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Yokohama Operational Technology Management

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Operational Technology

Use ServiceNow® for Operational Technology to help your organization streamline operations, boost productivity, and maximize your Operational Technology uptime on the production floor through digital workflows.

Operational Technology overview

Watch an overview about Operational Technology and the ServiceNow Operational Technology Management solution.

https://player.vimeo.com/video/1136253660?h=6cb04e4c1c&badge=0&autopause=0&player_id=0&app_id=58479

Benefits in Operational Technology, Core Operations, and empowering Factory Workers

Operational Technology

Contextualize and safeguard your Operational Technology systems, connect to digital workflows, and respond quickly to threats.

Core Operations

Streamline and digitize standard operating procedures (SOPs) and enable shared knowledge and collaboration across the enterprise.

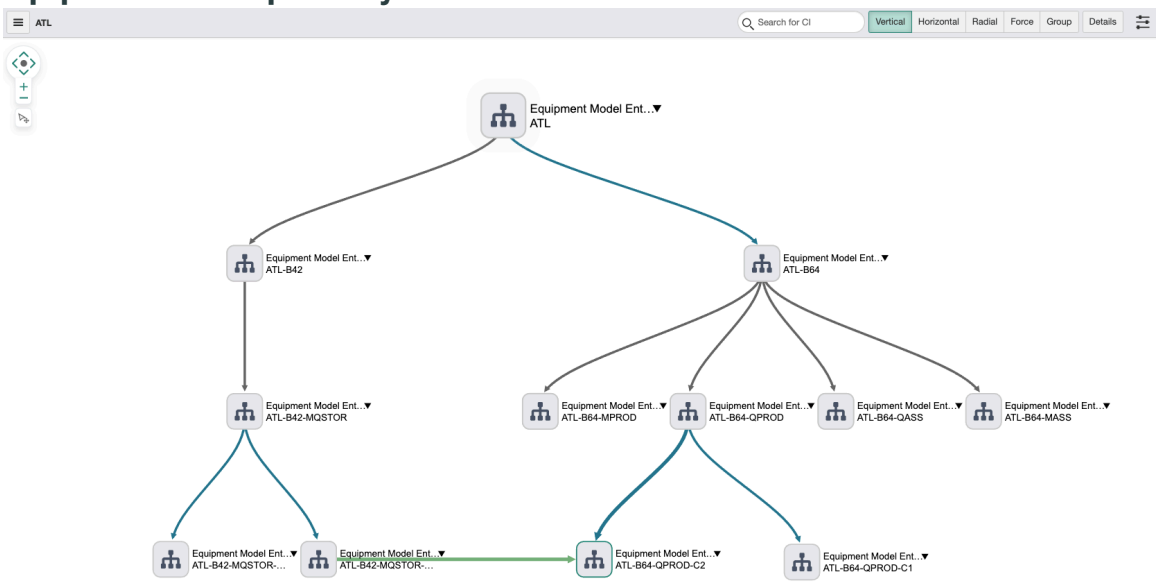
Factory Workers

Empower the workforce with digital tools and knowledge to adapt, collaborate, and excel in fast-changing conditions.

Maximize your uptime and build operational resilience with ServiceNow Operational Technology Management

Before industry Operational Technology, manufacturers depended on manual processes and legacy knowledge to maintain their environments. They found it challenging to get a complete view of their environments and to secure, monitor, and manage it all. With the ServiceNow Operational Technology Management solution, your industrial organization can now get a complete and contextual view of your operational technology systems. With this view, you can keep your systems secure, running, and connected to production processes and digital workflows. You can also enable your organization to assess, prioritize, and respond to events and threats.

Equipment model dependency view



By using a digital map, your organization can gain greater visibility of the industrial operations processes, systems, and relationships. With this map, you can manage and assess your potential production impacts easier and faster.

Note:
The Operational Technology Management solution isn't supported on Now Mobile®.

Improve visibility	Get a complete and contextual view of your Operational Technology systems, so that you can keep your systems secure and running.
Digital workflows	Connect your Operational Technology systems to production processes and digital workflows.
Vulnerability management	See everything in one place, so that you can assess, prioritize, and respond to events and threats.

Equip your workforce

Build low-code and no-code applications so that your employees can do collaborative monitoring, extended troubleshooting, problem-solving, and in-depth situational analysis.

See the solution brief for details.

Get started

- Watch features demonstrated via DemoNow.
- For information on how to request and set up Operational Technology, see

  - Configuring the Operational Technology Manager
  - Configuring Now Assist for Operational Technology Manager (OTM)
  - Configuring the Industrial Process Manager
  - Configuring Operational Technology Vulnerability Response
  - Configuring Operational Technology Incident Management
  - Configuring Operational Technology Change Management
  - Configuring Operational Technology Knowledge Management
  - Configuring Operational Technology Request Management
  - Configuring Recommended Actions for Operational Technology Service Management (OTSM)
- For more information about how Operational Technology manages and uses Common Service Data Model tables, see Operational Technology and CSDM tables.
- For more information about the latest releases for Operational Technology, see ServiceNow Store - Operational Technology release notes.

Applications

- Operational Technology Manager
- Now Assist for Operational Technology Manager (OTM)
- Industrial Process Manager
- Operational Technology Vulnerability Response
- Operational Technology Incident Management
- Operational Technology Change Management
- Operational Technology Knowledge Management
- Operational Technology Request Management
- Recommended Actions for Operational Technology Service Management (OTSM)
- Industrial Workspace for Operational Technology
- Service Management: IT Service Management
- Security: Vulnerability Response
- Visibility: IT Operations Management

Operational Technology Management licensing and subscriptions

ServiceNow® OTM licensing is a crucial aspect of Operational Technology Management as it calculates and presents the usage of OTM subscriptions based on subscription units, which could encompass factors like the number of devices monitored or the duration of the subscription.

Operational Technology Management licensing and subscriptions overview

This enables organizations to ensure compliance, allocate resources effectively, and make informed decisions about scaling their OTM capabilities to safeguard their operational technology systems and adapt to changing security and operational needs. Use the OTM

licensing module to access subscription-related details for the OTM products: ServiceNow OT Foundation, ServiceNow OT Visibility, and ServiceNow OT Vulnerability Response.

Get started

Explore OTM license	Install ITOM SU Licensing for OTM	Licensing References
		
Learn about subscription-related details	Update the latest version of plugin	Know about installed components like scheduled jobs and tables

Contact Support

Contact Customer Service and Support

Subscriptions for OTM

The ServiceNow platform employs OTM for license management in the manufacturing sector. OTM encompasses licenses found in IT Operations Management, along with licenses exclusive to the OTM domain.

Monitor OTM licenses in a manner similar to IT Operations Management licenses. Within the ServiceNow instance, you can identify OTM license types on the **ITOM Licensing Category MetaData** (**OTM License** > **Licenses by CI types**) page, where the **SKU Type** column displays a value of **otm**. By default, the license filter is set to **SKU Type** contains **otm**.

Install ITOM SU Licensing

Install or update the ServiceNow® ITOM SU Licensing [sn_itom_licensing] to ensure you use the latest licensing functionality. The application includes demo data and installs related ServiceNow® Store applications and plugins if they are not already installed.

Before you begin

- Ensure that the application and all of its associated ServiceNow Store applications have valid ServiceNow entitlements. For more information, see Get entitlement for a ServiceNow product or application.
- Review the ITOM SU Licensing application listing in the ServiceNow Store for information on dependencies, licensing or subscription requirements, and release compatibility.

Role required: admin

About this task

Prior to Q1 2022, the original licensing mechanism was delivered as part of the family releases. Since then the licensing mechanism is delivered using ServiceNow® ITOM SU Licensing on ServiceNow Store. The system automatically installs ServiceNow® ITOM SU Licensing. You receive notifications when updates for this application are available on ServiceNow Store.

The following items are installed with ITOM SU Licensing:

- Scheduled jobs
- Tables

For more information, see Components installed with ITOM SU Licensing for OTM.

Procedure

1. Navigate to **All** > **System Applications** > **All Available Applications** > **All**.
2. Find the application (sn_itom_licensing) using the filter criteria and search bar.

   You can search for the application by its name or ID. If you cannot find the application, you might have to request it from the ServiceNow Store.

   In the list next to the **Update** button, the versions that are available to you are displayed.
3. Select a version from the list and select **Update**.

   In the Install dialog that is displayed, any dependencies that are installed along with your application are listed.
4. If you're prompted, follow the links to the ServiceNow Store to get any additional entitlements for dependencies.
5. **Optional:** If demo data is available and you want to install it, select the **Load demo data** check box.
   Demo data are sample records that describe application features for common use cases. Load the demo data when you first install the application on a development or test instance.
6. Select **Update**.

View subscription statistics for OTM

View the count of OTM application subscriptions purchased and consumed by your organization, offering valuable insights for resource management and operational technology optimization.

Before you begin

- Ensure your organization has active OTM subscriptions.
- Ensure that you installed the latest available version of the ITOM SU Licensing from ServiceNow Store.

Role required: sn_itom_license.reader

About this task

Evaluate the allocation of configuration items (CIs) and their allocation levels to assess the OTM subscription utilization of your organization and to prepare for future subscription requirements.

Procedure

1. To view subscription information for OTM subscriptions purchased a la carte, navigate to **OTM License** > **License Summary**.
2. Review the details presented on the form, as outlined in the Subscriptions form for the OTM products.

Review OTM resource usage against allocated subscription units

Review and analyze resource statistics that OTM products can manage and compare this information to the average allocation of subscription units.

Before you begin

Role required: admin

About this task

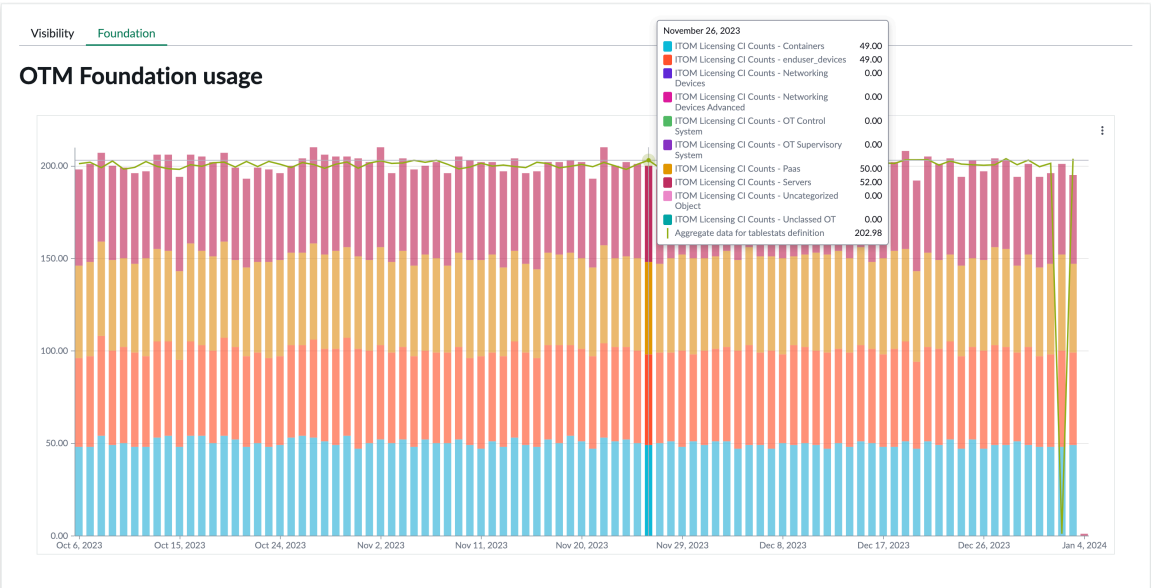
Explore detailed licensing data trends of OTM using the OTM Licensing dashboard. Observe daily CI counts or view the averages for the last 90 daily counts. This feature provides domain-specific information and specific CI listings for each daily count, enabling you to effectively monitor and analyze resource usage over time.

Note:
CIs managed by SG-OT Excel are counted and listed for license consumption with last_scan dates more recent than, equal to, and older than 90 days.

Procedure

1. Navigate to **All** > **OTM License** > **OTM Licensing Dashboard**.
2. Select the relevant tab to display the dashboard for the OTM product.
   For example, select **Foundation**.

OTM Licensing Dashboard



3. Point to a bar to view the number of CIs in each category.
4. Select the bar to view a list of the counted CIs.
5. Review the dashboard described in OTM Licensing dashboard.

Check CI count used for OTM subscriptions

View the daily counts or the averages for the most recent 90 days of CI data. ServiceNow OT Foundation, ServiceNow OT Visibility and ServiceNow OT Vulnerability and Response offer insights into the licensed resources that OTM applications support. Resources that OTM applications discover, monitor, and provision are configuration items (CIs) stored in the CMDB.

The OTM licensing module combines this CI information with the information on subscriptions your organization purchased to produce statistics on subscription use by OTM applications.

Before you begin

- Ensure your organization has active OTM subscriptions.
- Ensure that you installed the latest available version of the ITOM SU Licensing from ServiceNow Store.

Role required: sn_itom_license.reader

About this task

ServiceNow incurs charges for the usage of ServiceNow OT Foundation, ServiceNow OT Visibility and ServiceNow OT Vulnerability and Response. To gain a deeper understanding of the products and features included in OTM subscriptions, see Subscriptions for OTM.

The procedure for gathering and consolidating data for licensing purposes involves the following series of actions:

1. The OTM licensing system calculates the daily count of configuration items (CIs) managed by each OTM product, subsequently categorizing these CI counts into distinct licensable CI categories.
2. In cases where identical configuration items (CIs) are being managed by various features within the same OTM products, adjustments are made to eliminate any duplications in the CI count.
3. In cases where IT configuration items (IT CIs) are categorized as OT configuration items, the CIs are counted only once - under OTM licensing and not under ITOM licensing.
4. The licensing module consolidates CI counts from OTM applications to calculate the average of the daily CI count for the last 90 days.

   Note:
   CIs managed by SG-OT Excel are counted and listed for license consumption with last_scan dates more recent than, equal to, and older than 90 days ago.

5. The licensing module matches the daily average CI counts for OTM applications with the licensing details provided in the customer contract to generate license-related statistics.

Consequently, you can view the statistics on how your organization utilizes the purchased subscription units.

View information on CI count and subscriptions purchased for each OTM application separately (a la carte):

- **Total Count**: The average of the CI counts collected over 90 days, categorized by CI types, for each individual OTM application.

  Note:
  CIs managed by SG-OT Excel are counted and listed for license consumption with last_scan dates more recent than, equal to, and older than 90 days ago.

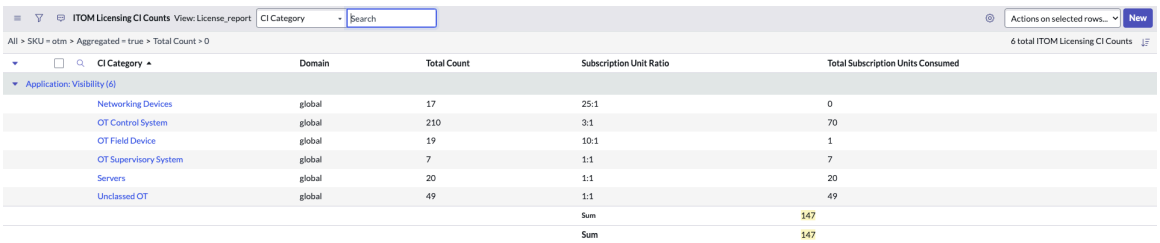
- **Subscription Unit Ratio**: Ratios determine how many CIs of a particular CI category necessitate a subscription. The licensing module retrieves this ratio information from customer contracts.

- **Total Subscription Units Consumed**: The quantity of subscriptions used by your organization for each CI category within each OTM application. This calculation is performed by applying the subscription units ratio to the count of CIs within each respective CI category.
- **Total Subscription Units Consumed**: The total subscription units consumed by all OTM applications combined.

You can access OTM Subscription Unit (SU) consumption categorized by domain. This data can be useful for allocating consumption and expenses to different organizations.

Procedure

1. Navigate to **OTM License** > **License Report**.



2. **Optional:** View the average of daily CI counts for the last 90 days.
3. **Optional:** To view the daily CI counts, modify the filter to set **Aggregated** to **false**.

   (Optional) If needed, you can modify the view by sorting the columns. The **Created** column displays the timestamp indicating when the CI information was most recently updated.

View CIs consuming OTM subscription units

Generate a list of currently countable CIs for each of the OTM applications: ServiceNow® OT Foundation, ServiceNow® OT Visibility and ServiceNow® OT Vulnerability and Response.

Before you begin

- Ensure your organization has active OTM subscriptions.
- Ensure that you installed the latest available version of the ITOM SU Licensing from ServiceNow Store.

Role required: sn_itom_license.reader

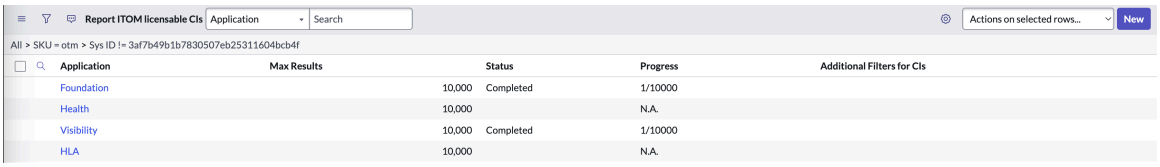
About this task

The CI list generated is strongly correlated to the most recent daily count of CIs. However, it's possible that the number of CIs on the generated list may display slight discrepancies compared to the latest daily count if any changes have occurred since the last daily count.

Procedure

1. Navigate to **All** > **OTM License** > **Report OTM Licensable CIs**.
   The **Report ITOM Licensable CIs** page appears.
2. Select the application for which you want to see licensed CIs.
   - Foundation
   - Visibility

- HLA
- Health



3. To create a report for the selected applications, select **Populate licensable CIs**.
4. To accept the confirmation message and generate the report, select **Yes**.

   The new report replaces the data in the previously generated report. You can cancel the report by selecting the application and then opting for the **Cancel Job** option.

5. Wait for a few minutes and then refresh the page.
   The application status is displayed as **Completed** once the report has finished processing.
6. Select the application and then select **Show licensable CIs**.

   The ITOM Licensable CIs page for OTM SKU displays the list of CIs with an OTM license.

OTM SU Licensing References

Use reference topics to gain valuable insights on the components installed with OTM licensing, subscription forms for OTM products, and an overview of the OTM licensing dashboard. Navigate the subtopics to access specific guidance and references on each of these critical aspects, helping you effectively manage your OTM subscriptions and licensing requirements.

Components installed with ITOM SU Licensing for OTM

Several types of components are installed with activation of the OTM SU Licensing plugin, including scheduled jobs and tables.

Scheduled jobs installed

Scheduled job	Description
ITOM Exclusion Tables Update Store	Updates the exclusion list.
ITOM Licensing Aggregator Store	Calculates the average of daily CI counts for the last 90 days.
ITOMHealthCIReporterWithOTOMCountOTOMStore	Compiles the list of licensable CIs for OTM Health.
ITOM Health Licensing Usage Count Store	Calculates the daily CI count for OTM Health.
OTOM Licensing Visibility CI Listing Store	Compiles the list of licensable CIs for OTM Visibility.
OTM Foundation Licensing CI Listing Store	Compiles the list of licensable CIs for OTM Foundation.
OTM Foundation Licensing Usage Count Store	Calculates the daily licensable CI counts for OT Foundation.

Tables installed

Table	Description
ITOM LU Discovery Source Mapping [itom_lu_discovery_source_mapping]	Contains the list of licensable discovery source for each category.
ITOM LU Governance App Mapping [itom_lu_governance_app_mapping]	List of records that contain the mapping of governance applications to their respective licensable CIs.
ITOM LU Governance CIs [itom_lu_governance_ci]	Contains the list of CIs counted under the Governance license.
ITOM License Exclusion Metadata [itom_license_exclusion_metadata]	Contains the list of exclusion rules applicable to different license.
License Exclusions [license_exclusion_list]	Contains the list of CIs that need to be excluded from the license count based on the exclusion rule.
Visibility LU Temporary [visibility_lu_temp]	Contains the list of CIs counted under the Discovery license.
ITOM Licensing Category MetaData [itom_lu_category_metadata]	Contains licensing metadata.
ITOM Licensing Discovery Sources [itom_lu_discovery_sources]	Contains the categories for all discovery sources.

Subscriptions form for the OTM products

Learn about the essential fields and indicators found on the Subscriptions form for our products, enabling streamlined subscription management and clarity in your OTM product usage.

View the following subscription statistics for items purchased individually (a la carte):

Name

The name of the OTM application.

Purchased

The number of purchased subscriptions per application.

Capacity Definition ID

The ID used for retrieving daily consumption data of subscription units from an application.

Start date/End date

The time duration during which this subscription remains active.

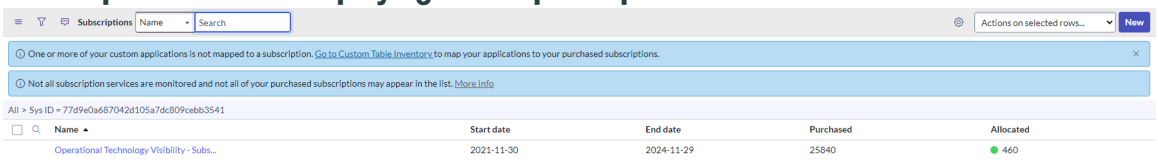
Subscriptions a la carte

The licensing module calculates and displays subscription consumption as follows:

Subscriptions a la carte

The Subscriptions window displays the information for purchased and allocated subscriptions for OTM applications.

Subscriptions window displaying subscriptions purchased a la carte



OTM Licensing dashboard

Use the OTM Licensing dashboard to assess resource consumption and status in relation to your acquired subscriptions. The dashboard provides dedicated reports for each OTM application, providing visual representations of daily usage counts and the average utilization of subscription units over a 90-day period. The OTM Licensing dashboard is an integral component of ITOM Licensing application version 4.0, accessible at ServiceNow Store.

Request apps on the Store

Visit the ServiceNow Store website to view all the available apps and for information about submitting requests to the store. For cumulative release notes information for all released apps, see the ServiceNow Store version history release notes.

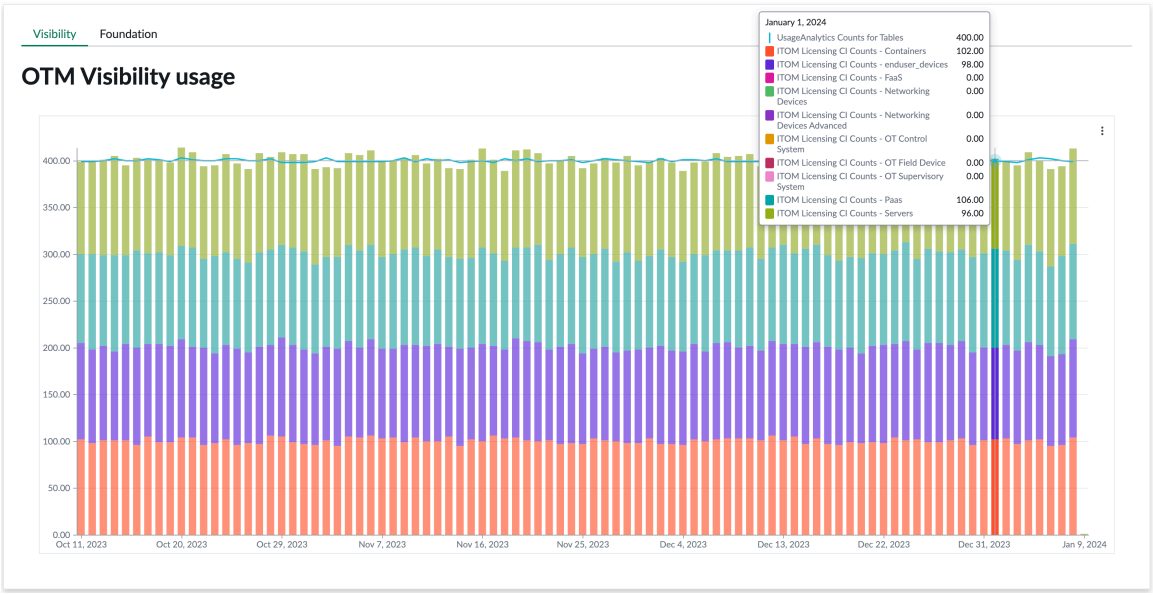
Required ServiceNow AI Platform roles

admin

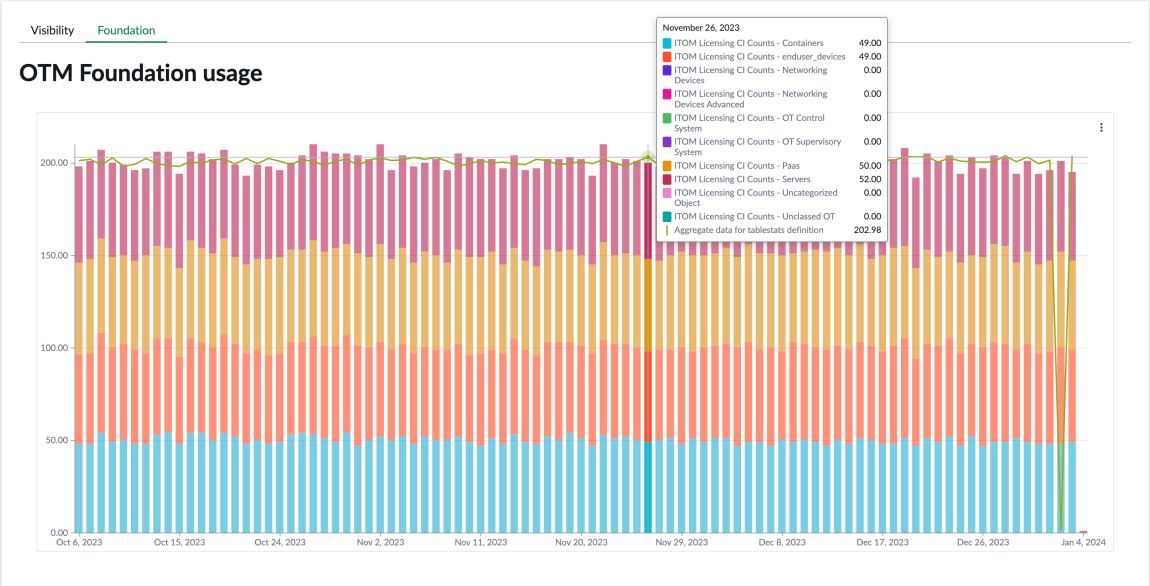
Access the Assessment dashboard

To open the dashboard for OTM, navigate to **All** > **OTM License** > **OTM Licensing Dashboard**.

OTM Licensing dashboard - Visibility



OTM Licensing dashboard - Foundation



Use cases

For examples of how different people in your organization would use this dashboard, see these use cases.

User	Dashboard use
admin	Validate the resource usage for different OTM products. Report the cases where the organization exceeded the number of purchased subscription units for specific resources.

Note:
ServiceNow applications refer to devices and applications that comprise an application service as configuration items (CIs).

Data visualization

The dashboard includes the following visualization:

Title	Source table	Description
OTM Visibility Usage and OTM Foundation Usage	ITOM Licensing CI Counts [itom_lu_ci_counts] and UsageAnalytics Counts for Tables [usageanalytics_count]	Displays bars that represent counts of CIs of different licensable categories for the last 120 days per ITOM application. The dashboard also displays the line that represents the average consumption of subscription units for the last 90 days.

Title	Source table	Description
		Note: CIs managed by SG-OT Excel are counted and listed for license consumption with last_scan dates more recent than, equal to, and older than 90 days ago.

Operational Technology Manager

The Operational Technology Manager application creates the foundational data and relationships that enable your organization to use the ServiceNow® Operational Technology solution. Operational Technology Manager supports the use of the Configuration Management Database (CMDB), Service Graph Connectors, and Discovery applications in the ServiceNow AI Platform.

Watch an overview about Operational Technology and the ServiceNow Operational Technology Management solution.

https://player.vimeo.com/video/957122379?h=d9c04a0637&badge=0&autopause=0&player_id=0&app_id=58479

Explore

Learn about how manufacturers use the Operational Technology Manager

Configure

Plan and configure your implementation

Use

Import, discover, and review Operational Technology devices

Integrate

Extend Operational Technology Manager by integrating it with other applications

Reference

Get details about related information and applications

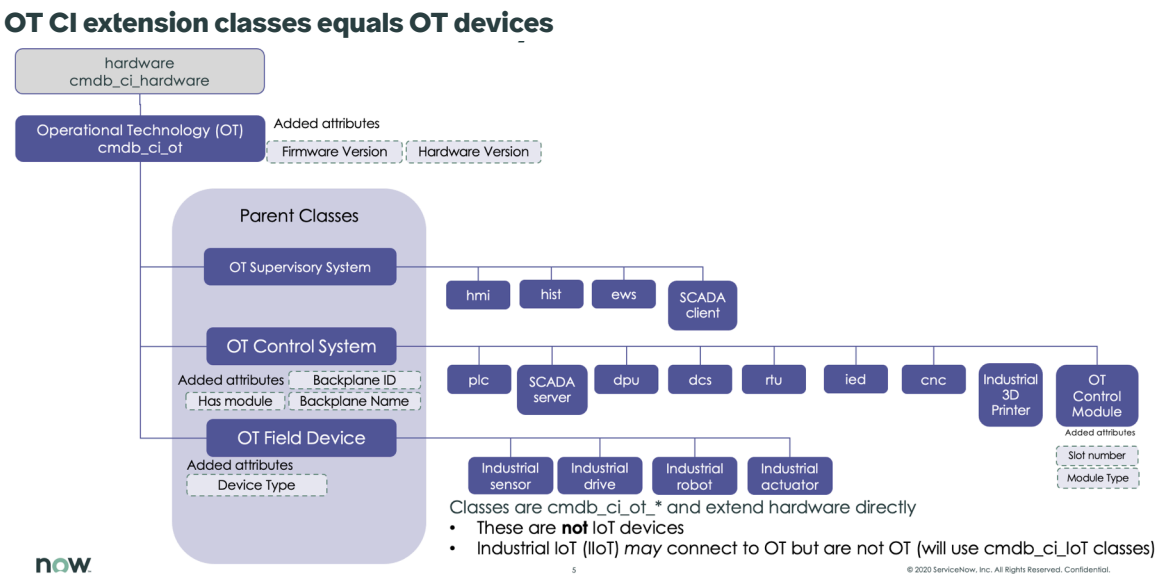
Exploring the Operational Technology Manager

Learn how you can use the Operational Technology Manager application to create the foundational data and relationships that enable your enterprise to use the ServiceNow® Operational Technology solution.

The Operational Technology Manager supports the use of the Configuration Management Database (CMDB), Service Graph Connectors, and Discovery applications in the ServiceNow AI Platform.

Operational Technology Manager (OT) configuration item extension classes

Operational Technology Manager uses Operational Technology (OT) configuration item (CI) extension classes that extend the CMDB class hierarchy as shown in the following figure.



Operational Technology Manager includes class descriptions, identification rules, identifier entries, and dependent relationships, if applicable. The Service Graph applications use these class extensions to populate CIs and discover various technologies and software. To learn more, see Operation Technology (OT) extension classes.

CMDB CI classes for Operational Technology Manager

Operational Technology Manager adds these Configuration Management Database (CMDB) configuration item (CI) classes that are part of the CMDB CI Class Models application.

Note:
To learn more about this application, see the CMDB CI Class Models application in the ServiceNow Store.

CMDB CI Classes for Operational Technology Manager Workflows

Class	Description	CI class extended
Network Intrusion Detection System	The Network Intrusion Detection System (NIDS) [cmdb_ci_nids] class builds the relationships between passive network monitoring appliances, and the devices on the network that it discovers.	cmdb_ci_nids

OT device data import and discovery

Multiple methods are available for uploading your existing Operational Technology device data into the ServiceNow AI Platform.

Service Graph Connector (Excel)

You can use the Service Graph Connector (Excel) function to import your Operational Technology data from a populated Microsoft Excel flat-file spreadsheet. You use the spreadsheet in the Integration Hub Extract Transform Load (ETL) to upload this data to the CMDB. To learn more, see Service Graph Connector for Microsoft Excel.

Discovery for Operational Technology

To discover Operational Technology devices in designated Purdue levels in your Industrial Control System (ICS) networks, you run the Discovery for Operational Technology function on a recurring basis. It operates in a manner that is similar to the standard Discovery processes. However, its Discovery normally takes place in the Purdue levels 3 through 3.5, depending on which level you select when you create an OT discovery schedule. To learn more, see IT Discovery for OT Networks.

Note:
To learn more about Purdue levels in Industrial Control Systems, see https://subscription.packtpub.com/book/networking_and_servers/9781788395151/1/ch01lvl1sec10/the-purdue-model-for-industrial-control-systems.

Service Graph Connectors from ServiceNow partners

ServiceNow partners also offer Service Graph Connectors that you can use to upload your existing OT data.

Differences between OT and standard IT networks

There are differences in how the Configuration Management Database (CMDB) handles the devices located in Operational Technology networks and those in standard Information Technology (IT) networks.

Configuration items (CIs) managed under Information Technology Operations Management (ITOM) are classified as type IT in the CMDB. They exist in Levels 4 and 5 of the Purdue Model, or at the Enterprise level.

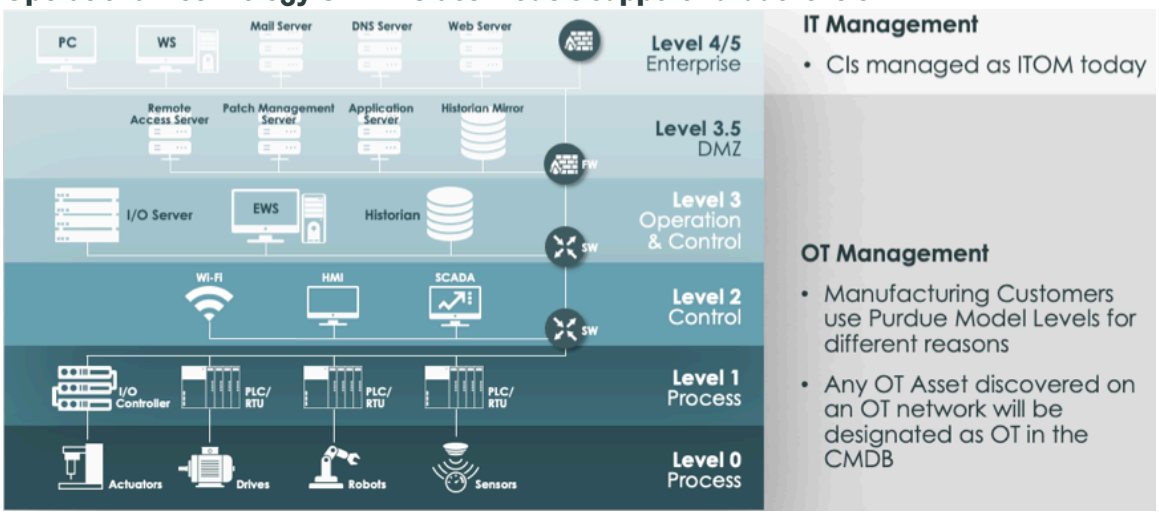
Devices managed under the OT data model exist in Levels 0 to 3.5 of the Purdue Model, and there are two primary components of OT devices:

1. A CI class record. This can be an IT or an OT class CI.
2. An OT device details record. This describes the OT device type (function) and other OT-specific attributes.

Note:
For more information about the OT data model and extension classes, see Operational Technology (OT) extension classes.

The following graphic depicts these differences.

Operational Technology CMDB Class Models support Purdue levels



Note:
To learn more about Purdue levels, see https://subscription.packtpub.com/book/networking_and_servers/9781788395151/1/ch01lvl1sec10/the-purdue-model-for-industrial-control-systems.

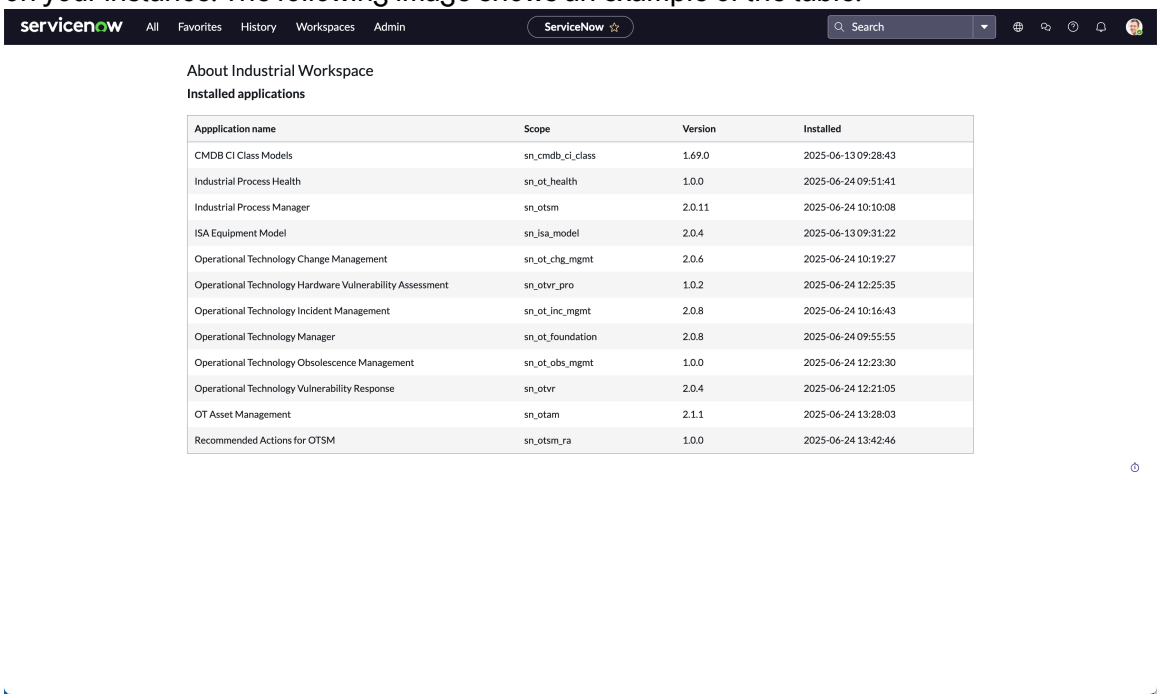
Viewing your installed Operational Technology applications

You can view the Operational Technology (OT) applications that you have installed on your instance for better visibility of how you can use the Operational Technology Management solution.

If you're assigned the cmdb_ot_viewer or cmdb_ot_isa_viewer role, you can view the OT applications that you have installed on your instance by navigating to **All** > **Industrial Workspace Admin** > **About Industrial Workspace**.

The Installed applications table contains the application name, scope, version, and install date for each application installed and available

on your instance. The following image shows an example of the table.



Appplication name	Scope	Version	Installed
CMDB CI Class Models	sn_cmdb_ci_class	1.69.0	2025-06-13 09:28:43
Industrial Process Health	sn_ot_health	1.0.0	2025-06-24 09:51:41
Industrial Process Manager	sn_otsm	2.0.11	2025-06-24 10:10:08
ISA Equipment Model	sn_isa_model	2.0.4	2025-06-13 09:31:22
Operational Technology Change Management	sn_ot_chg_mgmt	2.0.6	2025-06-24 10:19:27
Operational Technology Hardware Vulnerability Assessment	sn_otvr_pro	1.0.2	2025-06-24 12:25:35
Operational Technology Incident Management	sn_ot_inc_mgmt	2.0.8	2025-06-24 10:16:43
Operational Technology Manager	sn_ot_foundation	2.0.8	2025-06-24 09:55:55
Operational Technology Obsolescence Management	sn_ot_obs_mgmt	1.0.0	2025-06-24 12:23:30
Operational Technology Vulnerability Response	sn_otvr	2.0.4	2025-06-24 12:21:05
OT Asset Management	sn_otam	2.1.1	2025-06-24 13:28:03
Recommended Actions for OTSM	sn_otsm_ra	1.0.0	2025-06-24 13:42:46

Configuring the Operational Technology Manager

Configure the Operational Technology Manager application so that you can create the data foundation for the ServiceNow® Operational Technology solution.

Task	Purpose
1. Install Operational Technology (OT) extension classes.	Extend the Configuration Management Database (CMDB) class hierarchy for use in Operational Technology processing.
2. Install Operational Technology Manager.	Install the Operational Technology Manager application.
3. Assign Operational Technology roles.	Assigns roles to control the actions that are available for each user.
4. Prepare a Microsoft Excel spreadsheet for Service Graph Connector import.	Create and populate a Microsoft Excel spreadsheet with your existing Operational Technology data for upload to the ServiceNow AI Platform. For more information, see Prepare your Pre-import OT Worksheet Entry Review tool for Service Graph Connector import.
5. Import your Excel spreadsheet with an import task.	Upload your Operational Technology data to the Configuration Management Database (CMDB). For more information, see Using the Service Graph Connector for Microsoft Excel through import tasks.

Task	Purpose
6. Run the IT Discovery for OT Networks function.	Discover Operational Technology (OT) devices in the designated Purdue levels in your Industrial Control System (ICS) networks. For more information about Discovery for Operational Technology, see IT Discovery for OT Networks.
7. Install Service Graph Connectors that are provided by ServiceNow® partners.	Install ServiceNow, Inc. connectors that are provided by partners as they become available in the ServiceNow® Store.
8. Use the **All OT Devices** or **All OT Devices by IP Address** selections on the **Operational Technology (OT)** menu.	Edit or view detailed information for the OT devices in your enterprise, after you've imported your Excel spreadsheet, or have run the IT Discovery for OT Networks function.

Implementing the CSDM framework for Operational Technology

Following the CSDM framework ensures that you meet your primary goal of consistent accuracy in reporting and analytics so that you can effectively manage your Operational Technology (OT) environment.

CSDM framework for OT

You must complete the implementation for the CSDM framework in stages. For more information, see Implementing the CSDM framework in stages.

Operational Technology product view

Operational Technology covers products that tackle aspects of managing OT devices and production processes at various stages of the life cycle. The goal of this product view is to help you to understand how Operational Technology key entities work with the core Common Service Data Model (CSDM) framework.

Operational Technology Manager

Creates the foundational data and relationships that enable your enterprise to use the Operational Technology solution. For more information, see Operational Technology Manager.

Industrial Process Manager

Enables you to create the ISA-95 Equipment Model data foundation that is required for the Operational Technology solution. For more information, see Industrial Process Manager.

Operational Technology Vulnerability Response

Enables effective prioritization and remediation of OT device vulnerabilities at the site level. For more information, see Operational Technology Vulnerability Response.

Operational Technology Incident Management

Enables engineers to quickly resolve OT device and production process issues. For more information, see Operational Technology Incident Management.

Operational Technology Change Management

Enables your organization to implement changes to OT devices and production processes. For more information, see Operational Technology Change Management.

Operational Technology Knowledge Management

Enables your organization to capture information about your OT system in knowledge articles that are related to OT incidents. For more information, see Operational Technology Knowledge Management.

Operational Technology Request Management

Enables you to access the OT Service Catalog to request OT catalog items and fulfill them based on the defined flows. OT workers can then create and submit an OT request from a catalog item, which helps provide a consistent experience and facilitates cross-functional requests. For more information, see Operational Technology Request Management.

Operational Technology and CSDM tables

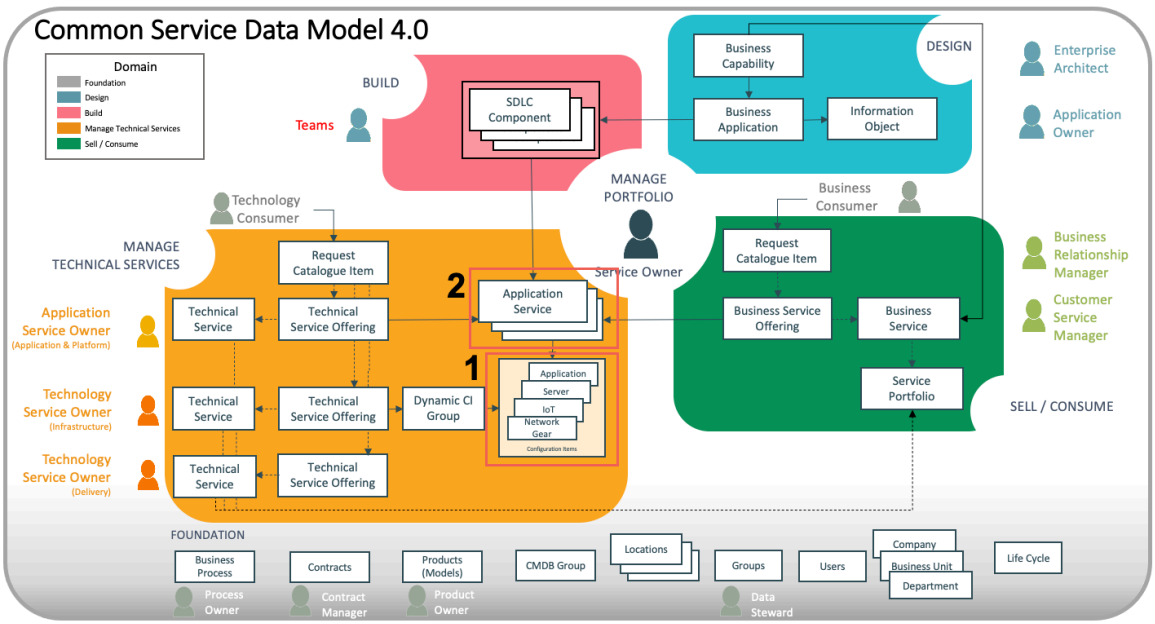
Operational Technology manages and uses CSDM tables. Several ServiceNow products benefit from and add value to Operational Technology.

CSDM tables managed by Operational Technology

There are three primary categories of tables managed by Operational Technology (OT):

- Operational Technology devices: Configuration items found on an OT (ICS or PCN) network.
- ISA equipment model entity: Industrial process automated by OT devices.
- OT system service: Creates other control systems, such as a distributed control system (DCS).

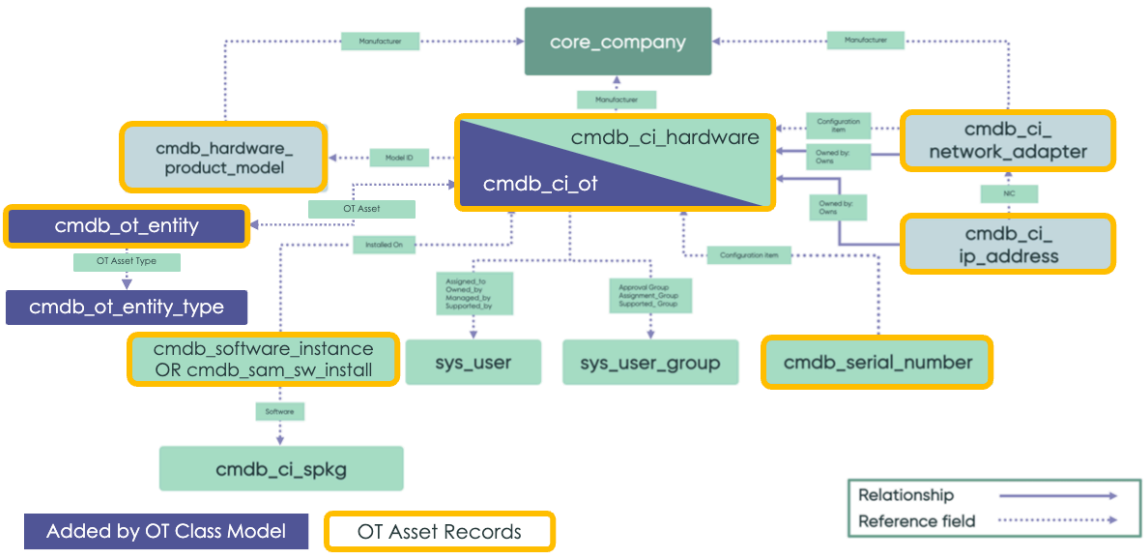
The numbers in this figure correspond to the CSDM tables managed by Incident Management.



CSDM tables used by Operational Technology

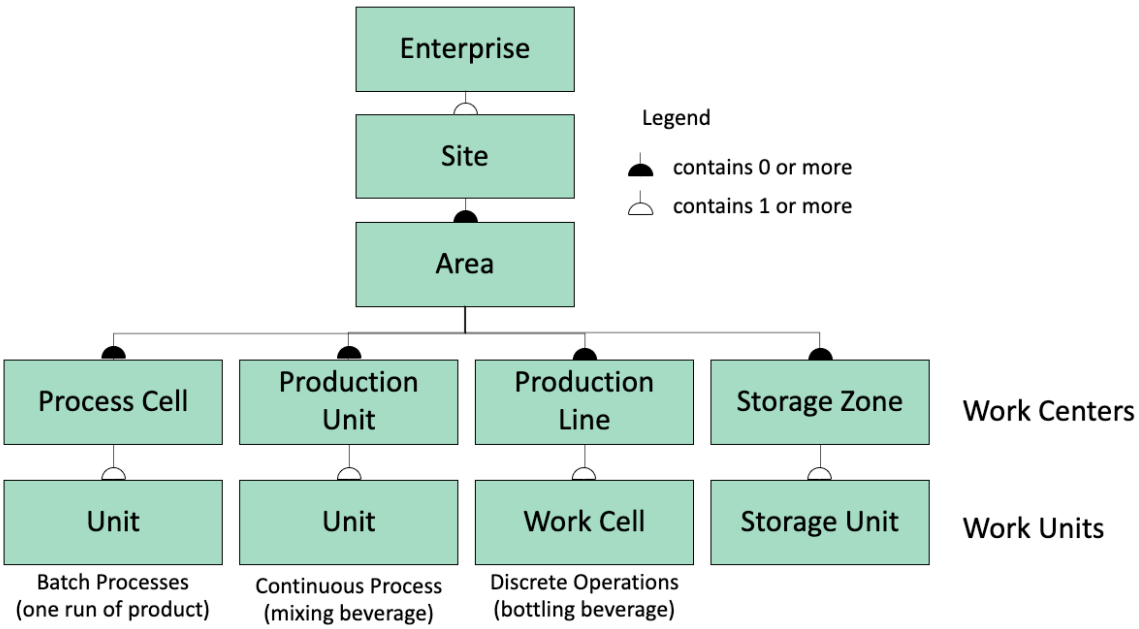
1. OT devices:
   a. Configuration Item classes were created for Operational Technology hardware classes (cmdb_ci_ot) by extending hardware. See Operational Technology (OT) extension classes for details.
   b. Any CI Class (any relevant existing hardware class as well as new OT classes can be designated as OT devices by adding OT device details using the OT Device Details (cmdb_ot_entity) reference to the cmdb_ot_entity table. OT Device Details include OT-specific characteristics like Purdue Level and OT device type.
   c. OT device types describe the function of any CI that automates an industrial or production process. The cmdb_ot_entity_type table describes these functions or roles.

      As shown here, a single OT device is represented by at least two records: one CI and one OT entity record. The device can contain six or more records in up to six tables (for example, if the CI has more than one IP and MAC address).



2. Equipment model entities:
   a. The equipment model entity class extends the Calculated Application Service and is used to:
      i. Represent the site of any OT device or equipment model entity. A record in the Equipment Model Entity table (cmdb_ci_ot_isa_entity) without a parent is considered a site.
      ii. Represent the ISA equipment model entity for a part of the production process.
   b. You can use equipment model templates (isa_entity_template) to further describe the relationships between equipment model entities found in an industrial environment.
      i. Levels (isa_entity_level) describe the hierarchical level of the equipment model entity. For the default ISA-95 template, the levels shown here (area, work center, and work units) are included in the base system.
      ii. Level types (isa_entity_type) describe the type of process represented by the equipment model entities at a given level. For the default ISA-95 template, the types shown here

(process cell, production unit, production line, and storage zone) are included in the base system.

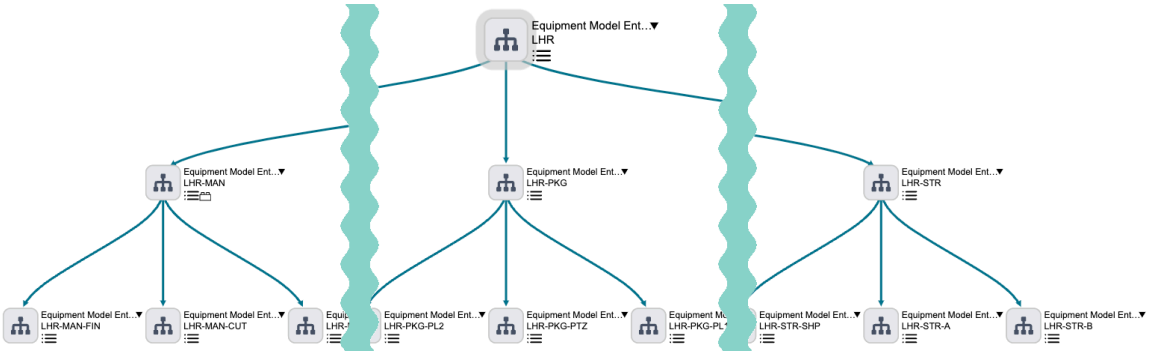


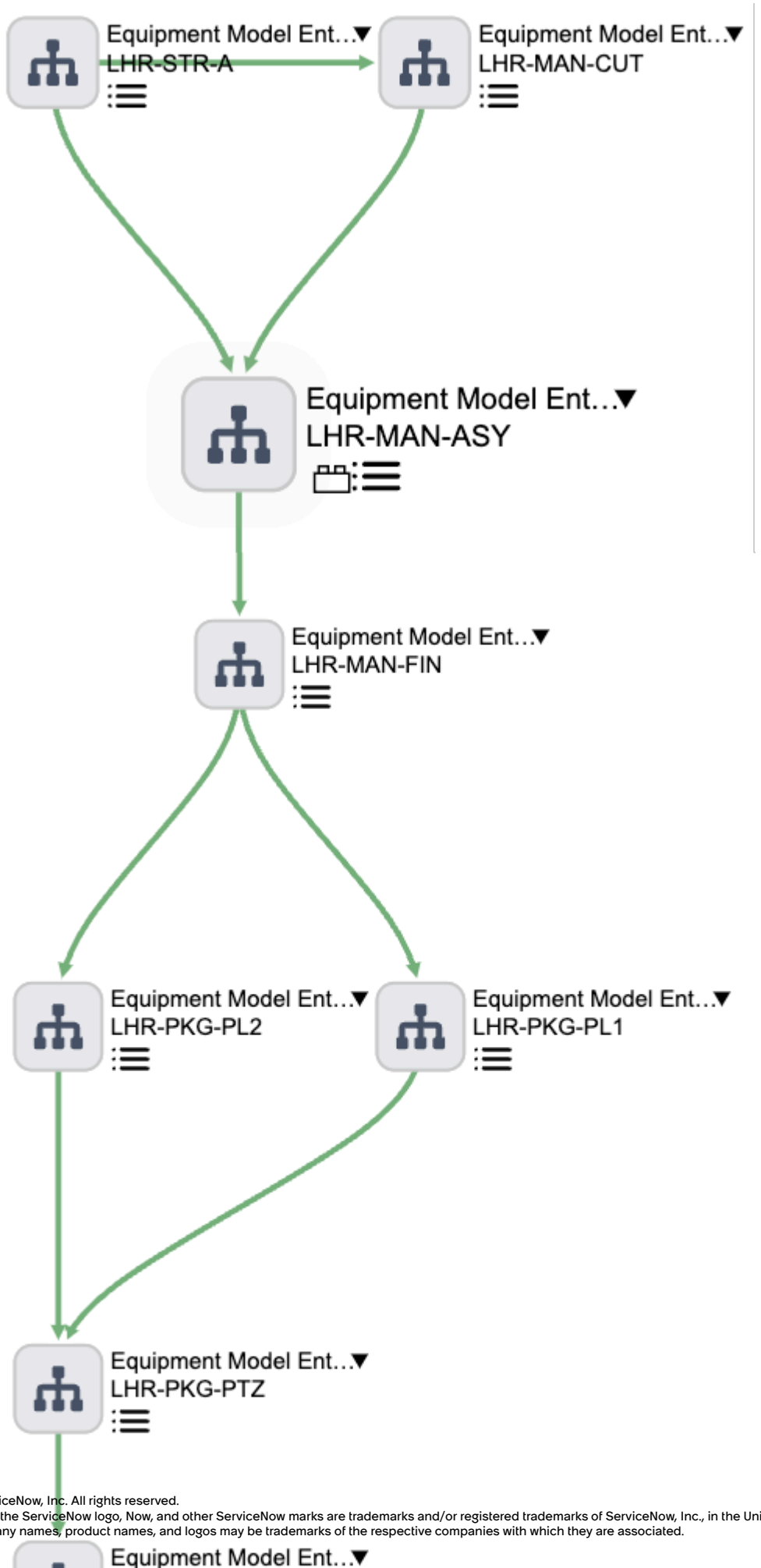
3. OT system service:
   a. The OT system service class extends the Calculated Application Service and is used to create the OT system service
   b. The OT system service can then be associated with equipment model entities, technical services for software applications, and business offerings.
   c. The OT system service can be related to the following items:
      - OT devices that are part of the OT system service
      - Equipment model entities that the OT system service manages

CSDM includes relationship types (specific to Operational Technology) that more accurately distinguish how OT devices and equipment model entities relate to each other:

- **Producer for::Consumer of**: Describes the production process (material flow) between equipment model entities.
- **Contains Element::Element of**: Describes the hierarchical relationship between equipment model entities.
- **Automated by::Automates**: Describes the relationship between an OT device and an equipment model entity that the OT device automates.
- **Detects::Detected by**: Describes which Network Intrusion Detection System (NIDS) class (cmdb_ci_nids) detected an OT device on an OT network.
- **Owns::Owned by**: Describes the relationship when an OT Control Module is owned by an OT Control System (PLC, DCS, and so on)

The following dependency maps show the relationships between OT devices and equipment model entities:





Products that add value to Operational Technology

When you use OT with any of the following ServiceNow products, you increase the value you get from OT.

Discovery for Operational Technology

Discovery for Operational Technology provides details about IT-classed hardware and software CIs and can be configured to provide additional OT device context like Purdue Level and Site on a per-OT schedule basis. Discovery for OT is part of the Operational Technology Manager product.

Industrial Process Manager

When OT devices are assigned to an equipment model entity, *automated by::automates* relationships are created between them. This can be done manually in the Industrial Workspace or using the relationship between OT subnets and equipment model entities using the Automatic Mapping Across Zone-based IP Network Groups (AMAZING) feature in the OT Subnet Mapping menu item.

Operational Technology Vulnerability Response

When vulnerable item (VIT) records are created by importing records from an OT-certified integration with a third-party security platform, OT devices are associated with the VIT. This enables both of the following capabilities:

- Risk calculation based on the criticality of the mapped equipment model entity.
- Assignment of VITs to the appropriate local team for remediation via site-based assignment groups.

Operational Technology Incident Management

Incident Management for OT runs separately from IT for most OT devices. OT incident records enable site-based access and views to issues that are related to OT devices.

Operational Technology Change Management

OT change requests enable changes to OT devices or industrial equipment configurations.

Operational Technology Knowledge Management

Operational Technology Knowledge Management enables you to capture information about your OT system in knowledge articles that are related to OT incidents.

Operational Technology Request Management

Enables you to access the OT Service Catalog to request OT catalog items and fulfill them based on the defined flows. OT workers can then create and submit an OT request from a catalog item, which helps provide a consistent experience and facilitates cross-functional requests.

Products that benefit from Operational Technology

IT Service Management (ITSM)

Services have the context of the site, production process, and OT devices, along with the information and technologies layered beneath them.

Information Technology Operations Management (ITOM)

Understands the business context for the production processes along with the OT device hardware and software being managed.

Security Operations

Understands the business context for the production processes as well as OT device hardware and software being secured.

Governance, Risk, and Compliance (GRC)

Auditors can better leverage production process flows and related Information objects. This helps auditors understand the design-time data sensitivity for scoping audits, measuring risks, and managing audit activities.

Asset Management

Manages the impact of the software and hardware life cycle process on the production processes.

Operational Technology Manager use case

The Operational Technology Manager use cases are described in this section.

Operational Technology Manager use case

The Operational Technology Manager application creates the foundational data and relationships that enable your enterprise to use the Operational Technology solution. It supports the use of the Configuration Management Database (CMDB), Service Graph Connectors, and Discovery applications in the ServiceNow AI Platform.

The OT Visibility dashboard in the Industrial Workspace summarizes your OT device inventory. For more information about the dashboard, see Operational Technology Visibility dashboard.

Key features

- Operational Technology Manager uses OT configuration item (CI) extension classes that extend the CMDB class hierarchy.
- IT Discovery for OT Networks is restricted to OT specific roles and OT related meta data can be added to an OT discovery schedule.
- The Service Graph connector (Excel) imports OT data from a populated Microsoft Excel flat-file spreadsheet. This data is validated and then transformed into the appropriate table records and relationships to represent OT device details in the CMDB.

Results

With the Operational Technology Manager use case, you can:

- Visualize dependencies of OT devices in the industrial environment.
- Manage the life cycle of OT devices on a site-by-site basis with site specific RBAC
- Create a solid data foundation and define critical levels of infrastructure.

Industrial Process Manager use case

Use the Industrial Process Manager application to create the ISA-95 equipment model data foundation that is required for the Operational Technology solution.

Key features

You can perform the following operations in the Industrial Process Manager workspace:

- Use ISA-95 models to describe the production process at each site in the industrial environment.
- Manage equipment model entities and their relationships with each other and with OT devices.
- Automatically map the relationship of all OT devices to the equipment model entity it automates using the OT subnet to equipment model entity relationship.

Results

The Industrial Process Manager enables you to create a custom version of the equipment models in each of your sites.

Operational Technology Vulnerability Response use case

Operational Technology Vulnerability Response enables you to effectively prioritize and remediate OT device vulnerabilities at the site level.

Key features

- Remediation owner workspace maps vulnerable items (VITs) with the production process.
- Risk calculation for OT VITs can be based on criticality of the equipment model entity automated by the OT device.
- Automatic assignment of VITs to remediation owners based on the site assigned to the OT device with the VIT.

Results

By leveraging the CMDB relationships of OT devices, you can prioritize vulnerable devices or items based on the criticality of the production process they automate.

As an OT engineer or OT vulnerability manager, Operational Technology Vulnerability Response enables you to find answers to questions such as:

- What are my OT device vulnerabilities?
- How can I prioritize vulnerability remediation using OT specific risk?
- What progress are we making toward remediation of OT vulnerabilities?

The OTVR (PA) dashboard and the OT Vulnerability Risk Management dashboard in the Industrial Workspace summarize the vulnerabilities in your system. For more information about the OTVR (PA) dashboard, see Operational Technology Vulnerability Response (PA) dashboard. For more information about the OT Vulnerability Risk Management dashboard, see Operational Technology Risk Management dashboard.

Operational Technology Incident Management use case

OT incidents occur when there is a disruption in service that is provided by an OT device on an OT network. Sometimes, the OT device may not be known when the incident is first created. Operational Technology Incident Management enables engineers to quickly resolve OT device and production process issues.

Key features

When a user creates an OT incident from the Industrial Workspace, the incident is automatically assigned a Network Type of OT to distinguish an OT incident from an IT incident. The field is not displayed by default.

Results

Operational Technology Incident Management enables engineers to quickly resolve OT device and production process issues. It enables you to manage OT incidents separately from IT incidents.

Operational Technology Change Management use case

Operational Technology Change Management enables your team members to work collaboratively on changes to OT devices or industrial equipment configurations.

Key features

- Digitized change workflow that connects all stakeholders.
- Sites that have different change management processes (workflows).
- Separated IT Change Management and Operational Technology Change Management, but ability to be combined if necessary.
- Integrated Operational Technology Change Management workflow with the Operational Technology Incident Management and Operational Technology Vulnerability Response applications.
- Aligned factory floor changes for the equipment model entities with downtime schedules.

Results

The following examples show how to apply Operational Technology Change Management to your organization:

- An OT remediation owner, who's responsible for fixing vulnerabilities on OT devices, wants to initiate a change to fix a group of vulnerabilities.
- An OT technician, who's responsible for OT configurations and plant engineering activities, wants to execute a change to fix a malfunctioned robotic arm on the industrial floor.
- A plant head, who's responsible for overall production activity, wants to review and approve a change requested by the engineering team.

Operational Technology Knowledge Management use case

Operational Technology Knowledge Management helps you to capture information about your Operational Technology (OT) system in knowledge articles that are related to OT incidents. Your organization can then use these knowledge articles to help your users to access the right information and prevent miscommunication with your users.

Key features

- Ability to use the existing Knowledge Management ServiceNow AI Platform capabilities with the Operational Technology Management solution.
- Ability to browse all knowledge base articles that are related to an OT incident and to create knowledge articles directly from an incident record.
- Ability to configure an OT knowledge base for knowledge managers and knowledge users.
- Ability to create knowledge articles in the Industrial Workspace.
- Ability to request approvals to publish, edit, retire, or delete a knowledge article.
- Ability to edit existing knowledge articles with updated information.

Results

The following examples show how to apply#Operational Technology Knowledge Management to your team:

- An OT engineer with several years of experience wants to capture their OT device knowledge in one place for guide workers and junior technicians.
- Front-line workers and technicians responsible for production process operations have noticed an issue on the factory floor and need a knowledge article that explains remediation.

Operational Technology Request Management use case

Operational Technology Request Management enables you to access the OT Service Catalog to request OT catalog items and fulfill them based on the defined flows. OT workers can then create and submit an OT request from a catalog item, which helps provide a consistent experience and facilitates cross-functional requests.

Key features

- Provides a single view to efficiently manage multiple catalog requests.
- Encourages transparency, expedites request processes, and minimizes delays with automatic notifications and approvals.
- Maintains the products and services menu that you can use to create and update catalog requests.

Results

The following examples show how to apply#Operational Technology Request Management to your team:

- OT engineers can file and manage OT requests for various OT products and services in a one place.
- A plant head or supervisor can engage with the correct team to remediate an incident reported on the factory floor.

Operational Technology and CSDM elements

Terms related to managing business applications with elements of CSDM.

Operational Technology terms

Term	Definition
Equipment model	The service records that describe how an industrial operation is organized to produce an output or product.
Production process	The relationships between equipment model entities and the various stages of the workflow from the raw material to finished goods.
Site	A parent equipment model entity record that has no parent. This is a special equipment model entity record because it is used to assign read or write level access to the OT devices assigned to the site.
OT device (site assignment)	The site assignment is needed for role-based security (RBAC) of OT devices. This is implemented as a choice list reference field on the OT Device Details (cmdb_ot_entity) table portion of the OT device record because an OT device can belong to only one site.

Operational Technology terms (continued)

Term	Definition
OT device (automates::automated)	The automates::automated by relationship describes how the OT device is related to the production process, which could include more than one equipment model entity.
Windows	In both OT and IT networks, the Windows server is represented in the cmdb_ci_win_server server. Additionally, the Windows server in the OT network has a reference in the cmdb_ci_win_server.cmdb_ot_entity field pointing to a record in the cmdb_ot_entity table that describes its function in OT and other OT characteristics like Purdue Level, site, and so on.

Operational Technology FAQ

You might have questions while implementing the CSDM framework.

What is the difference between a production process and an equipment model entity?

Equipment model entities are the service records used to describe how an industrial operation is organized to produce an output or product. The production process describes the relationships between equipment model entities as material flows from raw input to a finished product.

What is a site?

A site is a parent equipment model entity record that itself has no parent. A site is a special equipment model entity record because it is used to assign read or write level access to the OT devices assigned to the site.

Why does an OT device have both a site assignment and automates::automated by relationships?

The site assignment is needed for role-based security (RBAC) of the OT devices. This is implemented as a choice list reference field on the OT Device Details (cmdb_ot_entity) table portion of the OT device record because an OT device can belong to one site only.

The *automates::automated by* relationship describes how the OT device is related to the production process, which could include more than one equipment model entity.

What is the difference between a Windows server found on an OT network and one found on an IT network?

In both types of network, the Windows server is represented in the cmdb_ci_win_server server. Additionally, the Windows server in the OT network has a reference in the cmdb_ci_win_server.cmdb_ot_entity field pointing to a record in the cmdb_ot_entity table that describes its function in OT and other OT characteristics like Purdue Level, site, and so on.

Operational Technology (OT) extension classes installation

You must install the Operational Technology (OT) extension classes that are the foundation of the Operational Technology Manager.

You can access the OT extension classes by installing the CMDB CI Class Models application. For more information about installation, see CMDB CI Class Models.

The OT extension class model extend the Configuration Management Database (CMDB) class hierarchy, which includes the following information:

- Class descriptions
- Identification rules
- Identifier entries
- If applicable, dependent relationships

Applications, such as Discovery and Service Graph Connectors, use these class extensions to populate configuration items (CIs) and discover various technologies and software. For more information about the OT extension classes, see Operational Technology (OT) extension classes.

Install Operational Technology Manager

If you have the admin role, you can install the Operational Technology Manager application. The application includes demo data and installs that are related ServiceNow® Store applications and plugins, if they are not already installed.

Before you begin

- Ensure that the application and all of its associated ServiceNow Store applications have valid ServiceNow entitlements. For more information, see Get entitlement for a ServiceNow product or application.

Note:
To learn more about the subscriptions required for the Operational Technology Manager, see Subscriptions for Operational Technology Management (OTM)

Role required: admin

About this task

The following items are installed with Operational Technology Manager:

- Plugins
- Store applications
- Roles
- Tables
- Script includes

For more information on viewing components that are installed with Operational Technology Manager, see Components installed with Operational Technology Manager.

Procedure

1. Navigate to **All** > **System Applications** > **All Available Applications** > **All**.
2. Find the Operational Technology Manager application using the filter criteria and search bar.

You can search for the application by its name or ID. If you can't find the application, you might have to request it from the ServiceNow Store.

Visit the ServiceNow Store website to view all the available apps and for information about submitting requests to the store. For cumulative release notes information for all released apps, see the ServiceNow Store version history release notes.

3. In the Application installation dialog box, review the application dependencies.

   Dependent plugins and applications appear if they will be installed, are currently installed, or must be installed. If any plugins or applications require installation, you must install them before you can install Operational Technology Manager.

4. **Optional:** If demo data is available and you want to install it, select the **Load demo data** check box.
   Demo data are sample records that describe application features for common use cases. Load the demo data when you first install the application on a development or test instance.
5. Select **Install**.

Script includes installed with Operational Technology Manager

The Operational Technology Manager plugin installs the following script includes.

Name	Description
BaseDAO	Base DAO class that all DAO classes should extend.
NIDSUtils	Utilities for the cmdb_ci_nids devices.
OTDevicesMigrationUtils	Migrate records from specified classes to updated class tables. For more information, see Operational Technology (OT) extension classes.
OTDevice	Implementation class for performing operations on the [cmdb_ot_entity] table and related [cmdb_ci] and [cmdb_rel_ci] tables.
OTDeviceDAO	Utilities to assist with using IT Discovery for Operational Technology (OT) Network devices.
OTBaseDAO	Base DAO class that all DAO classes in OT should extend.
OTFoundationConstants	A collection of constants used by other script includes.
OTUtils	A collection of OT utility methods.
SGOTDeviceConstants	A collection of constants used by OT Service Graph Connectors.
SGOTDeviceTransformUtil	A collection of transform utility methods for OT Service Graph Connectors.
SGOTDataStreamBase	Base pattern to invoke a specific data stream with given inputs.

Name	Description
SGOTTroubleShootHelper	Helper methods for validating the Service Graph Connector configurations.
OTAssetFilterAjax	A utility client script to filter out application records and OT Control Modules from the All OT Devices list view in the Industrial Workspace.
OTBulkEditHandler	Server side script to handle the IT to OT bulk edit (conversion) and the OT device details bulk edit that are triggered through the Flow Actions and scheduled jobs.
Extension Points	
SGOTDeviceImportExtensionPoint	SG OT Device Import Extension Point which includes two methods: 1. getDeviceCMDBClassNameWithSysId; 2. getComputerType.

Assign Operational Technology Manager roles

Assign roles to your users so that you can control their access to the features, capabilities, and data in the Operational Technology Manager application.

Before you begin

Role required: admin

About this task

Users with the roles that are listed in the following table can use the Operational Technology Manager application.

If you want to configure site users, you can create and assign user criteria for equipment model entity site users. For more information, see Assign or remove equipment model site access for non-administrators.

Role	Description
Operational Technology Discovery Administrator [ot_discovery_admin]	Can run the Discovery for Operational Technology process, but cannot access the Configuration Management Database (CMDB) to view the configuration items (CIs) and related Operational Technology (OT) entities that are created from discovered items. To learn more, see Create an Operational Technology discovery schedule and run the Discovery process.
Operational Technology Manager Viewer [cmdb_ot_viewer]	Read-only access to Operational Technology (OT) device records.
Operational Technology Manager Editor [cmdb_ot_editor]	Create, read, update, and delete access for Operation Technology (OT) extension classes.

Role	Description
	Note: Users assigned the **cmdb_ot_editor** role can edit and delete only OT configuration items (CIs), and don't have the ability to edit IT CIs.
Operational Technology Manager Admin [cmdb_ot_admin]	Create, read, update, and delete access for Operational Technology (OT) device records. Can also edit and manage specific configurations in the OT entity type. To learn more, see Operation Technology (OT) extension classes. **Note:** Users assigned the **cmdb_ot_admin** role can edit and delete only OT configuration items (CIs), and don't have the ability to edit IT CIs.

Procedure

Assign roles to users and groups by using the ServiceNow AI Platform user administration feature.

Operational Technology Manager Integrations

The Operational Technology Manager application includes support for third-party integrations.

The following third-party integrations are currently supported.

- Service Graph Connector Integration for Claroty CTD
- Service Graph Connector for Microsoft Defender for IoT (Azure)
- Service Graph Connector for Microsoft Defender for IoT (On-premises Management Console)

Service Graph Connector Integration for Claroty CTD

Integrate Claroty Continuous Threat Detection (CTD) with the ServiceNow Operational Technology Manager application to import detected devices and Claroty CTD sites (sensor or Network Intrusion Detection System appliances).

Request apps on the Store

Visit the ServiceNow Store website to view all the available apps and for information about submitting requests to the store. For cumulative release notes information for all released apps, see the ServiceNow Store version history release notes.

Supported versions

Claroty CTD Version:

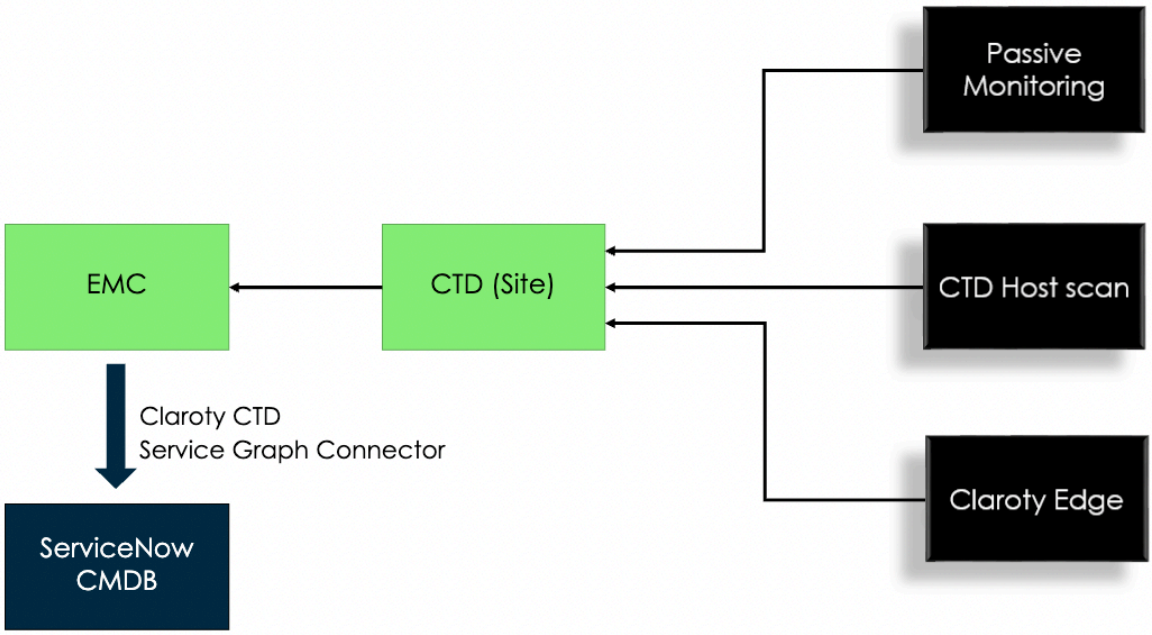
- 4.4.3 or later
- 5.1

Use cases

Use the Service Graph Connector Integration for Claroty Continuous Threat Detection with the Operational Technology Manager application to import the following information to the Configuration Management Database (CMDB)

- Sites
- Devices detected by each site
- Connections (or baselines)
- Installed programs

The following figure shows the detection method for importing Claroty CTD data into the CMDB.



Guided setup

The guided setup for the Service Graph Connector Integration for Claroty CTD provides an organized sequence of tasks to configure the integration on your instance. To access the guided setup, see Configure guided setup.

CMDB integrations dashboard

The Integration Commons for CMDB store app provides a dashboard with a central view of the status, processing results, and processing errors of all installed integrations. You can see metrics for all integration runs. You can filter the view to a specific CMDB integration, a specific time duration, or a specific integration run. For more details about monitoring integrations in the CMDB Integrations Dashboard, see Integration Commons for CMDB.

Data mapping

Data from the Claroty CTD data sources is mapped and transformed into the ServiceNow CMDB Configuration Item (CI) class definitions using the Robust Transform Engine (RTE). Data is inserted into the ServiceNow CMDB using the Identification and Reconciliation Engine (IRE).

The following table lists the data sources included for the Service Graph Connector Integration for Claroty CTD and the corresponding staging tables where the imported data is loaded.

Data sources and staging tables for Claroty CTD

Data source	Staging table
SG-OT Claroty CTD Devices	SG-OT Claroty CTD Devices Import [sn_clarotyctdsgc_sg_ot_claroty_ctd_devices_import]
SG-OT Claroty CTD Baselines	SG-OT Claroty CTD Baselines Import [sn_clarotyctdsgc_sg_ot_claroty_ctd_baselines_import]
SG-OT Claroty CTD Programs	SG-OT Claroty CTD Programs Import [sn_clarotyctdsgc_sg_ot_claroty_ctd_programs_import]
SG-OT Claroty CTD Sites	SG-OT Claroty CTD Sites Import [sn_clarotyctdsgc_sg_ot_claroty_ctd_sites_import]

The imported data from the staging tables is then inserted into the following target tables:

- Computer [cmdb_ci_computer]
- Hardware [cmdb_ci_hardware]
- IP Address [cmdb_ci_ip_address]
- Network Adapter [cmdb_ci_network_adapter]
- OT Device Details [cmdb_ot_entity]
- OT Control Module [cmdb_ci_ot_control_module]
- OT Control System [cmdb_ci_ot_control]
- Serial Number [cmdb_serial_number]

For more information, see CMDB classes targeted.

Default query parameters for the Service Graph Connector Integration for Claroty CTD

By default, the Service Graph Connector Integration for Claroty CTD is shipped with query parameter filters. You can modify their values based on ServiceNow entitlements that you have with the IntegrationHub Enterprise package.

When you begin importing the data from the Claroty CTD, the Service Graph Connector Integration for Claroty CTD uses the default query parameter filters that are listed in the following table.

Default query parameter filters

Query parameter filter	Value	Description
approved_exact	true	Unapproved devices on the Claroty CTD aren't imported because the value of approved_exact is set to true.
valid_exact	true	Invalid devices on the Claroty CTD aren't imported because the value of valid_exact is set to true.

Default query parameter filters (continued)

Query parameter filter	Value	Description
special_hint_exact	0	Address types that aren't set to 0 (unicast) on the Claroty CTD aren't imported.
ghost_exact	false	If there's an device on the Claroty CTD that is classified as a ghost, the Service Graph Connector Integration for Claroty CTD doesn't import it because the default value is set to false.

Configure the Service Graph Connector Integration for Claroty CTD

Use the guided setup for Service Graph Connector Integration for Claroty CTD to lead you through the integration steps.

Before you begin

Dependencies and requirements:

- The Integration Commons for CMDB store app, which is automatically installed.
- The CMDB CI Class Models, which is automatically installed.
- The ITOM Discovery License plugin (com.snc.itom.discovery.license). You must activate this plugin.
- ITOM Licensing plugin (com.snc.itom.license). For more information, see Request Discovery.
- The Datastream Action plugin (com.glide.hub.action_type.datastream), which is automatically installed.
- Review that **View** access is enabled in Claroty CTD for the following user permissions to collect data from Claroty CTD to ServiceNow:
  - Visibility
  - Investigation
- The Industrial Core plugin. You must activate this plugin.

  The Industrial Core plugin is required to access the class mappings table for the Service Graph Connector Integration for Claroty CTD. For more information about the Industrial Core plugin, see Industrial Core plugin.

Role required: admin

Note:
If you have an earlier version of the Service Graph Connector Integration for Claroty CTD, then don't migrate data from the old connector. You must uninstall the previous version and run the new integration.

Procedure

1. Ensure that the application is set to Service Graph Connector Integration for Claroty CTD by using the application picker.
   For more information, see Application picker.
2. Navigate to **All** > **Service Graph Connector Claroty CTD** > **Guided Setup**.

3. On the Getting started page, select **Get Started**.
4. To configure a MID Server, complete the following:
   a. In the Setup Connections and Credentials section, select the Configure MID server task.
   b. Select **Mark as complete** once you complete the MID Server configuration.
5. To set up the connections records, complete the following:
   a. In the Setup Connections and Credentials section, select the Configure Connections task.
   b. Select **Configure**.
   c. Open the Claroty CTD API record in the Connections table.
   d. In the **Connection URL** field, enter the name of the URL for your Claroty CTD Enterprise Management Console (EMC).
   For example, https://192.168.1.100.
   e. If you're using a MID Server, select the **Use MID Server** check box in the record.

      Note:
      If you're not using a MID Server, go to step 5g.

   f. From the Advanced MID Server Configuration related list, select a MID Server and a MID Selection.
   g. Select **Update**.
   h. Repeat steps 5a to 5h to update the **Claroty CTD EMC Base Auth** record.
6. To set up the credentials records, complete the following:
   a. In the Setup Connections and Credentials section, select the Configure Credentials task.
   b. Select **Configure**.
   c. Open the Claroty CTD EMC Base Auth record in the Credentials table.
   d. In the **User name** field, enter the user name that you used to log in to the Claroty CTD EMC.
   e. In the **Password** field, enter the password that you used to log in to the Claroty CTD EMC.
   f. Select **Update**.
7. To test the connection, complete the following:
   a. In the Setup Connections and Credentials section, select the Test/Validate Connection task.
   b. Select the **Test Connection** UI action from the related links section on the data source record for sensors.
   After completing the connection test, view the results. You must perform the suggested troubleshooting steps until the test result returns **Success**.
   c. Check that the connection manager has a valid certificate.

      A valid certificate must be installed for a production environment. For a non-production or proof of concept (POC) instance, you can configure the system properties to enable

the integration to work when the connection manager doesn't have a valid certificate. The following table lists the system properties that you can configure for a non-production environment.

System properties for a non-production environment

Property	Value
com.glide.communications.httpclient.verify_hostname	Set to **false**.
com.glide.communications.httpclient.verify_revoked_certificate	Set to **false**. If you need to add this system property, see Add a system property.
com.glide.communications.trustmanager_trustall	Set to **true**.

d. Check the MID security policy.
In the intranet record, verify that the columns in the following table show the specified values.

Intranet record values

Column	Value
Certificate chain check	**false**
Hostname check	**false**
Revocation check	**false**

For more information, see MID Server certificate check policies.

8. To set the system properties that configure the API resource paths, pagination sizes, and API key expiration times,complete the following:

a. In the Configure System Properties section, select **Configure**.

b. Configure the system properties in the following table:

Property	Description
sn_clarotyctdsgc.resourcepath.site	Property to set the resource path for the sites: **Note:** The resource path for the sites is provided by default for the Claroty CTD Enterprise Management Console (EMC) V4.4.3 API version for the CTD sites and devices. If you want to use a different API version, you can override the paths.

Property	Description
sn_clarotyctdsgc.resourcepath.device	Property to set the resource path for the devices: **Note:** The resource path for the devices is provided by default for the CTD EMC V4.4.3 API version for the CTD sites and devices. If you want to use a different API version, you can override the paths.
sn_clarotyctdsgc.pagesize.device	Property to set the number of device records to fetch in a paginated REST call to the Claroty CTD EMC. The default value is 500 records per page. **Note:** 500 is the maximum number of devices per page.
sn_clarotyctdsgc.resourcepath.baseline	Property to set the resource path for the baselines: **Note:** The resource path for the baselines is provided by default for the CTD EMC V4.4.3 API version for the CTD sites and devices. If you want to use a different API version, you can override the paths.
sn_clarotyctdsgc.pagesize.baseline	Property to set the number of baseline records to fetch in a paginated REST call to the Claroty CTD EMC. The default value is 500 records per page.
sn_clarotyctdsgc.get_all_baselines	Property to fetch all records for baselines or only the new records since the start time of the last successful import. **Note:** When you import baselines for the first time, all records are imported regardless of the setting for this property.
sn_clarotyctdsgc.resourcepath.entity	Property to set the resource path for the entities:

Property	Description
	Note: The resource path for the entities is provided by default for the CTD EMC V4.4.3 API version for the CTD sites and devices. If you want to use a different API version, you can override the paths.
sn_clarotyctdsgc.resourcepath.program	Property to set the resource path for the installed programs: **Note:** The resource path for the installed programs is provided by default for the CTD EMC V4.4.3 API version for the CTD sites and devices. If you want to use a different API version, you can override the paths.
sn_clarotyctdsgc.pagesize.entity	Property to set the number of entity records to fetch in a paginated REST call to the Claroty CTD EMC. The default value is 500 records per page.
sn_clarotyctdsgc.pagesize.program	Property to set the number of program records to fetch in a paginated REST call to the Claroty CTD EMC. The default value is 500 records per page.
sn_clarotyctdsgc.api_token_life_in_minutes	Property to set the number of minutes that the API is considered active. After the time expires, the Service Graph Connector fetches a new API key during the next import. The default value is 0 and a new token is fetched for each REST call. **Note:** You can change the value to keep the same token for a maximum of 24 hours and reduce the number of REST calls.
sn_clarotyctdsgc.classify_based_on_os	Property to provide a list of classes that support the classification by OS as part of the Service Graph Connector Integration for Claroty CTD. When the flag is set to **True**, the classification by OS is supported. When it is set to **False**, the Service Graph Connector no longer classifies by OS. For example:

Property	Description
	`{ "cmdb_ci_ip_switch":true, "cmdb_ci_nids":false }`
sn_clarotyctdsgc.filter.asset_type_code	Property to provide a list of codes for device types separated by the delimiter ($). For more information about Claroty types and codes, see CMDB classes targeted. For example, to only import PLC and HMI device types, enter the Claroty type code as `0$1`.
sn_clarotyctdsgc.filter.asset_purdue_level	Property to provide a list of Purdue Levels separated by the delimiter ($). For example, to only filter devices with Purdue Levels 1 and 2, To only filter Devices with Purdue Level 1 & 2, set the value as `1 . 0$2 . 0`.

c. Select **Save**.

9. To import CTD sites, complete the following:
   a. In the Configure CTD Sites section, select the Import CTD Sites task.
   b. Select **Configure**.
   c. Select the **Execute Now** button.
10. To configure Network Intrusion Detection Systems (NIDS), complete the following:
    a. In the Configure CTD Sites section, select the Configure NIDS task.
    b. Select **Mark as Complete** once you setup the NIDS used to get devices from Claroty CTD.
11. To configure the import schedules to run the sites, devices, baselines, and installed programs, complete the following:

> **Note:**
> Empty rack slots associated with a PLC are no longer imported into the Configuration Management Database (CMDB).

    a. In the Configure Import Schedules section, select the Configure Sites Import Schedule task.
    b. Select **Configure**.
    c. In the Scheduled Data Imports table, select **SG-OT CTD Sites Scheduled Import**.
       - By default, the sites import schedule is configured to run every day at midnight.
       - You must import and validate the CTD sites before you import the devices.
    d. Complete the following actions as needed to review or change the import schedule as needed:

Action	Description
Enter a conditional script	Enter a conditional script that determines whether a scheduled import should run by selecting **Conditional**.
Change the default import schedule	Change the default import schedule by setting the **Run** field as necessary.
Reference a user in the Users table	Reference a user in the Users table by selecting a user in the **Runs as** field. **Note:** By default, this field is set to System Administrator. The selected user must be assigned the admin role for the import to be successful. If left empty, the import schedule uses the roles of the logged-in user.
Run an import	Run an import by selecting Execute Now. You can import either all records or only new records since the start time of the last successful import, based on the system properties configured. For more information, see Configure guided setup.
Activate the import	Activate the import by selecting the **Active** check box.
Save any schedule changes	Save any schedule changes by selecting **Update**.

e. In the Configure Import Schedules section, select the Configure Devices Import Schedule task.

f. Select **Configure**.

g. In the Scheduled Data Imports table, select **SG-OT CTD Devices Scheduled Import** to review or change the import schedule for your devices.

- By default, the devices import schedule is configured to run every day at midnight.
- Devices are queried by the CTD site. The Service Graph Connector only queries for devices that are detected by validated CTD sites.

h. Complete the following actions as needed to review or change the import schedule as needed:

Action	Description
Enter a conditional script	Enter a conditional script that determines whether a scheduled import should run by selecting **Conditional**.

Action	Description
Change the default import schedule	Change the default import schedule by setting the **Run** field as necessary.
Reference a user in the Users table	Reference a user in the Users table by selecting a user in the **Runs as** field. **Note:** By default, this field is set to System Administrator. The selected user must be assigned the admin role for the import to be successful. If left empty, the import schedule uses the roles of the logged-in user.
Run an import	Run an import by selecting Execute Now. You can import either all records or only new records since the start time of the last successful import, based on the system properties configured. For more information, see Configure guided setup.
Activate the import	Activate the import by selecting the **Active** check box.
Save any schedule changes	Save any schedule changes by selecting **Update**.

i. In the Configure Import Schedules section, select the Configure Baselines Import Schedule task.

j. Select **Configure**.

k. In the Scheduled Data Imports table, select **SG-OT CTD Baselines Scheduled Import** to review or change the import schedule for the baselines.
By default, the baselines import schedule is configured to run after the parent OT Control System runs.

l. Complete the following actions as needed to review or change the import schedule as needed.

Action	Description
Enter a conditional script	Enter a conditional script that determines whether a scheduled import should run by selecting **Conditional**.
Change the default import schedule	Change the default import schedule by setting the **Run** field as necessary.
Reference a user in the Users table	Reference a user in the Users table by selecting a user in the **Runs as** field.

Action	Description
	Note: By default, this field is set to System Administrator. The selected user must be assigned the admin role for the import to be successful. If left empty, the import schedule uses the roles of the logged-in user.
Run an import	Run an import by selecting Execute Now. You can import either all records or only new records since the start time of the last successful import, based on the system properties configured. For more information, see Configure guided setup.
Activate the import	Activate the import by selecting the **Active** check box.
Save any schedule changes	Save any schedule changes by selecting **Update**.

m. In the Configure Import Schedules section, select the Configure Sites Installed Programs Import Schedule task.

n. Select **Configure**.

o. In the Scheduled Data Imports table, select **SG-OT CTD Installed Programs Scheduled Import** to review or change the schedule for the installed programs import.
By default, the installed programs import schedule is configured to run every day at midnight.

p. Complete the following actions as needed to review or change the import schedule as needed.

Action	Description
Enter a conditional script	Change the default import schedule by setting the **Run** field as necessary.
Change the default import schedule	Change the default import schedule by setting the **Run** field as necessary.
Reference a user in the Users table	Reference a user in the Users table by selecting a user in the **Runs as** field. **Note:** By default, this field is set to System Administrator. The selected user must be assigned the admin role for the import to be successful. If left empty, the import schedule uses the roles of the logged-in user.

Action	Description
Run an import	Run an import by selecting Execute Now. You can import either all records or only new records since the start time of the last successful import, based on the system properties configured. For more information, see step 7c.
Activate the import	Activate the import by selecting the **Active** check box.
Save any schedule changes	Save any schedule changes by selecting **Update**.

12. **Optional:** When configuration items (CIs) are created in the CMDB, asset records are created. The asset record contains the model category of the CI. For more information about the model categories for Operational Technology (OT), see Model categories for Operational Technology. To view the model category for an OT device, complete the following:
    a. Navigate to **All** > **Operational Technology (OT)** > **All OT Devices**.
    b. Select the OT device that you want to view the asset record for.
    c. Next to the **Asset** field, select the **Preview this record** ( ) icon.
    d. Select **Open Record**.
13. **Optional:** To troubleshoot the Service Graph Connector Integration for Claroty CTD, complete the following:
    a. Select the [OPTIONAL] Troubleshooting the Service Graph Connector for Claroty CTD section.
    b. In the Execute the validations scheduled job task, select **Configure**.
    c. Select **Execute Now**.
    This job performs tasks to validate the configurations for SGC and the connection to Claroty CTD. If configuration issues are found, the validation results report the problem and suggest troubleshooting steps. Wait for the scheduled job to finish.
    d. Once the scheduled job is complete, navigate back to the [OPTIONAL] Troubleshooting the Service Graph Connector for Claroty CTD section.
    e. In the Review validation results task, select **Configure**.
    This step opens the execution logs and suggestions of the last troubleshooting run for you to view.

f. Address the suggestions as needed.

> **Note:**
> You can use the scheduled script at any point after the initial configuration of the Service Graph Connector Integration for Claroty CTD. To trigger validations, navigate to **All** > **Service Graph Connector for Claroty CTD** > **Troubleshooting** > **Run Troubleshooting**. To view the validation results, navigate to **All** > **Service Graph Connector for Claroty CTD** > **Troubleshooting** > **Results**.
>
> For additional information about troubleshooting issues while using the Service Graph Connector Integration for Claroty CTD, see Troubleshooting scenarios for the Service Graph Connector Integration for Claroty CTD (KB1502041).

Validate NIDS sensors

Validate the Network IDS (NIDS) sensors once they're imported to prepare for device import. The sensors can only pass the validation if they aren't in learning mode as such sensors aren't eligible for device import.

Before you begin

It's recommended that you have the CSDM plugin installed. The Service Graph Connector aligns with the life cycle data models as per the CMDB standards. For more information, see Implementing the CSDM framework in stages.

Role required: cmdb_nids_admin

About this task

The **Life Cycle Stage** and **Life Cycle Stage Status** fields are used to capture the learning mode of a sensor. If the Life Cycle Stage field is set to **Operational** and Life Cycle Stage Status is set to **Learning Mode**, then validation is unsuccessful. If the Life Cycle Stage Status field is set to **In Use**, the validation is successful.

Procedure

1. Navigate to **All** > **Network IDS Appliances (NIDS)** > **Sensors**.
2. Select the sensor record that you want to validate.
3. In the NIDS Assigned Meta Data section, add values for the sensor that you want to be assigned to the detected devices.
4. In the NIDS Admin Configuration section, make sure that the **Life Cycle Stage Status** field value isn't **Learning Mode**.
   Otherwise, the validation fails.
5. Make sure that the **NIDS network type** field is set based on the NIDS network location.
   For example, you can select an NIDS network type of **IT** for a data center deployment of the NIDS, or an NIDS network type of **OT** for an industrial deployment on an Industrial/OT network.

   If you select OT, the OT device details are created for all devices.

6. When the attributes are correctly filled out, select **Validate**.

Note:

NOTE: The attributes passed from the sensor to the devices are defined in the sn_cmdb_ci_class.nids_map_fields system property. The following list is the default list of attributes.

- assigned_to
- location
- company
- owned_by
- managed_by
- supported_by
- change_control
- support_group
- managed_by_group
- assignment_group
- zone
- isa_entity_site (only available if you have the Industrial Process Manager application installed)

Accessing the connection details of the Service Graph Connector Integration for Claroty CTD

You can access the connection details of the Service Graph Connector Integration for Claroty CTD in a single view using the common connection framework (CCF) included within the Integration Commons for CMDB (sn_cmdb_int_util) store app.

With the CCF, you can access all the connections used by the Service Graph Connector Integration for Claroty CTD. The connection details include the connection alias, connection properties, data sources, and scheduled data imports associated with a connection. You can also test the connection. For more information, see Accessing the connection details of Service Graph Connectors.

Access the details of a Claroty CTD connection

Access the details of a Claroty CTD connection configured for the Service Graph Connector Integration for Claroty CTD.

Before you begin

Role required: admin

About this task

There are application modules available to navigate to the data sources, system properties, and scheduled data imports for the Service Graph Connector Integration for Claroty CTD separately. However, the common connection framework (CCF) makes it possible to gather all the related data sources and scheduled data imports created for Claroty CTD in one place. You can also test the connection to the source (Claroty CTD) using the related links section.

Procedure

1. Ensure that the application scope is set to the **Service Graph Connector Integration for Claroty CTD** application by using the application picker.
2. Navigate to **All** > **Service Graph Connector for Claroty CTD** > **Claroty CTD SGC Connection**.
3. On the Service Graph Connections page, select **SG-OT Claroty CTD Default Connection**.
4. **Optional:** To access the system properties, select the **Service Graph Connection Properties** tab.
5. **Optional:** To access the data sources, select the **Service Graph Connection Data Sources** tab.
6. **Optional:** To access the scheduled data imports, select the **Service Graph Connection Scheduled Data Imports** tab.
7. **Optional:** To test your connection with the Claroty CTD platform, select the **Test Connection** related link.
   You can test your connection at any time. When the connection test is complete, you can find the status and suggestions for troubleshooting the failed steps under **Status** and **Suggestion** on the same page respectively.

CMDB classes targeted in the Service Graph Connector Integration for Claroty CTD

When you complete the setup tasks, you can configure the integration periodically to pull data from Claroty CTD. The data is saved in tables that extend from the Configuration item [cmdb_ci] table.

Viewing class mappings

You can view the available class mappings for the Service Graph Connector Integration for Claroty CTD by navigating to **All** > **Service Graph Connector Claroty CTD** > **Class Mappings**. In the class mappings table, you can view the following attributes.

Class mapping attributes

Field	Description
Source Class	The class of the source CI.
Target CMDB class	The expected ServiceNow class for the CI.
OT Device type	The category type that the OT device is classified as. The device type is also the function that the device plays on the OT network. For example: An IT device, such as a server, can be converted to an OT device, and the function it plays on the network is an HMI. Therefore, its class is **server** and its device type is **HMI**.

Class mapping attributes (continued)

Field	Description
	Note: In some cases, there are OT devices with no OT function or OT devices where the device type is unknown. For OT devices with no OT function, select **No OT Function**. For OT devices where the device type is unknown, select **Unknown**.
Allow OS classification	When set to **True**, if an operating system is found on the CI, the target is switched away from the target CMDB class to a ServiceNow class that matches its OS.
Active	When checked, the class mapping is set to **Active**.

The Service Graph Connector Integration for Claroty CTD also uses Claroty types and codes. For more information, see the Default class mapping table.

Computer [cmdb_ci_computer]

The following attributes in the Computer [cmdb_ci_computer] table are populated by collected data:

Attribute label	Attribute name
Most recent discovery	last_discovered
Operating System	os
OS Version	os_version

External system metadata [cmdb_key_value_v2]

The following attributes in the External system metadata [cmdb_key_value_v2] table are populated by collected data:

Attribute label	Attribute name
Discovery source	discovery_source
Key	key
Source key	source_key
URL value	url_value
Value type	value_type

Firmware Installation [cmdb_firmware_install]

The following attributes in the Firmware Installation [cmdb_firmware_install] table are populated by collected data:

Attribute label	Attribute name
Source Native Key	firmware_version_snk
IRE criterion attribute	firmware_ire_criterion_key
Discovered version	firmware_version_cleansed
Discovery source	firmware_version_discovery_source

Hardware [cmdb_ci_hardware]

The following attributes in the Hardware [cmdb_ci_hardware] table are populated by collected data:

Attribute label	Attribute name
Change Group	assignment_group
Support group	support_group
Company	company
Vendor	vendor
Name	name
Serial number	serial_number
Class	sys_class_name
First discovered	first_discovered
Location	location
Model number	model_number
Most recent discovery	last_discovered
Supported by	supported_by
Assigned to	assigned_to
Managed By Group	managed_by_group
Managed by	managed_by
Model ID	model_id
Approval group	change_control
Owned by	owned_by
Manufacturer	manufacturer

Relationships created for Hardware

Parent class	Relationship type	Child class
Hardware [cmdb_ci_hardware]	Owns::Owned by	Network Adapter [cmdb_ci_network_adapter]
Hardware [cmdb_ci_hardware]	Owns::Owned by	IP Address [cmdb_ci_ip_address]

Relationships created for Hardware (continued)

Parent class	Relationship type	Child class
Hardware [cmdb_ci_hardware]	Reference	OT Device [cmdb_ot_entity]
Hardware [cmdb_ci_hardware]	Reference	External system metadata [cmdb_key_value_v2]
Hardware [cmdb_ci_hardware]	Reference	Software Installation [cmdb_sam_sw_install]

IP Address [cmdb_ci_ip_address]

The following attributes in the IP Address [cmdb_ci_ip_address] table are populated by collected data:

Attribute label	Attribute name
Owned By Configuration Item	owned_by_cmdb_ci
IP Address	ip_address
IP version	ip_version

Relationships created for IP Address

Parent class	Relationship type	Child class
IP Address [cmdb_ci_ip_address]		Network Intrusion Detection System [cmdb_ci_nids]
IP Address [cmdb_ci_ip_address]		Hardware [cmdb_ci_hardware]

Network Adapter [cmdb_ci_network_adapter]

The following attributes in the Network Adapter [cmdb_ci_network_adapter] table are populated by collected data:

Attribute label	Attribute name
MAC Address	mac_address
Name	name

Relationships created for Network Adapter

Parent class	Relationship type	Child class
Network Adapter [cmdb_ci_network_adapter]	Reference	Hardware [cmdb_ci_hardware]

Network Intrusion Detection System [cmdb_ci_nids]

The following attributes in the Network Intrusion Detection System [cmdb_ci_nids] table are populated by collected data:

Attribute label	Attribute name
Manufacturer	manufacturer
Name	name
Correlation ID	correlation_id
Description	short_description
Firmware version	firmware_version
NIDS manager connection state	connection_state
Life Cycle Stage Status	life_cycle_stage_status
Life Cycle Stage	life_cycle_stage
Validated	validated

Relationships created for NIDS

Parent class	Relationship type	Child class
Network Intrusion Detection System [cmdb_ci_nids]	Owns::Owned by	IP Address [cmdb_ci_ip_address]
Network Intrusion Detection System [cmdb_ci_nids]	Detects::Detected by	Hardware [cmdb_ci_hardware]

Operational Technology (OT) [cmdb_ci_ot]

The following attributes in the Operational Technology (OT) [cmdb_ci_ot] table are populated by collected data:

Attribute label	Attribute name\
Firmware version	firmware_version
Most recent discovery	last_discovered

OT Device [cmdb_ot_entity]

The following attributes in the OT Device [cmdb_ot_entity] table are populated by collected data:

Attribute label	Attribute name
Purdue level	purdue_level
ISA entity site	isa_entity_site
OT discovery source ID	ot_correlation_id
Device criticality	business_criticality
Zone	zone
OT device type	ot_asset_type
IRE criterion attribute	ire_criterion_attribute

OT Control Module [cmdb_ci_ot_control_module]

The following attributes in the OT Control Module [cmdb_ci_ot_control_module] table are populated by collected data:

Attribute label	Attribute name
Location	location
Supported by	supported_by
Name	name
Serial number	serial_number
Slot number	slot_number
Manufacturer	manufacturer
Firmware version	firmware_version
Approval group	change_control
Assigned to	assigned_to
Most recent discovery	last_discovered
Model ID	model_id
Model number	model_number
Company	company
Owned by	owned_by
Managed by	managed_by
Support group	support_group
Managed By Group	managed_by_group
Change Group	assignment_group
Vendor	vendor

Relationships created for OT Control Module

Parent class	Relationship type	Child class
OT Control Module [cmdb_ci_ot_control_module]	Reference	OT Device [cmdb_ot_entity]

OT Control System [cmdb_ci_ot_control]

The following attributes in the OT Control System [cmdb_ci_ot_control] table are populated by collected data:

Attribute label	Attribute name
Has module	has_module
Most recent discovery	last_discovered

Relationships created for OT Control System

Parent class	Relationship type	Child class
OT Control System [cmdb_ci_ot_control]	Owns::Owned by	OT Control Module [cmdb_ci_ot_control_module]

Serial Number [cmdb_serial_number]

The following attributes in the Serial Number [cmdb_serial_number] table are populated by collected data:

Note:
A fix script is automatically applied to clean up the serial number [cmdb_serial_number] records imported into the sys_object_source table from the Service Graph Connector. The script ensures that a null pointer exception doesn't occur when a serial number and MAC address are the same.

This fix script only runs once during the upgrade of Service Graph Connector Integration for Claroty CTD but doesn't run on zbooted instances or fresh installation. This doesn't affect the functionality or lead to any data loss.

Attribute label	Attribute name
Serial Number	serial_number
Serial Number Type	serial_number_type
Valid	valid

Relationships created for Serial Number

Parent class	Relationship type	Child class
Serial Number [cmdb_serial_number]	Reference	Hardware [cmdb_ci_hardware]

Software [cmdb_ci_spkg]

The following attributes in the Software [cmdb_ci_spkg] table are populated by collected data:

Attribute label	Attribute name
Key	key
Version	version
Manufacturer	manufacturer
Name	name

Relationships created for Software

Parent class	Relationship type	Child class
Software [cmdb_ci_spkg]	Reference	Software Instance [cmdb_software_instance]

Software Instance [cmdb_software_instance]

The following attributes in the Software Instance [cmdb_software_instance] table are populated by collected data:

Attribute label	Attribute name
Install date	install_date
Installed on	installed_on
Name	name

Relationships created for Software Instance

Parent class	Relationship type	Child class
Software Instance [cmdb_software_instance]	Reference	Hardware [cmdb_ci_hardware]

Software Installation [cmdb_sam_sw_install]

The following attributes in the Software Installation [cmdb_sam_sw_install] table are populated by collected data:

Attribute label	Attribute name
Display name	display_name
Version	version
Discovery source	discovery_source

Relationships created for Software Installation

Parent class	Relationship type	Child class
Software Instance [cmdb_software_instance]	Reference	Hardware [cmdb_ci_hardware]

Default class mapping

A default class mapping is shipped with the Service Graph Connector Integration for Claroty CTD application.

Note:
You can find the class mapping in the **sn_clarotyctdsgc.SGOTClarotyCTDConstants** script.

Claroty CTD Type	ServiceNow Type	Class	OT Entity Type	Claroty Types and Codes
eAAAServer	(Empty)	cmdb_ci_server		eAAAServer = 61
eAccessControl	(Empty)	cmdb_ci_iot		eAccessControl = 50

Claroty CTD Type	ServiceNow Type	Class	OT Entity Type	Claroty Types and Codes
eAccessPoint	(Empty)	cmdb_ci_ip_switch		eAccessPoint = 60
eADServer	(Empty)	cmdb_ci_server		eADServer = 33
eAutonomousVehicle	OT Field Device	cmdb_ci_ot_field_device	ot_field_device	eAutonomousVehicle = 58
eAVServer	(Empty)	cmdb_ci_server		eAVServer = 32
eBarcodeScanner	OT Field Device	cmdb_ci_ot_field_device	ot_field_device	eBarcodeScanner = 48
eBluetoothDevice	(Empty)	cmdb_ci_iot		eBluetoothDevice = 41
eBroadcast	(Empty)	cmdb_ci_netgear		eBroadcast = 4
eCamera	OT Field Device	cmdb_ci_ot_field_device	ot_field_device	eCamera = 42
eCleaningDevice	OT Field Device	cmdb_ci_ot_field_device	ot_field_device	eCleaningDevice = 55
eController	OT Control System	cmdb_ci_ot_control	ot_control_system	eController = 20
eDataLogger	OT Control System	cmdb_ci_ot_control	ot_control_system	eDataLogger = 66
eDBServer	(Empty)	cmdb_ci_server		eDBServer = 35
eDomainController	(Empty)	cmdb_ci_server		eDomainController = 5
eElectricalDrive	Industrial Drive	cmdb_ci_ot_industrial_drive	industrial_drive	eElectricalDrive = 68
eEndpoint	Operational Technology Device	cmdb_ci_ot	ot_base	eEndpoint = 2
eEngineeringStation	EWS	cmdb_ci_ot_ews	ews	eEngineeringStation = 14
eFileServer	(Empty)	cmdb_ci_server		eFileServer = 10
eFirewall	(Empty)	cmdb_ci_ip_firewall		eFirewall = 31
eFrontEndProcessor	OT Control System	cmdb_ci_ot_control	ot_control_system	eFrontEndProcessor = 26
eGateway	(Empty)	cmdb_ci_ip_switch		eGateway = 15
eGPSClock	Operational Technology Device	cmdb_ci_ot	ot_base	eGPSClock = 37
eGPSDevice	Operational Technology Device	cmdb_ci_ot	ot_base	eGPSDevice = 62
eHistorian	Historian	cmdb_ci_ot_historian	historian	eHistorian = 9
eHMI	HMI	cmdb_ci_ot_hmi	hmi	eHMI = 1

Claroty CTD Type	ServiceNow Type	Class	OT Entity Type	Claroty Types and Codes
eHomeAssistant	(Empty)	cmdb_ci_iot		eHomeAssistant = 53
eIED	IED	cmdb_ci_ot_ied	ied	eIED = 19
eInfusionPump	(Empty)	cmdb_ci_iot		eInfusionPump = 46
eMediaServer	(Empty)	cmdb_ci_server		eMediaServer = 54
eMedicalDevice	(Empty)	cmdb_ci_iot		eMedicalDevice = 47
eMicroscope	(Empty)	cmdb_ci_iot		eMicroscope = 49
eModem	(Empty)	cmdb_ci_netgear		eModem = 27
eMotorStarter	Industrial Drive	cmdb_ci_ot_industrial_drive	industrial_drive	eMotorStarter = 69
eNetworkAccessStorage	(Empty)	cmdb_ci_server		eNetworkAccessStorage = 30
eNetworking	(Empty)	cmdb_ci_netgear		eNetworking = 3
eNTPServer	(Empty)	cmdb_ci_server		eNTPServer = 21
eOPCServer	OPC Server	cmdb_ci_ot_opc_server	opc_server	eOPCServer = 16
eOT	Operational Technology Device	cmdb_ci_ot	ot_base	eOT = 17
ePLC	PLC	cmdb_ci_ot_plc	plc	ePLC = 0
ePrinter	(Empty)	cmdb_ci_printer		ePrinter = 6
eProxyServer	(Empty)	cmdb_ci_netgear		eProxyServer = 28
eRemoteIO	OT Field Device	cmdb_ci_ot_field_device	field_device	eRemoteIO = 13
eReverseProxyServer	(Empty)	cmdb_ci_netgear		eReverseProxyServer = 29
eRobot	Industrial Robot	cmdb_ci_ot_industrial_robot	industrial_robot	eRobot = 57
eRouter	Router	cmdb_ci_ip_router		eRouter = 11
eRTU	RTU	cmdb_ci_ot_rtu	rtu	eRTU = 18
eSCADAClient	SCADA Client	cmdb_ci_ot_scada_client	scada_client	eSCADAClient = 7
eSCADAMaster	SCADA Server	cmdb_ci_ot_scada_server	scada_server	eSCADAMaster = 38
eSCADAServer	SCADA Server	cmdb_ci_ot_scada_server	scada_server	eSCADAServer = 8
eSensor	Industrial Sensor	cmdb_ci_ot_industrial_sensor	industrial_sensor	eSensor = 67
eSmartLight	(Empty)	cmdb_ci_iot		eSmartLight = 51

Claroty CTD Type	ServiceNow Type	Class	OT Entity Type	Claroty Types and Codes
eSmartPhone	(Empty)	cmdb_ci_iot		eSmartPhone = 44
eSmartWatch	(Empty)	cmdb_ci_iot		eSmartWatch = 45
eStorageArray	(Empty)	cmdb_ci_server		eStorageArray = 36
eStreamer	(Empty)	cmdb_ci_iot		eStreamer = 52
eSwitch	(Empty)	cmdb_ci_ip_switch		eSwitch = 12
eSyslogServer	(Empty)	cmdb_ci_server		eSyslogServer = 25
eTerminalServer	(Empty)	cmdb_ci_server		eTerminalServer = 24
eTVScreen	(Empty)	cmdb_ci_iot		eTVScreen = 40
eUPS	(Empty)	cmdb_ci_ups		eUPS = 63
eUserConsole	HMI	cmdb_ci_ot_hmi	hmi	eUserConsole = 22
eUserWorkstation	HMI	cmdb_ci_ot_hmi	hmi	eUserWorkstation = 23
eVendingMachine	(Empty)	cmdb_ci_iot		eVendingMachine = 43
eVideoRecorder	(Empty)	cmdb_ci_server		eVideoRecorder = 64
eVirtualizationServer	(Empty)	cmdb_ci_server		eVirtualizationServer = 65
eVoipPhone	(Empty)	cmdb_ci_comm_hardware		eVoipPhone = 39
eVoipServer	(Empty)	cmdb_ci_server		eVoipServer = 56
eWebServer	(Empty)	cmdb_ci_server		eWebServer = 34
eWirelessLanController	(Empty)	cmdb_ci_netgear		eWirelessLanController = 59
eBarcodeReader	(Empty)	cmdb_ci_iot		eBarcodeReader = 77
eBiometricScanner	(Empty)	cmdb_ci_iot		eBiometricScanner = 74
eDNSServer	(Empty)	cmdb_ci_server		eDNSServer = 75
eSNMPScanner	(Empty)	cmdb_ci_server		eSNMPScanner = 73
eSNMPServer	(Empty)	cmdb_ci_server		eSNMPServer = 72
eVisionCamera	OT Field Device	cmdb_ci_ot_field_device	ot_field_device	eVisionCamera = 76

Claroty CTD Type	ServiceNow Type	Class	OT Entity Type	Claroty Types and Codes
eVisionController	OT Control System	cmdb_ci_ot_control	ot_control_system	eVisionController = 78
eVisionSensor	OT Field Device	cmdb_ci_ot_field_device	ot_field_device	eVisionSensor = 79
eVOIPAccessPoint	(Empty)	cmdb_ci_ip_switch		eVOIPAccessPoint = 71
eVulnerabilityScanner	(Empty)	cmdb_ci_server		eVulnerabilityScanner = 70

Service Graph Connector for Microsoft Defender for IoT (Azure)

Integrate Microsoft Defender for IoT with the ServiceNow® Operational Technology Manager application to automate import of OT devices and sensor appliances.

Request apps on the Store

Visit the ServiceNow Store website to view all the available apps and for information about submitting requests to the store. For cumulative release notes information for all released apps, see the ServiceNow Store version history release notes.

Supported versions

Supports Microsoft Defender for IoT sensor versions:

- 22.2.3.22
- 22.2.5.9

Use cases

You can use the Service Graph Connector for Microsoft Defender for IoT (Azure) with the ServiceNow® Operational Technology Manager application to import OT devices and sensor appliances.

Guided setup

The guided setup for the Service Graph Connector for Microsoft Defender for IoT (Azure) provides an organized sequence of tasks to configure the integration on your instance. To access the guided setup, see Configure guided setup.

CMDB integrations dashboard

The Integration Commons for CMDB store app provides a dashboard with a central view of the status, processing results, and processing errors of all installed integrations. You can see metrics for all integration runs. You can filter the view to a specific CMDB integration, a specific time duration, or a specific integration run. For more details about monitoring integrations in the CMDB Integrations Dashboard, see Integration Commons for CMDB.

Data mapping

Data from the Microsoft Defender for IoT (Azure) data sources is mapped and transformed into the ServiceNow CMDB Configuration Item (CI) class definitions using the Robust Transform Engine (RTE). Data is inserted into the ServiceNow CMDB using the Identification and Reconciliation Engine (IRE).

When you complete the setup, you can configure the integration to periodically pull data from the Microsoft Defender for IoT (Azure) application.

The following table lists the data sources included for a Microsoft Defender for IoT (Azure) project and the corresponding staging tables where the imported data is loaded.

Data sources and staging tables for Microsoft Defender for IoT (Azure)

Data source	Staging table
SG-OT Azure D4IoT Devices Import	SG-OT Azure D4IoT Devices Import [sn_msftd4iotazsgc_sg_ot_azure_d4iot_devices_import]
SG-OT Azure D4IoT Sensors Import	SG-OT Msft D4IoT Sensors Import [sn_msftd4iotazsgc_sg_ot_azure_d4iot_sensors_import]

The imported data from the staging tables is then inserted into the following target tables:

- AIX Server [cmdb_ci_aix_server]
- Computer [cmdb_ci_computer]
- Configuration Item [cmdb_ci]
- DCS [cmdb_ci_ot_dcs]
- ESX Server [cmdb_ci_esx_server]
- EWS [cmdb_ci_ot_ews]
- External System Metadata [cmdb_key_value_v2]
- Game Console [cmdb_ci_game_console]
- Handheld Computing Device [cmdb_ci_handheld_computing]
- Historian [cmdb_ci_ot_historian]
- HMI [cmdb_ci_ot_hmi]
- HP-UX Server [cmdb_ci_hpux_server]
- HVAC Equipment [cmdb_ci_hvac]
- HyperV Server [cmdb_ci_hyper_v_server]
- IED [cmdb_ci_ot_ied]
- Industrial Actuator [cmdb_ci_ot_industrial_actuator]
- Industrial Drive [cmdb_ci_ot_industrial_drive]
- Industrial Robot [cmdb_ci_ot_industrial_robot]
- Industrial Sensor [cmdb_ci_ot_industrial_sensor]
- IoT Device [cmdb_ci_iot]
- IP Address [cmdb_ci_ip_address]
- IP Camera [cmdb_ci_ip_camera]
- IP Firewall [cmdb_ci_ip_firewall]
- IP Phone [cmdb_ci_ip_phone]
- Linux Server [cmdb_ci_linux_server]
- Netgear [cmdb_ci_netgear]
- Network Adapter [cmdb_ci_network_adapter]

- Network Intrusion Detection System [cmdb_ci_nids]
- Operational Technology (OT) [cmdb_ci_ot]
- OSX Server [cmdb_ci_osx_server]
- OT Control Module [cmdb_ci_ot_control_module]
- OT Control System [cmdb_ci_ot_control]
- OT Device Details [cmdb_ot_entity]
- OT Field Device [cmdb_ci_ot_field_device]
- PLC [cmdb_ci_ot_plc]
- Printer [cmdb_ci_printer]
- RTU [cmdb_ci_ot_rtu]
- Serial Number [cmdb_serial_number]
- Server [cmdb_ci_server]
- Server [cmdb_ci_server]
- Solaris Server [cmdb_ci_solaris_server]
- Source [sys_object_source]
- Unix Servercmdb_ci_unix_server]
- Uninterruptible Power Supply (UPS) [cmdb_ci_ups]
- Wireless Access Point [cmdb_ci_wap_network]

For more information on where data is saved when pulling data from a Microsoft Defender for IoT (Azure) project, see CMDB classes targeted.

Configure the Service Graph Connector for Microsoft Defender for IoT (Azure)

Use the guided setup for the Service Graph Connector for Microsoft Defender for IoT (Azure) to lead you through the integration steps.

Before you begin

Dependencies and requirements:

- The Integration Commons for CMDB store app, which is automatically installed.
- The CMDB CI Class Models, which is automatically installed.
- The ITOM Discovery License plugin (com.snc.itom.discovery.license). You must activate this plugin.
- ITOM Licensing plugin (com.snc.itom.license). For more information, see Request Discovery.
- The Datastream Action plugin (com.glide.hub.action_type.datastream), which is automatically installed.
- The Industrial Core plugin. You must activate this plugin.

  The Industrial Core plugin is required to access the class mappings table for the Service Graph Connector for Microsoft Defender for IoT (Azure). For more information about the Industrial Core plugin, see Industrial Core plugin.

Role required: admin

Note:
If you have an earlier version of the Service Graph Connector for Microsoft Defender for IoT (Azure), then don't migrate data from the old connector. You must uninstall the previous version and run the new integration.

Procedure

1. Ensure that the application scope is set to the Service Graph Connector for Microsoft Defender for IoT (Azure) application by using the application picker.
   For more information, see Application picker.
2. Navigate to **All** > **Service Graph for MSFT D4IoT (Azure)** > **Guided Setup**.
3. On the Getting started page, select **Get Started**.
4. To access the Azure resources, complete the following:
   a. Select the Access to Azure Resources task.
   b. Once you complete the instructions in the description, select **Mark as Complete**.
5. To set up the connections and credentials, complete the following:
   a. In the Configure Connections and Credentials section, select the Setup Connections and Credentials task.
   b. Select **Configure**.
   c. Select the **SG-OT Azure Connection** record.
   d. Select the Create New Connection & Credential related link.
   e. In the Create Connection and Credential window, fill in the following fields.

Field	Description
Connection Name	Display name for the connection record
Connection URL	Azure URL
OAuth Client ID	Client ID (application ID) or Service Principal ID
OAuth Client Secret	Client secret key associated with the Service Principal
OAuth Token URL	URL to fetch Authorization token. Replace <tenantid> in the URL with the Tenant ID value.

Note:
When a token generation is successful, a new window appears with a success message. When a token generation isn't successful, a new window with the error message `OAuth flow failed` appears. Please check the details provided and try again by editing the record you created.

   f. Select **Create and Get OAuth Token**.
6. To test the connection, complete the following:

a. In the Setup Connections and Credentials section, select the Test/Validate Connection task.

b. Select the **Test Connection** UI action from the related links section on the data source record for sensors.
After completing the connection test, view the results. You must perform the suggested troubleshooting steps until the test result returns **Success**.

7. To configure the system properties, complete the following:

a. In the Configure System Properties section, select **Configure**.

b. Configure the following system properties.

Property	Description
sn_msftd4iotazsgc.resource_path	Set the resource path property. The default Resource Path for the ARG REST API version 2021-03-01 is `/providers/Microsoft.ResourceGraph/resources`.
sn_msftd4iotazsgc.pagesize.sensor	Set the page size property for sensors. ▪ As Azure ARG REST API supports pagination, you can choose the number of records per page for each API. ▪ The default is 1000 records per page. **Note:** 1000 is also the maximum number of records per page.
sn_msftd4iotazsgc.pagesize.device	Set the page size property for devices. ▪ As Azure ARG REST API supports pagination, you can choose the number of records per page for each API. ▪ The default is 1000 records per page. **Note:** 1000 is also the maximum number of records per page.
sn_msftd4iotazsgc.get_all_devices	▪ For devices, you can choose to fetch all records (box checked) or the delta (box unchecked). ▪ The DELTA fetches all the records created or updated since the start time of the last successful import in the CMDB.

Property	Description
	Note: When you run the Devices Integration for the first time, all records are imported independent of this property.
sn_msftd4iotazsgc.convert_sensor_names_to_lowercase	Set this property for devices import. ▪ This system property is used to convert the sensor names provided by Microsoft Azure into lowercase while importing devices. ▪ This is required as Microsoft Azure expects data for the query in a lowercase format.
sn_msftd4iotazsgc.filter.device_sub_types	Set this property for filtering the devices during device import by sub type. ▪ Comma-separated list of Microsoft Azure sub types to filter the devices. ▪ For example: to import only PLCs and servers, provide the value from the DeviceSubType attribute from Microsoft Azure as `Server, PLC`.
sn_msftd4iotazsgc.filter.device_tags	Set this property for filtering the devices during device import by device tag. ▪ Comma-separated list of case sensitive tags that are needed to filter devices. ▪ For example: to import devices with specific tags, provide a list of values from the DeviceTags attribute in Microsoft Azure.
sn_msftd4iotazsgc.filter.custom_query	Set this property to add more filters for device import apart from the Device SubType and Device Tags filter. ▪ Query to filter based on other attributes. ▪ This allows filtering for other attributes. For more information, see Azure Query Language.
sn_msftd4iotazsgc.azure_d4iot_site_map_fields	An object of fields from the Microsoft Defender for IoT (Azure) Site Map. When a field is set to **True**, the Service Graph Connector for Microsoft Defender for IoT (Azure) passes the value of the Site Map field to the corresponding field on each CI discovered by the integration at the Azure site. If set to **False** or not populated on the Site Map record, the field isn't set on the imported CIs associated with the Azure site.

Property	Description
	For consistency with the other integrations using the NIDS framework, check this system property. By default, only **location** and **equipment_model_entity** are set to **True**.
sn_msftd4iotazsgc.devices_fetch_type	Indicates if devices are fetched per sensor, Active Scan devices, or both.
sn_msftd4iotazsgc.active_scan_get_all_devices	Set this system property to import all Active Scan devices. If not checked, then only the Active Scan devices created or updated since the last successful import are imported. The default value is **No**.
sn_msftd4iotazsgc.filter.active_scan.device_subtypes	Comma-separated list of Azure subtypes to filter the Active Scan devices. For example, to only import PLCs and servers, provide the value from the Device SubType attribute as `Server, PLC` in Azure.
sn_msftd4iotazsgc.filter.active_scan.device_tags	Comma-separated list of case sensitive tags needed to filter Active Scan devices. For example, to import Active Scan devices with specific tags, provide a list of values from the DeviceTags attribute from Azure.
sn_msftd4iotazsgc.filter.active_scan.custom_query	Query to filter other attributes for Active Scan devices. For example, to allow filtering on other attributes. For more information about the Azure query language, see Azure Query Language for more information.

c. Select **Save**.

8. To import sensors, complete the following:
   a. In the Configure Sensors (NIDS) section, select the Import Sensors task.
   b. Select **Configure**.
   c. Select **Active** to activate the Scheduled Data Import job.
9. To configure the NIDS, complete the following:
   a. In the Configure Sensors (NIDS) section, select the Import Sensors task.
   b. Select **Mark as complete** once you complete the NIDS configuration linked in the description.
10. To configure import schedules, complete the following:
    a. In the Configure Import Schedules section, select **Configure**.
    b. Select **SG-OT Microsoft Azure D4IoT Sensors Scheduled Import** to review or change the sensors import schedule as needed.

i. Select **Active** to activate the sensors import schedule.

ii. By default, the sensors import schedule is configured to run daily at midnight. Change the schedule using the **Run** and **Time** fields.

iii. Select the **Conditional** check box to make this schedule conditional.

iv. Select **Execute Now** to start a manual import.

c. Select **SG-OT Microsoft Azure D4IoT Devices Scheduled Import** to review or change the devices import schedule as needed.

i. Select **Active** to activate the sensors import schedule.

ii. By default, the sensors import schedule is configured to run daily at midnight. Change the schedule using the **Run** and **Time** fields.

iii. Select the **Conditional** check box to make this schedule conditional.

iv. Select **Execute Now** to start a manual import.

Note:
Devices are queried per sensor. The Service Graph Connector only queries for devices detected by a validated sensor. For more information, see step 9.

11. **Optional:** When configuration items (CIs) are created in the CMDB, asset records are created. The asset record contains the model category of the CI. For more information about the model categories for Operational Technology (OT), see Model categories for Operational Technology. To view the model category for an OT device, complete the following:

a. Navigate to **All** > **Operational Technology (OT)** > **All OT Devices**.

b. Select the OT device that you want to view the asset record for.

c. Next to the **Asset** field, select the **Preview this record** ( ) icon.

d. Select **Open Record**.

12. **Optional:** To troubleshoot the Service Graph Connector for Microsoft Defender for IoT (Azure), complete the following:

a. Select the [OPTIONAL] Troubleshooting the Service Graph Connector for Microsoft Defender for IoT (Azure) section.

b. In the Execute the validations scheduled job task, select **Configure**.

c. Select **Execute Now**.
This job performs tasks to validate the configurations for SGC and the connection to Microsoft Azure. If configuration issues are found, the validation results report the problem and suggest troubleshooting steps. Wait for the scheduled job to finish.

d. Once the scheduled job is complete, Navigate back to the [OPTIONAL] Troubleshooting the Service Graph Connector for Microsoft Defender for IoT (Azure) section.

e. In the Review validation results task, select **Configure**.
This step opens the execution logs and suggestions of the last troubleshooting run for you to view.

f. Address the suggestions as needed.

> **Note:**
> You can use the scheduled script at any point after the initial configuration of the Service Graph Connector Integration for Claroty CTD. To trigger validations, navigate to **All** > **Service Graph for MSFT D4IoT (Azure)** > **Troubleshooting** > **Run Troubleshooting**. To view the validation results, navigate to **All** > **Service Graph for MSFT D4IoT (Azure)** > **Troubleshooting** > **Results**.

What to do next

You can now connect Microsoft Defender for IoT (Azure) with the ServiceNow Service Graph Connector for Microsoft Defender for IoT (Azure). For more information, see Connecting your Microsoft Defender for IoT (Azure) subscription to the ServiceNow Service Graph Connector for Microsoft Defender for IoT (Azure) (KB1587770).

Validate NIDS sensors

Validate the Network IDS (NIDS) sensors once they're imported to prepare for the device import. Sensors only pass the validation if they aren't in learning mode as such sensors are not eligible for device import.

Before you begin

It's recommended that you have the CSDM plugin installed. The Service Graph Connector aligns with the life cycle data models as per the CMDB standards. For more information, see Implementing the CSDM framework in stages.

Role required: cmdb_nids_admin

> **Note:**
> An NIDS appliance in ServiceNow represents a Microsoft Defender for IoT (Azure) sensor.

About this task

The **Life Cycle Stage** and **Life Cycle Stage Status** fields are used to capture the learning mode of a sensor. If the Life Cycle Stage field is set to **Operational** and Life Cycle Stage Status is set to **Learning Mode**, then validation is unsuccessful. If the Life Cycle Stage Status field is set to **In Use**, the validation is successful.

Procedure

1. Navigate to **All** > **Network IDS Appliances (NIDS)** > **Sensors**.
2. Select the sensor record that you want to validate.
3. In the NIDS Assigned Meta Data section, add values for the sensor that you want to be assigned to the detected devices.
4. From the NIDS Admin Configuration section, make sure that the **Life Cycle Stage Status** field value isn't **Learning Mode**.
   Otherwise, the validation fails.
5. Make sure that the **NIDS network type** field is set based on the NIDS network location.
   For example, you can select an NIDS network type of **IT** for a data center deployment of the NIDS, or an NIDS network type of **OT** for an industrial deployment on an Industrial/OT network.

   If you select OT, the OT device details are created for all devices.

6. When the attributes are correctly filled out, select **Validate**.

Note:

NOTE: The attributes passed from the sensor to the devices are defined in the sn_cmdb_ci_class.nids_map_fields system property. The following list is the default list of attributes.

- assigned_to
- location
- company
- owned_by
- managed_by
- supported_by
- change_control
- support_group
- managed_by_group
- assignment_group
- zone
- isa_entity_site (only available if you have the Industrial Process Manager application installed)

Accessing the connection details of the Service Graph Connector for Microsoft Defender for IoT (Azure)

You can access the connection details of the Service Graph Connector for Microsoft Defender for IoT (Azure) in a single view using the common connection framework (CCF) included within the Integration Commons for CMDB (sn_cmdb_int_util) store app.

With the CCF, you can access all the connections used by the Service Graph Connector for Microsoft Defender for IoT (Azure). The connection details include the connection alias, connection properties, data sources, and scheduled data imports associated with a connection. You can also test the connection. For more information, see Accessing the connection details of Service Graph Connectors.

Access the details of a Microsoft Defender for IoT (Azure) connection

Access the details of a Microsoft Defender for IoT (Azure) connection configured for the Service Graph Connector Integration for Claroty CTD.

Before you begin

Role required: admin

About this task

There are application modules available to navigate to the data sources, system properties, and scheduled data imports for the Service Graph Connector for Microsoft Defender for IoT (Azure) separately. However, the common connection framework (CCF) makes it possible to gather all the related data sources and scheduled data imports created for Microsoft Defender for IoT (Azure) in one place. You can also test the connection to the source (Microsoft Defender for IoT (Azure)) using the related links section.

Procedure

1. Ensure that the application scope is set to the Service Graph Connector for Microsoft Defender for IoT (Azure) application by using the application picker.
2. Navigate to **All** > **Service Graph for MSFT D4IoT (Azure)** > **Azure SGC Connection**.
3. On the Service Graph Connections page, select **SG-OT Azure SGC Default Connection** record.
4. **Optional:** To access the system properties, select the **Service Graph Connection Properties** tab.
5. **Optional:** To access the data sources, select the **Service Graph Connection Data Sources** tab.
6. **Optional:** To access the scheduled data imports, select the **Service Graph Connection Scheduled Data Imports** tab.
7. **Optional:** To test your connection with the Microsoft Azure platform, select the **Test Connection** related link.
   You can test your connection at any time. When the connection test is complete, you can find the status and suggestions for troubleshooting the failed steps under **Status** and **Suggestion** on the same page respectively.

Import OT devices using the Standard mode of discovery

Use the Service Graph Connector for Microsoft Defender for IoT (Azure) to import Operational Technology (OT) devices discovered through the Standard mode of discovery from Microsoft Defender for IoT.

Before you begin

Role required: admin

About this task

Standard mode uses an active search to discover additional information about the identified OT devices to supplement the existing device information. The devices identified during standard mode aren't associated with the passive sensor. To import these devices and assign them to a site, you can use the **Site Mappings** table. The table is populated using an automatic scheduled job. After the scheduled job is executed, the system populates the sites from the Source system in the table.

The **Site Mappings** table allows the admin to perform site mappings between the Microsoft Defender for IoT (Azure) site, where this data resides, and the ServiceNow ISA entity site [cmdb_ci_ot_isa_entity]. When the data is imported through the Service Graph Connector for Microsoft Defender for IoT (Azure), the devices are assigned to the correct site in the ISA entity site [cmdb_ci_ot_isa_entity].

Procedure

1. Navigate to **All** > **Service Graph for MSFT D4IoT (Azure)** > **Site Mappings**.
2. Select **New**.
3. On the form, fill in the following fields.

SG-OT Azure D4IoT Site Map fields

Field	Description
ISA Entity Site	Site name for your ISA Entity site.
Azure D4IoT Site	Site name for your Azure D4IoT site.

Field	Description
Location	Location of the Azure D4IoT Site
Approval group	Group that can approve requests related to the site.
Azure D4IoT Site URL	
Assigned to	User that the site is assigned to.
Change group	Group that is assigned change requests related to the site.
Company	Company that runs the site.
Managed by	User that manages the site.
Managed by group	Group that manages the site.
Owned by	User that owns the site.
Support group	Group that is contacted when issues are encountered.
Supported by	User that is contacted when issues are encountered.
Network type	Network type of site. For example, **OT**.
Correlation ID	Unique ID that identifies the correlation on the local system.

4. Select **Submit**.

Result
Once the Site Mappings record is created and you perform the device import, devices are imported through the sensor and active scan. The devices are then assigned to an ISA entity [cmdb_ci_ot_isa_entity] site in ServiceNow.

Note:
The metadata information from the site record, such as Assigned to and Owned by, are copied to the imported devices using the Service Graph Connector's system properties. For more information about the system properties for the Service Graph Connector for Microsoft Defender for IoT (Azure), see Configure guided setup.

CMDB classes targeted in the Service Graph Connector for Microsoft Defender for IoT (Azure)

When you complete the guided setup, you can configure the integration to periodically pull data from a Service Graph Connector for Microsoft Defender for IoT (Azure) (Azure) project. The data is saved in tables that extend from the Configuration item [cmdb_ci] table.

Viewing class mappings

You can view the available class mappings for the Service Graph Connector for Microsoft Defender for IoT (Azure) by navigating to **All** > **Service Graph for MSFT D4IoT (Azure)** > **Class Mappings**. In the class mappings table, you can view the following attributes.

Class mapping attributes

Field	Description
Source Class	The device type from the source system (Azure).
Target CMDB class	The expected ServiceNow class for the CI.
OT Device type	The category type that the OT device is classified as. The device type is also the function that the device plays on the OT network. For example: An IT device, such as a server, can be converted to an OT device, and the function it plays on the network is an HMI. Therefore, its class is **server** and its device type is **HMI**. **Note:** In some cases, there are OT devices with no OT function or OT devices where the device type is unknown. For OT devices with no OT function, select **No OT Function**. For OT devices where the device type is unknown, select **Unknown**.
Allow OS classification	When set to **True**, if an operating system is found on the CI, the target is switched away from the target CMDB class to a ServiceNow class that matches its OS.
Active	When checked, the class mapping is set to **Active**.

Computer [cmdb_ci_computer]

The following attributes in the Computer [cmdb_ci_computer] table are populated by collected data:

Computer [cmdb_ci_computer] attributes

Attribute label	Attribute name
Most recent discovery	last_discovered
Operating System	os
OS Address Width (bits)	os_address_width
OS Domain	os_domain
OS Version	os_version

External system metadata [cmdb_key_value_v2]

The following attributes in the External system metadata [cmdb_key_value_v2] table are populated by collected data:

External system metadata [cmdb_key_value_v2] attributes

Attribute label	Attribute name
Discovery source	discovery_source
Key	key
Source key	source_key
String value	string_value
URL value	url_value
Value type	value_type

Hardware [cmdb_ci_hardware]

The following attributes in the Hardware [cmdb_ci_hardware] table are populated by collected data:

Hardware [cmdb_ci_hardware] attributes

Attribute label	Attribute name
Class	sys_class_name
Model number	model_number
Most recent discovery	last_discovered
Location	location
Model ID	model_id
Manufacturer	manufacturer
First discovered	first_discovered
Owned by	owned_by
Approval group	change_control
Managed By Group	managed_by_group
Managed by	managed_by
Name	name
Company	company
Support group	support_group
Change Group	assignment_group
Assigned to	assigned_to
Supported by	supported_by

Relationships created for Hardware

Parent class	Relationship type	Child class
Hardware [cmdb_ci_hardware]	Owns::Owned by	IP Address [cmdb_ci_ip_address]

Relationships created for Hardware (continued)

Parent class	Relationship type	Child class
Hardware [cmdb_ci_hardware]	Owns::Owned by	Network Adapter [cmdb_ci_network_adapter]
Hardware [cmdb_ci_hardware]	Reference	External system metadata [cmdb_key_value_v2]
Hardware [cmdb_ci_hardware]	Reference	OT Device [cmdb_ot_entity]

IP Address [cmdb_ci_ip_address]

The following attributes in the IP Address [cmdb_ci_ip_address] table are populated by collected data:

IP Address [cmdb_ci_ip_address] attributes

Attribute label	Attribute name
IP Address	ip_address
IP version	ip_version
Owned By Configuration Item	owned_by_cmdb_ci

Relationships created for IP Address

Parent class	Relationship type	Child class
IP Address [cmdb_ci_ip_address]	Reference	Network Intrusion Detection System [cmdb_ci_nids]
IP Address [cmdb_ci_ip_address]	Reference	Hardware [cmdb_ci_hardware]

Network Adapter [cmdb_ci_network_adapter]

The following attributes in the Network Adapter [cmdb_ci_network_adapter] table are populated by collected data:

Network Adapter [cmdb_ci_network_adapter] attributes

Attribute label	Attribute name
MAC Address	mac_address
Name	name
Discovery source	discovery_source

Relationships created for Network Adapter

Parent class	Relationship type	Child class
Network Adapter [cmdb_ci_network_adapter]	Reference	Network Intrusion Detection System [cmdb_ci_nids]

Relationships created for Network Adapter (continued)

Parent class	Relationship type	Child class
Network Adapter [cmdb_ci_network_adapter]	Reference	Hardware [cmdb_ci_hardware]

Network Intrusion Detection System [cmdb_ci_nids]

The following attributes in the Network Intrusion Detection System [cmdb_ci_nids] table are populated by collected data:

Network Intrusion Detection System [cmdb_ci_nids] attributes

Attribute label	Attribute name
First discovered	first_discovered
NIDS source name	source_name
Life Cycle Stage	life_cycle_stage
Life Cycle Stage Status	life_cycle_stage_status
Name	name
Correlation ID	correlation_id
Firmware version	firmware_version
Fully qualified domain name	fqdn
NIDS assignment zone	zone
NIDS manager connection state	connection_state
Validated	validated
Manufacturer	manufacturer

Relationships created for NIDS

Parent class	Relationship type	Child class
Network Intrusion Detection System [cmdb_ci_nids]	Detects::Detected by	Hardware [cmdb_ci_hardware]
Network Intrusion Detection System [cmdb_ci_nids]	Owns::Owned by	IP Address [cmdb_ci_ip_address]
Network Intrusion Detection System [cmdb_ci_nids]	Owns::Owned by	Network Adapter [cmdb_ci_network_adapter]

Operational Technology (OT) [cmdb_ci_ot]

The following attributes in the Operational Technology (OT) [cmdb_ci_ot] table are populated by collected data:

Operational Technology (OT) [cmdb_ci_ot] attributes

Attribute label	Attribute name
Most recent discovery	last_discovered

OT Control Module [cmdb_ci_ot_control_module]

The following attributes in the OT Control Module [cmdb_ci_ot_control_module] table are populated by collected data:

OT Control Module [cmdb_ci_ot_control_module] attributes

Attribute label	Attribute name
Vendor	vendor
Support group	support_group
Serial number	serial_number
Class	sys_class_name
First discovered	first_discovered
Approval group	change_control
Managed by	managed_by
Managed By Group	managed_by_group
Change Group	assignment_group
Company	company
Rack number	rack_number
Slot number	slot_number
Location	location
Name	name
Firmware version	firmware_version
Most recent discovery	last_discovered
Assigned to	assigned_to
Owned by	owned_by
Supported by	supported_by
Model ID	model_id

Relationships created for OT Control Module

Parent class	Relationship type	Child class
OT Control Module [cmdb_ci_ot_control_module]	Reference	OT Device [cmdb_ot_entity]

OT Control System [cmdb_ci_ot_control]

The following attributes in the OT Control System [cmdb_ci_ot_control] table are populated by collected data:

OT Control System [cmdb_ci_ot_control] attributes

Attribute label	Attribute name
Has module	has_module
Most recent discovery	last_discovered

Relationships created for OT Control System

Parent class	Relationship type	Child class
OT Control System [cmdb_ci_ot_control]	Owns::Owned by	OT Control Module [cmdb_ci_ot_control_module]

OT Device [cmdb_ot_entity]

The following attributes in the OT Device [cmdb_ot_entity] table are populated by collected data:

OT Device [cmdb_ot_entity] attributes

Attribute label	Attribute name
ISA entity site	isa_entity_site
OT discovery source ID	ot_correlation_id
Device criticality	business_criticality
Purdue level	purdue_level
Zone	zone
OT device type	ot_asset_type
IRE criterion attribute	ire_criterion_attribute

PLC [cmdb_ci_ot_plc]

The following attributes in the PLC [cmdb_ci_ot_plc] table are populated by collected data:

PLC [cmdb_ci_ot_plc] attributes

Attribute label	Attribute name
Most recent discovery	last_discovered
Switch position	switch_position
Switch remote	switch_remote_mode

Serial Number [cmdb_serial_number]

The following attributes in the Serial Number [cmdb_serial_number] table are populated by collected data:

Serial Number [cmdb_serial_number] attributes

Attribute label	Attribute name
Serial Number	serial_number
Serial Number Type	serial_number_type
Valid	valid

Relationships created for Serial Number

Parent class	Relationship type	Child class
Serial Number [cmdb_serial_number]	Reference	Hardware [cmdb_ci_hardware]
Network Adapter [cmdb_ci_network_adapter]	Reference	Hardware [cmdb_ci_hardware]

Attribute mapping and classification for Service Graph Connector for Microsoft Defender for IoT (Azure)

The following tables describe the attribute mapping and classification for sensors and devices.

Sensors attribute mapping

Payload field name	Data type	Mapped to table	Mapped to field	Description
id	String format: /subscriptions/<subscription-id>/provider/<provider>/locations/<location>/sites/<site>/sensor/<sensor-name>	• sys_object_source • cmdb_ci_nids	• snk in sys_object_source • correlation_id	Unique ID for the sensor.
name	String	cmdb_ci_nids	name	Name of the sensor.
properties.hostname	String	cmdb_ci_nids	fqdn	Host name of the sensor.
properties.ip	String	cmdb_ci_ip_address	ip_address	IP address of the sensor.
properties.learningMode	Boolean	cmdb_ci_nids	False or unavailable: Life Cycle Stage (life_cycle_stage) : Operational Life Cycle Stage Status (life_cycle_stage_status): In Use	Learning mode status of the IoT sensor.

Sensors attribute mapping (continued)

Payload field name	Data type	Mapped to table	Mapped to field	Description
			True: Life Cycle Stage (life_cycle_stage) : Operational Life Cycle Stage Status (life_cycle_stage_status): Learning	
properties.mac	String	cmdb_ci_network_adapter	mac_address	MAC address of the sensor.
properties.sensorStatus	String	cmdb_ci_nids	connection_state	Status of the IoT sensor.
properties.sensorVersion	String	cmdb_ci_nids	firmware_version	Version of the IoT sensor.
properties.upSince_date	Date and time as string	cmdb_ci_nids	first_discovered	Startup time.
properties.zone	String	cmdb_ci_nids	zone	Zone of the IoT sensor.

Devices attribute mapping

Payload field name	Data type	Mapped to table	Mapped to field	Description
id	String format: /subscriptions/subscription-id>/providers/<providers-id>/location/<location>/deviceGroups/<device-Group>/devices/<name-field>	• sys_object_source • cmdb_ot_entity • cmdb_key_value_v2	• snk in sys_object_source • discovery_source_id in cmdb_ot_entity	Unique ID for the device.
resourceGroup	(Empty)	cmdb_key_value_v2	(Empty)	Resource group
tenantId	(Empty)	cmdb_key_value_v2	(Empty)	Tenant ID
properties.authorizedState	String	cmdb_key_value_v2	(Empty)	Authorized state of the device
properties.criticality	String	cmdb_ot_entity	business_criticality	Criticality of the device
properties.deviceName	String	cmdb_ci	name	Name of the device.
properties.deviceSubtypeDisplayName	String	cmdb_ci	sys_class_name	Device subtype display name.

Devices attribute mapping (continued)

Payload field name	Data type	Mapped to table	Mapped to field	Description
properties.firstSeen	Date and time as string	• cmdb_ci • cmdb_ci_ot_control_module (if control modules are present)	first_discovered	First time the device was seen.
properties.lastSeen	Date and time as string	• cmdb_ci • cmdb_ci_ot_control_module (if control modules are present)	most_recent_discovery	Last time the device was seen.
properties.purdueLevel	String	cmdb_ot_entity	purdue_level	Purdue level of the device.
properties.operatingSystem.distribution	String	cmdb_ci_computer	os	OS distribution
properties.operatingSystem.version	String	cmdb_ci_computer	os_version	OS version
properties.operatingSystem.platform	String	cmdb_ci_computer	os_domain	OS platform
properties.operatingSystem.architecture	String	cmdb_ci_computer	os_address_width	OS architecture
properties.additionalFields.plcKeyState	(Empty)	cmdb_ci_ot_plc	switch_position	PLC key state
properties.additionalFields.plcRunState	(Empty)	cmdb_ci_ot_plc	switch_remote_mode	PLC run state
properties.hardware	Object	(Empty)	(Empty)	Device hardware data
properties.hardware.model	String	cmdb_ci	(Empty)	Hardware model
properties.hardware.serialNumber	String	cmdb_serial_number	serial_number	Hardware serial number
properties.hardware.vendor	String	cmdb_ci	manufacturer	Hardware vendor
properties.nics	Array of Objects	(Empty)	(Empty)	List of the device network interface cards.
properties.nics[{}]	Object	(Empty)	(Empty)	Network interface card properties
properties.nics[{}].ipv4Address	String	cmdb_ci_ip_address	ip_address	IPv4 address
properties.nics[{}].macAddress	String	cmdb_ci_network_adapter	mac	MAC Address
properties.slots	Array of Objects	(Empty)	(Empty)	List of the device slot in the backplane.
properties.slots[{}]	Object	(Empty)	(Empty)	Slot data in PLC backplane.
properties.slots[{}].firmwareVersion	String	cmdb_ci_ot_control_module	firmware_version	Firmware version of the slot.

Devices attribute mapping (continued)

Payload field name	Data type	Mapped to table	Mapped to field	Description
properties.slots[{}].model	String	cmdb_ci_ot_control_module	model_id	Model of the slot.
properties.slots[{}].rackNumber	Integer	cmdb_ci_ot_control_module	rack_number	Rack number in the backplane
properties.slots[{}].serialNumber	String	cmdb_ci_ot_control_module	serial_number	Serial number of the slot.
properties.slots[{}].slotNumber	Integer	cmdb_ci_ot_control_module	slot_number	Slot number inside the rack.
properties.slots[{}].hardwareVendor	String	cmdb_ci_ot_control_module	vendor	Hardware vendor of the slot.

Device type classification

Microsoft Azure device sub type name	Microsoft Azure device type name	Operating system/ firmware	NOW class	NOW table	NOW OT type
Alarm Siren	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
Alarm System	(Empty)	(Empty)	OT Control System	cmdb_ci_ot_control	OT Control System
ATM	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
Backup Server	(Empty)	(Empty)	Server	cmdb_ci_server	NULL
Barcode Scanner	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
DB Server	(Empty)	(Empty)	Server	cmdb_ci_server	NULL
DCS Controller	Industrial	(Empty)	DCS	cmdb_ci_ot_dcs	NULL
Domain Controller	(Empty)	(Empty)	Server	cmdb_ci_server	NULL
Door Control Panel	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
DVR	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
Elevator	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
Engineering Station	Industrial	(Empty)	EWS	cmdb_ci_ot_ews	EWS
Fire Alarm	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
Fire Detector	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
Firewall	(Empty)	(Empty)	IP Firewall	cmdb_ci_ip_firewall	NULL
Game console	(Empty)	(Empty)	Game Console	cmdb_ci_game_console	NULL
Historian	(Empty)	(Empty)	Historian	cmdb_ci_ot_historian	Historian
HMI	Industrial	(Empty)	HMI	cmdb_ci_ot_hmi	HMI

Device type classification (continued)

Microsoft Azure device sub type name	Microsoft Azure device type name	Operating system/ firmware	NOW class	NOW table	NOW OT type
Humidity Sensor	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
HVAC	(Empty)	(Empty)	HVAC Equipment	cmdb_ci_hvac	NULL
I/O Adapter	(Empty)	(Empty)	Network Adapter	(Empty)	NA
IED	(Empty)	(Empty)	IED	cmdb_ci_ot_ied	ied
Industrial Packaging System	(Empty)	(Empty)	OT Field Device	cmdb_ci_ot_field_device	OT Field Device
Industrial Robot	(Empty)	(Empty)	Industrial Robot	cmdb_ci_ot_industrial_robot	Industrial Robot
Industrial Scale	(Empty)	(Empty)	OT Field Device	cmdb_ci_ot_field_device	OT Field Device
Intercom	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
IP Camera	(Empty)	(Empty)	IP Camera	cmdb_ci_ip_camera	NULL
IP Telephone	(Empty)	(Empty)	IP phone	cmdb_ci_ip_phone	NULL
Marquee	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
Meter	(Empty)	(Empty)	Industrial Sensor	cmdb_ci_ot_industrial_sensor	Industrial Sensor
Motion Detector	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
Multicast/ Broadcast	(Empty)	(Empty)	Netgear	cmdb_ci_netgear	NULL
NTP Server	(Empty)	(Empty)	Server	cmdb_ci_server	NULL
People Counter System	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
Physical Location	(Empty)	(Empty)	(Empty)	(Empty)	NULL
PLC	Industrial	(Empty)	PLC	cmdb_ci_ot_plc	PLC
Pneumatic Device	(Empty)	(Empty)	Industrial Actuator	cmdb_ci_ot_industrial_actuator	Industrial Actuator
Printer	(Empty)	(Empty)	Printer	cmdb_ci_printer	NULL
Protocol Converter	(Empty)	(Empty)	Netgear	cmdb_ci_netgear	NULL
Punch Clock	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL

Device type classification (continued)

Microsoft Azure device sub type name	Microsoft Azure device type name	Operating system/ firmware	NOW class	NOW table	NOW OT type
Robot Controller	(Empty)	(Empty)	OT Control System	cmdb_ci_ot_control	OT Control System
Router	(Empty)	(Empty)	IP Router	cmdb_ci_ip_router	NULL
RTU	(Empty)	(Empty)	RTU	cmdb_ci_ot_rtu	NULL
Server	Server	(Empty)	Server	cmdb_ci_server	NULL
Servo Drive	(Empty)	(Empty)	Industrial Actuator	cmdb_ci_ot_industrial_actuator	Industrial Actuator
Slot	(Empty)	(Empty)	OT Control Module	cmdb_ci_ot_control_module	OT Control Module
Smart Light	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
Smart Phone	(Empty)	(Empty)	Handheld Computing Device	cmdb_ci_handheld_computing	NULL
Smart Switch	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
Smart TV	(Empty)	(Empty)	Smart Television	cmdb_ci_stv	NULL
Storage	(Empty)	(Empty)	Server	cmdb_ci_server	NULL
Switch	Network Device	(Empty)	IP Switch	cmdb_ci_ip_switch	NULL
Tablet	(Empty)	(Empty)	Handheld Computing Device	cmdb_ci_handheld_computing	NULL
Terminal Station	(Empty)	(Empty)	Computer	cmdb_ci_computer	NULL
Thermostat	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
Turnstile	(Empty)	(Empty)	IoT device	cmdb_ci_iot	
Uninterruptable Power Supply	(Empty)	(Empty)	UPS	cmdb_ci_ups	NULL
Variable Frequency Drive	(Empty)	(Empty)	Industrial Drive	cmdb_ci_ot_industrial_drive	Industrial Drive
VPN Gateway	(Empty)	(Empty)	Netgear	cmdb_ci_netgear	NULL
Wifi Pineapple	(Empty)	(Empty)	Netgear	cmdb_ci_netgear	NULL
Wireless Access Point	(Empty)	(Empty)	Wireless Access Point	cmdb_ci_wap_network	NULL
WLAN access point	Network Device	(Empty)	Wireless Access Point	cmdb_ci_wap_network	NULL

Device type classification (continued)

Microsoft Azure device sub type name	Microsoft Azure device type name	Operating system/ firmware	NOW class	NOW table	NOW OT type
Workstation	Workstation	(Empty)	Computer	cmdb_ci_computer	NULL
Unknown	All	(Empty)	Operational Technology (OT)	cmdb_ci_ot	Operational Technology (OT)
Unclassified	Unclassified or All	(Empty)	Operational Technology (OT)	cmdb_ci_ot	Operational Technology (OT)
Any other type	(Empty)	(Empty)	Operational Technology (OT)	cmdb_ci_ot	Operational Technology (OT)
Any above type value except with designation Network and IoT	(Empty)	• windows server • windows server, version 2004[8] • windows server, version 1909[9] • windows server, version 1903[9] • windows server 2019 • windows server 2016 • windows server 2012 r2 • windows server 2012 • windows server 2008 r2 • windows server 2008 • windows server 2003 r2 • windows server 2003	Windows Server	cmdb_ci_linux_server	Same as when the operating system isn't present.

Device type classification (continued)

Microsoft Azure device sub type name	Microsoft Azure device type name	Operating system/ firmware	NOW class	NOW table	NOW OT type
		• windows 2000 server • windows nt 4.0 server • windows nt 3.51 server • windows nt 3.5 server • windows nt 3.1 server			
Any above type value except with designation Network and IoT	(Empty)	• linux • arch • centos • debian • fedora • suse • red hat • rhel • ubuntu • oracle	Linux Server	cmdb_ci_linux_server	Same as when the operating system isn't present.
Any above type value except with designation Network and IoT	(Empty)	aix	AIX Server	cmdb_ci_aix_server	Same as when the operating system isn't present.
Any above type value except with designation Network and IoT	(Empty)	esx	ESX Server	cmdb_ci_esx_server	Same as when the operating system isn't present.
Any above type value except with designation Network and IoT	(Empty)	• hp/ux • hpux	HP-UX Server	cmdb_ci_hpux_server	Same as when the operating system isn't present.

Device type classification (continued)

Microsoft Azure device sub type name	Microsoft Azure device type name	Operating system/ firmware	NOW class	NOW table	NOW OT type
Any above type value except with designation Network and IoT	(Empty)	• hyper-v • hyperv • hyper	HypverV Server	cmdb_ci_hyper_v_server	Same as when the operating system isn't present.
Any above type value except with designation Network and IoT	(Empty)	• solaris • sunos • sun os	Solaris Server	cmdb_ci_solaris_server	Same as when the operating system isn't present.
Any above type value except with designation Network and IoT	(Empty)	• macos x server • macos server • os x • osx	OSX Server	cmdb_ci_osx_server	Same as when the operating system isn't present.
Any above type value except with designation Network and IoT	(Empty)	• unix • gnu	Unix Server	cmdb_ci_unix_server	Same as when the operating system isn't present.
Any above type value except with designation Network and IoT	(Empty)	• win • windows • Microsoft • windows 1.0, 1.02, 1.03, 1.04, 2.03, 2.10, 2.11, 3.0, 3.1, 3.2, 7, 8, 8.1, 10, 98, 95 • windows 2000 • windows for workgroups 3.11 • windows me	Base Computer class	cmdb_ci_computer	Same as when the operating system isn't present.

Device type classification (continued)

Microsoft Azure device sub type name	Microsoft Azure device type name	Operating system/ firmware	NOW class	NOW table	NOW OT type
		• windows nt 3.1, 3.5, 3.51, 4.0 • windows vista • windows xp • windows xp professional x64 edition			
Any above type value except with designation Network and IoT	(Empty)	server	Base Server Class	cmdb_ci_server	Same as when the operating system isn't present.

Service Graph Connector for Microsoft Defender for IoT (On-premises Management Console)

Integrate Microsoft Defender for IoT (On-premises Management Console) with the ServiceNow® Operational Technology Manager application to automate import of sensor appliances, OT devices, and network connections.

Request apps on the Store

Visit the ServiceNow Store website to view all the available apps and for information about submitting requests to the store. For cumulative release notes information for all released apps, see the ServiceNow Store version history release notes.

Supported versions

Microsoft Defender for IoT (On-premises Management Console) version: 10.5.2#br later

Use cases

You can use the Service Graph Connector for Microsoft Defender for IoT (On-premises Management Console) with the ServiceNow® Operational Technology Manager application to import sensor appliances, OT devices, and network connections.

Guided setup

The guided setup for the Service Graph Connector for Microsoft Defender for IoT (On-premises Management Console) provides an organized sequence of tasks to configure the integration on your instance. To access the guided setup, see Configure guided setup.

CMDB integrations dashboard

The Integration Commons for CMDB store app provides a dashboard with a central view of the status, processing results, and processing errors of all installed integrations. You can see metrics for all integration runs. You can filter the view to a specific CMDB integration, a specific time duration, or a specific integration run. For more details about monitoring integrations in the CMDB Integrations Dashboard, see Integration Commons for CMDB.

Data mapping

Data from the Microsoft Defender for IoT (On-premises Management Console) data sources is mapped and transformed into the ServiceNow CMDB Configuration Item (CI) class definitions using the Robust Transform Engine (RTE). Data is inserted into the ServiceNow CMDB using the Identification and Reconciliation Engine (IRE).

When you complete the setup, you can configure the integration to periodically pull data from the Microsoft Defender for IoT (On-premises Management Console) application.

The following table lists the data sources included for a Microsoft Defender for IoT (On-premises Management Console) project and the corresponding staging tables where the imported data is loaded.

Data sources and staging tables for Microsoft Defender for IoT (On-premises Management Console)

Data source	Staging table
SG-OT Microsoft D4IoT Connections Import	SG-OT Msft D4IoT Connections Import [sn_msftd4iotsgc_sg_ot_msft_d4iot_connections_import]
SG-OT Microsoft D4IoT Devices Import	SG-OT Msft D4IoT Devices Import [sn_msftd4iotsgc_sg_ot_msft_d4iot_devices_import]
SG-OT Microsoft D4IoT Sensors Import	SG-OT Msft D4IoT Sensors Import [sn_msftd4iotsgc_sg_ot_msft_d4iot_sensors_import]

The imported data from the staging tables is then inserted into the following target tables:

- AIX Server [cmdb_ci_aix_server]
- Computer [cmdb_ci_computer]
- Configuration Item [cmdb_ci]
- DCS [cmdb_ci_ot_dcs]
- ESX Server [cmdb_ci_esx_server]
- EWS [cmdb_ci_ot_ews]
- External System Metadata [cmdb_key_value_v2]
- Game Console [cmdb_ci_game_console]
- Handheld Computing Device [cmdb_ci_handheld_computing]
- Historian [cmdb_ci_ot_historian]
- HMI [cmdb_ci_ot_hmi]
- HP-UX Server [cmdb_ci_hpux_server]
- HVAC Equipment [cmdb_ci_hvac]
- HyperV Server [cmdb_ci_hyper_v_server]

- IED [cmdb_ci_ot_ied]
- Industrial Actuator [cmdb_ci_ot_industrial_actuator]
- Industrial Drive [cmdb_ci_ot_industrial_drive]
- Industrial Robot [cmdb_ci_ot_industrial_robot]
- Industrial Sensor [cmdb_ci_ot_industrial_sensor]
- IoT Device [cmdb_ci_iot]
- IP Address [cmdb_ci_ip_address]
- IP Camera [cmdb_ci_ip_camera]
- IP Firewall [cmdb_ci_ip_firewall]
- IP Phone [cmdb_ci_ip_phone]
- Linux Server [cmdb_ci_linux_server]
- Netgear [cmdb_ci_netgear]
- Network Adapter [cmdb_ci_network_adapter]
- Network Intrusion Detection System [cmdb_ci_nids]
- Operational Technology (OT) [cmdb_ci_ot]
- OSX Server [cmdb_ci_osx_server]
- OT Control Module [cmdb_ci_ot_control_module]
- OT Control System [cmdb_ci_ot_control]
- OT Device Details [cmdb_ot_entity]
- OT Field Device [cmdb_ci_ot_field_device]
- PLC [cmdb_ci_ot_plc]
- Printer [cmdb_ci_printer]
- RTU [cmdb_ci_ot_rtu]
- Serial Number [cmdb_serial_number]
- Server [cmdb_ci_server]
- Server [cmdb_ci_server]
- Solaris Server [cmdb_ci_solaris_server]
- Source [sys_object_source]
- Unix Servercmdb_ci_unix_server]
- Uninterruptible Power Supply (UPS) [cmdb_ci_ups]
- Wireless Access Point [cmdb_ci_wap_network]

For more information on where data is saved when pulling data from a Microsoft Defender for IoT (On-premises Management Console) project, see CMDB classes targeted.

Configure the Service Graph Connector for Microsoft Defender for IoT (On-premises Management Console)

Use the Guided Setup for the Service Graph Connector for Microsoft Defender for IoT (On-premises Management Console) to lead you through the integration steps.

Before you begin

Dependencies and requirements:

- The Integration Commons for CMDB store app, which is automatically installed.
- The CMDB CI Class Models, which is automatically installed.
- The ITOM Discovery License plugin (com.snc.itom.discovery.license). You must activate this plugin.
- ITOM Licensing plugin (com.snc.itom.license). For more information, see Request Discovery.
- The Datastream Action plugin (com.glide.hub.action_type.datastream), which is automatically installed.

Role required: admin

Note:
If you have an earlier version of the Service Graph Connector for Microsoft Defender for IoT (On-premises Management Console), then don't migrate data from the old connector. You must uninstall the previous version and run the new integration.

Procedure

1. Ensure that the application scope is set to the Service Graph Connector for Microsoft Defender for IoT (On-premises Management Console) application by using the application picker.
   For more information, see Application picker.
2. Navigate to **All** > **Service Graph Connector Microsoft D4IoT** > **Guided Setup**.
3. On the Getting started page, select **Get Started**.
4. To configure a MID Server, complete the following:
   a. In the Setup Connections and Credentials section, select the Configure MID server task.
   b. Select **Mark as complete** once you complete the MID Server configuration linked in the description.
5. To update the Connection and Credentials Alias record, complete the following:
   a. In the Setup Connections and Credentials section, select the Connections and Credentials task.
   b. Select **Configure**.
   c. Open the default record **Microsoft D4IoT Base API**.
   d. From the Connections related list, select **New** to create a new HTTP(s) Connection record.
   e. In the **Connection URL** field, enter the name for the URL of your Microsoft Defender for IoT Central Manager.
      For example, `https://192.168.1.100`.
   f. **Optional:** If you are using a MID Server, select all of the following:
      - **Use MID Server** box
      - **MID Server** from the Advanced MID Server Configuration related list
      - **MID Selection** from the list
   g. In the **Credential** field, select the search icon to open the Credentials records list.

h. Select **New** to create a new record.

i. Select the **API Key Credentials** type.

j. In the **API Key** field, enter a name and the API Key provided by your Microsoft Defender for IoT management console.

k. Select **Submit** to create the credential record.
To create an API Key in the Microsoft Defender for IoT management console, refer to Microsoft product documentation: https://docs.microsoft.com/en-us/azure/defender-for-iot/organizations/references-work-with-defender-for-iot-apis.

l. On the Connection form, select **Submit** to finish creating the Connection record.

6. To test the connection, complete the following:

a. In the Setup Connections and Credentials section, select the Test/Validate Connection task.

b. Select the **Test Connection** UI action from the related links section on the data source record for sensors.
After completing the connection test, view the results. You must perform the suggested troubleshooting steps until the test result returns **Success**.

c. Check that the connection manager has a valid certificate.

A valid certificate must be installed for a production environment. For a non-production or proof of concept (POC) instance, you can configure the system properties to enable the integration to work when the connection manager doesn't have a valid certificate. The following table lists the system properties that you can configure for a non-production environment.

System properties for a non-production environment

Property	Value
com.glide.communications.httpclient.verify_hostname	Set to **false**.
com.glide.communications.httpclient.verify_revoked_certificate	Set to **false**. If you need to add this system property, see Add a system property.
com.glide.communications.trustmanager_trustall	Set to **true**.

d. Check the MID security policy.
In the intranet record, verify that the columns in the following table show the specified values.

Intranet record values

Column	Value
Certificate chain check	**false**
Hostname check	**false**

Column	Value
Revocation check	**false**

For more information, see MID Server certificate check policies.

The connection shows that it is set correctly when the progress window shows the Completion code **Success**, and the number of records processed shows as the same number of sensors in the connection manager.

7. To configure the system properties, complete the following:

   a. In the Configure System Properties section, select **Configure**.

   b. Configure the following system properties.

Property	Description
sn_msftd4iotsgc.resourcepath.sensor	Set the sensors resource path. ▪ The sensors resource path is provided by default for the V3 API version. ▪ If you want to use a different API version, you can override the path.
sn_msftd4iotsgc.resourcepath.device	▪ The devices resource path is provided by default for the V3 API version. ▪ If you want to use a different API version, you can override the path.
sn_msftd4iotsgc.resourcepath.connection	▪ The connections resource path is provided by default for the V3 API version. ▪ If you want to use a different API version, you can override the path.
sn_msftd4iotsgc.pagesize.device	Enter the number of records to display per page for each Devices and Connections API. Default value: 50 records per page
sn_msftd4iotsgc.pagesize.connection	▪ If you want to use a different Connection Alias than the Microsoft D4IoT Base API configured while setting up the connections and credentials records, you can enter the sys_id of your custom Connection Alias record in this property field. ▪ The default value of this property is empty. If this property field is left blank, the Microsoft D4IoT Base API Connection Alias is used by default.
sn_msftd4iotsgc.get_all_devices	Select whether to fetch all records for devices, or only new records since the start time of the last successful import.

Property	Description
	Note: When you import devices for the first time, all records are imported regardless of the setting for this property.
sn_msftd4iotsgc.get_all_connections	Select whether to fetch all records for connections, or only new records since the start time of the last successful import in the CMDB. **Note:** When you import connections for the first time, all records are imported regardless of the setting for this property.
sn_msftd4iotsgc.ot.vr.integration.id	If you are using the Operational Technology Vulnerability Response application with the Service Graph for Microsoft Defender for IoT integration, provide the sys ID of the OT VR import record. **Note:** If the Operational Technology Vulnerability Response plugin is installed and this property field is left blank, the **Microsoft D4IoT Devices CVE Integration (Delta Import)** executes if Active is set to **true** on the record.

c. Select **Save**.

8. To import sensors, complete the following:
   a. In the Configure Sensors (NIDS) section, select the Import Sensors task.
   b. Select **Configure**.
   c. Select **Active** to activate the Scheduled Data Import job.
9. To configure the NIDS, complete the following:
   a. In the Configure Sensors (NIDS) section, select the Import Sensors task.
   b. Select **Mark as complete** once you complete the NIDS configuration linked in the description.
10. To configure import schedules, complete the following:
    a. In the Configure Import Schedules section, select **Configure**.
    b. Select **SG-OT Microsoft D4IoT Sensors Scheduled Import** to review or change the sensors import schedule as needed.

- By default, the sensors import schedule is configured to run daily at midnight.
- Import sensors before importing devices or connections.

c. Select **Active** to activate the sensors import schedule.

d. Select **SG-OT Microsoft D4IoT Devices Scheduled Import** to review or change the devices import schedule as needed.

- By default, the devices import schedule is configured to run daily at midnight.
- Devices are queried by sensor. The Service Graph Connector queries for devices detected by validated sensors. For information about configuring Network Intrusion Detection System (NIDS) appliances, see Validate the NIDS.

e. Select **Active** to activate the devices import schedule.

f. Select **SG-OT Microsoft D4IoT Connections Scheduled Import** to review or change the connections import schedule as needed.

- By default, the connections import schedule is configured to run after the devices import runs (**After Parent Runs**).
- Connections are only imported if both devices (Source & Destination in Microsoft API, or Parent & Child in the CMDB) are already in the CMDB.
- Import devices before importing connections.

CMDB classes targeted in the Service Graph Connector for Microsoft Defender for IoT (On-premises Management Console)

When you complete the guided setup, you can configure the integration to periodically pull data from a Microsoft Defender for IoT (On-premises Management Console) project. The data is saved in tables that extend from the Configuration item [cmdb_ci] table.

Computer [cmdb_ci_computer]

The following attributes in the Computer [cmdb_ci_computer] table are populated by collected data:

Computer [cmdb_ci_computer] attributes

Attribute label	Attribute name
Most recent discovery	last_discovered
Operating System	os
OS Address Width (bits)	os_address_width
OS Domain	os_domain
OS Version	os_version

External system metadata [cmdb_key_value_v2]

The following attributes in the External system metadata [cmdb_key_value_v2] table are populated by collected data:

External system metadata [cmdb_key_value_v2] attributes

Attribute label	Attribute name
Discovery source	discovery_source
Key	key
Source key	source_key
String value	string_value
URL value	url_value
Value type	value_type

Hardware [cmdb_ci_hardware]

The following attributes in the Hardware [cmdb_ci_hardware] table are populated by collected data:

Hardware [cmdb_ci_hardware] attributes

Attribute label	Attribute name
Class	sys_class_name
Model number	model_number
Most recent discovery	last_discovered
Location	location
Model ID	model_id
Manufacturer	manufacturer
First discovered	first_discovered
Owned by	owned_by
Approval group	change_control
Managed By Group	managed_by_group
Managed by	managed_by
Name	name
Company	company
Support group	support_group
Change Group	assignment_group
Assigned to	assigned_to
Supported by	supported_by

Relationships created for Hardware

Parent class	Relationship type	Child class
Hardware [cmdb_ci_hardware]	Owns::Owned by	IP Address [cmdb_ci_ip_address]

Relationships created for Hardware (continued)

Parent class	Relationship type	Child class
Hardware [cmdb_ci_hardware]	Owns::Owned by	Network Adapter [cmdb_ci_network_adapter]
Hardware [cmdb_ci_hardware]	Reference	External system metadata [cmdb_key_value_v2]
Hardware [cmdb_ci_hardware]	Reference	OT Device [cmdb_ot_entity]

IP Address [cmdb_ci_ip_address]

The following attributes in the IP Address [cmdb_ci_ip_address] table are populated by collected data:

IP Address [cmdb_ci_ip_address] attributes

Attribute label	Attribute name
IP Address	ip_address
IP version	ip_version
Owned By Configuration Item	owned_by_cmdb_ci

Relationships created for IP Address

Parent class	Relationship type	Child class
IP Address [cmdb_ci_ip_address]	Reference	Network Intrusion Detection System [cmdb_ci_nids]
IP Address [cmdb_ci_ip_address]	Reference	Hardware [cmdb_ci_hardware]

Network Adapter [cmdb_ci_network_adapter]

The following attributes in the Network Adapter [cmdb_ci_network_adapter] table are populated by collected data:

Network Adapter [cmdb_ci_network_adapter] attributes

Attribute label	Attribute name
MAC Address	mac_address
Name	name
Discovery source	discovery_source

Relationships created for Network Adapter

Parent class	Relationship type	Child class
Network Adapter [cmdb_ci_network_adapter]	Reference	Network Intrusion Detection System [cmdb_ci_nids]

Relationships created for Network Adapter (continued)

Parent class	Relationship type	Child class
Network Adapter [cmdb_ci_network_adapter]	Reference	Hardware [cmdb_ci_hardware]

Network Intrusion Detection System [cmdb_ci_nids]

The following attributes in the Network Intrusion Detection System [cmdb_ci_nids] table are populated by collected data:

Network Intrusion Detection System [cmdb_ci_nids] attributes

Attribute label	Attribute name
First discovered	first_discovered
NIDS source name	source_name
Life Cycle Stage	life_cycle_stage
Life Cycle Stage Status	life_cycle_stage_status
Name	name
Correlation ID	correlation_id
Firmware version	firmware_version
Fully qualified domain name	fqdn
NIDS assignment zone	zone
NIDS manager connection state	connection_state
Validated	validated
Manufacturer	manufacturer

Relationships created for NIDS

Parent class	Relationship type	Child class
Network Intrusion Detection System [cmdb_ci_nids]	Detects::Detected by	Hardware [cmdb_ci_hardware]
Network Intrusion Detection System [cmdb_ci_nids]	Owns::Owned by	IP Address [cmdb_ci_ip_address]
Network Intrusion Detection System [cmdb_ci_nids]	Owns::Owned by	Network Adapter [cmdb_ci_network_adapter]

Operational Technology (OT) [cmdb_ci_ot]

The following attributes in the Operational Technology (OT) [cmdb_ci_ot] table are populated by collected data:

Operational Technology (OT) [cmdb_ci_ot] attributes

Attribute label	Attribute name
Most recent discovery	last_discovered

OT Control Module [cmdb_ci_ot_control_module]

The following attributes in the OT Control Module [cmdb_ci_ot_control_module] table are populated by collected data:

OT Control Module [cmdb_ci_ot_control_module] attributes

Attribute label	Attribute name
Vendor	vendor
Support group	support_group
Serial number	serial_number
Class	sys_class_name
First discovered	first_discovered
Approval group	change_control
Managed by	managed_by
Managed By Group	managed_by_group
Change Group	assignment_group
Company	company
Rack number	rack_number
Slot number	slot_number
Location	location
Name	name
Firmware version	firmware_version
Most recent discovery	last_discovered
Assigned to	assigned_to
Owned by	owned_by
Supported by	supported_by
Model ID	model_id

Relationships created for OT Control Module

Parent class	Relationship type	Child class
OT Control Module [cmdb_ci_ot_control_module]	Reference	OT Device [cmdb_ot_entity]

OT Control System [cmdb_ci_ot_control]

The following attributes in the OT Control System [cmdb_ci_ot_control] table are populated by collected data:

OT Control System [cmdb_ci_ot_control] attributes

Attribute label	Attribute name
Has module	has_module
Most recent discovery	last_discovered

Relationships created for OT Control System

Parent class	Relationship type	Child class
OT Control System [cmdb_ci_ot_control]	Owns::Owned by	OT Control Module [cmdb_ci_ot_control_module]

OT Device [cmdb_ot_entity]

The following attributes in the OT Device [cmdb_ot_entity] table are populated by collected data:

OT Device [cmdb_ot_entity] attributes

Attribute label	Attribute name
ISA entity site	isa_entity_site
OT discovery source ID	ot_correlation_id
Device criticality	business_criticality
Purdue level	purdue_level
Zone	zone
OT device type	ot_asset_type

PLC [cmdb_ci_ot_plc]

The following attributes in the PLC [cmdb_ci_ot_plc] table are populated by collected data:

PLC [cmdb_ci_ot_plc] attributes

Attribute label	Attribute name
Most recent discovery	last_discovered
Switch position	switch_position
Switch remote	switch_remote_mode

Serial Number [cmdb_serial_number]

The following attributes in the Serial Number [cmdb_serial_number] table are populated by collected data:

Serial Number [cmdb_serial_number] attributes

Attribute label	Attribute name
Serial Number	serial_number
Serial Number Type	serial_number_type
Valid	valid

Relationships created for Serial Number

Parent class	Relationship type	Child class
Serial Number [cmdb_serial_number]	Reference	Hardware [cmdb_ci_hardware]
Network Adapter [cmdb_ci_network_adapter]	Reference	Hardware [cmdb_ci_hardware]

Attribute mapping and classification for the Service Graph Connector for Microsoft Defender for IoT (On-premises Management Console)

The following tables describe the attribute mapping and classification for sensors and devices.

Sensors attribute mapping

Payload field name	Data type	Mapped to table	Mapped to field	Description
id	String format: /subscriptions/<subscription-id>/provider/<provider>/locations/<location>/sites/<site>/sensor/<sensor-name>	• sys_object_source • cmdb_ci_nids	• snk in sys_object_source • correlation_id	Unique ID for the sensor.
name	String	cmdb_ci_nids	name	Name of the sensor.
properties.hostname	String	cmdb_ci_nids	fqdn	Host name of the sensor.
properties.ip	String	cmdb_ci_ip_address	ip_address	IP address of the sensor.
properties.learningMode	Boolean	cmdb_ci_nids	False or unavailable: Life Cycle Stage (life_cycle_stage) : Operational Life Cycle Stage Status (life_cycle_stage_status): In Use	Learning mode status of the IoT sensor.

Sensors attribute mapping (continued)

Payload field name	Data type	Mapped to table	Mapped to field	Description
			True: Life Cycle Stage (life_cycle_stage) : Operational Life Cycle Stage Status (life_cycle_stage_status): Learning	
properties.mac	String	cmdb_ci_network_adapter	mac_address	MAC address of the sensor.
properties.sensorStatus	String	cmdb_ci_nids	connection_state	Status of the IoT sensor.
properties.sensorVersion	String	cmdb_ci_nids	firmware_version	Version of the IoT sensor.
properties.upSince_date	Date and time as string	cmdb_ci_nids	first_discovered	Startup time.
properties.zone	String	cmdb_ci_nids	zone	Zone of the IoT sensor.

Devices attribute mapping

Payload field name	Data type	Mapped to table	Mapped to field	Description
id	String format: /subscriptions/subscription-id>/providers/<providers-id>/location/<location>/deviceGroups/<device-Group>/devices/<name-field>	• sys_object_source • cmdb_ot_entity • cmdb_key_value_v2	• snk in sys_object_source • discovery_source_id in cmdb_ot_entity	Unique ID for the device.
resourceGroup	(Empty)	cmdb_key_value_v2	(Empty)	Resource group
tenantId	(Empty)	cmdb_key_value_v2	(Empty)	Tenant ID
properties.authorizedState	String	cmdb_key_value_v2	(Empty)	Authorized state of the device
properties.criticality	String	cmdb_ot_entity	business_criticality	Criticality of the device
properties.deviceName	String	cmdb_ci	name	Name of the device.
properties.deviceSubtype	String	cmdb_ci	sys_class_name	Device subtype display name.

Devices attribute mapping (continued)

Payload field name	Data type	Mapped to table	Mapped to field	Description
properties.firstSeen	Date and time as string	• cmdb_ci • cmdb_ci_ot_control_module (if control modules are present)	first_discovered	First time the device was seen.
properties.lastSeen	Date and time as string	• cmdb_ci • cmdb_ci_ot_control_module (if control modules are present)	most_recent_discovery	Last time the device was seen.
properties.purdueLevel	String	cmdb_ot_entity	purdue_level	Purdue level of the device.
properties.operatingSystem.distribution	String	cmdb_ci_computer	os	OS distribution
properties.operatingSystem.version	String	cmdb_ci_computer	os_version	OS version
properties.operatingSystem.platform	String	cmdb_ci_computer	os_domain	OS platform
properties.operatingSystem.architecture	String	cmdb_ci_computer	os_address_width	OS architecture
properties.additionalFields.plcKeyState	(Empty)	cmdb_ci_ot_plc	switch_position	PLC key state
properties.additionalFields.plcRunState	(Empty)	cmdb_ci_ot_plc	switch_remote_mode	PLC run state
properties.hardware	Object	(Empty)	(Empty)	Device hardware data
properties.hardware.model	String	cmdb_ci	(Empty)	Hardware model
properties.hardware.serialNumber	String	cmdb_serial_number	serial_number	Hardware serial number
properties.hardware.vendor	String	cmdb_ci	manufacturer	Hardware vendor
properties.nics	Array of Objects	(Empty)	(Empty)	List of the device network interface cards.
properties.nics[{}]	Object	(Empty)	(Empty)	Network interface card properties
properties.nics[{}].ipv4Address	String	cmdb_ci_ip_address	ip_address	IPv4 address
properties.nics[{}].macAddress	String	cmdb_ci_network_adapter	mac	MAC Address
properties.slots	Array of Objects	(Empty)	(Empty)	List of the device slot in the backplane.
properties.slots[{}]	Object	(Empty)	(Empty)	Slot data in PLC backplane.
properties.slots[{}].firmwareVersion	String	cmdb_ci_ot_control_module	firmware_version	Firmware version of the slot.

Devices attribute mapping (continued)

Payload field name	Data type	Mapped to table	Mapped to field	Description
properties.slots[{}].model	String	cmdb_ci_ot_control_module	model_id	Model of the slot.
properties.slots[{}].rackNumber	Integer	cmdb_ci_ot_control_module	rack_number	Rack number in the backplane
properties.slots[{}].serialNumber	String	cmdb_ci_ot_control_module	serial_number	Serial number of the slot.
properties.slots[{}].slotNumber	Integer	cmdb_ci_ot_control_module	slot_number	Slot number inside the rack.
properties.slots[{}].hardwareVendor	String	cmdb_ci_ot_control_module	vendor	Hardware vendor of the slot.

Device type classification

Microsoft Azure device sub type name	Microsoft Azure device type name	Operating system/ firmware	NOW class	NOW table	NOW OT type
Alarm Siren	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
Alarm System	(Empty)	(Empty)	OT Control System	cmdb_ci_ot_control	OT Control System
ATM	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
Backup Server	(Empty)	(Empty)	Server	cmdb_ci_server	NULL
Barcode Scanner	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
DB Server	(Empty)	(Empty)	Server	cmdb_ci_server	NULL
DCS Controller	Industrial	(Empty)	DCS	cmdb_ci_ot_dcs	NULL
Domain Controller	(Empty)	(Empty)	Server	cmdb_ci_server	NULL
Door Control Panel	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
DVR	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
Elevator	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
Engineering Station	Industrial	(Empty)	EWS	cmdb_ci_ot_ews	EWS
Fire Alarm	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
Fire Detector	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
Firewall	(Empty)	(Empty)	IP Firewall	cmdb_ci_ip_firewall	NULL
Game console	(Empty)	(Empty)	Game Console	cmdb_ci_game_console	NULL
Historian	(Empty)	(Empty)	Historian	cmdb_ci_ot_historian	Historian
HMI	Industrial	(Empty)	HMI	cmdb_ci_ot_hmi	HMI

Device type classification (continued)

Microsoft Azure device sub type name	Microsoft Azure device type name	Operating system/ firmware	NOW class	NOW table	NOW OT type
Humidity Sensor	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
HVAC	(Empty)	(Empty)	HVAC Equipment	cmdb_ci_hvac	NULL
I/O Adapter	(Empty)	(Empty)	Network Adapter	(Empty)	NA
IED	(Empty)	(Empty)	IED	cmdb_ci_ot_ied	ied
Industrial Packaging System	(Empty)	(Empty)	OT Field Device	cmdb_ci_ot_field_device	OT Field Device
Industrial Robot	(Empty)	(Empty)	Industrial Robot	cmdb_ci_ot_industrial_robot	Industrial Robot
Industrial Scale	(Empty)	(Empty)	OT Field Device	cmdb_ci_ot_field_device	OT Field Device
Intercom	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
IP Camera	(Empty)	(Empty)	IP Camera	cmdb_ci_ip_camera	NULL
IP Telephone	(Empty)	(Empty)	IP phone	cmdb_ci_ip_phone	NULL
Marquee	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
Meter	(Empty)	(Empty)	Industrial Sensor	cmdb_ci_ot_industrial_sensor	Industrial Sensor
Motion Detector	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
Multicast/ Broadcast	(Empty)	(Empty)	Netgear	cmdb_ci_netgear	NULL
NTP Server	(Empty)	(Empty)	Server	cmdb_ci_server	NULL
People Counter System	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
Physical Location	(Empty)	(Empty)	(Empty)	(Empty)	NULL
PLC	Industrial	(Empty)	PLC	cmdb_ci_ot_plc	PLC
Pneumatic Device	(Empty)	(Empty)	Industrial Actuator	cmdb_ci_ot_industrial_actuator	Industrial Actuator
Printer	(Empty)	(Empty)	Printer	cmdb_ci_printer	NULL
Protocol Converter	(Empty)	(Empty)	Netgear	cmdb_ci_netgear	NULL
Punch Clock	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL

Device type classification (continued)

Microsoft Azure device sub type name	Microsoft Azure device type name	Operating system/ firmware	NOW class	NOW table	NOW OT type
Robot Controller	(Empty)	(Empty)	OT Control System	cmdb_ci_ot_control	OT Control System
Router	(Empty)	(Empty)	IP Router	cmdb_ci_ip_router	NULL
RTU	(Empty)	(Empty)	RTU	cmdb_ci_ot_rtu	NULL
Server	Server	(Empty)	Server	cmdb_ci_server	NULL
Servo Drive	(Empty)	(Empty)	Industrial Actuator	cmdb_ci_ot_industrial_actuator	Industrial Actuator
Slot	(Empty)	(Empty)	OT Control Module	cmdb_ci_ot_control_module	OT Control Module
Smart Light	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
Smart Phone	(Empty)	(Empty)	Handheld Computing Device	cmdb_ci_handheld_computing	NULL
Smart Switch	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
Smart TV	(Empty)	(Empty)	Smart Television	cmdb_ci_stv	NULL
Storage	(Empty)	(Empty)	Server	cmdb_ci_server	NULL
Switch	Network Device	(Empty)	IP Switch	cmdb_ci_ip_switch	NULL
Tablet	(Empty)	(Empty)	Handheld Computing Device	cmdb_ci_handheld_computing	NULL
Terminal Station	(Empty)	(Empty)	Computer	cmdb_ci_computer	NULL
Thermostat	(Empty)	(Empty)	IoT device	cmdb_ci_iot	NULL
Turnstile	(Empty)	(Empty)	IoT device	cmdb_ci_iot	
Uninterruptable Power Supply	(Empty)	(Empty)	UPS	cmdb_ci_ups	NULL
Variable Frequency Drive	(Empty)	(Empty)	Industrial Drive	cmdb_ci_ot_industrial_drive	Industrial Drive
VPN Gateway	(Empty)	(Empty)	Netgear	cmdb_ci_netgear	NULL
Wifi Pineapple	(Empty)	(Empty)	Netgear	cmdb_ci_netgear	NULL
Wireless Access Point	(Empty)	(Empty)	Wireless Access Point	cmdb_ci_wap_network	NULL
WLAN access point	Network Device	(Empty)	Wireless Access Point	cmdb_ci_wap_network	NULL

Device type classification (continued)

Microsoft Azure device sub type name	Microsoft Azure device type name	Operating system/ firmware	NOW class	NOW table	NOW OT type
Workstation	Workstation	(Empty)	Computer	cmdb_ci_computer	NULL
Unknown	All	(Empty)	Operational Technology (OT)	cmdb_ci_ot	Operational Technology (OT)
Unclassified	Unclassified or All	(Empty)	Operational Technology (OT)	cmdb_ci_ot	Operational Technology (OT)
Any other type	(Empty)	(Empty)	Operational Technology (OT)	cmdb_ci_ot	Operational Technology (OT)
Any above type value except with designation Network and IoT	(Empty)	• windows server • windows server, version 2004[8] • windows server, version 1909[9] • windows server, version 1903[9] • windows server 2019 • windows server 2016 • windows server 2012 r2 • windows server 2012 • windows server 2008 r2 • windows server 2008 • windows server 2003 r2 • windows server 2003	Windows Server	cmdb_ci_linux_server	Same as when the operating system isn't present.

Device type classification (continued)

Microsoft Azure device sub type name	Microsoft Azure device type name	Operating system/ firmware	NOW class	NOW table	NOW OT type
		• windows 2000 server • windows nt 4.0 server • windows nt 3.51 server • windows nt 3.5 server • windows nt 3.1 server			
Any above type value except with designation Network and IoT	(Empty)	• linux • arch • centos • debian • fedora • suse • red hat • rhel • ubuntu • oracle	Linux Server	cmdb_ci_linux_server	Same as when the operating system isn't present.
Any above type value except with designation Network and IoT	(Empty)	aix	AIX Server	cmdb_ci_aix_server	Same as when the operating system isn't present.
Any above type value except with designation Network and IoT	(Empty)	esx	ESX Server	cmdb_ci_esx_server	Same as when the operating system isn't present.
Any above type value except with designation Network and IoT	(Empty)	• hp/ux • hpux	HP-UX Server	cmdb_ci_hpux_server	Same as when the operating system isn't present.

Device type classification (continued)

Microsoft Azure device sub type name	Microsoft Azure device type name	Operating system/ firmware	NOW class	NOW table	NOW OT type
Any above type value except with designation Network and IoT	(Empty)	• hyper-v • hyperv • hyper	HypverV Server	cmdb_ci_hyper_v_server	Same as when the operating system isn't present.
Any above type value except with designation Network and IoT	(Empty)	• solaris • sunos • sun os	Solaris Server	cmdb_ci_solaris_server	Same as when the operating system isn't present.
Any above type value except with designation Network and IoT	(Empty)	• macos x server • macos server • os x • osx	OSX Server	cmdb_ci_osx_server	Same as when the operating system isn't present.
Any above type value except with designation Network and IoT	(Empty)	• unix • gnu	Unix Server	cmdb_ci_unix_server	Same as when the operating system isn't present.
Any above type value except with designation Network and IoT	(Empty)	• win • windows • Microsoft • windows 1.0, 1.02, 1.03, 1.04, 2.03, 2.10, 2.11, 3.0, 3.1, 3.2, 7, 8, 8.1, 10, 98, 95 • windows 2000 • windows for workgroups 3.11 • windows me	Base Computer class	cmdb_ci_computer	Same as when the operating system isn't present.

Device type classification (continued)

Microsoft Azure device sub type name	Microsoft Azure device type name	Operating system/ firmware	NOW class	NOW table	NOW OT type
		• windows nt 3.1, 3.5, 3.51, 4.0 • windows vista • windows xp • windows xp professional x64 edition			
Any above type value except with designation Network and IoT	(Empty)	server	Base Server Class	cmdb_ci_server	Same as when the operating system isn't present.

Using the Operational Technology Manager

After you complete all required set up tasks, including installing the Operational Technology (OT) extension classes and assigning user roles, perform the following tasks to create the foundational data and relationships for the ServiceNow® Operational Technology solution.

Task	Purpose
1. Populate a Microsoft Excel spreadsheet with your existing Operational Technology data.	Positions your existing data in the correct columns on a Microsoft Excel spreadsheet to ensure the success of your data upload.
2. Import your Excel spreadsheet.	Uploads your existing Operational Technology data to the Configuration Management Database (CMDB).
3. Run the Discovery for Operational Technology function.	Discovers Operational Technology (OT) devices in designated Purdue levels in your Industrial Control System (ICS) networks
4. Use the selections on the Operational Technology (OT) menu.	Enables editing or viewing detailed information for the OT devices in your enterprise.

Service Graph Connector for Microsoft Excel

The Service Graph Connector for Microsoft Excel function enables you to import your existing Operational Technology data from a populated Microsoft Excel flat-file spreadsheet. You use it in the Integration Hub Extract Transform Load (ETL) to upload this data to the Configuration Management Database (CMDB).

Before you can run the import process, you must populate the Microsoft Excel spreadsheet with your existing Operational Technology data. When you import your Microsoft Excel spreadsheet using the Integration Hub ETL, it creates the correct configuration item (CI) records in the Configuration Management Database (CMDB). To learn more, see Operation Technology (OT) extension classes.

Related topics

- IntegrationHub
- IntegrationHub ETL

Configuring the Service Graph Connector for Microsoft Excel

Configure the Service Graph Connector for Microsoft Excel to import your existing Operational Technology data from a populated Microsoft Excel flat-file spreadsheet.

Use the Service Graph Connector for Microsoft Excel Excel guided setup and complete tasks in sequence to configure the Service Graph Connector for Microsoft Excel

Navigate to **All** > **Industrial Workspace Admin** > **Guided Setup**, open the following guided setups, and complete the tasks.

For more information on using guided setup, see Guided Setup.

Assign Pre-import OT Worksheet Entry Review roles

Assign roles to the users#br user groups so that you can manage the Service Graph Connector for Microsoft Excel staging table and ETL.

Before you begin

Role required: admin

About this task

Users with the roles that are listed in the following table can use the Operational Technology Manager application.

Role	Description
OT Staging User [ot_staging_user]	Can create, edit, and view records in the staging table.
CMDB Inst Admin [cmdb_inst_admin]	Can view and edit ETL.
OT Excel Import User [ot_excel_import_user]	Can create, edit, and view Import Tasks. This is the minimum role to perform Excel SGC imports via Import Tasks. This role contains ot_staging_user.
CMDB OT Editor [cmdb_ot_editor]	Can view and reassign Excel SGC Remediation Tasks. Needs additional ot_staging_user role to perform Remediation Tasks.
CMDB OT Admin [cmdb_ot_admin]	Can perform both Import and Remediation Tasks. This role contains both ot_excel_import_user and cmdb_ot_editor.

Procedure

Assign roles to users and groups by using the ServiceNow AI Platform user administration feature.

Review class mappings

Review and update the class mappings available for the Service Graph Connector for Microsoft Excel.

Before you begin

- Ensure that the Industrial Core plugin is installed so you can view the class mapping tables available.
- Role required: admin or cmdb_ot_admin

About this task

The Service Graph Connector for Microsoft Excel uses the configuration available in the Excel SGC Class Mapping [excel_sgc_class_mapping] table to determine the best ServiceNow Configuration Management Database (CMDB) class each configuration item (CI) should be placed into. You can modify these settings at any time but it is best to review the current configuration before running your first import.

Procedure

1. Navigate to **All** > **OT Manager Admin** > **Excel SGC Class Mappings**.
2. Review and update the following fields in the class mapping records as needed.

Classification settings fields

Field	Description
Source Class	The class of the source CI.
Target CMDB class	The expected ServiceNow class for the CI.
OT Device type	The category type that the OT device is classified as. The device type is also the function that the device plays on the OT network. For example: An IT device, such as a server, can be converted to an OT device, and the function it plays on the network is an HMI. Therefore, its class is **server** and its device type is **HMI**. **Note:** In some cases, there are OT devices with no OT function or OT devices where the device type is unknown. For OT devices with no OT function, select **No OT Function**. For OT devices where the device type is unknown, select **Unknown**.
Allow OS classification	When set to **True**, if an operating system is found on the CI, the target is switched away from the target CMDB class to a ServiceNow class that matches its OS.
Active	When checked, the class mapping is set to **Active**.

Review the system properties used by the Service Graph Connector for Microsoft Excel

As an OT Admin or CMDB Integration Admin, view system properties related to the Service Graph Connector for Microsoft Excel.

Before you begin

View a filtered list of all the system properties that are used by the Service Graph Connector.

Role required: cmdb_ot_admin or cmdb_inst_admin

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **OT Manager Admin** > **Import OT Devices - System Properties**.
   The list shows records whose names begin with **sn_otsm_sgc.excel**.
2. Review the following system properties.

Service Graph Connector for Microsoft Excel system properties

System property	Description
sn_otsm_sgc.excel.fields.for.transformed.name	○ This property enables the user to provide the fields to construct the transformed name. ○ The field value or column names must be separated by comma. This transformed name is used as the name of the configuration item (CI) instead of the name field directly from the staging table. By default, the name field value is itself used as the transformed name value. ○ This property belongs to the **sn_otsm_sgc** scope and is automatically appended to this property name. ○ Requires the admin, cmdb_ot_admin, and cmdb_inst_admin roles for read and write operations.
sn_otsm_sgc.excel.transformed.name.delimiter	○ This property specifies the delimiter to be used when computing the transformed name with more than one field or column value specified in the system property **fields.for.transformed.name**. ○ If only one column name is specified in the **fields.for.transformed.name** property, the delimiter is not used.

System property	Description
	○ This property belongs to the **sn_otsm_sgc** scope and is automatically appended to this property name. ○ Requires the admin, cmdb_ot_admin, and cmdb_inst_admin roles for read and write operations.
sn_otsm_sgc.excel.fields.for.validation.state.change	○ This property enables you to provide a comma-separated list of attributes so that their validation state is changed to **Pending validation**. The default value is **Empty**. **Note:** Changes to the identifier fields, such as Mac Address, Serial Number, Transformed Name, and slot number (for OT control modules), the validation state is changed to **Pending validation**. ○ This property belongs to the sn_otsm_sgc scope and is automatically appended to this property name. ○ Requires the admin, cmdb_ot_admin, and cmdb_inst_admin roles for read and write operations.
sn_otsm_sgc.enable.cmdb.validations	○ This property enables CMDB validations for the staging devices. If set to **True**, staging devices are validated against existing CMDB CIs for reconciliation. ○ This property belongs to the sn_otsm_sgc scope and is automatically appended to this property name. ○ Requires the admin, cmdb_ot_admin, and cmdb_inst_admin roles for read and write operations.

Add a custom field mapping in the staging table for Service Graph Connector for Microsoft Excel

With the Service Graph Connector for Microsoft Excel, add a custom field to the staging table and map the custom field to the configuration item (CI) field.

Before you begin

To configure the form layout, see Configure the form layout.

To create a custom field on the staging table, see Add and customize a field in a table.

Roles required:

- admin - Can change the script include. Can add class or field mappings and change the ETL.
- cmdb_inst_admin - Can only add new class or field mappings and change the ETL.

Procedure

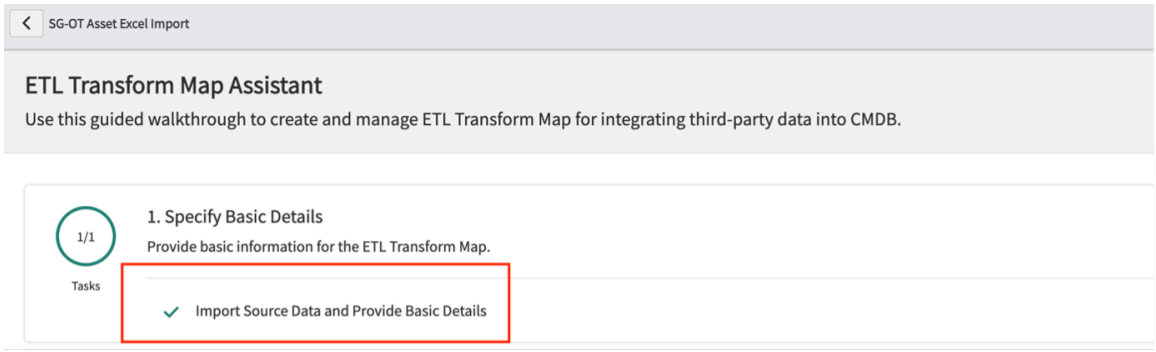
1. Add custom columns to the Staging [sg_ot_excel_staging] table.
2. Navigate to **All** and in the **Filter** field, add `sg_ot_excel_staging.list`.
3. On your keyboard, press enter.
4. If needed, manually create records by selecting **New**.
5. Navigate to **All** > **Industrial Workspace Admin** > **OT Manager** > **Import OT Devices - Script Includes** and select the `SGOTAssetImportExcelConstants` script include.
6. In the script, update the new column name from the staging table, and the new ETL column name inside the `SGOTAssetImportExcelConstants.importSetColumnsVsStagingColumnsMap` object in the format “<ETL Column Name>”: “<Column Name from staging table>”.

   In this example, the “u_my_custom_field” before the colon (:) indicates the ETL column name (shown as a column in the ETL preview step), and the “u_my_custom_field” after the colon indicates the column name in the staging table.

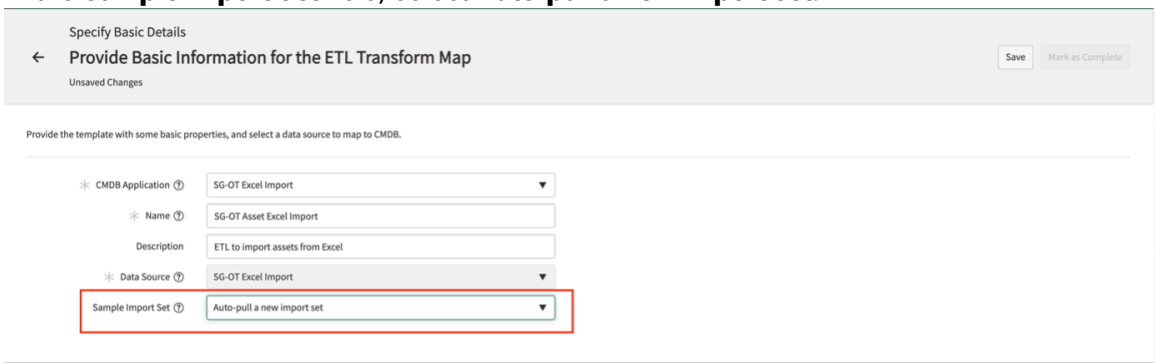
   Make sure that there’s a comma (,) added at the end of the line above the new line. In this example, a comma is added after the "custom_fields": "custom_fields" line.

```
SGOTAssetImportExcelConstants.importSetColumnsVsStagingColumnsMap = {
    // unique id used to uniquely identify the asset
    "id": "correlation_id",
    // Name of the asset
    "name": "transformed_name",
    // OperatingSystem of the asset
    //"operating_system": "os_version",
    // type of the asset.
    "type": "type",
    // if the asset has control module
    "has_module": "has_module",
    // id of the asset to which a control module belongs to (this is used in control module type asset).
    "control_module_parent_correlation_id": "control_module_parent_correlation_id",
    "ot_display_name": "display_name",
    "serial_number": "serial_number",
    "firmware_version": "firmware_version",
    "os_version": "os_version",
    "operating_system": "os",
    "assigned_to": "assigned_to",
    "manufacturer": "manufacturer",
    "model_number": "model_number",
    "serial_number_type": "serial_number_type",
    "purdue_level": "purdue_level",
    "asset_criticality": "asset_criticality",
    "short_description": "short_description",
    "vendor": "vendor",
    "equipment_model_entity_path": "equipment_model_entity_path",
    "first_discovered": "first_discovered",
    "hardware_version": "hardware_version",
    "status": "status",
    "backplane_name": "backplane_name",
    "backplane_id": "backplane_id",
    "slot_number": "slot_number",
    "rack_number": "rack_number",
    "module_type": "module_type",
    "device_type": "io_field_device_type",
    "support_group": "support_group",
    "site": "site",
    "ip_address": {
        "ip": "ip_address_" + SGOTAssetImportExcelConstants.STAGING.NESTED_COLUMN_DELIMITER
    },
    "mac_address": {
        "mac": "mac_address_" + SGOTAssetImportExcelConstants.STAGING.NESTED_COLUMN_DELIMITER
    },
    "memory": {
        "memory_card_serial": "memory_card_serial_" + SGOTAssetImportExcelConstants.STAGING.NESTED_COLUMN_DELIMITER,
        "memory_size": "memory_size_" + SGOTAssetImportExcelConstants.STAGING.NESTED_COLUMN_DELIMITER,
        "memory_type": "memory_type_" + SGOTAssetImportExcelConstants.STAGING.NESTED_COLUMN_DELIMITER
    },
    "software_installed": {
        "name": "software_installed_" + SGOTAssetImportExcelConstants.STAGING.NESTED_COLUMN_DELIMITER,
        "version": "software_version_" + SGOTAssetImportExcelConstants.STAGING.NESTED_COLUMN_DELIMITER,
        "install_date": "software_install_date_" + SGOTAssetImportExcelConstants.STAGING.NESTED_COLUMN_DELIMITER
    },
    // Do not change this. Key should match value of SGOTAssetImportExcelConstants.CUSTOM_FIELDS_COL_NAME_IN_IMPORT_SET
    "custom_fields": {
        "customfield": "customfield_" + SGOTAssetImportExcelConstants.STAGING.NESTED_COLUMN_DELIMITER
    }
```

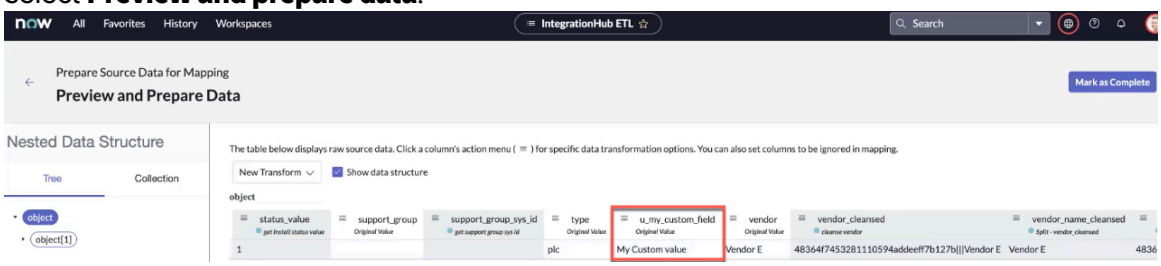
7. Select **Update** to save your changes.
8. Navigate to **All** > **Configuration** > **IntegrationHub ETL**.
9. Select the **CMDB Application: SG-OT Excel Import** ETL.
10. If the Invalid Mapping Data-Detected page is displayed, select **Close**.
11. From the ETL Transform Map Assistant, in the Specify Basic Details section of the guided setup, select **Import Source Data and Provide Basic Details**.



12. In the **Sample Import Set** field, select **Auto-pull a new import set**.



13. Select **Save**.
    The basic information saved successfully banner is displayed.
14. Select **Mark as Complete**.
15. From the ETL Transform Map Assistant page, in the Prepare Source Data for Mapping section, select **Preview and prepare data**.



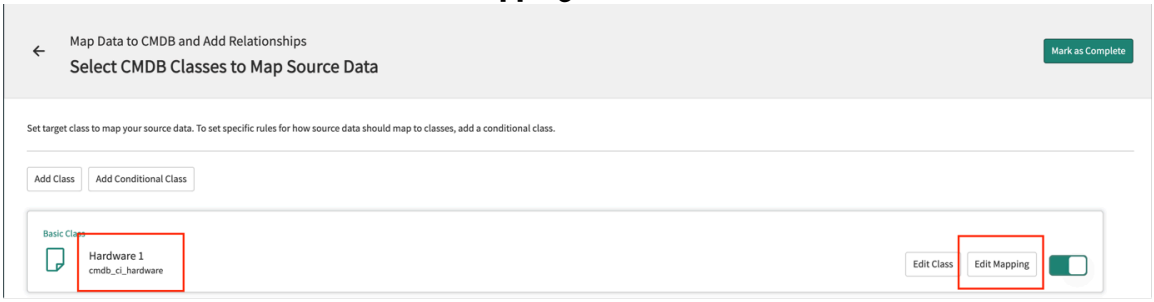
    If the column isn't visible, repeat the steps 11 through 14.
16. Select **Mark as Complete**.
17. From the ETL Transform Map Assistant page, in the Map Data to CMDB and Add Relationships section, select **CMDB Classes to Map Source Data**.
18. Map the column to the target class and attribute.

    For example, the **Comments** field is present on the Hardware [cmdb_ci_hardware] class. After the field is mapped, the **Comments** field on Hardware child classes is updated if the value for the Comments column in the staging table for that row isn't empty.

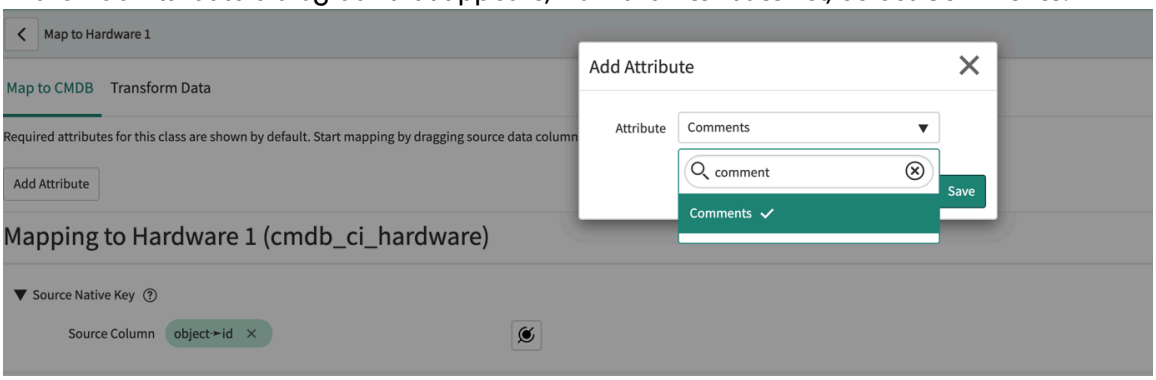
    If you're adding a mapping for a new field that isn't present, or for a field that isn't specific to the Hardware *cmdb_ci_hardware* class and instead is a field in the Operational Technology *(cmdb_ci_ot)* class, you can add the field mapping in the Operational Technology (OT) 1 stub.

a. Add a field mapping to the Hardware 1 class.

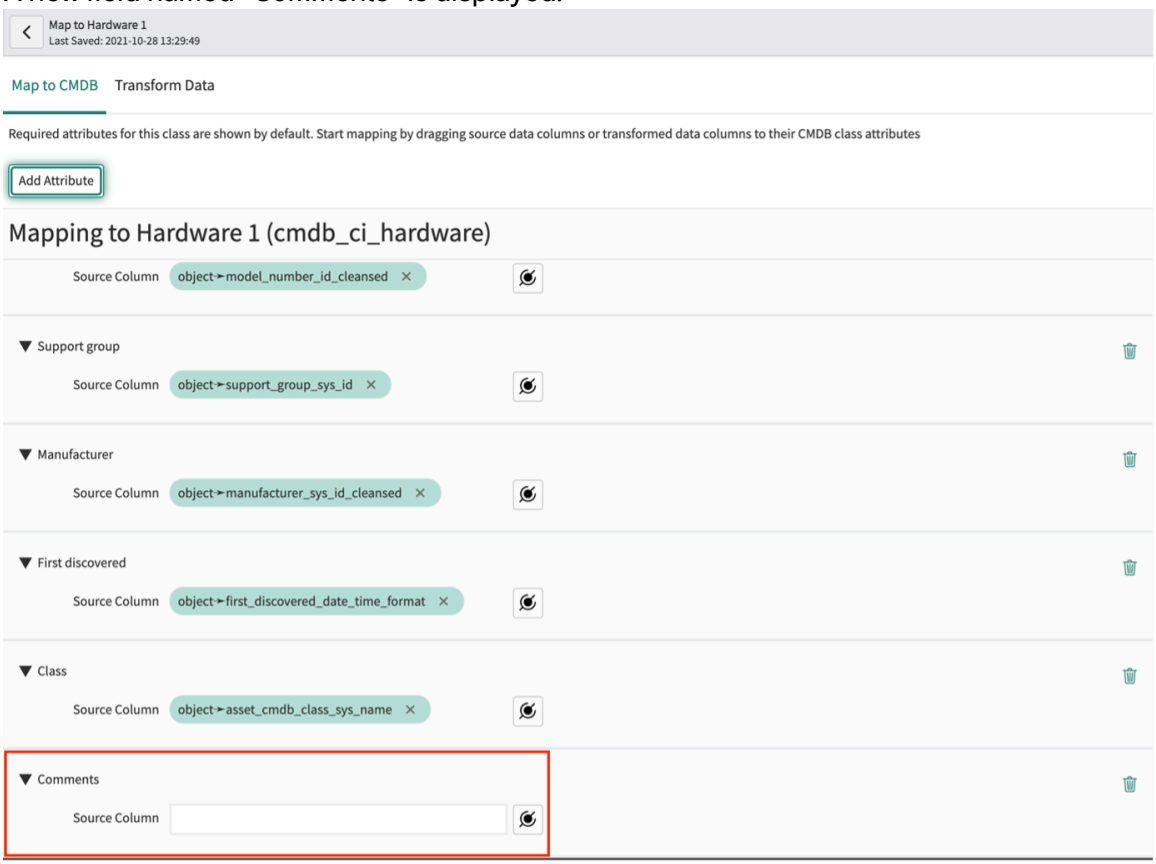
b. For the Hardware 1 class, select **Edit Mapping**.



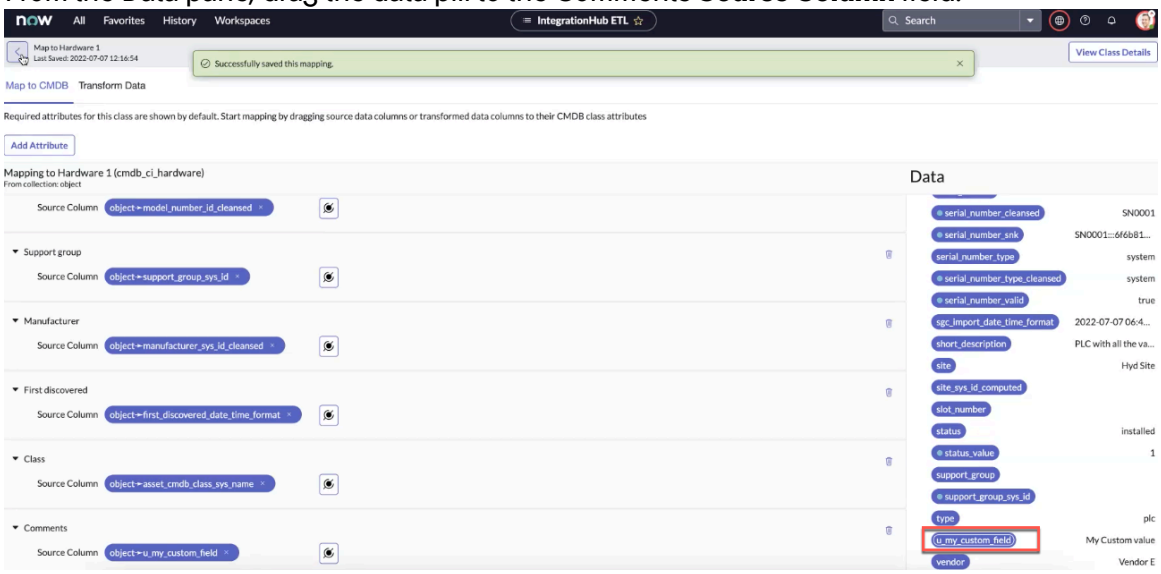
19. In the Add Attribute dialog box that appears, from the **Attribute** list, select **Comments**.



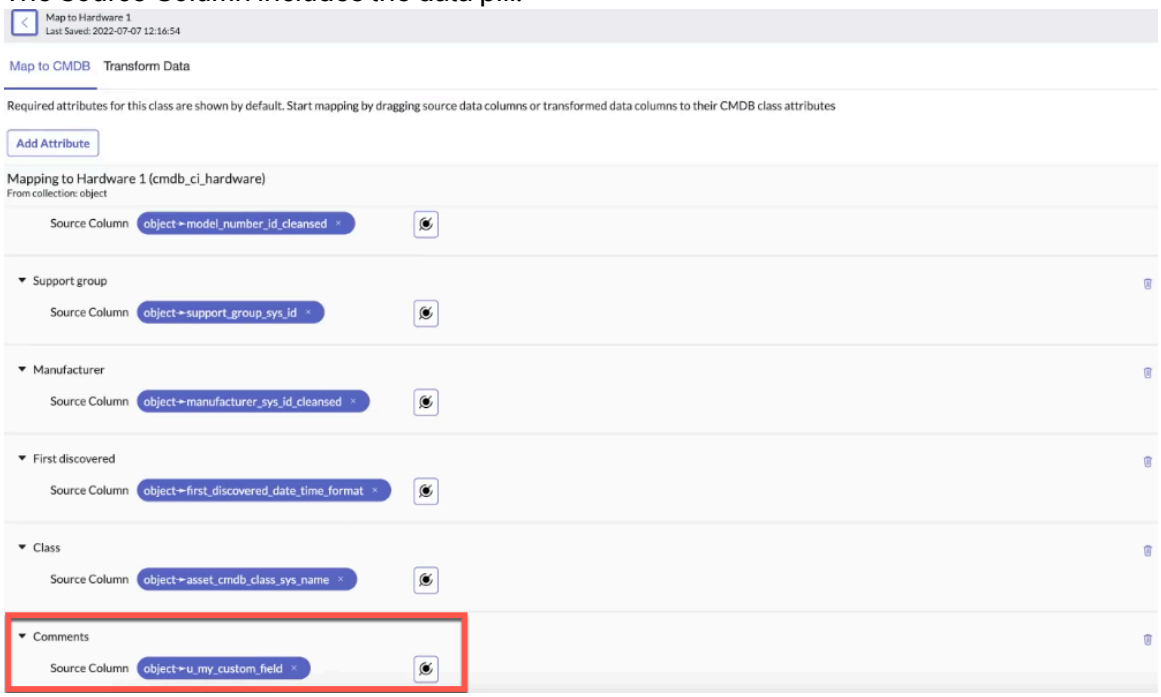
20. Select **Save**.
A new field named “Comments” is displayed.



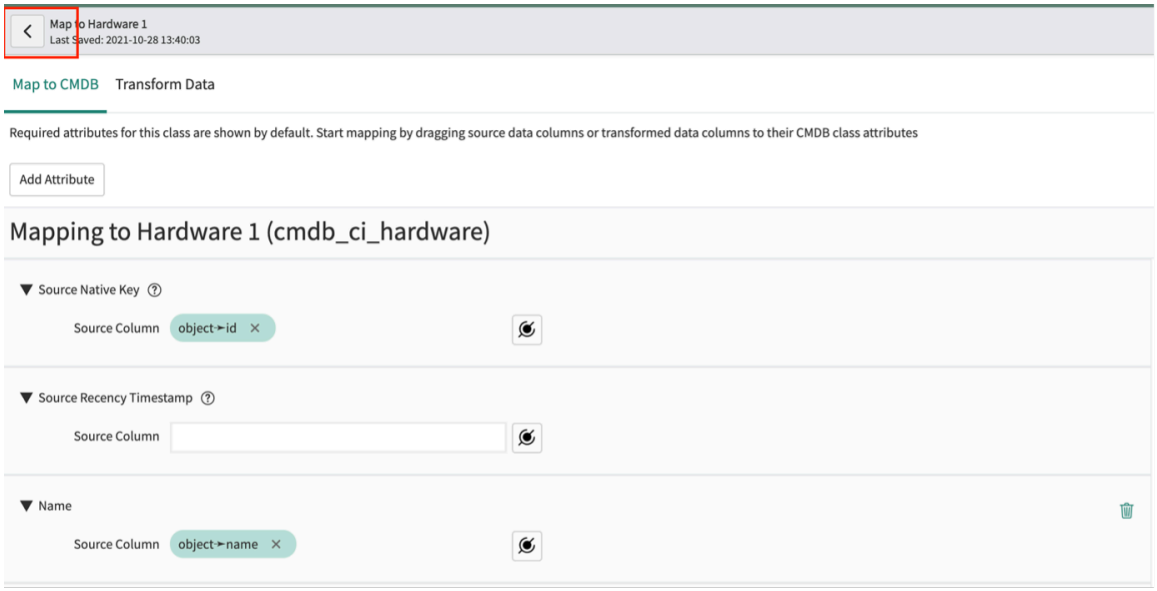
21. From the Data pane, drag the data pill to the Comments **Source Column** field.



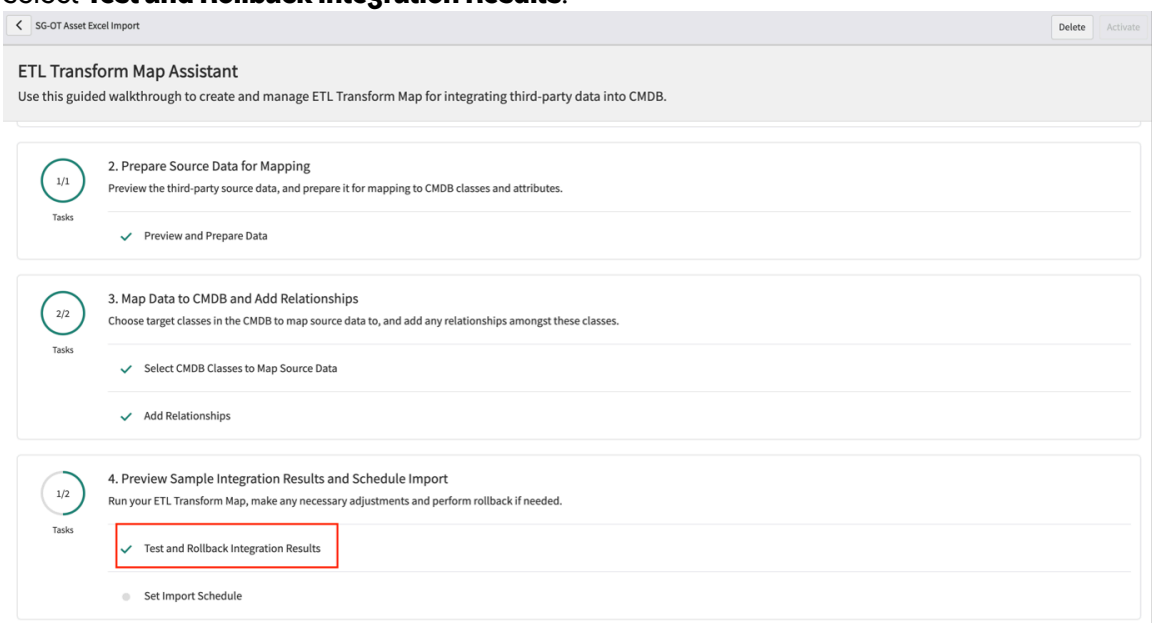
You can also select the source column icon ( ) to select the data-mapping field for it. The Source Column includes the data pill.



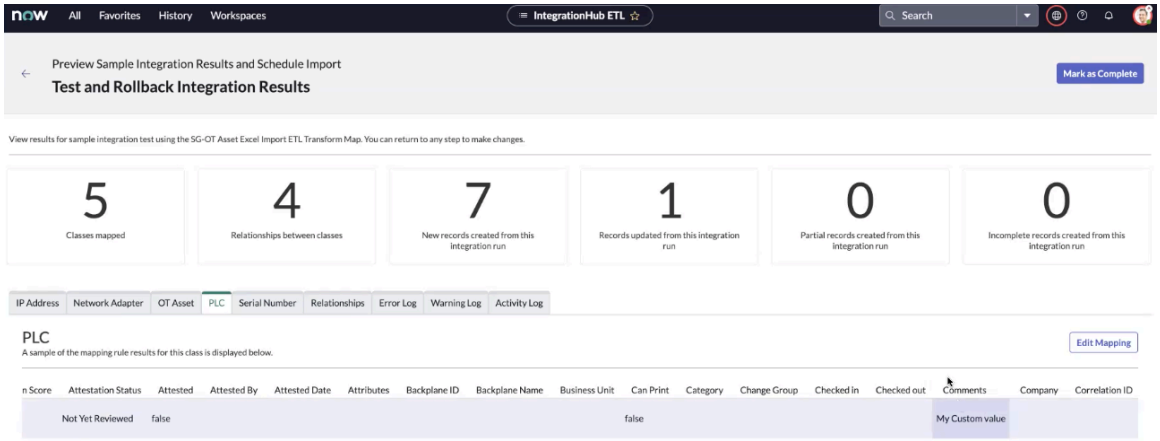
22. Navigate back to the **CMDB Classes to Map Source Data** of the Map Data to CMDB and Add Relationships section in the ETL Transform Map Assistant page.



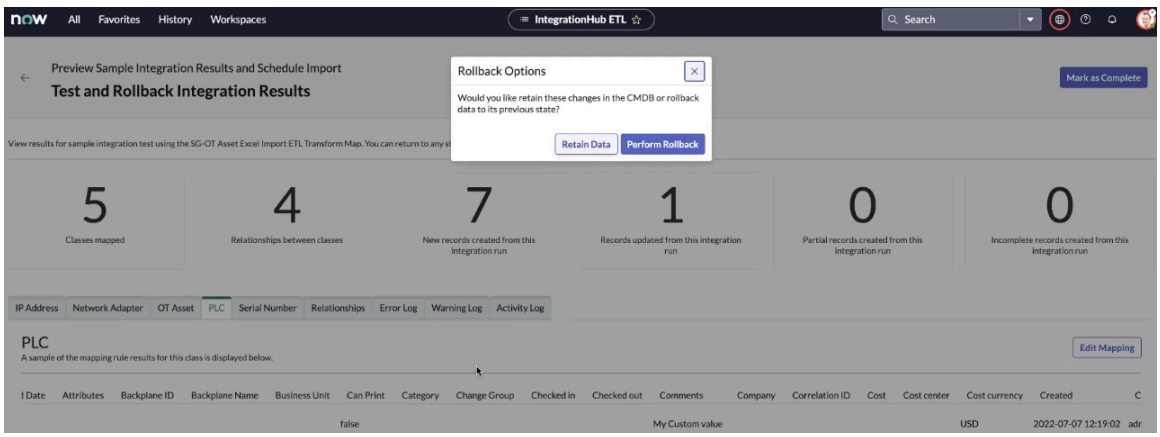
23. Select **Mark as Complete**.
24. Follow these steps to verify the new field mappings.
    a. Navigate to the home page of the ETL Transform Map Assistant.
    b. In the Preview Sample Integration Results and Schedule Import section of the guided setup, select **Test and Rollback Integration Results**.



    c. Select **Run Integration**.
    d. After the run finishes successfully, confirm that the Comments field of the CI that you provided a comments value for is updated in the staging table.
    e. Select **Mark as Complete**.



f. Select **Perform Rollback**.



g. If the ETL isn't activated, select **Activate**.
The new column field mapping is successfully added and verified.

Add a custom implementation for device classification

Customize the base system classification of an device based on the type, os_version, and firmware_version.

Before you begin

The base system for the *sn_otsm_sgc.SGOTAssetImportExtensionPoint* extension point uses the default implementation script that is shipped with the name of *sn_otsm_sgc.SGOTAssetImportUtil*. To add a customized classification, create an implementation for the extension point in the **Service Graph Connector for Operational Technology (Excel)** scope.

Note:
User must have only one implementation of the extension point. If you implement and activate a custom extension point rather than the default one, you must deactivate the default implementation.

Role required: admin

Procedure

1. Navigate to **All** > **System Extension Point** > **Scripted Extension points**.
2. Select *sn_otsm_sgc.SGOTAssetImportExtensionPoint*.
3. Select the **Create Implementation** related link.

4. Enter a name for the extension point implementation.
5. In the script field, check that the class object with the following two functions is populated. Make sure that the result returned from the **getAssetCMDBSysClassNameWithOtEntityTypeSysId** extension point follows the format mentioned in the comments. Any change in the result string format results in import failure or irregularities. The format should be <cmdb class name>:::<ot entity type sys id>.

Option	Description
getAssetCMDBSysClassNameWithOtEntityTypeSysId(/*string*/ type, /*string*/ osVersion, /*string*/ firmwareVersion)	Implement this method to return the CMDB sys class name that the device belongs to, along with the OT Entity type sys_id concate nated with ":::". For unclassified devices, the OT device type is set to ot_base.
getComputerType((/*string*/ operatingSystem)	Returns the CMDB sys class name based on the operating sys tem passed.

6. After you make all the desired changes, select **Update**.
   The implementation for the extension point is created.

What to do next

From the related lists Implementations tab, open the base system extension point implementation to inactivate it.

Add a custom validation for devices

Customize the validation for your OT devices.

Before you begin

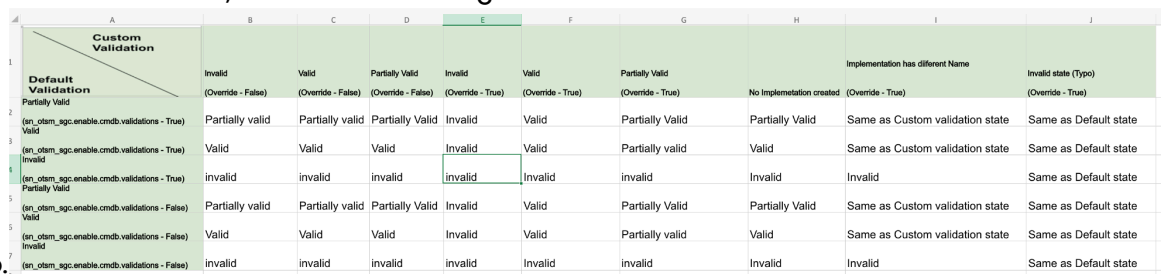
The base system for the **sn_otsm_sgc.SGOTAssetCustomValidationExtensionPoint** extension point uses the default **sn_otsm_sgc.SGOTExcelStagingAssetValidationProcessor** implementation script. You can add a customized validation by creating an implementation for the extension point in the Service Graph Connector for Operational Technology (Excel) scope.

Role required: admin

Procedure

1. Navigate to **All** > **System Extensions Point** > **Scripted Extension Points**.
2. Select **sn_otsm_sgc.SGOTAssetCustomValidationExtensionPoint**.
3. Select the **Create Implementation** related link.
   A script include is created where you can add your custom validation.

4. To add a custom validation, refer to the following validation scenario.



Custom Validation / Default Validation	Invalid (Override - False)	Valid (Override - False)	Partially Valid (Override - False)	Invalid (Override - True)	Valid (Override - True)	Partially Valid (Override - True)	No Implemetation created	Implementation has diferent Name (Override - True)	Invalid state (Typo) (Override - True)
Partially Valid (sn_otsm_sgc.enable.cmdb.validations - True)	Partially valid	Partially valid	Partially Valid	Invalid	Valid	Partially Valid	Partially Valid	Same as Custom validation state	Same as Default state
Valid (sn_otsm_sgc.enable.cmdb.validations - True)	Valid	Valid	Valid	Invalid	Valid	Partially valid	Valid	Same as Custom validation state	Same as Default state
Invalid (sn_otsm_sgc.enable.cmdb.validations - True)	invalid	invalid	invalid	invalid	Invalid	invalid	Invalid	Invalid	Same as Default state
Partially Valid (sn_otsm_sgc.enable.cmdb.validations - False)	Partially valid	Partially valid	Partially Valid	Invalid	Valid	Partially Valid	Partially Valid	Same as Custom validation state	Same as Default state
Valid (sn_otsm_sgc.enable.cmdb.validations - False)	Valid	Valid	Valid	Invalid	Valid	Partially valid	Valid	Same as Custom validation state	Same as Default state
Invalid (sn_otsm_sgc.enable.cmdb.validations - False)	invalid	invalid	invalid	invalid	Invalid	invalid	Invalid	Invalid	Same as Default state

5. Select **Update**.

Test the Service Graph Connector for Microsoft Excel

The troubleshooting actions can help resolve common issues when importing your Operational Technology devices or data. Access the System Log to troubleshoot for these errors.

These logs can be used to debug any issues or to find the Service Graph Connector steps are executed properly.

Issue	Solution
If there are entries in the Partial payload tab after test running the Service Graph Connector from ETL Guided Setup	Due to the following conditions: • Missing values for the required fields of an device. • Control Modules without a parent device associated with it - Check that the type of the device and control module parent id field is filled properly in the staging table.
If there are entries in the Incomplete payload tab after test running the Service Graph Connector from the ETL Guided Setup	Due to the missing values for fields that are used uniquely to identify an device.
If the timestamp column appears empty on the staging table	The user must use the UTC format (YYYY-MM-DD hh:mm:ss) to enter the date and time.
If the validation state update on records isn't visible after the validation process	The user must manually refresh the page.
When the user changes the existing data of the records in the staging table, the validation state is not set to Pending Validation.	The validation state is set to Pending validation, when the following attributes are changed: • Identifier fields (Mac-address (1-9)) • Serial Number • Name • Correlation ID • Type • Control module parent correlation ID • Fields used in transformed name computation

Issue	Solution
	• Rack Number • Slot Number For more information about the system properties, see Review the system properties used by the Service Graph Connector for Microsoft Excel.
After records are imported into the staging table, the updates done in the system properties related to transformed name computation are not reflected in the staging table records.	Change the system properties before importing the data into the staging table.
If the duplicate records exist in CMDB, the staging table does not detect it as duplicate.	The validations are executed only for the data available in the staging table. The validations are not executed for the data available in the CMDB.
The site name is provided in the spreadsheet or staging table but isn't shown on the OT devices after the import of the spreadsheet.	Only the existing site records in the CMDB are considered. The entity_name for the site (ISA Equipment model entity) must match the value provided in the site column in the excel or staging table. If the entity_name for the site does not match, the value is set to empty.

View script includes used by the Service Graph Connector for Microsoft Excel

As an admin, view the script includes related to the Service Graph Connector for Microsoft Excel

Before you begin

View a filtered list of all the scripts that are used by the Service Graph Connector for Microsoft Excel.

Role required: admin

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **OT Manager** > **Import OT Devices - Script Includes**.
   This list shows the records whose names begin with SGOTAsset or SGOTExcelStaging.
2. View the list of scripts.

Using the Service Graph Connector for Microsoft Excel through import tasks

With the Service Graph Connector for Microsoft Excel, you can create import tasks that handle the upload, validation, and import of staging records for your OT device data into the Configuration Management Database (CMDB).

Import task overview

Users assigned the OT Excel Import User [ot_excel_import_user] role can create import tasks in the Industrial Workspace. Import tasks handle the following tasks.

- Upload the populated Microsoft Excel spreadsheet into staging table.
- Validate the staging records created from the Microsoft Excel spreadsheet.
- Import the valid staging records into the CMDB.
- Optionally, create remediation tasks for invalid staging records.

Create an import task

Create an import task for the Service Graph Connector for Microsoft Excel to handle the import of Operational Technology (OT) device data from your Microsoft Excel spreadsheet.

Before you begin

Role required: ot_excel_import_user

About this task

Watch this short video to learn how to create an import task in the Industrial Workspace.

https://player.vimeo.com/video/1125340822?h=55052711fc&badge=0&autopause=0&player_id=0&app_id=58479

Procedure

1. In the Industrial Workspace, select the **List** () icon.
2. Under the OT Excel SGC - Import Task module, select one of the available lists.
3. Select **New**.
4. On the form, fill in fields.
5. Select **Save**.
6. Refresh the form to access the Microsoft Excel template.
7. From the **Attachments** panel, download the Microsoft Excel template by selecting the **Actions** ⋮ icon next to the **sg_ot_excel_staging.xlsx** template and clicking **Download**.
8. Save the template locally on your computer.
9. Fill in the template as needed with your OT device data.
   For more information about how to fill out the spreadsheet, see Prepare your Pre-import OT Worksheet Entry Review tool for Service Graph Connector import.
10. From the **Attachments** panel, delete the original template by selecting the **Actions** ⋮ icon next to the **sg_ot_excel_staging.xlsx** and clicking **Delete**.
11. Upload your completed Microsoft Excel spreadsheet.

    a. Ensure that you are assigned to the import task so that you can see the **Import Attachment** UI action.
    If you are not in the **Assigned to** field of the import task, click the **Assign to me** UI action before proceeding with the next step.

    b. Click **Select file**.

    c. From your local drive, upload the completed Microsoft Excel spreadsheet.

d. Once the spreadsheet is updated, select the **Import Attachment** UI action.

e. Wait for your system to complete the import process.
Once complete, the **State** field changes from **Pending staging import** to **Staging import succeeded**.

Result
After the import process is complete and the Microsoft Excel spreadsheet has been successfully imported, you can view the staging records for your Operational Technology (OT) device data by selecting the **Staging Records** tab.

What to do next
After the import process is complete, you can validate the imported staging records. For more information, see Validate imported staging records.

Prepare your Pre-import OT Worksheet Entry Review tool for Service Graph Connector import

Prepare your spreadsheet by positioning your existing data in the correct columns is crucial to the success of your upload.

Before you begin
Role required: ot_excel_import_user

About this task

Procedure
1. Fill the following columns in the Microsoft Excel spreadsheet.

> **Note:**
> Column names cannot be changed. Extra columns can be added to the staging table. For more information about adding a new custom field mapping in the staging table, see Add a custom field mapping in the staging table for Service Graph Connector for Microsoft Excel.

Refer to the following tables for guidance while filling in the spreadsheet. The spreadsheet contains many columns. The examples and field descriptions are split into multiple sections.

- Filling in columns A through K
- Filling in columns L through Y
- Filling in columns Z through AI
- Filling in columns AJ through AT
- Filling in columns AU through BD
- Filling in columns BE through BR
- Filling in columns BS to BW
- Filling in columns 1 to 8

Columns A through K

Column	Required column name	Type	Description and example
A	Device criticality	string	Measure of how critical, or important, the OT device is, based on its role. Examples: ○ High or Most critical ○ Medium or somewhat critical ○ Low or Less critical ○ None or not critical
B	Assigned to	string	Email address of the user that this OT device is assigned to. For example: bob@example.com
C	Backplane id	string	Unique ID that is used for the identification of the backplane and mapping to control modules. For example: BPSN123
D	Backplane name	string	Name of the backplane, if any, for the OT device. Examples: Backplane #51, PLC1 Backplane
E	Control module parent id	string	Unique ID that is used for the identification of the control modules to the parent control system backplane. For example: 482bb239-05e8-4bad-ba59-925eb87ff06e
F	Correlation id	string	Unique ID that is used for identification of the OT device. Enter the correlation_id a string. Examples: 482bb239-05e8-4bad-ba59-925eb87ff06e or 5123456. This column entry is required. ○ Each imported OT device must have a correlation_id that is unique. ○ The OT device data that you import normally originates in an external source system, which usually assigns a unique identifier to each record.
G	Custom field 1	string	(Optional) Custom data for the OT device is stored in the Attributes field on the CI. You can use this column to associate free-form data to the OT device for categorization or other purposes. Examples: Refurbished, Used
H	Custom field 2	string	(Optional) Custom data for the OT device is stored in the Attributes field on the CI. You can use this column to associate free-form data to the OT device for categorization or other purposes. Examples: Painting, Stamping
I	Custom field 3	string	(Optional) Custom data for the OT device is stored in the Attributes field on the CI. You can use this column to associate free-form data to the OT device for categorization or other purposes.
J	Custom field 4	string	(Optional) Custom data for the OT device is stored in the Attributes field on the CI. You can use this column to associate free-form data to the OT device for categorization or other purposes.
K	Custom field 5	string	(Optional) Custom data for the OT device is stored in the Attributes field on the CI. You can use this column to associate

Column	Required column name	Type	Description and example
			free-form data to the OT device for categorization or other purposes.

Columns L through Y

Column	Required column name	Type	Description and example
L	Display name	string	Used to populate the display name of OT devices.
M	Equipment model entity path	string	Path of the equipment model entity that the OT device is mapped to.
N	Firmware version	string	Firmware version of the OT device, if any. For example: 12.0
O	First discovered	datetime	ISO-formatted timestamp of the first time that the OT device was first discovered on your network. For example: YYYY-MM-DD HH:MM:SS.
P	Hardware version	string	Hardware version of the OT device, if any. For example: 13.2
Q	Has module	Boolean	For control systems with modules, indicates that this system has modules. Examples: True, False
R	IO field device type	string	If this device is a field device, indicates if it is used for input, output, or both. Examples: ○ input ○ output

Column	Required column name	Type	Description and example
			○ input_output The device acts as both input and output.
S	IP Address 1	string	First IP address, if any, that is associated with the OT device. If there are multiple IP addresses, use the next IP address column (IP Address 2). Examples: 10.0.0.22, 10.0.0.12
T	IP Address 2	string	Second IP address, if any, that is associated with the OT device. Examples: 192.168.100.1, 192.168.100.5
U	IP Address 3	string	Third IP address, if any, that is associated with the OT device.
V	IP Address 4	string	Fourth IP address, if any, that is associated with the OT device.
W	IP Address 5	string	Fifth IP address, if any, that is associated with the OT device.
X	IP Address 6	string	Sixth IP address, if any, that is associated with the OT device.
Y	IP Address 7	string	Seventh IP address, if any, that is associated with the OT device.

Columns Z through AI

Column	Required column name	Type	Description and example
Z	IP Address 8	string	Eighth IP address, if any, that is

Column	Required column name	Type	Description and example
			associated with the OT device.
AA	IP Address 9	string	Ninth IP address, if any, that is associated with the OT device.
AB	MAC Address 1	string	First MAC address, if any, that is associated with the OT device. If there are multiple MAC addresses, use the next Mac address column (MAC Address 2). Examples: 94:94:1d:01:6d:5f, cc:7c:4a:fb:20:71 **Note:** For an OT device, you must create an entry in at least one of these three spreadsheet columns, all values in these columns must be unique for the spreadsheet: ○ MAC Address 1 ○ Name ○ Serial number
AC	MAC Address 2	string	Second MAC address, if any, that is associated with the OT device. For example: e5:4d:c8:36:b1:2d
AD	MAC Address 3	string	Third MAC address, if any, that is associated with the OT device.
AE	MAC Address 4	string	Fourth MAC address, if any, that is

Column	Required column name	Type	Description and example
			associated with the OT device.
AF	MAC Address 5	string	Fifth MAC address, if any, that is associated with the OT device.
AG	MAC Address 6	string	Sixth MAC address, if any, that is associated with the OT device.
AH	MAC Address 7	string	Seventh MAC address, if any, that is associated with the OT device.
AI	MAC Address 8	string	Eighth MAC address, if any, that is associated with the OT device.

Columns AJ through AT

Column	Required column name	Type	Description and example
AJ	MAC Address 9	string	Ninth MAC address, if any, that is associated with the OT device.
AK	Manufacturer	string	Name of the manufacturer of the OT device. Examples: Rockwell Automation, Dell
AL	Memory card serial 1	string	Assigned serial number of the first memory card, if any, that is installed in the OT device. If there are multiple memory cards, use the next memory card serial column (Memory card serial 2). Examples: MMC DA362131, MemSN123
AM	Memory card serial 2	string	Assigned serial number of the second memory card, if any, that is installed in the OT device. For example: MemSN123
AN	Memory card serial 3	string	Assigned serial number of the third memory card, if any, that is installed in the OT device.
AO	Memory size 1	string	Size of the first memory card, if any, that is installed in the OT device. Examples: 256 GB or 1 GB
AP	Memory size 2	string	Size of the second memory card, if any, that is installed in the OT device. Examples: 256 GB or 1 GB
AQ	Memory size 3	string	Size of the third memory card, if any, that is installed in the OT device. Examples: 256 GB or 1 GB
AR	Memory type 1	string	Type of memory card that is installed in the OT device. If there are multiple memory cards, use multiple columns. For example: RAM
AS	Memory type 2	string	Type of memory card that is installed in the OT device. Examples: RAM

Column	Required column name	Type	Description and example
AT	Memory type 3	string	Type of memory card that is installed in the OT device.

Columns AU through BD

Column	Required column name	Type	Description and example
AU	Model number	string	Manufacturer's model number for the OT device. Examples: ThinkServer TD230, XPS 15z
AV	Module type	string	Description of the function of the control module, if this device is one. Examples: Input, Output
AW	Name	string	Host name of the OT device, usually as part of the FQDN. Examples: PLC1, Door Assembly HMI, and Robot Control Module. **Note:** For an OT device, you must create an entry in at least one of these three spreadsheet columns. All values in these columns must be unique for the spreadsheet: ○ MAC Address 1 ○ Name ○ Serial number
AX	Operating system	string	Operating system, if any, that is installed on the OT device. Examples: Linux Fedora, Windows 10, Windows 2000, Mac OS 8. **Note:** For an OT device, you should create entries in the following spreadsheet columns, even though they are not required: ○ Type ○ If available, Operating System ○ If available, Firmware version
AY	OS version	string	Reported version of the operating system, if any, that is installed on the OT device. Examples: 10.0, 13.5.2 **Note:** For an OT device, you should create entries in the following spreadsheet columns, even though they are not required: ○ type ○ If available, os_version ○ If available, firmware version
AZ	OT Staging Task	string	Tasks created to remediate invalid records on the staging table.

Column	Required column name	Type	Description and example
BA	Purdue level	string	Assigned Purdue level for the OT device. Assigning a Purdue level ensures that the Discovery for the Operational Technology function properly locates each item at the correct ICS level and produces accurate Discovery results. Examples: 1, 2, 3
BB	Rack number	string	Rack where the control module is mounted. Examples: 1, 2, 3
BC	Serial number	string	Assigned serial number, if any, for the OT device. Examples: SN545, SN998 **Note:** For an OT device, you must create an entry in at least one of these three spreadsheet columns. All values in these columns must be unique for the spreadsheet: ○ MAC Address 1 ○ Name ○ Serial number
BD	Serial number type	string	Normally set to the value of "system," but it could be a different type of serial number. For example: uuid

Columns BE through BR

Column	Required column name	Type	Description and example
BE	Short description	string	Short description of the OT device. Examples: HMI for the Door Painting Cell, Controls the door assembly robot.
BF	Site	string	The equipment models start at the site level and contain a detailed hierarchical structure that describes each industrial site. For more information, see ISA-95 equipment model.
BG	Slot number	string	For a control module, indicates the slots that this device occupies in the chassis of the control system. Examples: 1, 2
BH	Software install date 1	datetime	Date that the application software was installed on the OT device. If there are multiple dates, use multiple columns. Use only UTC format for the date. For example: YYYY-MM-DD HH:MM:SS
BI	Software install date 2	datetime	Date that the application software was installed on the OT device. If there are multiple dates, use multiple columns. Use only UTC format for the date. For example: YYYY-MM-DD HH:MM:SS

Column	Required column name	Type	Description and example
BJ	Software install date 3	datetime	Date that the application software was installed on the OT device. If there are multiple dates, use multiple columns. Use only UTC format for the date. Example: YYYY-MM-DD HH:MM:SS.
BK	Software installed 1	string	Name of the application software, if any, that is installed on the OT device. If there are multiple names, use multiple columns. For example: Rockwell HMI Vision
BL	Software installed 2	string	Name of the application software, if any, that is installed on the OT device.
BM	Software installed 3	string	Name of the application software, if any, that is installed on the OT device.
BN	Software version 1	string	Reported version of the application software, if any, that is installed on the OT device. If there are multiple versions, use multiple columns. For example: v1.2 or v2011 SP3 HF2 or 4.54.32145
BO	Software version 2	string	Reported version of the application software, if any, that is installed on the OT device. For example: v1.2 or v2011 SP3 HF2 or 4.54.32145
BP	Software version 3	string	Reported version of the application software, if any, that is installed on the OT device. For example: v1.2 or v2011 SP3 HF2 or 4.54.32145
BQ	Status	string	Status of the OT device: **--None--** No assigned status. **Absent** OT device is absent in your facilities. **In Maintenance** OT device is in maintenance and currently is off line. **In stock** OT device is in stock in your facilities. **Installed** OT device is installed in your facilities. **Pending Install** OT device is pending installation in your facilities. **Pending repair**

Column	Required column name	Type	Description and example
			OT device is pending repair but is not online yet. **Retired** OT device is retired. **Stolen** OT device has been stolen. **Note:** The values in this field are mapped to **Life Cycle Stage** and **Life Cycle Stage Status** fields on the CI form.
BR	Support group	string	Name of the primary support group for this OT device. Examples: Door Support, Corporate IT Support.

Columns BS to BW

Column	Required column name	Type	Description and example
BS	Transformed name	string	Users must not fill this column. By default, the transformed name value is populated using transformed column system properties. A user cannot edit the Transformed name. For system properties, see Review the system properties used by the Service Graph Connector for Microsoft Excel.
BT	Type	string	Type of OT device/ configuration item (CI). Examples: PLC, DCS

Column	Required column name	Type	Description and example
			Note: ○ For a listing and explanation of valid CI types, see Operation Technology (OT) extension classes. ○ For an OT device, you should create entries in the following spreadsheet columns, even though they are not required: ▪ type ▪ os_version
BU	Validation comments	string	Users must not fill this column. By default, Validation comments are populated after the validations are run on the staging table records that are imported from excel. Validation comments are not updated when records are imported. User cannot edit the Validation comments.
BV	Validation state	string	Users must not fill this column. By default, the validation state is populated when the data is imported in the staging table.

Column	Required column name	Type	Description and example
			Status of the OT device: **Pending validation** Default state when records are imported into the staging table. **Invalid** Cannot uniquely create a CI record in the CMDB. **Partially valid** One of the Transformed Name, MAC Address 1, and Serial number has no value. All the other fields (correlation id, control module parent id) have values. **Valid** All identifiers are present and are ready for import.

Column	Required column name	Type	Description and example
			Imported Completed the import of the data from the staging table to the Import set table. User cannot edit the Validation state.
BW	Vendor	string	Name of the vendor of the OT device.

Columns 1 to 8

Column	Required column name	Type	Choice columns if applicable	Description and example
1	Backup configuration status	choice list	Backup Enabled, Backup Disabled, Unknown, Not Applicable, Planned, Not Planned	Indicates whether the CI has been configured in the backup service or appliance with relevant policies. Examples: Backup Enabled
2	Backup execution mode	choice list	Manual, Automatic, Manual or Automatic, Unknown	Indicates whether the backup is configured to run automatically on a periodic basis, or if it is manually executed on an as-needed basis. Examples: Manual, Automatic
3	Backup source id	string		Backup service source identifier for a device, which identifies the device in external or

Column	Required column name	Type	Choice columns if applicable	Description and example
				internal backup services. Backup source id can include host_id, vcenter_id, instance_id, db_id. Examples: AdvWrks2008R2Backup
4	Last backup attempt	glide_date_time		Date and time of the last backup attempt made for a device. Examples: 2024-06-18 09:53:37
5	Last successful backup	glide_date_time		Date and time of the last successful backup made for a device. Examples: 2024-06-18 09:53:37
6	Backup recovery point objective	glide_duration		Represents the amount of time that can elapse between backups and the amount of data lost. Examples: 90 12:00:00
7	Backup managed by	string		Email ID of the user responsible for managing the backup. Examples: firstname.lastname@example.com
8	Backup managed by group	string		Name of the primary support group responsible for managing the backup.

Column	Required column name	Type	Choice columns if applicable	Description and example
				Examples: App Engine Admins

2. After populating the Microsoft Excel spreadsheet, save it in a known location for easy access to upload.

Validate imported staging records

Validate the imported staging records from your import task to find missing, duplicate, and invalid data.

Before you begin

Role required: ot_excel_import_user

Procedure

1. Navigate to **All** > **Industrial Workspace**.
2. Select the **List** ( ) icon.
3. Under the OT Excel SGC - Import Task module, select one of the available lists.
4. Select the Import Task record that you want to validate.
5. Ensure you're the assigned to the import task so you can see the **Validate** UI action.

   Note:
   If you aren't in the **Assigned to** field of the import task, click the **Assign to me** UI action before proceeding with the next step.

6. Click the **Validate** UI action.
   Once the validation process is complete, the **State** field of the Import Task record changes to **Validation complete**. The **Validation state** of the staging records created can update to one of the following values.
   - Valid
   - Invalid
   - Partially invalid

   If invalid, the **Validation comments** field contains the cause or causes of the invalid state.

   If an imported staging record matches an existing configuration item (CI) in the CMDB, you can preview the existing OT records. For more information, see Preview existing OT records in the CMDB.

What to do next

For valid records, you can directly trigger the Configuration Management Database (CMDB) import. For more information, see Trigger a CMDB import for valid staging records.

To resolve invalid or partially invalid records, you can optionally create remediation tasks. For more information, see Create a remediation task for invalid staging records.

Managing Validations

Validation enables you to review and manage the imported data in the staging table.

Validations to be executed:

- Missing correlation id (Correlation id)
- Missing parent correlation id in case the type is Control module (Control module parent id)
- Missing serial number (Serial number)
- Missing transformed name (Transformed name)
- Missing MAC Address (validation is executed on column MAC Address 1)
- Missing type (Type)
- Missing rack number (Rack number)
- Missing slot number (Slot number)
- Equipment model entity path does not exist (Equipment model entity path)
- Site name provided is invalid (Site name)
- Validate duplicates on transformed name (Transformed name)

  Note:
  This validation is skipped for control modules.

- Validate duplicates on MAC Address (check on all MAC Address 1 columns)
- Validate duplicates on Serial number column (Serial number)
- Validate duplicates on Correlation id column (Correlation id)
- Validate duplicates on rack and slot numbers

  Note:
  This validation is only for control modules.

- Validate Has Module and Control module Parent ID

  Note:
  This validation is only for PLCs and control modules.

- Validate Invalid types - Compare against the default Excel type to OT device type mapping through the *sn_otsm_sgc.SGOTAssetImportExtensionPoint* extension point implementation.

  If you have additional mappings, create an extension point implementation for the base system *sn_otsm_sgc.SGOTAssetImportExtensionPoint* extension point.

For more information about adding a custom implementation for device classification, see Add a custom implementation for device classification.

Preview existing OT records in the CMDB

Preview existing Operational Technology (OT) device records in the Configuration Management Database (CMDB) before you import any new records from the staging table. By previewing existing records, you can avoid reconciling or merging unrelated records.

Before you begin
Role required: ot_excel_import_user

About this task
If a matching configuration item (CI) is in the CMDB when you import OT devices from the staging table, existing records may reconcile or merge with new records. Matching CIs include the hostname, MAC address, or serial number. To avoid accidentally reconciling or merging records,

you can preview the existing records that share the matching CIs with the records in the staging table.

Procedure

1. Navigate to **All** > **Industrial Workspace**.
2. Select the **List** () icon.
3. Under the OT Excel SGC - Import Task module, select one of the available lists.
4. Select an Import Task record that you want to verify has any matching CIs.
5. In the Validation comments column, check if a matching CI has been found.
   The Validation comments column explains the matching CI that was found and contains a link to the matching CI. When a matching CI is found in the CMDB, the Validation state is set to **Partially Valid**. The following table lists the matching CI validation comments.

Matching CI validation comments

Matching CI	Validation comment
Hostname	Same transformed name found for another CI:<Link to CI>
MAC address	Same MAC address [MAC address] found for another CI:<Link to CI>
Serial number	Same serial number [serial number] found for another CI: <Link to CI>

6. **Optional:** View the matching CI by selecting it from the Matching CI in the CMDB column.

Trigger a CMDB import for valid staging records

Trigger a Configuration Management Database (CMDB) import for your valid staging records to directly import them into the CMDB

Before you begin

Role required: ot_excel_import_user

Procedure

1. Navigate to **All** > **Industrial Workspace**.
2. Select the **List** () icon.
3. Under the OT Excel SGC - Import Task module, select one of the available lists.
4. Open the Import Task record that you want to trigger the CMDB import for.
5. Ensure you are assigned to the import task so you can see the **Trigger CMDB Import** UI action. If you are not in the **Assigned to** field of the import task, click the **Assign to me** UI action before proceeding with the next step.
6. Click the **Trigger CMDB Import** UI action.
7. Review the newly imported OT devices in OT List module in the Industrial Workspace.

Create a remediation task for invalid staging records

After running validations for the Operational Technology (OT) device data imported with the Service Graph Connector for Microsoft Excel, optionally create a remediation task to resolve invalid staging records.

Before you begin
Role required: ot_excel_import_user

About this task
You can optionally create remediation tasks to resolve invalid staging records. For more information about the validation errors that can occur for your staging records, see Managing Validations.

Procedure
1. Navigate to **All** > **Industrial Workspace**.
2. Select the **List** ( ) icon.
3. Under the OT Excel SGC - Import Task module, select one of the available lists.
4. Select the Import Task record that you want to create remediation tasks for.
5. Ensure that you are assigned to the import task so that you can see the **Create Remediation Tasks** UI action.
   If you are not in the **Assigned to** field of the import task, click the **Assign to me** UI action before proceeding with the next step.
6. Click the **Create Remediation Tasks** UI action.

Result
Remediation tasks are created for the invalid staging records. To access the remediation tasks in the Import Task record, select the **Remediation Tasks** list.

Note:
One remediation task is created for all invalid staging records that belong to the same site.

When you view the remediation task record, you can also view the staging records associated with it by selecting the **Staging Records** tab.

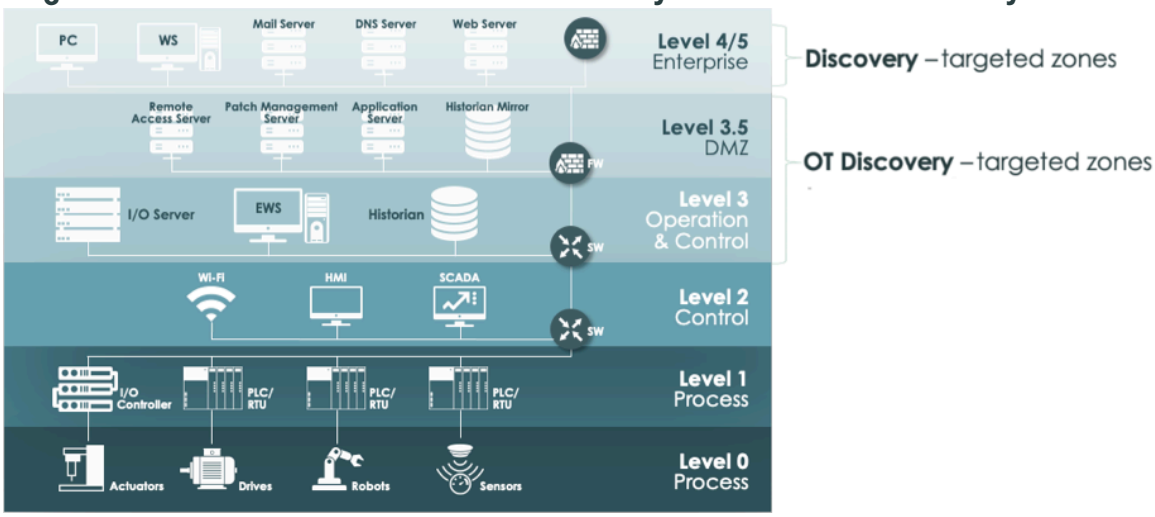
IT Discovery for OT Networks

You can run the IT Discovery for OT Networks function to discover IT class Operational Technology (OT) devices in designated Purdue levels in your Industrial Control System (ICS) networks. IT class items include switches, routers, and computers that exist both in data centers and in your factories.

Where standard Discovery processing takes place

The IT Discovery for OT Networks process operates in a manner that is similar to the standard Discovery processes.

Targeted Purdue levels in standard and IT Discovery for OT Networks Discovery



Standard Discovery processing in the ServiceNow AI Platform® normally takes place in the following Purdue levels in your enterprise:

Processed Purdue levels

Purdue Level	Description
4	Site business and logistics, such as all Information Technology (IT) functions.
5	Enterprise Network, where Enterprise Resource Planning (ERP) functions take place.

Note:
To learn more about Purdue levels in Industrial Control Systems, see https://subscription.packtpub.com/book/networking_and_servers/9781788395151/1/ch01lvl1sec10/the-purdue-model-for-industrial-control-systems.

Where and how IT Discovery for OT Networks processing takes place

In contrast, IT Discovery for OT Networks processing can take place in the following Purdue levels, depending on which you select when you create an OT discovery schedule:

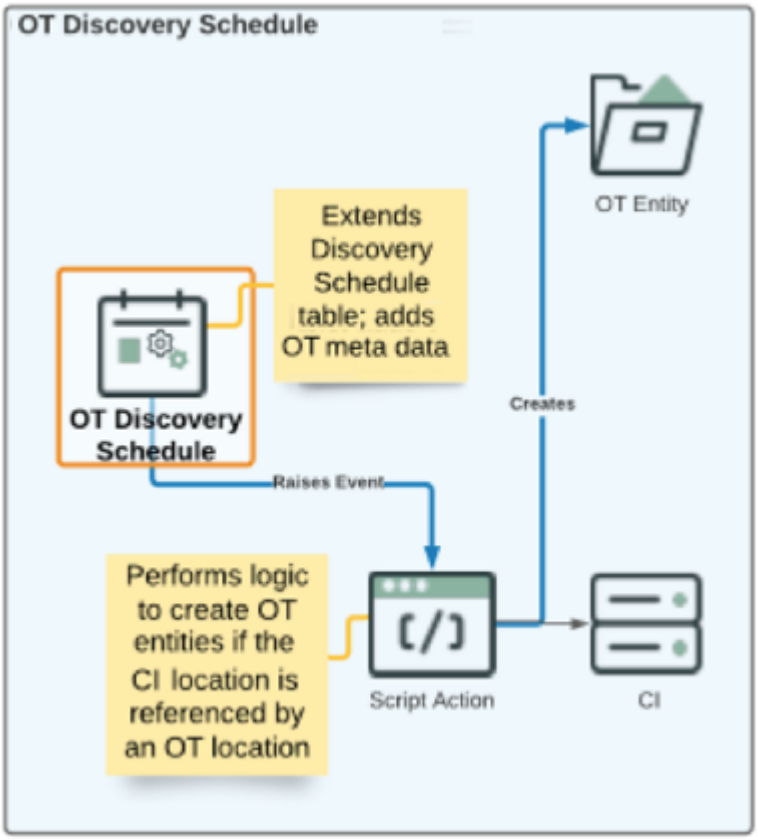
Processed Purdue levels

Purdue Level	Description
3.5	Demilitarized Zone (DMZ) or Industrial Demilitarized Zone (IDMZ). Similar to a traditional (IT) DMZ, the OT-oriented IDMZ enables you to securely connect networks with different security requirements.
3	Site operations where plant or site-wide control and monitoring functions reside.

You typically run IT Discovery for OT Networks in the DMZ (or IDMZ, Purdue Level 3.5) of your ICS networks. This Purdue level is where there are usually IT and OT class computers and servers to discover and manage.

Note:
To avoid the possibility of disrupting your industrial operations, you should not run Discovery processes against Purdue levels 0 through 2 in your ICS networks.

IT Discovery for OT Networks processing



When you run an OT discovery schedule, it performs the following processing:

1. Proceeds through the assigned IP addresses and discovers all hardware items that exist in it.
2. When it completes discovery of a configuration item (CI), it internally triggers a (discovery.device.complete) event. This logic checks if an OT entity (cmdb_ot_entity) record exists for it in the Configuration Management Database (CMDB).
   - If one exists, and any related attributes have changed for the discovered item, it updates the OT Entities that are related to that CI.
   - If one does not exist, it creates one for it.
3. In addition to the location attribute, it also pushes the defined attributes from the OT discovery schedule to the CI and to the related OT entity records.
4. It also creates OT entity records for the applications installed on discovered OT devices. To view the applications that have OT entity records created through IT Discovery for OT Networks, navigate to the Industrial Workspace list view and open the **Applications** list under **Operational Technology (OT)**.

Related topics

Operation Technology (OT) extension classes

MID Server

Discovery

- Horizontal discovery process flow with probes and sensors
- Schedule a horizontal discovery

IT Discovery for OT Networks related links and lists

IT Discovery for OT Networks contains several related links and lists.

Related links

Related link	Description
Quick Ranges	IP addresses and address ranges to scan when the OT discovery schedule runs. Enter IP addresses in multiple formats (network, range, or list) in a single, comma-delimited string. The MID server in use must be able to connect to the specified IP ranges. For more information, see Create a Quick IP range for a Discovery schedule.
Discovery now	Run the IT Discovery for OT Networks process immediately.
Run Point Scan	Access to the Execute Point Scan dialog. To learn more, see Execute a point scan.

Related lists

Related list	Description
Discovery IP Ranges	Discovery IP addresses and address ranges to scan and discover. If you are using a simple CI scan (no behaviors), use this related list to define these IP addresses. The MID server in use must be able to connect to the specified IP ranges. **Note:** To improve security, limit the range of discovery targets to exclude unnecessary networks and devices.
Discovery Range Sets	Definition of each range set that the OT discovery schedule scans, using one or more Shazzam probes.
Discovery Status	History of the results of the current and past OT discovery schedule runs.

Related topics

- MID Server
- Shazzam probe, port probes, and protocols
- Create a Shazzam probe

Create an Operational Technology discovery schedule and run the Discovery process

Define Operational Technology (OT) discovery schedules that orchestrate how and when the Discovery for an OT function should run. You can also perform an immediate Quick Discovery or an actual OT Discovery run.

Before you begin
Do the following actions before you run IT Discovery for OT Networks:

- Install and configure the standard Discovery application. To learn more, see Discovery setup.
- Install the CMDB CI Class Models plugin. To learn more, see Operational Technology (OT) extension classes installation.
- Install the Mid Server. To learn more, see Installing the MID Server.

Role required: ot_discovery_admin

Procedure
1. Navigate to **All** > **OT Discovery** > **OT Discovery Schedules**.
2. Run Quick Discovery, or select or create an OT discovery schedule.
3. In the form, fill in the OT Discovery Schedule fields.
   Most of the fields on this form are identical to or operate in the same manner as the standard Discovery form. Only those fields that differ from the standard Discovery scheduling appear in this topic. To learn more about the remaining fields, see Schedule a horizontal discovery
4. Run the Discovery process right away, or save the OT discovery schedule to run at the times you designated in the record.

Result
When the IT Discovery for OT Networks process runs, it creates a history record in the Discovery Status related list.

Create an Operational Technology device in the Industrial Workspace

Create an Operational Technology (OT) device in the Industrial Workspace.

Before you begin
Role required: cmdb_ot_editor

About this task
You can manually create an OT device in the Industrial Workspace, which creates an OT Entity [cmdb_ot_entity] record and associates it with a CI.

Procedure
1. Navigate to **All** > **Industrial Workspace**.
2. Select the **List** ( ) icon.
3. Under the **Operational Technology (OT)** module, select one of the following lists.
   - All OT Devices
   - OT Supervisory Systems
   - OT Control Systems
   - OT Field Devices
   - OT Computer and Servers
   - OT Network Gear

- Industrial IoT (IIoT)
- OT Systems
- Unclassed OT Devices

4. Select **Create New CI**.
5. In the Create OT CI tab, complete the following sections as needed.
   - Select class
   - Required attributes
   - Additional attributes
   - Relationship definition
   - Review
6. Select **Create**.
7. In the New CI created window, select **Review new CI** to redirect you to the form of the created OT CI.
   If there's an existing CI, select **Review existing CI**.
8. On the form, fill in the following fields.

New CI form

Field	Description
Display name	The name of the OT device displayed in the record. **Note:** You can add any string value to this field. Multiple devices can have the same OT display name. This is meant for easier understanding of the OT device and is different from the unique CI name generated when you import OT devices from the staging table.
Purdue level	Assigned Purdue level. The level ranges are 0–5. **Note:** To learn more about the Purdue levels in Industrial Control Systems, see https://subscription.packtpub.com/book/networking_and_servers/9781788395151/1/ch01lvl1sec10/the-purdue-model-for-industrial-control-systems.
Device criticality	Measure of the relative risk to the site process if the device fails: ○ 1 - Most critical ○ 4 - Not critical

Field	Description
Site	The top-level parent entity, or industrial site, where the device is located or assigned to.

9. Select **Save**.

Edit or view OT devices after import or discovery

Use the options on the Operational Technology (OT) menu to edit or view detailed information for the OT devices in your enterprise.

Before you begin

Import your Operational Technology device data in any of the following ways:

- Run IT Discovery for OT Networks. For more information, see IT Discovery for OT Networks.
- Use an Operational Technology Certified Service Graph Connector from the ServiceNow Store.

Role required: cmdb_ot_viewer, cmdb_ot_editor, cmdb_ot_admin, or admin

About this task

If you have an assigned cmdb_ot_viewer role, you can only view OT devices. If you have an assigned cmdb_ot_editor or cmdb_ot_admin role, you can edit OT device records in the following ways:

- Edit OT device records individually on the ServiceNow AI Platform.
- Bulk edit multiple OT device records from the Industrial Workspace list view.

Procedure

1. To edit one OT device record ServiceNow AI Platform, follow these steps.
   a. Navigate to **All** > **Operational Technology (OT)** and select one of the following menu items:

      All OT Devices

      By default, this list does not include control modules.

      All OT Devices by IP Address

      When you view the All OT Devices by IP Address list, note the following:

      - An OT device with multiple IP addresses is displayed once per assigned IP address.
      - Select the name of the OT device to open the OT device record. Selecting the IP address that is displayed for the record opens the record of only the IP address.
      - You **cannot** create a new OT device record from this list.

      OT Control Systems

      By default, this list does not include control modules.

      OT Control Systems with Modules

      When you view the OT Control Systems with Modules list, note the following:

      - The list view displays all the Control Modules grouped by their parent Control System.
      - You cannot create a new OT device record from this list.

   b. In the **OT device** column, select the OT device that you want to edit.

c. On the form, fill in the fields.

d. Click **Update**.

2. To bulk edit multiple OT device records Industrial Workspace, follow these steps.

a. Navigate to **All** > **Industrial Workspace**.

b. Open the list ( ) view and select one of the following lists available under **Operational Technology (OT)**.

- OT Supervisory Systems
- OT Control Systems
- OT Field Devices
- OT Computer and Servers
- OT Network Gear
- Industrial IoT (IIoT)
- Unclassed OT Devices

c. Select the check box next to each OT device that you want to edit.

> **Note:**
> You can only bulk edit OT devices with the same **Class** field. You can't use the bulk edit feature for OT devices with different classes.

d. To edit the configuration item (CI) fields, select the **Edit** button and edit the form fields as needed.

> **Note:**
> The maximum number of records that you can bulk edit the CI fields for is the records shown on a single page.

e. Click **Update**.

f. To edit the OT device details, select the **Edit OT details** button and edit the form fields as needed.

> **Note:**
> Bulk editing OT details is a background job that can take time to complete. If the background job is busy, you can't bulk edit other OT device records.

OT device related items and related lists

The All OT Devices, All OT Devices by IP Address, and All OT Devices by CI menu options contain several related items and lists.

Related items

This section lists any related or subordinate items that are associated with this OT device.

Note:
Not all OT devices display the following related lists. For OT devices in an Operational Technology class or extended class, the following related lists are displayed. For OT devices categorized in a different hardware class, such as Windows Server, an instance admin must add the related lists to the form.

1. To view the related records, click the name of the related item (for example, Memory Modules).
2. To add a configuration item (CI) relationship for this OT device, click the add CI relationships icon ( ). Use the search field to find the CI item that you want to create a relationship for.
3. To access the Dependency View form to see a pictorial depiction of the OT device relationships, click the show dependency views icon ( ).
4. To change the settings that govern how the related items appear and are filtered, click the settings icon ( ).

OT device related lists

Related list	Description
IP Address	The IP addresses, IP versions, Net masks, NIC numbers, and configuration items that are associated with the OT device.
Network Adapters	The names, MAC addresses, IP addresses, Netmasks, MAC manufacturers, and Dynamic Host Configuration Protocol (DHCP)-enabled indicators. It includes statuses of the network adapters that are associated with the OT device.
Serial Numbers	The serial numbers, validity indicators, and serial number types that are associated with the OT device.
Equipment Model Entities	The equipment model entities that are automated by the OT device.
OT Subnet Mappings	The subnet mapping that associates an OT device with an equipment model entity.
OT Control Modules	The control modules that are associated with the OT device of type OT control system or extended classes (for example, PLC). Each OT control module that has an "Owned by: Owns" relationship with the OT Control System record that is displayed. In the platform, the user can create an OT Control module. You can choose from the following Input/Output values depending on the **Module type** field: • None • Local • Remote • Distributed
CMDB 360	The related CMDB 360 data in the CMDB 360 [cmdb_multisource_data] table.
Memory Modules	The serial numbers, validity indicators, and serial number types for the memory modules that are associated with the OT device.

OT device related lists (continued)

Related list	Description
Software Installed	The application software, if any, that is installed for the OT device.
OT Vulnerable Items	The vulnerable items that are associated with the OT device.
OT Incidents	The OT incidents that are associated with the OT device.
OT Change Requests	The OT Change requests that are associated with the OT device.
External System Metadata	The URL of the device in the source system, discovery source, and updated devices that are associated with the CI. The URL is automatically populated by the source system through the service graph connector.
OT Protocols	This is applicable for protocol converter class. The protocols, description, vendor, and version that are associated with the protocol converter class.
Backup Information	The Backup Information object associated with the current CI.
Device to Device Connections	Shows the network connections an OT device has with other devices.
Key Value	Additional information related to the OT device that's populated with the available OT integrations and captured as Key value pairs.
Software Instance	Captures the software installed on the OT device if Software Asset Management isn't available. **Note:** If Software Asset Management is installed and entitled, the software installed data is available in the Software Installation related list.
Firmware Installation	Firmware associated with the OT device.

Operational Technology device form

Use the Operational Technology (OT) device form to edit the detailed information for the OT devices in your enterprise.

Operational Technology device form

Field	Description
OT display name	The name of the OT device displayed in the record.

Operational Technology device form (continued)

Field	Description
	Note: You can add any string value to this field. Multiple devices can have the same OT display name. This is meant for easier understanding of the OT device and is different from the unique CI name generated when you import OT devices from the staging table.
OT device type	The category type that the OT device is classified as. The device type is also the function that the device plays on the OT network. For example: An IT device, such as a server, can be converted to an OT device, and the function it plays on the network is an HMI. Therefore, its class is **server** and its device type is **HMI**. **Note:** In some cases, there are OT devices with no OT function or OT devices where the device type is unknown. For OT devices with no OT function, select **No OT Function**. For OT devices where the device type is unknown, select **Unknown**.
Device criticality	The measure of the relative risk to the site process of failure of the device. For example: • 1 - Most critical • 4 - Not critical
Site	The top-level parent entity, or industrial site, where the device is located or assigned to.
Purdue level	The assigned Purdue level. Ranges 0–5. **Note:** To learn more about Purdue levels in Industrial Control Systems, see https://subscription.packtpub.com/book/networking_and_servers/9781788395151/1/ch01lvl1sec10/the-purdue-model-for-industrial-control-systems.
Zone	The area within the site location that the device is assigned to.

Operational Technology device form (continued)

Field	Description
Class	The name of the assigned class for the OT device. **Note:** For a listing and explanation of CI classes, see Operation Technology (OT) extension classes.
Status	Status of the OT device: **--None--** No assigned status. **Absent** OT device is absent in your facilities. **In Maintenance** OT device is in maintenance and currently is off line. **In stock** OT device is in stock in your facilities. **Installed** OT device is installed in your facilities. **Pending Install** OT device is pending installation in your facilities. **Pending repair** OT device is pending repair but is not online yet. **Retired** OT device is retired. **Stolen** OT device has been stolen.
Discovery source	The Discovery source for the OT device data. For example, SG-OT Excel Import, if you imported the OT device from a Microsoft Excel spreadsheet using the Integration Hub ETL. To learn more, see Service Graph Connector for Microsoft Excel.
Infrastructure Relationships	Shows the relationship of OT device with other the OT devices and the equipment model entities.

Operational Technology device form (continued)

Field	Description
Service Relationships	Shows the relationship of OT device with the equipment model entities.
CI Timeline	Shows the timeline of OT incidents, OT change, and audit history associated with the OT device.
The following fields only apply to the Programmable Logic Controller (PLC) Class Records:	
Key switch	The Key switch modes: **Remote mode** You can change the configuration of the PLC. **Local mode** By default mode, you can't change the configuration of the PLC.
Switch position	The Switch position of the PLC has the following positions: • **Run** • **Program** • **Remote** • **Stop** • **Test** By default, the switch position is set to **None**. When the switch position is set to **Remote**, the Switch remote modes are enabled.
Switch remote mode	The Switch remote of the PLC has the following modes: • **Run** • **Program** • **Test** • **None**
Asset	When configuration items (CIs) are created in the Configuration Management Database (CMDB), asset records are created. The asset record contains the model category of the CI. For more information about the model categories for Operational Technology (OT), see Model categories for Operational Technology. To view the model category for an OT device, complete the following:

Operational Technology device form (continued)

Field	Description
	1. Navigate to **All** > **Operational Technology (OT)** > **All OT Devices**. 2. Select the OT device that you want to view the asset record for. 3. Next to the **Asset** field, select the **Preview this record** ( ) icon. 4. Select **Open Record**.
The following fields only apply to the following class records. • OT Supervisory System • OT Control System • OT Field Device • Unclassed OT Device	
Is Virtual	If selected, indicates that the OT device is virtual.

Convert an IT hardware device to an OT device

If you've identified IT hardware devices that belong to the OT network, you can convert these IT Configuration Items (CI) into OT devices.

Before you begin

Role required: cmdb_ot_admin or admin

About this task

This task is applicable to all IT hardware devices.

Procedure

1. Select an IT CI.
   For example, you can navigate to **All** > **Configuration** > **Base Items** > **Computers**.
2. Select the IT hardware device that you want to convert to an OT device.
3. In the Related Links module, select **Add OT Device Details**.

   The OT Device form is displayed.
4. Fill in the fields on the OT Device details form.
5. Select **Update**.
6. To view the converted OT Device, navigate to **All** > **Operational Technology (OT)** > **All OT Devices**.

Result

The selected IT hardware device has been converted to an OT device.

Alternatively, you can select multiple IT hardware devices and convert them into OT devices in a bulk edit. For more information, see Convert IT hardware to OT devices in a bulk edit.

Convert IT hardware to OT devices in a bulk edit

Choose multiple IT hardware devices and convert them to OT devices in a bulk edit so that you can edit your records more quickly and efficiently.

Before you begin

Role required: cmdb_ot_admin or admin

Procedure

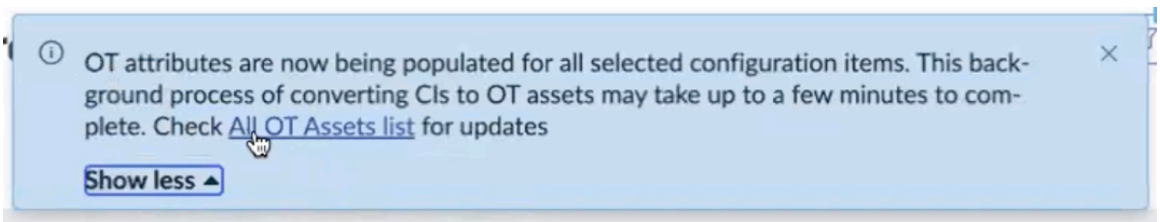
1. Navigate to **All** > **Industrial Workspace Admin** > **Industrial Workspace**.
2. In the Industrial Workspace, navigate to the All IT Hardware list.
3. **Optional:** If you want to filter the All IT Hardware list, do the following actions:
   - Select the filter icon in the top-right corner of the list.
   - Add the filter that you want applied to the list.
   - Select **Update**.
4. Select the check box next to each of the IT hardware devices that you want to convert.
   If you want to select all IT hardware devices in the list, select the check box next to the Name column.
5. Select the **Convert to OT devices** button.
6. On the form, fill in the fields.

Convert to OT devices form

Field	Description
OT Device Type	The category type that the OT device is classified as. The device type is also the function that the device plays on the OT network. For example: An IT device, such as a server, can be converted to an OT device, and the function it plays on the network is an HMI. Therefore, its class is **server** and its device type is **HMI**. **Note:** In some cases, there are OT devices with no OT function or OT devices where the device type is unknown. For OT devices with no OT function, select **No OT Function**. For OT devices where the device type is unknown, select **Unknown**.
Device Criticality	Measure of the relative risk to the site process if the device fails: ○ 1 - Most critical ○ 4 - Not critical
Purdue Level	Assigned Purdue level. The level ranges are 0–5.

Field	Description
	Note: To learn more about the Purdue levels in Industrial Control Systems, see https://subscription.packtpub.com/book/networking_and_servers/9781788395151/1/ch01lvl1sec10/the-purdue-model-for-industrial-control-systems.
Zone	area within the site location that the device is assigned to.
Site	Top-level parent entity, or industrial site, where the device is located or assigned to.

7. Select **Convert**.
   The following banner appears to let you know the process has started. To check the All OT Devices list for updates, you can select the link in the banner.



Result
The selected IT hardware devices have been converted into OT devices.

You can also use the Bulk Update Ruleset for Reassigning IT to OT feature to create a scheduled job that automatically converts IT hardware to OT devices. For more information, see Automatically convert your IT records to OT devices.

Convert your OT devices to IT hardware devices in a bulk edit

Bulk edit your Operational Technology (OT) devices to remove the OT device details. Then convert your OT devices to IT hardware devices.

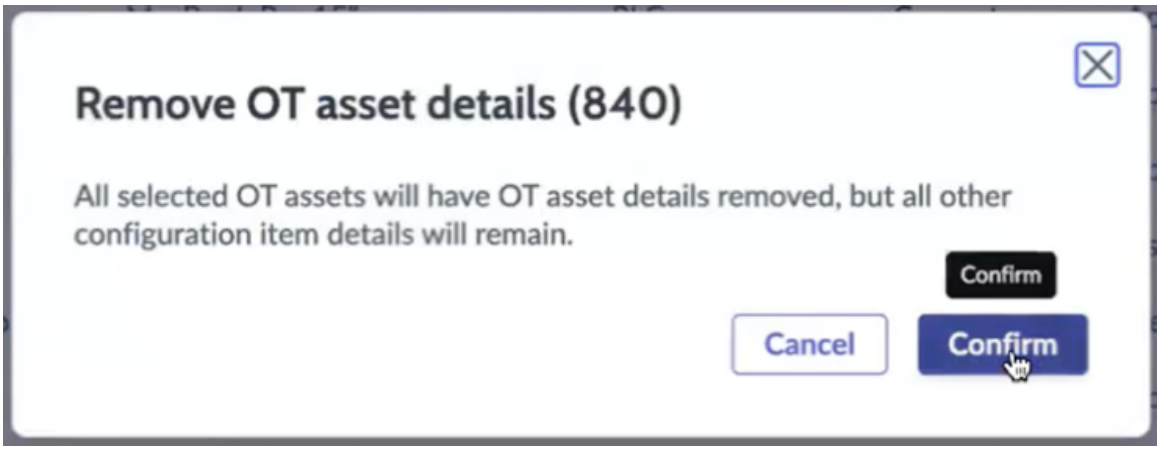
Before you begin
Role required: cmdb_ot_admin or admin

About this task
If you encounter OT devices that don't have an OT function and should be classified as IT hardware devices, you can select and edit multiple OT devices in a bulk edit to convert them to IT hardware devices.

Procedure
1. Navigate to **All** > **Industrial Workspace Admin** > **Industrial Workspace.**
2. In the list view, select one of the following lists.
   - OT Computer and Servers
   - OT Network Gear
   - Industrial IoT (IIoT)

3. Select the OT devices that you want to convert to IT hardware devices.
   If you want to select all OT devices in the list, select the check box next to the OT device column.
4. Select the **Remove OT device details** button.
   A dialog box appears that asks you to confirm that you want to remove the OT device details but keep all the other configuration item details.

> **Note:**
> None of the CI details, network adapters, or IP addresses are removed. Only the OT-specific data is removed.



5. Select **Confirm**.

Result
The OT device details are removed from the selected OT devices and the OT devices are converted to IT hardware devices. You can view these IT hardware devices in the IT Hardware list view on the Industrial Workspace.

Map IP addresses to OT devices

You can use the `SyncIPAddressToOT` scheduled job to update and synchronize the IP address information for all the available OT devices. The `SyncIPAddressToOT` scheduled job acquires the IP address information from the IP address (cmdb_ci_ip_address) table and adds it to the IP address field of the CI.

Before you begin
Role required: admin

Procedure
1. Navigate to **All** > **System Definition** > **Scheduled Jobs**.
2. In the **Scheduled Jobs** page, type `SyncIPAddressToOT` in the **Search** filter and hit enter to find the scheduled job.
3. Select `SyncIPAddressToOT`.
4. In the Scheduled Script ExecutionSyncIPAddressToOT page, select **Execute Now**.

View and edit device to device connections

View and edit device-to-device connections for your Operational Technology (OT) devices using the Device to Device Connections list in the Industrial Workspace.

Before you begin

- Ensure you have the Industrial Core [sn_ot_core] plugin installed.
- Role required: admin

About this task

The Device to Device Connections uses the `OTNetworkUtils` script include for the OT device look-up logic. The look-up logic identifies the corresponding Source and Destination CIs based on IP addresses, sites, and managed networks.

The Device to Device Connections list shows fields from both the OT Device Network Connection [sn_ot_device_network_connection] table and the CI relationships [cmdb_rel_ci] table.

Procedure

1. Navigate to **All** > **Industrial Workspace**.
2. Select the **List** ( ) icon.
3. Under the **OT Network** module, select the **Device to Device Connections** list.
4. If needed, edit the following fields.

Device to Device Connections form

Field	Description
Parent	Configuration item (CI) record of the source device.
Child	CI record of the destination device.
Source IP Address	IP address assigned to the source device.
Source Device CI	CI record of the source device.
Source MAC Address	MAC address of the source device.
Destination IP Address	IP address assigned to the destination device.
Destination Device CI	CI record of the destination device.
Destination MAC Address	MAC address of the destination device.
Destination Port	Network port used by the destination device for communication.
Last Communication Time stamp	Date and time when the devices last communicated. **Note:** Any device-to-device connection record with a Last Communication Time stamp of 90 days or longer is deleted. To edit the Last Communication Time stamp, perform the following actions.

Field	Description
	a. Navigate to **All** > **Instance Scan** > **Table Cleanup**. **b.** In the sn_ot_device_network_connection record, edit the **Age in seconds** field as needed. The default is 7 , 776 , 000.
Transport Protocol	Protocol used for data transfer. For example, TCP, UDP.
Application Protocol	Application-level protocol used. For example, HTTP, Modbus, FTP.
Source Managed Network	Managed network segment where the source device resides.
Destination Managed Network	Managed network segment where the destination device resides.
Discovery Source	Source that's providing the connection information.

5. Select **Save**.

Result
To view a device-to-device connection for an OT device, you can access the Device to Device Connections related list in the OT device record. For more information about related items and related lists for OT devices, see Edit or view OT devices after import or discovery.

Managing Network Intrusion Detection System appliances

If you have the cmdb_nids_admin or admin role, you can assign metadata attributes to Network Intrusion Detection System (NIDS) class records from the NIDS menu in the ServiceNow AI Platform.

A Network Intrusion Detection System helps manage the import of IT and OT devices from supported integrations. Assigning meta data such as location and NIDS network type to NIDS records helps you distinguish between detected OT and IT devices, and automatically adds the related meta data to the created records. Users with the cmdb_nids_admin or admin role can edit the **NIDS Assigned Meta Data** tab and view the changes made by the user in the Activity Stream.

Note:
Manual creation for an NIDS record in the table is restricted from the list view or the form view of the records.

For more information about the NIDS class records, see Network Intrusion Detection System (NIDS) CI extension class.

If a NIDS record has the Validated field set to true, then when any of the following attributes of the NIDS are changed on the NIDS form, a warning message is displayed.

- NIDS network type
- NIDS source name
- NIDS source ID

If the NIDS record with any detects::detected by relationships is deleted, a warning message is displayed.

You can use the Network Intrusion Detection Systems (NIDS) Guided Setup to lead you through:

- Configuring users and roles for users that do not already have an account in an instance
- Importing NIDS records from Operational Technology (OT) Certified Service Graph Connectors to designate if NIDS appliances are running on OT or IT networks
- Validating NIDS so that detected devices can be imported. For more information about validating NIDS, see Validate the NIDS.

To access the NIDS Guided Setup, navigate to **Network Intrusion Detection Systems (NIDS)** > **NIDS Guided Setup**.

To assign an appliance as a manager for NIDS sensors that detect devices, navigate to **Network Intrusion Detection Systems (NIDS)** > **Managers** to edit applicable "management consoles" or "central managers" records.

- Review the Sensors list to ensure that there is not currently a device assigned as manager.
- For any devices that do not function as sensors, change **is manager** to **True**.

For information about the `NIDSUtils` script include that copies NIDS-assigned meta data to detected devices, see Script includes installed with Operational Technology Manager.

Related topics

Network Intrusion Detection System (NIDS) CI extension class

Script includes installed with Operational Technology Manager

Validate the NIDS

Validate the NIDS to import the devices from the ETL that were detected by the sensor. The sensors can only pass the validation if they aren't in learning mode as such sensors aren't eligible for device import.

Before you begin

It's recommended that you have the Common Service Data Model plugin installed. The Service Graph Connector aligns with the life cycle data models as per the Configuration Management Database (CMDB) standards. For more information, see Implementing the CSDM framework in stages.

Role required: cmdb_nids_admin

About this task

The **Life Cycle Stage** and **Life Cycle Stage Status** fields are used to capture the learning mode of a sensor. If the Life Cycle Stage field is set to **Operational** and Life Cycle Stage Status is set to **Learning Mode**, then validation is unsuccessful. If the Life Cycle Stage Status field is set to **In Use**, the validation is successful.

Procedure

1. Navigate to **All** > **Network IDS Appliance (NIDS)** > **Sensors**.
2. If there are any management consoles or central managers in the list, do the following actions:
   a. Click **edit the record**.
   b. In the **NIDS Admin Configuration** tab, select **Is NIDS manager** to set the **Validated** column true.
3. In the NIDS Admin Configuration section, make sure that the **Life Cycle Stage Status** value is not Learning Mode.
   Otherwise, the validation fails.

4. Select the **NIDS network type**.

   The Network type must be selected based on the location of the sensor.

   Note:
   The network type OT creates the OT device record. The network type IT does not create the OT device records.

5. In the **NIDS Assigned Meta Data** tab, check that all the devices discovered by the NIDS are entered.
6. Click **Validate**.

   Note:

   The zone value is populated by the ETL. If a zone value is manually entered on the NIDS record, it is overridden what is populated by the ETL.

   If the NIDS record is not validated, the devices are not imported from the ETL that were detected by the sensor.

What to do next
Alternatively, you can validate more than one NIDS sensor through a bulk validation. For more information, see Validate multiple NIDS sensors at once.

Validate multiple NIDS sensors at once

Validate multiple NIDS sensors at once through a bulk validation so that you can edit your records more quickly and efficiently.

Before you begin
Role required: cmdb_nids_admin

About this task
You can use bulk validation to validate multiple NIDS sensors at once instead of individually validating each NIDS sensor.

Note:
Carefully review the NIDS sensors by discovery source and proceed with caution while bulk validating.

Procedure
1. Navigate to **All** > **Network IDS Appliance (NIDS)** > **Sensors**.
2. Select the check boxes the sensor records that you want to validate.
3. Select the **Validate Sensors** button.

Result
If the sensors you validated have a **Life Cycle Stage Status** of In Use, a successful validation message appears.

If the selected sensors have a **Life Cycle Stage Status** of Learning Mode or the **Validated** column is set to true, an error message appears alerting you that one or more sensors in learning mode haven't been validated or already validated. You should consider changing the **Life Cycle Stage Status** column to In Use to proceed with the bulk validation.

Modeling an Operational Technology system service

You can model an Operational Technology (OT) system service to create other control systems, such as a distributed control system (DCS).

An OT system service refers to a category of technology and systems that are used to manage, control, and monitor physical processes, machinery, and industrial operations. OT system services are typically employed in sectors such as manufacturing, energy, utilities, and transportation.

OT system services can include the following.

- Distributed Control Systems (DCS)
- Supervisory Control and Data Acquisition (SCADA)
- Industrial Control Systems (ICS)
- Safety Instrumentation Systems (SIS)
- Manufacturing Execution Systems (MES)
- Process Control Systems
- Transportation Management Systems
- Energy Management Systems
- Building Management system services (BMS)

These system services collectively ensure that industrial processes run efficiently and safely.
DCS example

You can model OT system services to create other control systems. For example, you can model a distributed control system (DCS) and all related components (PLCs, control modules, EWS, RTU, HMI, SCADA, and so on). A DCS is a platform for automated control and operation of a plant or industrial process. It coordinates and supervises the entire plant of many varying processes.

A DCS is a process-oriented system that uses closed loop control. The following table describes the components of a DCS.

DCS Components

Component	Description
Operator stations	Heart of DCS, operators view process, monitor alarms, and alerts.
Servers, EWS, Historians	Data collection and data exchange for hardware configurations.
Controllers, I/O modules	Data exchange to servers.
Field devices	Devices such as transmitters, switches, actuators, and valves.

A DCS differs from the centralized control system wherein a single controller at central location handles the control function but in a DCS, each process element, machine, or group of machines is controlled by a dedicated controller.

Create an Operational Technology system service

Create an Operational Technology (OT) system service to model a distributed control system (DCS) and all of its related components, such as control modules and programming logic controls (PLCs).

About this task

You can create an OT system service in the following locations:

- ServiceNow AI Platform in the **OT Systems** list
- Industrial Industrial Workspace list view

Before you begin

Role required: admin

Procedure

1. If you want to create an OT system service on the ServiceNow AI Platform, complete these actions:
   a. Navigate to **All** > **Operational Technology (OT)** > **OT Systems**.
   b. Select **New**.
   c. On the form, fill in the following fields.

OT System Service Form

Field	Description
Display name	Used to populate the display name of the OT system service.
Name	Host name of the OT system service.
ISA entity site	ISA entity site that the OT system service belongs to.
Manufacturer	Name of the manufacturer of the OT system service.
Model number	Manufacturer's model number for the OT system service.
Short description	Brief description of the OT system service.
Details	
Owned by	Name of the primary owner of the OT system service.
Managed by	Name of the primary manager of the OT system service.
Business criticality	Measure of how critical, or important, the system service is. Examples: ▪ High or Most critical ▪ Medium or somewhat critical ▪ Low or Less critical ▪ None or not critical
Support Group	Name of the primary support group for the OT system service.
Managed By Group	Name of the group that manages the OT system service.

Field	Description
Operational status	Status of the system service.

d. Select **Submit**.

2. If you want to create an OT system service in the Industrial Workspace list view, complete these actions:

a. Navigate to **All** > **Industrial Workspace**.

b. Select the List ( ) icon.

c. Under the **Operational Technology (OT)** module, select the **OT Systems** list.

d. Select **New**.

e. On the form, fill in the following fields.

OT System Service Form

Field	Description
Display name	Used to populate the display name of the OT system service.
Name	Host name of the OT system service.
ISA entity site	ISA entity site that the OT system service belongs to.
Manufacturer	Name of the manufacturer of the OT system service.
Model number	Manufacturer's model number for the OT system service.
Short description	Brief description of the OT system service.
Details	
Owned by	Name of the primary owner of the OT system service.
Managed by	Name of the primary manager of the OT system service.
Business criticality	Measure of how critical, or important, the system service is. Examples: ▪ High or Most critical ▪ Medium or somewhat critical ▪ Low or Less critical ▪ None or not critical
Support Group	Name of the primary support group for the OT system service.
Managed By Group	Name of the group that manages the OT system service.

Field	Description
Operational status	Status of the system service.

f. Select **Save**.

What to do next
Now you can add OT devices to the system service. For more information, see Add a device to an Operational Technology system service.

Add a device to an Operational Technology system service

Add an Operational Technology (OT) device to an OT system service to create a relationship between the equipment model entity that the device belongs to and the OT system service.

Before you begin
Role required: admin

Procedure
1. Navigate to **All** > **Industrial Workspace**.
2. Select the List ( ) icon.
3. Under the **Operational Technology (OT)** module, select the **OT Systems** list.
4. Select the OT system service you want to add a device to.
5. In the **Related Records** tab, select the **Associated OT Devices** related record.
6. Select **Add**.
7. Select the check box next to one or more OT devices.
8. After you choose all the OT devices, select **Add**.

Result
After you add the OT devices, the following relationships are created:

- The Depends on::Used by relationship between the selected configuration item (CI) and the OT system service
- The Managed by::Manages relationship between the OT system service and CI's equipment model entity.

Map an Operational Technology system service to an equipment model entity

Map an Operational Technology (OT) system service to an ISA equipment model entity by enabling a scheduled job. When the relationship between an OT device and an equipment model entity changes, the scheduled job recomputes the relationship between the OT system service and the equipment model entity.

Before you begin
Role required: admin

Procedure
1. Navigate to **All** > **System Definition** > **Scheduled Jobs**.
2. Select the Show/hide filter ( ) icon.
3. Add the following filter.
   `[Name] [is] [Map OT Systems to ISA Entities]`

4. Select the **Map OT Systems to ISA Entities** scheduled job record.
5. Next to the **Active** field, select the check box.
6. In the **Run** field, select the option that best fits your needs.
7. Select **Update**.

View the dependency map for an Operational Technology system service

View the dependency map for an Operational Technology (OT) system service to see the graphical representation of the hierarchical structure of the selected OT system service and its relationship with other entities in the production process.

About this task

You can view the dependency map for an OT system service in the following locations:

- ServiceNow AI Platform in an OT system service record
- Industrial Workspace in an OT system service record

Before you begin

Role required: cmdb_ot_editor

Procedure

1. If you want to view the dependency map for an OT system service on the ServiceNow AI Platform, complete the following actions:
   a. Navigate to **All** > **Operational Technology (OT)** > **OT Systems**.
   b. Select the OT system service record you want to view the OT dependency map for.
   c. Select **View OT Dependency map**.
2. If you want to view the dependency map for an OT system service in the Industrial Workspace, complete the following actions:
   a. Navigate to **All** > **Industrial Workspace**.
   b. Select the List ( ) icon.
   c. Under the **Operational Technology (OT)** module, select the **OT Systems** list.
   d. Select the OT system service record you want to view the OT dependency map for.
   e. Select **View OT Dependency map**.

Automatically convert your IT records to OT devices

Create a scheduled job that automatically converts your IT hardware to Operational Technology (OT) devices by using the Bulk Update Ruleset for Reassigning IT to OT feature. This scheduled job adds OT entity details to all the IT hardware that you want to convert at once.

Before you begin

Role required: admin

About this task

You may have configuration items (CIs) classed as IT hardware that you want to create OT entity records for. Follow these general guidelines:

- Make sure that the fields you use apply to the filter criteria conditions in steps 3 to 4. Verify that the data set doesn't exceed 1 million records so that you can avoid performance-related issues.
- Create separate scheduled job definitions for the separate CI classes in steps 3 to 6. This way, you can filter each CI level and define the OT entity default values.
- Use the Class field in the filter to query only specific CI classes in step 3.

Note:
Only the hardware class and its extended classes are used in the source table.

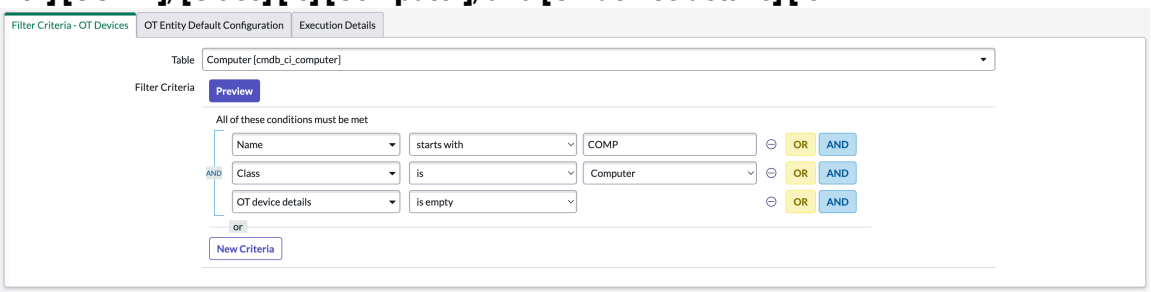
- Use the **Preview** button to verify the records selected for further review in step 4.
- Verify the data in the **OT Entity Default Configuration** tab in step 5. The OT entity records are created using these default values.

You can also manually convert the IT hardware to the OT devices. For more information, see Convert IT hardware to OT devices in a bulk edit.

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **OT Manager Admin** > **Automated IT OT Bulk Conversion**.
2. Select **New**.
3. On the **Filter Criteria - OT Devices** tab, set the source table and filter criteria to identify the CIs that you need to convert.

   For example, if you want to add the OT entity details for all computers that are imported into the system that have a prefix of COMP, select the source table as **cmdb_ci_computer** and then add the filter criteria as **[Name] [starts with] [COMP]**, **[Class] [is] [Computer]**, and **[OT device details] [is empty]**.



   You can also use CMDB groups to group IT CIs based on additional information, such as Software Installed, so that you can convert them to OT devices. For more information, see Use CMDB groups to add OT context to IT CIs.

4. Verify the number of records that were chosen from the filter condition you set by selecting the **Preview** button.
   The OT entity details are added for these records, such as OT Device Type and Device Criticality.
5. On the **OT Entity Default Configuration** tab, fill in the fields.
   The fields in the following table provide the default values that are added to the OT entity records or the OT-related metadata.

OT Entity Default Configuration form

Field	Description
OT Device Type	Category type that the OT device is classified as. The device type is also the function that the device plays on the OT network. For example, an IT device, such as a server, can be converted to an OT device, and the function it plays on the network is an HMI. Its class is server and its device type is HMI. **Note:** In some cases, OT devices have no OT function or the device type is unknown. Where the OT devices have no OT function, select **No OT Function**. Where the OT devices have an unknown device type, select **Unknown**.
Device Criticality	Measure of the relative risk to the site process if the device fails: ○ 1 - Most critical ○ 4 - Not critical
Purdue Level	Assigned Purdue level. The level ranges are 0–5. **Note:** To learn more about the Purdue levels in Industrial Control Systems, see https://subscription.packtpub.com/book/networking_and_servers/9781788395151/1/ch01lvl1sec10/the-purdue-model-for-industrial-control-systems.
Zone	Area within the site location that the device is assigned to.
Site	Top-level parent entity, or industrial site, where the device is located or assigned to.

6. In the **Run** field, select a scheduled time for this job to run.
7. Select the check box next to the **Active** field.
8. Select **Submit**.

Use CMDB groups to add OT context to IT CIs

Use Configuration Management Database (CMDB) groups to group IT configuration items (CIs) based on additional information, like installed software. Then you can add Operational Technology (OT) context to the IT CIs.

Before you begin
Role required: admin

About this task
Using CMDB groups doesn't change the class of the IT CI. It instead adds OT entity records to the IT CI, which captures the OT context.

Note:

Follow these general guidelines:

1. Ensure the filter conditions on the CMDB Group returns unique set of CI records every time. For example, adding a filter condition such as **OT device details is EMPTY** ensures that only records without OT device details are considered.
2. Make sure the indexed fields are used as part of the filter criteria conditions. Ensure that the data set does not exceed 10,000 records to avoid performance related issues.

   Note:
   The CMDB Group API doesn't support retrieving records exceeding 10,000 or the limit defined by the following properties.
   - glide.cmdb.query.max_results_limit
   - glide.cmdb.group.max_ci_limit

   To address this, these properties need to be adjusted to allow for larger query results if the CMDB query contains more records than the current limits permit.
3. Make sure to create an Automated IT to OT Bulk Conversion (sn_automated_it_ot_bulk_conversion) record per CMDB Group to have filtering at a group level and define respective OT entity default values.
4. Validate the data in the **OT Entity Default Configuration** tab. OT entity records are created using these default values.

Procedure
1. Define a CMDB group with the required filter criteria that identifies the right IT CIs..
   For more information, see CMDB groups.
2. Create an Automated IT to OT Bulk Conversion (sn_automated_it_ot_bulk_conversion) record associated with the CMDB group.
   Creating this record adds OT context to IT CIs through the OT entity details.

   For more information about how to create an Automated IT to OT Bulk Conversion record, see Automatically convert your IT records to OT devices.
3. To create a record in **sn_automated_it_ot_bulk_conversion_m2m_cmdb_group**, complete the following actions.
   a. Navigate to **All** > **Industrial Workspace Admin** > **OT Manager Admin** > **Automated IT OT Bulk Conversion - Using CMDB groups**.
   b. Select **New**.
   c. In the **Automated IT to OT Bulk Conversion** field, select the record created in step 2.
   d. In the **CMDB Group** field, select the CMDB created in step 1.
   e. Select **Submit**.
   The record associates the CMDB group with the Automated IT to OT Bulk Conversion record.

For example, if you want to add OT entity details for all computers that have a specific HISTORIAN software installed, we need to create a CMDB Group that matches this filter critieria. Then create a scheduled job and link it to the CMDB Group for computers that have HISTORIAN software installed.

Operational Technology Manager reference

Reference topics provide additional information about the Operational Technology Manager application.

Components installed with Operational Technology Manager

Several types of components may be installed with activation of the Operational Technology Manager application, including user roles.

Note:
The Application Files table lists the components that are installed with this application. For instructions on how to access this table, see Find components installed with an application.

Plugins installed

Plugin	Description
Industrial Core	Contains the class mappings needed for the OT Service Graph Connectors. For more information about the Industrial Core plugin, see Industrial Core plugin.

Roles installed

Role	Description
Operational Technology Discovery Administrator [ot_discovery_admin]	Can run the Discovery for Operational Technology process, but cannot access the Configuration Management Database (CMDB) to view the configuration items (CIs) and related Operational Technology (OT) entities that are created from discovered items. To learn more, see Create an Operational Technology discovery schedule and run the Discovery process.
Operational Technology Manager Viewer [cmdb_ot_viewer]	Read-only access to Operational Technology (OT) device records.
Operational Technology Manager Editor [cmdb_ot_editor]	Create, read, update, and delete access for Operation Technology (OT) extension classes.

Role	Description
	Note: Users assigned the **cmdb_ot_editor** role can edit and delete only OT configuration items (CIs), and don't have the ability to edit IT CIs.
Operational Technology Manager Admin [cmdb_ot_admin]	Create, read, update, and delete access for Operational Technology (OT) device records. Can also edit and manage specific configurations in the OT entity type. To learn more, see Operation Technology (OT) extension classes. **Note:** Users assigned the **cmdb_ot_editor** role can edit and delete only OT configuration items (CIs), and don't have the ability to edit IT CIs.

Installed software for Operational Technology Management

The installed software for the Operational Technology Management solution comes from IT Discovery for Operational Technology (OT) Networks or from the OT-certified Service Graph Connectors that support installed software.

Installed software overview

The installed software for a CI varies depending on if you have the Software Asset Management (SAM) application installed. The following tables are created when SAM is activated:

- Software Discovery Model [cmdb_sam_sw_discovery_model]
- Software Model [cmdb_software_product_model]
- Software Installation [cmdb_sam_sw_install]

For more information about how the table structure for managing software installations behaves differently when SAM is activated, see Discovery with Software Asset Management.

You can also configure a computer CI to display Software Asset Management data. For more information, see Configure a CI to display Software Asset Management data.

View installed software for OT devices

You can view the installed software for OT devices in the Industrial Workspace in the following locations:

- The **Software Installed on OT Devices** list by navigating to **All** > **Operational Technology (OT)** > **Software Installed on OT Devices**.
- The **Software Installed on OT Devices** list in the Industrial Workspace list view under the **Operational Technology (OT)** module.
- The **Software Installed** list under the **Related Records** tab in an OT device record.

Industrial Core plugin

The Industrial Core plugin contains the class mappings needed for the Operational Technology (OT) certified Service Graph Connectors.

Industrial Core plugin overview

The Industrial Core plugin [sn_ot_core] introduces foundational capabilities to support OT-specific data models and the site based licensing requirements for OT. The plugin is required as a dependency by all products in the Operational Technology Management solution. The dependency can be a direct dependency or a dependency through a base product. For example, the Operational Technology Manager application is a dependency. For the Operational Technology Vulnerability Response application, the Industrial Core plugin isn't added as a dependency because Operational Technology Manager is a direct dependency for Operational Technology Vulnerability Response.

Note:
All partner applications integrating with the OT functionality must declare a dependency on the Industrial Core plugin. This ensures consistent handling of licensing and future model enhancements.

Industrial Core plugin features

The following table summarizes the features for the Industrial Core plugin.

Plugin features

Feature	Description
OT Class Mapping Template [ot_class_mapping_template]	The Industrial Core plugin introduces a configuration template to manage class mappings through a user-accessible table part of the OT Service Graph Connectors. This configuration template replaces the prior script-based approach. While the OT Class Mapping Template is currently optional, adopting this method is recommended as it allows you to view, manage, and override class mappings directly in the UI and provides a greater transparency and flexibility. **Note:** Partners can extend the OT Class Mapping Template table in the scope of their application to capture the class mappings specific to the integration. For more information about the OT Class Mapping Template, see Operational Technology (OT) extension classes. For more information about reviewing class mappings for the Service Graph Connector for Microsoft Excel, see Review class mappings.

Plugin features (continued)

Feature	Description
OT Device Network connection [sn_ot_device_network_connection]	The OT Device Network Connection [sn_ot_device_network_connection] table references the CI relationships [cmdb_rel_ci] table, and identifies device-to-device connections in CI relationships for OT devices. **Note:** This data is populated with the available OT integrations and cannot be manually created. For more information about the OT Device Network Connection data model, see Operational Technology (OT) extension classes.
OT Activity [sn_ot_activity]	Captures the following activities that occur on the OT Device: • Addition, update, or retiring of a configuration item • Addition of an IP address
OT Backup Job Execution History [ot_backup_history_and_comparison_log]	The Backup Job Execution History class creates a history of records for all backup executions.
OT Automation Repo [ot_automation_repo]	The OT Backup Job Execution History class compares the history of records for all backup executions.
OT Automation Repo Device M2M [ot_automation_repo_device_m2m]	The OT Automation Repo class acts as a repository to store all configuration changes you want to perform on an OT entity.
OT AutomationCommit [ot_automation_commit]	The OT Automation Repo Device M2M class acts a reference to the OT Automation Repo and the OT Entity table.

Operational Technology Backup Management data model

The Operational Technology (OT) Backup Management provides visibility and actionable insights on the backup of the OT devices. The class tables described below are interconnected and collectively form the Backup Management data model.

Use the Backup Storage Information [cmdb_backup_storage_information] class to create backup records that identify the device in internal or external backup services. The Backup Storage Information table includes the following attributes:

Attributes	Description
Backup Configuration Status	Indicates whether the CI has been configured in the backup service or appliance with relevant policies.
Discovery Source	Discovery source of the backup record.
Backup Service	Reference to the Common Service Data Model Technical Service hosting external and internal backup system, services, or appliances
Managed By	Name or ID of the user whi is responsible for managing the backup.
Latest Successful Execution	Date and time of the most recent data backup that was successfully executed for a device.
Latest Execution Attempt	Date and time of the most recent data backup that was attempted for a device.
Next Execution Attempt	Date and time when the next data backup is going to be attempted for a device.
Latest Execution Log	Detailed log entries for all device data backup that were executed.
Backup Source ID	Backup service record for a device, which identifies the device in external or internal backup services. Backup source id can include host_id, vcenter_id, instance_id, db_id.
Job Definition ID	Identification number assigned to a data backup job.
Recovery Point Objective	Amount of time that can elapse between backups and the amount of data lost.
Execution Mode	Indicates whether the backup is configured to run automatically on a periodic basis, or if it's manually executed on an as-needed basis.
Backup Source	Details of the backed-up CI. This table holds the backup status details for the referenced CI.
Job Definition Name	Name assigned to a data backup job.
Managed By Group	Name of the user group responsible for managing the backup.
Domain	ID of the domain to which the instance belongs.

Use the Backup Job Execution History [cmdb_backup_job_execution_history] class to create a history of records for all backup executions. The Backup Job Execution History table includes the following attributes:

Attributes	Description
Backup Job Information	Details of the backup job you created.
Backup End Time	The time when the backup job ended.
Completion Status	The current completion status of the backup job.
Mark for Archival	Select to archive backup job execution history after 90 days.

Use the OT Backup Job Execution History [ot_backup_history_and_comparison_log] class to compare the history of records for all backup executions. The Backup Log table includes the following attributes:

Attribute	Description
Current Version	The current version of the OT device.
Current Version vs Backup	Comparison between the current version of the OT device and the version information available in the backup record.
Current Version vs Backup Error	Comparison between the current version of the OT device and the version information available in the backup record that experienced an error during backup job execution.
Current Version vs Backup Warning	Comparison between the current version of the OT device and the version information available in the backup record that experienced a warning during backup job execution.
Previous Version vs Backup	Comparison between the previous recorded version of the OT device and the version information available in the backup record.
Previous Version vs Backup Error	Comparison between the previous recorded version of the OT device and the version information available in the backup record that experienced an error during backup job execution.
Previous Version vs Backup Warning	Comparison between the previous recorded version of the OT device and the version information available in the backup record that experienced a warning during backup job execution.

Related topics

Operational Technology (OT) extension classes

Operational Technology Version Control data model for Backup Management

In Operational Technology (OT) Backup Management, you can develop multiple scripts or programs to automate the data backup process of OT devices. The Version Control data model

enables you to maintain a record of all the backup scripts or programs you develop for an OT entity.

The following class tables are interconnected and collectively form the Version Control data model for Operational Technology (OT) Backup Management data model.

Use the OT Automation Repo (ot_automation_repo) class as a repository to store all configuration changes you want to perform on an OT entity. The following attributes are available in the class:

Attribute	Description
Project Last Updated	Date and time of the most recent changes to the project.
Comments	Additional information provided by the OT engineer.
Is multiple edits enabled	Select **Yes** or **No** to enable multiple edits to the project.
Days since current state	Number of days that have passed since the project has been in the present status.
Latest version	Current version of the OT device the project is assigned to.
Project State	Status of the project.

Use the OT Automation Repo Device M2M (ot_automation_repo_device_m2m) class as a reference to the OT Automation repository and the OT Entity table. The following attributes are available in the class:

Attribute	Description
Automation Repo	The repository where all project modifications and configurations are stored.
OT Entity	The OT Entity to which the project has been assigned.

Use the OT AutomationCommit (ot_automation_commit) class as a reference to the changes you have committed to a project. The following attributes are available in the class:

Attribute	Description
Automation Version	The version of the script or the program committed for the OT entity.

Related topics

Operational Technology Backup Management data model

Model categories for Operational Technology

When configuration items (CIs) are created in the CMDB, asset records are created. The asset record contains the model category for the CI.

The following table describes the model categories available for Operational Technology (OT) and their CI class.

OT model categories

Name	CI class
Industrial	N/A
Industrial General	Operational Technology (OT) [cmdb_ci_ot]
Operational Equipment	Operational Equipment [cmdb_ci_oe]
OT Control	OT Control System [cmdb_ci_ot_control]
OT Control 3D Printer	Industrial 3D Printer [cmdb_ci_ot_industrial_3d_printer]
OT Control CNC	CNC [cmdb_ci_ot_cnc]
OT Control DCS	DCS [cmdb_ci_ot_dcs]
OT Control DPU	DPU [cmdb_ci_ot_dpu]
OT Control IED	IED [cmdb_ci_ot_ied]
OT Control Module	OT Control Module [cmdb_ci_ot_control_module]
OT Control PLC	PLC [cmdb_ci_ot_plc]
OT Control RTU	RTU [cmdb_ci_ot_rtu]
OT Control SCADA	SCADA Server [cmdb_ci_ot_scada_server]
OT Control Server	OPC Server [cmdb_ci_ot_opc_server]
OT Field Actuator	Industrial Actuator [cmdb_ci_ot_industrial_actuator]
OT Field Device	OT Field Device [cmdb_ci_ot_field_device]
OT Field Drive	Industrial Drive [cmdb_ci_ot_industrial_drive]
OT Field Robot	Industrial Robot [cmdb_ci_ot_industrial_robot]
OT Field Sensor	Industrial Sensor [cmdb_ci_ot_industrial_sensor]
OT Supervisory	OT Supervisory System [cmdb_ci_ot_supervisory]
OT Supervisory EWS	EWS [cmdb_ci_ot_ews]
OT Supervisory Historian	Historian [cmdb_ci_ot_historian]
OT Supervisory HMI	HMI [cmdb_ci_ot_hmi]
OT Supervisory OPC	OPC Client [cmdb_ci_ot_opc_client]
OT Supervisory SCADA	cmdb_ci_ot_scada_client

APIs for IT to OT and OT to IT conversion

There are 2 APIs used for handling refresh workflow scenarios for converting IT to Operational Technology (OT) and vice versa with the OT Asset Management application.

APIs used in OT Asset Management

With OT Asset Management, you need to maintain synchronization between asset and configuration item (CI) for OT assets. The following APIs are used for IT to OT conversion and OT to IT conversion in the OT Asset Management application.

Note:
The IT CI class isn't changed. Instead an OT entity record is added, which provides the OT device context.

- Convert IT to OT Asset API
- Convert OT to IT Asset API

Convert IT to OT Asset API

The Convert IT to OT Asset API is used in refresh workflows where an OT configuration item (CI) is replaced with a new CI. This API creates a replica of the previous OT entity record, and maps them to the new CI. No changes occur in the previous CI and its related OT entity record. Both the new CI and the previous CI references are used with this API.

Convert OT to IT Asset API

The Convert OT to IT Asset API is used if an asset needs to be replaced. The API deletes the OT entity record of the passed CI.

For more information about Asset and Configuration Item (CI) synchronization for Operational Technology (OT) assets, see Asset and Configuration Item (CI) synchronization for Operational Technology (OT) assets.

For more information about OT Asset Management, see OT Asset Management.

Related information

Find more information about the Network Intrusion Detection System (NIDS) extension class, OT extension classes, and related applications.

Extension classes overview

The extension classes help you understand how Operational Technology Management works with the Configuration Management Database (CMDB).

Network Intrusion Detection System (NIDS) CI extension class

The Network Intrusion Detection System (NIDS) [cmdb_ci_nids] class builds the relationships between passive network monitoring appliances, and the devices on the network that it discovers.

Operational Technology (OT) extension classes

The Configuration Management Database (CMDB) updates classes for OT.

Related applications

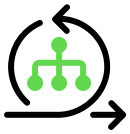
CMDB CI Class Models

The CMDB CI Class Models store app adds class models that extend the CMDB class hierarchy, including class descriptions, identification rules, identifier entries, and dependent relationships.

Now Assist for Operational Technology Manager (OTM)

Use the Now Assist for Operational Technology Manager (OTM) application to help streamline processes in the Industrial Workspace related to your Operational Technology (OT) device data.

Get started

Explore	Configure	Use
 Learn more about Now Assist for OTM	 Configure the Now Assist for OTM application to get started	 Use generative AI capabilities offered by Now Assist for OTM
	Use the OTM AI agent collection  Use agentic workflows for Now Assist for OTM	

Important:

- Not all model providers are available for customers with in-country SKUs, and some Now Assist products/features are currently unavailable for in-country customers. For more information, see the KB1584492 article in the Now Support Knowledge Base. Be sure to check for model provider availability updates in future releases.
- Some Now Assist products/features are currently unavailable for customers in the FedRAMP, NSC DOD IL5, or Australia IRAP-Protected data centers, self-hosted customers, or in other restricted environments. For more information, see the KB0743854 article in the Now Support Knowledge Base . Be sure to check for availability updates in future releases.
- Some Now Assist products/features are currently available only for customers in some regions. Be sure to check for availability updates in future releases.
- Some AI products and skills are not available in Regulated Markets. For more information, see KB2593939: Regulated Markets AI Products/Skills Not Available. Be sure to check for availability updates in future releases.

Troubleshoot and get help

- ServiceNow Community on AI and Intelligence
- Search the Known Error Portal for known error articles
- Contact Customer Service and Support

AI limitations

This application uses artificial intelligence (AI) and machine learning, which are rapidly evolving fields of study that generate predictions based on patterns in data. As a result, this application may not always produce accurate, complete, or appropriate information. Furthermore, there is no guarantee that this application has been fully trained or tested for your use case. To mitigate these issues, it is your responsibility to test and evaluate your use of this application for accuracy, harm, and appropriateness for your use case, employ human oversight of output, and refrain from relying solely on AI-generated outputs for decision-making purposes. This is especially important if you choose to deploy this application in areas with consequential impacts such as healthcare, finance, legal, employment, security, or infrastructure. You agree to abide by ServiceNow's AI Acceptable Use Policy, which may be updated by ServiceNow.

Data processing

This application requires data to be transferred from ServiceNow customers' individual instances to a centralized ServiceNow environment, which may be located in a different data center region from the one where your instance is, and potentially to a third-party cloud provider, such as Microsoft Azure. This data is handled per ServiceNow's internal policies and procedures, including our policies available through our CORE Compliance Portal.

Data collection

ServiceNow collects and uses the inputs, outputs, and edits to outputs of this application to develop and improve ServiceNow technologies including ServiceNow models and AI products. In addition, this application will collect incident data (for Incident Assist and Knowledge Assist) and chat transcripts (for Chat Assist). Customers can opt out of future data collection at any time, as described in the Now Assist Opt-Out page.

For more information, see the Now Assist documentation.

Exploring Now Assist for Operational Technology Manager (OTM)

The Now Assist for Operational Technology Manager (OTM) plugin uses generative AI to help streamline processes in the Industrial Workspace related to your Operational Technology (OT) device data. You can search for OT devices with the OT Configuration Management Database (CMDB) search feature and use an agentic workflow to automate the OT device import process.

Now Assist for OTM overview

With generative AI skills and agentic workflows, you can use the following features of Now Assist for OTM:

- An OT CMDB search feature that enables you to search for OT configuration item (CI) information and OT device information.
- An OTM agentic workflow that automates the import and validation of your OT device data into the OT CMDB.

Configuring Now Assist for Operational Technology Manager (OTM)

Configure the features and agentic workflows available for Now Assist for Operational Technology Manager (OTM).

Supporting information for Now Assist for Operational Technology Manager (OTM)

Get a quick overview of the important information that is related to Now Assist for Operational Technology Manager (OTM).

Supported language models for all Now Assist for OTM skills and AI agents

You can use Now LLM Service, Now LLM Long Term Stable models (LTS), Azure OpenAI, Google Gemini or Anthropic Claude on AWS as the AI model provider for all Now Assist skills and AI agents. Use the Configuration Controls in AI Control Tower to define which options are available, then set the skill-level preferences in the Now Assist Admin console. For more information, see Large language models on the ServiceNow AI Platform®.

Supported user interfaces

Now Assist for OTM includes the features that are listed in the following table.

Now Assist for OTM supported interfaces

Interface	Feature
Industrial Workspace	• Operational Technology (OT) Configuration Management Database (CMDB) search feature to search for OT device records using the Now Assist panel. The OT CMDB search feature leverages the following agentic workflow and skill: ○ Now Assist for CMDB's Search CMDB agentic workflow. For more information, see Use Now Assist to search the CMDB for CIs. **Note:** You must have the **cmdb_ot_viewer** role at minimum to use the CMDB search agentic workflow. ○ ServiceNow AI Platform's Analytics Query Generator skill. For more information, see the Query Generation store listing and . • Agentic workflow for uploading, importing, and validating your OT device data with the Service Graph Connector for Microsoft Excel.

Activate the OT CMDB Search feature

If you have the admin role, you can configure the Now Assist for Operational Technology Manager (OTM) application so that teams can use the Operational Technology (OT) Configuration Management Database (CMDB) search feature in the Industrial Workspace.

Before you begin
Role required: admin

About this task

Use the Now Assist Admin console to configure Now Assist for OTM. This console contains everything that you must install the plugins and configure the generative AI skills. For additional information, see Now Assist Admin console.

The following table lists the features and skills that you can access from the Now Assist Admin console.

OTM features and skills in the Now Assist Admin console

OTM features	Skills
Gen AI skills for OTM	Analytics Query Generator

Procedure

1. Install the Now Assist for OTM plugin (sn_otm_gen_ai).
   - For information about the application dependencies, see Supporting information for Now Assist for Operational Technology Manager (OTM).
   - For information about the installation process, see Install Now Assist plugins.
2. Navigate to **All** > **Now Assist Admin**.
3. Select the **Now Assist Skills** tab.
4. In the **Platform** category, find the Analytics Query Generator skill.
5. On the Analytics Query Generator tile, select **Turn on**.

> **Important:**
> This Now Assist skill is turned on by default. The skill will be automatically available to appropriate role users for the application. For more information, see Now Assist skills, agents, and agentic workflows on by default.

6. In the Turn on skill confirmation window, select **Turn on** to activate the skill.
7. Enable the Search CMDB agentic workflow in the Now Assist panel.

> **Important:**
> This agentic workflow is turned on by default. For more information, see Now Assist skills, agents, and agentic workflows on by default.

   a. Navigate to **All** > **AI Agent Studio** > **Create and manage**.
   b. Under the **Agentic workflows** tab, select the **Search** *CMDB* agentic workflow.
   c. In the **Select a UI display** screen next to the **Now Assist panel** option, select the **Display** toggle so that the conversation with the agent is displayed in the Now Assist panel.
8. To ensure the CMDB search AI agent is active and running, ensure the **Status** toggle is on.
   a. Navigate to **All** > **AI Agent Studio** > **Create and manage**.
   b. Under the **AI agents** tab, select the *CMDB* **CI search AI agent**.
   c. In the **Toggle display** screen, select the **Status** toggle if the toggle isn't already selected.

Activate the Import OT device spreadsheet into OT CMDB agentic workflow

You must activate the agentic workflow from the AI Agent Studio. The Now Assist for OTM agent included with the application and used in the agentic workflows are activated by default.

Before you begin
Role required: sn_aia.admin

About this task

Important:
This agentic workflow is turned on by default. For more information, see Now Assist skills, agents, and agentic workflows on by default.

Procedure

1. Navigate to **All** > **AI Agent Studio** > **Create and manage**.
2. Under the **Agentic workflows** tab, select the **Import OT device spreadsheet into OT** *CMDB* agentic workflow.
3. In the **Define key requirements** screen, review and update the information as needed then select **Save and Continue**.

   Note:
   In the Define who can access the agentic workflow section for the Import OT device spreadsheet into OT CMDB agentic workflow, a user must have the **ot_excel_import_user** role to access the agentic workflow.

4. In the **Select a UI display** screen next to the **Now Assist panel** option, select the **Display** toggle so that the conversation with the agent is displayed in the Now Assist panel.
5. Select **Save and test**.
   The agent can execute the request for the agentic workflow.
6. To confirm the OT Excel import task AI agent is active and running, verify the **Status** toggle is on.
   a. Navigate to **All** > **AI Agent Studio** > **Create and manage**.
   b. Under the **AI agents** tab, select the **OT Excel import task AI agent**.
   c. In the **Toggle display** screen, select the **Status** toggle if the toggle isn't already selected.

Edit trigger words for OT CMDB search

Edit the trigger words used in the Operational Technology (OT) Configuration Management Database (CMDB) search feature to optimize search results specific to OT.

Before you begin
Role required: admin

About this task
Optionally, you can update the `sn_mfg_common.ot_cmdb_search_trigger_words` system property as needed to include additional search keywords.

Procedure

1. Navigate to **All** > **Indsutrial Workspace Admin** > **Workspace System Properties**.
2. Under the **OT CMDB Search** section, update the Additional OT CMDB Search trigger words in a comma-separated format (`sn_mfg_common.ot_cmdb_search_trigger_words`) system property with additional keywords as needed.

   The following keywords are included for the OT CMDB search feature.

- OT
- Operational Technology
- CNC
- Control system
- Control module
- DCS
- DPU
- EWS
- Field device
- Historian
- HMI
- IED
- OPC client
- OPC server
- PLC
- RTU
- QICS
- Industrial 3d printer
- Industrial actuator
- Industrial drive
- Industrial sensor
- Industrial robot
- Industrial printer
- supervisory system
- SCADA client
- SCADA server

3. Select **Save**.

Using Now Assist for Operational Technology Manager (OTM)

You can search for Operational Technology (OT) configuration items (CIs) and OT device information using the Now Assist for OTM application.

Search for related records in an OT CMDB table

Search for Operational Technology (OT) configuration items (CIs) and OT device information available in an OT CMDB table.

Before you begin

- The Now Assist panel must be activated. For more information, see Activate Now Assist panel standard chat.
- You must be assigned the now_assist_panel_user role to have access to the Now Assist panel.
- You must be assigned appropriate roles to search the relevant OT CMDB tables, such as cmdb_ot_viewer or cmdb_ot_isa_viewer.

Role required: now_assist_panel_user and cmdb_ot_viewer

About this task

The OT CMDB search feature leverages the following:

- Now Assist for CMDB's Search CMDB agentic workflow

> **Important:**
> This agentic workflow is turned on by default. For more information, see Now Assist skills, agents, and agentic workflows on by default.

- ServiceNow AI Platform's Analytics Query Generator skill

> **Important:**
> This Now Assist skill is turned on by default. The skill will be automatically available to appropriate role users for the application. For more information, see Now Assist skills, agents, and agentic workflows on by default.

Procedure

1. Select the **Now Assist** icon.
   The Now Assist is displayed.
2. To initiate a search for OT CMDB tables, enter a prompt such as `Search CMDB` or `CMDB Search`.
   The command signals that you want to search the CMDB tables.
3. Search for an OT device.
   To optimize search results, include OT-specific trigger words or device types in your query, such as `OT`, `Operational Technology`, `PLC`, or `HMI`. Using relevant OT trigger words helps the CMDB search agentic workflow identify the OT context and display results in the Industrial Workspace.

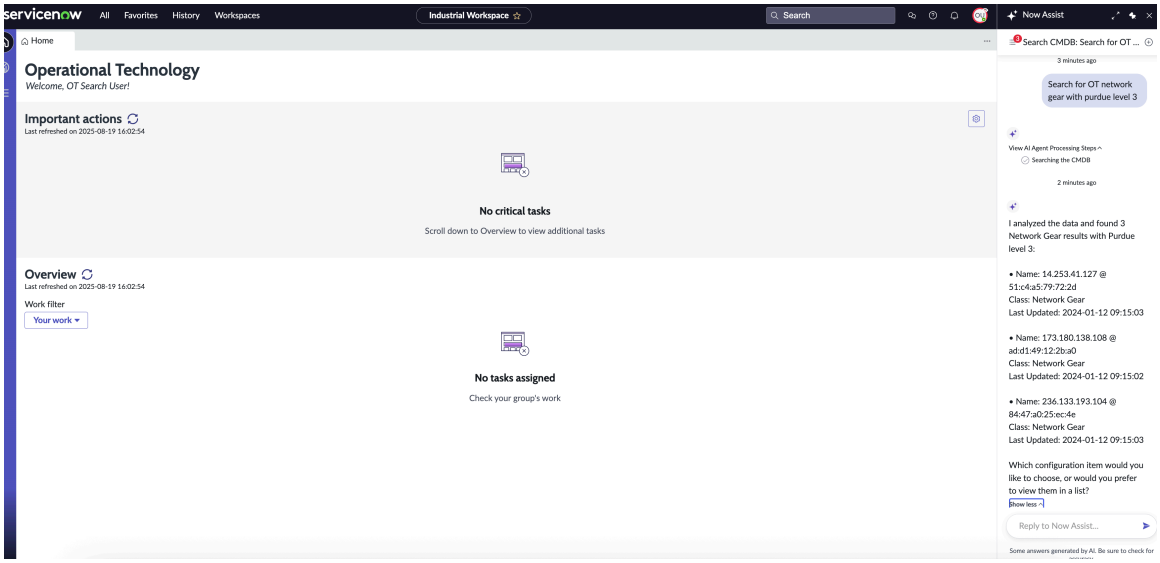
   For example, you can search for OT device information using prompts such as:

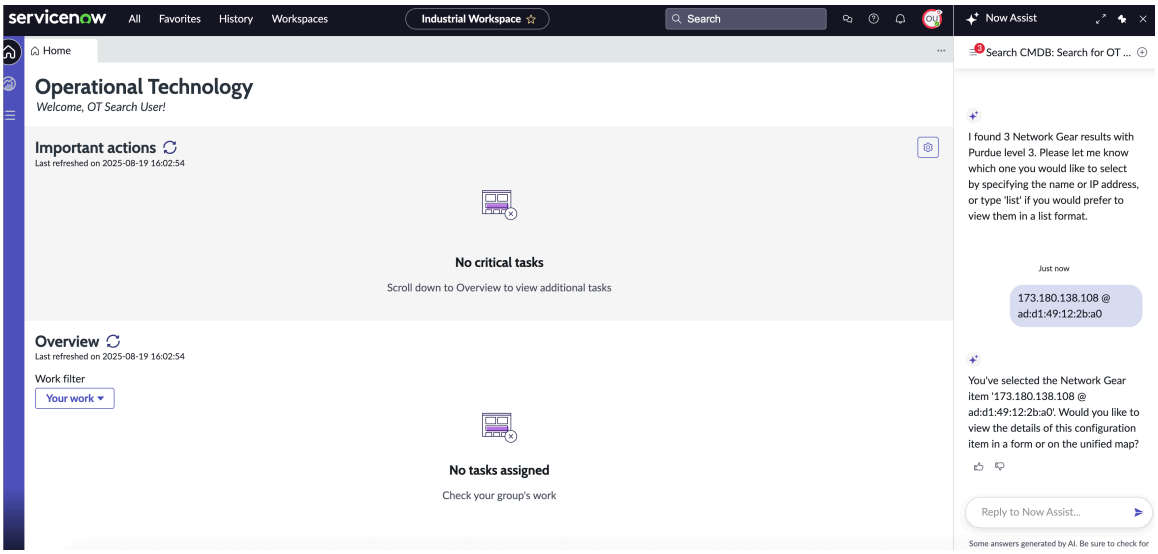
   - `Search for OT PLCs`
   - `Search for OT network gear with Purdue Level 3`
   - `Search for critical OT control systems`

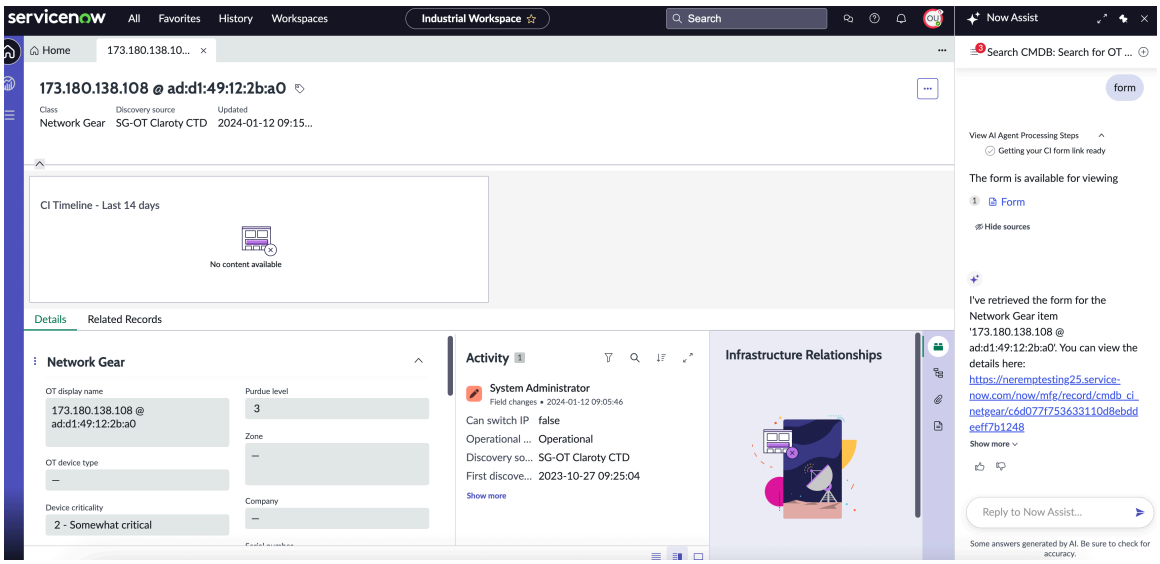
Result

If there are less than five OT device records in the search results, then the agent lists the devices in the Now Assist panel. You can enter the OT device name for more information. The agent gives you the option to view the device in either a form view or a unified map.

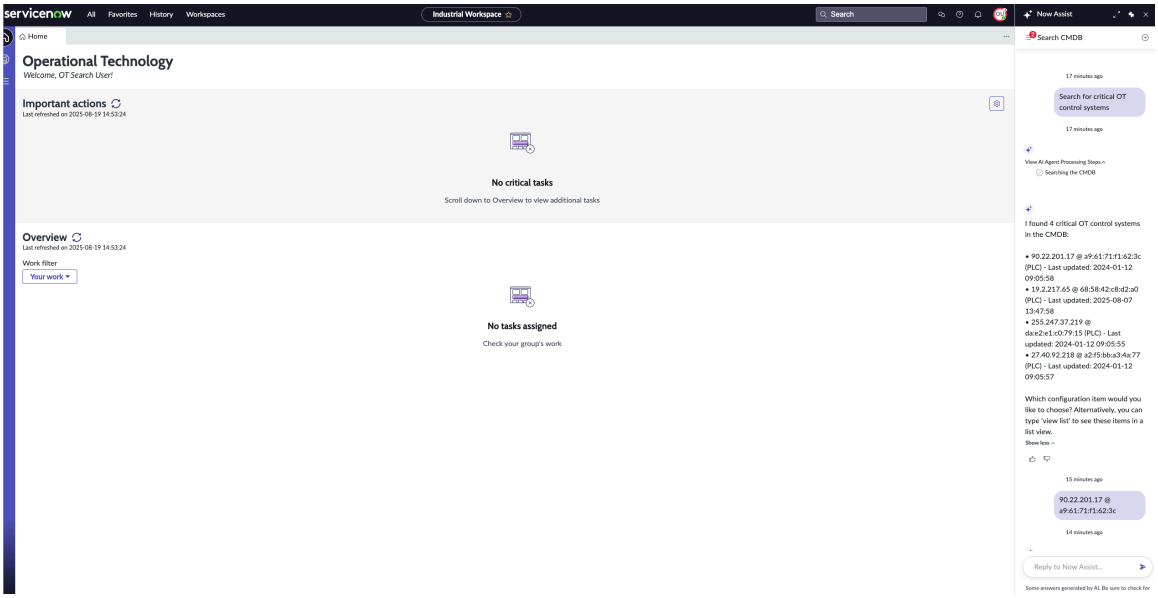
Here are some examples of the form view.

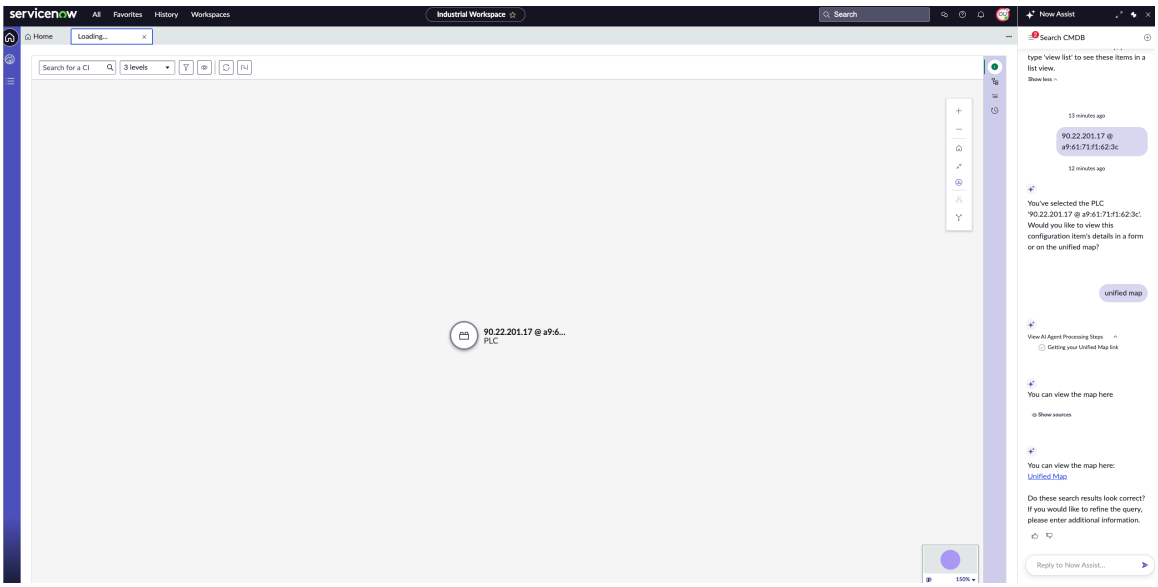




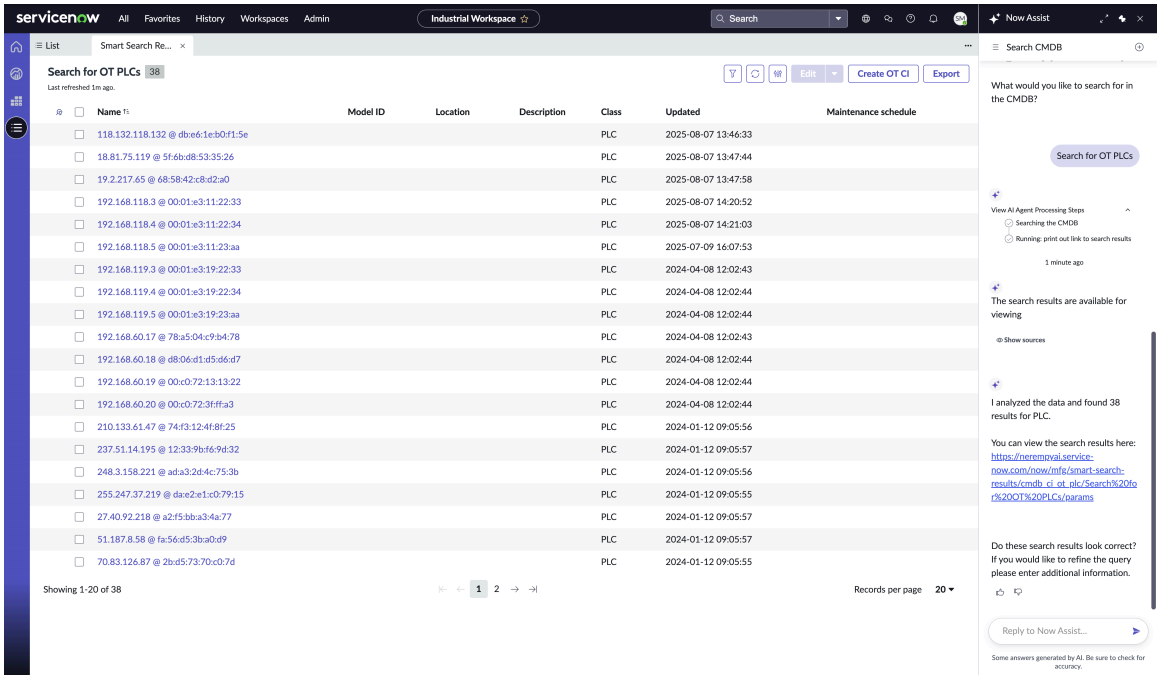


Here are some examples of the unified map view.





When more than five OT device records appear in the search results based on your search criteria, you can select the link in the Now Assist panel (NAP) to view them. Here's an example of the OT PLC search results.



Use agentic AI for Now Assist for Operational Technology Manager (OTM)

Use the Operational Technology Manager (OTM) AI agent within an agentic workflow to complete tasks autonomously.

Table 1. Available agentic workflows for OTM AI agent collection

Agentic workflow name	Description	Available AI agents
Import OT device spreadsheet into OT CMDB	With the Import OT device spreadsheet into OT CMDB agentic workflow, you can do the following: • Import the device inventory spreadsheet and map data to the OT staging table • Validate OT staging table records, remediate invalid records, and import all validated records into the Configuration Management Database (CMDB)	OT Excel import task AI agent

Important:
Some Now Assist skills, agents, and agentic workflows are turned on by default. For more information, see Now Assist skills, agents, and agentic workflows on by default.

Supported Large Language Models

Note:

You can use Now LLM Service, Now LLM Long Term Stable models (LTS), Azure OpenAI, Google Gemini or Anthropic Claude on AWS as the AI model provider for all Now Assist skills and AI agents. Use the Configuration Controls in AI Control Tower to define which options are available, then set the skill-level preferences in the Now Assist Admin console. For more information, see Large language models on the ServiceNow AI Platform®.

Security implementation considerations

Enable security implementation to execute AI agents and agentic workflows through Access Control Lists (ACLs) and user identities. For more information, see Implement access control in Now Assist AI agents

Considerations for running the autonomous AI agents

Important:
By default, all agent workflow and AI agent records are read-only.

To run the AI agents autonomously, you must first duplicate the agentic workflow, and then proceed with the following steps:

- Activate the agentic workflow.
- Activate all agents within the agentic workflow.
- Activate the trigger to invoke the agentic workflow automatically. The triggers for each agentic workflow must be unique. If you prefer to invoke it manually, activating the trigger isn't necessary.

Standalone AI agents

Looking for an AI agent?

- There might be AI agents installed with the Now Assist application that are not used in agentic workflows. To learn how to see all agents that are available on your instance, see Find AI agents.
- To find agents that might not be installed on your instance, visit the AI Agent Marketplace on the ServiceNow Store.

Role masking

Role masking enables users to limit the roles and privileges of agentic workflows during tool execution. Agentic workflows and their AI agents that get installed with Now Assist applications are assigned pre-defined roles. If you select *`Users with specific roles`* for user access, you must configure the security controls to include these roles. Data access settings must also include these roles. For the instructions to change the security controls, see Define security controls for an agentic workflow.

Import the OT device spreadsheet into OT CMDB agentic workflow

Use the Import OT device spreadsheet into OT CMDB agentic workflow to automate the upload, validation, and import of your OT device data into the OT CMDB.

Import OT device spreadsheet into OT CMDB overview

Using the Import OT device spreadsheet into OT CMDB agentic workflow, you can import the OT device inventory spreadsheet and map the spreadsheet data to the OT staging table. After importing and creating an OT staging table record, you can validate the staging record, remediate invalid records, and import all the validated records into the OT CMDB. For more information about how to use this agentic workflow, see Upload, validate, and import the OT device inventory spreadsheet.

Important:
This agentic workflow is turned on by default. For more information, see Now Assist skills, agents, and agentic workflows on by default.

To modify the Import OT device spreadsheet into OT CMDB agentic workflow, duplicate it, and adjust the settings according to your requirements.

Important:
When you modify an agentic workflow, AI agent, or a tool, make sure that you update all instructions accordingly.

Import OT device spreadsheet into OT CMDB agentic workflow

The workflow helps you complete the following process:

1. Import the OT device inventory spreadsheet with an OT Excel SGC Import Task record.
2. Map the spreadsheet data to the SG OT Excel Stagings table.
3. Validate the OT staging table records.
4. Remediate invalid records if needed.
5. Import all validated records into the OT CMDB.

To access the agentic workflow:

1. Navigate to **All** > **AI Agent Studio** > **Create and manage**.
2. Under the **Agentic workflows** tab, select the **Import OT device spreadsheet into OT CMDB** agentic workflow.

AI agents used in the Import OT device spreadsheet into OT CMDB agentic workflow

The Import OT device spreadsheet into OT CMDB agentic workflow uses the OT Excel import task AI agent. Once you upload the device inventory spreadsheet, the agent processes the spreadsheet, creates an OT Excel SGC Import Task record, and maps the data to the SG OT Excel Stagings table. The agent then runs validations on the staging records, creates a remediation task for all invalid records, and imports the valid records into the OT CMDB.

Important:
This agent is turned on by default. For more information, see Now Assist skills, agents, and agentic workflows on by default.

Upload, validate, and import the OT device inventory spreadsheet

Chat with an AI agent in the Now Assist panel to begin the process for uploading, validating, and importing your Operational Technology (OT) device data into the OT CMDB.

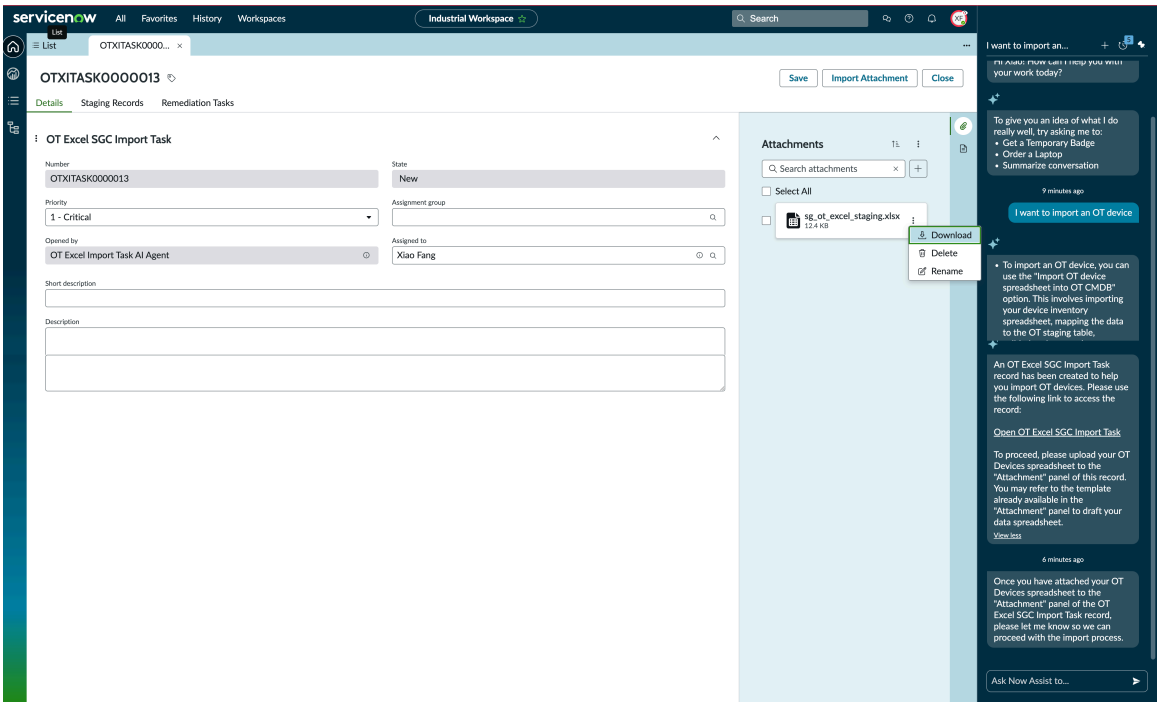
Before you begin

The Now Assist panel must be activated. For more information, see Activate Now Assist panel standard chat.

Role required: ot_excel_import_user and now_assist_panel_user

Procedure

1. Select the **Now Assist** icon.
   The Now Assist panel is displayed.
2. To initiate the Import OT device spreadsheet into OT CMDB agentic workflow, enter a prompt such as `I want to import an OT device`.
   The OT Excel import task AI agent begins the workflow process and creates an OT Excel SGC Import Task record. For more information about import tasks, see Using the Service Graph Connector for Microsoft Excel through import tasks.
3. Select **Open OT Excel SGC Import Task**.
4. In Attachment panel of the import task record, download and save the Microsoft Excel spreadsheet template to your local drive.



5. Once you have filled out the spreadsheet with your OT device inventory, upload it in the Attachment panel.
   For more information about how to fill out the spreadsheet, see Prepare your Pre-import OT Worksheet Entry Review tool for Service Graph Connector import.
6. In the Now Assist panel, enter a prompt such as `Done` to alert the agent that you have uploaded the spreadsheet.
   The agent uploads the spreadsheet to the SG OT Excel Stagings table. Wait for the **State** field of the import task record to update to **Staging import succeeded** and for the staging records to be created. You can view the staging records in the import task record's **Staging Records** tab.
7. Once the import is complete, enter a prompt in the Now Assist panel to alert the agent that the import was successful and can proceed to the next step, such as `Yes, proceed`.

The agent validates the staging records and replies with the number of valid records, partially valid records, and invalid records. For invalid records, the agent asks if you want to create a remediation task.

8. If you want to create a remediation task for the invalid records, enter `Yes`.
   The agent creates a remediation task for all invalid records so you can resolve them as needed. For more information about possible validation errors, see Managing Validations.

   The agent then asks if you want to proceed importing the valid or partially invalid staging records.

9. To import the valid or partially valid staging records, enter `Yes`.
   The agent triggers the CMDB import process. The **State** field of the import task record changes to **Pending CMDB import**. Once the import process is complete, the **State** field changes to **CMDB import complete**.

   The AI agent asks if you require any further assistance.

10. If no further assistance is needed, enter `No` to conclude the AI agent session.

What to do next

To verify the CMDB import, navigate to the Industrial Workspace list view and open the **All OT Devices** list. The recently imported OT device records should appear in the list.

Industrial Process Manager

Use the Industrial Process Manager application to create the ISA-95 Equipment Model data foundation that is required for the ServiceNow® Operational Technology solution. The Industrial Process Manager enables you to create your own version of the equipment models in each of your sites.

Note:
The Manufacturing Process Manager was renamed to the Industrial Process Manager for Vancouver. If you're on version 1.0.9 and prior, the application is still called Manufacturing Process Manager. If you're on version 2.0, the application is called Industrial Process Manager.

Watch an overview about the Industrial Process Manager application.

https://player.vimeo.com/video/1044353688?h=eba3593d47&badge=0&autopause=0&player_id=0&app_id=58479

Explore	Configure
	
Learn about how manufacturers use the Industrial Process Manager	Plan and configure your implementation

Use	Reference
 Review Operational Technology devices and equipment model entities	 Get details about related information and applications

Exploring Industrial Process Manager

Learn more about the common terminology, acronyms, and ISA-95 Equipment Model industry standard used in the Industrial Process Manager.

Industrial Process Manager common terminology

Before getting started with the Industrial Process Manager, let's look at some common terminology and acronyms that are used in this content.

Common terminology and acronyms

Term	Acronym	Definition
Operational Technology	OT	Technology that is used for industrial automation to control physical processes. **Note:** Operational Technology is not the Internet of Things (IoT).
International Society of Automation	ISA	Organization that publishes the standards for industrial enterprises, including the ISA-95 equipment model.
Extract, Transform, Load	ETL	Common term that is used for taking data from a source system, transforming it, and then uploading it to a target system.

ISA-95 equipment model

The ISA-95 Equipment Model is an industry standard that represents an industrial facility and the production equipment in it. You can describe the Equipment Model entities in your facilities by defining an equipment model template with different levels and level types.

With this template, you can do the following actions:

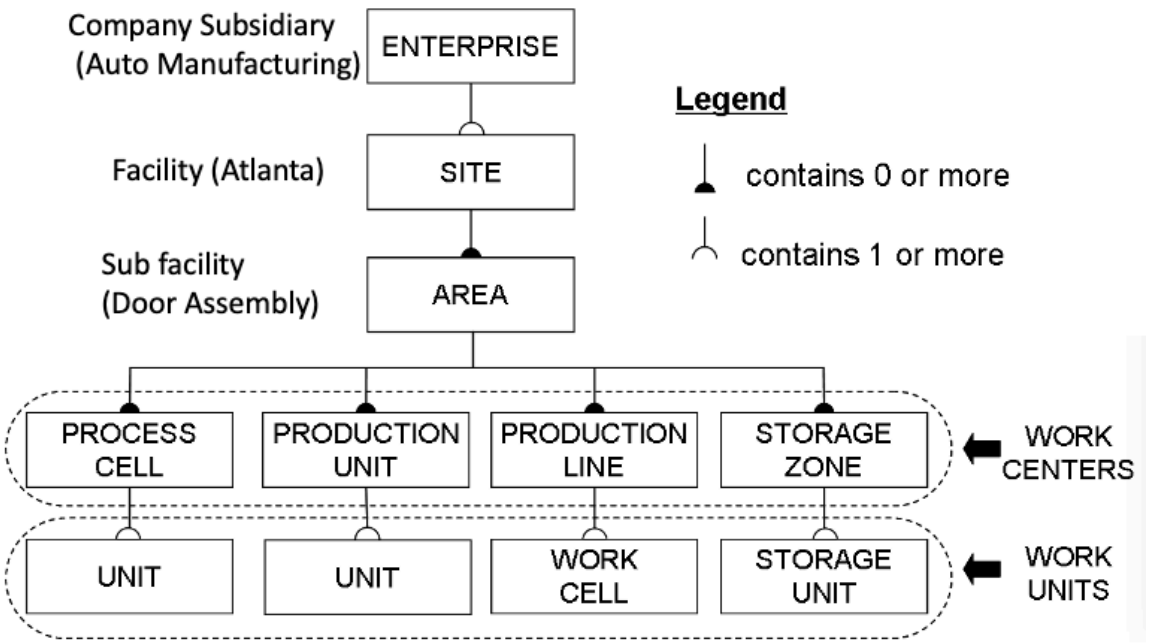
- Map your equipment model entities. With this map, you create a hierarchical structure.
- Create multiple equipment models for multiple industrial sites.
- Assign users to each site so that you can manage their access to the equipment model information for specific sites. For example, you can designate that users in Atlanta can access only the Atlanta site information but not the data for a site in Michigan. To learn more, see Assign or remove equipment model site access for non-administrators.

The equipment models start at the site level and contain a detailed hierarchical structure that describes each industrial site. You apply an equipment model template to structure this data in a hierarchical sequence.

The following graphic is an example of the standard ISA-95 default template that is delivered to you when you install the Industrial Process Manager. This graphic is a representation of a facility in Atlanta that manufactures cars.

- The subordinate levels below a site represent the door assembly area, its own subordinate work centers, and work units.
- The Work Centers and Work Unit levels each have level types. In this model, there are four different level types for the Work Center level:
  - Process Cell
  - Production Unit
  - Production Line
  - Storage Zone

Equipment model template example



Equipment model templates

You can create equipment model templates you use to characterize an equipment model, or to structure the data that describes your physical industrial facility by grouping similar types of equipment model entities.

An equipment model template consists of the following components:

Equipment model template

Name and description of the equipment model template.

Equipment model template hierarchical levels

Assigned hierarchical levels that are used to sort and structure the equipment model data.

Equipment model template hierarchical level types

Types that represent different types of the areas, functions, or production processes within a hierarchical level.

To learn more about equipment templates and see a graphic example of their structure, see ISA-95 equipment model and Defining equipment model templates.

Configuring the Industrial Process Manager

Configure the Industrial Process Manager application so that you can create the Equipment Model data foundation that is required for the ServiceNow® Operational Technology solution.

Note:

If you have the admin role, you can use the Industrial Guided Setup to lead you through the setup of the Industrial Process Manager application.

To access the Guided Setup, navigate to **Industrial Workspace Admin** > **Guided Setup**.

Task	Purpose
1. Install the Industrial Process Manager from the ServiceNow Store.	Installs the Industrial Process Manager application and supporting plugins.
2. Assign Industrial Process Manager roles.	Assigns roles to control the actions that are available for each user.
3. Populate a Microsoft Excel spreadsheet for Service Graph Connector import.	Creates and populates a Microsoft Excel spreadsheet with your existing ISA-95 Equipment Model data for upload to the ServiceNow AI Platform.
4. Import your Excel spreadsheet.	Uploads your existing ISA-95 Equipment Model data to the Configuration Management Database (CMDB).
5. Install Service Graph[service-graph] connectors that are provided by ServiceNow® partners, and import the equipment model data using the integrations.	Installs ServiceNow connectors that are provided by partners as they become available in the ServiceNow® Store, and imports equipment model data.
6. Grant equipment model site access to users with non-administrative roles.	Assigns or removes site access for users with assigned cmdb_ot_isa_viewer or cmdb_ot_isa_editor roles.
Optional: Automate mapping of OT devices	Automates mapping of OT devices to the production process. **Note:** Enabling the mapping feature requires the following plugins: • Operational Technology Manager • Industrial Process Manager

Install the Industrial Process Manager

If you have the required entitlement and the Administrator [admin] role, you can install the Industrial Process Manager application and the related plugins.

Before you begin

- Ensure that the application and all of its associated ServiceNow Store applications have valid ServiceNow entitlements. For more information, see Get entitlement for a ServiceNow product or application.

Role required: admin

About this task

The following items are installed with the Industrial Process Manager:

- Plugins
- Application menu, including Guided Setup
- Roles
- Tables

For more information on viewing the components that are installed with the Industrial Process Manager application, see Components installed with Industrial Process Manager.

Note:
For Operational Technology Service Management users with no license for Operational Technology Visibility, note the following:

- When you have the latest version of Operational Technology Incident Management installed, Industrial Process Manager is also installed.
- When you have the latest version of Operational Technology Change Management installed, Industrial Process Manager is also installed.

You should upgrade to the latest versions so you have access to the Operational Technology Service Management experience.

Procedure

1. Navigate to **All** > **System Applications** > **All Available Applications** > **All**.
2. Find the Industrial Process Manager application by using the filter criteria and search bar.

   You can search for the application by its name or ID. If you can't find the application, you might have to request it from the ServiceNow Store.

   Visit the ServiceNow Store website to view all the available apps and for information about submitting requests to the store. For cumulative release notes information for all released apps, see the ServiceNow Store version history release notes.
3. In the Application installation dialog box, review the application dependencies.

   Dependent plugins and applications appear if they will be installed, are currently installed, or must be installed. If any plugins or applications require installation, you must install them before you can install the Industrial Process Manager.
4. **Optional:** If demo data is available and you want to install it, select the **Load demo data** check box.
   Demo data are sample records that describe application features for common use cases. Load the demo data when you first install the application on a development or test instance.
5. Select **Install**.

Industrial Workspace Admin application menu and Guided Setup

After you install the application and related plugins, you can use the Industrial Workspace Admin application menu to access the related Operational Technology Manager, Industrial Process Manager, Operational Technology Incident Management, Operational Technology Vulnerability Response, Operational Technology Change Management, Operational Technology Knowledge Management, and Operational Technology Request Management functions.

Industrial Workspace Admin application menu contents

To access the Industrial Workspace Admin application menu, enter `Industrial Workspace Admin` in the application navigator. The Operational Technology Management solution currently consists of the following applications and features:

- Operational Technology Manager
- Industrial Process Manager
- Operational Technology Vulnerability Response
- Operational Technology Incident Management
- Operational Technology Change Management
- Operational Technology Knowledge Management
- Operational Technology Request Management

Note:
You need to install either the Operational Technology Manager or Industrial Process Manager applications first before using Operational Technology Incident Management and Operational Technology Change Management.

The options that appear on the Industrial Workspace Admin application menu depend on which OT applications are installed and what assigned roles the user has. When the Industrial Process Manager is installed, the following functions are available on the Industrial Workspace Admin application menu:

- Guided Setup
- All OT Properties
- Workspace System Properties
- OT Progress Scorecard Config
- OT Progress Scorecard Attributes
- OT Manager, which includes the following selections:
  - OT Manager Admin
  - Industrial Process Manager
  - OT Incident Admin
  - Operational Technology Change Management

To learn more about application installation and assigned roles, see Install the Industrial Process Manager and Assign Industrial Process Manager user roles.

Industrial Workspace Admin Guided Setup

If you have the admin role, you can use the Guided Setup to lead you through the setup of the Industrial Process Manager application.

To access the Guided Setup, navigate to **Industrial Workspace Admin** > **Guided Setup**.

The specific steps that appear as unlocked in the Guided Setup depend on which applications you have installed in your instance.

If only the Industrial Process Manager is installed, the following setup functions are locked:

- The Industrial Workspace setup steps.
- The Operational Technology Manager setup steps.
- Any Industrial Process Manager steps that depend on the Operational Technology Manager.
- The Operational Technology Vulnerability Response setup steps.
- The Operational Technology Incident Management setup steps.
- The Operational Technology Change Management setup steps.
- The Operational Technology Knowledge Management setup steps.
- The Operational Technology Request Management setup steps.

To learn more about Guided Setups and their use, see Using guided setup.

Assign Industrial Process Manager user roles

Assign roles to your users so that you can control their access to the features, capabilities, and data in the Industrial Process Manager application.

Before you begin

Role required: admin

About this task

Users with the roles that are listed in the following table can use the Industrial Process Manager application.

Role	Description
Equipment Model Viewer [cmdb_ot_isa_viewer]	Can only view the assigned ISA Equipment Model [cmdb_ci_ot_isa_entity] table records. To learn more, see Using Industrial Process Manager with the Operational Technology Manager and Managing equipment models.
Equipment Model Editor [cmdb_ot_isa_editor]	Can view and edit the assigned ISA Equipment Model [cmdb_ci_ot_isa_entity] records. To learn more, see Using Industrial Process Manager with the Operational Technology Manager and Managing equipment models.
Equipment Model Admin [cmdb_ot_isa_admin]	Inherit the cmdb_ot_isa_editor role and can also do the following actions:

Role	Description
	• Use the Industrial Guided Setup to set up the Industrial Process Manager and the Operational Technology Manager. • Edit the Equipment Model Template [isa_entity_template], [isa_entity_level], and Equipment Entity type [isa_entity_type] table records. To learn more, see Industrial Workspace Admin application menu and Guided Setup.
Equipment Model Downtime Planner [sn_isa_schedule_admin]	Can create, modify, and delete equipment entity schedules. Can also associate schedules with equipment entities.
Equipment Model Viewer All [cmdb_ot_isa_viewer_all]	Can view all ISA Equipment Model records (cmdb_ci_ot_isa_entity) and associated Equipment Model Template records (isa_entity_template, isa_entity_level, isa_entity_type). Role included with cmdb_ot_admin.
Amazing Admin [sn_ot_amazing_admin]	Can create, modify and delete OT subnet records (ot_subnet_mapping) for all the equipment model entity OT subnet system properties.
Amazing Editor [sn_ot_amazing_write]	Can create, modify and delete OT subnet records (ot_subnet_mapping) for all the equipment model entities associated with the user.
Amazing Viewer [sn_ot_amazing_read]	Can view OT subnet records (ot_subnet_mapping) for all the equipment model entities.

Procedure

Assign roles to users and groups by using the ServiceNow AI Platform user administration feature.

View and edit OT system properties

View and edit all of the Operational Technology (OT) related system properties for different applications.

Before you begin

Role required: admin

About this task

You can modify the system properties for the following OT applications from **All OT Properties** module on the ServiceNow AI Platform.

- IT Discovery for OT Networks
- Industrial Process Manager
- ISA Equipment Model
- Operational Technology Manager
- Operational Technology Incident Management
- Operational Technology Knowledge Management
- Operational Technology Change Management
- Industrial Workspace Common

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **All OT Properties**.
2. In the System Properties table, select the application that you want to edit the system properties for.
3. Edit the available system properties as needed for the application or feature.
4. Select **Update**.

Defining equipment model templates

Create templates that you can assign to the equipment model entities that you created in the ServiceNow AI Platform. You can use these templates to characterize an equipment model or structure the data that describes your physical industrial facility by grouping similar types of equipment model entities.

Create an equipment model template

Create an equipment model template record that identifies and describes the use of the template. After you create an equipment model template, you can create hierarchical levels and types for it.

Before you begin

Role required: cmdb_ot_isa_admin

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Industrial Process Manager** > **Equipment Model Template**.
2. Click **New**.
3. On the form, fill in the fields.

Equipment model template form

Field	Description
Name	Name of the equipment model template.
Description	Description of the equipment model template.
Application	Selected application scope. Global appears if this scope is the global application scope.

4. Click **Submit**.

What to do next
Create hierarchical sorting levels for the equipment model template.

Create hierarchical sorting levels for an equipment model template

Create and assign hierarchical levels for your equipment model template. When you assign an equipment template to an equipment model, these levels sort and structure the data you see in it.

Before you begin
Role required: admin

About this task
You can assign levels to an equipment model template for sorting purposes. For example, you can assign Site, Area, Work Center and other levels to the equipment, and designate the sorting sequence for each.

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Industrial Process Manager** > **Equipment Model Template**.
2. Select an equipment model template.
3. In the Template Levels related list, click **New**.
4. On the form, fill in the fields.

Template Level form

Field	Description
Level name	Name of the level to which you are assigning the equipment model. Examples include: **Site** An industrial site. **Area** An area in an industrial site. **Work Center** A work center in an industrial site.
Parent	Identifier for the equipment model template level above this level. If left empty, this level is the top level in the model. For example, you can do the following actions: ○ If you are creating a Site level, leave this field empty if it is the top level of the equipment model hierarchy that does not have a parent. ○ If you are creating an Area level, and it is a child to the Site level, select **Site** as its parent. ○ If you are creating a Work Center level, and it is a child to the Area level, select **Area** as its parent.

Field	Description
Application	Selected application scope. Global appears if this scope is the global application scope.
Template	Name of the selected equipment model template.
Order	Number that indicates the position of the level in the equipment model hierarchy for sorting purposes. The smallest number entered represents the highest hierarchical level. For example, enter `1` for Site if the site represents the highest level in the hierarchy for the equipment model template.

5. Click **Submit**.

What to do next
Create granular types within an equipment model template hierarchical level.

Create equipment model level types

Create granular level types within each equipment model template level that you created. The granular level types that you create within that level describe the type of production processes within it.

Before you begin
Role required: admin

About this task
You can create types that represent the different types of locations, areas, or functions within a level. For example, in the ISA 95 template, the Work Center level has the following level types:

- Production Cell
- Production Unit
- Production Zone
- Storage Zone

Procedure
1. Navigate to **All** > **Industrial Workspace Admin** > **Industrial Process Manager** > **Equipment Model Template**.
2. Select an equipment model template.
3. In the Template Levels related list, select an equipment model template level.
4. In the Template Types related list, click **New**.
5. On the form, fill in the fields.

Template Level Type form

Field	Description
Level type name	Name of the level type that you are assigning to the selected equipment model template level. For example, you assign Production

Field	Description
	Cell to create a Production Cell type for a Work Center level.
Level name	Name of the selected equipment model template level.
Application	Selected application scope. Global appears if this scope is the global application scope.
Template	Name of the selected equipment model template.

6. Click **Submit**.

Importing equipment model data

The scheduled import function enables you to import your existing equipment model data from a populated Microsoft Excel flat-file spreadsheet. You can use it to import your ISA-95 Equipment Model data to the Configuration Management Database (CMDB).

You must install the Industrial Process Manager before importing equipment model data.

Several methods are available for importing the equipment model data into the ServiceNow AI Platform:

1. If you use the spreadsheet to import the data, you must populate the Microsoft Excel spreadsheet with your existing ISA-95 Equipment Model data and run the **SG-Equipment Model Scheduled Import Using Spreadsheet** scheduled import. Many legacy record systems contain functions that enable you to export this data to an Excel spreadsheet, which means that you don't have to populate it manually.
2. Several ServiceNow partners are also developing integrations to third-party legacy record systems that store equipment model data.
   - When these integrations become available, you can find them on the ServiceNow Store by searching for Operational Technology certified integrations for the Industrial Process Manager.
   - Install those integrations that are applicable to your environment, and run them as needed.

By using these import methods, you can update existing equipment models in the ServiceNow AI Platform with the data that is stored in your authoritative source when needed. For newly imported data, the ServiceNow AI Platform automatically creates Equipment Model Entity CI class records in the Configuration Management Database (CMDB).

System properties that affect import processing

The following system properties affect how you populate your Microsoft Excel spreadsheet with the equipment model data and how the Import Equipment Model - ETL process functions.

sn_isa_model.cmdb_relationships_sync_levels

Determines how many levels of an equipment model can be imported into the ServiceNow AI Platform and then are synchronized in the Configuration Management Database (CMDB). The default value is 8.

sn_isa_model.short_code_validation_max_length

Sets the maximum length for the Short Code column on your spreadsheet. The default value is 3.

sn_isa_model.user_search_matching_attribute

Matches the user data references that are imported from your populated spreadsheet to the corresponding user records that are stored in the System Users [sys_user} table. The default is the user's email address, because the email address is unique to each user record.

glide.scriptable.excel.max_file_size

Sets the maximum size of an Excel file, expressed in bytes. This property is global.

Note:
To learn more about adding or creating system properties to control system behavior, see Add a system property.

Populating your Microsoft Excel spreadsheet with equipment model data

Create and populate a Microsoft Excel spreadsheet with your existing ISA equipment model data. Positioning your existing data in the correct columns is crucial to the success of your upload.

To create a Microsoft Excel spreadsheet that properly populates the Configuration Management Database (CMDB) in the ServiceNow AI Platform, do the following actions:

1. Prepare your spreadsheet for upload by using the Microsoft Excel spreadsheet that is attached to the data source record. To locate an empty template, do the following actions:
   a. Navigate to **Equipment Model - ISA** > **Import Equip. Model - Data Source**
   b. Click **Import Equipment Model – Data Source - v2.xlsx**

   Note:
   Alternately, to download the **Import Equipment Model – Data Source - v2.xlsx** spreadsheet, see the Microsoft Excel spreadsheets required for the ISA Equipment Model Excel Service Graph Connector [KB0966600] article in the Now Support Knowledge Base.

2. Download the attached Import Equipment Model – Data Source - v2.xlsx spreadsheet to learn more about the template and its worksheets:

   Note:
   If you're an ISA SGC user upgrading from v1 to v2, see the section named **Upgrading from v1 to v2** below.

Import Equipment Model – Data Source - v2.xlsx spreadsheet

Worksheet name	Purpose
Blank template for data import	Populates your Equipment Model data for import. You can view detailed examples in the remainder of this topic.
Data Column Descriptions	Provides descriptions of the data columns on the spreadsheet, similar to the information found in this topic.
Sample Data for Import	Provides an example of an equipment model for import in the spreadsheet. You can view these examples in the remainder of this topic.

3. After populating the Microsoft Excel spreadsheet, save it in a known location for easy access when you run the Integration Hub ETL function.

Note:
Column names cannot be changed. You can add additional columns to support additional fields to uniquely identify owners, as designated in the *sn_isa_model.user_search_matching_attribute* system property.

Populating the spreadsheet

Sample Operational Technology data, columns A through J

You can import data from multiple sites in a single spreadsheet. The example image shows data for two sites: ATL and CTL.

	A	B	C	D	E	F	G	H	I	J
1	Path	Short Code	Entity Name	Location	Assigned to	Support Group	Description	Process criticality	Company	Template
2	ATL	ATL	Atlanta Site	Altlanta Car Facility	fred.luddy@example.com	Atlanta Plant Support	the site in Atlanta where we make cars	1 - most critical	Demo Car Corp	ISA 95 Default Template
3	ATL-B64	B64	Building 64	Altlanta Building 64	fred.luddy@example.com	Atlanta Plant Support	the building with the number 64 on the side	1 - most critical	Demo Car Corp	ISA 95 Default Template
4	ATL-B42	B42	Building 42	Altlanta Building 42	fred.luddy@example.com	Atlanta Plant Support	similar to building 64 except with a 42 on the side	2 - somewhat critical	Demo Car Corp	ISA 95 Default Template
5	ATL-B64-MASS	MASS	Model M	Altlanta Building MASS	fred.luddy@example.com	Atlanta Plant Support	model S needs to be assembled somewhere	1 - most critical	Demo Car Corp	ISA 95 Default Template
6	ATL-B64-QASS	QASS	Model Q	Altlanta Building QASS	fred.luddy@example.com	Atlanta Plant Support	a place for the Q model to get assembled	1 - most critical	Demo Car Corp	ISA 95 Default Template
7	ATL-B64-MPROD	MPROD	Model MPROD	Altlanta Building MPROD	fred.luddy@example.com	Atlanta Plant Support	Model S also needs a production line	1 - most critical	Demo Car Corp	ISA 95 Default Template
8	ATL-B64-QPROD	QPROD	Model QPROD	Altlanta Building QPROD	fred.luddy@example.com	Atlanta Plant Support	Model Q production line	1 - most critical	Demo Car Corp	ISA 95 Default Template
9	ATL-B42-MQSTOR	MQSTOR	Model M and Q	Altlanta Building MQSTOR	fred.luddy@example.com	Atlanta Plant Support	storage for the models we built	2 - somewhat critical	Demo Car Corp	ISA 95 Default Template
10	ATL-B64-QPROD-C1	C1	Cell 1	Altlanta Building C1	fred.luddy@example.com	Atlanta Plant Support	Q prod assembly cell 1	1 - most critical	Demo Car Corp	ISA 95 Default Template
11	ATL-B64-QPROD-C2	C2	Cell 2	Altlanta Building C2	fred.luddy@example.com	Atlanta Plant Support	Q prod assembly cell 2	1 - most critical	Demo Car Corp	ISA 95 Default Template
12	ATL-B42-MQSTOR-Z1	Z1	Zone 1	Altlanta Building Z1	fred.luddy@example.com	Atlanta Plant Support	storage zone for MQ for transfer	2 - somewhat critical	Demo Car Corp	ISA 95 Default Template
13	ATL-B42-MQSTOR-Z6	Z6	Zone 2	Altlanta Building Z6	fred.luddy@example.com	Atlanta Plant Support	storage zone for MQ to just store the stuff	2 - somewhat critical	Demo Car Corp	ISA 95 Default Template
14	CTL	CTL	California Site	California Car Facility	fred.luddy@example.com	California Plant Support	the site in California where we make cars	1 - most critical	Demo Car Corp	ISA 95 Default Template
15	CTL-C64	C64	Building 64	California Building 64	fred.luddy@example.com	California Plant Support	the building with the number 64 on the side	1 - most critical	Demo Car Corp	ISA 95 Default Template

Columns A through J

Column	Name	Type	Description	Requ
A	Path	string	Concatenation of the short codes of this entity and all its parent entities. For example, ATL - B42 - MQSTOR - Z1 is the concatenation of these short codes: • ATL short code for the Atlanta site. • B42 short code for Building B42. • MQSTORE short code for Model M and Q. • Z1 short code for the Zone 1 transfer storage zone for Model M and Q.	Yes
B	Short Code	string, alphanumeric only	Short description code for the entity. Refer to the previous Path column description for examples of short codes. The Short Code can be no longer than the maximum length that is designated in the *sn_isa_model.short_code_validation_max_length* system property.	No

Columns A through J (continued)

Column	Name	Type	Description	Requ
C	Entity Name	string	Long name of the entity. For example, a city name, a building number, or a model number.	Yes
D	Location	string	Location of the entity. For example, you would list Atlanta Building 64 for each of the equipment models that are located there. The cmn-location value that is stored in the Configuration Management Database (CMDB) in the ServiceNow AI Platform, which uses it as a reference.	No
E	Assigned to	string	Email address of the assigned person who owns and manages this entity record. **Note:** You can use additional attributes, based on the settings designated in the *sn_isa_model.user_search_matching_attribute* system property.	No
F	Support Group	string	Name of the group that supports the maintenance and management of this entity.	No
G	Description	string	Long description of this equipment model entity and its purpose.	No
H	Process criticality	string	Measure of how critical, or important, the entity is to the industrial process. Examples are as follows: • 1 - most critical. • 2 - somewhat critical.	No
I	Company	string	Name of the company that the entity belongs to. The cmn-location value that is stored in the CMDB in the ServiceNow AI Platform, which uses it as a reference.	No
J	Template	string	The template used to import data. **Note:** After your import your data, you cannot set the template.	Yes

Upgrading from v1 to v2

If you're an ISA SGC user upgrading from v1 to v2, you can import new ISA equipment model entities that have a unique path and update existing ISA equipment model entities that already have a path value with a fix script.

Import your equipment model data using the data source and scheduled import

After you complete your Microsoft Excel spreadsheet with your equipment model data, import it into the ServiceNow AI Platform by using the data source and scheduled import.

Before you begin

Before you perform this process, you must prepare a Microsoft Excel spreadsheet for import. To learn more, see Populating your Microsoft Excel spreadsheet with equipment model data.

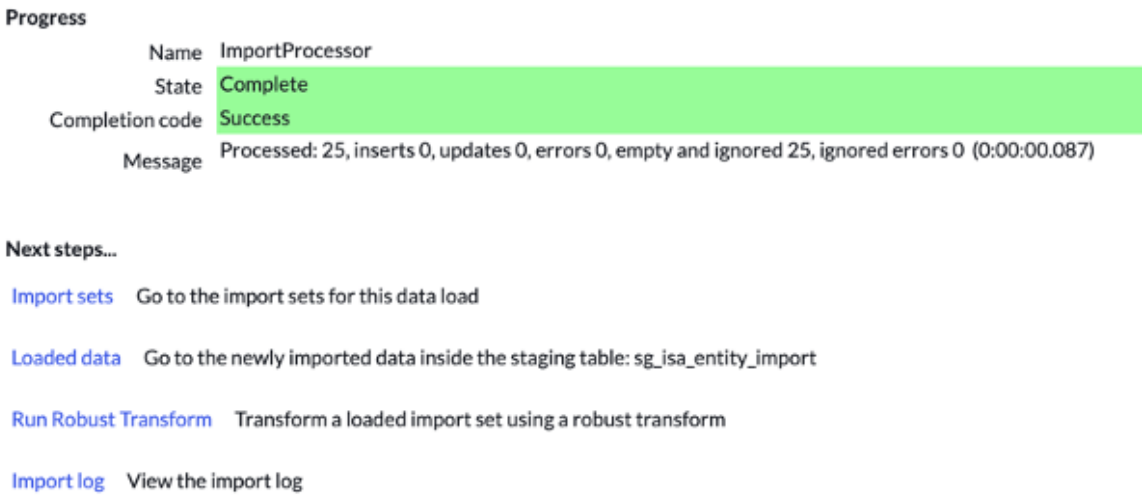
Role required: cmdb_inst_admin, import_admin

About this task

By running this process, you create unique Equipment Model Entity CI class records in the Configuration Management Database (CMDB) for the equipment model records that are included in your spreadsheet.

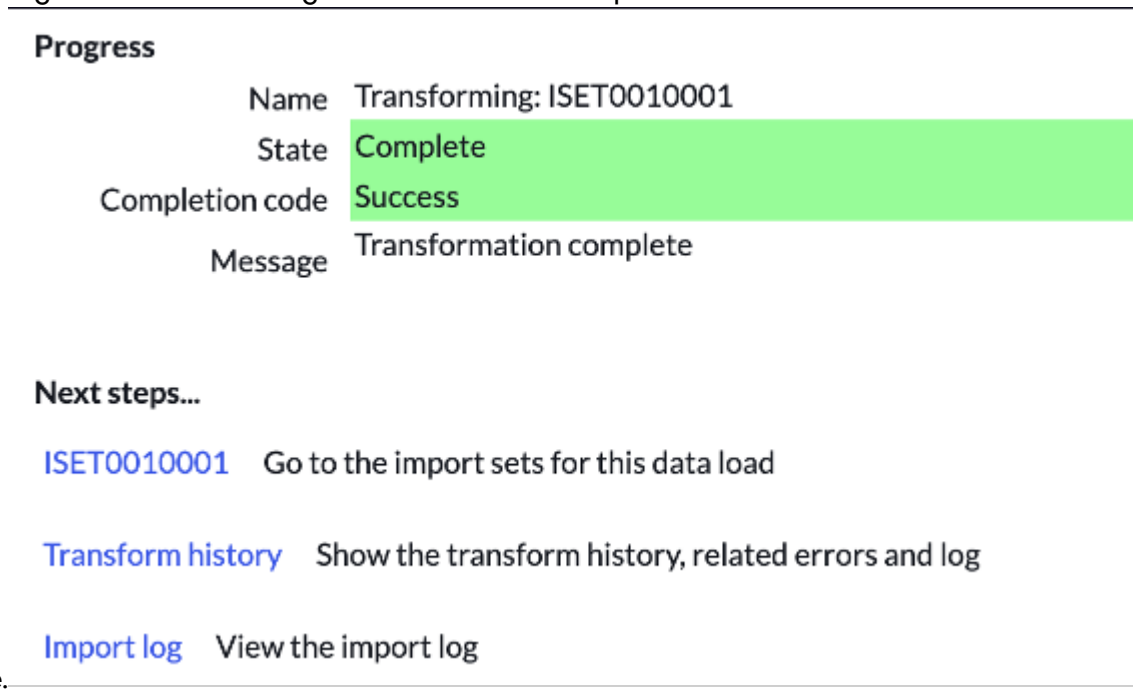
Procedure

1. Navigate to **All** > **Equipment Model - ISA** > **Import Equip. Model - Data Source**.
2. In the **SG Equipment Model** data source record, attach the Microsoft Excel spreadsheet that you created:
   a. Select **Manage Attachments**.
   b. In the Attachments dialog box, select **Choose File**.
   c. Select the Microsoft Excel spreadsheet that you created, and then close the Attachments dialog box.
   d. After attaching the spreadsheet, select the **Load All Records** related link to load all records from the spreadsheet to the import table. Once the operation is complete, you should see the following confirmation message with the **Success** completion code if the data is loaded without any errors.



e. In the confirmation message, select the **Run Robust Transform** related link.

f. Select **Transform**. If the import is successful, you should see the following confirmation message with the **Success** completion code.



Assign or remove equipment model site access for non-administrators

Assign or remove equipment model site access for non-administrators. You can create the user criteria to determine whether certain users can access the equipment model entities for specific sites.

Before you begin

Role required: admin

About this task

Use the user criteria to determine whether certain users can read or edit equipment model entities for specific sites. After you create a user criteria record, you can assign it to a site to control who can read and edit the equipment model entities. You can further assign the OT roles to users or groups to enable them access to OT devices that are assigned to those same sites. For more information, see Assign Operational Technology Manager roles.

Note:
For those users that are upgrading to version 1.0.12, their site user access is migrated to user criteria and groups. For more information, see Migrating site user access to user criteria and groups.

Procedure

1. Navigate to **All** > **Knowledge Management** > **Administration** > **User Criteria**
2. Select **New**.
3. On the form, fill in the fields.
   For a description of the field values, see User criteria form.

What to do next

After you create the user criteria, you can assign it to a site. For more information about assigning the Can Edit access to a site, see Assign the user criteria for Can Edit access to a site. For more

information about adding the Can Read access to a site, see Assign the user criteria for Can Read access to a site.

Assign the user criteria for Can Read access to a site

Assign the user criteria to a site to define which users can read or view the equipment model entities that belong to the selected site.

Before you begin
Role required: cmdb_ot_isa_admin or admin

About this task
You can assign the user criteria for Can Read access in two locations:

- From the Equipment Model Entity View Access table
- From the Can Read Equipment Models related list in a site record

Procedure

1. Navigate to either the table or related list.
2. Create a record by selecting **New**.
3. In the **Site** field, select the equipment model site record that you need.
4. In the **User Criteria** field, select the user criteria to define which users can read or view the selected site's equipment model entities.

   Note:
   If a user has the cmdb_ot_viewer role, the user can also view the Operational Technology (OT) devices that are assigned to the selected site.

   If a user has a cmdb_ot_editor role, the user can edit the OT devices that are assigned to the selected site.

5. Select **Submit**.

Assign the user criteria for Can Edit access to a site

Assign the user criteria to a site to define which users can edit the equipment model entities that belong to the selected site.

Before you begin
Role required: cmdb_ot_isa_admin or admin

About this task
You can assign the user criteria for Can Edit access in two locations:

- From the Equipment Model Entity Edit Access table
- From the Can Edit Equipment Models related list in a site record

Procedure

1. Navigate to one of the following locations.
2. Create a record by selecting **New**.
3. In the **Site** field, select the equipment model site record that you need.

4. In the **User Criteria** field, select the user criteria to define which users can edit the selected site's equipment model entities.

   Note:
   If a user has the cmdb_ot_viewer role, the user can also view the Operational Technology (OT) devices that are assigned to the selected site.

   If a user has a cmdb_ot_editor role, the user can edit the OT devices that are assigned to the selected site.

5. Select **Submit**.

Managing an equipment model entity schedule

You can manage an equipment model entity schedule with the Industrial Process Manager application. By using a schedule, you can track several maintenance tasks for one equipment model entity.

Equipment model entity schedule overview

You can link schedules to any equipment model entity. If you have the Equipment Model Downtime Planner role (sn_isa_schedule_admin), you can add, modify, or delete the schedule entries of an equipment model entity and do the following tasks:

- Maintain the schedules for the various equipment model entities.
- Associate these schedules with equipment model entities.
- Pick a time slot from a schedule so that you can work on an Operational Technology (OT) incident or remediation task. For more information, see Select a start time for an OT remediation task.

Examples

Let's say that you want to set multiple schedule entries for one equipment model entity schedule. These entries complete different tasks and occur at different times. You can do so by creating schedule entries in the Schedule Entries related link of the existing equipment model entity schedule record.

If you no longer want a schedule associated with an equipment model entity, you can detach the schedule by using the Schedules related link in the equipment model entity record.

If you want to view existing schedules for an equipment model entity, you can do so in the Equipment Model Manager or in the Planned Downtime module on the Platform.

Create an equipment model entity schedule

Create an equipment model entity schedule with the Industrial Process Manager application. With these schedules, you can easily maintain multiple equipment model entities.

Before you begin

Role required: sn_isa_schedule_admin

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Industrial Process Manager** > **Equipment Model Entity Schedules**.
2. Select **New**.

3. On the form, fill in the fields.

Equipment model entity schedules form

Field	Description
Name	Unique name for the schedule.
Time zone	Time zone for the schedule. If you select **Floating**, the time zone is relative to whatever process is accessing the item at. For example, if a resource manager in Amsterdam sets a floating schedule for 8:00 to 17:00, a user in San Jose, California, also sees the schedule as 8:00 to 17:00. When you define a schedule in one time zone, users in different time zones see the schedule in their own time zone.
Type	Text label that describes the purpose of the schedule.
Description	Description of the schedule.

4. Select **Submit**.

What to do next

Now, you can create the entries for an equipment model entity schedule. For more information, see Create a schedule entry.

Create a schedule entry

Create a schedule entry for an existing equipment model entity schedule in the Industrial Process Manager application. You can create more than one entry for a schedule. Schedule entries allow multiple maintenance tasks to take place for one equipment model entity.

Before you begin

Role required: sn_isa_schedule_admin

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Industrial Process Manager** > **Equipment Model Entity Schedules**.
2. Select an existing equipment model entity schedule record.
3. Select the **Schedule Entries** tab.
4. Select **New**.
5. On the form, fill in the fields.

Schedule entries form

Field	Description
Name	Unique name for the schedule entry.
Type	Label that describes the purpose of the schedule.

Field	Description
Show as	Option that indicates how the schedule entry should appear in calendar applications.
Repeats	Repetition interval for the schedule entry, if any. If you select a repetition interval, other fields appear so that you can further specify the repeat interval.
Repeat every	Scheduling repetition frequency - weekly, monthly, or yearly. This field appears only when **Daily**, **Weekly**, **Monthly**, or **Yearly** is selected from the **Repeats** field.
Repeat on	Days of the week that a weekly schedule repeats on. This field appears only when **Weekly** is selected from the **Repeats** field.
Monthly type	Monthly schedule repetition frequency. This field appears only when **Monthly** is selected from the **Repeats** field. Options include: ○ Repeat on a specific day of the month. ○ Repeat on a specific day in a specific week of the month. ○ Repeat on the last day of the month. ○ Repeat on a specific weekday in the last week of the month.
Yearly type	Yearly schedule repetition frequency. This field appears only when **Yearly** is selected from the **Repeats** field. Options include: ○ Repeat on a specific day of the year. ○ Repeat on a floating day.
Float week	Week of the month that a floating yearly schedule repeats on. This field appears only when **Floating** is selected from the **Yearly** field.
Float day	Day of the week that a floating yearly schedule repeats on. This field appears only when **Floating** is selected from the **Yearly** field.
Month	Month of the year that a floating yearly schedule repeats on. This field appears only when **Floating** is selected from the **Yearly** field.
Repeat until	Repetition end date. If you leave this field empty, the schedule repeats indefinitely.

6. Select **Submit**.

Result
Your schedule entry is created, and now you can edit and update the entry as necessary.

Associate a schedule with an equipment model entity

Create one or more maintenance schedules for an equipment model entity, edit an existing schedule, or delete schedules with the Industrial Process Manager application.

Before you begin
Role required: sn_isa_schedule_admin

Procedure

1. Navigate to **All** > **Equipment Model - ISA** > **Equipment Model Entities**.
2. Select the equipment model entity that you want to associate with a schedule.
3. Select the **Schedules** tab.
4. **Optional:** To add a new schedule for the selected equipment model entity, do these actions:
   - Select **New**.
   - Fill in the form and select **Submit**.
5. **Optional:** To delete a schedule for the selected equipment model entity, do these actions:
   - Select the schedule that you want to delete.
   - Select **Delete**.
6. **Optional:** To edit a schedule for the selected equipment model entity, do these actions:
   - Select the schedule that you want to edit.
   - Add your changes and select **Update**.

Result
The maintenance schedule is created, deleted, or edited. Depending on the steps you followed, an eligible user can see the new schedule, no longer see the deleted schedule, or see the edited version of the schedule.

Attach a schedule to an equipment model entity

Attach an existing schedule to an equipment model entity with the Industrial Process Manager application. Attaching a schedule to an equipment model entity applies the schedule and its entries to that entity.

Before you begin
Role required: sn_isa_schedule_admin

Procedure

1. Navigate to **All** > **Equipment Model - ISA** > **Equipment Model Entities**.
2. Select an equipment model entity record.
3. Select the **Schedules** tab.
4. Select **Edit**.
5. In the Collection list, select the schedule that you want to attach to the equipment model entity.
6. Move the selected schedule to the Schedules list by using the middle arrows.
7. Select **Save**.

Result
The attached schedule is now applied to the equipment model entity. You can view and manage the attached schedule in the equipment model entity record.

Detach a schedule from an equipment model entity

Detach an existing schedule from an equipment model entity with the Industrial Process Manager application. If a schedule no longer applies to an equipment model entity, you can easily remove it so that it doesn't show up for that entity.

Before you begin
Role required: sn_isa_schedule_admin

Procedure
1. Navigate to **All** > **Equipment Model - ISA** > **Equipment Model Entities**.
2. Select an equipment model entity record.
3. Select the **Schedules** tab.
4. Select **Edit**.
5. In the Schedules List, select the schedule that you want to detach from the equipment model entity.
6. Move the selected schedule to the Collection list by using the middle arrows.
7. Select **Save**.

View a schedule for the equipment model entity

View a schedule for an existing equipment model entity in the Industrial Process Manager application.

Before you begin
Role required: cmdb_ot_isa_viewer

About this task
You can view equipment model entity schedules in two places depending on where you're working:

- The Equipment Model Manager
- The Planned Downtime module on the Platform

Procedure
1. To view the equipment model entity schedules in the Equipment Model Manager, do these actions:
   a. Navigate to the **Equipment Model Manager**.
   b. Select an equipment model entity record.
   c. Select **View schedules**.
   d. View the downtime slots for that equipment model entity.
2. To view the equipment model entity schedules in the Planned Downtime module, do these actions:
   a. Navigate to **All** > **Industrial Workspace Admin** > **Industrial Process Manager** > **Planned Downtime**.
   b. View the association of the schedules and equipment model entities.

Add a child schedule

Add a child schedule to an existing equipment model entity schedule with the Industrial Process Manager application. When you make adjustments to the child schedule, it also applies to the parent schedule. For example, you might want to extend the scheduled time on a particular day or remove the holidays from a schedule.

Before you begin

Role required: sn_isa_schedule_admin

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Industrial Process Manager** > **Equipment Model Entity Schedules**.
2. Select a record for an existing equipment model entity schedule.
3. Select the **Child Schedules** tab.
4. Select **Edit**.
5. Select the desired schedule in the Collection list.
6. Move the selected schedule to the Child Schedules list by using the middle arrows.
7. Select **Save**.

Result

The selected child schedule now applies to the parent schedule.

Using Industrial Process Manager with the Operational Technology Manager

After you complete all required set up tasks, including importing equipment models, you can use the Operational Technology Manager and Industrial Process Manager functions on the Industrial Workspace Admin menu. These functions include the Equipment Model Manager and the Industrial Workspace.

The following graphic shows some common questions that industrial personnel ask about operational problems in an enterprise, and the ServiceNow AI Platform functions you use to answer them. These functions help your personnel visualize data relationships in your industrial facilities.

Industrial personnel questions about operational problems

Betty, a Configuration Manager, works at the enterprise level and wants to know where the OT devices reside in the enterprise. To answer this question, a Configuration Manager can use the

Operational Technology Manager functions on the Industrial Workspace Admin menu. To learn more, see Industrial Workspace Admin application menu and Guided Setup.

Bhuvnesh, an OT engineer, works at the site level and wants to know how OT devices map to specific productions processes. For example, a question asked might be "What HMIs and PLCs are controlling this specific portion of the industrial processing? To answer this question, an OT Manager at the site level can use the Industrial Process Manager functions on the Industrial Workspace Admin menu.

Managing equipment models

The Equipment Model Manager in the Industrial Workspace enables you to review and manage ISA-95 equipment model data. You use it to review imported equipment model data or to manually create an equipment model.

Equipment Model Manager in the Industrial Workspace

An equipment model maps the operational elements of a particular facility. For example, an industrial facility in Atlanta that stores materials, and uses them to produce cars. With the Equipment Model Manager, you can view selected equipment model entities and any related records for specific industrial sites. The Equipment Model Manager contains the following functionalities to help you manage the equipment model entities in your OT environment:

- Viewing a graphical representation of an equipment model hierarchy and its relationship to other equipment model entities.
- Viewing or mapping upstream or downstream production processes.
- Reviewing child equipment model entities.
- Reviewing or associating additional OT devices with the selected equipment model entity.
- Adding child equipment model entities to your favorites and updating your view to show only your favorites.
- Keeping record context available when viewing or creating multiple records by opening the records in a single row of tabs.

Note:
Users with an assigned cmdb_ot_isa_admin role can view equipment model entities for any site. However, users with assigned cmdb_ot_isa_editor or cmdb_ot_isa_viewer roles can only access those sites that an administrator has granted access to for specific users. To learn more about granting site access, see Assign or remove equipment model site access for non-administrators.

Review and update the equipment model details

Review and update the details for an equipment model that you imported into the ServiceNow AI Platform so that you can make sure that the information is correct. You can also manually create a new equipment model entity and then add details to it.

Before you begin

Import equipment model data to the ServiceNow AI Platform. To learn more, see Importing equipment model data.

Role required: cmdb_ot_isa_viewer, cmdb_ot_isa_editor, cmdb_ot_isa_admin.

About this task

If you have an assigned cmdb_ot_isa_viewer role, you can only view equipment model entities. If you have any of the other assigned cmdb_ot_isa roles, you can also edit equipment model entities.

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Industrial Process Manager** > **Equipment Model Manager**.
2. In the **Equipment model view for** field, select the site that you want to view the equipment model information for.
   You can search for a site by typing in the site name or its short code.
3. Review an existing equipment model entity, or create one.
4. On the form, review and update the fields.

Equipment model details form

Field	Description
Entity name	Name of the equipment model entity. **Note:** You can update the Entity name field after the equipment model entity is created. Updating this field also updates the tree component and site filter. For more information, see Update the entity name or parent of an equipment model entity.
Parent	Name of the entity, if any, that is the parent to this equipment model entity. This field is empty for the top-level parent entity, which has no parent. The top-level parent entity is referred to as a site. **Note:** You can update the Parent field after the equipment model entity is created. Updating this field also updates the tree component and site filter. For more information, see Update the entity name or parent of an equipment model entity.
Template	Equipment model template that is assigned to an equipment model entity you manually create. **Note:** You can't assign an equipment model template to an equipment model that you imported into the ServiceNow AI Platform® using the Integration Hub ETL or a third-party integration.
Level	Hierarchical level that is assigned from the selected equipment model template for data

Field	Description
	sorting and structuring purposes. Examples are as follows: **Site** Industrial site. **Area** Area in an industrial site. **Work Center** Work center in an industrial site. Search for and select an equipment level to assign to the equipment model entity. To learn more, see Create hierarchical sorting levels for an equipment model template.
Type	Name of the level type that is assigned to the equipment model template level. For example, Material Assembly or Production Cell for a Work Center level. To learn more, see Create equipment model level types.
Short description	Short description of this equipment model entity and its purpose.
Short Code	Short code that is assigned to this equipment model entity.
Path	Concatenation of the short codes of this equipment model entity and all its parent entities. For example, `ATL - B42 - MQSTOR - Z1` is the concatenation of the following short codes: ○ ATL short code for the Atlanta site. ○ B42 short code for Building B42. ○ MQSTORE short code for Model M and Q. ○ Z1 short code for the Zone 1 transfer storage zone for Model M and Q.
Location	Location of the equipment model entity. For example, Atlanta Building 64 would be the location for each associated equipment model that is located there. Search for and select the location to assign to the equipment model entity.
Company	Name of the company that is associated with the equipment model entity. Search for and select a company to assign to the entity.
Assigned to	Assigned user who operates and handles this equipment model entity. Search for and select the user to assign to the entity.
Managed by	Name of the assigned person who owns and is responsible for managing this entity record.

Field	Description
	Search for and select the user to assign to the equipment model entity.
Process criticality	Measure of how critical, or important, the equipment model entity is to the industrial process. Select the process criticality for the entity. For example: ○ 1 - most critical. ○ 2 - somewhat critical.
Support Group	Name of the group that supports this equipment model entity. Search for and select the user group to assign to the equipment model entity.
Managed by Group	Name of the assigned group that owns and is responsible for managing this entity record. Search for and select the user group to assign to the entity.
Company	Name of the company that the equipment model entity belongs to. The core_company value is stored in the CMDB in the ServiceNow AI Platform as a reference.
Operational status	Current operational status of the equipment model entity: **Operational** Entity that is fully operational in the production process. **Non-Operational** Entity that is non-operational in the production process. **Not in use** Entity that is operational but intentionally offline. You can use this value to designate which sites are included for licensing purposes. The sites marked as **Not in use** won't be visible in the Equipment Model Manager of the Industrial Workspace.

5. Review the associated equipment model data in the related list tabs as follows:

Task	Description
View the equipment model hierarchy	See View the equipment model hierarchy.

Task	Description
Map the upstream production processes for the equipment model entity.	**a.** Click **Upstream Process**. **b.** To learn more, see Map the upstream production processes for the selected equipment model entity.
Map the downstream production processes for the equipment model entity.	**a.** Click **Downstream Process**. **b.** To learn more, see Map the downstream production processes for the selected equipment model entity.
View the child entities for the equipment model entity.	**a.** Click **Child Entities**. **b.** To learn more, see Review the child entities for the equipment model entity.
View the OT devices that are associated with the current equipment model entity and its child entities.	**a.** Click **Mapped OT Devices**. **b.** To learn more, see Add OT devices that are associated with the selected equipment model entity. **Note:** By default, you cannot see OT control modules in this list.

6. When you finish reviewing and updating the equipment model details, do one of the following actions.

What to do next

To view the roll up for OT data associated with the equipment model entity and its child entities, you can use the following related lists in the equipment model entity record. The roll up view represents the OT devices, OT incidents, OT changes, and so on that automate the entire hierarchy of an equipment model entity.

- Mapped OT Devices
- OT Incidents
- OT Change Requests
- Vulnerable Items
- Remediation Tasks

Create an entity for a new equipment model

Create an entity for a new equipment model. You do this task when you want to manually create a new equipment model entity directly in the ServiceNow AI Platform rather than import the equipment model data from an external source.

Before you begin

Role required: cmdb_ot_isa_editor, cmdb_ot_isa_admin.

About this task

Users with an assigned cmdb_ot_isa_admin role can view equipment model entities for any site. However, users with an assigned cmdb_ot_isa_editor role can only access those sites that an

administrator has granted access to for specific users. To learn more about granting site access, see Assign or remove equipment model site access for non-administrators.

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Industrial Process Manager** > **Equipment Model Manager**.
2. In the **Equipment model view for** field, select the site that you want to view the equipment model information for.
   You can search for a site by typing in the site name or its short code.
3. Select **Create new entity**.
4. In the **Create new entity** window, search for and select the parent entity.

   Note:
   You can search the parent entity by short code or name.

5. On the form, fill in the fields.

Create new entity form

Field	Description
Parent	Name of the entity, if any, that is the parent to this entity. The currently selected equipment model appears as the parent entity. To change the parent, search for and select the entity that is a parent to the entity that you are creating.
Entity name	Name of the equipment model entity.
Short Code	Short code that is assigned to this entity.
Entity type	Name of the level type that is assigned to the equipment model template level. For example, Material Assembly or Production Cell for a Work Center level. Search for and select an entity type. To learn more, see Create equipment model level types.

6. Select **Save**.
7. In the Details form, enter the remaining details for the new equipment model entity.
   To learn more, see Review and update the equipment model details.

View the equipment model hierarchy

View a graphical representation of the hierarchical structure of the selected equipment model entity, and its relationships to other entities in the production process.

Before you begin

Role required: cmdb_ot_isa_editor, cmdb_ot_isa_admin.

About this task

Users with an assigned cmdb_ot_isa_admin role can view equipment model entities for any site. However, users with assigned cmdb_ot_isa_editor or cmdb_ot_isa_viewer roles can only access those sites that an administrator has granted access to for specific users. To learn more about granting site access, see Assign or remove equipment model site access for non-administrators.

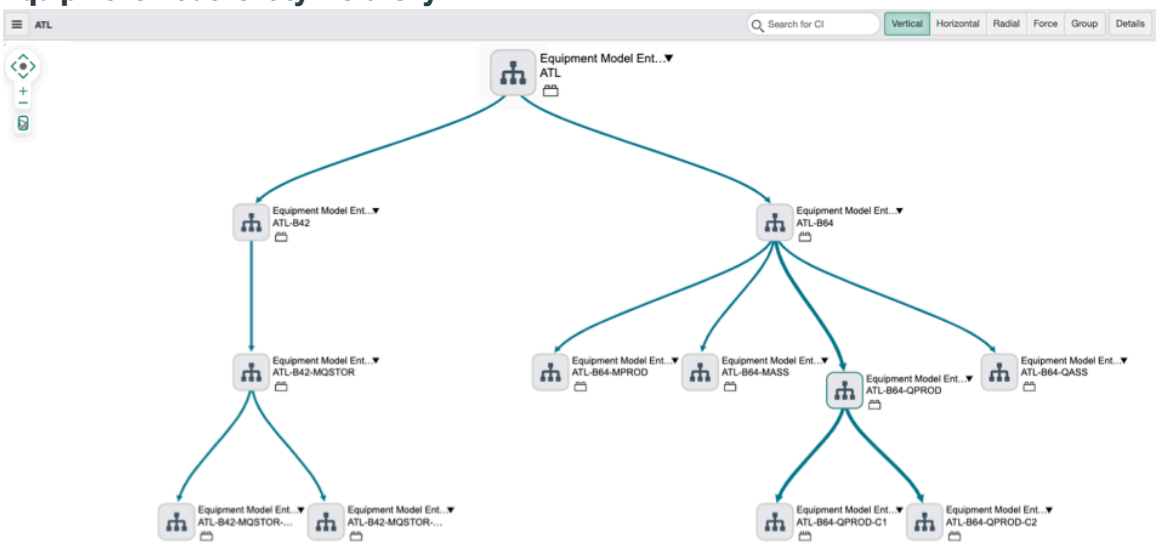
Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Industrial Process Manager** > **Equipment Model Manager**.
2. In the **Equipment model view for** field, select the site you want to view equipment model information for.
   You can search for a site by typing in the site name or its short code.
3. In the selector pane, click the equipment model entity you want to view a graphical representation of its hierarchy and relationship to other entities.
   For example, click the top-level site entity to view a representation of the entire site.
4. To view the hierarchical structure for the equipment model entity, click **View hierarchy**.

Result

The following graphical representation appears For the selected equipment model entity. The currently selected equipment model appears as the parent entity in the hierarchy.

Equipment model entity hierarchy



View the equipment model OT device map

View the graphical representation of the selected equipment model entity and its relationship to other Operational Technology (OT) devices in the production process.

Before you begin

Role required: cmdb_ot_isa_editor, cmdb_ot_isa_admin.

About this task

Users with an assigned cmdb_ot_isa_admin role can view equipment model entities for any site. However, users with assigned cmdb_ot_isa_editor or cmdb_ot_isa_viewer roles can only access those sites that an administrator has granted access to for specific users. To learn more about granting site access, see Assign or remove equipment model site access for non-administrators.

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Industrial Process Manager** > **Equipment Model Manager**.
2. In the **Equipment mode view for** field, select the site that you want to view equipment model information for.
   You can search for a site by typing in the site name or its short code.
3. In the selector pane, select the equipment model entity you want to view a graphical representation of its relationship to other devices.
   For example, select the top-level site entity to view a representation of the entire site.
4. To view the equipment model entity's relationships with devices, select **View OT Device Map**.

View the equipment model OT dependency map

View the graphical representation of the hierarchical structure of the selected equipment model entity and its relationship with other entities and devices in the production process.

Before you begin
Role required: cmdb_ot_isa_editor, cmdb_ot_isa_admin.

About this task
Users with an assigned cmdb_ot_isa_admin role can view equipment model entities for any site. However, users with assigned cmdb_ot_isa_editor or cmdb_ot_isa_viewer roles can only access those sites that an administrator has granted access to for specific users. To learn more about granting site access, see Assign or remove equipment model site access for non-administrators.

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Industrial Process Manager** > **Equipment Model Manager**.
2. In the **Equipment mode view for** field, select the site that you want to view equipment model information for.
   You can search for a site by typing in the site name or its short code.
3. In the selector pane, select the equipment model entity you want to view a graphical representation of its hierarchy and relationship to other devices and entities.
   For example, select the top-level site entity to view a representation of the entire site.
4. To view the equipment model entity's hierarchical structure of relationships with other devices and entities, select **View OT Dependency map**.

Map the upstream production processes for the selected equipment model entity

Use the upstream process to review upstream production processes for the selected equipment model entity. You can also create and map a new upstream production process for the equipment model entity.

Before you begin
Role required: cmdb_ot_isa_editor, cmdb_ot_isa_viewer, cmdb_ot_isa_admin

About this task
Users with an assigned cmdb_ot_isa_admin role can view equipment model entities for any site. However, users with an assigned cmdb_ot_isa_editor role can only access those sites that an administrator has granted access to for specific users. To learn more about granting site access, see Assign or remove equipment model site access for non-administrators.

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Industrial Process Manager** > **Equipment Model Manager**.
2. In the **Equipment model view for** field, select the site that you want to view equipment model information for.
   You can search for a site by typing in the site name or its short code.
3. In the selector pane, expand the equipment model hierarchy and then click the entity that you want to view.
4. To view the upstream production processes for the equipment model entity, click **Upstream Process**.
5. Review the upstream production processes for the equipment model, or map a new one.
6. Click **Submit**.

Map the downstream production processes for the selected equipment model entity

Use the downstream process to review the downstream production processes for the selected equipment model entity. You can also create and map a new downstream production process for the equipment model entity.

Before you begin

Role required: cmdb_ot_isa_editor, cmdb_ot_isa_viewer, cmdb_ot_isa_admin

About this task

Users with an assigned cmdb_ot_isa_admin role can view equipment model entities for any site. However, users with an assigned cmdb_ot_isa_editor role can only access those sites that an administrator has granted access to for specific users. To learn more about granting site access, see Assign or remove equipment model site access for non-administrators.

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Industrial Process Manager** > **Equipment Model Manager**.
2. In the **Equipment model view for** field, select the site that you want to view the equipment model information for.
   You can search for a site by typing in the site name or its short code.
3. In the selector pane, expand the equipment model hierarchy and then click the entity that you want to view.
4. To view the downstream production processes for the equipment model entity, click **Downstream Process**.
5. Review the downstream production processes for the equipment model, or map a new one.
6. Click **Submit**.

Review the child entities for the equipment model entity

Review the child entities that are associated with the selected equipment model entity. You can review the relationships of the associated entities that are subordinate to a higher-level entity.

Before you begin

Role required: cmdb_ot_isa_editor, cmdb_ot_isa_admin.

About this task

You can view equipment model entities for any site, if the cmdb_ot_isa_admin role is assigned to you. However, you can only access those sites that an administrator has granted access to, if the cmdb_ot_isa_editor role is assigned to you. To learn more about granting site access, see Assign or remove equipment model site access for non-administrators.

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Industrial Process Manager** > **Equipment Model Manager**.
2. In the **Equipment model view for** field, select the site that you want to view the equipment model information for.
   You can search for a site by entering in the site name or its short code.
3. In the selector pane, expand the equipment model hierarchy, and then select the entity that you want to view.
4. To create a child entity, select the **Create new entity** button and fill in the details in the Create new entity form.
   To learn more, see Create an entity for a new equipment model.
5. To view the child entities for the equipment model entity, select **Child Entities**.
6. Additionally, in the **Related Lists** section you can assign a value in the **Processing Order** field to prioritize a child entity for a given site.

Note:
The **Processing Order** value enables you to sort and prioritize a child entity according to its importance and functionality:

- In an equipment model hierarchy, a lower Processing Order value is prioritized. If the value assigned to one or more child entities are the same, the child entities are sorted alphabetically.
- In the Equipment Model menu of the Industrial Workspace, the hierarchy of an equipment model entity is based on the Processing Order value assigned to the child entities.
- In the OT Risk Management tab, all equipment model entities are in sequence according to the Processing Order value assigned to the child entities.

Add OT devices that are associated with the selected equipment model entity

Use OT devices to review the OT devices that are associated with the selected equipment model entity and its child entities. You can also select and associate other OT devices to the selected equipment model entity.

Before you begin

To associate additional OT devices to the selected equipment model entity, both the Operational Technology Manager and Industrial Process Manager applications must be installed.

Role required: To add OT devices, the logged in user has to have a combination of the following assigned roles:

- cmdb_ot_viewer, cmdb_ot_editor or cmdb_ot_admin role
- cmdb_ot_isa_editor or cmdb_ot_isa_admin role

Note:
To learn more about assigning user roles, see Assign Industrial Process Manager user roles.

About this task

Users with an assigned cmdb_ot_isa_admin role can view equipment model entities for any site. However, users with assigned cmdb_ot_isa_editor or cmdb_ot_isa_viewer roles can only access those sites that an administrator has granted access to for specific users. To learn more about granting site access, see Assign or remove equipment model site access for non-administrators.

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Industrial Process Manager** > **Equipment Model Manager**.
   You can search for a site by typing in the site name or its short code.
2. In the **Equipment model view for** field, select the site you want to view equipment model information for.
3. In the selector pane, expand the equipment model hierarchy, and then click the entity that you want to view.
4. To view the associated OT devices for the equipment model entity and its child entities, click **Mapped OT Devices**.
5. Review the associated OT devices or the associate additional OT devices to the selected equipment model entity.
6. Click **Save**.

Update the entity name or parent of an equipment model entity

Update the entity name or parent fields in an equipment model entity record as needed to help keep your equipment model information up to date.

Before you begin

Role required: cmdb_ot_isa_editor

Procedure

1. Navigate to **All** > **Industrial Workspace**.
2. Select the equipment model ( ) button.
   Alternatively, you can navigate to **All** > **Industrial Workspace Admin** > **Industrial Process Manager** > **Equipment Model Manager**.
3. Select the equipment model entity record that you want to update.
4. Update the **Entity name** field or the **Parent** field as needed.
5. Select **Save**.

Result

When you update the **Entity name** or **Parent** fields, the fields are also updated in the tree component in the Equipment Model Manager and the site filter on the Operational Technology (OT) landing page in the Industrial Workspace.

Bulk edit a site's Operational Technology Vulnerability Response assignment group

Use the bulk edit feature to update the Operational Technology Vulnerability Response (OT VR) assignment group field in multiple site records at once.

Before you begin

Role required: cmdb_ot_isa_admin

Procedure

1. Navigate to **All** > **Industrial Workspace**.
2. Open the list ( ) view.
3. Under the **Industrial Process Manager** module, select the Sites list.
4. Select the check box next to each OT site that you want to edit.
5. Select the **Edit** button.
6. In the **OT VR assignment group field**, add the Operational Technology Vulnerability Response assignment group for the selected sites.
7. Select **Update**.

Result
The **OT VR assignment group** field is updated for each selected site.

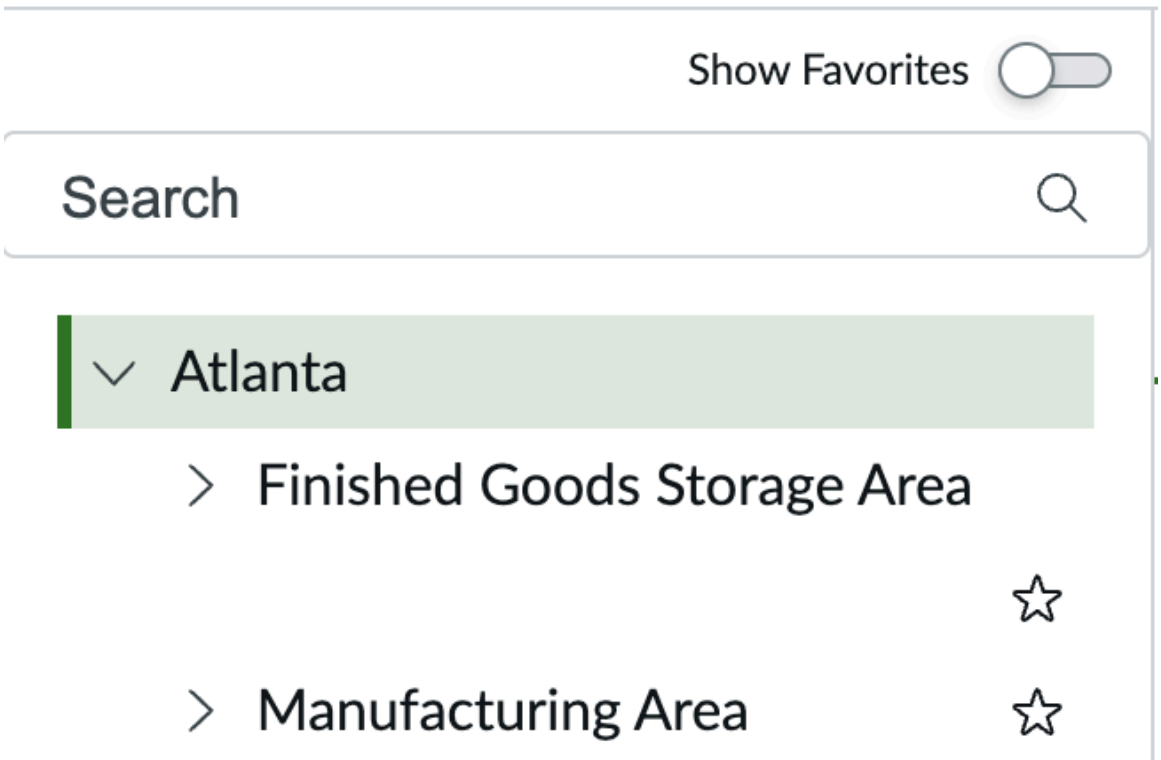
Search for an equipment model entity

Search for an equipment model entity in the Industrial Workspace so that you can find the entity more quickly and efficiently.

Before you begin
Role required: cmdb_ot_isa_editor

Procedure

1. Navigate to **All** > **Industrial Workspace**.
2. Select the Equipment Model Manager ( ) icon.
3. In the **Search** bar, search for the equipment model entity that you want to view.



Result
The list automatically expands to show the searched equipment model entity. When you have the **Show Favorites** toggle switched on, the list still expands to show the searched equipment model entity.

View all OT devices by managed network

View your Operational Technology (OT) devices by managed network on the ServiceNow AI Platform.

Before you begin
Role required: cmdb_ot_isa_viewer and cmdb_ot_viewer

About this task
The All OT Devices by Managed Network list on the ServiceNow AI Platform is a database view with data populated from the following tables.

- OT Entity [cmdb_ot_entity]
- Configuration Items [cmdb_ci]
- Configuration Item Relationships [cmdb_rel_ci]
- Allocated IP Address [cmdb_ci_allocated_ip_address]
- IP Network Subnet [cmdb_ci_ip_network_subnet]
- Managed Network [cmdb_ci_managed_network]

Using the All OT Devices by Managed Network list can help you understand the relationship between OT devices and their network.

For more information about the OT Device Network Connection data model, see the **OT Device Network Connection data model** section of Operational Technology (OT) extension classes.

Procedure
1. Navigate to **All** > **Industrial Workspace Admin** > **Industrial Process Manager**.
2. Select **All OT Devices by Managed Network**.
3. In the list, you can view the following information.

All OT Devices by Managed Network fields

Field	Description
Managed Network	Name of the managed network that the OT device belongs to.
IP Network Subnet Name	Identifier for the specific IP subnet that the OT device belongs to.
Device IP Address	IP address assigned to the OT device that is used for communication and device management.
OT Device	Name of the OT device.
Parent Managed Network	Higher-level managed network that contains or oversees the current managed network.

Filter equipment model entities by operational status

Filter how equipment model entities appear in the Equipment Model Manager on the Industrial Workspace using a system property. Filtering equipment model entities can help you organize the data shown on the Industrial Workspace.

Before you begin

Role required: cmdb_ot_isa_viewer and cmdb_ot_isa_admin

Procedure

1. Navigate to **All** > **Equipment Model - ISA** > **System Properties**.
2. Under **List of equipment model operational statuses that need to be filtered out from the equipment model page**, list the equipment model entities by**Operational Status** that you want removed from view in the Industrial Workspace.

   You can choose from the following options.

   - Operational = 1
   - Non-Operational = 2
   - Repair in Progress = 3
   - DR Standby = 4
   - Ready = 5
   - Retired = 6
   - Pipeline = 7
   - Catalog = 8
   - Not in Use = 9

   For example, if you want to remove equipment model entities with **Operational Status** field values of **Retired** and**Not in Use**, list `6 , 9`.

Favorite a child equipment model entity

Favorite a child equipment model entity in the Equipment Model Manager of the Industrial Workspace so that you can access a tailored view of your favorites while working.

Before you begin

Role required: admin

Procedure

1. Navigate to **All** > **Industrial Workspace**.
2. Select the Equipment Model Manager () icon.
3. Next to the child equipment model entity or entities that you want to favorite, select the **Mark as Favorite** (☆) icon.

Note:
You cannot select an ISA site as a favorite.

If you select a higher level entity as a favorite, the related child entities underneath won't be shown. But if you select a lower level child entity, the full hierarchy including the parent entity is shown.

4. **Optional:** To remove a child entity from your favorites, select the **Remove as Favorite** (★) icon.

Result
The child equipment model entities are added to your favorites as per your needs.

To view only favorite child equipment model entities, you can select the Show Favorites toggle to switch it on. The Show Favorites toggle focuses your UI view on the child entities added to your favorites to help you stay on track while making changes in the Equipment Model Manager.

When you switch on the Show Favorites toggle, the configuration is saved. When you log out and log back in, or open a different site, the Show Favorites toggle is still switched on.

Automated mapping of OT devices to the Equipment Model

Automate mapping of OT devices to the production process.

When OT managers experience vulnerabilities or need to manage workflow involving OT devices, the context of how the OT device connects to the production process it automates is critical to prioritizing work. Automatic mapping of OT devices to ISA equipment model entities enables the view of device-to-process relationships.

Note:
Only one subnet range per site is supported. Two different sites can have the same subnet; for example, 192.168.101.0/24. But multiple subnets of the same range are **not** supported for the same site. It is recommended that you use manual mapping in this scenario.

Key benefits

- Upload and store OT subnets from authoritative sources (such as NetDB or Firewalls) as records in a ServiceNow instance.
- Automate assignment of OT devices to ISA entity using IP addresses and OT subnet
- Minimize issues with reuse of private IP address ranges across multiple sites

Industrial networks use subnets to divide the private IP address space with a single subnet often aligned to a part of the production process, or the equipment model entity. For example: A canning line runs on a 192.168.101.0/24 network in which all the equipment was programmed by the integrator. The IPs used by the control systems, or OT devices, are often hard coded into the automation software used to run the line. If the subnet maps to the canning line in the Atlanta site, a manager can automatically map a detected PLC with IP 192.168.101.66 to the canning line.

The mapping feature relates each subnet to an equipment model entity, enabling you to automatically map OT devices to the subnets associated with the equipment model entity based on the IP address that was reported upon import from an OT Certified integration or ServiceNow® Discovery for OT.

A system administrator can import OT subnet mapping records. An ISA administrator can automatically create mappings of subnets to equipment model entities through a scheduled job flow. An ISA Editor can manually create mappings of an individual OT device on-demand.

Automated mapping feature personas

The automated mapping feature is aimed at the following personas.

Personas for automated mapping

Persona	Description
System Admin	The System Administrator performs these tasks: • Imports data into the OT subnet to Equipment Model Entity Mapping table • Activates, schedules, or manually triggers the OT Subnet Mapping scheduled flow
ISA Admin	The ISA admin manually triggers the Map all OT devices UI action from the OT Subnet Mapping list view.
ISA Editor	The ISA editor performs these tasks: • Manually creates and updates OT subnet mapping entries for specific sites • Maps individual OT devices to an equipment model entity from an OT device record • Maps multiple OT devices to an equipment model entity from an OT subnet mapping record

Plugins

Enabling the mapping feature requires the following plugins:

- Operational Technology Manager
- Industrial Process Manager

If the required plugins are installed, an ISA administrator can access the subnet mapping feature from the Industrial Process Manager application menu.

Workflow for the automated mapping feature

The Industrial Process Manager includes an automated flow for the automated mapping feature.

A predefined flows is included with this feature that you can use to schedule the assignment of OT devices to equipment model entities.

By using Flow Designer, you can review and configure the predefined flow for your business needs.

Flow available for this feature

The following table lists the predefined flow that is available with the Industrial Process Manager when installed with Operational Technology Manager.

Application	Flow
Industrial Process Manager when installed with Operational Technology Manager	OT device mapping flow

General use cases for the automated mapping feature

These use cases typically apply for the automated mapping feature:

- An OT manager has existing OT devices and wants to map individual OT devices on demand.
- An OT admin wants to automatically map newly detected OT devices with valid IP addresses to an equipment model entity.

The following is a typical workflow for the automated mapping feature.

- A system admin imports OT subnet data into the OT subnet mapping table from an Excel spreadsheet using Easy Import.
- Either the Amazing admin reviews the imported data records and associates (maps) OT subnet mapping records to a site and/or the Equipment Model Entity within that site.
- The Amazing admin activates or triggers the scheduled flow to automatically map OT devices for all sites on an instance.
- The Amazing editor can update the records that belong to the sites that they have editing access to.

Configure Automated Mapping of OT devices using guided setup

Use the Industrial Process Manager guided setup to automatically map OT devices to the ISA equipment model entity.

Before you begin

Role required: admin

About this task

If you have the admin role, you can use the Industrial Process Manager Guided Setup to walk you through mapping OT devices to the ISA equipment model entity. You can map OT devices for the sites that you have access to.

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Guided Setup**.
2. Select **Get Started** for the Industrial Process Manager application.
3. Select the **Automatically Map OT Devices** task.
4. Select the following task tabs, then select **Configure** to complete the configuration tasks.

Related topics

Guided Setup

Automated mapping of OT devices to the Equipment Model

Automatically map all OT devices to an equipment model entity

An Operational Technology (OT) Amazing admin can trigger automated mapping of all OT devices to the appropriate ISA equipment model entity.

Before you begin

The following plugins must be installed:

- Operational Technology Manager
- Industrial Process Manager

Role required: sn_ot_amazing_admin

Procedure

1. Navigate to **Industrial Workspace Admin** > **Industrial Process Manager** > **OT Subnet Mapping**.
2. Select **Map all OT devices** to execute the Map OT Device flow.

Result

OT devices are automatically mapped to the Equipment Model Entities listed on all active OT subnet mapping records. After the mapping is triggered, you can view the mapping results by selecting the link available in the information message from the list view.

Note:
Subnet mapping also supports Discovery created configuration items (CIs) for ISA equipment models.

Map all OT devices within a subnet

An OT admin can trigger automated mapping of all OT devices within a selected subnet.

Before you begin

The following plugins must be installed:

- Operational Technology Manager
- Industrial Process Manager

Role required: sn_ot_amazing_write

Procedure

1. Navigate to **Industrial Workspace Admin** > **Industrial Process Manager** > **OT Subnet Mapping**.
2. From the OT Subnet Mapping list, open the OT subnet mapping record whose devices you want to map.

   Note:
   Subnet mapping also supports Discovery created configuration items (CIs) for ISA equipment models.

3. Ensure that the Site and Equipment Model Entity fields are correctly completed.
4. Select the **Map OT devices in this subnet** UI Action to automatically map all OT devices in this site with IP addresses in the selected OT subnet.

Result
If there are OT devices in the selected site with IP addresses that fall in the selected IP range, all devices in the site are mapped for the OT subnet. After the mapping is triggered, you can view the mapping results by selecting the link available in the information message from the list view.

View OT devices not assigned to a site

View the list of Operational Technology (OT) devices that aren't assigned to a site.

Before you begin
The following plugins must be installed:

- Operational Technology Manager
- Industrial Process Manager

Role required: cmdb_ot_isa_editor and cmdb_ot_editor

About this task
As part of OT device mapping, you need to assign the device to a site before mapping it to an equipment model entity. To do this, you can view a list of all the OT devices that aren't assigned to a site.

Procedure
1. Navigate to **All** > **Operational Technology (OT)** > **OT Devices w/o Site Assignment**.
2. To assign a device to a site individually, select the device record and updating the **Site** field.
3. To perform a bulk edit to update the **Site** column and assign multiple devices to the same site, complete the following steps.
   a. Select the check boxes next to each OT device you want to assign to a site.
   b. In the **Site** column header, select the Column options button and choose **Update Selected**.
   c. Update the **Site** field.
   d. Select **Update**.

What to do next
The OT devices are assigned to a site but not mapped to an equipment model entity. You can view a list of the unmapped OT devices to complete the device mapping. For more information, see View unmapped OT devices.

View unmapped OT devices

View a list of Operational Technology (OT) devices with IP addresses that aren't mapped to any equipment model entity.

Before you begin
The following plugins must be installed:

- Operational Technology Manager
- Industrial Process Manager

Role required: cmdb_ot_isa_editor and cmdb_ot_editor

Procedure
1. Navigate to **All** > **Industrial Workspace**.
2. In the Industrial Workspace list view under the **Operational Technology (OT)** module, select the **Unmapped OT Devices** list.

This list shows the OT device records with IP addresses and other fields that you can use to map them to equipment model entities for your assigned site.

3. **Optional:** In the **Site** column header, select the Filter button and choose **Group by Site**. This filter lets you organize the unmapped OT devices by site and can be helpful if you manage multiple sites.

What to do next

Now, you can map the OT devices to equipment model entities. For more information, see Map an individual OT device to an equipment model entity.

Map an individual OT device to an equipment model entity

Perform on-demand mapping of an OT device to the ISA equipment model entity for the sites that you have access to.

Before you begin

The following plugins must be installed:

- Operational Technology Manager
- Industrial Process Manager

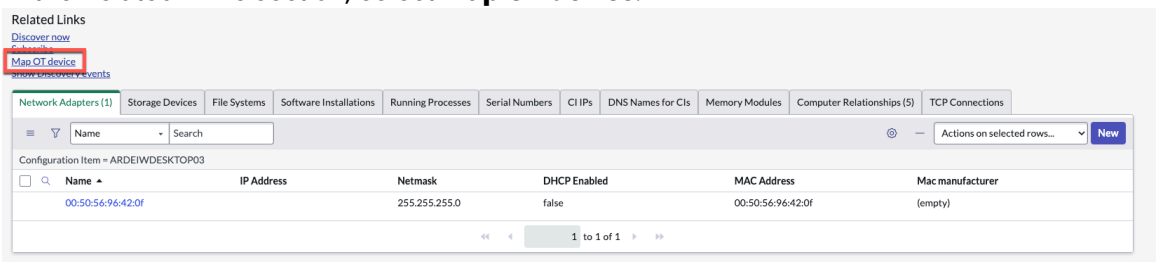
Role required: sn_ot_amazing_write and cmdb_ot_viewer

Procedure

1. Navigate to **All** > **Operational Technology (OT)** > **All OT Devices**.
2. In the **OT device** column, select the OT device that you want to map.

> **Note:**
> Subnet mapping also supports Discovery created configuration items (CIs) for ISA equipment models.

3. In the Related Links section, select **Map OT device**.



Result

If there is an active OT subnet that matches the IP address and site of the selected device, the device is mapped.

Configure the OT Subnet Mapping scheduled flow

Configure the OT device mapping flow to automatically map OT devices to sites and equipment model entities.

Before you begin

The following plugins must be installed:

- Operational Technology Manager
- Industrial Process Manager

Role required: admin

About this task

The OT device mapping flow can be set to run on a scheduled basis to automatically map OT devices for all active OT subnet mapping records.

Procedure

1. Navigate to **Industrial Workspace Admin** > **Industrial Process Manager** > **OT Subnet Mapping Scheduled Flow**.
2. **Optional:** Activate site mapping:
   a. Open the Set Flow Variables section.
   b. Check the box next to **Run Auto Assign Site** and select **Save**.
3. To schedule the flow to run on a regular basis, select the link in the Trigger section to define the interval.
4. In the header, select **Activate** to activate the scheduled execution of the OT device mapping flow.
   After activation, this flow can run on a scheduled basis to automatically map OT devices for all active OT subnet mapping records on an instance.

> **Note:**
> Subnet mapping also supports Discovery created configuration items (CIs) for ISA equipment models.

View OT subnet mappings

View all mapped OT subnets assigned to an equipment model entity.

Before you begin

Roles required:

- sn_ot_amazing_write, cmdb_ot_isa_editor, and cmdb_ot_viewer or
- sn_ot_amazing_admin, cmdb_ot_isa_editor, and cmdb_ot_viewer

Procedure

1. Navigate to the Equipment Model Manager using one of these options:
   - Navigate to **All** > **Industrial Workspace Admin** > **Industrial Process Manager** > **Equipment Model Manager**.
   - Navigate to **All** > **Industrial Workspace**. Select the Equipment model () icon.
2. From the Equipment model view, select the site, or expand the equipment model hierarchy to select the entity that you want to view mappings for.
3. In the entity form, select the **Mapped OT subnets** related list tab.
   The mapped OT subnets show as active or inactive. Only active OT subnets will be included in the scheduled flow. For more information, see Configure the OT Subnet Mapping scheduled flow.
4. **Optional:** To view the OT subnets that are used for mapping at the OT device level, select the **OT Subnets** related list in an OT device record.

What to do next

Create a new OT subnet mapping record

Create a new OT subnet mapping record

Create a new OT subnet mapping to associate with an equipment model entity.

Before you begin

Role required: sn_ot_amazing_write or sn_ot_amazing_admin

Note:
When creating new OT subnet mapping records, by default the new records are inactive. To automatically map records when the OT device mapping flow triggers, OT subnet mapping records must be active.

Procedure

1. Navigate to **Industrial Workspace Admin** > **Industrial Process Manager** > **Equipment Model Entities**.
2. Select the site or equipment model entity you want to create a new mapping for.

   Note:
   Subnet mapping also supports Discovery created configuration items (CIs) for ISA equipment models.

3. Select the **Mapped OT Subnets** related list, then select **New**.
4. On the form, fill in the fields.

OT Subnet to Equipment Model Entity Mapping form

Field	Description
Name	Zone or VLAN name for the subnet.
Site	From the Lookup, select the ISA site from the list of available sites if not already populated.
Type	Select the subnet type from these options: • IP Range - a subset of IP addresses in a subnet • IP Network - the entire subnet, in CIDR notation
Starting IP Address	Starting IP for the IP Range This field is visible when Type is IP Range.
Ending IP address	Ending IP for the IP Range This field is visible when Type is IP Range.
Source name	Name of the source, such as NetDB or Firewall.
Firewall Name	Name of the firewall managing the zone if applicable.
Description	Description for the subnet mapping.

Field	Description
Active	Select Active to include the subnet in automated mapping when the OT Subnet Mapping scheduled flow executes.
Equipment model entity	From the Lookup, select the equipment model entity from the list of available entities if not already populated.
Subnet	Enter the subnet address (CIDR format). This field is visible when Type is IP Network.
Location	Add a location to the subnet record to automatically add or update the location in the mapped OT devices. **Note:** The location is mapped based on the sn_otsm.subnet_mapping.location_auto_update system property. For more information about system properties used for OT subnet mapping, see System properties used by the OT subnet mapping feature.
Interface name	Name for the firewall interface if applicable.
VLAN ID	Specify the VLAN ID if applicable.

5. Select **Submit**.

View all mapped OT devices

View a list of all the Operational Technology (OT) devices that are mapped to an equipment model entity.

Before you begin

Role required: sn_ot_amazing_write or sn_ot_amazing_admin

About this task

When you open a parent record in the CI Relationships table, you can view the Mapped OT Devices related list. The related list is a rolled up view that shows all the devices mapped with children ISA equipment model entities after you open the parent ISA equipment model entity. It contains the records that represent a mapping between an equipment model entity and a device.

Procedure

1. To view the mapped OT devices in the Industrial Workspace, complete the following actions.
   a. Navigate to the Industrial Workspace.
   b. Select the Equipment model ( ) icon.
   c. Open the equipment model entity that you want to view the mapped devices for.

d. Select the **Mapped OT Devices** tab.

> **Note:**
> The **Mapped Equipment Model Entity** column notes the equipment model entity that the device is mapped to. You can map a device to more than one equipment model entity.

2. To view the mapped OT devices on the ServiceNow AI Platform, navigate to **All** > **Industrial Workspace Admin** > **Industrial Process Manager** > **Mapped OT Devices**.
   This list contains all the devices that are mapped with different equipment model entities. The **Automates by :: Automates** CI relationship is applied to the parent and child entities.

   In this list, you can use the **Mapped Equipment Model Entity** column to identify the equipment model entity the device is mapped to. For more information on how to add a column to a list, see Personalize a list.

System properties used by the OT subnet mapping feature

An Amazing Admin can view and configure the system properties that support the OT subnet mapping feature.

Users with the Amazing Admin role can access OT subnet mapping property settings by navigating to **Industrial Workspace Admin** > **Industrial Process Manager** > **OT Subnet Mapping Properties**.

OT subnet mapping system properties

Property	Description
sn_otsm.map_all_ot_assets.all_discovery_sources	Map OT devices for all discovery sources. Map OT devices for all discovery sources. If checked, this will override the specific discovery sources below. Default is Yes (true). Default value: **true**
sn_otsm.map_all_ot_assets.discovery_sources	Map OT devices for specified discovery sources (comma separated format). Only applicable if "Map OT devices for all discovery sources" above is unchecked.
sn_otsm.subnet_mapping.auto_assign_mode	Automatically assign all OT control modules to equipment model entities based on the Owns::Owned by relationship. Default is Yes (true).
sn_otsm.subnet_mapping.location_override	Override location of an OT device with subnet's location. If checked, the location of the subnet takes precedence over OT device's location when it's mapped with the subnet. Default is Yes.

Automated mapping components installed when Industrial Process Manager and Operational Technology Manager are both installed

Several types of automated mapping components will be installed with activation of the Industrial Process Manager when Operational Technology Manager is also active, including tables, system properties, and scheduled flows.

These automated mapping components are installed with or available when Industrial Process Manager is installed with Operational Technology Manager.

Tables

Table	Description
OT Subnet to Equipment Model Entity Mapping [ot_subnet_mapping]	Stores the mappings of OT subnet to equipment model entities.

Properties

Property	Description
sn_otsm.map_all_ot_assets.all_discovery_sources	Control mapping of OT devices for all discovery sources. Default value: **true**
sn_otsm.map_all_ot_assets.discovery_sources	Map OT devices for specified discovery sources (comma separated format).
sn_otsm.subnet_mapping.auto_assign_ot_control_modules	Automatically assigns all OT control modules to equipment model entities based on the Owns::Owned by relationship. Default is Yes (true).
sn_otsm.subnet_mapping.location_auto_update	Override location of an OT device with subnet's location. If checked, the location of the subnet takes precedence over OT device's location when it's mapped with the subnet. Default is Yes.

Flow Designer flows

Application	Flow
Industrial Process Manager integration with Operational Technology Manager	OT device mapping flow

Industrial Process Manager reference

Reference topics provide additional information about the Industrial Process Manager application.

Components installed with Industrial Process Manager

Several types of components may be installed with activation of the Industrial Process Manager application, including user roles.

Note:
The Application Files table lists the components that are installed with this application. For instructions on how to access this table, see Find components installed with an application.

Roles installed

Role	Description
Equipment Model Viewer [cmdb_ot_isa_viewer]	Can only view the assigned ISA Equipment Model [cmdb_ci_ot_isa_entity] table records. To learn more, see Using Industrial Process Manager with the Operational Technology Manager and Managing equipment models.
Equipment Model Editor [cmdb_ot_isa_editor]	Can view and edit the assigned ISA Equipment Model [cmdb_ci_ot_isa_entity] records. To learn more, see Using Industrial Process Manager with the Operational Technology Manager and Managing equipment models.
Equipment Model Admin [cmdb_ot_isa_admin]	Inherit the cmdb_ot_isa_editor role and can also do the following actions: • Use the Industrial Guided Setup to set up the Industrial Process Manager and the Operational Technology Manager. • Edit the Equipment Model Template [isa_entity_template], [isa_entity_level], and Equipment Entity type [isa_entity_type] table records. To learn more, see Industrial Workspace Admin application menu and Guided Setup.
ISA Site Viewer [cmdb_ot_isa_bypass_qbr]	Can view all sites in the OT Progress Scorecard.
Equipment Model Downtime Planner [sn_isa_schedule_admin]	Can create, modify, and delete equipment entity schedules. Can also associate schedules with equipment entities.
Equipment Model Viewer All [cmdb_ot_isa_viewer_all]	Can view all ISA Equipment Model records (cmdb_ci_ot_isa_entity) and associated Equipment Model Template records (isa_entity_template, isa_entity_level, isa_entity_type). Role included with cmdb_ot_admin.
Amazing Admin [sn_ot_amazing_admin]	Can create, modify and delete OT subnet records (ot_subnet_mapping) for all the equipment model entity OT subnet system properties.

Role	Description
Amazing Editor [sn_ot_amazing_write]	Can create, modify and delete OT subnet records (ot_subnet_mapping) for all the equipment model entities associated with the user.
Amazing Viewer [sn_ot_amazing_read]	Can view OT subnet records (ot_subnet_mapping) for all the equipment model entities.

Migrating site user access to user criteria and groups

When you upgrade to version 1.0.12 of the ISA Equipment Model, the migration from site user access to user criteria and groups begins automatically.

The following changes occur when you upgrade to version 1.0.12 of the ISA Equipment Model.

- Improved site level access control to that uses user criteria to define read or write level user access to equipment model entity sites. With the additional assignment of OT viewer (cmdb_ot_viewer) or OT Editor (cmdb_ot_editor) roles, you can also have view or edit access to OT devices in the sites assigned accordingly.
- When you upgrade to version 1.0.12 of ISA Equipment Model, existing site user records are migrated to an improved access control model using user criteria to preserve the same access permissions. For each site with ISA Entity Site User records, the following changes occur.
  - For users with viewer access:
    - A new user criteria record is created and named **Read User Criteria for <site name> Site#[System Generated]**
    - A new user group with all site users from this site is created and named **Read Group for <site name> Site [System Generated]**
    - A new record in the new Equipment Model Entity View Access table (isa_entity_m2m_user_criteria_can_view) is created with the new user criteria and user group.
  - For users with editor access:
    - A new user criteria record is created and named **Edit User Criteria for <site name> Site [System Generated]**
    - A new user group with all site users from this site is created and named **Edit Group for <site name> Site [System Generated]**
    - A new record in the new Equipment Model Entity Edit Access table (isa_entity_m2m_user_criteria_can_edit) is created with the new user criteria and user group.
- The Site User application menu and Site Users related list on the Equipment Model Entity record for a site is removed.
- All site user (isa_entity_site_user) records are set to inactive.
- The **Site User – Can Read** and **Site User – Can Edit** application menu items are added to the ServiceNow AI Platform.
- The **Can Read Equipment Models** and **Can Edit Equipment Models** related lists are added to the Equipment Model Entity record for a site.

User criteria form

You can use the User Criteria form to determine whether certain users can access the equipment model entities for specific sites.

The following table describes the user criteria form fields.

User criteria form

Field	Description
Name	Name of the user criteria.
Short description	Brief description of the user criteria to access the site's equipment model entities.
Users	Users that can access the site's equipment model entities when you apply the user criteria. Select the users who can access the entities by selecting the unlock users icon ( ). Add yourself as a user by selecting the add me icon ( ).
Groups	Groups that can access the site's equipment model entities when you apply the user criteria. Select the groups by selecting the unlock groups icon ( ).
Roles	Roles that can access the site's equipment model entities when you apply the user criteria. Select the groups by selecting the unlock groups icon ( ).
Advanced	Option to create a script for the user criteria.
Application	Field that is automatically set to `Global`.
Active	Option to make the user criteria available.
Companies	Companies that can access the site's equipment model entities when you apply the user criteria. Select the companies by selecting the unlock companies icon ( ).
Locations	Locations that can access the site's equipment model entities when you apply the user criteria. Select the locations by selecting the unlock locations icon ( ).
Departments	Departments that can access the site's equipment model entities when you apply the user criteria. Select the departments by selecting the unlock departments icon ( ).
Match All	Option to make every condition required when the user criteria are applied. The conditions are set in the previous fields, such as the **Location**, **Department** fields.

ISA Equipment Model system properties

Enable the system properties for the ISA Equipment Model as needed.

You can access the system properties for the ISA Equipment Model by navigating to **All** > **Industrial Workspace Admin** > **All OT Properties**. For more information about how to view and edit the OT system properties, see View and edit OT system properties.

The following table describes the system properties for the ISA Equipment Model.

ISA Equipment Model System Properties

System property	Description	Type
sn_isa_model.cmdb_relationships_sync_levels	Number of levels of CMDB relationships that are synchronized.	Integer
sn_isa_model.short_code_validation_max_length	Maximum length for the short code validation.	Integer
sn_isa_model.excluded_operational_statuses	List of equipment model operational statuses that need to be filtered out from the equipment model page.	String
sn_isa_model.user_search_matching_attribute	Column in the User Table [sys_user] that matches with a user in the system. By default, the Email column on the User table is used.	String
sn_isa_model.user_sites_cache_expiration_time	Expiration time in seconds. The default is set to 600 (10 minutes).	Integer
sn_isa_model.use_user_sites_cache	Enables the session cache for ISA entity records.	Boolean

Predefined filters for the Industrial Process Manager

Industrial Process Manager application uses predefined filters so that you can view the equipment model dependency maps by selecting the available UI actions in the Industrial Workspace.

The following predefined filters are available for the Industrial Process Manager.

ISA Equipment Model - Hierarchy Process

The hierarchical structure of the selected equipment model entity and its relationships to other entities in the production process.

ISA Equipment Model - OT Dependency Map

The hierarchical structure of the selected equipment model entity and its relationship with other entities and Operational Technology (OT devices in the production process.

ISA Equipment Model - OT Device Map

The graphical representation of the selected equipment model entity and its relationship to other OT devices in the production process.

ISA Equipment Model - Process

The graphical representation of the selected equipment model entity and its relationship to the production process.

You can view the equipment model dependency maps using the described predefined filters by navigating to the **Industrial Workspace** and opening the equipment model view. Then you can select the equipment model entity you want to view a dependency map for. When you open the record, you see the following UI actions to choose from:

- View OT Dependency map

> **Note:**
> You can also view the OT Dependency map in an OT device record by selecting **View map** in the record header.

- View OT Device map
- View hierarchy
- View process

You can also update the predefined filters as needed for your organization. For more information, see Modify predefined filters.

Modify predefined filters

Modify the predefined filters for the ISA Equipment Model application as needed for your organization.

Before you begin

Role required: ecmdb_admin

Procedure

1. Navigate to **All** > **Dependency Views** > **Predefined Filters**.
2. Apply the filter **[Application] [is] [ISA Equipment Model]**.
3. Select the predefined filter record that you want to edit.
4. Modify the Configuration Types, CI Filters, and Relationship Types related lists as needed. For more information about how to modify these related lists, see Create a predefined filter.
5. Select **Update**.

Site vs location

The site and location attributes have different uses for Operational Technology (OT).

Site

A site is part of the ISA Equipment Model Entity and describes an industrial site where your production process takes place. Sites are logical and you can use them to define an equipment model. You can then use that equipment model to provide access control. For more information about access control, see Assign or remove equipment model site access for non-administrators.

Sites can have a location but they aren't considered a location. Any OT device can have a location and be assigned to an equipment model entity site.

Location

Location refers to the value stored in the **Locations** (cmn_location) table. It's the physical location of an equipment model or device. For example, if one of your equipment models belongs to the site Atlanta and is located in Atlanta, GA, you would list its location as **Atlanta, GA**.

Related information

Find more information about the Network Intrusion Detection System (NIDS) extension class, OT extension classes, and related applications.

Extension classes overview

The extension classes help you understand how Operational Technology Management works with the Configuration Management Database (CMDB).

Network Intrusion Detection System (NIDS) CI extension class

The Network Intrusion Detection System (NIDS) [cmdb_ci_nids] class builds the relationships between passive network monitoring appliances, and the devices on the network that it discovers.

Operational Technology (OT) extension classes

The Configuration Management Database (CMDB) updates classes for OT.

Related applications

Operational Technology Manager

The Operational Technology Manager application enables you to aggregate OT device data from multiple sources, so that you can build the foundational data relationships used in the Industrial solution.

Operational Technology Vulnerability Response

Operational Technology Vulnerability Response enables effective prioritization and remediation of OT device vulnerabilities at the site level. By leveraging the CMDB relationships of OT devices, vulnerable devices or items can be prioritized based on the criticality of the production process they automate.

Explore	Configure
	
Exploring Operational Technology Vulnerability Response	Configuring Operational Technology Vulnerability Response

Use	Integrate
 Using Operational Technology Vulnerability Response	 Extend Operational Technology Vulnerability Response by integrating it with other applications
Reference	
 Get details about related information and applications	

Exploring Operational Technology Vulnerability Response

Use Operational Technology Vulnerability Response as an integrated solution for the industrial production process.

Operational Technology Vulnerability Response overview

https://player.vimeo.com/video/1020858131?h=c90c2ff89a&badge=0&autopause=0&player_id=0&app_id=58479

As an OT engineer or OT vulnerability manager, Operational Technology Vulnerability Response enables you to find answers to the questions such as:

- What are my OT device vulnerabilities?
- How can I prioritize vulnerability remediation using OT specific risk?
- What progress are we making toward remediating OT vulnerabilities?

Remediation task and vulnerable item states

Vulnerable items (VITs) and their remediation tasks can have different states due to complex use cases. For more information about remediation task and vulnerable item states and their workflow, see Vulnerability Response remediation task and vulnerable item states.

Key features

With Operational Technology Vulnerability Response, you can use the following key features.

- The Operational Technology Vulnerability Response (PA) dashboard tracks the volume, performance, and progress of OT VITs from initial analysis and detection to containment, or remediation.
- The Operational Technology (OT) Vulnerability Risk Rollup dashboard contains the risk score of the OT devices at each level of the equipment model.

Operational Technology Vulnerability Solution Management

Starting from the Xanadu version, Operational Technology (OT) Vulnerability Solution Management is a feature available within the Operational Technology Vulnerability Response application.

Security and IT teams often spend a significant amount of time and effort to research vulnerability findings and identify the most effective solutions for their environment. In large organizations, translating vulnerability findings into remediation tasks is a manual, tedious, and error-prone process due to the volume and complexity of the vulnerabilities.

OT Vulnerability Solution Management automatically correlates the vulnerability findings in your environment with possible solutions that remediate them. You can identify the remediation actions that apply to your vulnerabilities and prioritize them by the severity of the vulnerability risk. Also, you can mitigate the risk posed by vulnerabilities that cannot be patched immediately by using compensating controls for OT. For more information, see Use compensating controls for Operational Technology.

The OT Vulnerability Solution Management feature is based on the feature available in the Vulnerability Response application. For more information on Vulnerability Solution management, refer to Vulnerability Solution Management.

OT Vulnerability Solution Management supports the generic format for solution intelligence integration. The generic framework for solution intelligence integration ingests data in different file formats from solution vendors. These formats speed up information exchange and processing. It also improves critical security-related information sharing in a standardized reporting format. The supported file format is the Common Security Advisory Framework (CSAF), which is an open-source standard that provides JSON-based structured, machine-readable security advisories. Major vendors such as Cybersecurity & Infrastructure Security Agency (CISA), Siemens, Hitachi, Schneider Electric, and others support the CSAF format.

The CSAF supported solution management includes the following key features:

- Configuration through Setup Assistant. For more information, see Configure vulnerability solution providers.
- Support of importing CSAF data through file import. For more information, see Import Common Security Advisory Framework data through file import.
- Support of importing CSAF data through CSAF URL. For more information, see Import Common Security Advisory Framework (CSAF) data through CSAF URL. OT Vulnerability Solution Management enables you to import CSAF data from:
  - Individual vendors that support CSAF format and have a CSAF URL ROLIE Feed. You can use the CSAF URL ROLIE Feed provided by the vendor to import the CSAF data. For example, the Siemens URL ROLIE Feed.
  - CSAF Aggregators or Trusted Providers through a URL import that supports the ROLIE Feed. You can import CSAF data of multiple vendors from a Trusted Provider. For example, CISA is a Trusted Provider and you can import CSAF data of multiple vendors from the Industrial Control System (ICS) CSAF advisories located at the CISA's GitHub CSAF repository. These vulnerability solutions are automatically mapped to the correct vendor and vulnerable items (VITs) based on the Common Vulnerabilities and Exposures (CVEs). Using a Trusted Provider reduces the time and effort required to import CSAF data from individual vendors' CSAF URLs.
- Support of importing CSAF data through advisories or using the APIs. For more information, see Import Common Security Advisory Framework data from advisories.

Note:
Navigate to **All** > **Vulnerability Response** > **Solutions** > **All** to view the list of solutions you have imported using the preceding methods.

The Vulnerability Response plugin takes care of updating the metrics statuses of the created solution.

Related topics

View vulnerable items and solutions in the Industrial Workspace

Configuring Operational Technology Vulnerability Response

Configure Operational Technology (OT) assignment rules, remediation targets, risk calculators, and risk rollup calculation then configure integrations to create vulnerable item records.

Note:

If you have the sn_vul.vulnerability_admin role, you can use the Industrial Guided Setup to lead you through the setup of the Operational Technology Vulnerability Response application.

To access the Guided Setup, navigate to **Industrial Workspace Admin** > **Guided Setup**.

Task	Purpose
1. Install Operational Technology Vulnerability Response from the ServiceNow Store.	Install the Operational Technology Vulnerability Response application.
2. Assign roles to admin users#br user groups, if needed.	Assigns roles to control the actions that are available for each user.
3. Assign roles for the OT Vulnerability Remediation Owner.	Assigns roles to control the actions that are available for the OT Vulnerability Remediation Owner.
4. Create assignment groups and assign users to sites and groups. **1.** Create an Operational Technology Vulnerability Response site assignment group for each site that you have in the Equipment Model Manager. **2.** Assign users who already have either the cmdb_ot_isa_viewer or cmdb_ot_isa_editor role to sites. **3.** Add users to the assignment group for their site.	• Allows OT Remediation Owner users to see only vulnerable Items for their site. • Allows users to see the Vulnerability Items for the sites they're assigned to.
5. Configure OT remediation target rules.	• Assigns OT vulnerable items to site-level groups, or groups based on classification. • Defines the expected timeframe for remediating vulnerable items.

Task	Purpose
6. Load the demo data records for the Operational Technology Vulnerability Response application.	Calculates the remediation target for OT vulnerable items.
7. Configure OT risk calculators.	Determines which OT risk factors to use when calculating the risk of a vulnerable item on an OT device.
8. Configure OT risk roll up calculator.	Calculates the risk score of the OT devices at each level for the equipment model entity.
9. Install Operational Technology Certified integrations for the Operational Technology Vulnerability Response application that are applicable to your environment.	Integrates certified third-party applications that enhance functionality of OT vulnerability management.

Vulnerability Response apps are consolidated under Unified Security Exposure Management (USEM) from version 30.0.x. Due to this upgrade, starting from Operational Technology Vulnerability Response version 30.0.x, users are redirected to the Security Exposure Management Workspace (SEM Workspace) to perform some configuration tasks.

If you haven't installed Operational Technology Vulnerability Response version 30.0.x, you can use the USEM Migration Assistance Tool to migrate to the USEM platform, ensuring a smooth and secure transition. For more information, see Migrating from Vulnerability Response to Unified Security Exposure Management (USEM).

The SEM Workspace is part of ServiceNow's next-generation platform, USEM. USEM consolidates multiple security exposure applications—Vulnerability Response (VR), Application Vulnerability Response (AVR), Container Vulnerability Response (CVR), and Configuration Compliance (CC)—into a unified architecture. It provides a single source of truth for security exposure, enabling real-time visibility, streamlined workflows, and automated remediation through the SEM Workspace. For more information about installing USEM, see Install Unified Security Exposure Management.

Install Operational Technology Vulnerability Response

Install the Operational Technology Vulnerability Response application if you have the admin role. This application includes demo data and installs the related store applications and plugins if they are not already installed.

Before you begin

- Ensure that the application and all of its associated ServiceNow Store applications have valid ServiceNow entitlements. For more information, see Get entitlement for a ServiceNow product or application.
- If the application requires plugins or other store applications, install them first if they are not already installed.
- Operational Technology Vulnerability Response requires the following plugins. Ensure that these plugins are activated before you install Operational Technology Vulnerability Response.

Required ServiceNow plugins

Vulnerability Response (sn_vul)

The ServiceNow® Vulnerability Response application imports and automatically groups vulnerable items according to group rules allowing you to remediate vulnerabilities. See Install Vulnerability Response

Industrial Process Manager (sn_otsm)

Creates the ISA-95 Equipment Model data foundation that is required for the ServiceNow® Industrial solution. See Install the Industrial Process Manager.

Operational Technology Manager

The Operational Technology Manager application creates the foundational data and relationships that enable your enterprise to use the ServiceNow® Industrial solution. Operational Technology Manager supports the use of the Configuration Management Database (CMDB), Service Graph Connectors, and Discovery applications in the ServiceNow AI Platform. See Configuring the Operational Technology Manager (OTM).

Role required: admin

About this task

The following items are installed with the installation of the Operational Technology Vulnerability Response application:

- Plugins
- Store applications
- Roles
- Business rules

For more information on viewing the components that are installed with an application, see the following:

- Components installed with Operational Technology Vulnerability Response
- Find components installed with an application.

Procedure

1. Navigate to **All** > **System Applications** > **All Available Applications** > **All**.
2. Find the Operational Technology Vulnerability Response application using the filter criteria and search bar.

   You can search for the application by its name or ID. If you cannot find an application, you may have to request it from the ServiceNow Store.

   Visit the ServiceNow Store website to view all the available apps and for information about submitting requests to the store. For cumulative release notes information for all released apps, see the ServiceNow Store version history release notes.
3. Select a version from the list and select **Install**.

   In the Review Installation Details dialog box, any dependencies installed with your application are listed.
4. If you're prompted, follow the links to the ServiceNow Store to get any additional entitlements for dependencies.
5. **Optional:** If demo data is available and you want to install it, select the **Load demo data** check box.

Demo data are sample records that describe application features for common use cases. Load the demo data when you first install the application on a development or test instance.

6. Select **Install**.

Assign Operational Technology Vulnerability Response roles

Assign roles to your users so that you can control their access to the features, capabilities, and data in the Operational Technology Vulnerability Response application.

Before you begin
Role required: admin

About this task
Users with the roles that are listed in the following tables can use the Operational Technology Vulnerability Response application.

Assign roles to admin users#br user groups as needed.

Assign roles to admin users#br groups

Role	Description
OT VR Integration Viewer [sn_otvr.integration_viewer]	Can view OT VR integration records.
OT VR Integration Admin [sn_otvr.integration_admin]	Can view and edit OT VR integration records.
OT Vulnerability Remediation Owner [sn_otvr.remediation_owner]	Can create remediation tasks. Can also schedule existing remediation tasks for vulnerable items.

Procedure

Assign roles to users and groups by using the ServiceNow AI Platform user administration feature.

What to do next
Create a site assignment group.

Create a site assignment group

Create one Operational Technology Vulnerability Response assignment group per site that you have in the Equipment Model Manager. This allows OT Remediation Owner users to only see vulnerable items for their site.

Before you begin
Create an Operational Technology Vulnerability Response assignment group, preferably with the same name as the site it will be related to. For example, if your site is in Milan, name the group the 'Milan OT VR Assignment Group'.

Role required: cmdb_ot_isa_admin

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Industrial Process Manager** > **Sites**.
2. Select a site record.

The site record is a parent Equipment Model Entity that has no parent itself.

3. In the **OT VR assignment group** field, select the search icon to show existing user groups.
4. Select the applicable assignment group.
   - If the desired group exists, select it from the list.
   - If the desired group does not exist, select **New** to create the group, then select **Submit**.
5. After returning to the site record, select **Update**.
   The new OT VR assignment group is created.

What to do next

Assign users to sites

Assign users to sites

If you have not already done so during configuration of the Industrial Process Manager, assign users who already have either the cmdb_ot_isa_viewer or cmdb_ot_isa_editor role to sites.

Before you begin

When OT devices are in the CMDB, site access can be configured to limit visibility of OT devices to users with both a cmdb_ot_viewer, editor, or admin role, and a cmdb_ot_isa_viewer or editor role.

Role required: cmdb_ot_isa_admin

Procedure

1. From the Equipment Model Entities form, select a parent Equipment Model entity.
   For information about equipment models, see Managing equipment models.
2. From the Site Users tab, select **New**.
3. On the ISA Entity Sites Users form, fill in the fields.
4. Select **Submit**.
   The user is assigned to the site.

What to do next

Assign users to assignment groups

Assign users to assignment groups

Add users to assignment groups so they can see the vulnerability items for their assigned site.

Before you begin

To allow users to see the vulnerability items for the sites you've assigned them to, add users to the OT VR assignment group for the site.

When OT vulnerable items are created, visibility is limited to:

- Users with the VR Remediation Owner (sn_vul.remediation_owner) role
- Membership in the Operational Technology Vulnerability Response assignment group associated with the site that the OT device belongs to

Role required: admin

Procedure

1. Open the group that corresponds to the Operational Technology Vulnerability Response assignment group for the site.
2. From the Group Members tab, select **Edit**.
3. Add the users from the Collection list into the Group Members List.
4. Select **Save**.
   Users are assigned to the group and can see the vulnerability items for the assigned site. For more information about admin tasks, such as adding users to groups, see User administration.

What to do next

Assign vulnerable items to groups.

Assign vulnerable items to groups

Configure OT Vulnerability assignment rules.

Before you begin

OT Vulnerable Items can be assigned to site level groups or groups based on classification, depending on your remediation strategy.

Role required: sn_sec_wf.manage_admin_rules

About this task

When Vulnerable Items are imported, they are assigned to the appropriate group based on Vulnerability Assignment Rules. Operational Technology Vulnerability Response ships with one OT vulnerability assignment rule, **Operational Technology (OT) assignment rule**, which assigns OT vulnerable item records (VIT) to the corresponding OT VR assignment group based on its site. If it does not belong to any site, or if there's no group specified on the site, the rule assigns to the OT VR Default Assignment Group.

For more information about creating Vulnerability Response assignment rules, see Create or edit Vulnerability Response assignment rules.

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Guided Setup** > **Operational Technology Vulnerability Response** > **Assignment Rules** > **Configure**.
2. Also, if you are using version 30.0.x, navigate to **Workspaces** > **Security Exposure Management** > **Administration** > **Assignment**.
3. From the Vulnerability Assignment Rules list, select **Operational Technology (OT) assignment rule**.
4. Configure it based on your remediation strategy:
   - If your remediation strategy is to assign all OT Vulnerable Items to the site, set the execution order of the OT VR Assignment rule to be less than all other rules.
   - If your strategy is to assign by class and then assign to sites for all other classes, set the execution order of the OT VR Assignment Rule to be greater than all class-based rules.
5. Once the execution order is updated, set the OT VR Assignment Rule Active state to **true**.

What to do next

Configure OT remediation target rules.

Configure OT remediation task rules

For remediation tasks that are created in the Industrial Workspace, update existing remediation task rules to prevent imported vulnerable items from automatically adding OT devices.

Before you begin

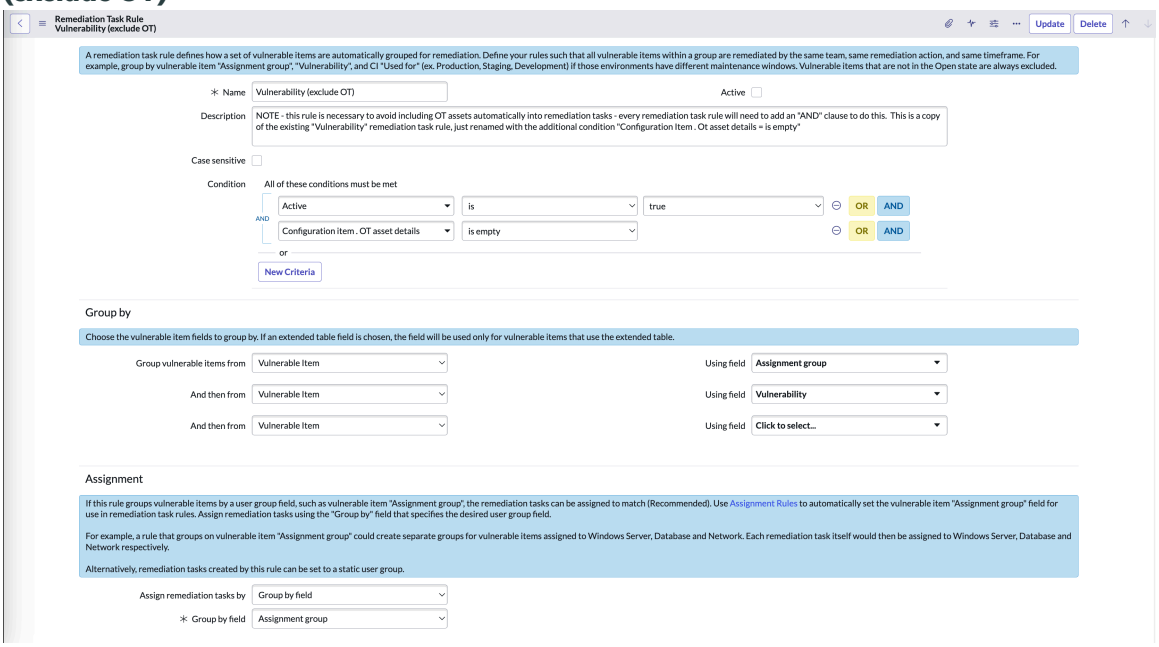
Role required: sn_sec_wf.manage_admin_rules

When vulnerable items are imported, they can be added to remediation tasks based on configured remediation task rules. If you use Vulnerability Response for both IT and OT networks, you must modify a configuration if you group Vulnerability Items for remediation differently between IT and OT networks. Operational Technology Vulnerability Response provides a sample Remediation Task Rule record that is loaded with demo data to demonstrate how to exclude OT network vulnerabilities from being grouped automatically.

Configure any new or existing Remediation Task Rules based on your remediation strategy:

- If your remediation strategy is to automatically create remediation tasks only for vulnerabilities within your IT environment, add the following condition to each existing remediation task rule to exclude OT vulnerabilities:
  - Configuration Item . OT device details = **is empty**
- If your remediation strategy is to automatically create remediation tasks for all OT vulnerable items, create an appropriate rule.

Sample shipped with OT VR demo data: Remediation Task Rule - Vulnerability (exclude OT)



Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Guided Setup** > **Operational Technology Vulnerability Response** > **Remediation Task Rules** > **Configure**.
2. Also, if you are using version 30.0.x, navigate to **Workspaces** > **Security Exposure Management** > **Administration** > **Remediation Task**.
3. Select the name of the rule you want to update.

- Define the rules such that all vulnerable items within a group are remediated by the same team, the same remediation action, and the same timeframe. For example, group by vulnerable item "Assignment group", "Vulnerability", and CI "Used for" (ex. Production, Staging, Development) if those environments have different maintenance windows.
- For more information about remediation task rules, see Vulnerability Response Workspaces.
- For more information about remediation tasks, see Explore the IT Remediation Workspace.

Configure OT remediation target rules

Configure remediation target rules for OT vulnerable items.

To calculate the remediation target date for OT vulnerable items, load the demo data records for the Operational Technology Vulnerability Response application and configure the remediation target rules.

Role required: sn_sec_wf.manage_admin_rules

To configure OT Remediation Targets or load the demo data records:

- Navigate to **All** > **Industrial Workspace Admin** > **Guided Setup** > **Operational Technology Vulnerability Response** > **Remediation Targets** > **Configure**
- Or, if you are using version 30.0.x, navigate to **Workspaces** > **Security Exposure Management** > **Administration** > **Remediation target** > **Configure**.

OT Remediation Targets may be different due to the infrequent opportunities to perform maintenance in an industrial environment. Remediation target rules are applied in order from smallest target to largest target.

A different remediation target date may be needed for OT device vulnerabilities that do not have maintenance windows available in the same time frame as other vulnerabilities. To demonstrate how to configure remediation target dates in this situation, two demo data records are provided to demonstrate how this can be managed for Critical risk ratings:

- Critical Risk Rating rule (OT only) - This rule uses the condition of **Configuration item.OT device details is not empty AND Risk rating = 1- Critical**. Update the Target (days) and activate the record.
- Critical Risk Rating rule (exclude OT) - In order to apply a shorter target to Critical Risk non-OT items only, you need to filter out OT devices first. This rule uses the condition **Configuration item.OT device details is empty AND Risk rating = 1- Critical**. Update the Target (days), inactivate any existing critical target rule, and activate this rule in its place.

Note:
Both of these rules must be activated so that any OT critical risk vulnerabilities are excluded from the non-OT remediation target rule.

For more information about creating Vulnerability Response assignment rules, see:

- Vulnerability Response remediation target rules
- Create or edit Vulnerability Response remediation target rules

Configure risk calculators

Configure risk calculators

Determine which OT risk factors to use when calculating the risk of a vulnerable item on an OT device.

Before you begin

In Operational Technology, additional factors can include the OT device criticality, the Purdue Level, and the criticality of the production process that the OT device automates.

Role required: sn_sec_wf.manage_admin_rules

About this task

For this step, refer to the Default Risk Calculator with OT vulnerability calculator shipped with the Operational Technology Vulnerability Response application. The Default Risk Calculator with OT is used when risk must be calculated differently for OT and non-OT vulnerable items.

Note:

- You can directly access and use the Operational Technology Vulnerability Response Risk Calculator without loading the demo data while installing the plugin. In previous releases, Risk Calculation was included as part of the demo data.
- Because only one vulnerability calculator can be active at a time, the provided Default Risk Rule (non OT) is used as an example for calculating risk for all non-OT vulnerable items.

For more information, see Define fields and weights for the risk rule.

To set the risk score for OT vulnerable items, adjust the weights for the risk rule records of the OT Default Risk Rule in the demo data. More fields available for OT in the demo data include:

- Equipment Model Entity Criticality - Use the Service Business criticality rule.
- OT Device Criticality - Use the Configuration item OT device details Device Criticality rule.
- Purdue Level - Use the Configuration item OT device details Purdue level field.

Procedure

1. Navigate to **All** > **Industrial Workspace** > **Guided Setup** > **Operational Technology Vulnerability Response** > **Vulnerability Risk Calculators** > **Configure**.
2. Also, if you are using version 30.0.x, navigate to **Workspaces** > **Security Exposure Management** > **Administration** > **Risk Calculator**.
3. From the Risk Calculators list, select **Default Risk Calculator with OT**.
4. From the Risk Rules list, open the risk rule that you want to edit.
   For example, select **OT Default Risk Rule**.
5. In the Scoring Criteria section, select one or more risk rule field and update the weight or the weightage % for each criterion according to its importance in the overall risk score calculation.
6. Select **Update**.

What to do next

To set the risk score for all other vulnerable items, copy the existing risk rules to the Default Risk Calculator with OT, and set the order to run after the OT Default Risk Rule.

Configure OT vulnerability risk rollup calculator

Use the OT vulnerability risk rollup calculator to calculate the risk score of the OT devices at each level of the equipment model. The overall risk score is rolled up to the parent equipment model entity.

Before you begin

- Calculate the risk score for all the equipment model entities by executing the scheduled job.

  Note:
  The risk score calculation for all the equipment model entities is only for the subsequent run of the daily schedule job.

- Check that the Service Populator column in the Equipment Model Entities list is set to **OTDynamicManualServicePopulator** by navigating to **All** > **Equipment Model - ISA** > **Equipment Model Entities**. If it's set to other values, you must execute the *`Update ISA entity service populator`* on-demand job:
  - Navigate to **All** > **System Definition** > **Scheduled Jobs**.
  - Select the *`Update ISA entity service populator`* job.
  - Select **Execute Now**.

  Note:
  If you don't see the Service Populator column in the Equipment Model Entities list, you can add it by personalizing the list. For more information, see Personalize a list.

- Role required: sn_vul.vulnerability_admin

About this task

For this step, refer to the Vulnerability Rollup Calculators with OT vulnerability calculator shipped with the Operational Technology Vulnerability Response application demo data.

For more information, see Vulnerability Response Rollup Calculators.

To calculate the risk score for the equipment model entity, set up the weights for these fields:

- Maximum risk score of the Vulnerable Items (VITs) associated to the equipment model entity.
- Average risk score of the VITs associated to the equipment model entity.
- Number of vulnerable items per equipment model entity.

Procedure

1. Navigate to **All** > **Vulnerability Response** > **Administration** > **Vulnerability Rollup Calculator**.
2. From the Vulnerability Rollup Calculators list, select **Equipment Model Entity Rollup**.
3. If required, in the Rollup Weights section, update the weight for each criterion.
4. Select **Update**.

What to do next

Now, you can calculate the risk associated at a level for your equipment model entities.

1. Calculate the risk rollup for all equipment model entities:
   a. Navigate to **All** > **Industrial Workspace Admin** > **Guided Setup**.
   b. Select **Operational Technology Vulnerability Response**.

c. In the Risk roll up calculation section, select the Risk roll-up configuration task.

d. Select **Configure**.

e. Follow the steps described in the Guided Setup.

2. Configure the *Risk Rollup for VITs by Equipment Model Entity* scheduled job:

a. Navigate to **All** > **Industrial Workspace Admin** > **Guided Setup**.

b. Select **Operational Technology Vulnerability Response**.

c. In the Risk roll up calculation section, select the Daily Schedule job for risk roll up task.

d. Select **Configure**.

e. Follow the steps described in the Guided Setup.

> **Note:**
> By default, the job is set to run daily. You can change this to fit your business needs by editing the **Run**, **Time zone**, and **Time** fields.

3. Configure the entities for risk score roll-up:

a. Navigate to **All** > **Industrial Workspace Admin** > **Guided Setup**.

b. Select **Operational Technology Vulnerability Response**.

c. In the Risk roll up calculation section, select the Set All Entities for Risk score Roll-Up Job task.

d. Select **Configure**.

e. Follow the steps described in the Guided Setup.

4. To avoid getting the wrong risk score and rating for remediation tasks, change the **Table** field in the **OT Devices with No sites Assigned Rollup** record:

a. Navigate to **All** > **System Definition** > **Scripts - Background**.

b. In the **Run script** field, add the following script.

```
var gr = new GlideRecord('sn_vul_rollup');

gr.get('sys_id','24973dc4939e42900b1566f4548918eb');

gr.table = 'sn_ot_metric';

gr.update();
```

c. Select **Run script**.

d. To check the value of the **Table** field in the **OT Devices with No sites Assigned Rollup** record and run the scheduled job, navigate to **All** > **Vulnerability Response** > **Administration** > **Vulnerability Rollup Calculator**.

e. Select the **OT Devices with No sites Assigned Rollup** record.

f. Ensure that the **Table** field is set to **OT Metric [sn_ot_metric]**.

g. Run the scheduled job.

After running the job, the correct VIT risk scores and ratings are rolled up to the remediation tasks.

Install certified Vulnerability Response integrations

Integrate certified third-party applications that enhance functionality of OT vulnerability management.

Search the ServiceNow® Store for Operational Technology Certified integrations for the Operational Technology Vulnerability Response application, and install those applicable to your environment.

Operational Technology Vulnerability Response Integrations

The Operational Technology Vulnerability Response application includes support for third-party integrations.

The following third-party integrations are currently supported.

- Vulnerability Response for Microsoft Defender for IoT (On-premises Management Console)
- Vulnerability Response Integration with Claroty CTD.

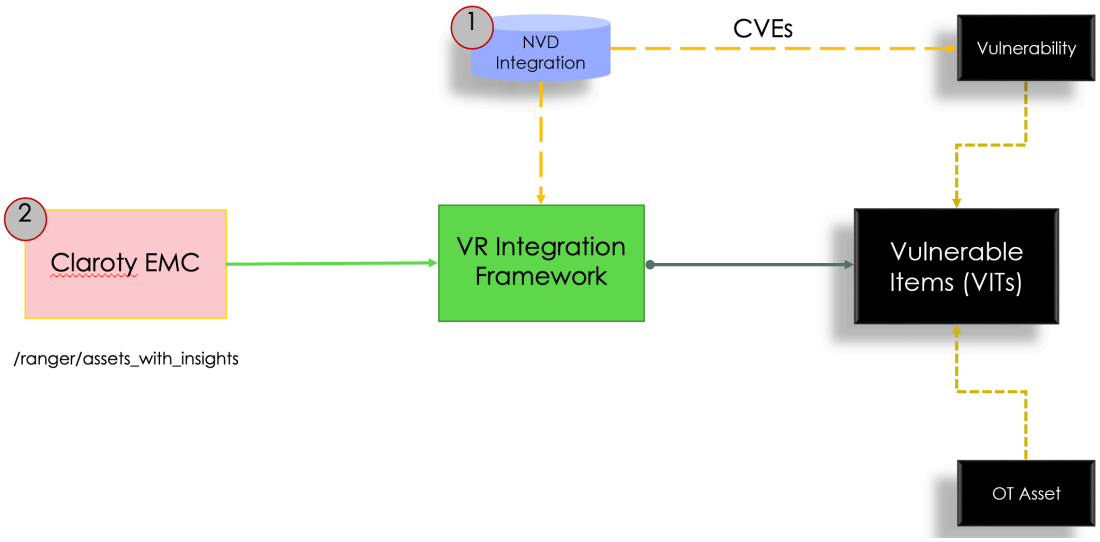
Vulnerability Response Integration with Claroty CTD

The Vulnerability Response Integration with Claroty Continuous Threat Detection (CTD) uses vulnerability data imported from Claroty CTD to enable risk-based action within the production process.

Use this Vulnerability Response Integration with the ServiceNow® Operational Technology Vulnerability Response application to track, prioritize, and resolve vulnerabilities used in the production process.

The following image shows the process for the Vulnerability Response Integration with Claroty CTD.

Process for the Vulnerability Response Integration with Claroty CTD



Before you run the Vulnerability Response Integration with Claroty CTD, you must run the National Vulnerability Database (NVD) integration. The NVD integration fetches published Common Vulnerabilities and Exposures (CVEs) from the NVD and populates them in ServiceNow. Then when you run the Vulnerability Response Integration with Claroty CTD application, the application identifies the vulnerabilities for each device and creates vulnerable items (VITs).

Each VIT has a relationship with an Operational Technology (OT) device, or Configuration Item (CI), and the vulnerability that's detected. The vulnerability integration framework establishes a

connection with the Claroty Enterprise Management Console (EMC) and pulls the vulnerabilities for all OT devices.

Note:
The Claroty CTD EMC platform insights API has a limitation of 10 CVEs. Therefore, only 10 CVEs are provided to ServiceNow by Claroty. However, the xDome platform doesn't have this limitation.

Key features

- Import common vulnerabilities and exposures (CVEs) associated with Operational Technology (OT) devices from Claroty CTD. Create vulnerable items (VITs) to provide a single view of OT device vulnerability data and how it affects the production process.
- Run imports of newly detected vulnerabilities automatically on your own schedule.
- Use assignment rules to route VITs automatically for remediation to local site-based teams that can take risk-based actions.

Install Vulnerability Response Integration with Claroty CTD

Install the Vulnerability Response Integration with Claroty CTD (sn_clarotyctdvr). The application includes installs related ServiceNow® Store applications and plugins if they aren't already installed.

Before you begin

- Ensure that the application and all of its associated ServiceNow Store applications have valid ServiceNow entitlements. For more information, see Get entitlement for a ServiceNow product or application.
- Review the Vulnerability Response Integration with Claroty CTD application listing in the ServiceNow Store for information on dependencies, licensing or subscription requirements, and release compatibility.
- Vulnerability Response Integration with Claroty CTD requires the following ServiceNow Store applications. Ensure that these applications are installed before you install the Vulnerability Response Integration with Claroty CTD.

  CMDB CI Class Models store app

  This integration uses the Operational Technology extension classes that are part of the CMDB CI Class Models application. For more information, see CMDB CI Class Models.

  Service Graph Connector Integration for Claroty CTD

  This integration uses the Operational Technology Manager application to automate the import of sites, detected devices by each site, connections (or base systems), and installed programs to the Configuration Management Database (CMDB). To install the Service Graph Connector Integration for Claroty CTD, see Install Vulnerability Response Integration with Claroty CTD.

Role required: admin

About this task

The following items are installed with Vulnerability Response Integration with Claroty CTD:

- Vulnerability response plugin
- Vulnerability Response Integration with NVD

Procedure

1. Navigate to **All** > **System Applications** > **All Available Applications** > **All**.
2. Find the Vulnerability Response Integration with Claroty CTD application (sn_clarotyctdvr) using the filter criteria and search bar.

   You can search for the application by its name or ID. If you can't find the application, you might have to request it from the ServiceNow Store.

   In the list next to the **Install** button, the versions that are available to you are displayed.
3. Select a version from the list and select **Install**.

   In the Review Installation Details dialog box, any dependencies installed with your application are listed.
4. If you're prompted, follow the links to the ServiceNow Store to get any additional entitlements for dependencies.
5. Select **Install**.

Assign Vulnerability Response Integration with Claroty CTD roles

Assign roles to your users so that you can control their access to the features, capabilities, and data in the Vulnerability Response Integration with the Claroty CTD application.

Before you begin
Role required: admin

About this task
When you're assigned the roles listed in the following table, you can use the Vulnerability Response Integration with Claroty CTD application.

Assign roles to admin users or user groups as needed.

For more information about the roles available for the Vulnerability Response Integration with Claroty CTD application, see Vulnerability Response Integration with Claroty CTD roles.

Procedure

Assign roles to users or groups by using the ServiceNow AI Platform user administration feature.

Vulnerability Response Integration with Claroty CTD roles

Roles control access to features and capabilities in the Vulnerability Response Integration with Claroty CTD.

The following table describes the roles and permissions for the Vulnerability Response Integration with Claroty CTD.

Vulnerability Response Integration with Claroty CTD roles

Role	Description
OT VR Integration Viewer [sn_otvr.integration_viewer]	Can view OT VR integration records.
OT VR Integration Admin [sn_otvr.integration_admin]	Can configure and execute the OT VR integration.

Vulnerability Response Integration with Claroty CTD roles (continued)

Role	Description
MID server [mid_server]	Can configure a MID Server.

Required permissions in Claroty CTD

Review that the following user permissions have the **View** access enabled in Claroty CTD to collect data from Claroty CTD to ServiceNow:

- Visibility
- Investigation
- Threat Detection
- Risk and Vulnerabilities

Run the National Vulnerability Database integration

Run the National Vulnerability Database (NVD) integration to import data from the National Institute of Standards and Technology (NIST) NVD product. Running the NVD integration helps you determine the severity and details of Common Vulnerabilities and Exposures (CVEs) found in your environment.

Before you begin

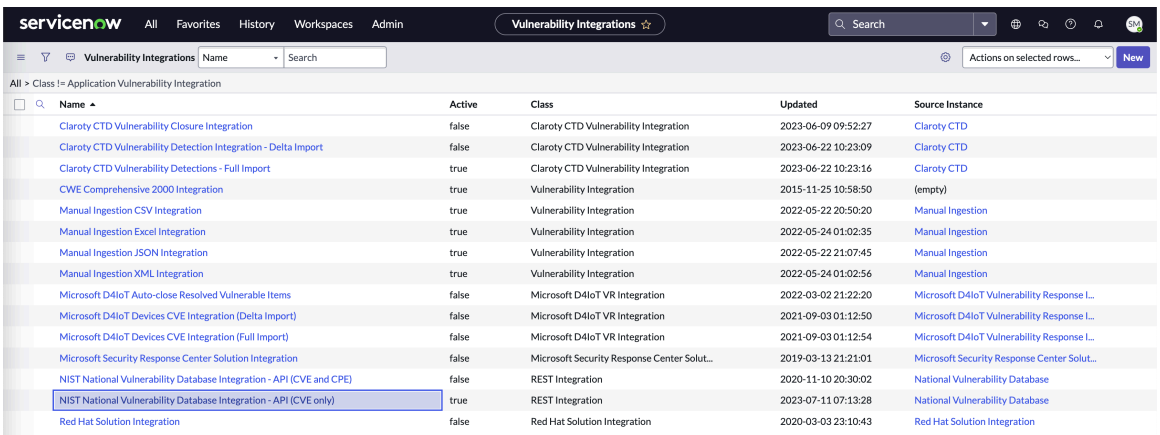
Before you run the NIST NVD integration on your instance, the installation and configuration steps must be completed. Completing the installation and configuration ensures that the NVD product properly integrates with the Operational Technology Vulnerability Response application.

To install the NVD plugin, see Install the Vulnerability Response Integration with the NIST National Vulnerability Database.

Role required: admin

Procedure

1. Navigate to **All** > **Vulnerability Response** > **Administration** > **Integrations**.
2. Select the NIST NVD integration - API (CVE only) record.



3. In the **Import Since** field, set the value to **NULL**.
4. Select **Execute Now**.

Configure the Vulnerability Response Integration with Claroty CTD

Configure the Vulnerability Response Integration with Claroty CTD to begin importing data.

Use the Claroty CTD Vulnerability Integration Guided Setup to complete the configuration.

To access the Claroty CTD Vulnerability Integration Guided Setup, navigate to **Claroty CTD Vulnerability Integration** > **Admin** > **Setup**.

Connect to the Claroty CTD

Connect to the Claroty CTD to begin the Vulnerability Integration setup.

Before you begin

Before performing the setup, change the application scope to **Vulnerability Response Integration with Claroty CTD** by selecting the globe icon () in the navigation bar.

Role required: admin

Procedure

1. Navigate to **All** > **Claroty CTD Vulnerability Integration** > **Admin** > **Setup**.
2. In the Connect to Claroty CTD section, select the **Setup Connections** task.
3. On the Setup Connections task page, select **Configure**.
   The Claroty CTD Connection Manager page opens.
4. On the form, fill in the following fields.

Connect to Claroty CTD form

Field	Description
Claroty EMC URL	URL of the Claroty CTD Enterprise Management Console (EMC).
Minimum CVSS Score	This field is visible if you select 5.0.x or 5.1.x as the CTD version. If applicable, you can filter which vulnerabilities are imported based on their Common Vulnerability Scoring System (CVSS) score. The filter is actually values that ranges from 0.0 to 10.0 and acts as a greater than or equal filter. For example, if you enter the score value as **9** the integration imports vulnerabilities with a CVSS score of 9.0-10.0.
EPSS Score (Optional)	This field is visible if you select 5.1.x or later as the CTD version. If applicable, you can filter which vulnerabilities are imported based on their Exploit Prediction Scoring System (EPSS) score. The EPSS Score uses the following values that acts as a filter: Critical, High, Medium, and Low.

Field	Description
	You can select only one option. For example, if you select **Critical** as the EPSS Score value, Claroty CTD only imports the vulnerabilities with a **Critical** EPSS score.
User Name	Claroty account user name.
Password	Claroty account password.
MID Server	If your Claroty EMC is on-premises, a MID Server may be required. If so, select a MID Server here.

5. Select **Update**.
6. Select **Test Connection**.
   If the connection test is successful, a `Results 200` output message appears. An unsuccessful connection attempt displays the error code and the message received from Claroty.

Activate the Delta Import integration

Activate the Delta Import integration to import vulnerabilities from Claroty CTD.

Before you begin

Before scheduling the import of Claroty CTD records, run the NVD integration to fix any issues. For more information, see Run the National Vulnerability Database integration.

Role required: admin

About this task

The Delta Import integration imports vulnerabilities from Claroty CTD from the last successful integration run. By default, the first run imports the past 90 days of data. Clearing the **Start time** field results in a full import.

Procedure

1. Navigate to **All** > **Claroty CTD Vulnerability Integration** > **Admin** > **Setup**.
2. In the Configure Integration Scheduled Jobs section, select the **Activate Delta Import Integration** task.
3. Select **Configure**.
4. Ensure the Delta Import integration record is set to **Active**.
5. Ensure that the **Run** field is set to **On Demand**.
6. **Optional:** To execute a full import, clear the **Start time** field.
7. Select **Update**.

Run the Vulnerability Integration after the Service Graph Connector

Run the Claroty CTD Vulnerability Integration after running the Service Graph Connector for Claroty CTD. Running the Vulnerability Integration immediately after running the Service Graph Connector ensures that the most up to date CMDB information is populated from Claroty CTD.

Before you begin

The Service Graph Connector Integration for Claroty CTD must be configured and active in order to run the Vulnerability Response Integration to run after the Service Graph Connector.

Before scheduling the import of Claroty CTD records, run the NVD integration to fix any issues. For more information, see Run the National Vulnerability Database integration.

Role required: admin

Procedure

1. Navigate to **All** > **Claroty CTD Vulnerability Integration** > **Admin** > **Setup**.
2. In the Configure Integration Scheduled Jobs task, select the **Run After Service Graph Connector** tab.
3. Select **Configure**.
4. For the Run After SGC - Claroty CTD Vulnerability Detection Integration - Delta Import record, activate it by selecting the **Active** option.
5. Ensure the **Run** field is set to **After Parent Runs**.
6. Ensure the **Parent** field is set to **SG-OT Claroty CTD Assets Scheduled Import**.
7. Select **Update**.

Activate the Auto-Closure Integration

Activate the auto-closure integration to close the corresponding ServiceNow Vulnerability Detections.

Before you begin

Before scheduling the import of Claroty CTD records, run the NVD integration to fix any issues. For more information, see Run the National Vulnerability Database integration.

Role required: admin

About this task

There are two closure integration jobs available for the Vulnerability Response Integration with Claroty CTD:

- Claroty CTD Resolved Vulnerability Closure Integration
- Claroty CTD Full Vulnerability Closure Integration

The Claroty CTD Resolved Vulnerability Closure Integration checks for the vulnerable items (VITs) that have been marked as **Resolved** in the ServiceNow Configuration Management Database (CMDB). It then queries Claroty CTD for these VITs and closes them based on the response obtained from Claroty CTD.

The Claroty CTD Full Vulnerability Closure Integration checks for all VITs regardless of their state (Resolved or not) in the ServiceNow CMDB. It then queries Claroty CTD for all the VITs, and closes those that don't have a corresponding CVE entry in Claroty CTD.

Procedure

1. Navigate to **All** > **Claroty CTD Vulnerability Integration** > **Admin** > **Setup**.
2. In the Configure Integration Scheduled Jobs task, select the **Activate Auto-Closure Integration** tab.
3. Select **Configure**.

Note:
The auto-closure integration is pre-configured to run after the Delta Import, so no scheduling is required.

4. Ensure that the **Run** field is set to **On Demand**.
5. Ensure that the record is set to **Active**.
6. Select **Update**.

Configure the Full Import Integration from Claroty CTD

Configure the Full Import Integration to import the entire vulnerability inventory of a device from Claroty CTD.

Before you begin

Before scheduling the import of Claroty CTD records, run the NVD integration to fix any issues. For more information, see Run the National Vulnerability Database integration.

Role required: admin

About this task

The Claroty CTD Vulnerability Detections - Full Import integration imports the entire vulnerability inventory of a device from Claroty CTD without respect to a certain date. This integration is useful if the daily delta imports haven't imported all the necessary vulnerability data.

Note:
If you're using Claroty CTD v5.1, there's no limit on the number of Common Vulnerabilities and Exposures (CVEs) you can import per configuration item (CI). If you are using version 5.0.x or an earlier version of Claroty CTD, the number of CVEs you can import is limited to 10 per CI.

For more information on using Operational Technology Vulnerability Response Integration with Claroty CTD, see Connect to the Claroty CTD.

Procedure

1. Navigate to **All** > **Claroty CTD Vulnerability Integration** > **Admin** > **Setup**.
2. In the Configure Integration Scheduled Jobs task, select the **Configure Full Import Integration** tab.
3. Select **Configure**.
4. Ensure that the **Run** field is set to **On Demand**.
5. Ensure that the record is set to **Active**.
6. Select **Update**.

Set the system properties installed for the Vulnerability Response Integration with Claroty CTD

Set the system properties for the Vulnerability Response Integration with Claroty CTD so that you can enable the properties as needed.

Before you begin

Before performing the setup, change the application scope to **Vulnerability Response Integration with Claroty CTD** by selecting the Globe icon () in the navigation bar.

Role required: sn_otvr.integration_admin

Procedure

1. Navigate to **All** > **Claroty CTD Vulnerability Integration** > **Admin** > **Properties**
2. Configure the following system property records according to your requirement for your organization:

System properties

Name	Description	Type	Default value
sn_clarotyctdvr.api_token_length_of_time	Length of time the Claroty CTD API token is valid. Default is 480 minutes (8 hours).	integer	480
sn_clarotyctdvr.api_token_object	Authenticates access to the API.	string	{"customer_name":"","first_name":"Serv for API","id":1,"last_name":null,"mail":null,"p
sn_clarotyctdvr.auto_close_stale_detections	Auto-close stale Vulnerability Detections from Claroty CTD.	true, false	false
sn_clarotyctdvr.auto_close_stale_detections_after_days	Detection stale Vulnerability Detections from Claroty CTD will be auto-closed after a designated number of days since Last Found.	integer	90
sn_clarotyctdvr.default_api_page_size	Number of records to pull per page from the Claroty CTD API.	integer	500
sn_clarotyctdvr.detection_integration_start_time_buffer	When importing data from the Claroty CTD API, a buffer of a designated number of hours is added before the "start time." This ensures that no records are missed in the Delta import.	integer	4
sn_clarotyctdvr.integration_default_days_back	By default, the first run of the integration imports data from a past number of days.	integer	90
sn_clarotyctdvr.logging.application	Application logging level	choice	info
sn_clarotyctdvr.require_match	Require an incoming CI to match the CMDB to create Vulnerability Detections.	true, false	true

3. Select **Update** and save your changes.

Properties installed for the Vulnerability Response Integration with Claroty CTD

You can enable system properties for the Vulnerability Response Integration with Claroty CTD application.

To access the Vulnerability Response Integration with Claroty CTD system properties, navigate to **All** > **Claroty CTD Vulnerability Integration** > **Admin** > **Properties**.

System properties

Name	Description	Type	Default value
sn_clarotyctdvr.api_token_length_in_minutes	Length of time the Claroty CTD API token is valid. Default is 480 minutes (8 hours).	integer	480
sn_clarotyctdvr.api_token_object	Authenticates access to the API.	string	{"customer_name":"","first_name":"Servi for API","id":1,"last_name":null,"mail":null,"pa
sn_clarotyctdvr.auto_close_stale_detections	Auto-close stale Vulnerability Detections from Claroty CTD.	true, false	false
sn_clarotyctdvr.auto_close_detections_after_days	Detected detections in Claroty CTD will be auto-closed after a designated number of days since Last Found.	integer	90
sn_clarotyctdvr.default_api_page_size	Number of records to pull per page from the Claroty CTD API.	integer	500
sn_clarotyctdvr.detection_integration_start_time_buffer	When importing data from the Claroty CTD API, a buffer of a designated number of hours is added before the "start time." This ensures that no records are missed in the Delta import.	integer	4
sn_clarotyctdvr.integration_default_days	By default, the first run of the integration imports data from a past number of days.	integer	90
sn_clarotyctdvr.logging_verbosity	Application logging level	choice	info
sn_clarotyctdvr.require_vi_match	Require incoming CI to match the CMDB to create Vulnerability Detections.	true, false	true

Data mapping for the Vulnerability Response Integration with Claroty CTD

This section specifies how fields from the Claroty CTD API are mapped to fields in the ServiceNow tables.

Vulnerability detection data mapping

Claroty CTD field	ServiceNow field	Notes
	Source	Always set to **Claroty CTD**.
Identified_on	First Found	
Last_updated	Last Found	
Status	Status	A status of **0** means **Open**. A status of **2** means **Closed/ Fixed**.
Resource_id	Configuration item	The configuration item (CI) is set through a CI lookup rule that searches the sys_object_source table for the Resource ID. For example, 33.1.

Vulnerability entry data mapping

Vulnerability entries are only created if an existing Common Vulnerabilities and Exposures (CVE) record is not found in the National Vulnerability Database Entry [sn_vul_nvd_entry] table. If the Claroty CTD Integration must create a CVE, it maps the following source fields listed in the table.

Claroty CTD field	ServiceNow field	Notes
Cve_id	ID	Example: CVW-2017-17562
Title	Summary	The integration adds [Claroty] to the Summary so that the NVD CVEs, backfilled by Claroty, are visible. For example, the [Claroty] Authentication Bypass Vulnerability in SIPROTEC.
Cvss	V3_base_score	
Published	Date_published	
Modified	Last_modified	

Errors for the Vulnerability Response Integration with Claroty CTD

You may encounter errors that need troubleshooting while you're working with the Vulnerability Response Integration with Claroty CTD.

Vulnerability Detection Integration (Data Retrieval)

Error message	Possible cause
Can't run a Claroty CTD Integration without a user name and password combo.	No user name or password is present on the integration configuration.
Can't run integration without a REST message and REST method specified.	On the Claroty CTD Integration job record, the REST message or REST method fields aren't populated.
Can't run integration without Claroty CTD server URL specified.	No URL is present on the integration configuration.
Can't run integration without the detection API resource path specified.	On the integration configuration, the detection_api_resource_path parameter isn't populated. The default is `/ranger/assets_with_insights`.
Invalid response code {response code} received from Claroty CTD.	The response from the Claroty API was invalid. For example, the message `Invalid response code 401` is received from Claroty CTD. This invalid response code means **Unauthorized** and that the credentials (user name/password) are likely invalid.
Unable to read the count_total property from JSON data.	The count_total used for pagination wasn't present in the API response. It likely means that an invalid payload was received from Claroty CTD. Ensure that the Claroty CTD instance is reachable through the MID Server and examine the Data Source attachment `response.json` file to ensure that count_total exists.

Vulnerability Detection Integration (Data Processing)

Error message	Possible cause
Error writing attachment.	The system couldn't attach the response data to the Data Source. Contact your administrator for further assistance. A common cause for this error is that the MID Server user is missing the sn_vul.vr_import_admin role.
Attachment content is null: attachment sys_id = {sys_id}.	The Data Source attachment content is null. This could indicate an issue with the Claroty API itself, or an issue in ServiceNow. Contact your administrator for further assistance.
Couldn't find attachment with sys_id {sys_id}.	Data Source attachment wasn't found. Follow the same procedures for the preceding error.

Vulnerability Auto-Closure Integration (Data Retrieval)

Error message	Possible cause
Can’t run a Claroty CTD Integration without a user name and password combo.	No user name or password is present on the integration configuration.
Can’t run integration without a REST message and REST method specified.	On the Claroty CTD Integration job record, the REST message or REST method fields aren’t populated.
Can’t run integration without Claroty CTD server URL specified.	No URL is present on the integration configuration.
Can’t run integration without the detection API resource path specified.	On the integration configuration, the detection_api_resource_path parameter isn’t populated. The default is `/ranger/assets_with_insights`.
Invalid response code {response code} received from Claroty CTD.	The response from the Claroty API was invalid. For example, the message `Invalid response code 401` is received from Claroty CTD. This invalid response code means **Unauthorized** and that the credentials (user name/password) are likely invalid.
Unable to read the count_total property from JSON data.	The count_total used for pagination wasn’t present in the API response. It likely means that an invalid payload was received from Claroty CTD. Ensure that the Claroty CTD instance is reachable through the MID Server and examine the Data Source attachment `response.json` file to ensure that count_total exists.
Error parsing 'objects' array from response body.	Likely means that an invalid payload was received from Claroty CTD. Ensure that the Claroty CTD instance is reachable and check Outbound HTTP Logs to see if there was a valid response.

Vulnerability Auto-Closure Integration (Data Processing)

Error message	Possible cause
Failed to parse the Data Dictionary JSON.	The payload from the Data Source attachment was invalid JSON. Likely another error occurs before this error occurs. Ensure that the Claroty CTD instance is reachable and check Outbound HTTP Logs to see if there was a valid response.

Vulnerability Response Integration with Microsoft Defender for IoT (Azure)

The Vulnerability Response Integration with Microsoft Defender for IoT (Azure) uses data imported from Microsoft Defender for IoT (Azure) to enable risk-based action with the production process context.

Use the Vulnerability Response integration with the ServiceNow® Operational Technology Vulnerability Response application to track, prioritize, and resolve vulnerabilities on devices used in the production process.

Key Features

- Import CVEs associated with OT devices from Microsoft Defender for IoT (Azure) and create vulnerable items (VITs) to provide a single view of OT devices vulnerability data with production process context.
- Run imports of vulnerabilities automatically on your own schedule.
- Using assignment rules, VITs can be automatically routed for remediation to local site-based teams to take risk-based action.

Install the Vulnerability Response for Microsoft Defender for IoT (Azure)

You can install the Vulnerability Response for Microsoft Defender for IoT (Azure) if you have the admin role. The application includes installs related ServiceNow® Store applications and plugins if they are not already installed.

Before you begin

- Ensure that the application and all of its associated ServiceNow Store applications have valid ServiceNow entitlements. For more information, see Get entitlement for a ServiceNow product or application.
- Review the Vulnerability Response for Microsoft Defender for IoT (Azure) application listing in the ServiceNow Store for information on dependencies, licensing or subscription requirements, and release compatibility.
- Vulnerability Response for Microsoft Defender for IoT (Azure) requires the following ServiceNow Store applications. Ensure that these applications are installed before you install the Vulnerability Response integration with Microsoft Defender for IoT.

  CMDB CI Class Models store app

  This integration uses the Operational Technology extension classes that are part of the CMDB CI Class Models application. For more information, see CMDB CI Class Models.

  Service Graph Connector Microsoft Defender for IoT (Azure)

  This integration uses the Operational Technology Manager application to automate the import of sensor appliances, OT devices, and network connections. To install the Service Graph, see Service Graph Connector for Microsoft Defender for IoT (Azure).

Role required: admin

About this task

The following items are installed with Vulnerability Response for Microsoft Defender for IoT (Azure):

- Vulnerability Response plugin
- Vulnerability Response Integration with NVD

Procedure

1. Navigate to **All** > **System Applications** > **All Available Applications** > **All**.
2. Find the Vulnerability Response Integration for Microsoft Defender for IoT (Azure) using the filter criteria and search bar.

   You can search for the application by its name or application scope ID. If you can't find the application, you may have to sync applications or request it from the ServiceNow Store and entitle your instance.

   In the list next to the **Install** button, the versions that are available to you are displayed.
3. Select a version from the list and select **Install**.

   In the Review Installation Details dialog box, any dependencies installed with your application are listed.
4. If you're prompted, follow the links to the ServiceNow Store to get any additional entitlements for dependencies.
5. Select **Install**.

Navigate to Guided Setup for the Vulnerability Response Integration with Microsoft Defender for IoT (Azure)

After installing the Vulnerability Response Integration with Microsoft Defender for IoT (Azure), navigate to the Guided Setup to walk you through the application's configuration.

Before you begin

Change the application scope to Vulnerability Response Integration with Microsoft Defender for IoT (Azure) by selecting the globe icon () in the navigation bar.

Role required: admin

Procedure

1. Navigate to **All** > **Azure D4IoT Vulnerability Integration** > **Admin** > **Guided Setup**.
2. Select **Get Started**.

Connect to the Microsoft Defender for IoT (Azure)

Connect to Microsoft Defender for IoT (Azure) to begin the Vulnerability Integration setup.

Before you begin

Review that you have **Security Reader** permission enabled on Microsoft Defender for IoT Azure, which provides the following user actions:

- Download sensor endpoint details
- View values on the Sites and sensors page
- View Azure device inventory
- View Azure workbooks
- View Defender for IoT settings
- Download OT threat intelligence packages

For more information, see Azure user roles and permissions for Defender for IoT.

Role required: admin

Procedure

1. Navigate to **All** > **Azure D4IoT Vulnerability Integration** > **Admin** > **Guided Setup**.
2. In the Connect to Microsoft Defender for IoT (Azure) section, select the **Setup Connections** task.
3. On the Setup Connections task page, select **Configure**.
   The Connect to Microsoft Azure Defender for IoT page opens.
4. On the form, fill in the following fields.

Connect to Microsoft Azure Defender for IoT form

Field	Description
OAuth Token URL	The OAuth 2.0 token URL for login.microsoftonline.com. For example, `https://login.microsoftonline.com/<your tenant id>/oauth2/v2.0/token`.
OAuth Client ID	Your client ID.
OAuth Client Secret	Your client secret.
Page Size Limit	The maximum number of records to pull for each page of data. The default is 500.
Minimum CVSS Score	Only vulnerabilities with a CVSS score greater than or equal to this value are imported. The default is 0.0 for all vulnerabilities.
Run After Service Graph Connector Import	This is a recommended field that runs the vulnerability import immediately after the Service Graph Connector for Microsoft Defender for IoT (Azure) devices import is completed. This ensures the best probability of matching incoming vulnerability data to the CMDB. Most commonly, the value is `SG-OT Microsoft Azure D4IoT Devices Scheduled Import`. When selecting this field, leave the **Azure D4IoT Vulnerability Detection Integration - Full Import** scheduled job set to run **On Demand**. This ensures that the Service Graph Connector device import can execute it as a child job once the devices import is complete.
Daily Import Time	If you're not using the **Run After Service Graph Connector Import** field, you can set the daily import time of the integration using this field.

Field	Description
	Note: If you have a scheduled import selected for the **Run After Service Graph Connector Import** field, this field is unavailable.

5. Select **Update**.
6. Select **Test Connection**.
   If the connection test is successful, a `Results 200` output message appears. An unsuccessful connection attempt displays the error code and the message received from Microsoft Defender for IoT (Azure).

Run the National Vulnerability Database integration

Run the National Vulnerability Database (NVD) integration to import data from the National Institute of Standards and Technology (NIST) NVD product. Running the NVD integration gives you the foundational Common Vulnerabilities and Exposures (CVEs) data referenced by the Microsoft Defender for IoT (Azure) vulnerabilities to help you determine the severity and details of vulnerabilities in your environment.

Before you begin

Before you run the NIST NVD integration on your instance, the installation and configuration steps for the integration must be completed. Completing the installation and configuration ensures that the NVD product properly integrates with the Operational Technology Vulnerability Response application.

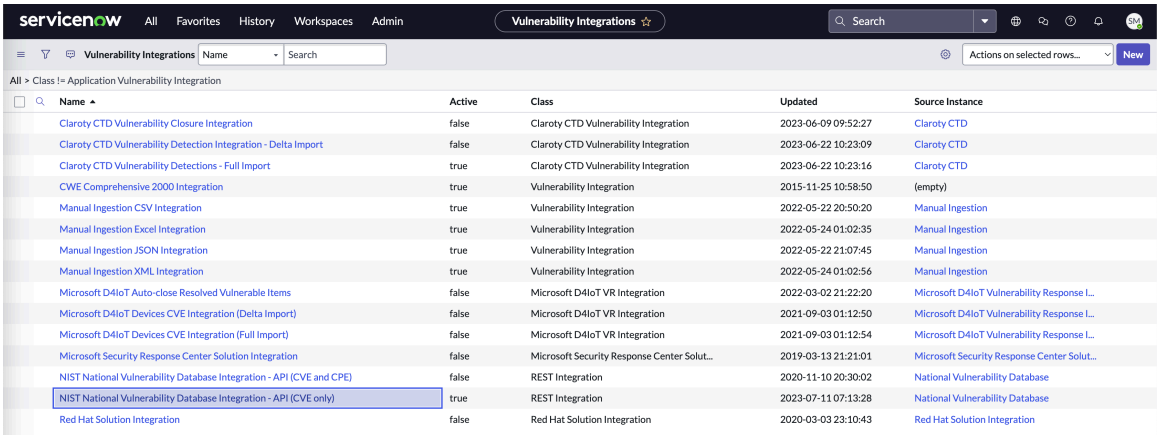
To install the NVD plugin, see Install the Vulnerability Response Integration with the NIST National Vulnerability Database.

Role required: admin

Procedure

1. Navigate to **All** > **Azure D4IoT Vulnerability Integration** > **Admin** > **Guided Setup**.
2. In the **Configure Integration** section, select **Configure** next to the **Import National Vulnerability Database (NVD) CVE Entries** task.
3. Depending on which is active, select either the NIST NVD integration - API (CVE only) record or the NIST National Vulnerability Database Integration – API (CVE and CPE) record.

   Note:
   The NIST NVD integration - API (CVE only) record is most commonly active by default.



4. To edit the record, set the **Application scope** to **Vulnerability Response Integration with NVD** using the globe ( ) icon.
5. In the **Import Since** field under the **Integration Details** tab, set the value to a date in the past.

> **Note:**
> This is required so a full import of the NVD occurs. The recommended date is `1999-01-01 00:00:00`.

6. Select **Save**.
7. Select **Execute Now**.

Configure integration scheduled jobs

Activate the scheduled jobs that import vulnerability data.

Before you begin

Before scheduling the import of Microsoft Defender for IoT (Azure) records, run the NVD integration to fix any issues. For more information, see Run the National Vulnerability Database integration.

Role required: admin

Procedure

1. Navigate to **All** > **Azure D4IoT Vulnerability Integration** > **Admin** > **Guided Setup**.
2. In the **Configure Integration** section, select **Configure** next to the **Verify and Activate Integration Scheduled Jobs** task.
3. Select the **Azure D4IoT Vulnerability Detection Integration - Full Import** job.
   This job imports vulnerability detections from Microsoft Defender for IoT (Azure).
4. Next to the **Active** field, select the check box.
   You can also adjust the schedule if additional changes are needed. If you configured the vulnerability integration to **Run After Service Graph Connector Import** in the **Setup Connections** task, you should leave this job set to run **On Demand**. For more information about the **Setup Connections** task, see Connect to the Microsoft Defender for IoT (Azure).
5. Select **Update**.
6. Select the **Azure D4IoT Vulnerability Closure Integration** job.
   Azure D4IoT Vulnerability Closure Integration is a detection job that determines which detections have been deleted from Microsoft Defender for IoT (Azure) and then closes them in ServiceNow.

7. Next to the **Active** field, select the check box.
   It's recommended to keep the **Run** field as **On Demand**.
8. Select **Update**.

Activate Auto-Close Stale Detections

Configure the system properties that are used in the auto-close stale detections process to automatically close vulnerabilities that are no longer in your environment.

Before you begin
Role required: admin

Procedure

1. Navigate to **All** > **Azure D4IoT Vulnerability Integration** > **Admin** > **Guided Setup**.
2. In the **Auto-Close Stale Detections (Optional)** section, select the **Activate Auto-Close Stale Detections** task.
3. Select **Configure**.
4. In the **Azure D4IoT VR Auto Close Properties** page in the **Auto-close stale detections from Microsoft Azure Defender for IoT?** field, select **Yes**.
5. In the **Detections from Microsoft Azure Defender for IoT will be auto-closed after (value) days since they were updated** field, enter the number of days to wait until the detections automatically close.
   The default is 90.
6. Select **Save**.

Activate the Auto-Close Stale Detections job

Activate the scheduled job to auto-close stale detections on a recurring basis.

Before you begin
Role required: admin

Procedure

1. Navigate to **All** > **Azure D4IoT Vulnerability Integration** > **Admin** > **Guided Setup**.
2. In the **Auto-Close Stale Detections (Optional)** section, select the **Activate Auto-Close Stale Detections Scheduled Job** task.
3. Select **Configure**.
4. Next to the **Active** field, select the checkbox.
5. **Optional:** In the **Run** field, select the option that fits your needs.
   By default, the field is set to **On Demand** but you can change it based on your needs. For example, you can select **Daily** and choose the hour and minute of the day in the **Time** field that appears.
6. Select **Save**.

Support for the Vulnerability Response Integration with Microsoft Defender for IoT (Azure)

You can refer to this section for questions regarding data mapping and error handling.

Data mapping

The following tables describe the data mapping fields used for vulnerability detection and National Vulnerability Database (NVD) entries in the Microsoft Defender for IoT (Azure) application and if there's an equivalent entry used after the data is imported into the ServiceNow CMDB.

Vulnerability Detection

Microsoft Defender for IoT (Azure) field	ServiceNow field
N/A	source **Note:** Always set this field to **Microsoft Azure Defender for IoT**.
name	detection_key
N/A	status **Note:** This field is set to **0**, meaning open, by default.

NVD entries

Microsoft Defender for IoT (Azure) field	ServiceNow field
properties/vulnerabilityid	id
	source **Note:** This field is set to **NVD** by default.
properties/description	summary
properties/score	score
properties/exploittype	Exploit exists If the API data indicates an exploit exists, the integration sets this field to **Yes**.
properties/exploittype	public_exploit If the API data indicates an exploit exists, the integration sets this field to **Yes**.

Configuration item (CI) lookup

The CI Lookup is performed using the **deviceid** from Microsoft Defender for IoT (Azure). The sys_object_source table, populated by the Service Graph Connector, is searches for the the matching deviceid. If a match is found, the detection and vulnerable item are linked to that CI.

Note:
By default, a CI match is required to insert vulnerability detections. This helps minimize unclassed hardware CIs in your CMDB. To change this behavior, you can set the **sn_msftd4iotazvr.require_ci_matchsystem** property to **false**. Setting the property to false allows the creation of unclassed hardware CIs if a CI match isn't found.

Error handling

The integration is designed to be mostly pre-configured, so you only need to enter your Azure Tenant ID, Client ID, and Client Secret. Log messages from the application are viewable in the System Logs from the **sn_msftd4iotazvr** source. Additional relevant log message can also appear from the **sn_vul** source.

If the integration run fails, the error is shown in the **Notes** field on the integration run. The state is set to **Complete** with a substate of **Failed**.

The Import Queue (sn_vul_ds_import_q_entry) table contains all the pending transformation requests. You can filter this table to only show items that have a **status** of **Processing** to view what is currently under transformation.

The following tables describes the error messages and possible causes during data retrieval and data processing.

Vulnerability Detection Integration (Data Retrieval)

Error message	Possible cause
Cannot run integration without a REST message and REST method specified	On the Detection Integration job record, the **REST message** or **REST method** fields are not populated.
Cannot run integration without Microsoft Defender for IoT (Azure) oauth_client_id specified	On the Integration Instance, the **OAuth Client ID** is not populated.
Cannot run integration without Microsoft Defender for IoT (Azure) oauth_client_secret specified	On the Integration Instance, the **OAuth Client Secret** is not populated.
Cannot run integration without the detection API resource path specified	On the Integration Instance, the detection API resource path is not populated. The default is `https://management.azure.com/providers/Microsoft.ResourceGraph/resources`
Cannot run integration with API version specified	On the Integration Instance, the API version is not populated. The default is 2021-03-01.

Vulnerability Detection Integration (Data Retrieval) (continued)

Error message	Possible cause
Invalid response code {response code} received from Microsoft Defender for IoT (Azure)	The response from the Microsoft API is invalid. For example, the invalid response code 401 received from Microsoft Defender for IoT (Azure) means **Unauthorized**. The credentials or OAuth Token are likely invalid.
Failed to parse the JSON response body	The JSON response received is invalid if it isn't able to be parsed. This means that no data was received. Ensure that the credentials are correct and no other errors occur.
Error writing attachment	The system couldn't attach the response data to the data source. You likely need to contact your system administrator for further troubleshooting. A common cause for this error is that the MID Server or **Run as** user is missing the sn_vul.vr_import_admin role.
Attachment content is null: attachment sys_id = {sys_id}	The Data Source attachment content is null. This could indicate an issue with the Microsoft API itself, or an issue in ServiceNow. Contact your system administrator for further troubleshooting.
Could not find attachment with sys_id {sys_id}	Data source attachment was not found. This could indicate an issue with the Microsoft API itself, or an issue in ServiceNow. Contact your system administrator for further troubleshooting.

Vulnerability Detection Integration (Data Processing)

Error message	Possible cause
Cannot create a Detection without a vulnerability ID	A vulnerability ID was not present for the record. This is most likely caused by an issue with the Microsoft API.

Vulnerability Response for Microsoft Defender for IoT (On-premises Management Console)

The Vulnerability Response for Microsoft Defender for IoT (On-premises Management Console) uses data imported from Microsoft Defender for IoT (On-premises Management Console) to enable risk-based action with the production process context.

Use the Vulnerability Response for Microsoft Defender for IoT (On-premises Management Console) application to track, prioritize, and resolve vulnerabilities on devices used in the production process.

Key Features

- Import CVEs associated with OT devices from Microsoft Defender for IoT (On-Premises Management Console) and create vulnerable items (VITs) to provide a single view of OT devices vulnerability data with production process context.
- Run imports of newly detected vulnerabilities automatically on your own schedule.
- Using assignment rules for VITs can be automatically routed for remediation to local site-based teams to take risk-based action.

Install the Vulnerability Response for Microsoft Defender for IoT (On-premises Management Console)

You can install the Vulnerability Response for Microsoft Defender for IoT (On-premises Management Console) if you have the admin role. The application includes installs related ServiceNow® Store applications and plugins if they are not already installed.

Before you begin

- Ensure that the application and all of its associated ServiceNow Store applications have valid ServiceNow entitlements. For more information, see Get entitlement for a ServiceNow product or application.
- Review the Vulnerability Response for Microsoft Defender for IoT (On-premises Management Console) application listing in the ServiceNow Store for information on dependencies, licensing or subscription requirements, and release compatibility.
- Vulnerability Response for Microsoft Defender for IoT (On-premises Management Console) requires the following ServiceNow Store applications. Ensure that these applications are installed before you install the Vulnerability Response integration with Microsoft Defender for IoT.

  CMDB CI Class Models store app

  This integration uses the Operational Technology extension classes that are part of the CMDB CI Class Models application. For more information, see CMDB CI Class Models.

  Service Graph Connector Microsoft Defender for IoT (on-premises)

  This integration uses the Operational Technology Manager application to automate the import of sensor appliances, OT devices, and network connections. To install the Service Graph, see Service Graph Connector for Microsoft Defender for IoT (On-premises Management Console).

Role required: admin

About this task

The following items are installed with Vulnerability Response for Microsoft Defender for IoT (On-premises Management Console):

- Vulnerability response plugin
- Vulnerability Response Integration with NVD

Procedure

1. Navigate to **All** > **System Applications** > **All Available Applications** > **All**.
2. Find the Vulnerability Response for Microsoft Defender for IoT (On-premises Management Console) using the filter criteria and search bar.

You can search for the application by its name or ID. If you cannot find the application, you might have to request it from the ServiceNow Store.

In the list next to the **Install** button, the versions that are available to you are displayed.

3. Select a version from the list and select **Install**.

   In the Review Installation Details dialog box, any dependencies installed with your application are listed.

4. If you're prompted, follow the links to the ServiceNow Store to get any additional entitlements for dependencies.
5. Select **Install**.

Assign Vulnerability Response for Microsoft Defender for IoT (On-premises Management Console) roles

Assign roles to your users so that you can control their access to the features, capabilities, and data in the Vulnerability Response for Microsoft Defender for IoT (On-premises Management Console) application.

Before you begin
Role required: admin

About this task
Users with the roles that are listed in the following tables can use the Vulnerability Response for Microsoft Defender for IoT (On-premises Management Console) application.

Assign roles to admin users or user groups as needed.

Vulnerability Response for Microsoft Defender for IoT (On-premises Management Console) roles

Role	Description
OT VR Integration Viewer [sn_otvr.integration_viewer]	Can view OT VR integration records.
OT VR Integration Admin [sn_otvr.integration_admin]	Can configure and execute OT VR integration.
MID server [mid_server]	Can configure MID Server.

Procedure

Assign roles to users and groups by using the ServiceNow AI Platform user administration feature.

Run the National Vulnerability Database integration

Run the National Vulnerability Database (NVD) integration to import data from the National Institute of Standards and Technology (NIST) NVD product. Running the NVD integration helps you determine the severity and details of Common Vulnerabilities and Exposures (CVEs) found in your environment.

Before you begin

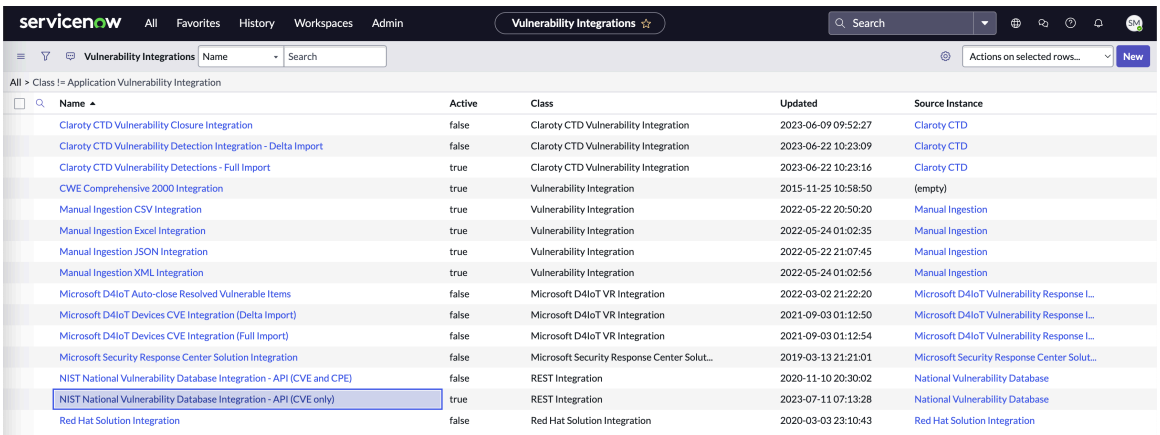
Before you run the NIST NVD integration on your instance, the installation and configuration steps must be completed. Completing the installation and configuration ensures that the NVD product properly integrates with the Operational Technology Vulnerability Response application.

To install the NVD plugin, see Install the Vulnerability Response Integration with the NIST National Vulnerability Database.

Role required: admin

Procedure

1. Navigate to **All** > **Vulnerability Response** > **Administration** > **Integrations**.
2. Select the NIST NVD integration - API (CVE only) record.



Name	Active	Class	Updated	Source Instance
Claroty CTD Vulnerability Closure Integration	false	Claroty CTD Vulnerability Integration	2023-06-09 09:52:27	Claroty CTD
Claroty CTD Vulnerability Detection Integration - Delta Import	false	Claroty CTD Vulnerability Integration	2023-06-22 10:23:09	Claroty CTD
Claroty CTD Vulnerability Detections - Full Import	true	Claroty CTD Vulnerability Integration	2023-06-22 10:23:16	Claroty CTD
CWE Comprehensive 2000 Integration	true	Vulnerability Integration	2015-11-25 10:58:50	(empty)
Manual Ingestion CSV Integration	true	Vulnerability Integration	2022-05-22 20:50:20	Manual Ingestion
Manual Ingestion Excel Integration	true	Vulnerability Integration	2022-05-24 01:02:35	Manual Ingestion
Manual Ingestion JSON Integration	true	Vulnerability Integration	2022-05-22 21:07:45	Manual Ingestion
Manual Ingestion XML Integration	true	Vulnerability Integration	2022-05-24 01:02:56	Manual Ingestion
Microsoft D4IoT Auto-close Resolved Vulnerable Items	false	Microsoft D4IoT VR Integration	2022-03-02 21:22:20	Microsoft D4IoT Vulnerability Response I...
Microsoft D4IoT Devices CVE Integration (Delta Import)	false	Microsoft D4IoT VR Integration	2021-09-03 01:12:50	Microsoft D4IoT Vulnerability Response I...
Microsoft D4IoT Devices CVE Integration (Full Import)	false	Microsoft D4IoT VR Integration	2021-09-03 01:12:54	Microsoft D4IoT Vulnerability Response I...
Microsoft Security Response Center Solution Integration	false	Microsoft Security Response Center Solut...	2019-03-13 21:21:01	Microsoft Security Response Center Solut...
NIST National Vulnerability Database Integration - API (CVE and CPE)	false	REST Integration	2020-11-10 20:30:02	National Vulnerability Database
NIST National Vulnerability Database Integration - API (CVE only)	true	REST Integration	2023-07-11 07:13:28	National Vulnerability Database
Red Hat Solution Integration	false	Red Hat Solution Integration	2020-03-03 23:10:43	Red Hat Solution Integration

3. In the **Import Since** field, set the value to **NULL**.
4. Select **Execute Now**.

Configure the Vulnerability Response for Microsoft Defender for IoT (On-premises Management Console)

Configure the record for the Vulnerability Response for Microsoft Defender for IoT (On-premises Management Console) integration.

Before you begin

Use the Vulnerability Response for Microsoft Defender for IoT (On-premises Management Console) guided setup to complete the configuration. To access the Guided Setup, navigate to **MSFT D4IoT Vulnerability Integration** > **Administration** > **Guided Setup**.

Role required: sn_otvr.integration_admin and mid_server

Procedure

1. Navigate to **All** > **MSFT D4IoT Vulnerability Integration** > **Administration** > **Configurations**.
2. Click **New**.
3. On the form, fill in the fields.
   For a description of the field values, see Microsoft Defender for IoT VR Configuration form.
4. Click **Save and Verify Credentials**.

Microsoft Defender for IoT VR Configuration form

Use the Microsoft Defender for IoT VR Configuration form to configure the Vulnerability Response for Microsoft Defender for IoT (On-premises Management Console) application.

Microsoft Defender for IoT VR Configuration form

Field	Description
Name	The name of the configuration.
Integration instance	The instance for the configuration. The available default integration instance is the Microsoft Defender for IoT Vulnerability Response instance.
Endpoint URL	The URL of the Microsoft Defender for IoT Management Console. For example: `https://10.10.0.222/external/v3/integration/devicecves`
MID server	The MID Server used for the integration.
API key	The token needed to access the Central Manager APIs. For information about creating an API key in the Microsoft Defender for IoT management console, see https://docs.microsoft.com/en-us/azure/defender-for-iot/organizations/references-work-with-defender-for-iot-apis.
Page size	The number of devices per page in the Microsoft API response. The default page size is 50.
CVSS V2 Score	The vulnerabilities with the score greater than or equal to the configured CVSS V2 score is considered for the import of CVEs and creation of Vulnerable Item (VIT) records. The default value is set to 0.
Auto-close Resolved VIs	If the VIT record is set to resolved, it can be closed automatically if the CVE no longer appears in the API response from Microsoft Defender for IoT for that OT device.
Wait days to reopen a Resolved VI	When a VIT is resolved, it can take a while for Microsoft Defender for IoT to confirm if the vulnerability is resolved based on the OT device's communication in the network. Define the number of days to wait before reopening the resolved VIT when the NIDS cannot confirm it as Closed.

Configure import schedules

Configure the import schedules to access the Microsoft Defender for IoT records.

Before you begin

Before scheduling the import of Microsoft Defender for IoT records, run the NVD integration to fix any issue. For more information, see Run the National Vulnerability Database integration.

Role required: admin

Procedure

1. Navigate to **All** > **MSFT D4IoT Vulnerability Integration** > **Administration** > **Integrations**.
2. From the list of records, select your record:
   - The **Full Import** schedule imports all the vulnerabilities for all OT devices.

     Note:
     Frequent execution of the Full Import Schedule is not recommended because the number of records can be high.

   - The **Delta Import** schedule can be configured by default to run after the Microsoft Service Graph Connections integration. See Configure the system ID of the OT Vulnerability Response integration.
   - Use the **Auto-close Resolved VIT Import** schedule if the vulnerability on the OT device is resolved. The Vulnerable Items (VITs) are closed automatically based on the confirmation from the scanner.

   If the scope is not in the correct application, the message `To edit this record click here` appears on the top of the page.
3. Click **here** to edit the record.
4. Select the **Active** check box to change **Active** to **true**.
5. Select **Schedule** from the drop-down list as required.
6. Click **Execute Now**.

Configure the system ID of the OT Vulnerability Response integration

Configure the system ID to import integration records fully after the Microsoft SGC Connections integration.

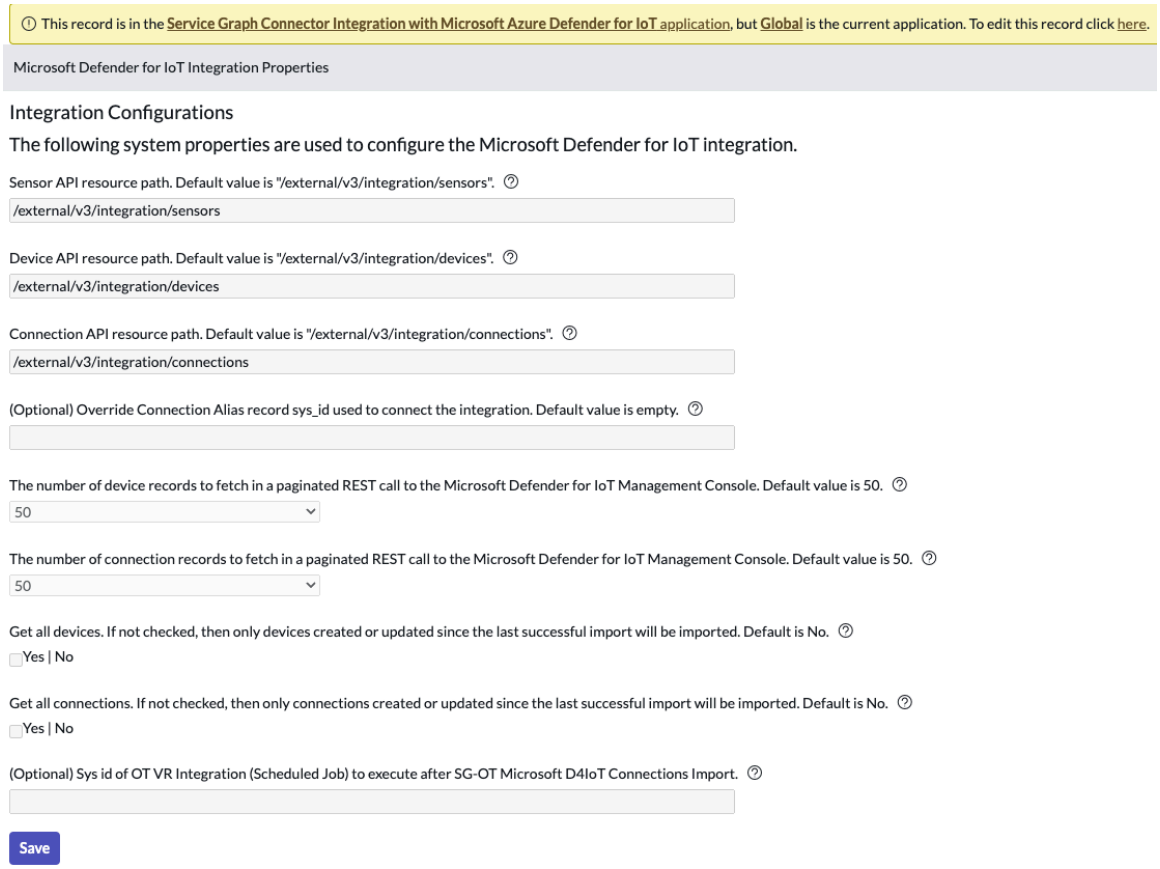
Before you begin
Role required: admin

About this task
This configuration is strongly recommended to ensure all OT devices are in the CMDB that may have vulnerabilities reported against them.

Procedure

1. Navigate to **All** > **Service Graph Connector Microsoft D4 IoT** > **Properties**.

   If the scope is set to the wrong application, the message `To edit this record click here` appears at the top of the page.



2. Click **here** to edit the record.
3. Configure the system property `sn_msftd4iotsgc.ot.vr.integration.id` with the sys_id of the OT VR Integration.
4. Click **Save**.

Configure Auto-Close Stale Detections

Enable Auto-Close Stale Detections to automatically close stale vulnerable detections not recently found by your third-party integrations.

Before you begin

Role required: admin

About this task

The stale detections most likely result from a remediation targeted for a critical risk vulnerable item (VIT) that also addresses multiple additional lower criticality VITs with an **Open** state. Moving these VITs to **Closed** reduces the number of active VITs and vulnerability groups in your ServiceNow AI Platform instance.

Procedure

1. Navigate to **All** > **Vulnerability Response** > **Administration** > **Auto-Close Configuration** > **Stale Detections**.

   The Auto-Close Stale Configuration form is displayed.

2. Fill in the fields.
3. For the **Auto-close stale detections based on** field, select **Detections last found** in the list.

This option searches for the most current, or latest date that detections were found again by the scanner.

Note:
The **Devices last scanned** option is not applicable for OT scanners.

Starting from v22.0 of Vulnerability Response, you can configure additional options for your search. See Create auto-close rules for more information.

4. To enable the module, select the **Active** check box.
5. In the **Detections last found (days ago)** field, enter the age of older, stale detections in the number of days.

   The default is 90 days. You can enter any positive value for the number of days. This value is used to match a last detected date provided by Microsoft Defender for IoT. With 90 and **Detections last found** displayed, any vulnerable items not detected in the last 90 days are automatically closed.

6. **Optional:** To ignore stale detections that are mapped to deferred VITs or VITs currently in review for deferral, select the **Ignore the stale detections for deferred VIs** check box.
   If you leave this option disabled, any detections that match your criteria will be closed that mapped to deferred VITs, or to VITs that are in review for deferral. The deferred VITs, or VITs that are in review that correspond to these detections are also automatically closed based on the rollup logic. For more information on roll up logic, see Closing stale detections in Vulnerability Response.

   If you enable this option, any detections that match your criteria that map to deferred VITs, or to VITs that are in review for deferral, are skipped during auto-close.

7. **Optional:** Deselect the **Ignore stale detections for closed VIs** check box.
   By default, this check box is selected so that the closed VIT is not reopened when a new detection to this closed VIT is identified. For more information on roll up logic, see Closing stale detections in Vulnerability Response.
8. Select **Update**.

   The *Auto-Close Stale Detections* scheduled job runs daily. The job determines whether you have selected the date when detections were last found or the date when assets were last scanned. It then transitions the corresponding detections to the Stale state. It's important to note that the Auto-Close Stale Detection feature only closes stale detections for active integration instances. Vulnerable items and detections associated with active integration instances are closed. Starting from v21.1 of Vulnerability Response the scheduled job has been modified to take into account the common table [sn_vul_cmn_auto_close_rule].

   After the detections are marked as Stale, if the scanner reports finding that detection again, the Status field of the detections transitions to Open. The detection's corresponding vulnerable items are also reopened.

   Additionally, if the detection is marked as Stale, and the scanner finds that it is Fixed, the detection transitions to Closed. The state also rolls up to the VITs.

Using Operational Technology Vulnerability Response

After you complete all required set up tasks, including importing vulnerable items from a third-party integration, you can use the Operational Technology Vulnerability Response application from the Industrial Workspace.

Industrial Workspace

To use Operational Technology Vulnerability Response, access the following landing page and menus from the Industrial Workspace.

For more information on the Industrial Workspace, see Industrial Workspace.

OTVR (PA) dashboard in the Industrial Workspace

Use the OTVR (PA) dashboard to track the volume, performance, and progress of your vulnerable items from the initial analysis and detection to the containment, or remediation. You can filter the reports by the assignment group, exploits, risk rating, or state to get insight into your vulnerability exposure and the services that are affected.

For more information about the OTVR (PA) dashboard, see Operational Technology Vulnerability Response (PA) dashboard

OT Vulnerability Risk Rollup dashboard overview

The Operational Technology (OT) Vulnerability Risk Rollup dashboard contains two tables for your vulnerability risk scores.

- Vulnerability risk table for your equipment model entities
- Vulnerability risk table for OT devices with no site assigned

List menu

Use the List menu to view all OT Vulnerable Item records that you have access to and remediation tasks that have either been assigned to you or to an assignment group that you are a member of.

- OT Remediation Tasks
  - Assigned to me
  - Assigned to my groups
- OT Vulnerable Items
  - Assigned to me
  - Assigned to my groups
  - My Exception Requests
  - All Exceptions

> **Note:**
> The All Exceptions list also shows exceptions with a **Rejected** state.

Navigate to records under the OT Remediation Tasks or OT Vulnerable Items list menus to get more OT-related context. To view the history of the record, you can view the **Activity** window in the record where various work notes, comments, and record updates are captured. You can also add new comments or work notes in the **Compose** window.

For more information about remediation tasks, see Create a remediation task.

For more information on how to use the List view in the Industrial Workspace for Operational Technology Vulnerability Response, see Use the List view in the IT Remediation Workspace.

Equipment model menu

Use the Equipment Model Manager to view OT vulnerable items, and view and create remediation tasks associated with OT devices that are mapped to an equipment model entity.

Hardware Vulnerability Assessment

Use the Hardware Vulnerability Assessment menu to view and manage the vulnerabilities assessments that have performed on the firmwares of the OT devices in the inventory.

Use the following tabs in the Hardware Vulnerability Assessment menu to view all the assessments records and the vulnerable items that are created automatically:

- Fully matched assessments
- Partially matched assessments
- Vulnerable items
- Ignored assessments
- Awaiting Normalization

Related topics

Vulnerability Response Workspaces

Create a remediation task

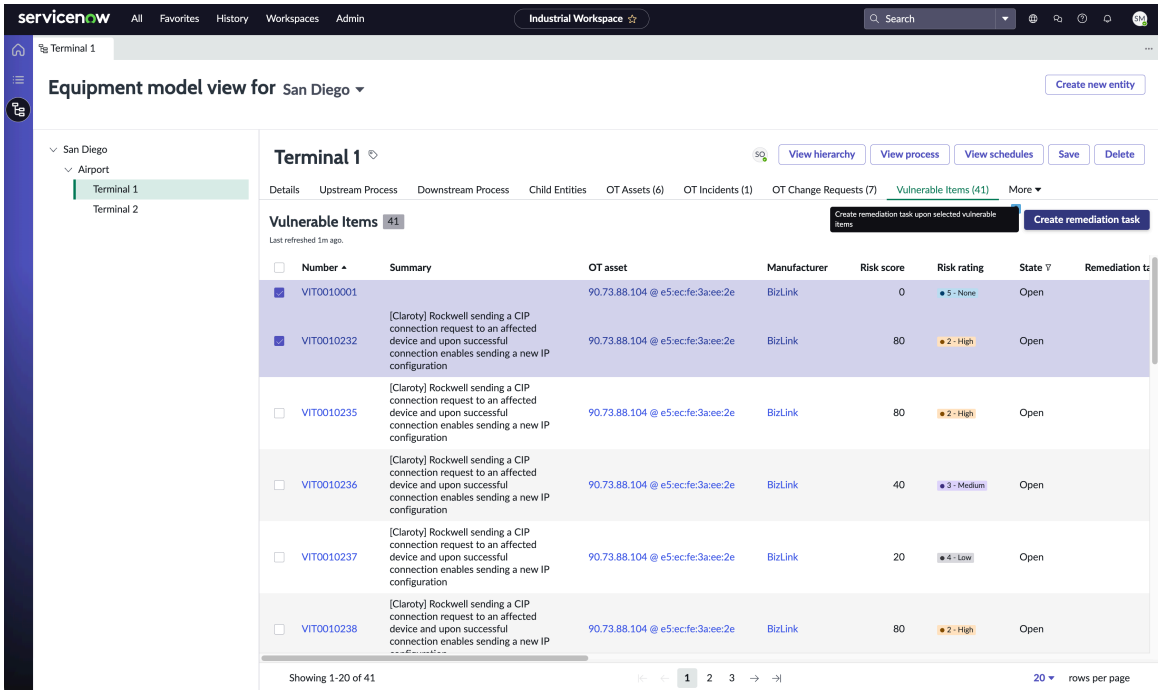
Create remediation tasks associated with OT devices that are mapped to an equipment model entity.

Before you begin

Role required:sn_otvr.remediation_owner

Procedure

1. Navigate to **All** > **Industrial Workspace**.
2. Open the **Equipment model** page.
3. In the **Equipment model view for** field, select the site that you want to view the equipment model information for.
4. Select the appropriate equipment model entity and navigate to the **Vulnerable Items** related list tab.
5. Select the vulnerable item records you want to add to the remediation task, then select **Create remediation task**.



6. Provide all the required details for the remediation task.
   The Assignment group field automatically assigns based on the site assignment group.
7. Select **Save** to create the task record.

Result

Once you create a remediation task, the task is picked up during the next scheduled maintenance determined by your equipment model entity maintenance schedule. For more information about equipment model entity schedules, see Managing equipment models.

You can also manually select a start time for a remediation task. For more information about selecting a start time, see Select a start time for a remediation task.

View vulnerable items and solutions in the Industrial Workspace

View Operational Technology (OT) vulnerable items (VITs) and their respective preferred solutions or all available solutions provided by OT Vulnerability Solution Management in the Industrial Workspace.

Before you begin

Role required: admin

Procedure

1. View the list of vulnerable items from the Industrial Workspace.
   - Navigate to **All** > **Industrial Workspace** > **Select the List menu icon** > **OT Vulnerable Items** > to view the complete list of vulnerable items in your OT environment.
   - Navigate to **All** > **Industrial Workspace** > **Select the Equipment Model menu icon** > **Vulnerable Items** to view the list of vulnerable items for a specific site.

a. From the displayed list, select a VIT.

b. In the Remediation section of the VIT, view the preferred solution or all the available solutions for the VIT.

c. If there's more than one solution available for the VIT, select the search icon in the **Preferred Solution** field to search for and view all the available solutions for the VIT.

2. Navigate to **All** > **Industrial Workspace** > **Select the list menu icon** > **Solutions**.

a. View the complete list of available vulnerability solutions by selecting the **All** list.

b. View the list of vulnerability solutions for the respective vulnerable items by selecting the **With vulnerable items** list.

Related topics

Operational Technology Vulnerability Solution Management

View vulnerability exceptions in the Industrial Workspace

Request an Operational Technology (OT) Admin to ignore a vulnerable item (VIT) as an exception.

Before you begin

Role required: admin

Procedure

1. Navigate to **All** > **Industrial Workspace** > **Select the List menu icon** > **OT Vulnerable Items**.

- View the VITs you have requested to be considered as exceptions by selecting the My Exception Requests list.
- View the VIT exceptions requested by all the users in your OT environment by selecting the All Exception Requests list.
- View all the approved VIT exceptions in your OT environment by selecting the All Exceptions list.

2. Navigate to **All** > **Industrial Workspace** > **Select the List menu icon** > **OT Vulnerability Exception Approvals**.

View all the VIT exceptions requests assigned to you for approval or already approved by you by selecting the Assigned to me list.

Use the OT Vulnerability Exception Approvals list to view any change of state for approvals and details of requested approvals for a specific exception that has been triggered from the Industrial workspace.

Select a start time for a remediation task

Select an expected start time for an Operational Technology (OT) remediation task by using the time slots in the equipment model entity schedules.

Before you begin

Role required: sn_otvr.remediation_owner

About this task

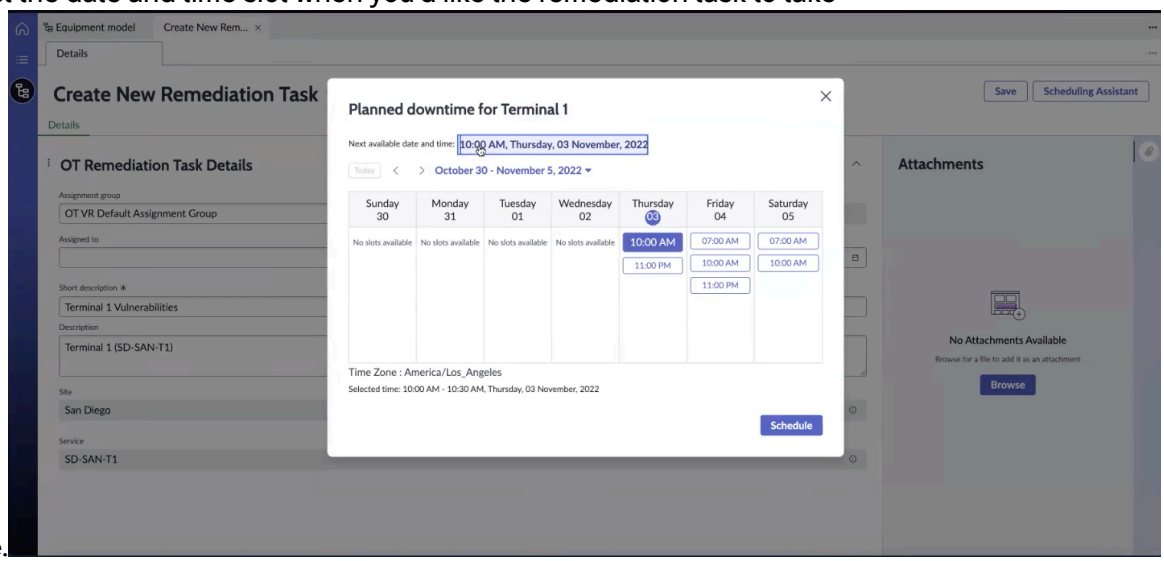
There are two ways to manually select a start time for an OT remediation task.

- You can select a start time when creating a remediation task by selecting **Scheduling Assistant** on the Create New Remediation Task form.
- You can open an existing remediation task and schedule from there.

The Scheduling Assistant uses the time slots from the equipment model entity schedules. For more information, see Managing an equipment model entity schedule.

Procedure

1. If you want to select a start time while creating a remediation task, do these actions:
   a. Refer to Create a remediation task and complete steps 1-6.
   b. Select **Scheduling Assistant**.
   c. Select the date and time slot when you'd like the remediation task to take place.



   d. Select **Schedule**.
2. If you want to select a start time for an existing remediation task, do these actions:
   a. Navigate to **All** > **Industrial Workspace**.
   b. In the list view, navigate to **OT Remediation Tasks** > **Assigned to me**.
   c. From the list, select the remediation task that you want to set a start time for.
   d. Select **Scheduling Assistant**.
   e. Select the date and time slot when you'd like the remediation task to take place.
   f. Select **Schedule**.

Result
The remediation task takes place during the set time.

Split remediation task

User can split the Vulnerable items (VIs) from a remediation task record to create a remediation task.

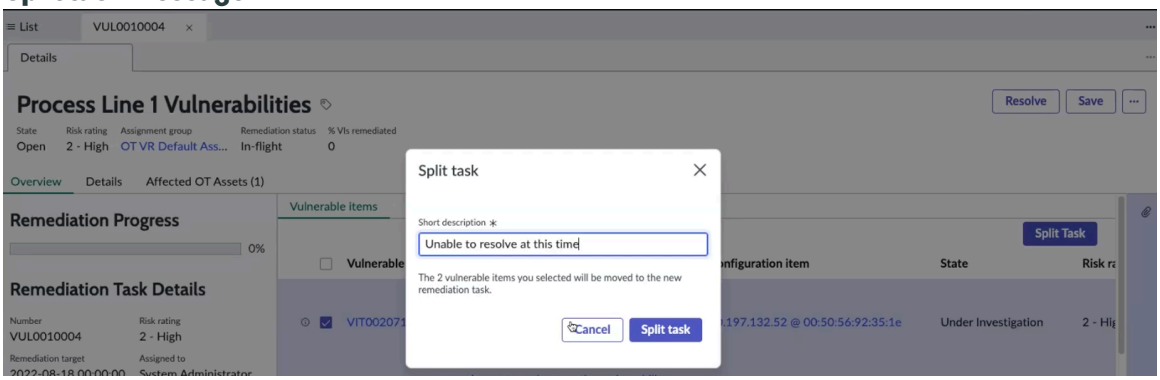
Before you begin
Role required: sn_otvr.remediation_owner

Procedure

1. Navigate to **All** > **Industrial Workspace** > **OT Remediation Tasks** > **Assigned to Me**.
2. From the list, select the VIs that you want to move to a new remediation task.
3. Click **Split Task**.
4. In the dialog that is displayed, fill the short description field.

   The number of VIs you selected from the list is displayed.

Split task message



5. Click **Split Task** again.

View remediation tasks in the Industrial Workspace

View the remediation tasks created for the Operational Technology (OT) vulnerable items (VITs) in the Industrial Workspace.

Before you begin

Role required: admin

Procedure

1. Navigate to **All** > **Industrial Workspace** > **Select the List menu icon** > **OT Remediation Tasks**.
2. View all the remediation tasks assigned to you by selecting the Assigned to me list.
3. View all the remediation tasks assigned to the user groups that you are assigned to as a user by selecting the Assigned to My Groups list.
4. View the remediation tasks that you have requested to be considered as exceptions by selecting the My Exception Requests list.
5. View all the remediation tasks in your OT environment that have been approved as exceptions by selecting the All Exceptions list.
6. View all the remediation tasks created in the OT environment by selecting the All list.

Related topics

Create a remediation task

Split remediation task

Defer a remediation task

Defer a remediation task to create an exception request that you can resolve later.

Before you begin
Role required: admin

Procedure
1. Navigate to **All** > **Industrial Workspace**.
2. To open the Industrial Workspace list view, select the list () icon.
3. Under the **OT Remediation Tasks** module, select one of the available lists.
4. Select the remediation task that you want to defer.
5. Select **Request Exception**.
6. On the form, fill in the fields.

Field	Description
Until	Select the date when the Deferred state expires and the remediation task is reactivated.
Reason	Enter the reason for deferring the issue. Choices include: ○ Awaiting maintenance window ○ False positive ○ Fix unavailable ○ Risk accepted ○ Mitigating control in place ○ Other
Additional information	Enter any other relevant information.

7. Select **Save**.

Result
An exception request is created. You can view your exception requests in the **My Exception Requests** list under the **OT Remediation Tasks** module. You can also view all existing exception requests in the **All Exceptions** list under the **OT Remediation Tasks** module.

Understanding compensating controls for Operational Technology

Compensating controls in OT environments are alternative security measures when risks posed by vulnerabilities can't be patched immediately.

In OT environments, systems often cannot be taken offline for updates due to their critical role in infrastructure and production processes. Compensating controls secures the OT environment and reduces the risk until the vulnerability can be fully remediated using permanent solutions, such as patches or hardware replacements.

The following table describes certain scenarios where compensating controls helps in reducing risk:

Use cases scenarios for compensating controls

Use case scenario	Compensating controls
Unauthorized access to programmable logic controllers (PLCs).	• Implement access control lists (ACLs) on network devices. • Disable unused ports and services on PLCs. • Implement strong passwords and authentication mechanisms.
Buffer Overflow in Human Machine Interfaces (HMI) Panels	• Apply firmware updates released by HMI panel manufacturer. • Enable hardware watchdog timers for fail-safe operations. • Implement boundary checks in the application code.
Man-in-the-Middle Attacks on PROFINET	• Use encrypted communications via VPNs or IPsec. • Configure PROFINET with secure certificates. • Implement network segmentation with firewalls.
Denial of Service (DoS) on SCADA Systems	• Enable rate-limiting on critical OT network components. • Configure SCADA systems for redundancy and load balancing. • Apply security patches provided by Siemens.
Malware Infection on Engineering Workstations	• Install and regularly update manufacturer recommended anti-malware software. • Apply application allow list to prevent unauthorized software execution. • Use secure removable media policies.

Use compensating controls for Operational Technology

Configure compensating controls for Operational Technology (OT).

About this task

Compensating controls help mitigate the likelihood or impact of a successful exploit. For more information about compensating controls, see Understanding compensating controls for risk reduction.

Before you begin
Role required: sn_vul.vulnerability_admin or sn_vul.vulnerability_analyst

Procedure
1. Navigate to **All** > **Industrial Workspace**.
2. Select the List ( ) icon.
3. Under the **Libraries** module, select the **Compensating Controls** list.
4. Select **New**.
5. On the form, fill in the following fields.

Compensating Controls form

Field	Description
Name	The name of the compensating control you want to add.
Description	An explanation of the compensating control you want to add.
Active	If selected, the compensating control is activated.

6. Select **Save**.

View Common Vulnerability Entries in the Industrial Workspace

View Common Vulnerability Entries (CVEs) in the Industrial Workspace to access information needed for compensating controls.

Before you begin
Role required: sn_vul.vulnerability_admin

Procedure
1. Navigate to **All** > **Industrial Workspace**.
2. Select the List ( ) icon.
3. Under the **Libraries** module, select the **CVEs** list.

Operational Technology Vulnerability Response reference

Reference topics provide additional information about the Operational Technology Vulnerability Response application.

Components installed with Operational Technology Vulnerability Response

Several types of components are installed with activation of the Operational Technology Vulnerability Response (com.sn_otvr) plugin, including user roles and a business rule.

Note:
The Application Files table lists the components that are installed with this application. For instructions on how to access this table, see Find components installed with an application .

Demo data is available for this feature.

Roles installed

Role title [name]	Description	Contains roles
OT Vulnerability Remediation Owner [sn_otvr.remediation_owner]	Can create remediation tasks. Can also schedule existing remediation tasks for vulnerable items.	• cmdb_ot_isa_viewer • cmdb_ot_viewer • sn_vul.close_vi_vg • sn_vul.remediation_owner
OT VR Integration Viewer [sn_otvr.integration_viewer]	Can view Operational Technology Vulnerability Response integration records.	None
OT VR Integration Admin [sn_otvr.integration_admin]	Can view and edit Operational Technology Vulnerability Response integration records.	• sn_sec_cmn.admin • sn_otvr.integration_viewer • sn_vul.read_all

Business rules installed

Business rule	Table	Description
Associate OT VITs To Remediation Task	Remediation Task [sn_vul_vulnerability]	When an OT Remediation task is created, groups the associated vulnerable items to the task with respect to the filter condition specified in the task->Filter grouping configuration.

Operational Technology Vulnerability Response vulnerable item form fields

List of fields displayed in a vulnerable items created for OT devices.

Vulnerable item fields

Field	Description
Overview	
Number	Automatically generated vulnerable item number for this record.
State	This field defaults to **Open**, but you can change it to **Under Investigation** if the vulnerability is ready for immediate remediation.
Risk rating	Quantified **Risk Score** separating vulnerable items into Critical, High, Medium, Low, and None. For more information on risk ratings,

Field	Description
	see Vulnerability Response calculators and vulnerability calculator rules. **Note:** This base **Risk rating** isn't the same as the Solution record **Risk rating.**
Risk score	Calculated amount of risk the vulnerable item poses to your environment. **Note:** This base **Risk score** isn't the same as the Solution record **Risk score.** For more information, see Vulnerability Response calculators and vulnerability calculator rules.
Vulnerability	ID of the vulnerability associated with this vulnerable item.
Source	Scanner that found this vulnerable item.
Configuration item	ID of the OT asset associated with this vulnerable item.
Assignment group	Group selected to work on this remediation task.
Assigned to	Individual from the selected assignment group that works on this vulnerability.
Created	Date this vulnerable item was created in your instance.
Last opened	Date the vulnerable item was most recently opened in your instance. Initially, this is the same as the creation date of the vulnerable item, however, if it was closed, then reopened the Last opened date contains the date and time reopened.
Updated	Date of the last scan.
Summary	Description of the vulnerability.
Severity	Normalized degree of severity of this vulnerability. Severity maps are provided for NVD and with ServiceNow third-party integrations. For more information on creating or adjusting severity maps, see .Create a Vulnerability Response severity map.
Vulnerability score (v3)	CVSS v3 score.
Vulnerability score (v2)	CVSS v2 score.

Field	Description
Exploit exists	Yes, if at least one exploit is associated with the vulnerabilities associated with this vulnerable item.
Exploit attack vector	Most vulnerable attack vector of the exploits for the vulnerabilities associated with this vulnerable item.
Exploit skill level	Lowest skill level required to exploit the vulnerabilities associated with this vulnerable item.
Date published	Date the vulnerability was published.
Last modified	Date the vulnerability was last modified.
Threat	Relevant information about the threat. Pulled from the vulnerable entry record. **Note:** Any changes made here update the vulnerable entry record.
Remediation notes	Relevant solution to the threat, pulled from the vulnerable entry record.
Additional comments/Work notes	Any relevant information. Select the check box to add Additional comments. Starting with Vulnerability Response v20.0, you can add work notes in the Notes section for a deferred vulnerable item.
Activity	Only appears when a work note has been created.
Related Links	
Calculate Risk Score	When either the **Vulnerability Severity** or **Risk Score** calculators is enabled, the **Risk Score** field is updated.

Related information

Find more information about the Network Intrusion Detection System (NIDS) extension class, OT extension classes, and related applications.

Extension classes overview

The extension classes help you understand how Operational Technology Management works with the Configuration Management Database (CMDB).

Network Intrusion Detection System (NIDS) CI extension class

The Network Intrusion Detection System (NIDS) [cmdb_ci_nids] class builds the relationships between passive network monitoring appliances, and the devices on the network that it discovers.

Operational Technology (OT) extension classes

The Configuration Management Database (CMDB) updates classes for OT.

Related applications

Vulnerability Response

When integrated with Operational Technology Vulnerability Response, the ServiceNow Vulnerability Response application aids you in prioritizing and resolving OT vulnerabilities based on process criticality.

CMDB CI Class Models

The CMDB CI Class Models store app adds class models that extend the CMDB class hierarchy, including class descriptions, identification rules, identifier entries, and dependent relationships.

Industrial Process Manager

Use the Industrial Process Manager application to create the ISA-95 Equipment Model data foundation that is required for the ServiceNow Industrial solution, enabling you to create your own version of the equipment models in each of your industrial sites.

Operational Technology Manager

The Operational Technology Manager application enables you to aggregate OT device data from multiple sources, so that you can build the foundational data relationships used in the Industrial solution.

Operational Technology Incident Management

Operational Technology Incident Management enables manufacturers to manage OT device incidents from open to closure.

Explore  Exploring Operational Technology Incident Management	Configure  Plan and configure your implementation
Use  Using Operational Technology Incident Management	Reference  Get details about related information and applications

Exploring Operational Technology Incident Management

Learn more about the Operational Technology Incident Management application.

Operational Technology Incident Management overview

Watch an overview about the Operational Technology Service Management product suite to learn more about the Operational Technology Incident Management application.
https://player.vimeo.com/video/1019801515?badge=0&autopause=0&player_id=0&app_id=58479

Key features

With Operational Technology Incident Management, you can use the following key features.

- Create OT incidents and drive workflows to quickly restore production processes impacted by OT devices.
- Understand context and impact of OT incidents on production processes.
- Monitor and manage OT incidents separately from IT incidents.
- Assign a separate role for the OT incident fulfiller.
- Improved OT user experience.
- Support for Operational Technology Knowledge Management. For more information, see Operational Technology Knowledge Management.

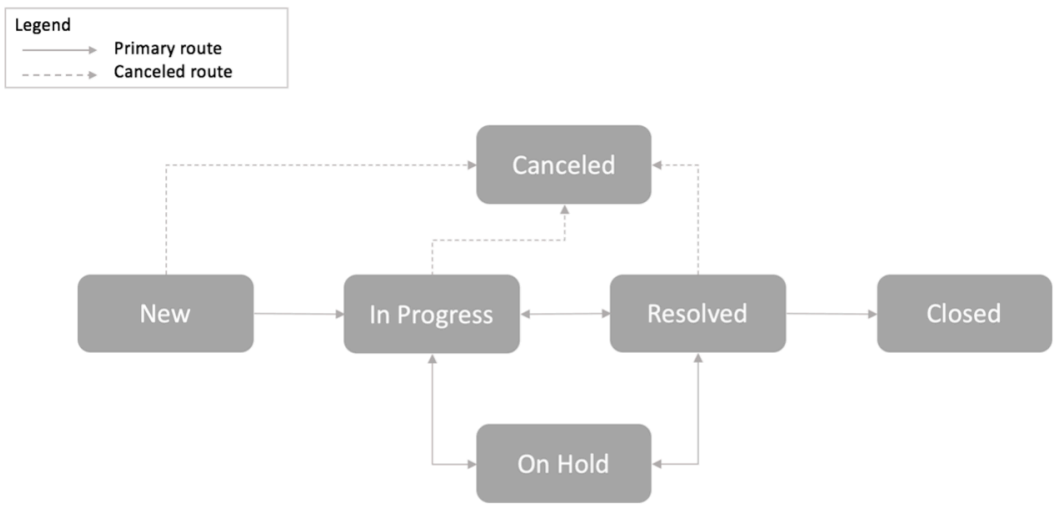
Operational Technology Incident Management

Operational Technology Incident Management enables engineers to quickly resolve Operational Technology (OT) device and production process issues.

Operational Technology Incident Management enables you to manage OT incidents separately from IT incidents. OT incidents occur when there's a disruption in service provided by an OT device on an OT network. Sometimes, the OT device may not be known when the incident is first created. If the OT device is unknown, an incident can be raised for an equipment model entity where the issue occurred.

The OT Incident manager is responsible for managing the default life cycle of incidents from creation to closure. The OT Incident Management process has many states, and each is important to the success of the process and the quality of service delivered. The different states are shown in the following diagram.

Operational Technology Incident Management process states



The incident states are as follows.

State	Description
New	Incident is logged but not yet investigated.
In Progress	Incident is assigned and being investigated.
On Hold	The responsibility for the incident temporarily shifts to another entity to provide further information, evidence, or a resolution. When you select the **On Hold** option, the following **On hold reason** list appears. These list options call out where your additional information is coming from. • Awaiting Caller • Awaiting Change • Awaiting Problem • Awaiting Vendor If the On Hold reason is **Awaiting Caller**, the **Additional comments** section is required. **Note:** If the caller updates the incident, the On Hold reason field is cleared and the state of the incident is changed to **In Progress**. An email notification is sent to the user whose name is mentioned in the **Assigned to** field and the users on the Watch list. You can place an incident On Hold one or more times before closing the incident.
Resolved	An acceptable fix is provided for the incident to ensure that it doesn't happen again.
Closed	Incident is marked **Closed** after it's in the **Resolved** state for a specific duration, and it's confirmed that the incident is satisfactorily resolved.
Canceled	Incident was triaged but found to be a duplicate incident, an unnecessary incident, or not an incident at all.

Integrating with Industrial Process Manager

Integrate Operational Technology Incident Management with Industrial Process Manager to report incidents on equipment model entities.

Industrial Process Manager creates the ISA-95 Equipment Model data foundation that is required for the ServiceNow® Operational Technology solution. When integrated with Operational Technology Incident Management, you're enabled to view incident impact against production processes.

The ISA Equipment Model plugin (sn_isa_model) installed with Industrial Process Manager enables views for specified roles. For more information, see ISA-95 equipment model.

When an OT incident is created from an OT device record, the following occurs:

- The **OT device** field on the OT incident form is filled with the OT device value.
- If the OT device has an associated equipment model entity, then the equipment model entity is added to **Equipment model entity** field on the OT incident form.
- The **Site** field on the OT incident form is filled with the site of the OT device.

When an OT incident is created from an equipment model entity record, the following occurs:

- The **Equipment model entity** field on the OT incident form is filled with the equipment model entity value.
- The **Site** field on the OT incident form is filled with the site of the equipment model entity.

The **OT incident** related list on the equipment model entity record shows all OT incidents reported on that entity. The **Equipment model entity** field on the form can only have entities under the selected site.

Configuring Operational Technology Incident Management

Configure the Operational Technology Incident Management application so that you can create the data foundation for the ServiceNow® Operational Technology solution.

Operational Technology Incident Management v2 is dependent on Tokyo P5 or later.

Note:

If you have the admin role, you can use the Guided Setup to lead you through the setup of the Operational Technology Incident Management application. To access the Guided Setup, navigate to **Industrial Workspace Admin** > **Guided Setup**.

Task	Purpose
1. Install the Operational Technology Incident Management application from the ServiceNow Store.	Installs the Operational Technology Incident Management application and supporting plugins.
2. Assign Operational Technology Incident Management roles.	Assigns roles to control the actions that are available for each user.
3. Migrate OT Incidents.	Migrates OT incidents from the incident table to the OT incident table. **Note:** This step applies only when upgrading from Paris, San Diego, or Tokyo to Utah.
4. Configure categories and subcategories for OT incidents.	Configures categories and subcategories for OT incidents as needed.
5. Configure state models.	Configures state models for OT incident sites.
6. (Optional) Create an assignment rule.	Create an assignment rule to automatically assign an OT incident to the right group or user.

Install Operational Technology Incident Management

You can install the Operational Technology Incident Management application (sn_ot_inc_mgmt) if you have the admin role. The application installs related ServiceNow® Store applications and plugins if they are not already installed.

Before you begin

- Ensure that the application and all of its associated ServiceNow Store applications have valid ServiceNow entitlements. For more information, see Get entitlement for a ServiceNow product or application.
- Operational Technology Incident Management requires the following plugins. Ensure that these plugins are activated before you install Operational Technology Incident Management.

  Required ServiceNow plugins

  CMDB CI Class Models (sn_cmdb_ci_class)

  The CMDB CI Class Models store app adds class models that extend the CMDB class hierarchy, including class descriptions, identification rules, identifier entries, and dependent relationships. For more information, see CMDB CI Class Models store app.

  ISA Equipment Model (sn_isa_model)

  The data model for ISA-95 equipment model entities and templates. For more information, see ISA-95 equipment model.

- Operational Technology Incident Management requires either one or both of the following ServiceNow Store applications. Ensure that at least one of these applications is installed before you install Operational Technology Incident Management.

  Required ServiceNow Store applications

  Operational Technology Manager

  The Operational Technology Manager application creates the foundational data and relationships that enables your enterprise to use the ServiceNow® Operational Technology solution. Operational Technology Manager supports the use of the Configuration Management Database (CMDB), Service Graph Connectors, and Discovery applications in the ServiceNow AI Platform. For more information, see Configuring the Operational Technology Manager.

  Industrial Process Manager

  The Industrial Process Manager application creates the ISA-95 Equipment Model data foundation that is required for the ServiceNow® Industrial solution, enabling you to create your own version of the equipment models in each of your industrial sites. For more information, see Configuring the Industrial Process Manager.

- Role required: admin

About this task

The following items are installed with Operational Technology Incident Management:

- Plugins
- Store applications
- Roles and ACLs

For more information about the roles and ACLs installed, see Components installed with Operational Technology Incident Management.

Note:
For Operational Technology Service Management users with no license for Operational Technology Visibility, note the following:

- When you have the latest version of Operational Technology Incident Management installed, Industrial Process Manager is also installed.
- When you have the latest version of Operational Technology Change Management installed, Industrial Process Manager is also installed.

You should upgrade to the latest versions so you have access to the Operational Technology Service Management experience.

Procedure

1. Navigate to **All** > **System Applications** > **All Available Applications** > **All**.
2. Find the Operational Technology Incident Management application (sn_ot_inc_mgmt) using the filter criteria and search bar.

   You can search for the application by its name or ID. If you cannot find the application, you might have to request it from the ServiceNow Store.

   Visit the ServiceNow Store website to view all the available apps and for information about submitting requests to the store. For cumulative release notes information for all released apps, see the ServiceNow Store version history release notes.
3. In the Application installation dialog box, review the application dependencies.

   Dependent plugins and applications are listed if they will be installed, are currently installed, or need to be installed. If any plugins or applications need to be installed, you must install them before you can install Operational Technology Incident Management.
4. Select **Install**.

Migrate incidents to the new incident table

Migrate Operational Technology incidents from the old incident table to the new incident table. Migrating incidents lets the Operational Technology Incident Management application know that the old table is no longer applicable.

Before you begin

- Set the application scope to **Operational Technology Incident Management**.
- Role required: admin

Procedure

1. Navigate to **Industrial Workspace Admin** > **Guided Setup**.
2. In the Operational Technology Incident Management category, select **Get Started**.
3. Next to the Migrate OT Incidents section, select **Configure**.
4. Start the migration by selecting **Execute now**.
5. **Optional:** To see the activity log for this scheduled job, navigate to **All** > **System Logs** > **System Log** > **All**.

Result
The Operational Technology incidents are migrated to the new incident table, and the Operational Technology Incident Management application no longer uses the old table.

Assign roles to your users

Assign roles to your users in the Operational Technology Incident Management application so that you can control their access to the features, capabilities, and data.

Before you begin
Role required: admin

About this task
Users with the roles that are listed in the following table can use the Operational Technology Incident Management application.

Note:
The OT Incident User [ot_incident_user] role is deprecated. For users who are assigned with this role, you can execute the scheduled job "Assign New OT Incident Roles" to assign them with new Operational Technology Incident Management roles. For more information, see Assign new roles to your users.

Role	Description
OT Incident Admin [sn_ot_incident_admin]	Can create, view, delete, and edit OT incident records for any equipment model entities. Users with this role can configure **Priority Lookup Rules** and **OT incident system properties**.
OT Incident Reader [sn_ot_incident_read]	Can only view OT incident records.
OT Incident Fulfiller [sn_ot_incident_write]	Can create, view, and edit OT incident records.

Procedure

Assign roles to users or groups by using the ServiceNow AI Platform user administration feature.

Assign new roles to your users

Assign new roles to users who had the OT Incident User [ot_incident_user] role through a scheduled job in the Operational Technology Incident Management application.

Before you begin

- Set the application scope to **Operational Technology Incident Management**.
- Role required: admin

About this task
The OT Incident User role [ot_incident_user] is deprecated. You can assign new roles to users that had the ot_incident_user role through a scheduled script execution.

Procedure

1. Navigate to **All** > **System Definition** > **Scheduled Jobs**.
2. In the search bar, search for the **Assign New OT Incident Roles** scheduled job.
3. Start a scheduled job by selecting **Execute now**.
4. **Optional:** To see the activity log for this scheduled job, navigate to **All** > **System Logs** > **System Log** > **All**.

Result

The scheduled job is executed and users are now assigned with the new Operational Technology Incident Management roles.

Create an assignment group

Create an Operational Technology (OT) specific assignment group to assign to OT incident records.

Before you begin

Role required: admin

About this task

The **Assignment Group** field in an OT incident record only shows assignment groups with the type OT. This helps separate Operational Technology (OT) and Information Technology (IT) incidents.

You can create OT-specific assignment groups that you want visible on an OT incident record.

Procedure

1. Navigate to **All** > **User Administration** > **Groups**.
2. Select **New**.
3. On the form, fill in the fields.

Assignment groups form

Field	Description
Name	Name of the assignment group.
Manager	Group manager or lead.
Type	Category for this group. In the **Select target record** field, search for **OT** to add it to the type field.
Group email	Group email distribution list or the email address of the point of contact.
Parent	Other group that the group is a member of.
Description	Description of the assignment group.

4. Select **Submit**.

Result

Now, the OT-specific assignment group is visible on the incident record.

Incident categories and subcategories

By categorizing Operational Technology (OT) incidents, you can group and narrow the search for specific OT incidents.

When you can create an OT incident, you can choose from the categories and subcategories that are listed in the following table.

Incident categories

Category	Subcategory
Database	• DB2 • MS SQL Server • Oracle
Hardware	• OT issue • CPU • Disk • Keyboard • Memory • Monitor • Mouse
Inquiry / Help	• Antivirus • Email • Internal Application
Network	• DHCP • DNS • IP Address • VPN • Wireless
Productivity	• Minor Stops • Slow Running • Setup and Adjustments • Breakdown
Quality	• Incoming Material • Startup Rejects

Incident categories (continued)

Category	Subcategory
	• Process Defects - Qualitative • Process Defects - Quantitative
Safety	• Near Miss • Hazard • Safety Concern • Accident
Software	• Email • Operating System

Edit a category or subcategory

Edit your existing Operational Technology incident categories and subcategories to classify your incidents.

Before you begin

- Set the application scope to **Operational Technology Incident Management**.
- Role required: admin

Procedure

1. Navigate to **All** > **System Definition** > **Choice Lists**.
2. Set the condition filters to **[Table] [is] [sn_ot_incident]** and **[Element] [is] [category]** or **[Element] [is] [subcategory]**.
3. Select the category or subcategory record.
4. Edit the form based on your needs.
5. Select **Save**.

Result

Now, the changes to the existing category or subcategory appear on the record.

Create a category or subcategory

Create an Operational Technology incident category or subcategory that you want to use to classify incidents.

Before you begin

- Set the application scope to **Operational Technology Incident Management**.
- Role required: admin

Procedure

1. Navigate to **All** > **System Definition** > **Choice Lists**.
2. To create a category, do these actions:
   a. Select **New**.
   b. In the **Element** field, enter the word `category`.
   c. In the **Label** field, enter the category name.
   d. In the **Value** field, enter the category value.
   e. In the **Sequence** field, enter the sequence number.
   f. Select **Submit**.
3. To add a new subcategory, do these actions:
   a. Select **New**.
   b. In the **Element** field, enter the word `subcategory`.
   c. In the **Label** field, enter the subcategory name.
   d. In the **Value** field, enter the subcategory value.
   e. In the **Sequence** field, enter the sequence number.
   f. If the subcategory belongs to an existing category, add the category value to the **Dependent value** field.
   g. Select **Submit**.

Result

The new category or subcategory is available to select on an Operational Technology incident record.

Delete a category or subcategory

Delete an Operational Technology incident category or subcategory if your organization no longer uses that category or subcategory.

Before you begin

- Set the application scope to **Operational Technology Incident Management**.
- Role required: admin

Procedure

1. Navigate to **All** > **System Definition** > **Choice Lists**.
2. Set the condition filters to **[Table] [is] [sn_ot_incident]** and **[Element] [is] [category]** or **[Element] [is] [subcategory]**.
3. Point to the category or subcategory record that you want to delete and select the check box.
4. In the Actions on selected rows menu, select **Delete**.

Result

The deleted category or subcategory is no longer available on an Operational Technology incident record.

Create an incident state model

Create an Operational Technology (OT) incident state model for your sites. By using an incident state model, you can manage the life cycle of the related incidents.

Before you begin

- Set the application scope to **Operational Technology Incident Management**.
- Role required: admin

About this task

By using state management, you can configure a state model for OT incident sites and their incident life cycles. You can create one model per site.

For more information about state management and state models, see State Management.

For more information about the incident life cycles, see Operational Technology Incident Management.

Procedure

1. Navigate to **All** > **State Management** > **State Models**.
2. Select the **OT Incident: Default Flow** model.
3. Set the **Condition**.
4. In the State Transitions Context menu, configure the State Transition records as required. For example, if you want to edit the **Enter Condition** field of the **In Progress** state record, select the state record, add your changes, and select **Update**.
5. Select **Update**.

Result

Now, the state model accurately describes the expected record workflow through the life cycle of the incident record.

Define a priority lookup rule for incidents

Define the impact and urgency of an Operational Technology incident to calculate its priority. You can then use the priority calculation to prioritize your work and to drive service level agreements (SLAs) in your organization.

Before you begin

Role required: ot_incident_admin

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Operational Technology Incident Management** > **Priority Lookup Rules**.
2. Select **New**.
3. On the form, fill in the fields.

Priority lookup rule form

Field	Description
Impact	Measure of the effect of an incident on business processes.
Urgency	Measure how long the resolution can be delayed until an incident has a significant business impact.

Field	Description
Priority	Option that is based on the impact and urgency. The priority identifies how quickly the OT engineer should address the task.
Application	Scope of the rules. The scope defines whether the rules are available for all applications or for scoped applications.
Active	Option to define whether the rule is active or not.
Order	Order in which the rules appear in the priority lookup list. This field indicates which rule to execute first.

Note:

The priority is calculated according to the sample data lookup rules in the following table.

Priority Data lookup rules

Impact	Urgency	Priority
1 - High	1 - High	1 - Critical
1 - High	2 - Medium	2 - High
1 - High	3 - Low	3 - Moderate
2 - Medium	1 - High	2 - High
2 - Medium	2 - Medium	3 - Moderate
2 - Medium	3 - Low	4 - Low
3 - Low	1 - High	3 - Moderate
3 - Low	2 - Medium	4 - Low
3 - Low	3 - Low	5 - Planning

By default, the **Priority** field is read-only and must be set by selecting the **Impact** and **Urgency** values. To change how the priority is calculated, you can either alter the priority lookup rules or disable the **Priority is managed by Data Lookup - set as read-only** UI policy and create their own business logic.

4. Select **Submit**.

Set the system properties

Set the system properties for the Operational Technology Incident Management application so that you can enable the incident properties as needed.

Before you begin

- Set the application scope to **Operational Technology Incident Management** by selecting the Globe icon ( ) in the navigation bar.
- Role required: sn_ot_incident_admin

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Operational Technology Incident Management** > **System Properties**.
2. Enable the following properties as needed for your organization.

3. Select **Save** to save your changes.

Create an assignment rule

Create an assignment rule to automatically assign an Operational Technology (OT) incident to a group or user according to one or more conditions in the assignment rule. You use assignment rules to run at the time that you open an OT incident.

Before you begin

Role required: admin

Procedure

1. Navigate to **All** > **System Policy** > **Rules** > **Assignment**.
2. Select **New**.
3. On the form, fill in the fields.
   For a description of the field values, see Assignment rule form.
4. Select **Submit**.

What to do next

For more information about assignment rules, see Defining assignment rules.

Using Operational Technology Incident Management

After you complete all required set up tasks for the Operational Technology Incident Management application, you can begin managing OT incidents.

Managing OT incidents

Depending on your assigned user role, you can manage OT incidents in the Industrial Workspace.

In the Industrial Workspace, the OT incident writer can create and update an OT incident form from the following places:

- An OT device form
- An equipment model entity form
- The List module

In the Industrial Workspace, the OT incident viewer can view OT incidents in the following places:

- The OT Incidents related list under the **Related Records** tab on an OT device record
- The **OT Incidents** tab on an equipment model entity record
- The following lists under the **OT Incidents** list module:

- Assigned to me
- Belong to my sites
- All

The OT incident administrator can go to any OT incident record in the Industrial Workspace and delete it.

Access control for incidents

To help separate Operational Technology (OT) and Information Technology (IT) data, only OT users can view OT incidents.

The following table describes the roles and permissions for the users that have the Operational Technology Incident Management roles.

Role	Permissions
sn_ot_incident_write	Can create, edit, and read OT incidents.
sn_ot_incident_read	Can only read OT incidents.
sn_ot_incident_admin	Can create, view, edit, and delete incident records for any equipment model entity.

For more information about access control rules, see Access control rules in application administration apps.

Report an OT incident

Create an Operational Technology (OT) incident record to report a deviation from an expected standard of operation.

Before you begin

Role required: sn_ot_incident_write

Procedure

1. Navigate to the **Industrial Workspace**.
2. Select the **List** icon.
3. Under the OT Incidents list module, select one of the following available lists.
   - Assigned to me
   - Belong to my sites
   - All
4. Select **New**.
5. On the form, fill in the following the fields as needed.
   If you selected an OT device record, the **Site** and **OT device** fields are automatically filled in. If you selected an equipment model entity record, the **Site** and **Equipment model entity** fields are automatically filled in. If the OT incident is raised from the OT Incidents list module, then none of these fields are automatically filled in.

Note:
Your organization may have configured the OT incident form and its fields to adhere to your incident management process. The following table describes the typical OT incident form fields.

OT incident form

Field	Description
Short description	Brief description of the incident.
Description	Detailed explanation of the incident.
Number	Unique system-generated incident number that is prefixed with Operational Technology Incident (OTINC).
Caller	User who contacted the OT engineer with an issue.
Impact	Measure of the effect that an incident has on industrial processes.
Urgency	Measure of how long the resolution can be delayed until an incident has a significant business impact.
State	State of the OT incident. The state moves and tracks incidents through several stages of resolution.
Category	Type of issue. After selecting the category, select the subcategory if applicable.
Subcategory	Type of issue within the selected category.
Watch list	Users who receive notifications about this incident when comments are added.
Work notes list	Users who receive notifications about this incident when work notes are added.
Site	Site where the issue happened.
OT device	Affected OT device at the site.
Equipment model entity	Affected equipment model equipment model entity at the site.
Business impact	More information about the business impact of the OT incident.
Assignment group	Assigned group that works on the incident. The assignment group can be any group with the type OT.
Assigned to	User who works on this incident. If the assignment group changes, the **Assigned to** field is cleared. You can only select the users that are included in the **Assignment group** field and have the **sn_ot_incident_write** role. If the

Field	Description
	Assignment group field is empty, then any site user with the sn_ot_incident_write role can be selected.
Parent incident	Unique number of the parent incident for this incident record.
Additional comments	More information about the issue as needed. All users that can view incidents can see the additional comments.
Work notes	Information about how to resolve the incident or the steps taken to resolve it, if applicable.

6. Select **Save**.

Result
Now, the assignment group and assignee are aware that there's an OT incident that must be addressed.

What to do next
You can view an OT incident record created for an OT device directly in the device record by opening the device record, clicking the **Related Records** tab, and selecting **OT Incidents**.

Create an Operational Technology incident from an Operational Technology change request

Create an Operational Technology (OT) incident related to an OT change request directly from the OT change record in the Industrial Workspace.

Before you begin
Role required: sn_ot_change_write and sn_ot_incident_write

About this task
The following related lists are available in an OT change record in the Industrial Workspace so you can create an OT incident or add an existing OT incident related to the change request.

Incidents Fixed by Change

OT incidents that are fixed by the selected change record.

Incidents Caused by Change

OT incidents that are caused by the selected change record.

Procedure
1. Navigate to **All** > **Industrial Workspace**.
2. Open the Industrial Workspace list view.
3. In the OT Change Requests list module, select one of the available lists.
4. Select the change record in one of your sites that you want to create an incident from.
5. To create an OT incident, complete the following actions.

a. In the Incidents Fixed by Change related list or the Incidents Caused by Change related list, select **New**.

b. On the form, fill in the following fields.

OT incident form

Field	Description
Number	Unique system-generated incident number that is prefixed with Operational Technology Incident (OTINC).
Opened	The date the incident is submitted.
Short description	Brief description of the incident.
Site	Site where the issue happened.
Equipment model entity	Affected equipment model equipment model entity at the site.
OT Device	Affected OT device at the site.

c. Select **Save**.

6. To add an existing OT incident to the change request record, complete the following actions.

> **Note:**
> An OT incident can be fixed by one OT change request at most, and caused by one OT change request at most. You can add an OT incident already associated to another OT change request, but doing so overrides the existing relationship.

a. In the Incidents Fixed by Change related list or the Incidents Caused by Change related list, select **Add**.

b. Select the OT incident that you want to add.

c. Select **Add**.

Result

After you create the incident from the change request, you can view the incident record in the related list or by navigating back to the Industrial Workspace list view. Then select one of the available lists under the **OT Incidents** list module.

Create tasks to fulfill an incident

Create a set of incident tasks to fulfill an Operational Technology (OT) incident. Incident tasks help you to split up and categorize the work that is needed to resolve an incident.

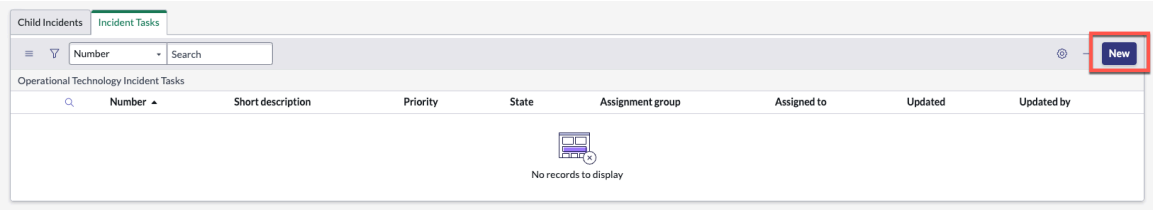
Before you begin

Role required: sn_ot_incident_write

Procedure

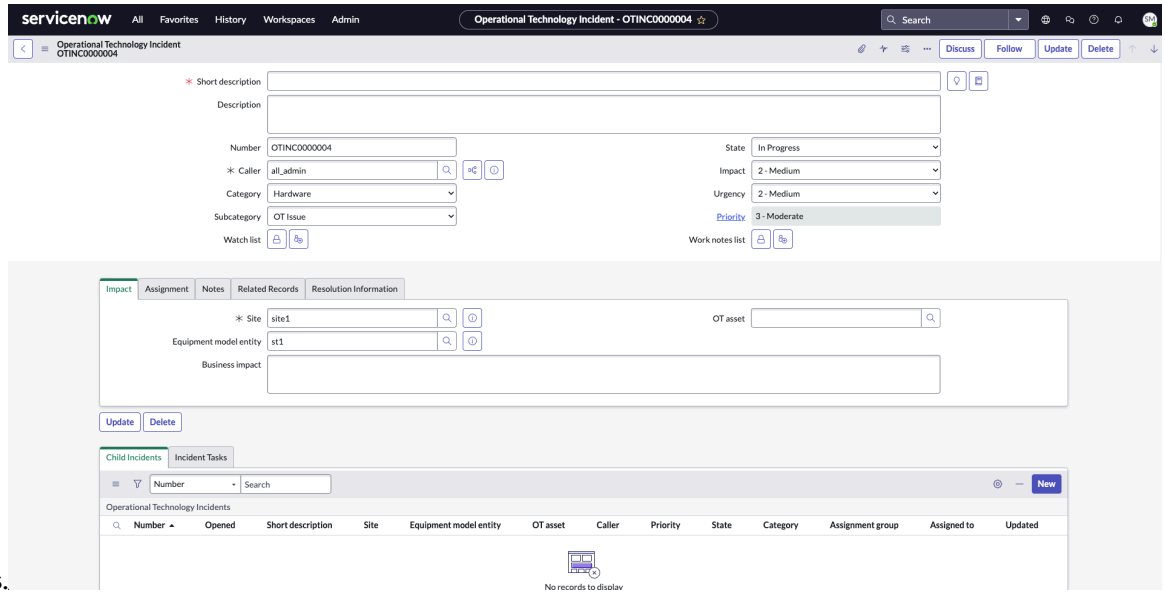
1. Navigate to **All** > **Incident** > **Open**.
2. Open the OT incident record that you want to create a task for.

3. In the Incident Tasks related list, select **New**.



If you don't see the Incident Tasks related list, you must add it.

4. On the form, fill in the fields.



Incident task form

Field	Description
Number	Unique system-generated incident task number.
Incident	Incident with which the task is related.
Site	Affected incident site. **Note:** This field is read-only and is automatically filled in with the related incident site, if applicable.
Equipment Model Entity	Affected equipment model entity. **Note:** This field is read-only and is automatically filled in with the related equipment model entity, if applicable.
OT device	Affected OT device.

Field	Description
	Note: This field is read-only and is automatically filled in with the related OT device, if applicable.
State	State for tracking an incident task through several stages of the incident's resolution.
Priority	Priority of the incident task.
Assignment group	Group who works on the incident task. If you leave this field empty, the incident is automatically assigned.
Assigned to	User to whom the incident task is assigned to work on. **Note:** If the **Assignment group** changes, the **Assigned to** field is cleared.
Short description	Brief description of the incident task.
Description	Detailed explanation on the incident task.
Notes	
Work notes list	Users who receive notifications about this incident task when work notes are added. **Note:** You can select the add me icon to add yourself to the work notes list.
Work notes	Information about how to resolve the incident task, or the steps that need to be taken to resolve it, if applicable.

5. Select **Submit**.

Result
Now, you can view and edit the incident task in the related OT incident record in the **Incident Tasks** tab on either the ServiceNow AI Platform or in the Industrial Workspace.

You can also view incident tasks in the Industrial Workspace list view in the following places.

- Incident tasks assigned to you: **OT Tasks** > **Assigned to Me**
- Incident tasks assigned to your group: **OT Tasks** > **Assigned to My Groups**
- Unassigned incident tasks: **OT Tasks** > **Unassigned**

Create a child incident

Create a child Operational Technology (OT) incident record to capture part of the deviation reported so that it can be worked on separately. Creating child incidents can help you organize multiple incidents related to the same parent.

Before you begin

- Enable the Create child incident feature (*com.snc.incident.create.child.enable*) property. For more information, see Set the system properties.
- Role required: sn_ot_incident_write

About this task

Fields that are copied over to the child incident are configured by using the *com.snc.sn_ot_incident.copy.attributes* system property.

Procedure

1. Navigate to the **OT Incidents** list module in the Industrial Workspace.
   Alternatively, you can go to an OT device record or equipment model entity record and select the **OT Incidents** tab.
2. Open the OT incident that you want to create a child incident for.
3. Select the **Child Incidents** related list.
4. Select **New**.
5. Fill in the details of the child incident.
6. Select **Save**.

Result

Now, you can view and edit the child incident in the parent incident record.

Visibility of incidents across sites

With the Operational Technology (OT) incident fulfiller role (sn_ot_incident_write), you can view, create, or edit the incidents that belong to your site. You can also view the incidents that belong to other sites to help resolve similar incidents at your site.

OT incident visibility overview

If you're a user with the OT incident fulfiller role (sn_ot_incident_write), you can do the following tasks:

- View and edit the OT incident records that are assigned to you or the incidents that belong to your site.
- Create OT incidents.
- View OT incidents that belong to the other sites.

Benefit of the OT incident fulfiller role

The main benefit of being an OT incident fulfiller is that you have read-only visibility of incidents across sites. Viewing other incidents across sites can help you resolve similar incidents at your site.

Note:
You can't edit OT incidents for other sites. You can only edit incidents that belong to your site.

Where to view or edit incidents

The following OT incident lists are available in the Lists module on the Industrial Workspace:

- Assigned to me: View and edit your assigned incident records by navigating to **OT Incidents** > **Assigned to me**.
- Belong to my sites: View and edit the incident records that belong to your sites by navigating to **OT Incidents** > **Belong to my sites**.
- View the existing incident records at different sites by navigating to **OT Incidents** > **All**.

Synchronization between an incident and its incident tasks

You can use Operational Technology (OT) incident tasks to collaborate with and request work from other stakeholders. An OT incident and its tasks are synchronized so that the state of the incident tasks change depending on the state of incident.

The *com.snc.incident.ot_incident_task.closure* property closes open incident tasks when the related incident is closed or canceled. This property is responsible for different actions that take place on OT incident tasks based on the state of the OT incident.

The synchronization between an OT incident and its open OT incident task is as follows:

- When an OT incident is closed, the state of any open OT incident task is set to **Closed Incomplete**.
- When an OT incident is canceled, the state of any open OT incident task is set to **Closed Skipped**.

Incident email notifications

Use Operational Technology (OT) incident email notifications to alert users when changes are made to an incident.

The notifications are listed in the following table.

OT incident email notifications

Notification name	When to send	Who receives it	What it contains
Incident commented	When an extra comment is added	Assigned to, Watch list	Subject: <Incident #> - comment added Body: Comment added URL to the incident
Incident opened and unassigned	When the **Assigned to** field changes to empty and **Active** is true	The one who opened the incident	Subject: <Incident #> - is unassigned Body: Please identify someone to work on this incident URL to the incident
Incident closed	When the incident is closed	Assignment group	Subject: <Incident #> - is closed

OT incident email notifications (continued)

Notification name	When to send	Who receives it	What it contains
			Body: Resolution Code and Resolution Notes
Incident priority changed	When triggered	Assigned to, Assignment group, Watch list	Subject: <Incident #> - priority changed Body: New priority: <priority>
Incident resolved	When the incident state changes to **Resolved**	Caller, Watch list	Subject: <Incident #> - is resolved Body: Resolution Code and Resolution Notes
Incident assigned to my group	When the **Assignment Group** field changes	Assignment group, Watch list	Subject: <Incident #> - is assigned to <assignment group> Body: Priority, Short description, Description URL to the incident
Incident assigned to me	When the **Assigned to** field changes	Assigned to, Watch list	Subject: <Incident #> - is assigned to you Body: Priority, Short description, Description URL to the incident
Incident opened for me	When a new incident is created	Caller	Subject: <Incident #> - is opened on your request Body: Priority, Short description, Description URL to the incident
Incident state changed	When the state of the incident changes	Assigned to, Watch list	Subject: <Incident #> - State changed

OT incident email notifications (continued)

Notification name	When to send	Who receives it	What it contains
			Body: Short description, Old State, New State URL to the incident

Compose an email from an OT incident record

Compose an email directly in an OT incident record so that you can conveniently update your team and others about the incident.

Before you begin

Role required: sn_ot_incident_write

Procedure

1. Navigate to **All** > **Industrial Workspace**.
2. Open the Industrial Workspace list view.
3. In the OT Incidents list module, select one of the available lists.
4. Select the incident record that you want to send an email for.
5. In the incident header, open the menu by selecting the **More actions** ··· button.
6. Select **Compose Email**.
7. On the email template, fill in the form.

Email template form

Field	Description
To	User or users that you want to send the email to. This field automatically fills in the user in the **Assigned to** field of the OT incident record.
Subject	Subject of the email. This field automatically fills in the number of the OT incident record and its short description.
Body	Updates that you want to send to a user or users that are related to the OT incident.

8. **Optional:** If the email is a response, you can use a response template in the **Response Templates** field to fill in the email body.
9. **Optional:** To save the email as a draft, select **Save as draft**.
10. Select **Send Email**.

Result
The email is sent to the user or users that you specified in the email template.

Resolve and close an incident

When an issue is corrected, you can set the Operational Technology (OT) incident state to **Resolved**. If you're happy with the resolution, you can close the incident. The incident also auto-closes after a certain amount of time based on the incident auto-close properties.

Before you begin
Role required: sn_ot_incident_write

Procedure
1. Navigate to **All** > **Incident** > **Open**.
2. Open the in-progress OT incident that you want to resolve and close.
3. In the **Resolution Information** related list, fill in the following fields.

Resolution Information fields

Field	Description
Resolution code	Information to categorize resolved cases. **Duplicate** Incident is a duplicate of an existing incident and should be closed. **Known error** Incident was resolved by a solution from a known error. **Resolved by caller** Incident was resolved by the user who contacted the OT engineer for the issue. **Resolved by change** Incident was resolved with an OT change request. For more information about OT change requests, see Create a change request. **Resolved by problem** Incident was resolved with a problem that identified the cause of the incident. For more information about problems, see Managing Problems. **Resolved by request** Incident was resolved by an OT request.

Field	Description
	For more information about OT requests, see Create an Operational Technology request on the Industrial Workspace. **Solution provided** Solution for the incident was provided that doesn't fit the other resolution codes.
Resolution notes	Describes how the incident was resolved.

4. In the **State** field, select **Resolved**.
5. Click **Update**.

Edit the related devices and equipment model entities in an incident record

Add or remove the related Operational Technology (OT) devices and equipment model entities directly from an OT incident record. You can track the relationship between the incident and its affected items.

Before you begin
Role required: sn_ot_incident_write or sn_ot_incident_admin

Procedure
1. Navigate to **All** > **Industrial Workspace**.
2. Open the Industrial Workspace list view.
3. In the OT Incidents list module, select one of the available lists.
4. Select the incident record that you want to edit.
5. Add or remove a related OT device.
   The OT devices are now added to or removed from the change record in the Affected OT Devices related list.
6. Add or remove an equipment model entity from an incident record by repeating steps 4 and 5 but in the Impacted Equipment Model Entities related list.

Operational Technology Incident Management reference

Reference topics provide additional information about the Operational Technology Incident Management application.

Assignment rule form

Assignment rules automatically assign an Operational Technology (OT) incident to a group or user according to one or more conditions in the assignment rule.

The following table describes the field values for the Assignment rule form.

Assignment rule form

Field	Description
Name	Descriptive name for the assignment rule.
Active	Option to activate the assignment rule.
Applies to	
Table	Table with the records that the assignment rule applies to. **Note:** For assignment rules that are specific to OT incidents, set the Table field to **Operational Technology Incident [sn_ot_incident]**. The list shows only the tables and database views that are in the same scope as the assignment rule. If you select a custom table that extends the task table and to make sure that the assignment rule works properly, you must clear the instance cache by navigating to https://<instance_name>.service-now.com/cache.do. **Important:** Clearing the system cache can affect the overall performance and may degrade the system response times. Don't run cache flushes during business hours, and don't trigger cache flushes to run automatically.
Conditions	Conditions under which the assignment rule applies.
Assign to	
User	User that the event is assigned to.
Group	Group that the event is assigned to.
Script	
Script	Script to specify the advanced assignment rule functionality. The current.variable_pool set of variables is available. **Note:** Make sure that the input in the script is correct and that the input type matches the field type in the Assignment Rule script. For example, if the assignment rule script sets the value of an Integer field, and the value in the script is set to String, the assignment rule may yield unexpected results.
Optional fields	
Match conditions	**Any** If any of the conditions are met, the assignment rule applies. **All** If all the conditions are met, the assignment rule applies.
Execution Order	Order in which the assignment rule is processed. If the assignment rules conflict, a rule with a lower-order value takes precedence over a rule with a higher value. If the order values are set to the same number, the assignment rule with the first matching condition takes precedence over the others without the first matching condition. Only the first assignment rule with a matching condition runs against a record.

Components installed with Operational Technology Incident Management

Several types of components may be installed with activation of the Operational Technology Incident Management (sn_ot_inc_mgmt) plugin, including user roles.

Note:
The Application Files table lists the components that are installed with this application. For instructions on how to access this table, see Find components installed with an application.

Roles installed

Role	Description	Contains roles
OT Incident Admin [sn_ot_incident_admin]	Can create, view, delete and edit OT incident records for any equipment model entities. Can configure **Priority Lookup Rules** and **OT incident system properties**.	• cmdb_ot_isa_viewer_all • sn_ot_incident_write
OT Incident Reader [sn_ot_incident_read]	Can only view OT incident records.	• cmdb_ot_viewer • cmdb_ot_isa_viewer
OT Incident Fulfiller [sn_ot_incident_write]	Can view, create, and edit OT incident records.	sn_ot_incident_read

Note:
The OT Incident User [ot_incident_user] role is deprecated. For users assigned this role, you can execute a scheduled job to assign them new Operational Technology Incident Management roles. For more information, see Assign new roles to your users.

Tables installed

Table	Description
OT Incidents [sn_ot_incident]	List of OT incidents reported across sites.
OT Incident Tasks [sn_ot_incident_task]	List of OT incident tasks created under various OT incidents.
OT Incident Priority Rule Lookup [dl_ot_inc_priority]	List of rules to calculate the priority of an OT incident.

Related information

Find more information about the OT extension classes and related applications.

Extension classes overview

The extension classes help you understand how Operational Technology Management works with the Configuration Management Database (CMDB).

Operational Technology (OT) extension classes

The Configuration Management Database (CMDB) updates classes for OT.

Related applications

IT Service Management

When integrated with Operational Technology Incident Management, the ServiceNow IT Service Management application enables engineers to resolve OT device and production process issues quickly.

Operational Technology Change Management

The ServiceNow® Operational Technology Change Management application enables your organization to implement changes to Operational Technology (OT) devices and production processes.

Explore  Exploring Operational Technology Change Management	Configure  Plan and configure your implementation
Use  Using Operational Technology Change Management	Reference  Get details about related information and applications

Exploring Operational Technology Change Management

Learn more about the Operational Technology Change Management application.

Operational Technology Change Management overview

Watch an overview about the Operational Technology Service Management product suite to learn more about the Operational Technology Change Management application.
https://player.vimeo.com/video/1019801515?badge=0&autopause=0&player_id=0&app_id=58479

Key features

With the Operational Technology Change Management application, you can use the following key features:

- Digitized change workflow that connects all stakeholders.
- Sites that have different change management processes (workflows).
- Separated IT Change Management and Operational Technology Change Management, but ability to be combined if necessary.
- Integrated Operational Technology Change Management workflow with the Operational Technology Incident Management and Operational Technology Vulnerability Response applications.
- Aligned factory floor changes for the equipment model entities with downtime schedules.

Using Operational Technology Change Management to optimize your production process

The Operational Technology Change Management application enables your team members to work collaboratively on changes to operational technology (OT) devices or industrial equipment configurations. These changes include any optimizations, alterations in the production process, or vulnerability fixes.

Operational Technology Change Management overview

By using the Operational Technology Change Management application, you can manage your OT change requests separately from your Information Technology (IT) change requests. You can separate OT change requests from IT change requests by the network type and you can manage OT change requests per site.

The following examples show how to apply Operational Technology Change Management to your organization:

- An OT remediation owner, who's responsible for fixing vulnerabilities on OT devices, wants to initiate a change to fix a group of vulnerabilities.
- An OT technician, who's responsible for OT configurations and plant engineering activities, wants to execute a change to fix a malfunctioned robotic arm on the industrial floor.
- A plant head, who's responsible for overall production activity, wants to review and approve a change requested by the engineering team.

OT change requests

OT change requests occur when there's a disruption in service from an OT device on an OT network. In some cases, the OT device may not be known when the change request is created. When you create an OT change request from the Industrial Workspace, the change request is automatically assigned a Network Type of **OT**. This attribute is used to distinguish an OT change request from an IT change request. This field isn't displayed by default. For more information about OT devices, see OT device related items and related lists.

For more information about how to create an OT change request, see Create a change request.

Separating an IT and OT change

When the Operational Technology Change Management application is installed on your instance, you can choose a Network Type of **IT**, **OT**, or **None**. New change requests are assigned a Network Type of **None** by default.

Operational Technology Change Management model state transitions

The following tables list the Operational Technology Change Management model state transitions for both the Basic OT Change Model and the Advanced OT Change Model. For more information about the OT Change Models, see Select a change model to fulfill change requests.

States for the Basic OT Change Model

State	Description
New	An OT change request is initiated.
Plan	The OT change request is analyzed with the following criteria: • Justification • Implementation plan • Risk and impact analysis • Backout plan • Test plan • Schedule the change
Implementation	The change is performed on the targeted OT device.
Closed	The change record is closed after the change is completed.
Canceled	The change record is canceled and the change isn't applied to the OT device.

States for the Advanced OT Change Model

State	Description
New	An OT change request is initiated.
Plan	The OT change request is analyzed with the following criteria: • Justification • Implementation plan • Risk and impact analysis • Backout plan • Test plan • Schedule the change

States for the Advanced OT Change Model (continued)

State	Description
Approve	The reviewers approve or deny the OT change request.
Implementation	The change is performed on the targeted OT device.
Post-Implementation Review	Add additional OT change tasks if needed and perform the following checks: • Electrical check • Network check • Quality check • Safety check
Closed	The change record is closed after the change is completed.
Canceled	The change record is canceled and the change isn't applied to the OT device.

Configuring Operational Technology Change Management

Configure the Operational Technology Change Management application so that you can create the data foundation for the ServiceNow® Operational Technology (OT) solution.

If you have the admin role, you can use the Guided Setup to lead you through the setup of the Operational Technology Change Management application. Guided Setup is a tool that assists with application configuration. It organizes the configuration activities into categories. These categories contain the information about the setup tasks, steps to complete each task, and links to the pages in your instance where you perform the configuration. Links to useful help content are also provided.

Note:

Operational Technology Change Management is dependent on Utah P4 or later releases.

To access the Guided Setup, navigate to *Industrial Workspace Admin* > **Guided Setup**.

The following table explains the Guided Setup tasks and their purpose for the Operational Technology Change Management application.

Task	Purpose
1. Install the Operational Technology Change Management application from the ServiceNow Store.	Installs the Operational Technology Change Management application and supporting plugins.
2. Assign Operational Technology Change Management roles.	Assigns the roles to control the actions that are available for each user.
3. Configure Operational Technology Change Management categories.	Configures the categories for the OT changes that are needed for your organization.

Task	Purpose
4. Select the Operational Technology Change Management model.	Selects the change model for your organization.

Install Operational Technology Change Management

You can install the Operational Technology Change Management application (sn_ot_chg_mgmt) if you have the admin role.

Before you begin

- Ensure that the application and all of its associated ServiceNow Store applications have valid ServiceNow entitlements. For more information, see Get entitlement for a ServiceNow product or application.
- The Operational Technology Change Management application requires the following plugins. Ensure that these plugins are activated before you install the Operational Technology Change Management application.

  Required ServiceNow plugins

  CMDB CI Class Models (sn_cmdb_ci_class)

  The Configuration Management Database (CMDB) CI Class Models store app adds class models that extend the CMDB class hierarchy, including the class descriptions, identification rules, identifier entries, and dependent relationships. For more information, see CMDB CI Class Models store app.

  ISA Equipment Model (sn_isa_model)

  The data model for ISA-95 equipment model entities and templates. For more information, see ISA-95 equipment model.

- The Operational Technology Change Management application requires either one or both of the following ServiceNow Store applications. Ensure that at least one of these applications is installed before you install the Operational Technology Change Management application.

  Required ServiceNow Store applications

  Operational Technology Manager

  The Operational Technology Manager application creates the foundational data and relationships that enable your organization to use the Operational Technology solution. The Operational Technology Manager application supports the use of the Configuration Management Database (CMDB), Service Graph Connectors, and Discovery applications in the ServiceNow AI Platform. For more information, see Configuring the Operational Technology Manager.

  Industrial Process Manager

  The Industrial Process Manager application creates the ISA-95 Equipment Model data foundation that is required for the ServiceNow® Industrial solution, enabling you to create your own version of the equipment models in each of your industrial sites. For more information, see Configuring the Industrial Process Manager.

Role required: admin

About this task

The following items are installed with the Operational Technology Change Management application:

- Plugins
- Store applications
- Roles and ACLs

For more information about the roles and ACLs installed, see Components installed with Operational Technology Change Management.

Note:
For Operational Technology Service Management users with no license for Operational Technology Visibility, note the following:

- When you have the latest version of Operational Technology Incident Management installed, Industrial Process Manager is also installed.
- When you have the latest version of Operational Technology Change Management installed, Industrial Process Manager is also installed.

You should upgrade to the latest versions so you have access to the Operational Technology Service Management experience.

Procedure

1. Navigate to **All** > **System Applications** > **All Available Applications** > **All**.
2. Find the Operational Technology Change Management application by using the filter criteria and search bar.

   You can search for the application by its name or ID. If you can't find the application, you might have to request it from the ServiceNow Store.

   Visit the ServiceNow Store website to view all the available apps and for information about submitting requests to the store. For cumulative release notes information for all released apps, see the ServiceNow Store version history release notes.
3. In the Application installation dialog box, review the application dependencies.

   Dependent plugins and applications are listed if they'll be installed, are currently installed, or must be installed. If any plugins or applications must be installed, you must install them before you can install the Operational Technology Change Management application.
4. Select **Install**.

Assign Operational Technology Change Management roles

Assign roles to your users so that you can control their access to the features, capabilities, and data in the Operational Technology Change Management application.

Before you begin

Role required: admin

About this task

Users with the roles that are listed in the following table can use the application.

Role	Description
Change Manager [sn_ot_change_manager]	Can manage OT change model records.
Change Admin [sn_ot_change_admin]	Can create, view, delete, and edit OT change records. Can configure categories and system properties.
Change Write user [sn_ot_change_write]	Can create, view, and edit OT change records. Can also be assigned IT change tasks, and can edit and close the IT change task they're assigned to. For more information, see Managing change requests across sites.
Change Read user [sn_ot_change_read]	Can only view OT change records.

Procedure

Assign roles to users and groups by using the ServiceNow AI Platform user administration feature.

Select a change model to fulfill change requests

Select an Operational Technology (OT) change model to begin fulfilling your change requests depending on the needs of your organization.

Before you begin

Role required: sn_ot_change_admin or admin

About this task

Two OT change models are available for you to use:

- OT Change Basic
- OT Change Advanced

The OT Change Basic model uses the change process without approvals.

For more information about the OT Change Basic Model, see Basic OT Change Model playbook.

The OT Change Advanced model uses the change process with approvals. You can create a change approval policy and assign an approval group to review your change request. For more information about change approvals, see Operational Technology change approval.

For more information about the Advanced OT Change Model, see Advanced OT Change Model playbook.

Procedure

1. Navigate to **Industrial Workspace Admin** > **Guided Setup**.
2. In the Operational Technology Change Management category, select **Get Started**.
3. Next to the Change Models section, select **Configure**.

4. Select the change model that fits the needs of your organization.
5. Edit the record as needed.

Result
The change model is applied to your system and you can begin creating OT change requests.

Basic OT Change Model playbook

Learn about the Basic Operational Technology (OT) Change Model playbook stages that an OT change without approvals must go through until it's completed.

Initiate

The Initiate stage of an OT change request lets you capture the details of the requested change and assign the change as necessary. This stage has three tasks.

Describe the change

Field	Description
Short description	Brief description of the change.
Description	Details of the change.
Category	Type of change.
Site	Site where the change takes place.
Watch list	Users who receive notifications about this change when comments are added.
Work notes list	Users who receive notifications about this change when work notes are added.

Capture risk

Field	Description
Priority	Impact and urgency to identify how quickly the change should be addressed.
Risk	Amount of risk that the change poses.
Impact	Measure of the effect that a change has on your industrial processes.

Assign the change

Field	Description
Requested by	User who requests the change.
Assignment group	Assigned group that works on the change. The assignment group can be any group with the type OT.
Assigned to	User who works on this change. If the assignment group changes, the **Assigned to** field is cleared.

Plan

The Plan stage of an OT Change request lets you add a justification for the change, an implementation plan, a risk and impact plan, a backout plan, a test plan, and a time to schedule the change. This stage has six tasks.

Add a justification

Field	Description
Justification	Reason why the change must take place.

Add implementation plan

Field	Description
Implementation plan	Details of how to implement the requested change.

Add risk and impact analysis

Field	Description
Risk and impact analysis	Details of any risk and impact factors that are related to this change.

Add backout plan

Field	Description
Backout plan	Details of how to reverse the change in place if necessary.

Add test plan

Field	Description
Test plan	Details of how to test the implemented change.

Schedule the change

Field	Description
Planned start date	Date that the change takes place. **Note:** You can also choose an available downtime slot on the calendar by selecting the **Scheduling Assistant** button to fill in the planned start date field automatically.
Planned end date	Date that the change ends.

Schedule the change (continued)

Field	Description
	Note: You can also choose an available downtime slot on the calendar by selecting the **Scheduling Assistant** button to fill in the planned end date field automatically.

Implement

The Implement stage of an OT change request provides the details of the following task. You can mark this stage as complete when it's finished.

Perform the change

Mark as complete when the change is performed on the targeted OT devices and completed.

Close

The Close stage lets you close the change record after the change is completed.

Close the change record

Field	Description
Close code	Reason that the change record was closed.
Close notes	Additional details about closing the change record.

Advanced OT Change Model playbook

Learn about the Advanced Operational Technology (OT) Change Model playbook stages that an OT change with approvals must go through until it’s completed.

Initiate

The Initiate stage of an OT Change request lets you capture the details of the requested change and assign the change as necessary. This stage has three tasks.

Describe the change

Field	Description
Short description	Brief description of the change.
Description	Details of the change.
Category	Type of change.
Site	Site where the change takes place.
Watch list	Users who receive notifications about this change when comments are added.

Describe the change (continued)

Field	Description
Work notes list	Users who receive notifications about this change when work notes are added.

Capture risk

Field	Description
Priority	Impact and urgency to identify how quickly the change should be addressed.
Risk	Amount of risk the change poses.
Impact	Measure of the effect that a change has on your industrial processes.

Assign the change

Field	Description
Requested by	User who requests the change.
Assignment group	Assigned group that works on the change. The assignment group can be any group with the type OT.
Assigned to	User who works on this change. If the assignment group changes, the **Assigned to** field is cleared.

Plan

The Plan stage of an OT change request lets you add a justification for the change, an implementation plan, a risk and impact plan, a backout plan, a test plan, and a time to schedule the change. This stage has six tasks.

Add justification

Field	Description
Justification	Reason why the change must take place.

Add implementation plan

Field	Description
Implementation plan	Details of how to implement the requested change.

Add risk and impact analysis

Field	Description
Risk and impact analysis	Details of any risk and impact factors that are related to this change.

Add backout plan

Field	Description
Backout plan	Details of how to reverse the change in place if necessary.

Add test plan

Field	Description
Test plan	Details of how to test the implemented change.

Schedule the change

Field	Description
Planned start date	Date that the change takes place. **Note:** You can also choose an available downtime slot on the calendar by selecting the **Scheduling Assistant** button to fill in the planned start date field automatically.
Planned end date	Date that the change ends. **Note:** You can also choose an available downtime slot on the calendar by selecting the **Scheduling Assistant** button to fill in the planned end date field automatically.

Approve

The Approve stage of an OT Change request lets reviewers approve or deny the OT Change. This stage includes only one task.

Review and take action

Field	Description
Approve button	If you're a reviewer shown in the table on the task form, select **Approve** to accept the change.
Deny button	If you're a reviewer shown in the table on the task form, select **Deny** to reject the change.
Comments	Additional information about the approval or denial of the change.

For more information about change approvals, see Operational Technology change approval.

Implement

The Implement stage of an OT change request provides the details of the following tasks. You can mark this stage as complete when it's finished.

Stop the function

If needed, mark as complete after you stop the function of the targeted OT devices.

Ensure LOTO

Lockout/Target (LOTO) is a safety procedure to prevent accidental or unintentional start-up of machinery during maintenance or service. Mark as complete when LOTO is completed.

Perform the change

Mark as complete when the change is performed on the targeted OT devices and completed.

Post-implementation Review

The Post-implementation Review stage of an OT change request lets you check off the performed tasks, create additional OT change tasks for remaining work identified during the review, and mark the revoke LOTO process as complete.

Perform checks

Field	Description
Perform electrical check	Check box that you select after the electrical check has been completed.
Perform network check	Check box that you select after the network check has been completed.
Perform quality check	Check box that you select after the quality check has been completed.
Perform safety check	Check box that you select after the safety check has been completed.

Recommend spin-off tasks

Field	Description
OT Change Tasks	List of the change tasks that are related to the OT change.
State	State of the OT change. The state moves and tracks changes through several stages of resolution.
Assigned to	User who works on this change. If the assignment group changes, the **Assigned to** field is cleared.
Short description	Brief description of the change task.

Revoke LOTO

After the change is implemented and reviewed, mark as complete when the lockout-target is revoked.

Spin-off Tasks

The Spin-off Tasks stage lists all the change tasks in the Post Implementation Review that must be completed.

Close

The Close stage lets you close the change record after the change is completed.

Close change record

Field	Description
Close code	Reason that the change record was closed.
Close notes	Additional details about closing the change record.

Using Operational Technology Change Management

After you complete all required set-up tasks for the Operational Technology Change Management application, you can begin managing Operational Technology (OT) change requests.

Create a change request

Create an Operational Technology (OT) change request to report a change in your site.

Before you begin
Role required: sn_ot_change_write

Procedure

1. Navigate to **All** > **Industrial Workspace**.
2. In the **OT Change Requests** list view, select the list you want to open.
3. Select **New**.

4. Select the OT change model that applies to your organization.
5. Select **Create OT Change Record**.
6. Complete the playbook as needed as your team works on the change request.
   For more information about the Basic OT Change Model playbook, see Basic OT Change Model playbook. For more information about the Advanced OT Change Model playbook, see Advanced OT Change Model playbook.

Note:
If you don't have Playbook enabled, you can only view the **Details** and **Related Records** tabs in the OT change request record.

Create a change task to fulfill a change request

Create a change task to fulfill an Operational Technology (OT) change request. Change tasks help to capture all the tasks that need to take place during a change request.

Before you begin

Role required: sn_ot_change_write

About this task

Change tasks are the individual steps that must take place to fulfill and complete a change request.

Procedure

1. Navigate to **All** > **Industrial Workspace**.
2. Select the change record that you want to create a task for.
3. In the Change Tasks related list, select **New**.
   If you don’t see the Change Tasks related list, you must add it.
4. On the form, fill in the fields.

Incident task form

Field	Description
OT Change Task	
Short description	Brief description of the change task.
Description	Details of the change task.
OT device	Affected OT device.
OT change request	Record number of the related OT change request.
State	State for tracking a change task through several stages of the change implementation.
Type	Type of change.
Assignment	
Assignment group	Group who works on the change task. If you leave this field empty, the change task is automatically assigned.
Assigned to	User to whom the change task is assigned to work on.

Field	Description
OT Change Task	
	Note: If the **Assignment group** changes, the **Assigned to** field is cleared.
Notes	
Watch list	Users who receive notifications about this change when comments are added.
Work notes list	Users who receive notifications about this change when work notes are added.
Work notes (Private)	Work notes that aren't available to customers.

5. Select **Save**.

Result
You can view and edit the change task in the related OT change record.

You can view change tasks in the Industrial Workspace list view in the following places.

- Change tasks assigned to you: **OT Tasks** > **Assigned to Me**
- Change tasks assigned to your group: **OT Tasks** > **Assigned to My Groups**
- Unassigned change tasks: **OT Tasks** > **Unassigned**

Create a change request from OT device details

Create an Operational Technology (OT) change request from an OT device record. Creating a change request from a device record automatically populates the information in your change request record, such as the site or business service and the OT Device field.

Before you begin
Role required: sn_ot_change_write

Procedure
1. Navigate to **All** > **Industrial Workspace**.
2. In the All OT Devices list, select an OT device record.
3. Under the **Related Records** tab, select the OT Change Requests related list.
4. Select **New**.
5. Select the OT change model that applies to your organization.
6. Select **Create OT Change Record**.
7. Complete the playbook as needed as your team works on the change request.

   For more information about the Basic OT Change Model playbook, see Basic OT Change Model playbook. For more information about the Advanced OT Change Model playbook, see Advanced OT Change Model playbook.

   The following fields are automatically populated depending on the conditions that you set.

- The **OT Device** field is auto-populated only if the Industrial Process Manager application is enabled.
- If the Industrial Process Manager is installed, then the site assigned to the OT device shows up in the **Site** field.
- If the Industrial Process Manager is enabled and there's only one entity that is associated with the OT device, then the **Equipment model entity** field is automatically populated.

> **Note:**
> If multiple entities are associated with an device, the **Equipment model entity** field is left empty.

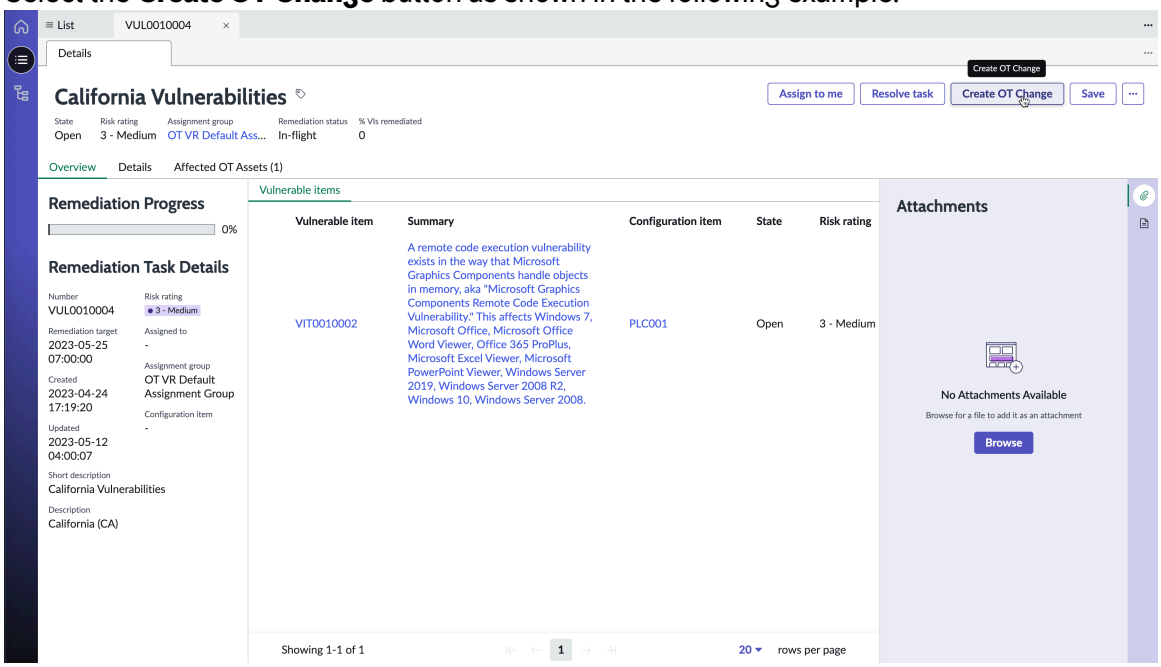
Result
The change request is created, and the users in the Assignment group, Assigned to, and Watch list fields are notified.

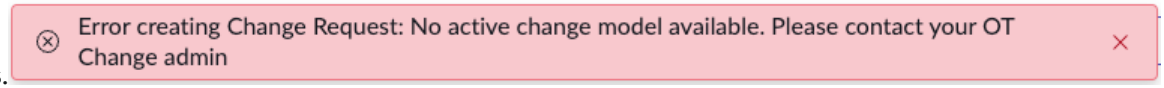
Create a change request from a remediation task

Create an Operational Technology (OT) change request from an OT remediation task. Creating a change request from a remediation task automatically populates the information in your change request record, such as the Site and the OT Device fields.

Before you begin
Roles required: sn_ot_change_write or sn_otvr.remediation_owner

Procedure
1. Navigate to **All** > **Industrial Workspace**.
2. Open the remediation task record that you want to create a change request from.
3. Select the **Create OT Change** button as shown in the following example.



> **Note:**
> If there's no active change model, the following error appears.
>
> 
>

4. Select the OT change model that applies to your organization.
5. Select **Next**.
6. Complete the playbook as needed as your team works on the change request.

   For more information about the Basic OT Change Model playbook, see Basic OT Change Model playbook. For more information about the Advanced OT Change Model playbook, see Advanced OT Change Model playbook.

   The following fields are automatically populated depending on the conditions that you set.

   - The **OT Device** field is auto-populated only if the Industrial Process Manager application is enabled.
   - If the Industrial Process Manager is installed, then the site assigned to the OT device shows up in the **Site** field.
   - If the Industrial Process Manager is enabled and there's only one entity that is associated with the OT device, then the **Equipment model entity** field is automatically populated.

     Note:
     If multiple entities are associated with an device, the **Equipment model entity** field is left empty.

Create a change request from an incident record

Create an Operational Technology (OT) change request from an OT incident record. By creating a change request directly from an incident record, the data is automatically mapped to the new change request from the incident record.

Before you begin

Role required: sn_ot_incident_write, sn_ot_incident_admin, or sn_ot_change_write

Procedure

1. Navigate to **All** > **Industrial Workspace**.
2. In the OT Incidents list module, select one of the available lists.
3. Select the incident record that you want to create an OT change request from.
4. Select the **Create OT Change** button.
   The Select OT change form opens.
5. Select the change model that is applicable to your organization.
   For more information, see Select a change model to fulfill change requests.
6. Select **Create OT Change record**.
7. Fill in the playbook and related forms as needed.

For more information about the playbook and related forms, see Basic OT Change Model playbook and Advanced OT Change Model playbook depending on which OT change model you chose.

Note:
In the Details related list of the new change request, the following fields and related lists are automatically filled in with the values from the related OT incident record:

- Site
- Equipment Model Entity
- OT Device (CI)
- Short Description
- Description
- Priority

Note:
A **Priority** field value from 1 through 4 is the same in the new change record. But a value of 5 in the incident record's **Priority** field is changed to 4 in the new change record.

Edit the related devices and equipment model entities in a change record

Add or remove the related Operational Technology (OT) devices and equipment model entities directly from an OT change record. You can track the relationship between the change request and its affected items.

Before you begin

Role required: sn_ot_change_write or sn_ot_change_admin

Procedure

1. Navigate to **All** > **Industrial Workspace**.
2. Open the Industrial Workspace list view.
3. In the OT Change Requests list module, select one of the available lists.
4. Select the change record that you want to edit.
5. Add or remove a related OT device.
   The OT devices are now added to or removed from the change record in the Affected OT Devices related list.
6. Add or remove an equipment model entity from a change record by repeating steps 4 and 5 but in the Impacted Equipment Model Entities related list.

Operational Technology change approval

The Operational Technology (OT) change approval lets reviewers approve your requested changes and suggest improvements as necessary.

Change approval overview

An OT change approval with the Advanced OT Change Model enables approvers to review a change request, edit the request as necessary, and approve the change request.

Note:
The change approval only applies to the Advanced OT Change Model. There's no change approval policy applied to the Basic OT Change Model.

Change approval requirements

Requirement	Description
Site level	Site or area where the change takes place.
Site approval group	Members assigned to an approval group that can review and approve change requests.
Role required	Approvers must have the sn_ot_change_read role.
Percentage of approvals	51% of the approval group has to approve the change for it to move forward.

OT change approval flow

The OT change approval flow is as follows.

1. Create the change request.
2. The flow is invoked based on the change model.
3. The flow applies the change approval policy.
4. Various decision records are evaluated.
5. Matching approval definitions are executed.
6. Add a list of site level approvers to the change record.

The Advanced OT Change Model contains a change approval policy. You can also create your own approval policy. For more information about how to create an approval policy, see Create change approval policies.

Add an approver to review a change request

Add a group member, or approver, manually to your approval group to review your Operational Technology (OT) change request.

Before you begin
Role required: admin

Procedure

1. Navigate to **All** > **User Administration** > **Groups**.
2. From the Groups list, select the **OT Change Default Approvers** group.
3. Select the Group Members related list.
4. Select **Edit**.
5. In the Collection list, select the members that you want to add to the approval group.
6. Move the selected members to the OT Change Default Approvers list by using the middle arrows.
7. Select **Save**.

Result
New members have been added to your approval group. Now, the approval group can review your change request.

Once you complete the Initiate and Plan stages of your OT change request in the Advanced OT Change Model playbook, you can request an approval in the Approve stage. The member or members in your approval group must open the change request record to approve it in the Industrial Workspace using either of the following methods.

- In the change request record, select the **Approvers** tab and change the **State** field from **Requested** to the appropriate option.
- In the **Playbook** tab, select the Approve stage and change the **State** field from **Requested** to the appropriate option.

Managing change requests across sites

You can view, create, or edit the change requests that belong to your site or other sites by using the Operational Technology Change Management application. By viewing the change requests from other sites, you can implement similar changes at your site.

Change requests across sites overview

If you have the sn_ot_change_write role, you can do the following tasks:

- View and edit the Operational Technology (OT) change requests that are assigned to you or the change requests that belong to your site.
- Create the OT change requests.
- View the OT change requests that belong to the other sites.

The main benefit of having the sn_ot_change_write role is that you have read-only visibility of changes across sites. Viewing other changes across sites can help you implement similar changes at your site.

Note:
You can only edit OT change requests belonging to sites you have access to. Learn more about additional roles required for managing cross-site OT change requests in the following sections.

Other OT roles and permissions that you need with the sn_ot_change_write role

The following table describes the additional roles that you, as a user with the sn_ot_change_write role, need so that you can access the change requests for your site or any site.

Other roles that you need with the sn_ot_change_write role

Role	Permissions
sn_ot_change_write with the cmdb_ot_isa_editor role	Create and edit the change requests for your site.
sn_ot_change_write with cmdb_ot_isa_viewer role	Create and edit the change requests for your site.
sn_ot_change_write and cmdb_ot_isa_viewer_all	Create and edit the change requests for any site.
sn_ot_change_write with no site role	View the change requests for any site.

Other OT roles and permissions that you need with the sn_ot_change_read role

The following table describes the additional roles and permissions that you, as a user with the sn_ot_change_read role, need so that you can view the change requests for your site or any site.

Other roles that you need with the sn_ot_change_read user role

Role	Permissions
sn_ot_change_read with the cmdb_ot_isa_editor role	View the change requests for your site.
sn_ot_change_read with cmdb_ot_isa_viewer role	View the change requests for your site.
sn_ot_change_read and cmdb_ot_isa_viewer_all	View the change requests for any site.
sn_ot_change_read with no site role	View the change requests for any site.

Where to view or edit change requests

The following OT change request lists are available in the Lists module on the Industrial Workspace:

- Assigned to me: View and edit your assigned change records by navigating to **OT Change Requests** > **Assigned to me**.
- Belong to my sites: View and edit the change records that belong to your sites by navigating to **OT Change Requests** > **Belong to my sites**.
- View the existing change records at different sites by navigating to **OT Change Requests** > **All**.

Visibility of change model records across sites

Depending on your Operational Technology (OT) change role and site role, you can view, create, or edit the change model record for your site or other sites.

OT Change roles and visibility to change model records

The following tables describe the roles and permissions for different OT change users to access change model records.

Permissions for users with the sn_ot_change_write role

Role	Permissions
sn_ot_change_write with cmdb_ot_isa_editor site role	Use a change model for their records.
sn_ot_change_write with cmdb_ot_isa_viewer site role	Use a change model for their records.
sn_ot_change_write with cmdb_ot_isa_viewer_all site role	Use a change model for their records.
sn_ot_change_write with no site role	No access to change models.

Permissions for users with the sn_ot_change_read role

Role	Permissions
sn_ot_change_read with cmdb_ot_isa_editor site role	No access to change models.
sn_ot_change_read with cmdb_ot_isa_viewer site role	No access to change models.
sn_ot_change_read with no site role	No access to change models.
sn_ot_change_read with cmdb_ot_isa_viewer_all site role	No access to change models.

Permissions for users with the sn_ot_change_manager role

Role	Permissions
sn_ot_change_manager with cmdb_ot_isa_editor site role	• Create, edit, and delete change models for any site. • Assign change models to any site. • Remove change models from any site.
sn_ot_change_manager with cmdb_ot_isa_viewer site role	• Create, edit, and delete change models for any site. • Assign change models to any site. • Remove change models from any site.
sn_ot_change_manager with no site role	Can’t view or edit change models for any site. Can only view the base system change models that aren't associated with any site.

If you have the sn_ot_change_admin role, you can use the change models to create a change request for any site.

Change email notifications

Use email notifications to alert users when an Operational Technology (OT) change request or a change task is updated.

The notifications for OT change requests and change tasks are listed in the following tables.

OT change request email notifications

Name	When to send	Who receives it	What it contains
Change assigned to me	When the **Assigned to** field changes and is not empty	User who's assigned the change	Subject: <Change request #> notification Body: Short Description: <Short description>

OT change request email notifications (continued)

Name	When to send	Who receives it	What it contains
			Click here to view Change Request: <URL to the change request> Site: <Site name> OT Device: <OT device> Equipment Model Entity: <Equipment model entity> Description: <Description>
Change assigned to my group	When the **Assignment group** field changes and is not empty	Assignment group	Subject: <Change request #> has been assigned to group <assignment group> Body: Short Description: <Short description> Click here to view Change Request: <URL to the change request> Site: <Site name> OT Device: <OT device> Equipment Model Entity: <Equipment model entity> Description: <description>
Change commented	When the change request is commented	• Requested By • Watch list	Subject: <Change request #> comments added Body: Short description: <Short description> Click here to view Change Request:

OT change request email notifications (continued)

Name	When to send	Who receives it	What it contains
			<URL to the change request> Comments: <Comments added to the change request>
Change worknoted	When a work note is added to the change request.	• Work note list • Assigned to • Assignment group	Subject: <Change request #> work notes added Body: Short description: <Short description> Click here to view Change Request: <URL to change request> Work Notes: <Work notes added to change request>
Change approved	When the change request is approved	• Assigned to • Assignment group	Subject: <Change request #> has been approved Body: Short Description: <Short description> Click here to view <URL to change request> Description: <Description>
Change rejected	When the change request is rejected	• Assigned to • Assignment group	Subject: <Change request #> has been rejected Body: Short Description: <Short description> Click here to view <URL to change request>

OT change request email notifications (continued)

Name	When to send	Who receives it	What it contains
			Description: <Description>
Change on hold	When the change request is put on hold	Requested By	Subject: <Change request #> has been put on hold Body: Hello <user who created change request>, The <Change request #> you requested has been put on hold. The reason for the request being put on hold is: <Reason for change request being put on hold> Click here to view your change request: <URL to change request>
Change off hold	When the change request is taken off hold	Requested By	Subject: <Change request #> has been taken off hold Body: Hello <user who created change request>, The <Change request #> you requested has been taken off hold and is in the <Updated state field> state. Click here to view your change request: <URL to change request>

OT change task email notifications

Name	When to send	Who receives it	What it contains
Change task assigned to me	When the **Assigned to** field changes and is not empty	Person who is assigned the change task	Subject: <Change task #> notification -- <Short description>

OT change task email notifications (continued)

Name	When to send	Who receives it	What it contains
			Body: Short Description: <Short description> Click here to view Change Task: <URL to change task> Site: <Site name> OT Device: <OT device> Equipment Model Entity: <Equipment model entity> Description: <Description>
Change task assigned to my group	When the **Assignment group** field changes and is not empty	Assignment group	Subject: Subject: <Change task #> notification -- <Short description> Body: Short Description: <Short description> Click here to view Change Task: <URL to change task> Site: <Site name> OT Device: <OT device> Equipment Model Entity: <Equipment model entity> Description: <Description>
Change task worknoted	When a work note is added to the change task	• Work note list • Assigned to • Assignment group	Subject: <Change task #> work notes added -- <Short description> Body: Short description: <Short description>

OT change task email notifications (continued)

Name	When to send	Who receives it	What it contains
			Click here to view Change Task: <URL to change task> Work Notes: <Work notes added to change task>

Operational Technology Change Management reference

Reference topics provide additional information about the Operational Technology Change Management application.

Change categories

By categorizing the Operational Technology (OT) change requests, you can group and narrow the search for specific OT change requests. Categories also help stakeholders know what the change is about.

When you can create an OT change request, you can choose from the categories listed in the following table.

OT change request categories

Category	Description
Hardware	Changes to add, remove, or configure OT devices.
Software	Changes to add, remove, or configure OT software.
Service	Changes to an OT service.
System Software	Changes to the OT system software.
Applications Software	Changes to the OT applications software.
Network	Changes to subnets, IP addresses, and MAC addresses.
Telecom	Changes to telecommuncations used in your OT system.
Documentation	Changes to the OT documentation.
Firmware	Changes to the OT firmware.
Other	Other changes not captures in the categories above.

Components installed with Operational Technology Change Management

Several types of components may be installed with activation of the Operational Technology Change Management (sn_ot_chg_mgmt) application, including the user roles.

Note:
The Application Files table lists the components that are installed with this application. For instructions on how to access this table, see Find components installed with an application.

Roles installed

Role	Description	Contains roles
Change Manager [sn_ot_change_manager]	Can manage OT change model records.	• sn_ot_change_write • sn_sttrm_condition_read
Change Admin [sn_ot_change_admin]	Can create, view, delete, and edit OT change records. Can configure categories and system properties.	• cmdb_ot_isa_viewer_all • sn_ot_change_write
Change Write user [sn_ot_change_write]	Can create, view, and edit OT change records. Can also be assigned IT change tasks, and can edit and close the IT change task they're assigned to. For more information, see Managing change requests across sites.	• cmdb_ot_viewer • cmdb_ot_isa_viewer • sn_ot_change_read
Change Read user [sn_ot_change_read]	Can only view OT change records.	• cmdb_ot_viewer • cmdb_ot_isa_viewer

Related information

Find more information about the OT extension classes and related applications.

Extension classes overview

The extension classes help you understand how Operational Technology Management works with the Configuration Management Database (CMDB).

Operational Technology (OT) extension classes

The Configuration Management Database (CMDB) updates classes for OT.

Related applications

IT Service Management

When integrated with Operational Technology Change Management, the ServiceNow IT Service Management application enables engineers to resolve OT device and production process issues quickly.

Operational Technology Knowledge Management

ServiceNow® Operational Technology Knowledge Management can help you collect, organize, and share knowledge about your Operational Technology (OT) system, its devices, and the resolved incidents within your organization.

Explore  Exploring Operational Technology Knowledge Management	Configure  Plan and configure your implementation
Use  Using Operational Technology Knowledge Management	Reference  Get details about related information and applications

Exploring Operational Technology Knowledge Management

Operational Technology Knowledge Management helps you to capture information about your Operational Technology (OT) system in knowledge articles that are related to OT incidents. Your organization can then use these knowledge articles to help your users to access the right information and prevent miscommunication with your users.

Operational Technology Knowledge Management overview

Watch an overview about the Operational Technology Service Management product suite to learn more about the Operational Technology Knowledge Management.
https://player.vimeo.com/video/1019801515?badge=0&autopause=0&player_id=0&app_id=58479

Operational Technology Knowledge Management benefits

With Operational Technology Knowledge Management, you can use the following key features:

- Ability to use the existing Knowledge Management ServiceNow AI Platform capabilities with the Operational Technology Management solution.
- Ability to browse all knowledge base articles that are related to an OT incident and to create knowledge articles directly from an incident record.
- Ability to configure an OT knowledge base for knowledge managers and knowledge users.
- Ability to create knowledge articles in the Industrial Workspace.

- Ability to request approvals to publish, edit, retire, or delete a knowledge article.
- Ability to edit existing knowledge articles with updated information.

Configuring Operational Technology Knowledge Management

Configure Operational Technology Knowledge Management so that you can create the data foundation for the Operational Technology (OT) solution.

If you have the admin role, you can use Guided Setup to lead you through the setup of Operational Technology Knowledge Management. Guided Setup is a tool that assists with application configuration. It organizes the configuration activities into categories. These categories contain the information about the setup tasks, the steps to complete each task, and the links to the pages in your instance where you perform the configuration. The links to useful help content are also provided.

To access Guided Setup, navigate to **Industrial Workspace Admin** > **Guided Setup**.

The following table lists the Guided Setup tasks and their purposes for Operational Technology Knowledge Management.

Note:
Operational Technology Knowledge Management is included with the Operational Technology Incident Management application. As long as you have the Operational Technology Incident Management application (version 2.0.2) installed and configured, you can configure Operational Technology Knowledge Management. No additional plugins are needed.

The following table shows the tasks that your users must complete for a successful setup and configuration.

Operational Technology Knowledge Management setup tasks

Task	Purpose
Assign Knowledge Management roles to Operational Technology Knowledge Management.	Assigns the roles to control the actions that are available for each user.
Create an OT knowledge base.	Configures an OT knowledge base to add managers and configure access.
Create user criteria to apply to an OT knowledge base.	Creates a user criteria record to determine the users who can read or contribute to an OT knowledge base.
Assign user criteria to an OT knowledge base.	Assigns the user criteria records to an OT knowledge base to control which users can create, read, write, and retire knowledge articles within the knowledge base.
Configure access to OT knowledge bases for unauthenticated users.	Reviews the OT knowledge bases that are accessible to unauthenticated users. Access is based on the user criteria and glide.knowman.block_access_with_no_user_criteria property settings.

Operational Technology Knowledge Management setup tasks (continued)

Task	Purpose
Assign knowledge workflows to an OT knowledge base.	Assigns different knowledge workflows to each OT knowledge base for the publishing and retiring processes.
Review the Knowledge Management properties that are used for Operational Technology Knowledge Management.	Configures the look and functionalities of OT knowledge bases with the applicable Knowledge Management properties.

Assign roles to your Operational Technology Knowledge Management users

Assign Knowledge Management roles to your users so that you can control their access to the features, capabilities, and data for Operational Technology Knowledge Management.

Before you begin

Role required: admin

About this task

If you're assigned a Knowledge Management role, you can use the Operational Technology Knowledge Management capabilities.

Note:
The user criteria determine the access to knowledge articles. For more information, see Managing access to knowledge bases and knowledge articles.

For more information about the Knowledge Management roles applicable to Operational Technology Knowledge Management, see Operational Technology Knowledge Management roles.

Procedure

Assign roles to users and groups by using the ServiceNow AI Platform user administration feature.

Create an OT knowledge base

Create an Operational Technology (OT) knowledge base to provide a self-service platform for OT knowledge users to store, share, and manage content that is related to OT incidents.

Before you begin

Role required: admin

Procedure

1. Navigate to **Knowledge** > **Administration** > **Knowledge Bases**.
2. Select **New**.
3. On the knowledge base form, fill in the fields.
   For a description of the field values, see Knowledge base form.
4. Right click the form header and select **Save**.
5. In the related list section, view or configure the items in the following table that are related to the OT knowledge base.

Name	Description
Knowledge	List of knowledge articles that are stored in this knowledge base.
Can Read	List of user criteria that grants read access and enables a user who matches the criteria to read articles in the OT knowledge base.
Can Contribute	List of user criteria that grants contributor access and enables users who match the criteria to create and modify the articles in the OT knowledge base.
Article Templates	If you've activated the Knowledge Management Advanced (com.snc.knowledge_advanced) plugin, the Article Templates related list is displayed. If article templates are in the related list, the articles in that knowledge base can only be created by using one of the article templates listed. If the Article Templates related list is empty, articles can be created by using any article template. Map article templates to the knowledge base by selecting **Edit**. **Note:** Admins, knowledge admins, and knowledge managers can edit the article templates for the knowledge base.
Knowledge categories	List of knowledge categories that are associated with the OT knowledge base. **Note:** If the category is marked as inactive, then you can't associate articles to the category. However, it doesn't affect the existing articles of that category.

6. Select **Submit**.

Create the user criteria for an OT knowledge base

Create a user criteria record to determine the users who can read or contribute to an Operational Technology (OT) knowledge base.

Before you begin

Role required: user_criteria_admin

Note:
To create a user criteria record from the Knowledge module, you must have the user_criteria_admin role in addition to the knowledge role. For more information about access, see Managing access to knowledge bases and knowledge articles.

About this task

Use the user criteria in Knowledge Management to determine whether certain users can access OT knowledge bases and knowledge articles. After you create a user criteria record, you can assign it to an OT knowledge base to control who can read and contribute to a knowledge base and its articles. You can further assign the user criteria at an article level to control who can read it.

Procedure

1. Navigate to **All** > **Knowledge** > **Administration** > **User Criteria**.
2. Select **New**.
3. On the form, fill in the fields.

User Criteria form

Field	Description
Name	Unique name of the user criteria.
Users	Users who must match the user criteria.
Groups	Groups that must match the user criteria.
Roles	Roles to match the user criteria. **Note:** ○ Because the evaluation of a role is cached in the session, any change in the role requires you to log in again. ○ User criteria are not applicable for elevated privilege roles.
Advanced	Option to display or hide the advanced option that includes the **Script** field on the User Criteria form.
Script	Script to define any additional user criteria that returns true or false. This field is available when the **Advanced** option is selected on the User Criteria form. **Note:** ○ A script is evaluated in the scope that the user criteria are created in. ○ The evaluation of a script is cached in the session, so any change in the evaluation requires you to log in again. If a scripted user criterion is defined for a knowledge base, the user access to the knowledge bases is evaluated after every session. If the script results in changes after a session cache is built, the result takes effect in the next session. ○ Don't use `gs.getUser()` or other session APIs because they cause conflicts when used in diagnostic tools. Use the predefined `user_id` variable available in the script to get the user ID of the user being used to evaluate the script. ○ Scripts are evaluated dynamically. Therefore, including scripts in a user criteria can impact the performance of your system.

Field	Description
Active	Option to activate or deactivate the user criteria.
Companies	Companies that the user record must match.
Locations	Locations that the user record must match.
Departments	Departments that the user record must match.
Match All	Option to determine whether all elements from each populated user criteria field must match. If selected, only the users who match all user criteria are given access. If cleared, the user must meet one or more of the set user criteria to be given access. By default, this check box is cleared so that any condition met provides a match. For example, consider a user criteria record for the following conditions: ○ Locations A or B ○ Company C or D With **Match All** selected, only the users who meet all of these conditions are matched. For example, a user with a location A and a company C. If **Match All** isn't selected, users who meet any of these conditions are matched. For example, a user with a location B. **Note:** If you select **Match All**, ensure that you don't create contradictory conditions that can never be met. For example, if all users in location A work for company G, the conditions in this example can never be met.

4. Select **Submit**.

What to do next
Now you can assign the user criteria to an OT knowledge base. For more information, see Assign the user criteria to an OT knowledge base.

Assign the user criteria to an OT knowledge base

Assign the user criteria records to an Operational Technology (OT) knowledge base to control which users can create, read, write, and retire knowledge articles within the knowledge base.

Before you begin
Role required: knowledge_manager, knowledge_admin, or admin

About this task
You can assign user criteria to an OT knowledge base to control read or contribute access.

Procedure
1. Navigate to **All** > **Knowledge** > **Administration** > **Knowledge Bases**.
2. Select the OT knowledge base record that you want to manage.
3. Add the user criteria to the OT knowledge base.

a. Depending on the user criteria that you want to set, select one or more of the related lists.

Related list	Description
Can Read	Users can read knowledge articles in the knowledge base.
Cannot Read	Users can't read knowledge articles in the knowledge base.
Can Contribute	Users can create, modify, and retire knowledge articles in a knowledge base. Contribute access to a knowledge base also provides read access to all articles in the knowledge base.
Cannot Contribute	Users can't create, modify, retire, or read knowledge articles in the knowledge base.

b. In the selected related list, add the required user criteria.

- As a user with the admin role, add a new user criteria record by selecting **New**, specifying the required fields, and selecting **Submit**.
- As a user with the knowledge_manager, knowledge_admin, or admin role, add an existing user criteria record by selecting **Edit**, moving the required user criteria from the Collection column to the Knowledge column, and selecting **Save**.

4. On the knowledge base form, select **Update**.

Review access to OT knowledge bases for unauthenticated users

Review the Operational Technology (OT) knowledge bases that are accessible to unauthenticated users by using the user criteria and *glide.knowman.block_access_with_no_user_criteria* property settings.

Before you begin

Role required: knowledge_admin or admin

About this task

If you want to restrict unauthenticated users for a knowledge base, you can use the user criteria or the *glide.knowman.block_access_with_no_user_criteria* property settings.

Procedure

1. Navigate to **All** > **Knowledge** > **Administration** > **Knowledge Bases**.
2. Review the OT knowledge bases that are accessible to unauthenticated users.
3. **Optional:** To restrict unauthenticated users for a knowledge base by using the user criteria, select the knowledge base record and update its user criteria.
   For more information about creating the user criteria, see Create the user criteria for an OT knowledge base. For more information about assigning the user criteria, see Assign the user criteria to an OT knowledge base.
4. **Optional:** Restrict unauthenticated users for a knowledge base by using the *glide.knowman.block_access_with_no_user_criteria* property settings.

a. Navigate to **All** > **Knowledge** > **Administration** > **Properties**.

b. Set the *glide.knowman.block_access_with_no_user_criteria* property settings to true.

c. Select **Save**.

Assigning knowledge workflows to an OT knowledge base

You can assign different Knowledge Management workflows to each Operational Technology (OT) knowledge base for the publishing and retiring processes.

Knowledge workflow overview

You can use the default Knowledge Management workflows in the following table for Operational Technology Knowledge Management and apply them to OT knowledge bases.

Note:
For the workflows that require approval, you can configure which users can approve or reject by editing the `getApprovers()` function in the `KBWorkflow` script include.

Default Knowledge Management workflows

Workflow	Description
Knowledge - Approval Publish	Requests approval from a manager of the knowledge base. Articles in approval have a state of **In Review** before moving to a **Published** state after approval. If they're set to publish later, they’re moved to a **Scheduled** state. If the manager rejects the request, the workflow is canceled and the article remains in the **Draft** state. If the**ownership groups** option is enabled, email notifications with a link to the article are sent to the ownership group members for approval. If the **ownership groups** option isn't enabled, email notifications with a link to the article are sent to the knowledge base managers for approval. A notification is also sent to the authors or the revisers of the articles to inform them that their article has been approved or rejected. To turn on the approval email notifications, set the *glide.knowman.enable_approval_notification* property to `true`. **Note:** Only the active user receives the notifications.

Default Knowledge Management workflows (continued)

Workflow	Description
Knowledge - Approval Retire	Requests approval from a manager of the knowledge base before moving the article to the retired state. If any manager rejects the request, the workflow is canceled and the article remains in the **Published** state. If the **ownership groups** option is enabled, email notifications with a link to the article are sent to the ownership group members for approval. If the **ownership groups** option isn't enabled, email notifications with a link to the article are sent to the knowledge base managers for approval.
Knowledge - Instant Publish	Immediately publishes a draft article without requiring an approval, or publishes on the scheduled publish date if set to publish later.
Knowledge - Instant Retire	Immediately retires a published article without requiring an approval.
Knowledge - Publish Knowledge	Subflow that moves the knowledge article to the **Published** state. You can use this subflow when defining your own workflow.
Knowledge - Retire Knowledge	Subflow that moves the knowledge article to the **Retired** state. You can use this subflow when defining your own workflow.

Email notifications for approval workflows

You can send email notifications for approval workflows.

- Notify approvers about the knowledge articles submitted for their approvals.
- Notify authors about the approval status of their knowledge articles

To send email notifications for approval workflows, enable the **Send notification to approvers and authors in article approval workflow** property (*glide.knowman.enable_approval_notification*). Beginning with the New York release, the property is enabled by default. Existing customers on release versions prior to the New York release can enable this property to send email notifications. Disable any custom notifications for article approvals before enabling this property. If the *glide.knowman.enable_approval_notification* property isn't available, an administrator can create the property and set its value to true. For more information, see Knowledge Management properties.

Reviewing the Knowledge Management property for an Operational Technology knowledge base

As an administrator, you can configure the look and functionalities of Operational Technology (OT) knowledge bases with the Knowledge Management properties.

You can access the Knowledge Management properties by navigating to **All** > **Knowledge** > **Administration** > **Properties**.

Use the property that is listed in the following table to control which roles can flag incomplete or inaccurate articles in knowledge bases.

Glide.knowman.show_flag.roles property

Property	Description
List of roles (comma-separated) that can flag incomplete/inaccurate articles (`glide.knowman.show_flag.roles`)	Enter the role names exactly as they appear in **User Administration** > **Roles**. If both the **Show article rating section** and **Show "Flag Article" option** properties are selected, the users with the roles listed in this property see the flag article option in the article view. All roles listed in this property must also be listed in the **List of roles that can see an article's rating section** property.

For more information about the other available Knowledge Management properties, see Knowledge Management properties.

Using Operational Technology Knowledge Management

After you complete all the required set-up tasks for Operational Technology Knowledge Management, you can begin managing knowledge articles that are related to Operational Technology (OT) incidents.

Operational Technology Knowledge Management overview

By using#Operational Technology Knowledge Management, you can create, edit, and retire knowledge articles depending on the needs of your team. When used with the Operational Technology Incident Management application, you can browse articles that are related to an incident and create articles from an incident.

The following examples show how to apply#Operational Technology Knowledge Management to your team:

- An OT engineer with several years of experience wants to capture their OT device knowledge in one place for guide workers and junior technicians.
- Front-line workers and technicians responsible for production process operations have noticed an issue on the factory floor and need a knowledge article that explains remediation.

Basic Operational Technology Knowledge Management Process

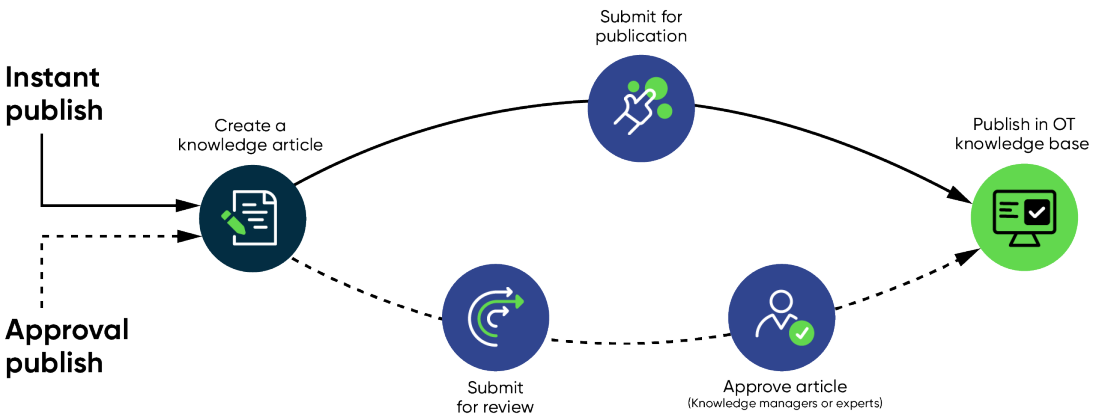
The following workflow describes the basic process for Operational Technology Knowledge Management.

Basic OT Knowledge workflow

Publish a knowledge article

The following workflow describes how a knowledge article is created and published both with (Approve Publish) and without (Instant Publish) approval.

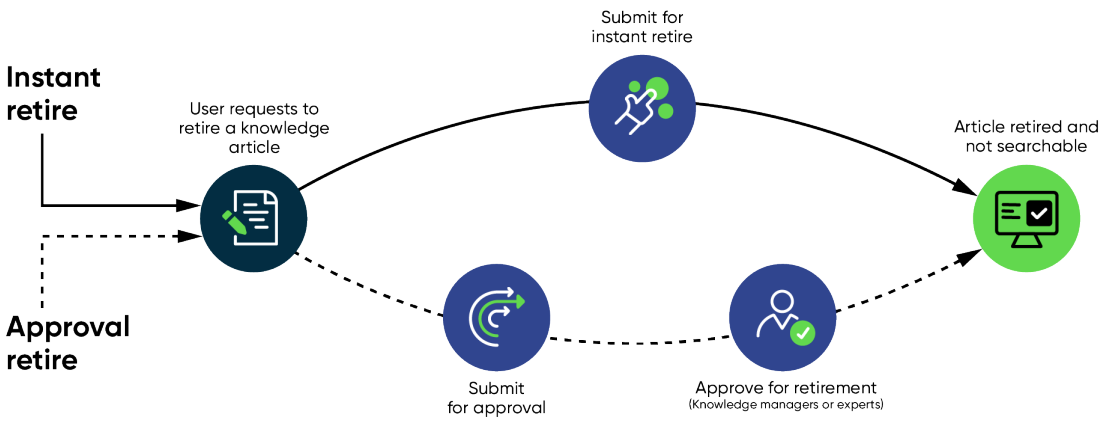
Publish workflow



Retire a knowledge article

The following workflow describes how a knowledge article is retired both with (Approve Retire) and without (Instant Retire) approval. The Instant Retire workflow lets you retire articles immediately without needing an approval. The Approval Retire workflow sends an approval request to knowledge managers or experts to make sure that retiring the article is necessary.

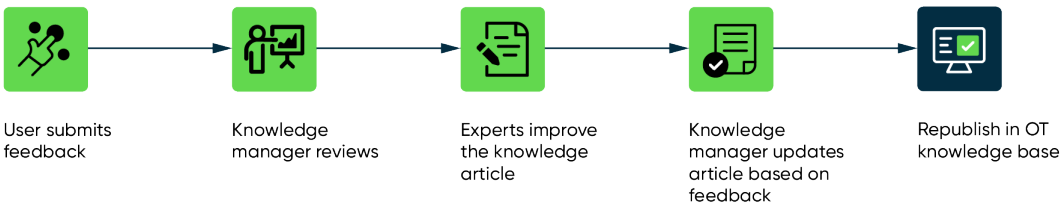
Retire workflow



Review and approve changes to a knowledge article

The following workflow describes how an existing knowledge article is updated with user feedback.

User feedback workflow



Knowledge articles

Knowledge articles provide information about workplace updates, self-help, troubleshooting steps, and other information that your OT team must access. For example, you can create the following knowledge articles for the following cases:

- A standard operating procedure template used throughout your organization.
- Lessons learned during an incident.
- An image that annotates the different production materials.

You can view the knowledge articles in the Industrial Workspace in the following ways:

- Under the Knowledge module in the Industrial Workspace list view.
- In the Agent Assist window when you open an OT incident.
- Using the global search feature in the Industrial Workspace header.

Under the Knowledge module in the Industrial Workspace list view, you can view knowledge articles in the following lists:

Note:
You must be assigned the knowledge role to see these list modules in the Industrial Workspace.

Your unpublished articles

The articles you've created that aren't yet published in the OT knowledge base.

Your published articles

The articles you've created that are published to the OT knowledge base.

All articles

All articles that are available in the OT knowledge base.

Create a knowledge article from an OT incident record

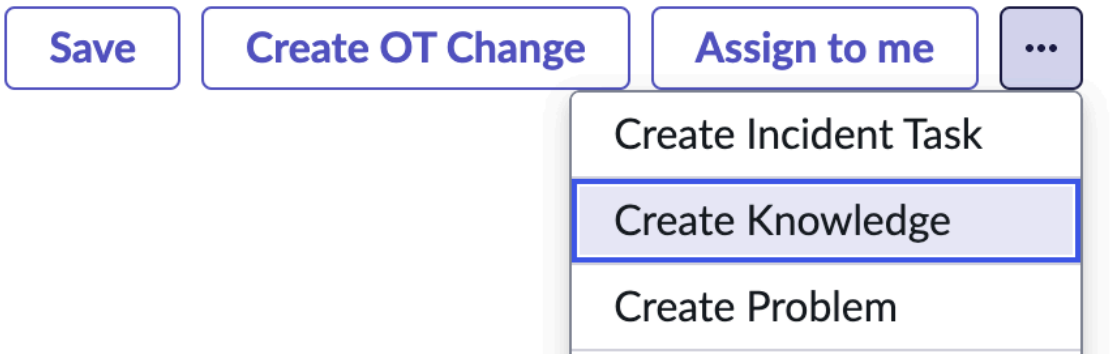
Create a knowledge article to record and save information that is related to an Operational Technology (OT) incident and its resolution.

Before you begin
Role required: sn_ot_incident_write

> **Note:**
> You also need the **Can contribute** access to at least one knowledge base. For more information, see Create an OT knowledge base.

About this task
Creating a knowledge article directly from an incident record helps to make sure that the knowledge article is linked to the correct incident for contextual information. The knowledge article can also help your team resolve similar incidents in the future when they include the correct procedures, challenges, and solutions.

Procedure
1. Navigate to **All** > **Industrial Workspace**.
2. In the list view under the OT Incident module, open one of the available lists.
3. Select the OT incident record that you want to create a knowledge article for.
4. Select the **More actions** icon (···) to expand the menu.
5. Select **Create**



Knowledge.

> **Note:**
> You must set the incident record's state to **Resolved** to see the **Create Knowledge** button.

6. On the form, fill in the fields.

Knowledge article form

Field	Description
Knowledge base	Knowledge base that the knowledge article should be included in. **Note:** If you configured the OT knowledge base's visibility correctly, OT users can find the knowledge base in this reference list.
Category	Classification of the knowledge article.

Field	Description
Short description	Brief description of the incident resolution that is used as the knowledge article title.
Article body	Content of the knowledge article that describes any procedures, challenges, and solutions for the incident.
Valid to	Date that the knowledge article is valid until.

7. Select **Save**.
   The knowledge article is saved as a draft and attached to the parent OT incident.
8. Select **Publish**.

Result
The knowledge article is now published in your OT knowledge base. To view the knowledge article, open the Attached Knowledge related list in the incident record.

Note:
If you set the **Publish workflow** field in your OT knowledge base to **Knowledge - Approval Publish**, the article must be approved before being published.

Create a knowledge article in Industrial Workspace

Create a knowledge article in Industrial Workspace to help cater an article's contents to the needs and solutions not directly related to an Operational Technology (OT) incident.

Before you begin
Role required: knowledge

Note:
You also need the **Can contribute** access to at least one knowledge base. For more information, see Create an OT knowledge base.

Procedure
1. Navigate to **All** > **Industrial Workspace**.
2. In the list view under the Knowledge module, open one of the available lists.
3. Select **New**.

4. On the form, fill in the fields.

Knowledge article form

Field	Description
Knowledge base	Knowledge base that the knowledge article should be included in.

Field	Description
	Note: If you configured the OT knowledge base's visibility correctly, OT users can find the knowledge base in this reference list.
Category	Classification of the knowledge article.
Short description	Brief description of the incident resolution that is used as the knowledge article title.
Article body	Content of the knowledge article that describes any procedures, challenges, and solutions for the incident.
Valid to	Date that the knowledge article is valid until.

5. Select **Save**.
   The knowledge article is saved as a draft and attached to the parent OT incident.
6. Select **Publish**.

Result
The knowledge article is now published in your OT knowledge base.

Note:
If you set the **Publish workflow** field in your OT knowledge base to **Knowledge - Approval Publish**, the article must be approved before being published.

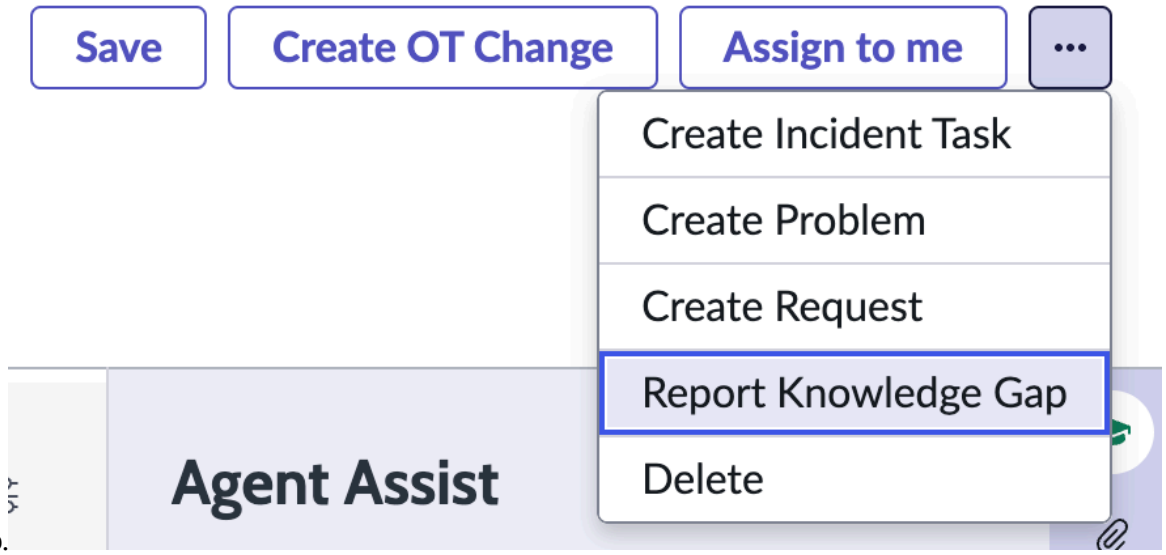
Report a knowledge gap from an OT incident record

Report a knowledge gap from an Operational Technology (OT) incident if you can't find relevant knowledge articles about the incident.

Before you begin
Role required: sn_ot_incident_read

Procedure
1. Navigate to **All** > **Industrial Workspace**.
2. In the list view under the OT Incident module, open one of the available lists.
3. Select the incident record that you want to report a knowledge gap for.
4. Select the **More actions** icon (···) to expand the menu.

5. Select **Report Knowledge Gap**.



6. On the form, fill in the **Description** field with a summary of the knowledge gap.

> **Note:**
> The **Topic** field automatically fills with the name of the incident record. If needed, you can change this field.

7. Select **Submit**.

Result
The knowledge gap is reported and a feedback task is created.

What to do next
You can view the feedback task under the Knowledge Gaps related list in the incident record.

To assign feedback tasks to the correct user or user group, see Assign feedback tasks.

Approve requests to publish or retire a knowledge article

Approve requests to publish or retire a knowledge article to help ensure that the knowledge base is up to date.

Before you begin
Role required: knowledge_manager

About this task
If you're assigned as the manager of an OT knowledge base receive, you can receive approval requests for the publishing and retiring of articles that belongs to the knowledge base.

Procedure

1. Open the email notification regarding the approval request.
2. Select the link in the email to open the request.
3. Approve or reject the request.
4. **Optional:** If rejected, leave a comment explaining why the article request was rejected.

Result
The user who created the approval request is notified via email.

Assign feedback tasks

Assign feedback tasks to a user to help make sure that the feedback task is addressed and the related knowledge article is updated.

Before you begin

Role required: knowledge_manager

Procedure

1. Navigate to **All** > **Industrial Workspace**.
2. In the list view under the Knowledge module, open the Unassigned OT Knowledge Gaps list.
3. Select the feedback task that you want to assign to a user or assignment group.
4. In the **Assigned to** field, add the user that you want to assign the feedback task to.
5. Select **Save**.

Result

The assigned user can now view the feedback task in the My Feedback Tasks list under the Knowledge module list view.

To view other assigned feedback tasks, select the Assigned Feedback Tasks list under the Knowledge module list view in the Industrial Workspace.

To view the unassigned OT knowledge gaps, select the Unassigned OT Knowledge Gaps list under the Knowledge module list view in the Industrial Workspace.

Find information in the related knowledge articles for an OT incident

Find information in the related knowledge articles that are attached to an Operational Technology (OT) incident record for any previous resolutions that may be applicable.

Before you begin

Role required: sn_ot_incident_read

Note:
You must have the sn_ot_incident_read role and read access to the knowledge base that contains the articles that match the context of this incident.

Procedure

1. Navigate to **All** > **Industrial Workspace**.
2. In the list view under the OT Incident module, open an available list.
3. Select the incident record that you want to view.
4. In the incident record, select the **Agent assist** button to open the Agent Assist window if it's not already opened.
5. To view the full knowledge article, select the **More actions** button .
6. Select **Full View**.
7. **Optional:** To attach the knowledge article to the open incident record, select **Attach** in the Agent Assist window.

8. **Optional:** To flag the knowledge article, select **Flag** in the Agent Assist window.
9. **Optional:** To mark the knowledge article as helpful, select the **More actions** button ⋮ and choose **Helpful**.

Operational Technology Knowledge Management reference

Reference topics provide additional information about Operational Technology Knowledge Management.

Operational Technology Knowledge Management roles

You can assign Knowledge Management roles to your Operational Technology Knowledge Management users.

The following table lists the Knowledge Management roles that you can assign to your users so that they can access Operational Technology Knowledge Management capabilities.

Knowledge Management roles applicable to Operational Technology Knowledge Management

Role	Description
knowledge	The knowledge role can contribute to the default knowledge base and access the Knowledge application menu. The knowledge role is a fulfiller role and not a requester role. **Note:** Requesters can view, comment, and give feedback to the knowledge articles. However, a requester can't create or edit articles.
knowledge_manager	The knowledge manager can perform administrative functions for the knowledge bases that they manage, such as defining the categories, pinning the important articles, and approving the changes to the articles. Users selected as managers of a knowledge base receive this role automatically. **Note:** The knowledge role comes as a subordinate role.
knowledge_admin	The knowledge administrator can perform all the administrative tasks that are associated with maintaining the Knowledge Management system.

Knowledge Management roles applicable to Operational Technology Knowledge Management (continued)

Role	Description
	Note: • A user selected as a knowledge admin can make changes to all the knowledge bases except the scoped knowledge base. • The knowledge role comes as a subordinate role.

Knowledge base form

When creating a new knowledge base, fill out the following form fields.

Knowledge base form fields

Field	Description
Title	Unique name for the Operational Technology (OT) knowledge base.
Article Validity	Number of default days that the articles are valid for after the date that they're created.
Icon	Image that provides a visual reference to describe the OT knowledge base. The image is displayed next to all articles from this knowledge base in the article search results page.
Disable commenting	Option to disable commenting. If selected, users can't comment on articles in the OT knowledge base.
Disable suggesting	Option to disable edit suggestions. If selected, users can't suggest edits to articles in the OT knowledge base.
Disable category editing	Option to disable the editing of OT knowledge categories. If selected, only OT knowledge managers can add or edit the knowledge categories for the OT knowledge base.
Disable rating	Option to disable the rating for articles. If selected, users can't rate the article in the OT knowledge base.
Disable mark as helpful	Option to disable the mark as helpful. If selected, the user can't mark any article as helpful in the OT knowledge base.
Enable blocks	Option to enable the knowledge blocks feature. If selected, you can create knowledge blocks to add to knowledge articles within the OT knowledge base.

Knowledge base form fields (continued)

Field	Description
Checklist	Checklist to evaluate the quality of articles in the OT knowledge base.
Application	Application scope of the OT knowledge base.
Owner	User responsible for the OT knowledge base. A knowledge base owner can assign other roles to the knowledge base.
Managers	Users who perform administrative functions on the OT knowledge base.
Publish workflow	Workflow for publishing the articles in the knowledge base: • **Knowledge - Instant Publish**: Publishes articles in the knowledge base without requiring an approval. • **Knowledge - Approval Publish**: Requests an approval from the manager of the knowledge base before moving the articles to the published state.
Retire workflow	Workflow for retiring the articles in the OT knowledge base: • **Knowledge - Instant Retire**: Retires the articles in the knowledge base without requiring an approval. • **Knowledge - Approval Retire**: Requests an approval from the manager of the knowledge base before moving the articles to the retired state.
Active	Option to indicate that the OT knowledge base is active. If not selected, only users with the admin role or knowledge administrators can create, search for, or view its articles.
Description	
Set default knowledge field values	Default configuration settings for the OT knowledge base.
Related products	List of products that are related to the OT knowledge base content.

Related information

Find more information about the OT extension classes and related applications.

Extension classes overview

The extension classes help you understand how Operational Technology Management works with the Configuration Management Database (CMDB).

Operational Technology (OT) extension classes

The CMDB updates classes for OT.

Related applications

Knowledge Management

The Knowledge Management application enables the sharing of information in knowledge bases. These knowledge bases contain articles that provide users with information such as self-help, troubleshooting, and task resolution.

Operational Technology Incident Management

The Operational Technology Incident Management application enables manufacturers to manage OT device incidents from the time the incident is opened to when it's complete.

IT Service Management

When integrated with Operational Technology Knowledge Management, the ServiceNow IT Service Management application enables engineers to resolve OT device and production process issues quickly.

Operational Technology Request Management

Operational Technology Request Management lets you request catalog items and fulfill them based on the defined flows.

Explore  Exploring Operational Technology Request Management	Configure  Plan and configure your implementation
Use  Using Operational Technology Request Management	Reference  Get details about related information and applications

Exploring Operational Technology Request Management

Operational Technology Request Management lets you access the Operational Technology (OT) Service Catalog to request OT catalog items and fulfill them based on the defined flows. OT workers can then create and submit an OT request from a catalog item, which helps provide a consistent experience and facilitates cross-functional requests.

Operational Technology Request Management overview

Watch an overview about the Operational Technology Service Management product suite to learn more about the Operational Technology Request Management.
https://player.vimeo.com/video/1019801515?badge=0&autopause=0&player_id=0&app_id=58479

Operational Technology Request Management benefits

With Operational Technology Request Management, you can apply the following benefits to your OT system and help your team manage catalog requests:

- Provides a single view to efficiently manage multiple catalog requests.
- Encourages transparency, expedites request processes, and minimizes delays with automatic notifications and approvals.
- Maintains the products and services menu that you can use to create and update catalog requests.

Applying Operational Technology Request Management to your OT system

You can apply Operational Technology Request Management to your Operational Technology (OT) system to enable other users to create and submit OT requests for OT products and services.

Operational Technology Request Management overview

Operational Technology Request Management lets you request catalog items and fulfill them based on the defined flows. OT workers can then create a request in the OT Service Catalog and choose the catalog item that best fits their needs.

Use cases

The following table describes different OT personas and how they can use Operational Technology Request Management.

Operational Technology Request Management use cases

Persona	Description
OT engineer	Can use Operational Technology Request Management to file and manage OT requests for various OT products and services in a one place. A few examples of the catalog items that can be requested are third party remote access, new OT PCs, new OT devices, and new OT host connections.
Plant head or supervisor	Can use Operational Technology Request Management to engage with the correct team to remediate an incident reported on the factory floor.

Configuring Operational Technology Request Management

Configure Operational Technology Request Management so that you can create the data foundation for the Operational Technology (OT) solution.

If you have the admin role, you can use Guided Setup to lead you through the setup of Operational Technology Request Management. Guided Setup is a tool that assists with application or capability configuration. It organizes the configuration activities into categories. These categories contain the information about the setup tasks, the steps to complete each task, and the links to the pages in your instance where you perform the configuration. The links to useful help content are also provided.

To access Guided Setup, navigate to **Industrial Workspace Admin** > **Guided Setup**.

The following table lists the Guided Setup tasks and their purposes for Operational Technology Request Management.

Note:
Operational Technology Request Management is included with the Industrial Workspace Common. No additional plugins are needed.

The following table shows the tasks that your users must complete for a successful setup and configuration.

Operational Technology Request Management setup tasks

Task	Purpose
Load demo data.	To load the demo data for Operational Technology Request Management, you must load the demo data of the Industrial Workspace Common plugin. To load the demo data, complete the following steps. 1. Navigate to **All** > **System Definition** > **Plugins**. 2. In the search bar, search for the `Industrial Workspace Common` plugin. 3. Once the results load, select the **Installed** tab and open the Industrial Workspace Common page. 4. Under **Quick Actions**, select **Load demo data**.
Assign Operational Technology Request Management roles.	Assigns the roles to control the actions that are available for each user.
Create catalog items for your OT service catalog using the catalog builder.	Create catalog items for the OT Service Catalog using the catalog builder so other users can submit their OT requests and choose the catalog item that best fits their needs.
Add catalog item categories for the catalog items you create in the OT Service Catalog.	Select different categories for the catalog items you create in the OT Service Catalog to organize OT catalog items into logical groups.

Operational Technology Request Management setup tasks (continued)

Task	Purpose
Create a fulfillment flow for an OT request in Workflow Studio.	Create a fulfillment flow with catalog tasks in Workflow Studio for your catalog item as needed to fulfill an OT request.

Assign roles to your Operational Technology Request Management users

Assign roles to your users so that you can control their access to the features, capabilities, and data for Operational Technology Request Management.

Before you begin

Role required: admin

About this task

For more information about the Operational Technology Request Management roles you can assign to your users, see Components installed with Operational Technology Request Management.

Procedure

Assign roles to users and groups by using the ServiceNow AI Platform user administration feature.

Catalog item categories

You can select different categories for the catalog items you create in the Operational Technology (OT) Service Catalog. Categories help organize OT catalog items into logical groups. When requesters submit an OT request, they can choose the catalog item that best fits their needs based on its designated category.

If needed, you can define categories and subcategories to organize the OT catalog items and help users locate the products and services they need. For more information about how to define catalog item categories, see Create a category.

Create a catalog item for your Operational Technology Service Catalog

Create a catalog item for the Operational Technology (OT) Service Catalog using the catalog builder so that other users can submit OT requests categorized by catalog item.

Before you begin

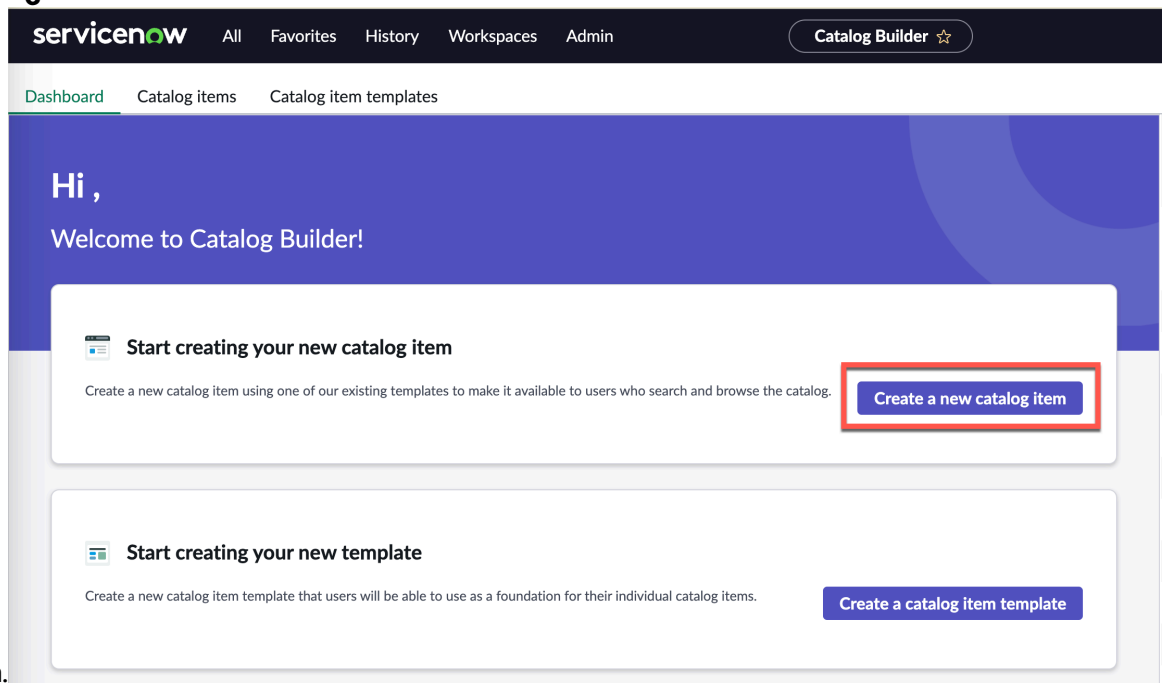
Role required: admin

About this task

You can create catalog items for the OT Service Catalog in the catalog builder. When other users submit an OT request, they can choose the catalog item that best fits their needs. For example, requesting remote access to an OT device can be a catalog item available in the OT Service Catalog. This allows third parties to work on issues related to OT devices.

Procedure

1. Navigate to **All** > **Service Catalog** > **Catalog Builder**.
2. In the **Dashboard** tab under **Start creating your new catalog item**, select **Create a new catalog item**.



   Alternatively, select the **Catalog Items** tab and click **New**.
3. On the **Getting Started** page, select **Continue**.
4. On the **Select your item template** page, select the **OT Catalog Item Template**.
5. Select **Use this item template**.
6. On the **Create catalog item** form, fill in the fields.

   For more information about the Catalog Item form fields, see Operational Technology Catalog Item form.

   Note:
   You can't remove the OT Catalog Item Variable Set from the Questions section. The OT Catalog Item Variable Set is what distinguishes OT requests from other requests. You can instead create new questions for your item form by selecting **Insert New Question**. For more information about inserting a new question, see Create a question for a catalog item in Catalog Builder.
7. **Optional:** To preview your catalog item, select **Preview**.
8. **Optional:** To save your progress, select **Save**.
9. Once you get to the **Review and Submit** section, review the catalog item information you added and select **Submit**.
10. Repeat steps 1 to 9 for each catalog item that you want to create.

Result

The catalog item is created and available for other users to select when they create an OT request in the OT Service Catalog.

Create a fulfillment flow for an Operational Technology request

Create a fulfillment flow with catalog tasks in Workflow Studio for your catalog item as needed to fulfill an Operational Technology (OT) request.

Before you begin
Role required: admin

About this task
You can link a fulfillment flow to your catalog item. Fulfillment flows trigger catalog task creation and notifications when another user submits an OT request.

Procedure

1. Navigate to **All** > **Process Automation** > **Flow Designer**.
2. Select the **Flows** button.
3. In the **New** drop-down, select **Flow**.
4. On the **Properties** form, fill out the fields.
   For more information about the **Properties** form, see Create a flow in Workflow Studio.
5. Select **Build Flow**.
6. Add a trigger to your flow.
   For more information, see Create a flow in Workflow Studio.
7. Add actions, flows, subflows, or glow logic.
   For more information, see Create a flow in Workflow Studio.
8. Select **Save**.

Result
Workflow Studio saves a draft of the flow, trigger, and actions for the fulfillment flow. You can now choose the fulfillment flow and apply it to a catalog item.

Using Operational Technology Request Management

After you complete all the required set-up tasks for Operational Technology Request Management, users can begin creating and managing Operational Technology (OT) requests.

Create an Operational Technology request on the Industrial Workspace

Create an Operational Technology (OT) request in the Industrial Workspace to address a product or service needed for an OT device or incident.

Before you begin
Role required: any OT user

Procedure

1. Navigate to **All** > **Industrial Workspace**.
2. Open the Industrial Workspace list view.
3. In the **OT Requests** list module, select the **My Requests** list.

Note:

The **My Requests** list is accessible to all the OT users that can access the Industrial Workspace.

4. Select **New**.
5. In the OT Service Catalog, select one of the available catalog items that best fits your needs.
6. Fill in the fields as needed for your request.
7. Select **Request**.

What to do next

Once the OT request is submitted, you receive an email with the details of your request. You can use the link provided in the email to open the request record and track its status. You can also edit the request record with further context needed to complete the request.

If there are any changes made to the request record, you're notified with an email describing the changes made. For example, work notes were added to the record, or its state was updated.

Operational Technology Request Management lists in the Industrial Workspace

You can view your Operational Technology (OT) requests and catalog tasks in the Industrial Workspace list view.

OT requests

The following lists are available to view and access OT requests in the Industrial Workspace list view under the **OT Request** module.

Note:
You must have the sn_request_read role to access these lists.

OT Request lists

List	Description
My Requests	OT requests raised by you or for you by the Administrator.
Open Request Items	All OT requests

OT catalog tasks

You can view your OT catalog tasks in the lists available under the **OT Tasks** module. For OT catalog tasks, the **Task type** column value is **Catalog Task**.

Operational Technology Request Management reference

Reference topics provide additional information about Operational Technology Request Management.

Components installed with Operational Technology Request Management

Several types of components may be installed with the activation of Operational Technology Request Management, including user roles and service catalogs.

Roles installed

Operational Technology Request Management roles

Name	Description	Contains roles
sn_request_read	Read access to the Request (sc_request,) Requested Item (sc_req_item) or Catalog Task (sc_task).	NA
sn_request_write	Write access to the Request (sc_request,) Requested Item (sc_req_item), or Catalog Task (sc_task).	• task_editor • dependency_views • agent_workspace_user • view_changer • cmdb_read • cmdb_query_builder_read • sn_request_read
sn_request_comment_write	Write access to the comments for the Requested Item (sc_req_item). **Note:** The sn_request_comment_write role alone does not give access to comments write, you will need write access for the table.	NA

Service catalogs installed

Operational Technology Request Management service catalog

Name	Description
OT Service Catalog	Service catalog provided for users to submit OT requests.

Operational Technology Catalog Item form

When creating a new catalog item for the Operational Technology (OT) Service Catalog, fill out the following form fields.

The following tables describe the fields available in each section of the OT Catalog Item form.

Details

Field	Description
Basic Info	

Details (continued)

Field	Description
Item name	Name to appear in the catalog.
Short description	Text that appears on the service catalog homepage, search results, and the title bar of the order form.
Item details	
Image	Image of the item.
Description	Full description of the item. This description appears in the catalog when a user selects the item or clicks the associated **Preview** link. You can embed videos, images, links to internal knowledge base (KB) articles, and links to external sources of information and instruction documentation.

Location

Field	Description
Catalogs	
Selected catalogs	Catalogs this item appears in.
Categories	
Selected categories	Category for the item. Categories can only be selected after the **Catalogs** field is populated. Catalog searches find only items assigned to a category in the Service Portal.
Topics	
Selected topics	Topics for the item. Requesters can use the topics you added to find and access the catalog item once the catalog item is published.

Questions

Field	Description
OT Catalog Item Variable Set	
Site	Site that's affected by the catalog item.

Settings

Field	Description
Portal settings	
Submit button label	Label for the submit button after the requester finishes filling out the catalog item form.
Hide 'Add to cart' button	If selected, the **Add to Cart** button is not displayed for the item. If the **Show Add to Cart** instance option of the widget is set to false, then this setting is ignored. This setting is selected by default if the **Request method** is **Request** or **Submit**. For upgrade scenarios, if the **No cart** field is selected in Platform, run the `CatalogPortalSettingsMigration` script include to update this setting to the **Hide 'Add to Cart'** field in the **Portal Settings** tab. **Note:** Applicable for a catalog item and order guide.
Hide ‘Save as draft’ button	If selected, the **Save as draft** button is not displayed for the item.
Hide quantity selector	If selected, the **Quantity** list is not displayed for the catalog item. This is selected by default if the **Request method** is **Request** or **Submit**. For upgrade customers, if the **No quantity** field is selected in Platform, run the `CatalogPortalSettingsMigration` migration script to update this setting to the**Hide Quantity** field in the **Portal Settings** tab. **Note:** Applicable for a catalog item. An order guide inherits this setting from the included catalog item.
Hide delivery time	If selected, the **Delivery Time** field is not displayed for the catalog item. This is selected by default if the **Request method** is **Submit**. **Note:** Applicable for a catalog item.

Settings (continued)

Field	Description
	An order guide inherits this setting from the included catalog item.
Hide attachment button	If selected, the **Add attachments** button is not displayed for the catalog item. **Note:** Applicable for a catalog item and record producer. An order guide inherits this setting from the included catalog item.
Make attachment mandatory	If selected, adding an attachment is mandatory for the catalog item. **Note:** Applicable for a catalog item and record producer.

Access

Field	Description
Available for	
User criteria granted access	Select the user criteria that can access the catalog item.
Not available for	
User criteria denied access	Select the user criteria that cannot access the catalog item.

Fulfillment

Field	Description
Fulfillment method	
Process engine	Sequence for item request fulfillment.
Selected flow	Flow that defines how the item request is fulfilled. **Note:** This field is only visible if you select **Flow Designer Flow** in the **Process engine** field.
Selected workflow	Workflow that defines how the item request is fulfilled.

Fulfillment (continued)

Field	Description
	Note: This field is only visible if you select **Workflow** in the **Process engine** field.

Related information

Find more information about the Operational Technology (OT) extension classes and related applications.

Extension classes overview

The extension classes help you understand how Operational Technology Management works with the Configuration Management Database (CMDB).

Operational Technology (OT) extension classes

The CMDB updates classes for OT.

Related applications

Request Management

Request Management allows catalog items to be requested and fulfilled based on defined flows.

IT Service Management

The ServiceNow IT Service Management application enables engineers to resolve OT device and production process issues quickly.

Recommended Actions for Operational Technology Service Management (OTSM)

Recommended Actions for Operational Technology Service Management (OTSM) allows you to set up and apply real-time actionable recommendations for speeding up the triaging process and resolving issues quickly across various records in the Industrial Workspace including Operational Technology (OT) incidents.

Get started

Explore	Configure	Use
		
Learn how Recommended Actions for OTSM	Set up and configure Recommended Actions	Manage your OTSM records with

can help you manage your OT system.	for OTSM to meet your specific needs.	Recommended Actions for OTSM.

Helpful resources

Some ServiceNow resources that can provide you with helpful information are:

ServiceNow Store

https://store.servicenow.com/sn_appstore_store.do#!/store/home

Support

Exploring Recommended Actions for Operational Technology Service Management (OTSM)

Recommended Actions for Operational Technology Service Management (OTSM) allows you to set up and apply real-time actionable recommendations for speeding up the triaging process and resolving issues quickly across various records in the including Operational Technology (OT) incidents.

Recommended Actions for OTSM overview

Recommendations appear as actionable real-time recommendation in the side panel while updating or creating OT incident records in the Industrial Workspace. You can access recommendations in the Industrial Workspace by selecting the **Recommendations** icon ( ) in the side panel.

Recommended Actions for OTSM workflow

The workflow for Recommended Actions for OTSM includes the Use Context. Use the OT incident context to find and use the recommendations in Industrial Workspace.

Note:
For OT incidents, you can use guidance based recommendations in the **Recommendations** panel.

Recommended Actions for Operational Technology Service Management (OTSM) overview

Recommended Actions for Operational Technology Service Management (OTSM) includes the following context components used to configure Recommended Actions for various records in the Industrial Workspace, including Operational Technology (OT) incidents.

Contexts in Recommended Actions for OTSM

#A context enables you to see recommendations for a specific type of record when certain rules are met. These recommendations can help you by suggesting actions to take based on the record context.#For more information, see Contexts in Recommended Actions.

The OTSM context ships the OT incident context described in the following table.

Contexts description

Context	Description
OT incident context	This shows all valid recommendations on OT incidents based on the active recommendations in the Industrial Workspace.

Note:
To create a context, see Create a context in Recommended Actions.

Search result mappings

The search result mappings appear in AI search results for OT incident records in the Industrial Workspace.

The OTSM context includes the following search result mappings based on context type:

OT incident: Knowledge [kb_knowledge], OT Incident [sn_ot_incident]

Search Application Configuration

The OTSM context includes the **[AIS] Recommended Actions for OTSM Search Config**. This application supports the AI search for various records in the Industrial Workspace, including OT incidents.

Configuring Recommended Actions for Operational Technology Service Management (OTSM)

Enable a user working on the relevant recommendations provided by Recommended Actions for Operational Technology Service Management (OTSM)

Recommended Actions for OTSM is provided as a new feature for the Operational Technology Incident Management application.

Set up Recommended Actions for Operational Technology Service Management (OTSM)

Set up recommended actions to display relevant recommendations in the Industrial Workspace.

Before you begin
Role required: admin

Procedure

1. Create a rule in Recommended Actions for OTSM.
   OTSM enables you to create new rules. For more information, see Create a rule in Recommended Actions.
2. Create a recommendation.

   OTSM enables you to create new recommendations. For more information, see Create a recommendation in Recommended Actions.
3. Create a resource generator.

   OTSM enables you to create new resource generators. For more information, see Create a resource generator in Recommended Actions.

4. Create Guidance and field recommendations.
   OTSM enables you to configure or create guidance and field recommendations. For more information, see Creating guidance and field recommendation in Recommended Actions.

Configure AI Search for Operational Technology Service Management

Configure AI Search for Recommended Actions for Operational Technology Service Management (OTSM) to enable intelligent query features that help you quickly find the answers you need for OT incidents.

Before you begin
Role required: admin

About this task
For Operational Technology Service Management users, you must define the OT incident [sn_ot_incident] table as an indexed source in order to use AI Search for OT incident records. For more information about indexing, see Indexed sources in AI Search.

Note:
Knowledge [kb_knowledge] is also used as an indexed source for Recommended Actions for OSTM, but Knowledge is already indexed.

To define indexed sources, you can use the Guided Setup for AI Search. The following procedure describes how to access the **Define indexed sources** task. For more information about the Guided Setup for AI Search, see Configuring AI Search.

Procedure
1. Navigate to **AI Search** > **Guided Setup**.
2. In the **Define Searchable Content** section, select the **Define indexed sources** task.
3. Select **Configure**.
4. In the **AI Search Indexed Sources** list, select the OT Incident record.
5. Select the **Index Selected Table/s** button.

Using Recommended Actions for Operational Technology Service Management (OTSM)

After you complete all the required set-up tasks for Recommended Actions for OTSM, users can begin utilizing recommended actions for Operational Technology (OT) incidents.

Apply Recommended Actions to your Operational Technology incidents

Apply Recommended Actions to your Operational Technology (OT) incidents to display relevant actions to users based on the context of an OT incident record.

Before you begin
Role required: sn_ot_incident_write

Note:
You can only view the recommended actions for an OT incident when the OT incident is related to a site that you have access to, or the incident isn't in a **Closed** or **Canceled** state.

About this task
You can use the Recommendations panel and AI search when viewing an OT incident record to view and select relevant actions related to your incident.

For more information about Recommended Actions, see Using the Recommended Actions application.

Procedure

1. Navigate to **All** > **Industrial Workspace**.
2. Open the Industrial Workspace list view.
3. In the OT Incidents list module, select one of the available lists.
4. Open the incident record that you want to review the recommended actions for.
5. Select the **Recommended Actions** ( ) icon.
6. In the **Recommendations** panel, review and select the recommended actions.

Industrial Workspace

The Industrial Workspace is a user interface that provides Operational Technology (OT) users with the tools they need to manage their OT data.

Explore  Exploring the Industrial Workspace	Configure  Plan and configure your implementation
Use  Using the Industrial Workspace	

Exploring the Industrial Workspace

The Industrial Workspace is a user interface that provides Operational Technology (OT) users with the tools they need to manage their OT data.

Industrial Workspace navigation

The Industrial Workspace is organized into the following pages.

Industrial Workspace pages

Page	Description
OT Action-Oriented Landing Page	When you select the **Home** () icon, you're taken to the OT Action-Oriented Landing Page. The landing page helps you keep track of critical tasks related to your OT network.
Dashboard Library	When you select the **Dashboard Library** () icon, you're taken to the dashboard library that contains the following dashboards. **OT Visibility dashboard** Contains the data related to your OT devices. **Operational Technology Vulnerability Response (PA) dashboard** Tracks the volume, performance, and progress of the OT vulnerable items from the initial analysis and detection to the containment, or remediation. **OT Vulnerability Risk Rollup dashboard** Contains the risk score of the OT devices at each level of the equipment model.
OT Progress Scorecard	When you select the **OT Progress Scorecard** () icon, you're taken to the OT Progress Scorecard. The OT Progress Scorecard lets you compare site data in one view.
Industrial Workspace list view	When you select the **List** () icon, you're taken to the Industrial Workspace list view, which gives you access to all the lists related to your OT data records. You can access the following list modules and their subsequent lists: • Operational Technology (OT) • Information Technology (IT) Hardware • Industrial Process Manager • OT Incidents • OT Change Requests • OT Remediation Tasks • OT Vulnerable Items • OT Tasks • Knowledge

Industrial Workspace pages (continued)

Page	Description
Equipment Model Manager	When you select the **Equipment Model** () icon, you're taken to the Equipment Model Manager, where you can view your sites and their equipment model data.

Operational Technology Action-Oriented Landing Page

You can use the Operational Technology (OT) Action-Oriented Landing Page to track critical tasks related to your OT network.

OT Action-Oriented Landing Page overview

The OT Action-Oriented Landing Page helps users, such as OT engineers, view tasks assigned to them, their site, or their group. The landing page calls out important actions that must be prioritized for the signed-in user and includes an overview of existing OT incidents, OT change requests, OT remediation tasks, OT vulnerable items, and other tasks.

The landing page provides a detailed and role-based view of the daily tasks and important actions. Each task in the **Important Action** section shows tasks sorted by their **Opened** date by default. If the task is critical, then it shows up in the **Important Action** section.

To access the OT Action-Oriented Landing Page, navigate to **All** > **Industrial Workspace**, select the Home () icon.

Landing page contents

The following sections describe the content that you can view in the OT Action-Oriented Landing Page.

Important actions

The Important actions section contains OT tasks or actions that are considered critical and must be addressed as soon as possible. By default, the tasks are organized by their **Opened** date with the most recently created critical task assigned to the signed in user shown first.

The tasks shown in this section are the most critical tasks pulled from the **Overview** section that you can act on. Task criticality is determined by the following criteria:

- Their priority is critical
- The task is a remediation task and its risk rating is critical

The tasks included in this section are organized in the following ways:

- All tasks directly assigned to the signed in user are shown first.
- Tasks assigned to a user's group that are also not assigned to any user are shown after.
- Tasks that aren't assigned to a group or user but are assigned to a site the signed in user has access to are shown last.

Overview

The Overview section contains an overview of OT incidents, change requests, remediation tasks, vulnerable items, and other tasks assigned to you, your group, or your site.

You can use the following filters to view the records shown based on the **Assigned to**, **Assignment group**, and **Site** fields on the records:

Your work

Records assigned to you.

Your group's work

Records assigned to your group or groups.

Your site's work

Records assigned to your site or sites.

The following table describes the tiles in the Overview section.

Overview tiles

Tile	Description
OT Incidents assigned to you / OT Incidents assigned to your groups / OT Incidents assigned to your sites	Number of OT incident records assigned to either you, your assignment group, or your site. To view a list of all the OT incident records, select **All records**. To only show the list of records based on their state or type, select the respective section of the available graph. For example, if you only want to view the incident records based on their priority, select the **Critical** section of the graph.
OT Change Requests assigned to you / OT Change Requests assigned to your groups / OT Change Requests assigned to your sites	Number of OT change request records assigned to either you, your assignment group, or your site. To view a list of all the OT change request records, select **All records**. To only show the list of records based on their state, select the respective section of the available graph. For example, if you only want to view the change request records that are scheduled, select the **Scheduled** section of the graph.
OT Remediation Tasks assigned to you / OT Remediation Tasks assigned to your groups / OT Remediation Tasks assigned to your sites	Number of OT remediation task records assigned to either you, your assignment group, or your site. To view a list of all the OT remediation task records, select **All records**. To only show the list of records based on their state, select the respective section of the available graph. For example, if you only want to view the remediation task records that are in review, select the **In Review** section of the graph.
OT Vulnerable Items assigned to you / OT Vulnerable Items assigned to your groups / OT Vulnerable Items assigned to your sites	Number of OT vulnerable item records assigned to either you, your assignment group, or your site. To view a list of all the OT vulnerable item records, select **All records**.

Overview tiles (continued)

Tile	Description
	To only show the list of records based on their risk rating, select the respective section of the available graph. For example, if you only want to view the vulnerable item records that are a high priority, select the **High** section of the graph.
Other OT Tasks assigned to you / Other OT Tasks assigned to your groups / Other OT Tasks assigned to your sites	Number of other OT task records assigned to either you, your assignment group, or your site. To view a list of all the other OT task records, select **All records**. To only show the list of records based on their priority, select the respective section of the available graph. For example, if you only want to view the OT tasks that are considered low priority, select the low section of the graph.

OT *CMDB* Health

The OT *CMDB* Health helps you monitor and maintain the health of your devices in the Configuration Management Database (CMDB). You can view the number of your OT devices organized by type.

Note:
This section is only displayed if you have Operational Technology Manager installed.

The following table describes the tiles in the OT *CMDB* Health section. To view the OT *CMDB* Health section, you must have the **cmdb_ot_isa_viewer** role.

OT CMDB Health tiles

Tile	Description
Unclassed OT devices	Number of the OT devices in your OT network that aren't assigned an OT device type category. To view the list of unclassed OT device records, select **All records**.
Unassigned OT devices	Number of the OT devices in your OT network that aren't assigned to a user. To view the list of unassigned OT device records, select **All records**.
Unmapped OT devices	Number of the OT devices in your OT network that aren’t mapped to any equipment model entity for your assigned site. To view the list of unmapped OT device records, select **All records**.

OT CMDB Health tiles (continued)

Tile	Description
	Note: This tile is only available when the Industrial Process Manager is installed and if the signed in user has the cmdb_ot_isa_viewer role. The tile requires that your organization has an equipment model for mapping OT devices to a production process.
No site assigned	Number of OT devices in your OT network that aren't assigned to a site. **Note:** This tile is only available if the signed in user has the cmdb_ot_isa_viewer role. To view the list of OT device records without a site, select **All records**.
No IP address OT devices	Number of OT devices in your OT network that aren't assigned an IP address. To view the list of OT device records without an IP address, select **All records**.

Dashboard Library in the Industrial Workspace

The Dashboard Library in the Industrial Workspace contains the Operational Technology Visibility dashboard, the Operational Technology Vulnerability Response (PA) dashboard, and the Operational Technology Vulnerability Risk Rollup dashboard.

Operational Technology Visibility dashboard

The Operational Technology (OT) Visibility dashboard helps you manage your OT device in a centralized location. The OT Visibility dashboard lets you the access your OT device data.

OT Visibility dashboard overview

The OT Visibility dashboard is a centralized location in the Industrial Workspace. You can use this dashboard to review your Operational Technology Manager and Industrial Process Manager data. You can also use it to review or edit the detailed information for the OT devices and equipment model entities in your OT network.

With the OT Visibility dashboard, you can achieve the following:

- Understand what OT device information changed in your OT network in the past week.
- View the progress of an OT device inventory through an industrial facility.
- Analyze your OT devices in meaningful ways. For example, you can gain insights into how many of your production devices map to your production processes.

Dashboard contents

To access the OT device data in the OT Visibility dashboard, navigate to **All** > **Industrial Workspace**, select the Dashboard Library ( ) icon, and then select the **Operational Technology Visibility**. To access the key performance indicators (KPI) graph for any tile that is described in the following table, select the number count or chart component in the tile.

The following table describes the OT device data that you can see on the different tiles on the dashboard.

Dashboard tiles

Tile	Description
Updates from the past 7 days	
New OT devices discovered	Number of the new OT devices that were discovered by Discovery for Operational Technology and other automated processes in your OT network during the last seven calendar days.
Inactive OT devices	Number of the OT devices that haven't appeared in your OT network during the last seven calendar days. These devices are considered inactive.
OT devices overview	
Total CMDB OT devices	
Unclassed OT devices	Number of the OT devices in your OT network that aren't assigned with an OT device type category.
Unassigned OT devices	Number of the OT devices in your OT network that aren't assigned to a user.
Unmapped OT devices	Number of the OT devices in your OT network that are not mapped to any equipment model entity for your assigned site. **Note:** This tile is only available when the Industrial Process Manager is installed because it requires that your organization has an equipment model for mapping OT devices to a production process.
OT devices by category	
Supervisory systems	Number of the OT devices in your OT network that are assigned to a Supervisory systems category.
Control systems	Number of the OT devices in your OT network that are assigned to the Control systems category.

Dashboard tiles (continued)

Tile	Description
	Note: Control modules aren't included in this number.
Field devices	Number of the OT devices in your OT network that are assigned to the Field devices category.
Computers and servers	Number of the OT devices in your OT network that are assigned to the Computers and servers category.
Network Gear	Number of the OT devices in your OT network that are assigned to the Network Gear category.
Industrial IoT	Number of the OT devices in your OT network that are assigned to the Industrial Internet of Things (IoT) category.
OT devices by Purdue level	Bar chart that indicates the number of OT devices in your OT network by their assigned Purdue level. **Note:** To learn more about the Purdue levels in the OT systems, see https://subscription.packtpub.com/book/networking_and_servers/9781788395151/1/ch01lvl1sec10/the-purdue-model-for-industrial-control-systems.
OT devices by type (Top Level)	Bar chart that categorizes the OT device data by the OT device types.
OT devices by manufacturer (Top Level)	Pie chart that indicates the number of OT devices in your OT network by their assigned manufacturer.
OT devices by criticality	Pie chart that indicates the number of OT devices in your OT network by their assigned criticality.

Required roles to view the dashboard

To access the OT Visibility dashboard, you must have the **cmdb_ot_viewer** and **cmdb_ot_isa_viewer** roles.

Site filter

You can use the **Site** filter to search for and select the site that you want to view on the dashboard. To access and use the site filter, you must have the **cmdb_ot_isa_viewer** role with access to the site you want to view.

For more information, see Use the site filter.

Operational Technology Vulnerability Response (PA) dashboard

Track the volume, performance, and progress of the Operational Technology (OT) vulnerable items (VIs) from the initial analysis and detection to the containment, or remediation. You can filter the reports by the assignment group, exploits, risk rating, or state to get insight into your vulnerability exposure and the services that are affected.

Required Operational Technology and Operational Technology Vulnerability Response roles

To access the OTVR (PA) dashboard, you must have the **sn_otvr.remediation_owner** role.

To view the Operational Technology Vulnerability Response (PA) dashboard, navigate to **All** > **Industrial Workspace** and select the **Dashboard Library** ( ) icon in the navigation panel. Then select **Operational Technology Vulnerability Response**.

Use cases

The following table shows some examples of how different people in your organization can use this dashboard.

Operational Technology Vulnerability Response (PA) dashboard use cases

User	Dashboard use
OT site managers, OT analysts, vulnerability remediation owners	Help your organization deal with increasing security incidents due to exploited vulnerabilities by determining which OT vulnerable items present the most risk. This dashboard provides a graphical view into the OT vulnerable item activity and can help you to design the remediation plans and status progress. You can focus on the key performance indicators (KPIs) that are associated with the critical affected devices and high-visibility vulnerabilities.

Dashboard tabs

You can see the reports that show the trending data over time and the reports with real-time data. You can also view the trends of the important metrics on a regular schedule so that you can analyze your overall business processes and identify the areas that need to be improved.

Learn what's in the **Vulnerable Items** tab, **Remediation** tab, and **Exceptions** tab.

Vulnerable Items tab

The **Vulnerable Items** tab communicates the KPIs for the vulnerability risk and prevalence, affected devices, remediation target adherence, and remediation progress.

On the **Vulnerable Items** tab, you can view the following reports:

- Total OT Vulnerable Items
- New OT Vulnerable Items
- OT Unassigned Vulnerable Items
- OT Vulnerable Items by State
- OT Vulnerable Items by Risk Rating
- OT VIs Met Remediation Target

  Note:
  You can view the data by the last month, 3 months, 6 months, year, or all time.

- OT VI Mean Time to Remediate (MTTR)

  Note:
  You can view the data by the last month, 3 months, 6 months, year, or all time.

- OT VI by age
- OT Closed Vulnerable Items by Remediation Target Status
- OT Critical Vulnerable Items by Assignment Group
- OT Overdue Critical Vulnerable Items by Assignment Group

Remediation tab

The **Remediation** tab helps you to understand the progress of your remediation actions and to see which support teams need the most assistance with their completion.

On the **Remediation** tab, you can view the following reports in real time:

- OT Remediation Tasks
- OT Critical Remediation Tasks Near Due
- OT Remediation Task by Risk Rating
- OT Remediation by Target Status
- OT Remediation Task by State
- OT Unassigned Remediation Tasks
- OT Critical Remediation Task by Assignment Group
- OT Overdue Critical Remediation Task by Assignment Group

Exception tab

The **Exception** tab helps you to understand where your organization is taking a risk due to potentially excessive deferrals of remediation.

On the **Exception** tab, you can view the following reports in real time:

- OT Deferred Vulnerable Items by Reason
- OT Exceptions for Critical Vulnerable Items by Assignment Group.

Site filter

You can use the **Site** filter to search for and select the site that you want to view on the dashboard. To access and use the site filter, you must have the **cmdb_ot_isa_viewer** role with access to the site you want to view.

For more information, see Use the site filter.

Indicator sources

The Operational Technology Vulnerability Response indicators gather data from the following sources:

- OTVI.Active
- OTVI.Closed
- OTRT.Active

For more information about the indicator sources that are used for the dashboard, see Indicator sources and indicators for the Operational Technology Vulnerability Response (PA) dashboard.

If you expect more than 1 million records to be collected from the indicator sources, you must override the expected count in the Records collection section of the indicator source. For more information, see Review the indicator sources for a larger number of records.

Indicators

Several indicators are used to measure and track the progress of your vulnerability remediation in the Operational Technology Vulnerability Response application. For more information about the indicators used for the dashboard, see Indicator sources and indicators for the Operational Technology Vulnerability Response (PA) dashboard.

The **collect records** option for the indicators is inactive by default for the Operational Technology Vulnerability Response application. This option is turned off to avoid the performance issues that may occur when you collect a large amount of data for each indicator.

Breakdowns

Breakdowns filter and group the collected records by a qualitative attribute. The following breakdowns apply to the indicators on the dashboard:

- Age
- Age Closed
- Assignment Group
- CI Manager
- Deferral Reason
- Exploit Attack Vector
- Exploit Exists
- Exploit Skill Level
- Remediation Target Rule
- Remediation Target Status
- Remediation Target Status (Closed)
- Risk Rating

- Severity
- State

The breakdown sources specify the unique values that a breakdown contains. The unique values are called the breakdown elements. The dashboard uses the following breakdown sources:

- Assignment Group
- Deferred.Reason.Non.Closed
- Exploit Attack Vector
- Exploit Exists
- Exploit Skill Level
- OT Age Range
- Remediation Target Status
- Remediation Target Status (Closed)
- Remediation.Target.Rule
- Risk Rating
- Severity
- State
- Vulnerable.Item.CI.Manager

For more information about the breakdowns and breakdown sources, see Operational Technology Vulnerability Response (PA) dashboard breakdowns.

Collection jobs

The dashboard uses the following collection jobs to gather the OT vulnerability data that are displayed on the dashboard.

- [PA OT VR] Historical Vulnerability Data Collection
- [PA OT VR] Daily Collection for Remediation Tasks
- [PA OT VR] Daily Collection for Vulnerable Items 1
- [PA OT VR] Daily Collection for Vulnerable Items 2

For more information about the collection jobs, see Operational Technology Vulnerability Response (PA) dashboard collection jobs.

Data visualizations

The Operational Technology Vulnerability Response (PA) dashboard uses data visualizations to display your OT vulnerability data. For example, the total number of OT vulnerable items in your system is displayed in the **Total OT Vulnerable Items** bar chart and is grouped by OT device type.

For more information about the data visualizations that are used in the dashboard, see Data visualizations used in the Operational Technology Vulnerability Response (PA) dashboard.

Operational Technology Risk Management dashboard

The Operational Technology (OT) Risk Management dashboard contains the risk score and the vulnerability items (VITs) of the OT devices at each level of the equipment model.

About OT Risk Management dashboard

The OT Risk Management dashboard is available in the Dashboard Library ( ) of the Industrial Workspace. The following tables are available for your rolled up vulnerability risk scores in the OT Risk Management dashboard:

- Vulnerability risk table for your equipment model entities
- Vulnerability risk table for OT devices with no site assigned

OT Risk Management dashboard tables

Table	Description
Vulnerability risk table for your equipment model entities	Displays the risk scores for your site's equipment model entities and their VITs. It also highlights the area that poses the most risk and the number of VITs.
Vulnerability risk table for no site assigned OT devices	Displays the risk scores and count of vulnerable items for OT devices that aren't assigned to any site

You can view all the VIT records created for an entity by selecting the displayed number of VITs. Additionally, you can select a VIT record and view its details.

Required roles to view the dashboard

To access the OT Risk Management dashboard, you must have the **sn_otvr.remediation_owner**, **cmdb_ot_isa_viewer**, and the **admin** role.

View OT Vulnerability Risk of a site

You can use the Site list to search for and select the site that you want to view on the dashboard.

Select the **OT Vulnerability Risk** from the Select Risk Type list to view the rolled up risk score and the VITs for the selected sites.

Operational Technology Progress Scorecard

The Operational Technology (OT) Progress Scorecard lets you compare device and vulnerable item data between your sites.

OT Progress Scorecard overview

The OT Progress Scorecard is a centralized location in the Industrial Workspace that lets you compare your site data. Site data includes both OT device data and vulnerability data. With the OT Progress Scorecard, you can track site progress and determine the sites that need attention.

You can also view the site data for the following Operational Technology applications:

- Operational Technology Manager
- Operational Technology Vulnerability Response
- Operational Technology Incident Management
- Operational Technology Change Management

You can configure the OT Progress Scorecard using the Industrial Workspace Admin Guided Setup. For more information about the setup tasks, see Setting up the Operational Technology Progress Scorecard.

Scorecard contents

To access the OT Progress Scorecard, navigate to **All** > **Industrial Workspace** and select the **OT Progress Scorecard** () icon.

The following table describes columns in the OT Progress Scorecard.

OT Progress Scorecard columns

Column	Description
Overall Score (%)	The progress of your site determined by the indicators on the scorecard. You can edit the weightage to control how much an indicator contributes to the overall score. For more information, see Set the system properties for the Operational Technology Progress Scorecard.
% of Expected OT Devices in CMDB	The percentage of your OT devices that you expect to have in the Configuration Management Database (CMDB). **Note:** If you see a value of -1, then one or more of the values in the % of Expected OT Devices in CMDB indicator is missing the **Expected OT Device** attribute in the OTPSC Attributes table. For information about how to configure expected OT devices see Configure the expected OT devices for a site.
Classified OT Devices (%)	The percentage of classed OT devices. Classified OT Devices (%) doesn't include OT devices classed as cmdb_ci_ot.
Assigned OT Devices (%)	The percentage of OT devices with values in the following fields: • Assigned to • Owned by • Managed by • Supported by • Approval group • Managed group • Support by • Change group

OT Progress Scorecard columns (continued)

Column	Description
OT Device Data Completeness (%)	The percentage of OT devices that meet your data goals. This metric depends on the CMDB Health Dashboard - Completeness Score Calculation job and you must set the required & recommended fields on the CI Class Manager. For more information, see Set up and configure CMDB Health. Completeness is a KPI determined by the following metrics: **Required** Measures the percentage of CIs in which fields that are defined as required, aren't populated. Missing fields are tagged as incomplete noting that for this CI some information is missing. **Recommended** Measures the percentage of CIs in which fields that are set as recommended, aren't populated. For more information about data completeness, see CMDB Health KPIs and metrics **Note:** If you see a value of -1, then the CMDB Health Dashboard - Completeness Score Calculation job hasn't been run yet. Or the job has been run with an incomplete status.
Mapped OT Devices (%)	The percentage of OT devices mapped to an equipment model entity. **Note:** If you see a value of 0, then no OT devices have been found.
Backed up OT Devices (%)	The percentage of OT devices with backup records created. **Note:** If you see a value of 0, then no OT devices have been found.
Assigned OT Vulnerable Items (%)	The percentage of OT vulnerable items that aren't closed and addressed.

OT Progress Scorecard columns (continued)

Column	Description
	Note: If you see a value of 0, then no OT devices have been found.
Approved OT Change Requests (%)	The percentage of OT change requests that are submitted and approved. **Note:** If you see a value of 0, then no OT devices have been found.
OT Incidents with OT Context (%)	The percentage of OT incidents that have OT device or equipment model data. **Note:** If you see a value of 0, then no OT devices have been found.

Operational Technology Unified Map experience in the Industrial Workspace

The Operational Technology (OT) Unified Map available in the Industrial Workspace provides a unified experience to view the relationships between devices and other configuration items (CIs), and view related items, like OT incidents and change requests.

Unified Map overview

The OT Unified Map experience shows a hierarchical map of CIs and their relationships while centered on a selected CI, known as a home node. The experience combines the capabilities of dependency views and service mapping into a single map experience.

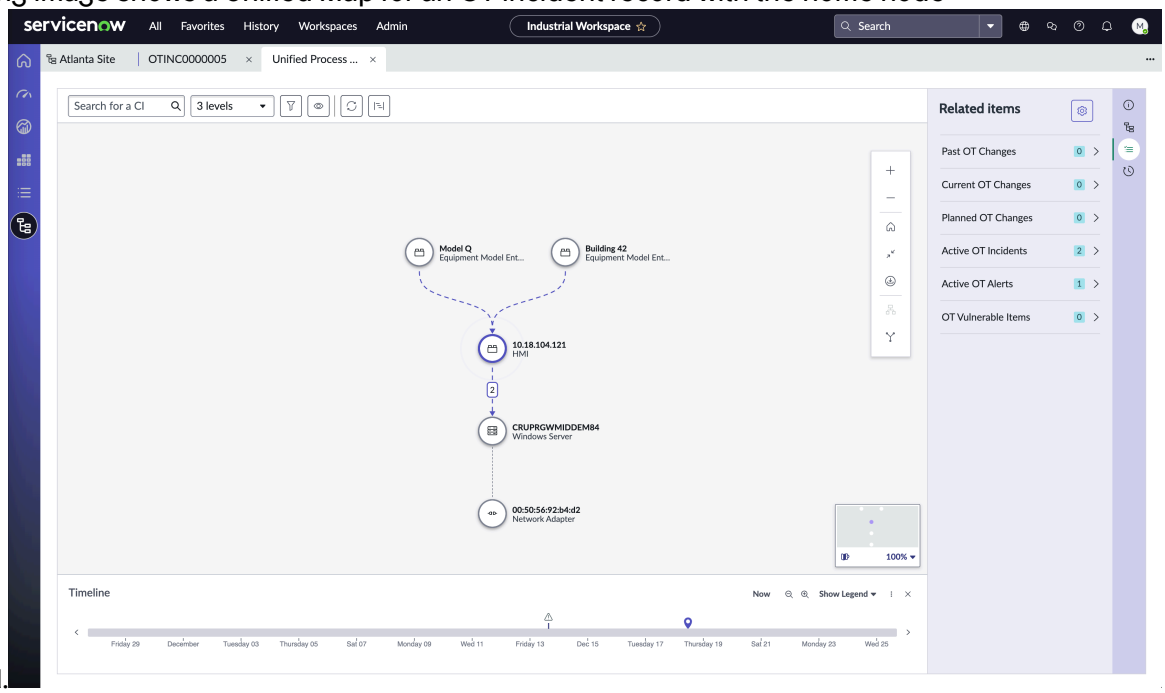
You can access a Unified Map in the following locations in the Industrial Workspace.

- ISA record in the Equipment Model Manager
- OT incident record
- OT change record

On the Unified Map, you can also see the highlighted nodes of the following related items.

- Past OT Changes
- Current OT Changes
- Planned OT Changes
- Active OT Incidents
- Active OT Alerts
- OT Vulnerable Items

The following image shows a Unified Map for an OT incident record with the home node highlighted.



For more information about configuring the OT Unified Maps experience, see Setting up the Operational Technology Unified Map experience.

For more information about viewing an OT Unified Map, see View an Operational Technology Unified Map.

Operational Technology Hardware Vulnerability Assessment

The Operational Technology (OT) Hardware Vulnerability Assessment (HVA) application enables you to assess the firmware vulnerabilities of the OT devices in inventory and create vulnerable items (VIT) against the impacted OT devices.

Hardware Vulnerability Assessment overview

Hardware Vulnerability Assessment uses normalized content for firmware discovery model to perform assessments. The normalized content contains OT device data, such as manufacturer, firmware version, and product model. It's based on the normalization process available in Enterprise Asset Management. The normalized content for OT devices is mapped according to the Common Platform Enumeration (CPE) format provided by the National Vulnerability Database (NVD). An OT device is considered at risk when the Common Vulnerabilities and Exposures (CVEs) data available in the NVD database matches the OT device data available in the CPE-mapped normalized content. The Hardware Vulnerability Assessment menu available in the Industrial Workspace displays the OT devices that are at risk.

HVA can assess firmware discovery models, which don’t have normalized content and they haven’t been CPE-mapped yet. HVA uses a matching score algorithm to compare CPE values with existing firmware discovery values. The matching algorithm searches for CPEs that matches OT devices with the same discovery publisher name, model name, and version. The HVA matching algorithm compares the data from CPEs and unmapped firmware discovery model. Based on the comparison, the matching algorithm evaluates the best possible CPE match for unmapped firmware discovery models. Even though the results may not be fully accurate, it helps in vulnerability assessments until CPE-mapped normalized content is available.

Also, HVA uses the range information provided by NVD to assess vulnerabilities more accurately. For example:

- In case there's version information unavailable for a CPE, the range information available for a specific OT device publisher and model is used to perform a hardware vulnerability assessment.
- For versions, a comparison algorithm is used to determine if the input version is in range.

Important:
If you're already using HVA, rerun the NVD Integrations to use the range information feature. For more information, see Run NVD Integrations for Hardware Vulnerability Assessment.

You must activate and schedule the following scheduled jobs to perform hardware vulnerability assessment automatically and periodically:

- *Hardware Vulnerability Assessment - Full*
- *Hardware Vulnerability Assessment - Delta*

Required Operational Technology and Hardware Vulnerability Assessment roles

You must have the following roles to use the Hardware Vulnerability Assessment (HVA) menu:

- sn_vul.manage_exposure_assessment: Assign roles to admin users or user groups as needed, which enables them to view or edit properties for HVA.
- sn_otvr.vul_event_manager (OT Vulnerability Event Manager): Assign roles to HVA users#br user groups as needed, which enables them to view assessment records and act accordingly.

Use case

OT hardware vulnerability analysts can use HVA to:

- Identify cybersecurity risks in OT devices.
- Focus on high-risk vulnerabilities via fully matched assessments on OT device data.
- Set up automatic creation of vulnerable items for fully matched assessments.
- Investigate and address partially matched assessments to identify potential risks and act accordingly.
- Monitor unprocessed OT devices from the **Awaiting Normalization** tab, which are pending full discovery or pending content updates.

HVA tabs

The HVA menu displays HVA records created for the OT devices. These assessment records are created based on many criteria. For example, CVE vulnerability, OT device at risk, Common Vulnerability Scoring System (CVSS) score, Confidence Score, and Device Criticality.

- The **Fully matched assessments** tab displays the assessment records, where the CVEs fully match with the manufacturer, product model, and firmware version of the OT devices. A fully matched assessment means that an OT device matches all vulnerability factors specified in a CVE.
- The **Partially matched assessments** tab displays the assessment records, where the CVEs partially match the firmware version or the manufacturer and model on the OT device. Also, HVA creates partial assessments for normalized discovery models, which don't have firmware version available. Using the matching algorithm, the version information from the normalized content of OT devices with the same publisher and model is used to create an assessment.
- The **Vulnerable Items** tab displays the VITs that are created automatically or you create manually based on the assessments.

- The **Ignored assessments** tab displays the assessments of the devices that you choose to ignore.
- The **Awaiting Normalization** tab displays the OT device data that doesn't have the normalized data and hasn't been used for assessment.

Important:

- If the property to create automatic VIT is enabled, the **Fully matched assessments** tab doesn't display any data. You can view this information on the **Vulnerable Items** tab.
- Enable the Firmware Discovery Model Opt-in feature in Enterprise Asset Management so that OT devices data are available for normalization. For more information, see Opt-in to Enterprise Asset Management Content Service.

Additional Resources

Related topics

Enterprise Asset Management normalization

Industrial Workspace

Set up the Hardware Vulnerability Assessment of Operational Technology devices using guided setup

Use the Hardware Vulnerability Assessment menu in the Industrial Workspace

Confidence score calculation for hardware vulnerability assessment

Confidence Score is displayed for partially matched assessments, vulnerable items (VITs), and ignored assessments.

About Confidence Score Calculation

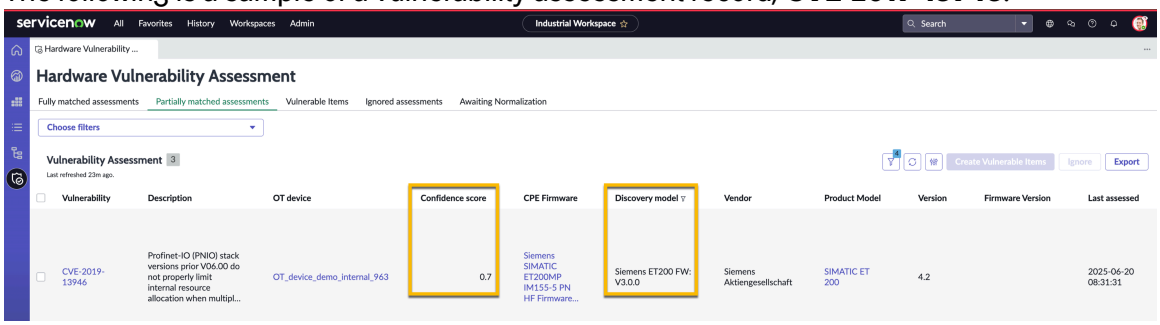
HVA uses a scoring mechanism called Confidence Score to indicate the accuracy of the CVE data matching the CPE-mapped normalized content of an OT device. Confidence Score is an aggregated calculation of the matching scores created by the matching algorithm in HVA.

The Confidence Score varies for the following assessments:

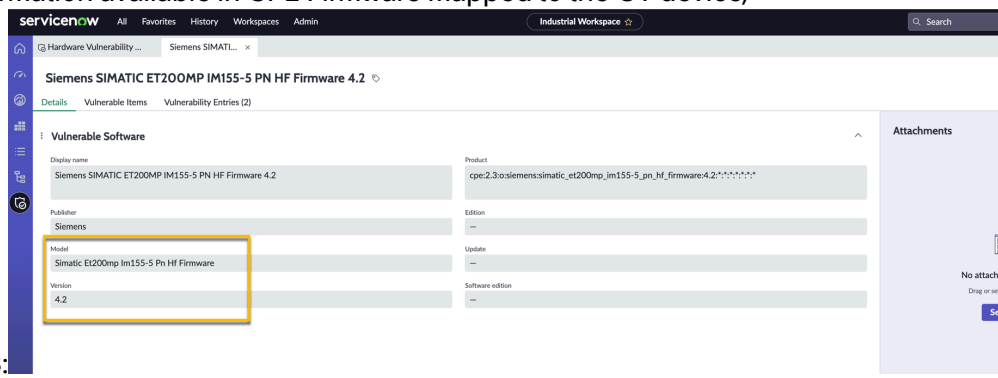
- Fully matched assessments: The Confidence Score is 1 for full assessments as all the parameters in the CVE information matches the device discovery model values available for the OT device.
- Partially matched assessments: The Confidence Score is less than 1 for partial assessments as all the parameters in the CPE information doesn't match the device discovery model values available for the OT device.

Following is an example of calculating the confidence score from the Common Platform Enumeration (CPE) information available for an OT device.

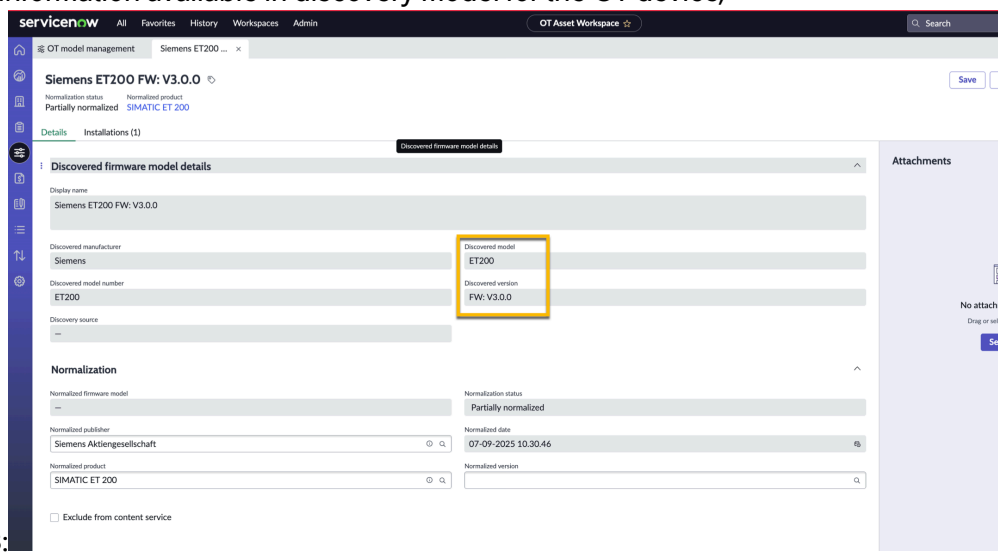
The following is a sample of a vulnerability assessment record, **CVE-2019-13946**:



The following is a sample of information available in CPE Firmware mapped to the OT device, **OT_device_demo_internal_963**:



The following is a sample of the information available in discovery model for the OT device, **OT_device_demo_internal_963**:



How to calculate the confidence score

If you compare the samples of the CPE Firmware mapped to the OT device and the discovery model for the OT device, you can see that:

- There is only a partial match for the **Model** information. Due to a partial match, the model score is assigned a value of 20.
- The **Version** information doesn't match so the version score is assigned a value of 0.

The confidence score range is 0–1. Based on the CPE information, the confidence score is calculated using the following formula:

```
((BASE SCORE) + (publisher score) + (model score) + (version
 score)) / 100
```

=

```
((25) + (25) + (20) + (0)) / 100
```

=

```
70 / 100
```

=

```
.70
```

Note:
To refer to the values used to calculate the confidence score, see Confidence score reference tables for hardware vulnerability assessment.

Confidence score reference tables for hardware vulnerability assessment

Reference values used to calculate the confidence score.

Reference tables

Confidence score calculation reference table

Information available in discovery model for OT device	Information available in CPE mapped to OT device	Partial match score	Additional score for full match
Discovered Publisher name	Publisher	20	5
Discovered Model name	Model	20	5
Discovered Version	Version	0	25

Confidence score summary table

Score	Value
Sum of all scores	75
Base score **Note:** Minimum score given to all matched discovery models.	25
Total score	100

Configuring the Industrial Workspace

Configure Industrial Workspace so that you can manage your Operational Technology (OT) data.

If you have the admin role, you can use Guided Setup to lead you through the setup of the Industrial Workspace. Guided Setup is a tool that assists with application or capability configuration. It organizes the configuration activities into categories. These categories contain the information about the setup tasks, the steps to complete each task, and the links to the pages in your instance where you perform the configuration. The links to useful help content are also provided.

To access Guided Setup, navigate to **Industrial Workspace Admin** > **Guided Setup**.

The following table lists the Guided Setup tasks and their purposes for the Industrial Workspace.

Industrial Workspace setup tasks

Task	Purpose
Assign the Industrial Workspace role.	Assigns the Configure Industrial Workspace [configure_industrial_workspace] role to users that need to configure the Industrial Workspace.
Review the homepage destination rules.	Redirects users to different pages in the Industrial Workspace based on user criteria.
Complete the configuration tasks for the OT Action-Oriented Landing Page.	Configures the OT Action-Oriented Landing Page so users can access the landing page in the Industrial Workspace.
Complete the configuration tasks for the OT Progress Scorecard.	Configures the OT Progress Scorecard so users can begin comparing site data and progress in the Industrial Workspace.
Complete the configuration tasks for the OT Visibility dashboard.	Configures the tabs on the OT Visibility dashboard so users can access the dashboard in the Industrial Workspace.
Complete the configuration tasks for the Operational Technology Vulnerability Response (PA) dashboard.	Configures the Operational Technology Vulnerability Response (PA) dashboard in the Industrial Workspace.
Complete the configuration tasks for the OT Unified Map experience	Configures the OT Unified Map experience if you want to modify the default settings.

Assign the Industrial Workspace role

Assign the Industrial Workspace role to your users so that you can control their access to the workspace's features, capabilities, and data.

Before you begin

Role required: admin

About this task

Users with the role that are listed in the following table can access the Guided Setup for the OT Action-Oriented Landing Page and the OT Progress Scorecard.

OT Progress Scorecard role

Role	Description
Configure Industrial Workspace [configure_industrial_workspace]	Can access the Industrial Workspace and the Guided Setup for the OT Action-Oriented Landing Page and the OT Progress Scorecard.

Procedure

Assign roles to users and groups by using the ServiceNow AI Platform user administration feature.

Review the homepage destination rules for the Industrial Workspace

Review the homepage destination rules for the Industrial Workspace.

Before you begin

Role required: admin

About this task

The homepage destination rules redirect users to different pages in the Industrial Workspace based on user criteria. For more information about the homepage destination rules, see Industrial Workspace homepage destination rules.

Procedure

1. Navigate to **All**.
2. In the **Filter** field, add `sys_homepage_destination_rule.list`.
3. Press the Enter key.
4. Select one of the following Industrial Workspace homepage destination rules whose user criteria you want to edit:
   - OT Progress Scorecard Page
   - Industrial Workspace Home Page
   - OT Dashboard Library Page

     Note:
     The OT Dashboard Library Page rule only displays if Operational Technology Manager is installed.

   - ISA Equipment Model Page

     Note:
     The ISA Equipment Model Page rule only displays if Industrial Process Manager is installed.

   - Industrial Workspace List Page
5. In the **User Criteria** field, copy the user criteria.
6. To apply the user criteria that redirects users to the page in the Industrial Workspace that you select, complete the following steps.
   a. Navigate to **All** > **User Criteria**.
   b. In the list view's search bar, search the homepage destination rule's user criteria you copied in step 5.
   c. Modify the User Criteria record so that the required users that you want redirected match the user criteria.
   d. Select **Update**.

Result

The users, groups, and roles defined in the user criteria record are now automatically redirected to the selected page in the Industrial Workspace.

Setting up the Operational Technology Action-Oriented Landing Page

Set up the Operational Technology (OT) Action-Oriented Landing Page in the Industrial Workspace so that your users can access their critical tasks.

The following table lists the Guided Setup tasks and their purposes for the OT Action-Oriented Landing Page.

OT Action-Oriented Landing Page setup tasks

Task	Purpose
1. Set the system properties for the OT Action-Oriented Landing Page.	Changes the amount of cards shown under **Important Actions** with the sn_mfg_common.landing_page_important_actions_limit system property.

Set the system properties for the Operational Technology Action-Oriented Landing Page

Set the system properties for the Operational Technology (OT) Action-Oriented Landing Page so that you can enable the properties as needed.

Before you begin

Role required: configure_industrial_workspace

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Workspace System Properties**.
2. Edit the following properties as needed.

System property	Description
OT Home (Action-Oriented Landing Page) system properties	
sn_mfg_common.landing_page_important_actions_limit	Maximum number of Important Actions fetched for the **Important Actions** section in the OT Action-Oriented Landing Page. The default is 50.

3. Select **Save**.

Setting up the Operational Technology Progress Scorecard

Set up the Operational Technology (OT) Progress Scorecard in the Industrial Workspace so that your users can compare site data and progress.

The following table lists the Guided Setup tasks and their purposes for the OT Progress Scorecard.

OT Progress Scorecard setup tasks

Task	Purpose
1. Assign the OT Progress Scorecard roles.	Assign the OT Progress Scorecard roles to your users so that you can control their access to the features, capabilities, and data for OT Progress Scorecard.
2. Validate the completeness score calculation.	Validate that the **CMDB Health Dashboard - Completeness Score Calculation** is activated to run if you want to include the **OT Device**

OT Progress Scorecard setup tasks (continued)

Task	Purpose
	Data Completeness (%) indicator in the OT Progress Scorecard.
3. [Optional] Review the indicator sources.	Reviews the indicator sources for a larger number of records. If you expect more than the default value of 1 million total records, you must override the records collection.
4. Configure the expected OT devices for a site.	Configure the number of expected OT devices for a site so that you can use the **% of Expected OT Devices in CMDB** indicator in the OT progress scorecard.
5. Complete the [PA OTPSC] Monthly Data Collection job.	Collects and displays the daily data for all indicators from Performance Analytics for the OT Progress Scorecard tab. You must complete this step before others can view the data in this tab.
6. Configure the OT Progress Scorecard indicators.	Configure the OT Progress Scorecard indicators so that the display of each indicator meets your needs.
7. Set the system properties for the OT Progress Scorecard.	Configures the thresholds shown on the OT Progress Scorecard and the components used to determine the calculated score.
8. Customize the module name.	Customize the module name of the OT Progress Scorecard to change its name from the default value with a name more suitable for your needs.

Assign the Operational Technology Progress Scorecard roles

Assign the Operational Technology (OT) Progress Scorecard roles to your users so that you can control their access to the features, capabilities, and data for OT Progress Scorecard.

Before you begin

Role required: admin

About this task

Users with the role that are listed in the following table can use the OT Progress Scorecard.

OT Progress Scorecard role

Role	Description
OT Progress Scorecard Viewer [ot_progress_scorecard_viewer]	Can view the OT Progress Scorecard with all site data available.
OT Progress Scorecard Editor [ot_progress_scorecard_editor]	Can view and edit the OT Progress Scorecard with all site data available.

Procedure

Assign roles to users and groups by using the ServiceNow AI Platform user administration feature.

Validate the completeness score calculation

Validate that the **CMDB Health Dashboard - Completeness Score Calculation** is activated to run if you want to include the **OT Device Data Completeness (%)** indicator in the Operational Technology (OT) Progress Scorecard.

Before you begin
Role required: admin

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Guided Setup**.
2. In the **Industrial Workspace** section, select **OT Progress Scorecard**.
3. In the **Validate Completeness Score Calculation** task, select **Configure**.
4. In the **CMDB Health Dashboard - Completeness Score Calculation** Scheduled Script Execution record, validate the following items:
   a. Validate that the **Active** check box is checked.
   b. To ensure accurate scores are collected for end of the month reporting, validate that **Run** field is configured
5. Select **Update**.

   For more details on how completeness is calculated, see the **Completeness** section of CMDB Health KPIs and metrics.

Review the indicator sources for a large number of records

Review the indicator sources if you need a large number of records. You can override the records collection so that the Operational Technology (OT) Progress Scorecard shows more records than the default value of 1 million.

Before you begin
Role required: admin

About this task
Due to the migration with Performance Analytics, each indicator of the OT Progress Scorecard can only show 1 million records by default. If you have the admin role and the records exceed 1 million after running the [PA OTPSC] Monthly Data Collection, an error message directs you to the job logs.

> **Note:**
> If you don't have the admin role and the records exceed 1 million after running the [PA OTPSC] Monthly Data Collection job, an error message directs you to contact an administrator for help.

If you have the admin role, you can check the job logs related list from the link in the error message and filter out the information to see which indicator source has the error. After you find the indicator source with the error, you can change the indicator sources for a larger number of records and override the indicator source data. Then, an error message no longer appears for

the other users and the data is shown for the indicator source. For more information about the indicator sources, see Indicator sources.

Note:
If you need to create new indicators, you must use the site breakdown included in the Industrial Workspace Common. The site breakdown part of the Operational Technology Manager application is deprecated.

The job logs may include errors that aren't about the indicator sources. You must filter the job logs record by the **Level** column and find the error messages about the indicator sources.

Procedure

1. Navigate to **All** > **Performance Analytics** > **Sources** > **Indicator Sources**.
2. Apply a filter by selecting the Show/hide filter ( ) icon and add the following filter:
   `[Application] [is] [Industrial Workspace Common]`
3. Select the indicator source record that you need to change.
   You can find which indicator source needs to be adjusted from the job logs link in the error message.
4. On the **Records Collection** tab, select the check box next to the **Override records collection** field.
5. In the **Maximum number of fetched records** field, change the value to `XM`.
6. Select **Update**.

Configure the expected OT devices for a site

Configure the number of expected OT devices for a site so that you can use the **% of Expected OT Devices in CMDB** indicator in the OT progress scorecard.

Before you begin

Role required: ot_progress_scorecard_editor and cmdb_ot_isa_viewer with site access assigned for relevant sites through user criteria

Note:
For more information about site access through user criteria, see Review the homepage destination rules for the Industrial Workspace.

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **OT Progress Scorecard Attributes**.
2. If you need to create a record with your site, complete these actions.
   a. Select **New**.
   b. In the **Site** field, add your site.
   c. In the **Value** field, add the number of expected OT devices for that site.

      Note:
      Don't include OT control modules in this value.

   d. Select **Save**.
3. If a record with your site exists and you want to modify the expected devices, complete these actions.

a. Select the record you want to edit.

b. In the **Value** field, modify the number of expected OT devices for that site.

> **Note:**
> Don't include OT control modules in this value.

c. Select **Update**.

Configure the data collection for the Operational Technology Progress Scorecard

Configure the data collection for Operational Technology (OT) Progress Scorecard so that you can collect and display the daily data for all indicators from Performance Analytics. This configuration ensures that your OT data is displayed accurately on the scorecard.

Before you begin

Role required: admin

About this task

If you don't run the [PA OTPSC] Monthly Data Collection job, then no data is available for the OT Progress Scorecard. If you have the admin role, you see a warning message that prompts you to run the job.

> **Note:**
> If you don't have an admin role, you see a warning message that prompts you to reach out to the administrator for help.

Procedure

1. Navigate to **All** > **Data Collector** > **Performance Analytics** > **Jobs**.
   If you're in the OT Progress Scorecard, navigate to the Scheduled Data Collection table by selecting **Run job now** in the error message.
2. Apply a filter by selecting the Show/hide filter ( ) icon and add a filter of `[Name] [is] [[PA OTPSC] Monthly Data Collection]`.
3. Start collecting the data by selecting the check box next to the **Active** field in the Job parameters section and then schedule a time in the **Time** field.
   You can collect the data manually, by using the **Execute Now** button. Otherwise, no data is shown when you view the tab. Only use the **Execute Now** button when you first run the job. The data that is collected after this point should be collected at a scheduled time.
4. Check if the default schedule collection time works for you.
   The default time is 00:00:00 at the beginning of every month. If you want to change the default collection time, you can change it after activating the job. Make sure that you notify your users about this change.

Result

The OT Progress Scorecard is now showing the correct site data for your users.

> **Note:**
> The OT Progress Scorecard uses Performance Analytics. Performance Analytics only saves the scores for 5 months. If want to preserve your scores and compare site data for more than 5 months, see Activating your Performance Analytics subscription.

Configure an indicator by threshold, weightage, and order

Configure the Operational Technology (OT) Progress Scorecard indicators so that the display of each indicator meets your needs.

Before you begin
Role required: ot_progress_scorecard_editor or configure_industrial_workspace

About this task
You can configure the following indicators.

- Overall Score (%)
- % of Expected OT Devices in CMDB
- Classified OT Devices (%)
- Assigned OT Devices (%)
- OT Device Data Completeness (%)
- Mapped OT Devices (%)
- Backed up OT Devices (%)
- Approved OT Change Requests (%)
- OT Incidents with OT Context (%)

Procedure
1. Navigate to **All** > **Industrial Workspace Admin** > **OT Progress Scorecard Config**.
2. Select the indicator you want to edit.
3. On the form, fill in the following fields.

Indicator configuration fields

Field	Description
Low Threshold	The lowest threshold that the indicator can meet.
High threshold	The highest threshold that the indicator can meet.
Weightage	The total weightage that the indicator contributes to the overall score.
Order	The rank of the indicator by importance from left to right.

4. If you do not need an indicator to be shown, set de-select the **Active** field.
5. Select **Update**.

Set the system properties for the Operational Technology Progress Scorecard

Set the system properties for the Operational Technology (OT) Progress Scorecard so that you can enable the properties as needed.

Before you begin
Role required: configure_industrial_workspace

Procedure
1. Navigate to **All** > **Industrial Workspace Admin** > **Workspace System Properties**.
2. Edit the following properties as needed.

System property	Description
OT Progress Scorecard configuration	
sn_mfg_common.otpsc.page_title	The page title shown on the OT Progress Scorecard. The default is `OT Progress Scorecard`.
sn_mfg_common.otpsc.records_per_page	The number of records shown per page. The default is `10`.
sn_mfg_common.otpsc.low_threshold_color	A color to represent the low threshold in the OT Progress Scorecard.
sn_mfg_common.otpsc.medium_threshold_color	A color to represent the medium threshold in the OT Progress Scorecard.
sn_mfg_common.otpsc.high_threshold_color	A color to represent the high threshold in the OT Progress Scorecard.

3. Select **Save**.

Customize the module name

Customize the module name of the Operational Technology (OT) Progress Scorecard to change its name from the default value with a name more suitable for your needs.

Before you begin

Role required: admin

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Guided Setup**.
2. In the **Industrial Workspace** module, select the **OT Progress Scorecard section**.
3. In the **[OPTIONAL] Customize Module Name** task, select **Configure**.
4. In the **Value** field, edit the `"message"` value from `OT Progress Scorecard` to a name that fits your needs.
5. Select **Update**.

Setting up the Operational Technology Visibility dashboard

Complete the Guided Setup tasks so that you can start setting up the Operational Technology (OT) Visibility dashboard with the data collections, indicator resources, and filters for your organization.

To access the Guided Setup for the OT Visibility dashboard, navigate to **All** > **Industrial Workspace Admin** > **Guided Setup** and select the Operational Technology Visibility Dashboard section under Operational Technology Manager.

For more information about the OT Visibility dashboard and its contents, see Operational Technology Visibility dashboard.

The following table shows the Guided Setup tasks used to set up the dashboard.

OT Visibility dashboard Guided Setup tasks

Task	Purpose
1. Complete the OT Devices Daily Data Collection job.	Collects and displays the daily data for all indicators from Performance Analytics for the OT Visibility dashboard. You must complete this step before others can view the dashboard data.
2. [Optional] Review the indicator sources.	Reviews the indicator sources for a larger number of records. If you expect more than the default value of 1 million total records, you must override the records collection.

Configure the data collection for Operational Technology devices

Configure the data collection for Operational Technology (OT) devices so that you can collect and display the daily data for all indicators from Performance Analytics. This configuration ensures that your OT data is displayed accurately on the OT Visibility dashboard.

Before you begin

Role required: admin

About this task

If the OT Devices Daily Data Collection job hasn't run yet, that means that no data is available for the OT Visibility dashboard and the **Last updated** timestamp is hidden. If you have the admin role, you see the following warning message that prompts you to run the OT Devices Daily Data Collection job:

Note:
If you don't have an admin role, you see a warning message that prompts you to reach out to the administrator for help.

Procedure

1. Navigate to **All** > **Data Collector** > **Performance Analytics** > **Jobs**.
   If you're in the OT Visibility dashboard, you can navigate to the Scheduled Data Collection table by selecting **Run job now** in the error message.
2. Apply a filter by selecting the Show/hide filter ( ) icon and add a filter of `[Name] [is] [OT Devices Daily Data Collection]`.
3. Start collecting the data by selecting the check box next to the **Active** field in the Job parameters section and then schedule a time in the **Time** field.
   You can collect the data manually by using the **Execute Now** button. Otherwise, no data is shown when you view the dashboard. Only use the **Execute Now** button when you first run the job. The data that is collected after this point should be collected at a scheduled time.
4. Check if the default schedule collection time works for you.
   The default time is 00:00:00 daily. If you want to change the default collection time, you can change it after activating the job. Make sure that you notify your users about this change.

Result

The OT Visibility dashboard is now showing the correct data for the collected OT devices for your users.

What to do next
Now, you can review the indicator sources and determine if you need to override the default records collection. For more information, see Review the indicator sources for a large number of records.

Review the indicator sources for a large number of records

Review the indicator sources if you need a large number of records. You can override the records collection so that the Operational Technology (OT) Visibility dashboard shows more records than the default value of 1 million.

Before you begin
Role required: admin

About this task
Due to the migration with Performance Analytics, each indicator of the OT Visibility dashboard can only show 1 million records by default. If you have the admin role and the records exceed 1 million after running the OT Devices Daily Data Collection job, an error message directs you to the job logs.

Note:
If you don't have the admin role and the records exceed 1 million after running the OT Devices Daily Data Collection job, an error message directs you to contact an administrator for help.

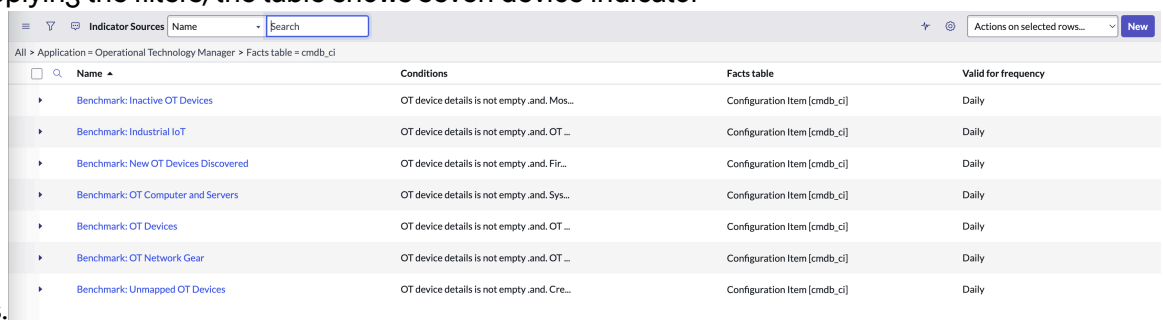
If you have the admin role, you can check the job logs related list from a link in the error message and filter out the information to see which indicator source has the error. After you find the indicator source with the error, you can change the indicator sources for a larger number of records and override the indicator source data. Then, an error message no longer appears for the other users and the data is shown for the indicator source. For more information about the indicator sources, see Indicator sources.

Note:
If you need to create new indicators, you must use the site breakdown included in the Industrial Workspace Common. The site breakdown part of the Operational Technology Manager application is deprecated.

The job logs may include errors that aren't about the indicator sources. You must filter the job logs record by the **Level** column to find the error messages about the indicator sources.

Procedure
1. Navigate to **All** > **Performance Analytics** > **Sources** > **Indicator Sources**.
2. Apply a filter by selecting the Show/hide filter ( ) icon and add the following filters.
   - `[Application] [is] [Operational Technology Manager]`
   - `[Facts table] [is] [cmdb_ci]`

   After applying the filters, the table shows seven device indicator records.



3. Select the indicator source record that you need to change.
   You can find which indicator source needs to be adjusted from the job logs link in the error message.
4. On the **Records Collection** tab, select the check box next to the **Override records collection** field.
5. In the **Maximum number of fetched records** field, change the value to `XM`.
6. Select **Update**.

Setting up the Operational Technology Vulnerability Response (PA) dashboard

Set up the Operational Technology Vulnerability Response (PA) dashboard in the Industrial Workspace so that your users can access their critical tasks.

The following table lists the Guided Setup tasks and their purposes for the Operational Technology Vulnerability Response (PA) dashboard.

Operational Technology Vulnerability Response (PA) dashboard setup tasks

Task	Purpose
1. Configure the data collection jobs.	Collects and displays the daily data for all indicators from Performance Analytics for the OTVR (PA) dashboard. You must complete this step before others can view the data in this tab.
2. [Optional] Review the indicator sources.	Reviews the indicator sources for a larger number of records. If you expect more than the default value of 1 million total records, you must override the records collection.

Configure the data collection for the Operational Technology Vulnerability Response (PA) dashboard

Configure the data collection for the data shown on the Operational Technology Vulnerability Response (PA) dashboard. Scheduled jobs are automated pieces of work that can be performed at a specific time or on a recurring schedule.

Before you begin

Role required: admin

Procedure

1. Navigate to **All** > **Data Collector** > **Performance Analytics** > **Jobs**.
2. Apply a filter by selecting the Show/hide filter ( ) icon and add the following filters .
   - `[Application] [is] [Operational Technology Vulnerability Response]`
   - `[Class] [is] [Scheduled Data Collection]`

   The following scheduled jobs appear when you apply the filter.

- [PA OT VR] Historical Vulnerability Data Collection

  Note:
  The [PA OT VR] Historical Vulnerability Data Collection job is an on-demand job that you only need to execute once. After the historical data is collected, the daily data collection jobs run on a scheduled time every day. For more information about historical data, see Collect historical data.

- [PA OT VR] Daily Collection for Remediation Tasks
- [PA OT VR] Daily Collection for Vulnerable Items 1
- [PA OT VR] Daily Collection for Vulnerable Items 2
- [PA OT VR] Daily Collection for Vulnerable Configuration Items (CIs)

3. To start collecting the data, select a scheduled job record.
4. Select the check box next to the **Active** field in the Job parameters section and then schedule a time in the **Time** field.
   You can collect the data manually, by using the **Execute Now** button. Otherwise, no data is shown when you view the tab. Only use the **Execute Now** button when you first run the job. The data that is collected after this point should be collected at a scheduled time.
5. Check if the default schedule collection time works for you.
   The default time is 00:00:00 daily. If you want to change the default collection time, you can change it after activating the job. Make sure that you notify your users about this change.
6. Repeat steps 3 to 5 for each scheduled job.

Result
The Operational Technology Vulnerability Response (PA) dashboard is now showing the correct data for your users.

What to do next
Now, you can review the indicator sources and determine if you need to override the default records collection. For more information, see Review the indicator sources for a larger number of records.

Review the indicator sources for a larger number of records

Review and update an indicator source to override the expected record count if you expect more than 1 million records to be collected from the indicator sources. This action helps to avoid system performance issues when collecting data for the Industrial Workspace.

Before you begin
Role required: admin

Procedure
1. Navigate to **All** > **Performance Analytics** > **Indicators** > **Automated Indicators**.
2. Apply the filter **[Application] [is] [Operational Technology Vulnerability Response]**.
3. Under the Indicator Source column, select the indicator source record that you want to edit.
4. In the Records collection section, select the check box next to the **Override record collection** field.
5. In the **Maximum number of fetched records** field, add a number greater than the default value of 1 million records.

For example, **2 million**.

6. Select **Update**.

Setting up the Operational Technology Unified Map experience

Set up the Operational Technology (OT) Unified Map experience in the Industrial Workspace so that your users can access Unified Maps.

The following table lists the Guided Setup tasks and their purposes for the OT Unified Map experience. The admin role is required.

Note:
These Guided Setup tasks are optional to complete as they modify the default settings of the available configuration identifier.

These configuration identifier settings affect all users. Individual users cannot configure the settings.

OT Unified Map experience setup tasks

Task	Purpose
Modify the default settings of the Industrial Workspace Config Identifier.	Modify the following default settings of the Industrial Workspace Config Identifier to configure the OT Unified Map experience: • Workspace configuration properties • Node map profiles • Node map related items • Operational life cycle modes • Table attributes

Default settings of the Operational Technology Unified Map experience

You can modify the default settings available for the Operational Technology (OT) Unified Map experience.

With the admin role, you can modify the default settings of the Industrial Workspace Config Identifier available with the OT Unified Map experience. A configuration identifier, or config identifier, is a configuration element within the configuration identifiers framework. A config identifier contains settings and table-driven configurations used in a UX application such as a workspace.

If a property isn't set or if there are no entries in the table-driven configuration, look-up uses the values in the default configuration identifier instead. For more information about the configuration identifiers framework, see Configuration identifiers framework.

To access the Industrial Workspace Config Identifier record, navigate to **All**, and in the filter bar, enter `sn_cmdb_ws_config_identifier.list`. Then select **Industrial Workspace Config Identifier**.

The following sections describe the default settings available to modify in the Industrial Workspace Config Identifier.

Note:
The settings described affect all users. Individual users can’t configure the settings.

Workspace Config Properties

By default, the following configuration properties are listed in the `sn_cmdb_ws_config_property.list` and are assigned to the default configuration identifier.

- unifiedmap.map_search.max_nodes
- unifiedmap.map_search_filter.default_levels
- unifiedmap.map_search_filter.max_levels
- unifiedmap.map_search_filter.endpoint_deduplication_fields

Node Map Profiles

You can configure profiles that set default map filters and default map orientation for a class. For example, to show the service-mapping data for the Mapped Application Service class.

These class profiles help in identifying which layers are shown on the Unified Map for a given configuration item (CI) node. Class profiles are applied when no filter preset is used with the current map. This application typically occurs when you initially load a map without a filter preset, or when you set the filter preset to the default view.

With class profiles, you can only configure the **Layer** category in the filter panel.

Node Map References

Map references enable connections on the map between CIs from two classes that aren't connected by a relationship.

Node Map Related Items

You can use the Related Items module in the Unified Map to set the related items categories that appear for CIs, such as active incidents and active problems. When you select the Related Items module, related items are grouped by categories in the contextual side panel.

Operational life cycle modes

You can specify the operational states that CIs must have for them to be included in the Unified Maps.

Table Attributes

Each class has a unique set of extended properties that appear in the Unified Map Attributes panel for a CI. Many common classes are preconfigured with these properties. You can modify the default settings and globally configure extended properties for additional classes.

Set up the Hardware Vulnerability Assessment of Operational Technology devices using guided setup

Use the Industrial Workspace Admin guided setup to walk through configuring the Hardware Vulnerability Assessment feature available on the Industrial Workspace menu.

Before you begin

Role required: admin

About this task

Use the Industrial Workspace Admin guided setup to assign required user roles, configure a system property, and schedule jobs to perform the hardware vulnerability assessment of Operational Technology devices.

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Guided Setup** > *Operational Technology Vulnerability Response*.
2. Select **Get Started** for the *Operational Technology Vulnerability Response* application.
3. Select the *Hardware Vulnerability Assessment* task.
4. Select the following task tabs, then select **Configure** to complete the configuration tasks.

Related topics

Guided Setup

Operational Technology Hardware Vulnerability Assessment

Assign roles for Hardware Vulnerability Assessment

Assign roles to users so that they can configure properties, and use hardware vulnerability assessments features, capabilities, and data.

Before you begin
Role required: admin

About this task
Assign the following roles to users and user groups or Hardware Vulnerability Analyst users#or user groups that are listed in the following table:

Hardware Vulnerability Assessment Roles

Role	Description
[sn_vul.manage_exposure_assessment]	Can view or edit properties for Hardware Vulnerability Assessment.
OT Vulnerability Event Manager [sn_otvr.vul_event_manager]	Can view and perform assessments related to Hardware Vulnerability Assessment.

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Guided Setup** > **Operational Technology Vulnerability Response** > **Hardware Vulnerability Assessment** > **Configure User Roles assignment** > **Configure**.
   Alternatively, you can navigate to **User Roles assignment** > **Configure** > **Users**.
2. Assign roles to users and groups by using the ServiceNow AI Platform user administration feature.

Run NVD Integrations for Hardware Vulnerability Assessment

Install and run National Vulnerability Database (NVD) integrations to perform hardware vulnerability assessment.

Before you begin
Role required: sn_otvr.vul_event_manager and admin

About this task

Hardware Vulnerability Assessment is based on the vulnerability assessment feature in Vulnerability Response. You must HVA run the NVD integrations to access the Common Vulnerabilities and Exposures (CVEs) data in the NVD database.

To understand what are the different NVD integrations and how do the integrations work, see:

- Understanding the NVD integrations
- Install the Vulnerability Response Integration with the NIST National Vulnerability Database

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Guided Setup** > **Operational Technology Vulnerability Response** > **Hardware Vulnerability Assessment** > **Configure Install and Run NVD Integration** > **Configure**.
   Alternatively, you can navigate to **All** > **Vulnerability Response** > **Administration** > **Integrations**
2. Install and execute the following NVD Integrations:
   - *NIST National Vulnerability Database Integration-API (CVE only)*
   - *NIST National Vulnerability Database Integration-API (CPE only)*
   - *NIST National Vulnerability Database Integration-API (Unmapped CPE)*

Configure the properties for Hardware Vulnerability Assessment

Configure the properties required to perform hardware vulnerability assessment.

Before you begin

Role required: sn_vul.manage_exposure_assessment and admin

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Guided Setup** > **Operational Technology Vulnerability Response** > **Hardware Vulnerability Assessment** > **Configure Vulnerability Assessment Properties** > **Configure** > **Vulnerability Assessment**.
   Alternatively, you can navigate to **All** > **Vulnerability Response** > **Administration** > **Properties** > **Vulnerability Assessment**.
2. Perform the following configurations.
3. Select **Save**.

Run scheduled jobs to perform Hardware Vulnerability Assessment

Execute scheduled jobs to perform hardware vulnerability assessment.

Before you begin

Role required: sn_otvr.vul_event_manager and admin

About this task

You must perform the following scheduled jobs to detect firmware vulnerabilities of any Operational Technology (OT) devices in the inventory:

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Guided Setup** > **Operational Technology Vulnerability Response** > **Hardware Vulnerability Assessment** > **Scheduled Vulnerability Assessment Jobs** > **Configure** > **Scheduled Jobs**.

   Important:
   - You must run the *Hardware Assessment - Full* job before you schedule the *Hardware Assessment - Delta* job. You can run the *Hardware Assessment - Full* job on demand.
   - You can schedule the *Hardware Assessment - Delta* job to run daily, weekly, or according to your required frequency.

2. Select **Hardware Assessment - Full** > **Execute Now**.
   This job performs an assessment on all OT devices in the inventory to detect any firmware vulnerabilities regardless of prior assessments.
3. Select **Hardware Assessment - Delta** > **Active**, then select **Run** and choose a frequency from the list.

   The **Hardware Assessment - Delta** job runs according to the frequency that you select.

   This job performs incremental assessments, targeting only changes or updates since the last assessment was run. It captures changes on firmware, normalized contents, and vulnerabilities since the last successful run of the hardware vulnerability assessment. This job makes sure that you can maintain continuous monitoring and timely updates.
4. Select **Hardware Vulnerability Assessment - Mark Expired Assessments** > **Active** to start this job, then select **Run** and choose a frequency from the list.

   The *Hardware Vulnerability Assessment - Mark Expired Assessments* job runs according to the frequency that you select.

   Hardware vulnerability assessments are based on the firmware data available for a device. If you update the firmware version of a device, the existing assessments based on the previous firmware version are no longer valid and are considered as expired assessments. You can delete expired assessments, which are older than a month. However, you must perform new vulnerability assessments for the devices with an updated firmware version.

Related topics

Scheduled jobs

Configure Normalization Opt-in for Hardware Vulnerability Assessment

Select **Firmware Discovery Model** Opt-in option for ServiceNow Asset Management Content Service to collect unnormalized firmware details of Operational Technology (OT) devices and update the normalized content library. This process improves the ratio of normalized data mapping to CVEs and therefore improves assessment of vulnerabilities.

Before you begin

Role required: sn_eam.enterprise_admin or admin

Procedure

1. Navigate to **All** > **Industrial Workspace Admin** > **Guided Setup** > **Operational Technology Vulnerability Response** > **Hardware Vulnerability Assessment** > **Normalization opt-in** > **Configure**.
2. Select **Yes**.
3. Enable **Firmware Discovery Models** toggle button.

Related topics

Opt-in to Enterprise Asset Management Content Service

Delete obsolete and expired hardware vulnerability assessments

Set up automatic deletion of obsolete or expired assessment records.

Before you begin
Role required: admin

About this task
Configure the age of obsolete or expired assessments to be cleaned.

- Obsolete assessments: Invalid assessments, which have been ignored or the associated vulnerable items (VITs) that are closed for more than two years.
- Expired assessments: If you update the firmware version of a device, the existing assessments based on the previous firmware version become invalid and are considered as expired assessments. You can delete expired assessments, which are older than a month. However, you must perform new vulnerability assessments for the devices with an updated firmware version.

Procedure

1. Navigate to **All** > **System Data Management** > **Data Management Policies**.
2. Search for and select the **sn_vul_analyst_firmware_vulnerability_assessment** policy.
3. Select the **Active** check box and configure clean-up rules according to your requirement. Configure the age in clean-up rules 1, 2, and 3, after which the obsolete and expired assessments are deleted:
   - Rule 1: Delete the firmware vulnerabilities assessment whose associated Vulnerability Item (VIT) was closed more than two years ago, based on the last update date of the associated VIT
   - Rule 2: Delete the firmware vulnerabilities assessments that have been ignored for a period exceeding two years, based on the creation date.
   - Rule 3: Delete firmware assessments that have been expired over 30 days, based on the last update date.
4. Select **Update**.

Using the Industrial Workspace

After you complete all the required set-up tasks for the Industrial Workspace, users can begin managing their Operational Technology data on the different pages and dashboards available in the Industrial Workspace.

Industrial Workspace homepage destination rules

Depending on your assigned roles, you're redirected to different pages in the Industrial Workspace with homepage destination rules. This helps you access the data that you need more quickly and efficiently.

Homepage destination rules overview

Each destination rule redirects different OT users to different pages on the Industrial Workspace based on their assigned role or roles. Some roles may not have access to the data on one page, so redirecting users to a page where data is available to view helps them better navigate the Industrial Workspace. For example, users with only the Operational Technology Editor [cmdb_ot_editor] role can't view data on the OT Action-Oriented Landing Page, so they only see the an empty landing page. Instead, they're redirected to the Industrial Workspace Lists, where they can view the applicable OT device data.

Industrial Workspace homepage destination rule descriptions

The following table describes the Industrial Workspace homepage destination rules and their destinations.

Homepage destination rules

Rule	Destination	Roles redirected	Description
OT Progress Scorecard Page	now/mfg/ot-progress-scorecard/ (OT Progress Scorecard)	ot_progress_scorecard_viewer	The OT Progress Scorecard rule takes users with the roles described in the rule directly to the OT Progress Scorecard when they log in.
Industrial Workspace Home Page	now/mfg/home (OT Action-Oriented Landing Page)	• sn_ot_incident_read • sn_ot_change_read • sn_otvr.remediation_owner	The Industrial Workspace Home Page rule takes users with the roles described in the rule directly to the OT Action-Oriented Landing Page when they log in.
OT Dashboard Library Page	now/mfg/dashboard-library (OT Dashboard Library)	cmdb_ot_viewer + cmdb_ot_isa_viewer	The OT Dashboard Library Page rule takes users with the roles described in the rule directly to the OT Visibility dashboard when they log in.

Homepage destination rules (continued)

Rule	Destination	Roles redirected	Description
			Note: The OT Dashboard Library Page rule only displays if Operational Technology Manager is installed.
ISA Equipment Model Page	now/mfg/isa-equipment-model (Equipment Model Manager)	cmdb_ot_isa_viewer	The ISA Equipment Model Page rule takes users with the roles described in the rule directly to the Equipment Model Manager when they log in. **Note:** The ISA Equipment Model Page rule only displays if Industrial Process Manager is installed.
Industrial Workspace List Page	now/mfg/list (Industrial Workspace Lists)	cmdb_ot_viewer	The Industrial Workspace List Page rule takes users with the roles described in the rule directly to the Industrial Workspace Lists when they log in.

Search for a record in the Industrial Workspace

Search for a record in the Industrial Workspace related to Operational Technology (OT) data, or Configuration Management Database (CMDB) data.

Before you begin

- This search experience applies only to instances with AI Search as its search engine. Instances with Zing as its search engine have a different search experience.
- Role required: cmdb_ot_viewer

About this task

The Industrial Workspace search is configured to show Natural Language Query (NLQ) Genius Results for each search. For more information about how NLQ Genius Results are used in the

Industrial Workspace, see NLQ Genius Results used in the Industrial Workspace. For more information about NLQ Genius Results, see NLQ Genius Results.

Using the search bar in the Industrial Workspace, you can search and find results for the following records.

- IT Incident
- OT Incident and Incident Task

> **Note:**
> OT Incident and Incident Task records are only available if you have Operational Technology Incident Management installed.

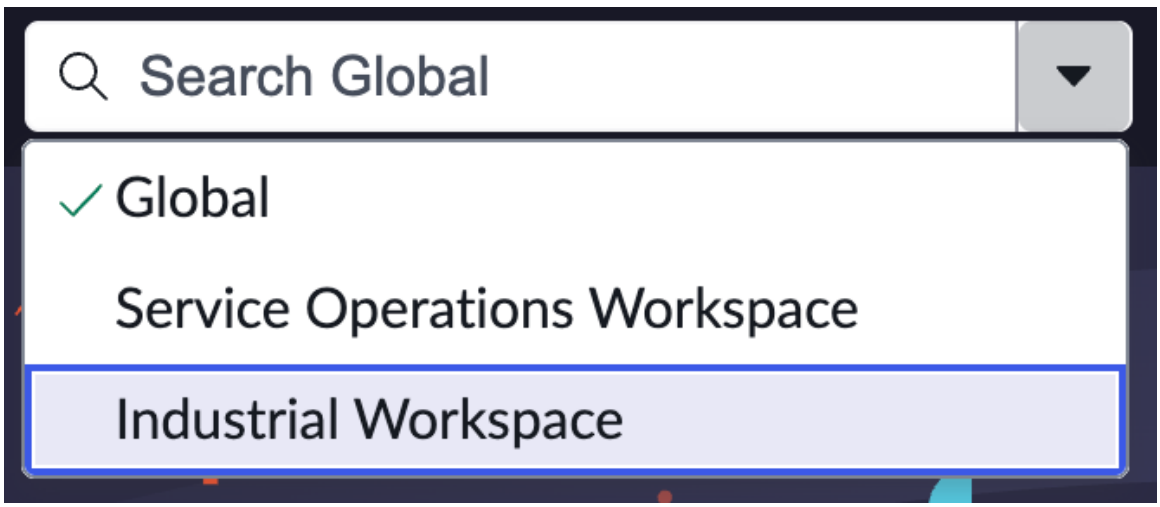
- OT Change and Change Task

> **Note:**
> OT Change and Change Task records are only available if you have Operational Technology Change Management installed.

- Catalog Task
- Knowledge
- User

Procedure

1. Navigate to **All** > **Industrial Workspace**.
2. In the Search bar, use key words or the record number to search for a record.
3. In the search results, select the record you want to view.
   If you select a tab and don't have access to the returned records, you will see a **No Results** message.
4. If you're not in the Industrial Workspace but want to search for records in the Industrial Workspace, perform the following actions.
   a. In the Search bar, select the **Choose search context** ( ) icon.
   b. From the menu, select **Industrial Workspace**.



NLQ Genius Results used in the Industrial Workspace

The Industrial Workspace leverages Natural Language Query (NLQ) Genius Results for each search.

NLQ Genius Results overview

Configuration Management Database (CMDB) tables cannot be indexed by AI Search. The Industrial Workspace search is configured to show NLQ Genius Results for each search, which can be used to search CMDB tables. NLQ Genius Results use NLQ processing to surface relevant results from tables that match your search query.

For more information about NLQ Genius Results, see NLQ Genius Results.

Searching OT CIs

You can search Operational Technology (OT) configuration items (CIs) by specifying the table and column, leveraging the NLQ Genius Results.

The following table contains examples for searching different information for a PLC. If there are additional columns you need to search, you can follow this general pattern.

Information type	Search input
Searching for a PLC by name	`PLC Name <insert name>`
Searching for a PLC by model ID	`PLC Model ID <insert model ID>`
Searching for a PLC by description	`PLC Description <insert description>`
Searching for a PLC by manufacturer	`PLC Manufacturer <insert manufacturer>`

Site filter in the Industrial Workspace

You can use the site filter in the Operational Technology (OT) Visibility dashboard, the Operational Technology Vulnerability Response (PA) dashboard, and the OT Vulnerability Risk Rollup dashboard to view data for specific sites.

The site filter lets you specify the OT device or vulnerability data that you want to see on the following dashboards.

- OT Visibility dashboard
- OTVR (PA) dashboard
- OT Vulnerability Risk Rollup dashboard

To use the site filter, you must have the **cmdb_ot_isa_viewer** role with access to the site you want to view.

The site filter lets you do the following actions:

- Search for a specific site.
- View the OT data for one or multiple sites.

- View the OT data for no site assigned.

> **Note:**
> If there's no site assigned to an OT device, the filter shows **No site assigned**. To have the correct sites shown on the dashboard, you must assign a site to the device and then assign a business unit to that site.

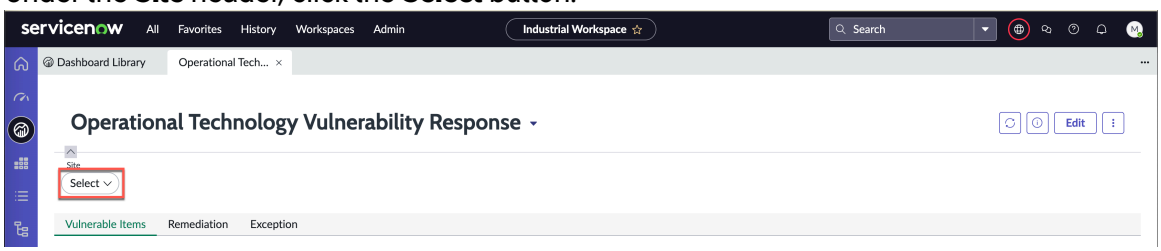
Use the site filter

Use the site in the Operational Technology (OT) Visibility dashboard, the Operational Technology Vulnerability Response (PA) dashboard, and the OT Vulnerability Risk Rollup dashboard to filter the data by the selected site or sites.

Before you begin
Role required: cmdb_ot_isa_viewer with site access

Procedure

1. Navigate to **All** > **Industrial Workspace**.
2. Select the **Dashboard Library** ( ) icon.
3. Select either the OT Visibility dashboard or the Operational Technology Vulnerability Response dashboard.
4. Under the **Site** header, click the **Select** button.



5. **Optional:** To search for a specific site, use the search function.
6. To apply one or more sites to the dashboard, complete the following actions.
   a. In the **Available** column, select each site that you want to view data for.
   b. To move your selected site or sites to the **Applied** column, click the **Move selected items** icon .

Operational Technology Progress Scorecard filters

You can use the filters on the Operational Technology (OT) Progress Scorecard to specify the data that you want to see on your scorecard by site, business unit (BU), or date.

Scorecard filter overview

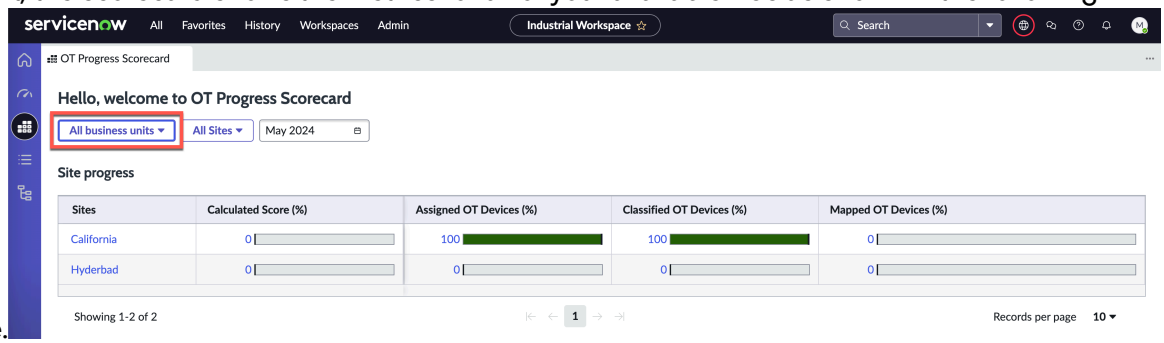
The business unit, site, and date filters let you specify the scorecard metrics that you want to see on the OT Progress Scorecard. You can filter by one or more business units, their respective sites, and a specific calendar month.

Business unit filter

The business unit (BU) filter lets you do the following actions:

- View the scorecard metrics for all business units.
- View the scorecard metrics for a specific business unit.
- View the scorecard metrics for multiple business units.

By default, the scorecard shows the metrics for all of your available BUs as shown in the following example.



After you set the BU filter, the scorecard displays the data from every site that is included in the selected BUs. You can then select a site from the All Sites menu, which is described in the next section. If you change the BU filter and select different BUs, the site filter is updated to only include the sites that are associated with the BU that you selected.

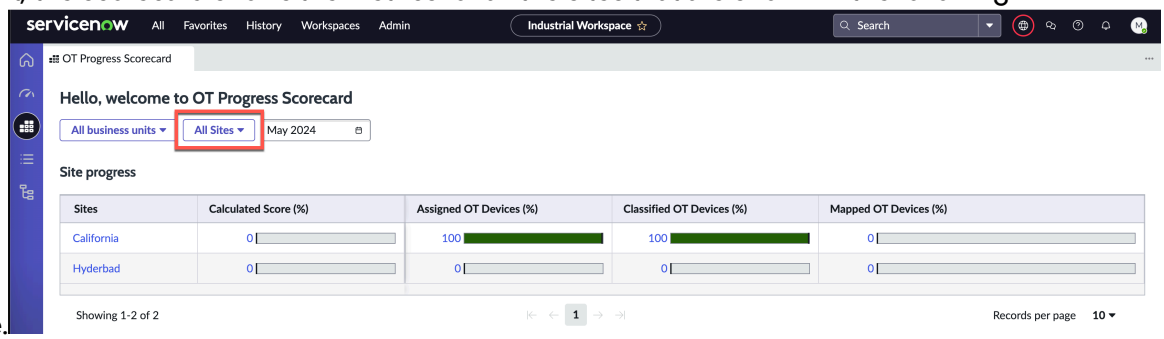
For more information about how to use BU and site filters, see Use the Operational Technology Progress Scorecard filters.

Site filter

The site filter lets you do the following actions:

- View the scorecard metrics for all sites.
- View the scorecard metrics for a specific site.
- View the scorecard metrics for multiple sites.

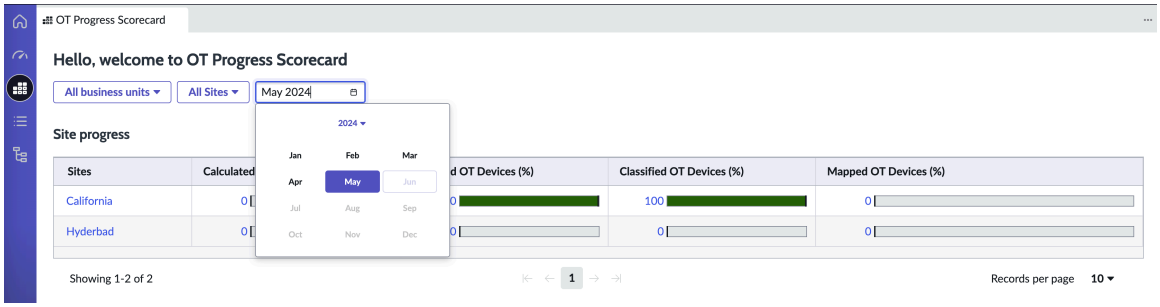
By default, the scorecard shows the metrics for all the sites that are shown in the following example.



Date filter

The date filter lets you view the scorecard metrics for a specific calendar month in the selected year. By default, the scorecard shows the metrics for the previous month and year.

Note:
If the [PA OTPSC] Monthly Data Collection job hasn't run yet, the scorecard shows a score of 0. For more information about the [PA OTPSC] Monthly Data Collection job, see Configure the data collection for the Operational Technology Progress Scorecard.



Use the Operational Technology Progress Scorecard filters

Use the business unit (BU) and site filters on the Operational Technology (OT) Progress Scorecard to filter the data by business unit, site, or date.

Before you begin

Role required: admin

Procedure

1. Navigate to **All** > **Industrial Workspace**.
2. Open the OT Progress Scorecard.
3. View the scorecard metrics for one or more BUs.
   a. In the header, select the **All business units** menu.
   b. From the list, select one or more BUs that you want to see the data for. You can use the search function to search for a specific BU.
4. View the scorecard metrics for one or more sites.
   a. In the header, select the **All sites** menu.
   b. From the list, select one or more sites that you want to see the data for.

   Note:
   You can use the search function to search for a specific site. Enter the name of the site or the short code in the search bar. The short code is an abbreviation for your site.

5. View the scorecard metrics for a calendar date.
   a. In the header, select the calendar ( ) icon.
   b. Select the month and year that you want to the data for.

Sort the Operational Technology Progress Scorecard by ascending or descending order

Sort the Operational Technology (OT) Progress Scorecard by ascending or descending order to customize your view of the scorecard.

Before you begin

Role required: ot_progress_scorecard_viewer

Procedure

1. Navigate to **All** > **Industrial Workspace**.
2. Select the **OT Progress Scorecard** ( ) icon.
3. Select the Ascending ( ) or Descending ( ) icon.

Result

The OT Progress Scorecard is now organized by ascending or descending order. If you log out, the sort configuration is saved for the next time you log in.

Configure the order of your important actions on the Operational Technology Action-Oriented Landing Page

Configure the order of your important actions on the Operational Technology (OT) Action-Oriented Landing Page to personalize how you view your tasks.

Before you begin

Role required: cmdb_ot_viewer

Procedure

1. Navigate to **All** > **Industrial Workspace**.
2. To the **Home** ( ) icon.
3. Select the **Configure important actions** ( ) icon.
4. Select **Sort items**.
5. In the **Select attribute** field, select the attribute that you want your important actions to be filtered by.
   You can use the **Search** field to find the attribute you want to sort your actions by.
6. In the **Order** field, select **Ascending** or **Descending**.

Indicator sources and indicators for the Operational Technology Vulnerability Response (PA) dashboard

The Operational Technology Vulnerability Response application uses indicator sources and indicators to gather data and track the progress of your vulnerability remediation.

Indicator sources

The Operational Technology Vulnerability Response indicators gather data from the following indicator sources. If you expect more than 1 million records to be collected from the indicator sources, you must override the expected count in the Records collection section of the indicator source. For more information, see Review the indicator sources for a larger number of records.

OTVI.New

Uses the sn_vul_vulnerable_item table and collects the new OT vulnerable items.

OTVI.Active

Uses the sn_vul_vulnerable_item table and includes all the active vulnerable items in your OT system.

OTVI.Closed

Uses the sn_vul_vulnerable_item table and includes all the closed vulnerable items in your OT system.

OTRT.Active

Uses the sn_vul_vulnerablity table and includes all the active remediation tasks in your OT system.

Indicators

Several indicators are used to measure and track the progress of your vulnerability remediation in the Operational Technology Vulnerability Response application.

The **collect records** option for the indicators is inactive by default for the Operational Technology Vulnerability Response application. This option is turned off to avoid the performance issues that may occur when you collect a large amount of data for each indicator.

OT Vulnerable Items

Number of the OT vulnerable items on the data source OTVI.Active, which uses the sn_vul_vulnerable_item table. The goal is to minimize the number of vulnerable items in your system.

OT Critical Vulnerable Items

Number of the OT critical vulnerable items on the data source OTVI.Active, which uses the sn_vul_vulnerable_item table. The goal is to minimize the number of critical vulnerable items in your system.

OT Unassigned Vulnerable Items

All active OT Vulnerable Items where both the Assignment Group and Assigned To fields are empty. The goal is to minimize the number of unassigned vulnerable items.

OT Closed Vulnerable Items

The OT Closed Vulnerable Items indicator is measured daily as a unit number. The goal is to maximize the number of closed vulnerable items in your system.

OT Deferred Vulnerable Items

Number of OT deferred vulnerable items on the data source OTVI.Active, which uses the sn_vul_vulnerable_item table. The goal is to minimize the number of deferred vulnerable items in your system.

OT Critical Deferred Vulnerable Items

Number of OT critical deferred vulnerable items on data source OTVI.Active, which uses the sn_vul_vulnerable_item table. The goal is to minimize the number of critical deferred vulnerable items.

OT Non-Deferred Overdue Critical Vulnerable Items

Number of OT non-deferred overdue critical vulnerable items on the data source OTVI.Active, which uses the sn_vul_vulnerable_item table. The goal is to minimize the number of non-deferred overdue critical vulnerable items in your system.

OT Remediation Tasks

Number of OT remediation tasks on the data source OTRT.Active, which uses the sn_vul_vulnerability table. The goal is to minimize the number of remediation tasks in your system.

OT Non-Deferred Overdue Critical Remediation Tasks

Number of OT non-deferred overdue critical remediation tasks on the data source OTRT.Active, which uses the sn_vul_vulnerability table. The goal is to minimize the number of non-deferred overdue critical remediation tasks in your system.

OT Non-Deferred Remediation Tasks

Number of OT non-deferred remediation tasks on the data source OTRT.Active, which uses the sn_vul_vulnerability table. The goal is to minimize the number of non-deferred remediation tasks in your system.

OT Non-Deferred Critical Remediation Tasks

Number of OT non-deferred critical remediation tasks on the data source OTRT.Active, which uses the sn_vul_vulnerability table. The goal is to minimize the number of non-deferred critical remediation tasks in your system.

OT Unassigned Remediation Tasks

All active remediation tasks where both the Assignment Group and Assigned To fields are empty. The goal is to minimize the number of unassigned remediation tasks in your system.

% Vulnerable Items Met Remediation Target

```
([[Closed Vulnerable Items > Remediation Target = Target
Met]] / [[Closed Vulnerable Items]]) * 100
```

The goal is to maximize the percentage of vulnerable items that meet the remediation target in your system.

OT Vulnerable Item Mean Time to Remediate

```
[[Summed Duration of Closed Vulnerable Items]] / [[Closed
Vulnerable Items]]
```

OT Summed Duration of Closed Vulnerable Items

Number of OT summed duration of closed vulnerable items on the data source OTVI.Closed, which uses the sn_vul_vulnerable_item table. The goal is to minimize the summed duration of the closed vulnerable items in your system.

Operational Technology Vulnerability Response (PA) dashboard breakdowns

The Operational Technology Vulnerability Response uses breakdowns to filter and group the collected records.

The following breakdowns apply to the indicators on the dashboard.

Age

Age of the vulnerable item that is displayed in the Days/Hours/Minutes format.

Age Closed

Age of the vulnerable item when its state changes to Closed.

Assignment Group

Assignment group of the vulnerable item or remediation task.

CI Manager

Manager of vulnerable configuration items (CIs).

Deferral Reason

Reason that a vulnerable item is deferred for remediation.

Exploit Attack Vector

Most vulnerable attack vector of the exploits for a vulnerability.

Exploit Exists

Exploit that is associated with a vulnerability.

Exploit Skill Level

Lowest skill level required to exploit a vulnerability.

Remediation Target Rule

Expected time frame for remediating a vulnerable item.

Remediation Target Status

Updated status of a vulnerable item with a remediation target date.

Remediation Target Status (Closed)

Updated status of a vulnerable item when the remediation target date is met.

Risk Rating

Quantified Risk Score that separates the vulnerable items into Critical, High, Medium, Low, and None.

Severity

Normalized degree of severity of a vulnerability.

State

State of a vulnerable item or remediation task.

The following breakdown sources apply to the indicators on the dashboard for vulnerable item reports, remediation task reports, or both types of reports.

Assignment Group

Vulnerable item and remediation task reports.

Deferred.Reason.Non.Closed

Vulnerable item reports.

Exploit Attack Vector

Vulnerable item reports.

Exploit Exists

Vulnerable item reports.

Exploit Skill Level

Vulnerable item reports.

OT Age Range

Vulnerable item reports.

Remediation Target Status

Vulnerable item and remediation task reports.

Remediation Target Status (Closed)

Vulnerable item and remediation task reports.

Remediation.Target.Rule

Vulnerable item and remediation task reports.

Risk Rating

Vulnerable item and remediation task reports.

Severity

vulnerable item and remediation task reports.

State

Vulnerable item and remediation task reports.

Vulnerable.Item.CI.Manager

Vulnerable item reports.

Operational Technology Vulnerability Response (PA) dashboard collection jobs

The Operational Technology Vulnerability Response (PA) dashboard uses collection jobs to collect the data that is shown on the dashboard.

The following collection jobs collect the data that is shown on the Operational Technology Vulnerability Response (PA) dashboard:

[PA OT VR] Historical Vulnerability Data Collection

Collection job for the historical data of existing records.

> **Note:**
> The Historical Vulnerability Data Collection is an on-demand job that you only need to execute once. After the historical data is collected, the daily data collection jobs run on a scheduled time every day. For more information, see Collect historical data.

[PA OT VR] Daily Collection for Remediation Tasks

Collection job for the remediation task data that occurs daily.

[PA OT VR] Daily Collection for Vulnerable Items 1

Collection job that occurs daily for non-deferred overdue critical vulnerable items, deferred vulnerable items, vulnerable items, and critical vulnerable items.

[PA OT VR] Daily Collection for Vulnerable Items 2

Collection job that occurs daily for unassigned vulnerable items, closed vulnerable items, summed duration of closed vulnerable items, and critical deferred vulnerable items.

Data visualizations used in the Operational Technology Vulnerability Response (PA) dashboard

The Operational Technology Vulnerability Response (PA) dashboard uses data visualizations to display your OT vulnerability data.

The following tables describe the data visualizations shown in the Operational Technology Vulnerability Response (PA) dashboard.

Vulnerable Items tab data visualizations

Name	Type	Description
Total OT Vulnerable Items	Bar	Bar chart that displays the active (non-closed) OT vulnerable items grouped by device type.
New OT Vulnerable Items	Pie	Pie chart that displays the new OT vulnerable items that were found in your system grouped by device type.
OT Unassigned Vulnerable Items	Pie	Pie chart that displays the OT vulnerable items grouped by device type that are open and haven't been assigned to a user.

Vulnerable Items tab data visualizations (continued)

Name	Type	Description
OT Vulnerable Items by State	Bar	Bar chart that displays all the vulnerable items by state. You can interpret how many vulnerabilities are being addressed and how many need further investigation. For example, if the **Under Investigation** category is relatively high, you can prioritize these items by addressing those vulnerable items first.
OT Vulnerable Items by Risk Rating	Bar	Number of the active OT vulnerable items that are grouped by the risk rating over the selected time span.
OT VIs Met Remediation Target	Singe score	Percentage of the closed OT vulnerable items that have met their remediation target dates in the current and previous quarters. Remediation targets are calculated from the Last Opened date plus the number of days since the Last Opened date (measured as 24-hour increments).
OT VI Mean Time to Remediate (MTTR)	Single score	Mean time to remediate (close) an OT vulnerable item, displayed as a 30-day running average. **Note:** The value for Age Closed is calculated when the data is collected. The value is the difference between the last_opened date and the date and time of the collection job.
OT VI by age	Bar	Bar chart that displays the OT active vulnerable items grouped by age (in days).
OT Closed Vulnerable Items by Remediation Target Status	Bar	Number of the closed OT vulnerable items that are grouped by the remediation

Vulnerable Items tab data visualizations (continued)

Name	Type	Description
		target status over the selected time span. **Note:** The value for Age Closed is calculated when the data is collected. The value is the difference between the last_opened date and the date and time of the collection job.
OT Critical Vulnerable Item by Assignment Group	Indicator scorecard	Critical VIs organized by assignment group.
OT Overdue Critical Vulnerable Items by Assignment Group	Indicator scorecard	Critical VIs that are overdue organized by assignment group.

Remediation tab data visualizations

Name	Type	Description
OT Remediation Tasks	Single score	Number of the active (non-closed) OT remediation tasks.
OT Critical Remediation Tasks Near Due	Single score	Number of the active OT remediation tasks that are approaching their remediation target date. The remediation target date of an OT remediation task is set to the closest due date that belongs to an active vulnerable item in the group. The remediation targets are calculated from the Last Opened date plus the number of days (measured as 24-hour increments). This report excludes the deferred OT remediation tasks.
OT Remediation Task by Risk rating	Bar	Bar chart that displays the active OT remediation tasks grouped by the risk rating.

Remediation tab data visualizations (continued)

Name	Type	Description
OT Remediation Task by Target Status	Bar	Bar chart that displays the active OT remediation tasks grouped by the remediation target status. This report excludes the deferred OT vulnerable items.
OT Remediation Task by State	Bar	Bar chart that displays all the remediation tasks by state. You can interpret the progress of your remediation tasks.
OT Unassigned Remediation Tasks	Single score	Number of the active OT remediation tasks without an assignee or assignment group.
OT Critical Remediation Task by Assignment Group	Indicator scorecard	Critical remediation tasks organized by assignment group.
OT Overdue Critical Remediation Task by Assignment Group	Indicator scorecard	Critical remediation tasks that are overdue organized by assignment group.

Exception tab data visualizations

Name	Type	Description
OT Deferred Vulnerable Items by Reason	Bar	Number of the deferred OT vulnerable items that are grouped by the deferral reason.
OT Exceptions for Critical Vulnerable Items by Assignment Group	Indicator scorecard	Exceptions for critical VIs organized by assignment group.

View an Operational Technology Unified Map

View an Operational Technology (OT) Unified Map in the Industrial Workspace that displays the relationships between devices and other CIs.

Before you begin

Role required: admin

About this task

You can access the OT Unified Map in the following locations in the Industrial Workspace.

- ISA record in the Equipment Model Manager
- OT incident record
- OT change record

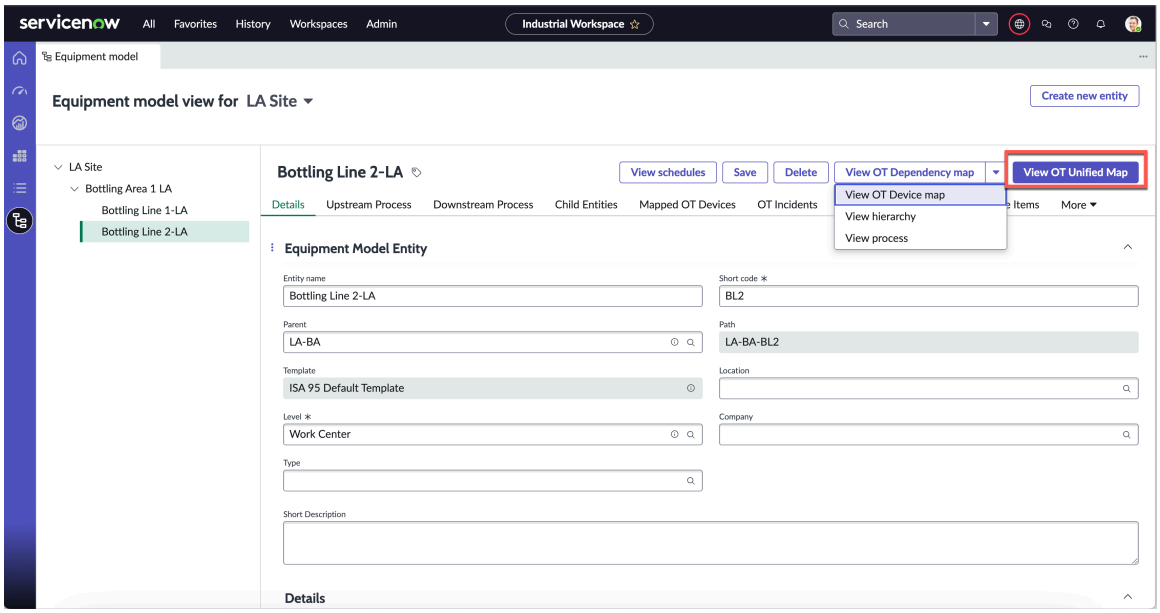
Procedure

1. Navigate to **All** > **Industrial Workspace**.
2. To access the OT Unified Map in an equipment model entity record, complete the following actions.

   a. Open the Equipment Model Manager by selecting the Equipment Model ( ) icon.

   b. Open the equipment model entity record that you want to view the Unified Map for.

   c. Select the **View OT Unified Map** button.



3. To access the OT Unified Map in a related record, such as an OT incident record, or change record, complete the following actions.

   a. Open the Industrial Workspace list view by selecting the List ( ) icon.

   b. Select the record that you want to view the Unified Map for.

      For example, if you want to view the Unified Map for an OT incident record, select one of the available lists under the **OT Incidents** module and open the record.

   c. To open the map in a new window, select the **View OT Unified Map** button.

   d. To open the map in the side panel of the record, select the **OT Health** ( ) icon.

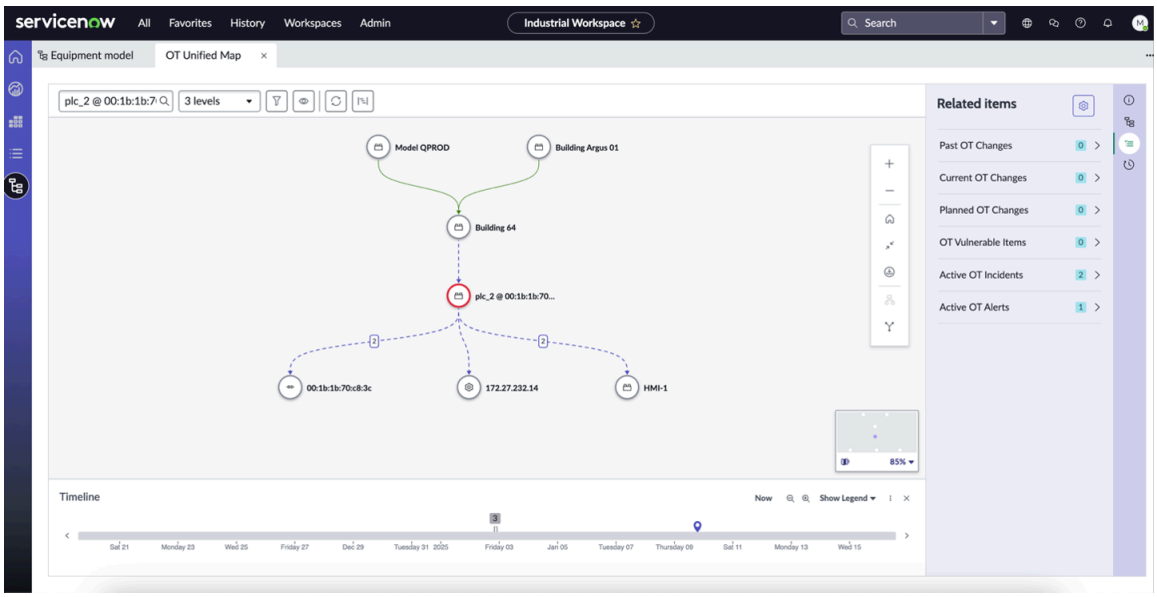
What to do next

You can now view the OT Unified Map. On the Unified Map, you can also see the highlighted nodes of the following related items.

- Past OT Changes
- Current OT Changes
- Planned OT Changes

- Active OT Incidents
- Active OT Alerts
- OT Vulnerable Items

The following image shows an example of an OT Unified Map.



View a daily summary of Operational Technology device activities for an Equipment Model Entity

In the Equipment Model View of the Industrial Workspace, view the previous day's actions and changes that have been performed on the Operational Technology (OT) devices in a site.

Before you begin

Role required: cmdb_ot_isa_viewer

About this task

In the Equipment Model menu of the Industrial Workspace, the **Daily Activity** tab displays the number of activities that were performed on the OT devices in your site for the previous day. The **Daily Activity** tab displays the following activities:

- An OT device has been added to the site.
- An OT device details have been updated.
- An OT device has been mapped to a new equipment model entity.
- An OT device lifecycle status has been marked as retired.

Procedure

1. Navigate to **All** > **Industrial Workspace** > **Equipment Model menu ( ) icon.**.
2. Select the equipment model entity record for which you want to view the Daily Summary of its OT devices.

What to do next

You can view the total number of activities in the **Daily Activity** tab. If you want to view an expanded list of all the activities that have been performed on the OT devices on the previous day, select the **Daily Activity** tab. In the expanded list, you can view the activity details such as:

- OT device type
- Mapped equipment model entity
- Change status
- Device criticality
- Discovery Source
- Changed by
- Changed field
- Field changes

Note:
The daily activity records, which are older than two days are automatically deleted.

Use the Hardware Vulnerability Assessment menu in the Industrial Workspace

Use the *Hardware Vulnerability Assessment* menu to view and track all the firmware vulnerability assessments in your OT environment. Also, in the HVA menu you can view the vulnerable items that are created based on the firmware vulnerability assessments.

Before you begin

Role required: sn_otvr.vul_event_manager

About this task

The *Hardware Vulnerability Assessment* menu provides information of all vulnerabilities in the Operational Technology (OT) inventory that match fully or partially to the vulnerabilities enlisted in the National Vulnerability Database (NVD).

Procedure

1. Navigate to **Workspaces** > *Industrial Workspace* > *Hardware Vulnerability Assessment*. **Select the menu icon ( )**.
2. Perform the following actions on the **Fully matched assessments**, **Partially matched assessments**, **Vulnerable Items**, **Ignored assessments**, and **Awaiting Normalization** tabs as needed:
   a. Choose additional columns and view them for more information regarding the assessment by selecting the update pPersonalized list icon ( ).
   b. Update thethe displayed list of assessments by selecting the refresh icon ( ).
   c. View assessment information in the tab according to the additional filter conditions that you select from the filter list icon ( ) icon.
   d. Perform a quick filtration of assessments by selecting **Choose Filters**.
3. View the assessment records by selecting the **Fully matched assessments** and **Partially matched assessments** tabs.
   a. You can manually create vulnerable items for any assessment records that you choose. Select one or more records from the displayed list and then select **Create Vulnerable Items**.
   b. You can ignore assessment records that you choose from the displayed list. Select one or more assessment records and then select **Ignore**. These ignored assessments are available on the **Ignored assessments** tab.
4. On the **Ignored assessments** tab:

a. If you want to perform assessments on the OT devices that you have ignored previously, select **Revert**.

b. If you want to create vulnerable items manually for the assessments that you choose from the displayed list, select **Create Vulnerable Items**.

5. The **Vulnerable Items** tab View the list of vulnerability items that are created based on the assessment records created in the **Fully matched assessments**, **Partially matched assessments**, and **Ignored assessments** tabs.
6. View the OT device data that hasn't been used for assessment and awaiting normalization, by selecting the **Awaiting Normalization** tab.
   The device data may have the following normalization status:
   - **New**
   - **Match not found**
   - **Publisher normalized**

> **Important:**
> Enable the Opt-in feature in Enterprise Asset Management, which enables OT devices to be available for normalization. For more information, see Opt-in to Enterprise Asset Management Content Service.

Related topics

Operational Technology Hardware Vulnerability Assessment

Set up the Hardware Vulnerability Assessment of Operational Technology devices using guided setup

Domain separation and Operational Technology

Domain separation is supported for Operational Technology. Domain separation enables you to separate data, processes, and administrative tasks into logical groupings called domains. You can control several aspects of this separation, including which users can see and access data.

Support level: Basic

- Business logic: Ensure that data goes into the proper domain for the application's service provider use cases.
- The application supports domain separation at run time. The domain separation includes separation from the user interface, cache keys, reporting, rollups, and aggregations.
- The owner of the instance must set up the application to function across multiple tenants.

Sample use case: When a service provider (SP) uses chat to respond to a tenant-customer's message, the customer must be able to see the SP's response.

For more information on support levels, see Application support for domain separation.

Operational Technology domain separation overview

Operational Technology inherits the domain separation features of the dependency applications. As each application can have its own domain separation relationship, there is no one specific support level to associate with Operational Technology. To learn more, see Domain separation and Workflow Studio.

The following table describes the domain separation support levels and use cases for each Operational Technology application.

Support levels by application

Application	Support level
Operational Technology Manager	Basic
Industrial Process Manager	Basic
Operational Technology Vulnerability Response	Basic
Operational Technology	Basic
Operational Technology Change Management	Basic
Operational Technology Knowledge Management	Basic
Operational Technology Request Management	Basic

Related topics

Domain separation for service providers