Asset Inventory CMDB Sync App

User Guide
Version 2.1.0

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About this guide

Welcome to Qualys Cloud Platform! We'll show you how to use the Qualys Asset Inventory CMDB Sync App to synchronize Qualys IT asset discovery and classification with the ServiceNow Configuration Management Database (CMDB) system.

About Qualys

Qualys, Inc. (NASDAQ: QLYS) is a pioneer and leading provider of cloud-based security and compliance solutions. The Qualys Cloud Platform and its integrated apps help businesses simplify security operations and lower the cost of compliance by delivering critical security intelligence on demand and automating the full spectrum of auditing, compliance and protection for IT systems and web applications.

Founded in 1999, Qualys has established strategic partnerships with leading managed service providers and consulting organizations including Accenture, BT, Cognizant Technology Solutions, Deutsche Telekom, Fujitsu, HCL, HP Enterprise, IBM, Infosys, NTT, Optiv, SecureWorks, Tata Communications, Verizon and Wipro. The company is also a founding member of the Cloud Security Alliance (CSA). For more information, please visit www.qualys.com

Qualys Support

Qualys is committed to providing you with the most thorough support. Through online documentation, telephone help, and direct email support, Qualys ensures that your questions will be answered in the fastest time possible. We support you 7 days a week, 24 hours a day. Access support information at www.qualys.com/support/

Welcome to Qualys Asset Inventory CMDB Sync 2.1

The Qualys Asset Inventory CMDB Sync App 2.1 (Qualys App) for Configuration Management Database (CMDB) automatically synchronizes comprehensive information about your global IT resources that are continuously monitored by Qualys Asset Inventory. This leverages Qualys' highly distributed and scalable cloud platform, and various data collection tools, including Qualys' groundbreaking Cloud Agents, to compile and continually update a full inventory of your IT assets everywhere: on premises, in elastic clouds and mobile endpoints.

Key Features

- Asset information is automatically enriched with additional context such as lifecycle date and support stage, license category

- For assets that already exist in both, asset metadata can be synchronized

- Optionally, asset information is staged for user approval before being written to CMDB

- Support for multiple Qualys accounts/API sources

- Synchronization schedules can be configured and saved

- Preconfigured table transform maps for open ports, assets, network interfaces, software, processors and volumes

- Preconfigured reports

- Preconfigured CI Class Manager that pre-populates the source-destination field mappings and also allows you to create your own mappings for CI Class.

- Support for Cloud Data (metadata) synchronization for Amazon Web Services, Microsoft Azure, Google Cloud Platform cloud providers.

Migration of Assets after Upgrade

We do not support backward compatibility once you upgrade to Qualys Asset Inventory CMDB Sync App 2.1 version. Once upgrade to 2.1 version and before you sync assets or create schedules, we recommend you to migrate all assets (that belong to Computer Extended tables) to the CMDB production tables. We provide a scheduled job for migration of such assets. For more information and detailed steps, refer to Migration Support.

Pre-requisites

You must have a valid Qualys account subscription with API Access and access to following modules:

- Qualys Subscription with Global IT Asset Inventory (Qualys to ServiceNow Sync)

- Asset Inventory CMDB Sync enabled within your Qualys subscription (Qualys to ServiceNow Sync)

- Vulnerability Management (ServiceNow to Qualys Sync)

Get Started

Here we'll help you with the initial configuration and setup needed to get started.

Quick Steps

Install the App - You'll get the app from the ServiceNow app store.

Add API Source- Provide the API Source details and use Test Connection to know if the connection between ServiceNow and the defined source is working fine.

Create Schedules - Provide details to create a schedule. Once a schedule is successfully created, the sync between the source and CMDB gets working as per the schedule.

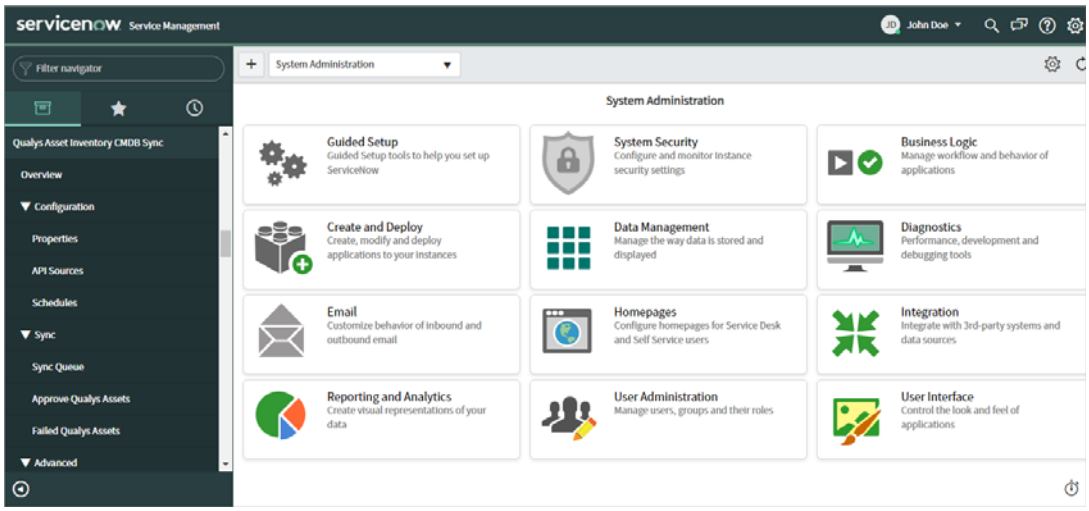
Update Properties - The Properties have pre-defined values, however you can always update a property to better suit your needs.

Install the App

Visit the ServiceNow Online Store.

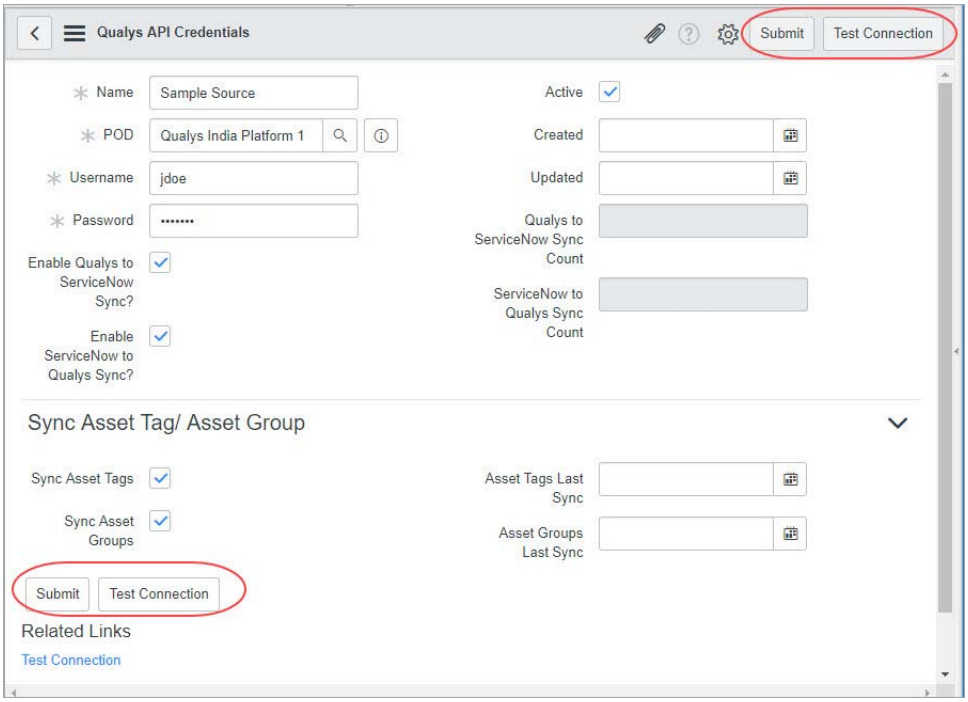
Search for Qualys Asset Inventory CMDB Sync App, and click Contact Seller. Your Technical Account Manager (TAM) will contact you, and then ServiceNow provisions the app into an instance of your choice. The app then appears in the "Downloads" list of your instance. Click "Install" to start using the app.

In the Search field, type Asset Inventory, and then select Qualys Asset Inventory CMDB Sync App from the left pane. After you are done, new module appears in your ServiceNow instance that looks like this:



Add API Source

Once you install the Qualys App, you need to add the API source. Go to Qualys Asset Inventory CMDB Sync App > Configuration > API Sources, and click New.



Enter required details to create the source:

Name - Provide a name for the API source.

POD - Click and select the valid Qualys POD.

Username and **Password** - Enter valid Qualys Cloud Platform credentials with API access enabled for the account on the selected POD.

Enable Qualys to ServiceNow Sync and **Enable ServiceNow to Qualys Sync** - Select these options to allow uninterrupted sync between Qualys and ServiceNow.

Active - Select this option to tell us the source is active and assets should be synced from the active source. In case of multiple sources, you can use this option to activate or deactivate a source.

Click **Submit** to create the API source.

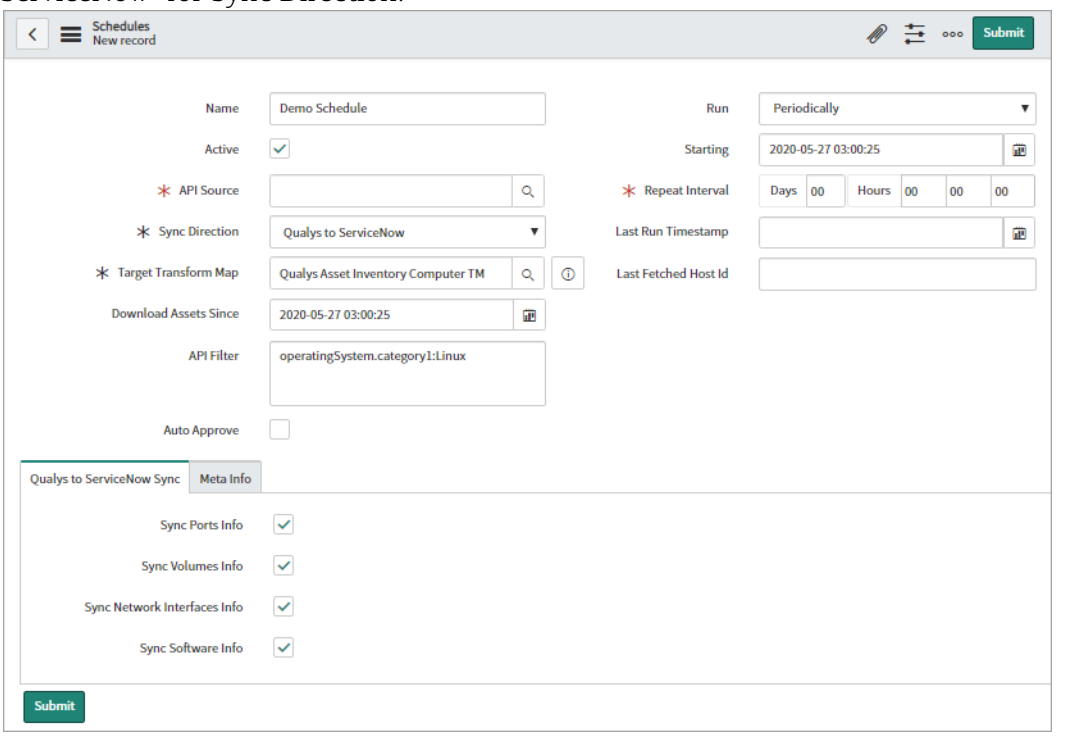
Then, after configuring and saving the API source, choose the record you just created from the API source list, open the record and click **Test Connection**.

Create Schedules

You need to set up at least one schedule. You may eventually want many more. Once a schedule is successfully created, the sync between the source and CMDB gets working as per the defined schedule.

Qualys to ServiceNow Scheduling

Go to Qualys Asset Inventory CMDB Sync App > Schedules and select “Qualys to ServiceNow” for Sync Direction.



Enter required details to configure the schedule:

Name - Provide a unique name for your schedule that helps you identify your schedule.

Active - Select to enable and activate the schedule you create. If you want to activate a schedule sometime later, you can disable this checkbox.

API Source - Select the API Source.

Sync Direction - Select Qualys to ServiceNow.

Target Transform Map - Select the custom transform map that tells us which destination table to put the assets in. Support of Configuration Item (CI) Class Selection allows you to define/customize the destination tables into which the pulled asset information should go after the assets are approved. Learn more

Download Assets Since: Define the date and time to sync assets from Qualys to ServiceNow. The schedules will download the assets after the defined time.

API Filter: Use search tokens to filter the assets as per the requirement.

Example: `operatingSystem.category1:'Linux'`

This token will list all the assets with the Linux operating system.

Click here for help on using the search tokens.

Run, Starting, Repeat Interval - Tell us the frequency of the schedule to be executed. For example, you could schedule it periodically every 15 minutes.

Auto Approve - Select this to enable auto-approval of assets. This will save the effort of manually approving the assets to be staged on the production tables.

Qualys to ServiceNow Sync - Select the information we should fetch for each asset: Sync Ports Info, Sync Volumes Info, Sync Network Interfaces Info, Sync Software Info.

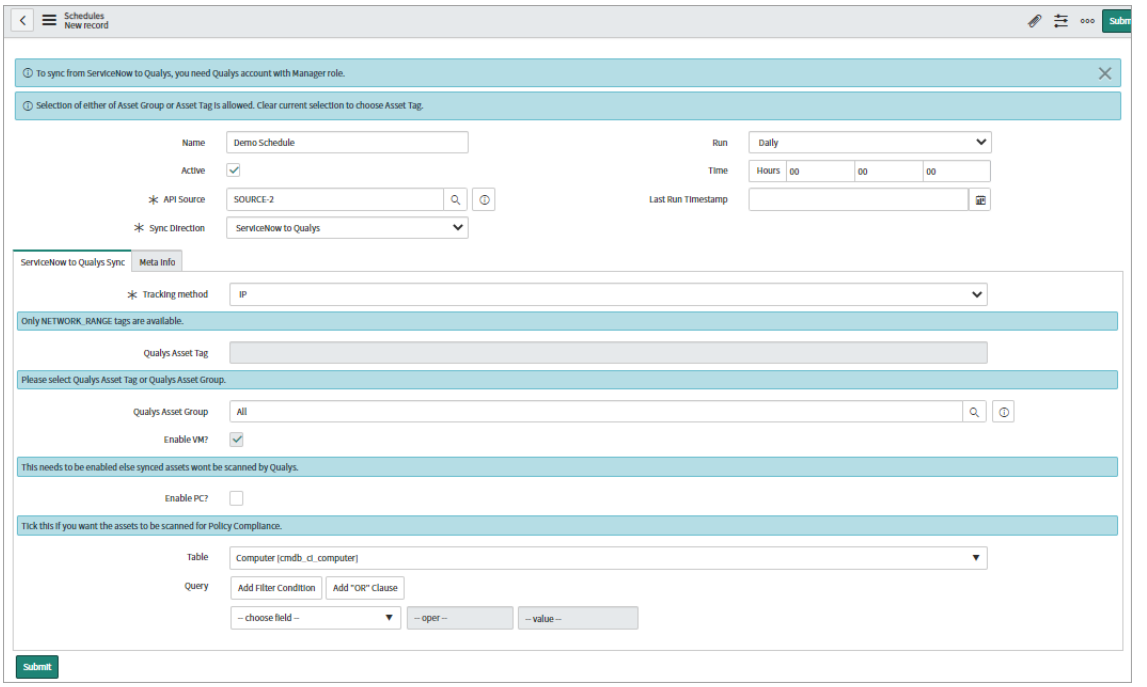
For initial sync from Qualys to ServiceNow, we recommend that you plan your schedules at an interval of every ten minutes.

Once you configure your selections, click Submit to create the schedule.

Note: The Meta Info fields and few other blank fields such as Last Run Timestamp, Last Fetched Host Id are populated with information only after the schedule is executed.

ServiceNow to Qualys Scheduling

Go to Qualys Asset Inventory CMDB Sync App > Schedules and select “ServiceNow to Qualys” for Sync Direction.



Enter required details to configure the schedule:

Name - Provide a unique name for your schedule that helps you identify your schedule.

Active - Select to enable and activate the schedule you create. If you want to activate a schedule sometime later, you can disable this option.

API Source - Select the API source.

Sync Direction - Select ServiceNow to Qualys.

Run - Tell us the frequency of the schedule to be executed. For example, we could configure to execute schedule only on-demand.

Tracking Method - Choose a tracking method when syncing from ServiceNow to Qualys. Choose IP, DNS, or NETBIOS tracking method.

Qualys Asset Tag or **Qualys Asset Group** (Optional) - Choose a Qualys Asset Tag or Qualys Asset Group. The "Qualys Asset Tag" or "Qualys Asset Group" box will assign that tag in Qualys Cloud Platform to any assets synced from ServiceNow. Note - The Asset Tags that belong to only NETWORK_RANGE type are populated. All other asset tags are ignored.

We also highly recommend you add filter conditions (at minimum IP Address) to assets to be synced. When you select a TABLE ensure that the table has a column with "ip_address" name, else the ServiceNow > Qualys sync may not function.

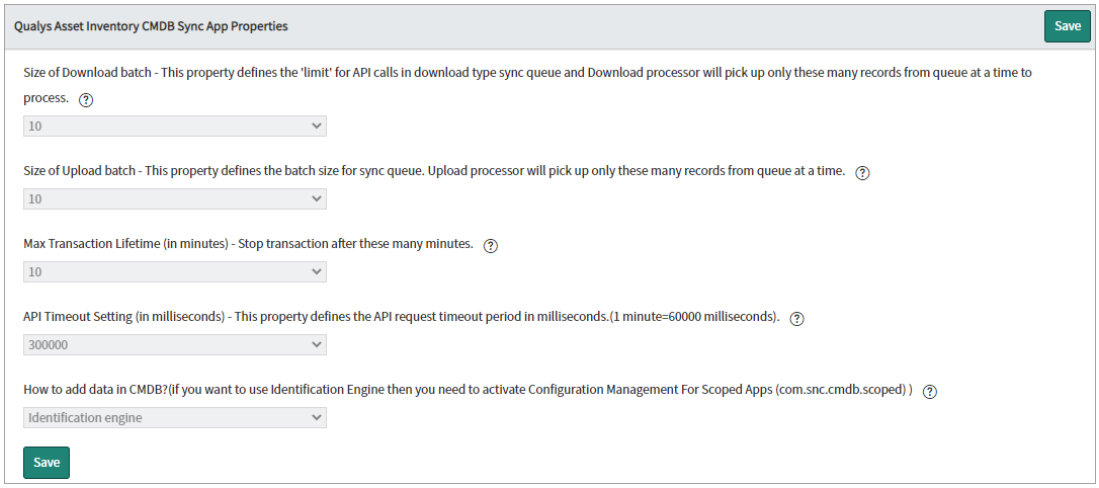
VM (Vulnerability Management) is enabled by default to be able to scan the assets you sync. We recommend that you do not disable this option. It is optional to enable PC (Policy Compliance).

Once you configure your selections, click Submit to create the schedule.

Note: The Meta Info fields and few other blank fields such as Last Run Timestamp are populated with information only after the schedule is executed.

Update Properties

The Asset Sync Properties have pre-populated values. However, you can always change the values to suit your needs. To view the existing properties or update the values, go to Qualys Asset Inventory CMDB Sync App > Configuration > Properties.



Let's take a look at how each property functions.

Size of Download batch - Configure two properties using this setting:

- The maximum number of assets to be fetched in a single API request call made by the scheduler.

- The maximum number of records to be fetched and processed at one go from the queue by the download processor.

Size of Upload batch - Maximum number of records to be picked by the upload processor from the queue to be uploaded to Qualys.

Max Transaction Lifetime (in minutes) - The Qualys App has time restrictions on schedule run time. Although by default the time restriction is set to 10 minutes, you can change the time restriction to any time between 10 and 60 minutes. If you configure the schedule time to 20 minutes, the schedule is stopped after 20 minutes. In such a case, next scheduled run will resume from where the earlier run was stopped.

API Timeout Setting (in milliseconds) - The wait time (in milliseconds) for the response to the API request.

How to add data in CMDB - Choose a method to insert the data in CMDB:

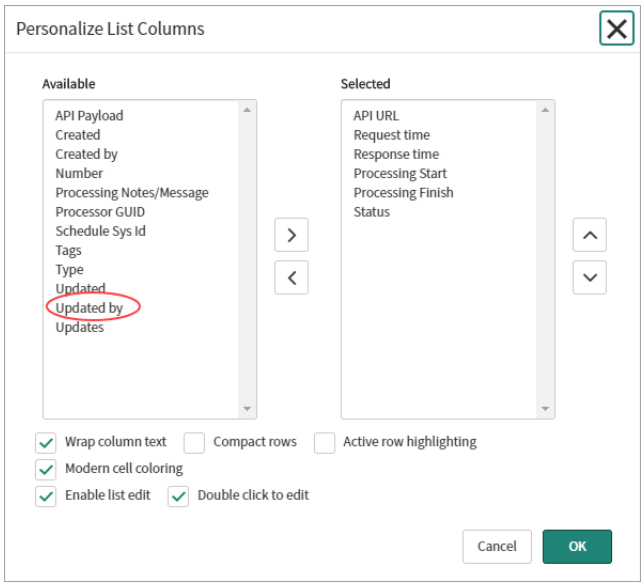
- Transform Maps. Allows you to use single or multiple attributes but only single condition to define which assets to add/update to the CI records. Learn more

- Identification Engine. Allows you to use single or multiple attributes along with multiple conditions to define which assets to add/update to the CI records. Learn more

Customize Data List Columns

We display few columns in the data lists. You can customize which columns appear and change the column sequence. We'll show you an example for adding the column "Updated by" to data lists.

1) Click the icon in the main pane. The Personalize List Columns pop-up appears.



2) The Available list includes columns that are currently hidden. From this list, select the column you want to display. For example, double-click the column "Updated by" and you'll see it moved to the Selected list.

3) Enable or disable other settings like Wrap column text, double click to edit, and so on.

4) Click OK.

You'll start seeing the Updated by column. If for some columns, the data is not available , the value in the column will be empty.

Syncing

Start syncing your asset information between Qualys and ServiceNow CMDB.

In Summary

Sync Queue: This is where you'll see all jobs involved during the flow of assets between Qualys and ServiceNow.

Approve Qualys Assets: This is where you'll see assets that need manual approval when auto-approval is not enabled.

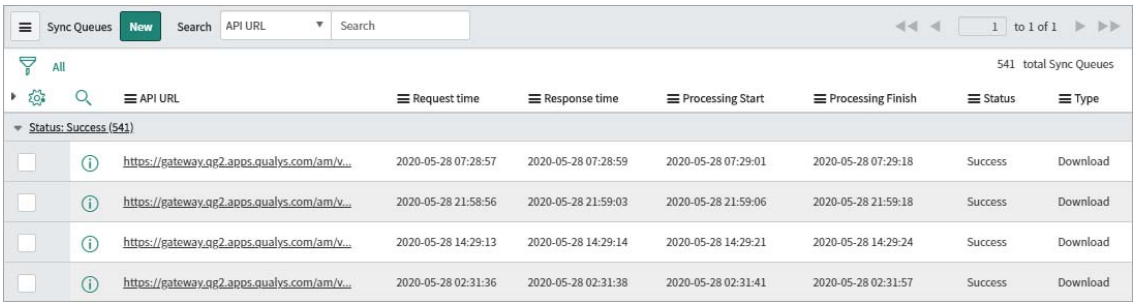
Failed Qualys Assets: This is where you'll see assets that failed to get transformed.

Sync Queue

The Sync Queue lists jobs of two types: Upload and Download. The Type column indicates the direction of the flow of assets.

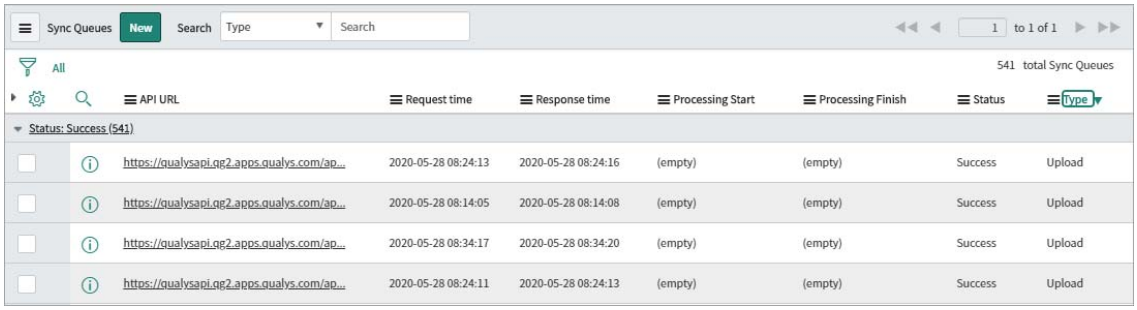
Download: Qualys to ServiceNow

This shows the list of jobs run from Qualys to ServiceNow assets. The status indicates whether the application was able to parse the XML response successfully. The XML that was transferred is also available here (usually attached as response.xml).



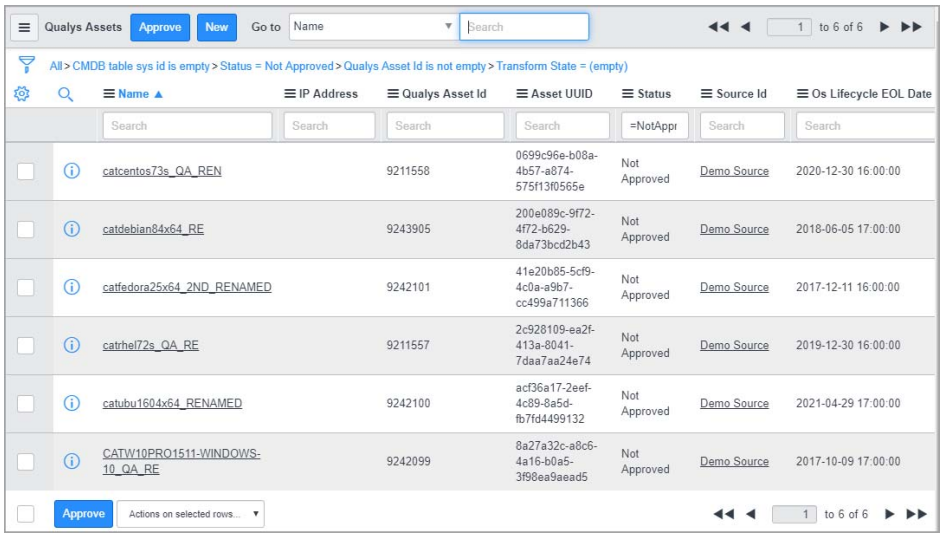
Upload: ServiceNow to Qualys

This is the list of assets to be synced from ServiceNow to Qualys Cloud Platform. Defining IP along with Asset Tag or Asset Group in Schedules will add two entries for an asset during upload: one for IP address and one for Asset Tag or Asset Group.



Approve Qualys Assets

Assets imported from Qualys to ServiceNow will appear here for approval after successful processing in Sync Queue. If processing fails for any record in Sync Queue (status = Error), none of the host assets in that XML will be visible here. You'll need to approve each asset individually or one screen at a time. You will overwrite data in your CMDB when you approve the asset.



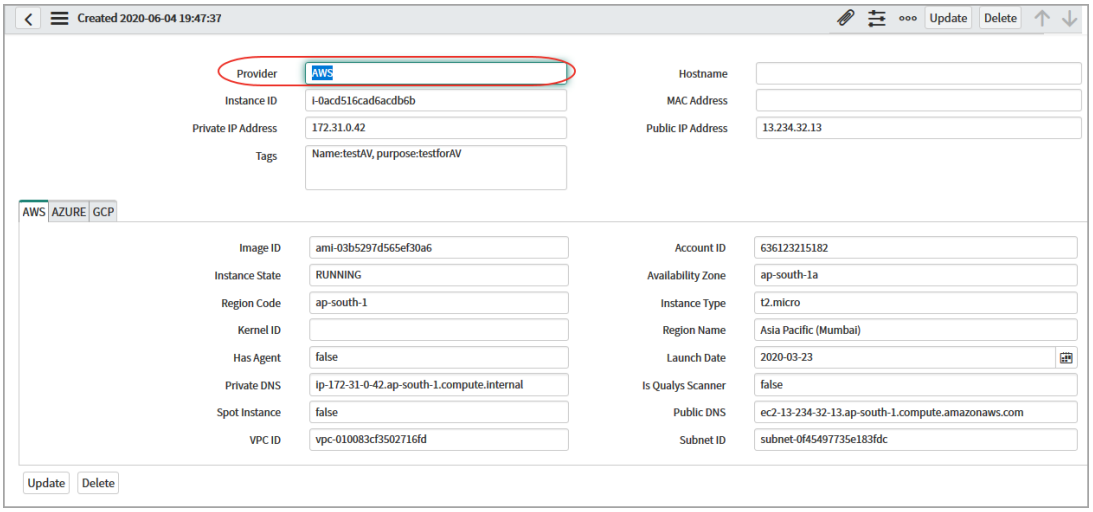
Save time by using auto-approval

Enabling auto-approval of assets saves you effort and time because you won't have to manually approve each asset. If you enable auto-approval, none of the assets are displayed in the Approve Qualys Assets list.

Support for Cloud Meta data

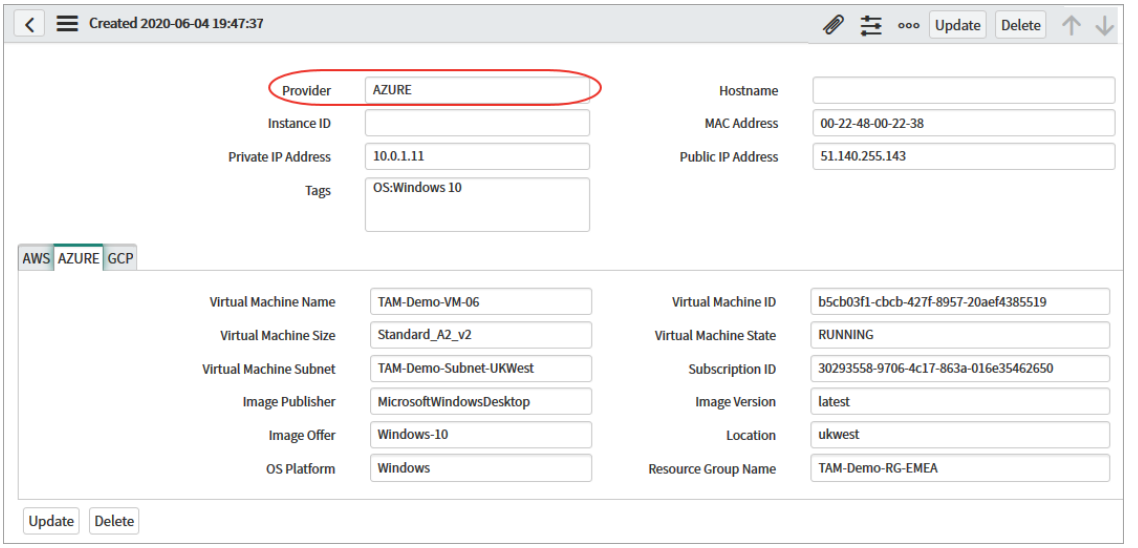
We currently support three cloud providers: Amazon Web Services (AWS), Microsoft Azure, Google Cloud Platform (GCP). All your cloud assets imported from Qualys to ServiceNow appear in Asset Details related tables for approval after successful processing in Sync Queue. Let us view few examples.

AWS

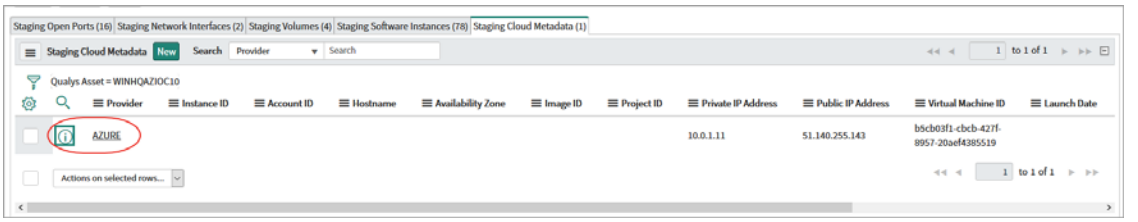


AWS: Staging Cloud Metadata

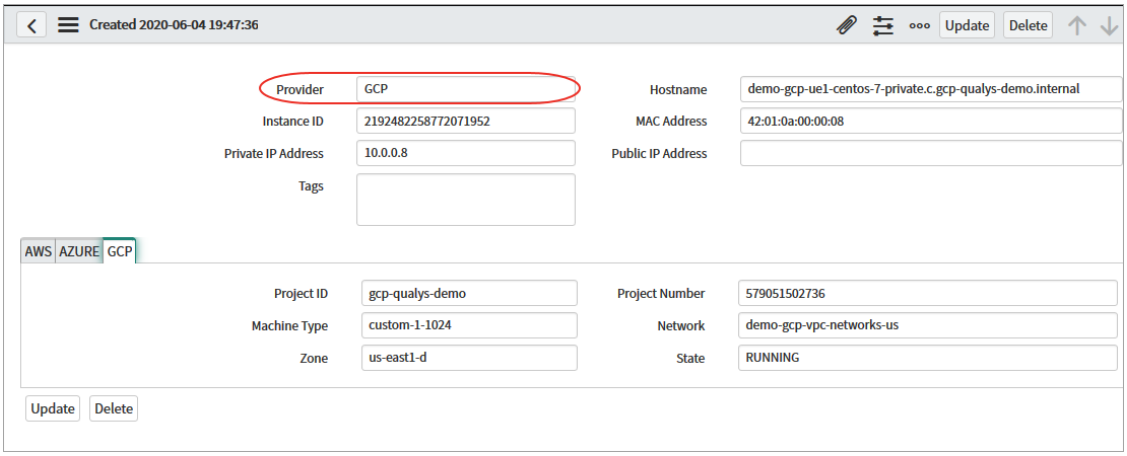
Microsoft Azure



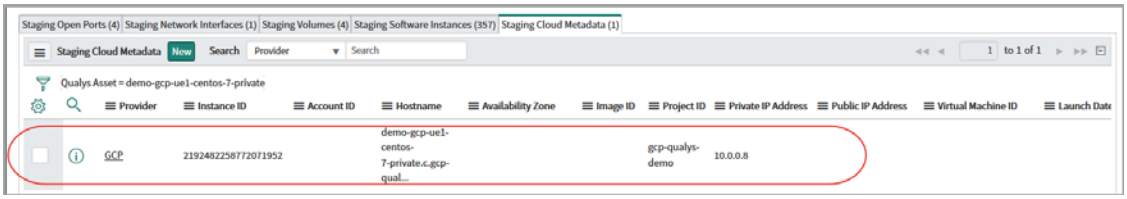
Microsoft Azure: Staging Cloud Metadata



GCP

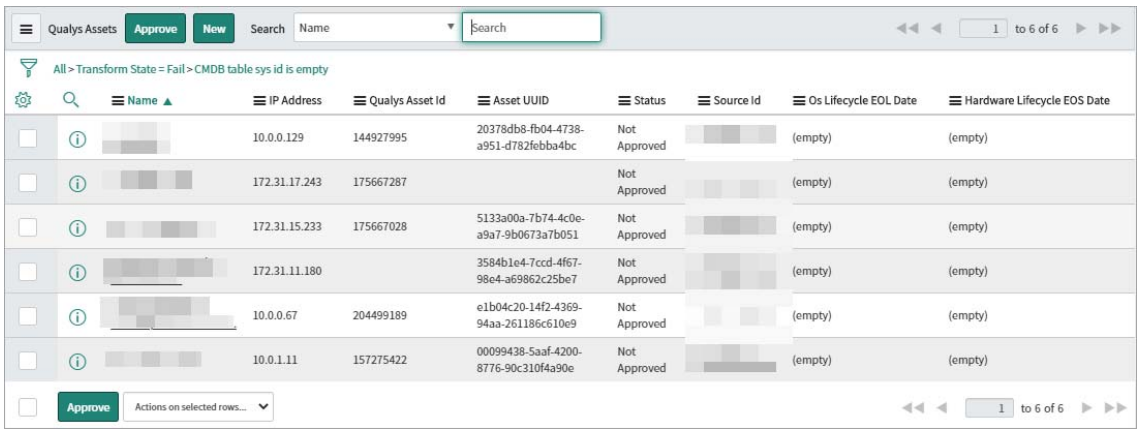


GCP: Staging Cloud Metadata



Failed Qualys Assets

All of the assets imported from Qualys to ServiceNow that fail to get transformed are listed in the Failed Qualys Assets list. The transformation from Qualys to ServiceNow could fail due to criteria not being matched. For example, if you define the method to add data as “Identification Engine” and there is no identifier in the app.



Advanced Configuration

The Advanced Configuration tells you about various pre-defined configurations and steps to customize them to your need. Transform Maps and Identification Engine are methods you can use to add data to your CMDB.

In Summary

App Scheduled Jobs - List of all scheduled jobs. Update or change the frequency of scheduled jobs as per your needs.

Transform Maps - Use transform mapping to map source and destination fields dynamically. Use predefined Transform Maps.

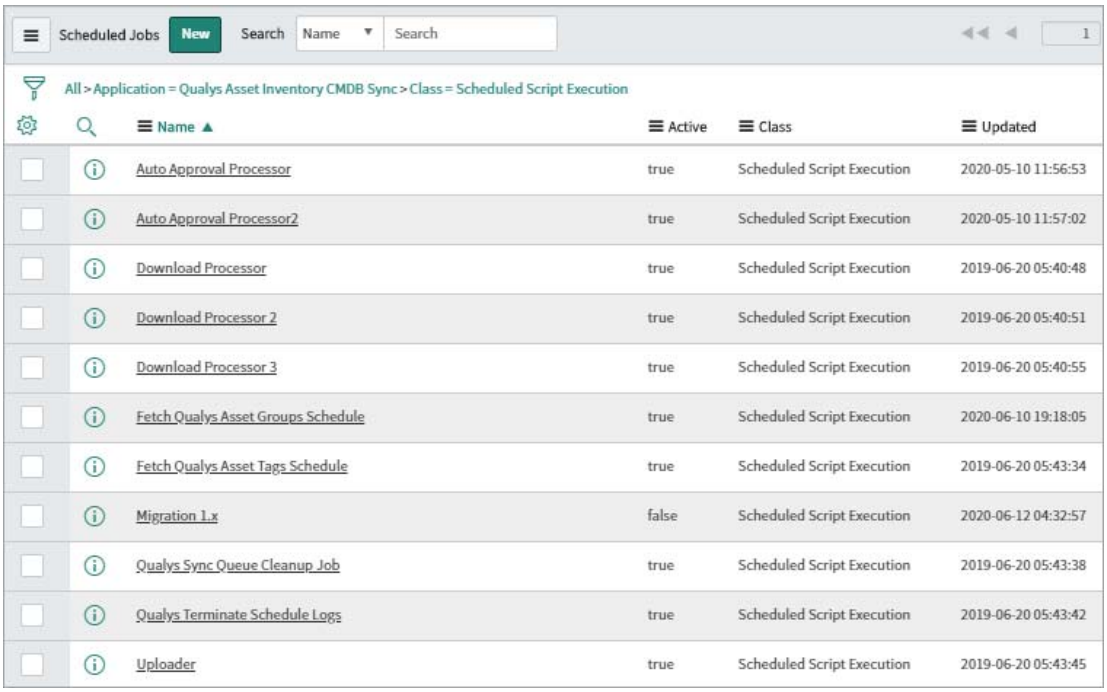
Identification Engine - Use this method to define the criteria using single or multiple attributes that uniquely identify the source assets and asset information before the assets get approved and are added to the CMDB system.

Qualys Category - CI Class Mappings - Provides pre-defined class mappings to identify source assets.

Application Log - All log entries related to the important activities in Qualys App.

App Scheduled Jobs

All of the App Scheduled Jobs are listed under Advanced > App Scheduled Jobs.



Name ▲	Active	Class	Updated
Auto Approval Processor	true	Scheduled Script Execution	2020-05-10 11:56:53
Auto Approval Processor2	true	Scheduled Script Execution	2020-05-10 11:57:02
Download Processor	true	Scheduled Script Execution	2019-06-20 05:40:48
Download Processor 2	true	Scheduled Script Execution	2019-06-20 05:40:51
Download Processor 3	true	Scheduled Script Execution	2019-06-20 05:40:55
Fetch Qualys Asset Groups Schedule	true	Scheduled Script Execution	2020-06-10 19:18:05
Fetch Qualys Asset Tags Schedule	true	Scheduled Script Execution	2019-06-20 05:43:34
Migration 1.x	false	Scheduled Script Execution	2020-06-12 04:32:57
Qualys Sync Queue Cleanup Job	true	Scheduled Script Execution	2019-06-20 05:43:38
Qualys Terminate Schedule Logs	true	Scheduled Script Execution	2019-06-20 05:43:42
Uploader	true	Scheduled Script Execution	2019-06-20 05:43:45

We support the following App Scheduled Jobs. The function and frequency of execution of each job is described. However, you can always update or change the frequency of scheduled jobs as per your needs.

Auto Approval Processor - Checks the records to know which schedule does it belong to and processes it further. Only records that have auto-approval enabled are processed by the Auto Approval Processor.

Download Processor - Picks the records of type Download with Queued status from sync queue and parses the XML. The number of records to be picked in a batch is defined by the Size of Download batch setting in Properties section. Currently, we support three download processors that work in parallel to fasten the process.

Fetch Qualys Asset Groups Schedule - By default, this schedule is executed once daily. Once executed, it syncs all of the Asset Groups in Qualys Cloud Platform for use within the App. You may run this more than once a day if you generate Asset Groups in Qualys Cloud Platform frequently.

Fetch Qualys Asset Tags Schedule - By default, this schedule is executed once daily. Once executed, it syncs all of the Asset Tags in Qualys Cloud Platform for use within the App. You may run this more than once a day if you generate Asset Tags in Qualys Cloud Platform frequently.

Migration 1.x - By default, this job is deactivated. The purpose of this job is only for migration of approved assets that belong to Computer Extended table and need to be in production tables. To know more about the complete migration process, refer to Migration Support.

Qualys Sync Queue Cleanup Job - Clears the Sync Queue records with 'SUCCESS' status (older than 30 days) and records with 'ERROR' status (older than 60 days) on daily schedule.

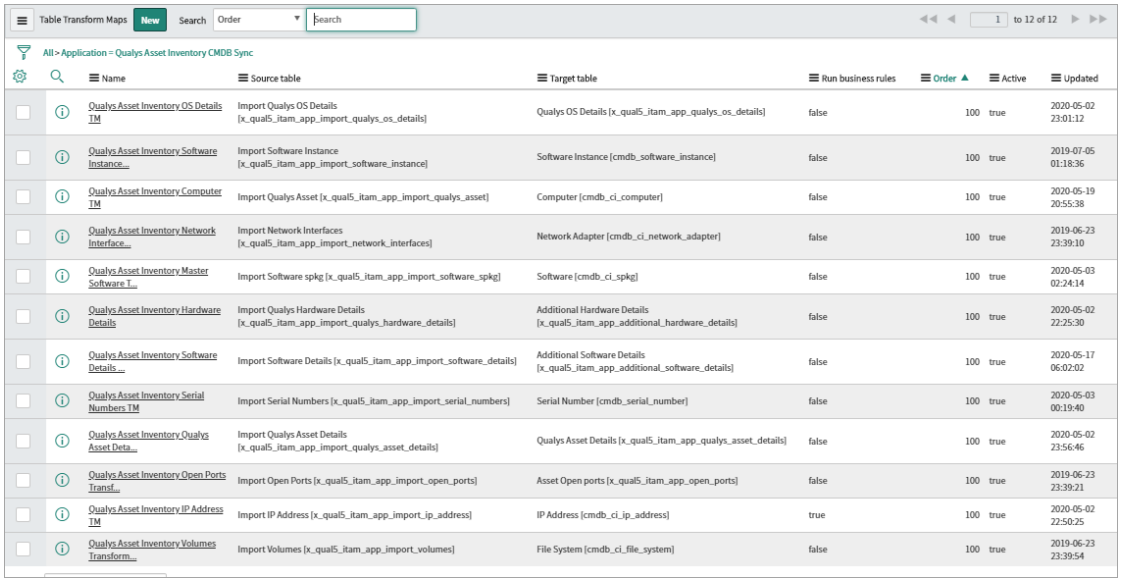
Qualys Terminate Schedule Logs - Maintains a log of the transactions that are terminated due to exceeding the time required to execute the transaction.

Uploader - Picks the records of type Upload with Queued status from Sync Queue and sends it to Qualys.

Transform Maps

A transform map is a set of field maps that determine the relationships between fields in an import set and fields in an existing ServiceNow table.

After creating a transform map, you can reuse it to map data from another import set to the same ServiceNow table. The Transform Maps module allows an administrator to define destinations for imported data on any ServiceNow table. Transform mapping can be as simple as a drag and drop operation to specify linking between source fields on an import set table and destination fields on any ServiceNow table.



Name	Source table	Target table	Run business rules	Order	Active	Updated
Qualys Asset Inventory OS Details TM	Import Qualys OS Details [x_qual5_itam_app_import_qualys_os_details]	Qualys OS Details [x_qual5_itam_app_qualys_os_details]	false	100	true	2020-05-02 23:01:12
Qualys Asset Inventory Software Instance...	Import Software Instance [x_qual5_itam_app_import_software_instance]	Software Instance [cmdb_software_instance]	false	100	true	2019-07-05 01:18:36
Qualys Asset Inventory Computer TM	Import Qualys Asset [x_qual5_itam_app_import_qualys_asset]	Computer [cmdb_ci_computer]	false	100	true	2020-05-19 20:55:38
Qualys Asset Inventory Network Interface...	Import Network Interfaces [x_qual5_itam_app_import_network_interfaces]	Network Adapter [cmdb_ci_network_adapter]	false	100	true	2019-06-23 23:39:10
Qualys Asset Inventory Master Software T...	Import Software spkg [x_qual5_itam_app_import_software_spkg]	Software [cmdb_ci_spkg]	false	100	true	2020-05-03 02:24:14
Qualys Asset Inventory Hardware Details	Import Qualys Hardware Details [x_qual5_itam_app_import_qualys_hardware_details]	Additional Hardware Details [x_qual5_itam_app_additional_hardware_details]	false	100	true	2020-05-02 22:25:30
Qualys Asset Inventory Software Details ...	Import Software Details [x_qual5_itam_app_import_software_details]	Additional Software Details [x_qual5_itam_app_additional_software_details]	false	100	true	2020-05-17 06:02:02
Qualys Asset Inventory Serial Numbers TM	Import Serial Numbers [x_qual5_itam_app_import_serial_numbers]	Serial Number [cmdb_serial_number]	false	100	true	2020-05-03 00:19:40
Qualys Asset Inventory Qualys Asset Deta...	Import Qualys Asset Details [x_qual5_itam_app_import_qualys_asset_details]	Qualys Asset Details [x_qual5_itam_app_qualys_asset_details]	false	100	true	2020-05-02 23:56:46
Qualys Asset Inventory Open Ports Transf...	Import Open Ports [x_qual5_itam_app_import_open_ports]	Asset Open ports [x_qual5_itam_app_open_ports]	false	100	true	2019-06-23 23:39:21
Qualys Asset Inventory IP Address TM	Import IP Address [x_qual5_itam_app_import_ip_address]	IP Address [cmdb_ci_ip_address]	true	100	true	2020-05-02 22:50:25
Qualys Asset Inventory Volumes Transform...	Import Volumes [x_qual5_itam_app_import_volumes]	File System [cmdb_ci_file_system]	false	100	true	2019-06-23 23:39:54

Use transform mapping to map source and destination fields dynamically. You could easily use the predefined Transform Maps or create one to suit your need.

Qualys Pre-defined Transform Map	Type of Asset Information Affected
Qualys Asset Inventory OS Details Transform Map	Qualys OS Details
Qualys Asset Inventory Software Instance Transform Map	Software Instance
Qualys Asset Inventory Computer Transform Map	Computer
Qualys Asset Inventory Network Interface Transform Map	Network Adapter
Qualys Asset Inventory Master Software Transform Map	Software
Qualys Asset Inventory Hardware Details Transform Map	Additional Hardware Details
Qualys Migration Transform Map	Computer
Qualys Asset Inventory Software Details Transform Map	Additional Software Details

Qualys Pre-defined Transform Map	Type of Asset Information Affected
Qualys Asset Inventory Serial Numbers Transform Map	Serial Number
Qualys Asset Inventory Qualys Asset Details Transform Map	Qualys Asset Details
Qualys Asset Inventory Open Ports Transform Map	Asset Open ports
Qualys Asset Inventory IP Address Transform Map	IP Address
Qualys Asset Inventory Volumes Transform Map	File System

Learn more

Please refer to the ServiceNow documentation to learn more about transform maps.

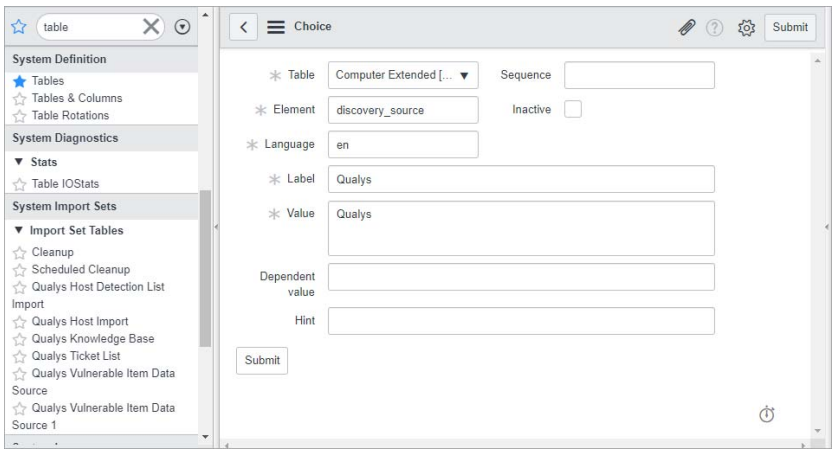
Identification Engine

You could opt to use Identification Engine instead of Transform Maps. Similar to transform maps, the identification engine helps you to decide which assets should be added to CMDB system. You can to define the criteria using single or multiple attributes that uniquely identify the source assets and asset information before the assets get approved and are added to the CMDB system.

Pre-requisites

- Identification Engine uses the “Configuration Management for Scoped Apps” plugin which must be installed before you start using it. Please refer to the ServiceNow documentation for detailed installation steps.

- Ensure that you add Qualys as Choices in the Discovery Source (column) of the Configuration Item (cmdb_ci table). Go to System Definition > Tables and search for Configuration Item table. In the table, open the Discovery Source column. Click New under Choices section and add Qualys as Label and Qualys as Value and click Submit.



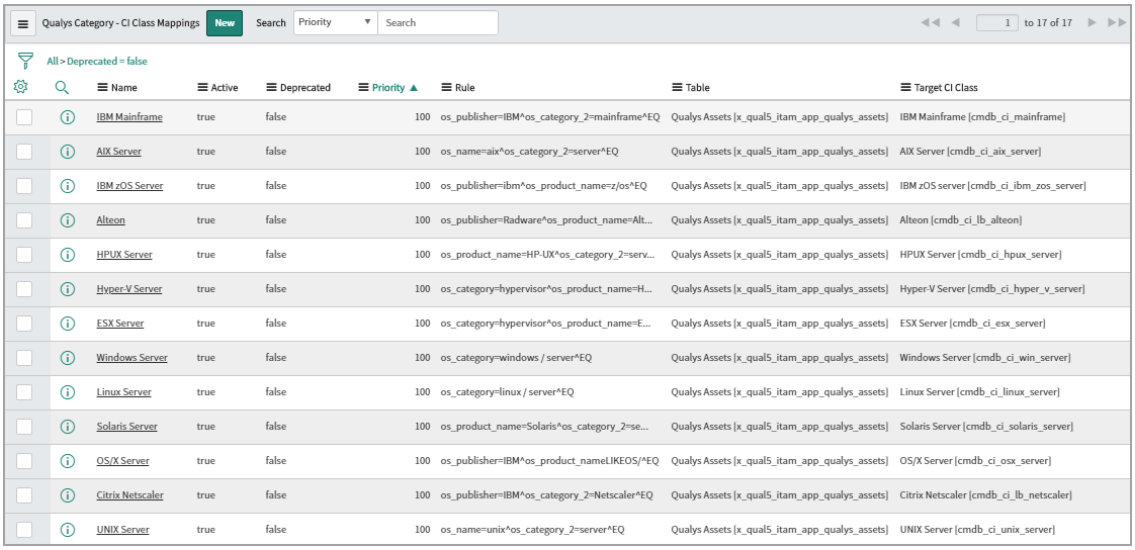
Qualys Category - CI Class Mappings

We have pre-defined tables that contains set of records with matching rules. The rules are defined using single or multiple attributes to uniquely identify source assets. The rules form the criteria to identify the assets to be picked from the source and then added to target CI classification.

The fields that could be mapped directly with the ServiceNow tables got listed in the classified tables. The custom fields that could not be directly mapped with the existing ServiceNow tables are listed in the related tables.

Classified Tables

The classified table includes the mapping of source fields with target fields that are recommended/used by ServiceNow.



Name	Active	Deprecated	Priority ▲	Rule	Table	Target CI Class
IBM Mainframe	true	false	100	os_publisher=IBM^os_category_2=mainframe^EQ	Qualys Assets [x_qual5_itam_app_qualys_assets]	IBM Mainframe [cmdb_ci_mainframe]
AIX Server	true	false	100	os_name=aix^os_category_2=server^EQ	Qualys Assets [x_qual5_itam_app_qualys_assets]	AIX Server [cmdb_ci_aix_server]
IBM zOS Server	true	false	100	os_publisher=ibm^os_product_name=z/os^EQ	Qualys Assets [x_qual5_itam_app_qualys_assets]	IBM zOS server [cmdb_ci_ibm_zos_server]
Alteon	true	false	100	os_publisher=Radware^os_product_name=Alt...	Qualys Assets [x_qual5_itam_app_qualys_assets]	Alteon [cmdb_ci_lb_alteon]
HPUX Server	true	false	100	os_product_name=HP-UX^os_category_2=serv...	Qualys Assets [x_qual5_itam_app_qualys_assets]	HPUX Server [cmdb_ci_hpux_server]
Hyper-V Server	true	false	100	os_category=hypervisor^os_product_name=H...	Qualys Assets [x_qual5_itam_app_qualys_assets]	Hyper-V Server [cmdb_ci_hyper_v_server]
ESX Server	true	false	100	os_category=hypervisor^os_product_name=E...	Qualys Assets [x_qual5_itam_app_qualys_assets]	ESX Server [cmdb_ci_esx_server]
Windows Server	true	false	100	os_category=windows / server^EQ	Qualys Assets [x_qual5_itam_app_qualys_assets]	Windows Server [cmdb_ci_win_server]
Linux Server	true	false	100	os_category=linux / server^EQ	Qualys Assets [x_qual5_itam_app_qualys_assets]	Linux Server [cmdb_ci_linux_server]
Solaris Server	true	false	100	os_product_name=Solaris^os_category_2=se...	Qualys Assets [x_qual5_itam_app_qualys_assets]	Solaris Server [cmdb_ci_solaris_server]
OS/X Server	true	false	100	os_publisher=IBM^os_product_nameLIKEOS/^EQ	Qualys Assets [x_qual5_itam_app_qualys_assets]	OS/X Server [cmdb_ci_osx_server]
Citrix Netscaler	true	false	100	os_publisher=IBM^os_category_2=Netscaler^EQ	Qualys Assets [x_qual5_itam_app_qualys_assets]	Citrix Netscaler [cmdb_ci_lb_netscaler]
UNIX Server	true	false	100	os_name=unix^os_category_2=server^EQ	Qualys Assets [x_qual5_itam_app_qualys_assets]	UNIX Server [cmdb_ci_unix_server]

Each column of the categorized CI class mappings is listed below:

Name: The pre-defined name given by Qualys to the CI class mapping.

Active: The status of the mapping indicating if the current mapping is active or not. True indicates mapping being active.

Deprecated: The status of the record if it is displayed in the table or not while creating new rule. This is a read-only field used by application for processing purposes.

Priority: The priority decides the sequence in which the mappings should be acted upon. In case of multiple mappings for similar fields, the mapping with lowest number gets higher priority. For example, if there are two mappings with priority 50 and 100. The mapping with priority 50 gets higher precedence than 100.

Rules: The rule that forms the criteria to select the assets from the source table (Qualys).

Table: The column used to hold reference to staging table on which rules conditions are being executed

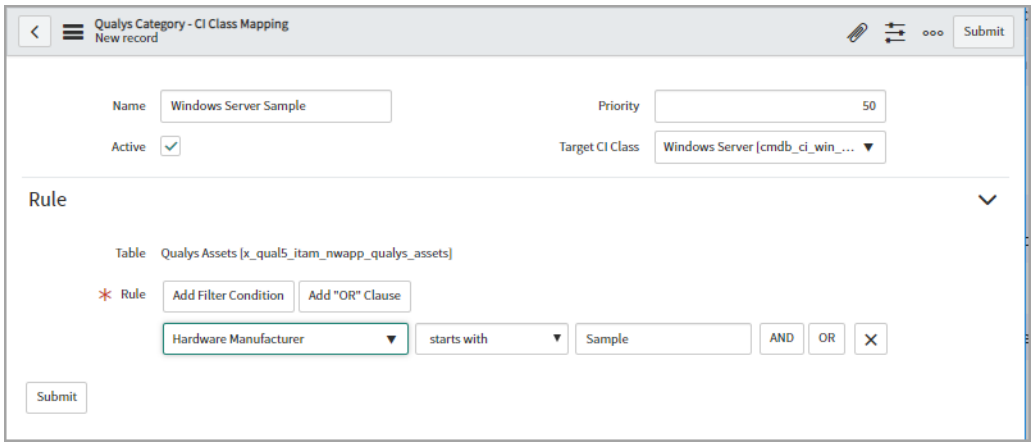
Target CI Class: The name of the destination/target table (defined by ServiceNow) on the production environment where the data should be inserted. If you want change destination table, you can change the target CI class for the corresponding source field.

For detailed list of field mappings for classified tables, refer to the Classified Tables.

CI Class Mapping for Custom Fields

Let us see an example of creating custom fields mapping based on the hardware manufacturer for Windows server.

Click New and the blank form to create a new record for CI class mapping is displayed.



1. Provide a name for the record you want to create. For example, Windows Server Sample as we are creating mapping for Windows server.

2. Select the **Active** check box to activate the mapping you create. If the check box is clear, it indicates that the current mapping will not be used for inserting data in production table of ServiceNow.

3. Define the priority for the mapping. For highest precedence, use the lowest number in priority.

4. Select the **Target CI Class** table from the pre-populated list. The table you choose forms the destination table for the mapping.

5. Define the rule that would form the criteria to choose the source assets to be picked and mapped. You could form a rule using single or multiple attributes and filters.

Click **Submit** to complete the mapping process.

Related Tables for Custom Fields

The custom fields that could not be accommodated in the classified tables are listed in separate tables called as related tables.

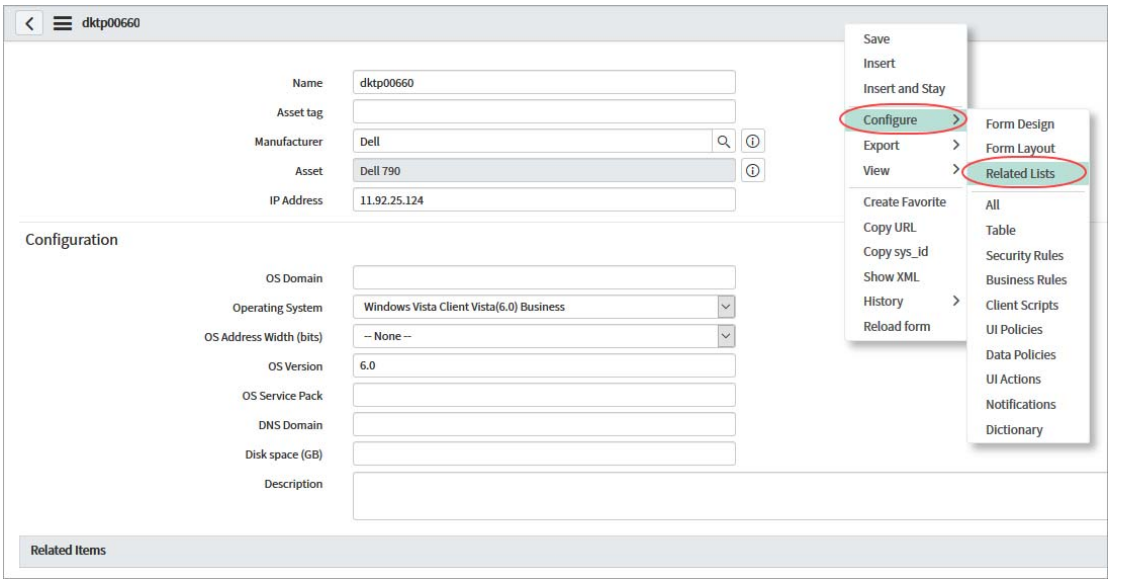
If you are using custom table that includes custom fields (excluding pre-defined fields), you need to create new mappings record to match the customizations.

Note: We do not recommend that you edit the mappings we provide in the related tables as it could lead to mismatch of the data and result it Identification Engine discarding the data.

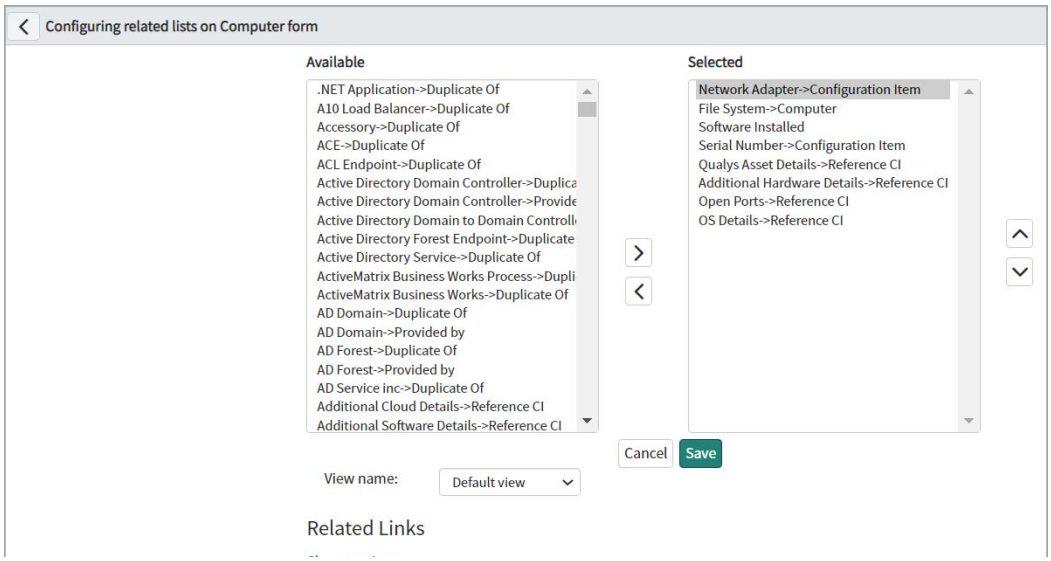
How to identify and view related table entries in out of the box table entries

1. Open the CMDB Table Record Entry (cmdb_ci_computer.list).

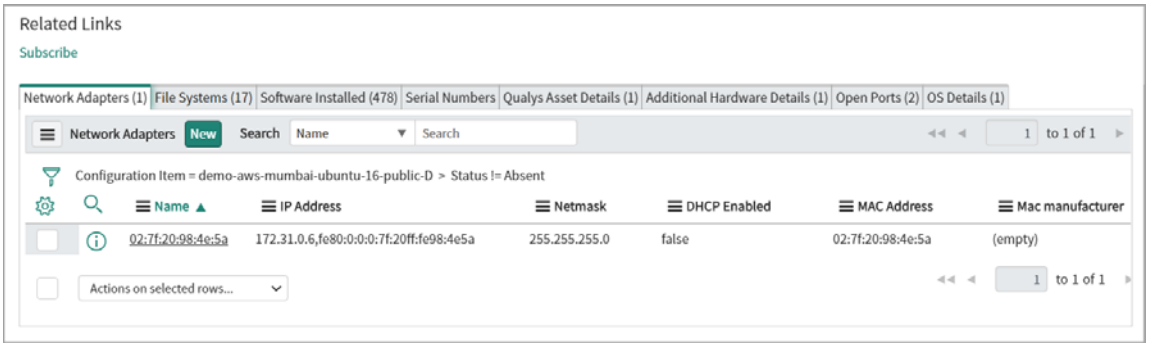
2. On the top grey bar, right-click and choose **Configure** > **Related lists** from the menu.



4. Select the required column names from **Available** and then click the **>** (Add) button to **Selected** check box and then click **Save**.

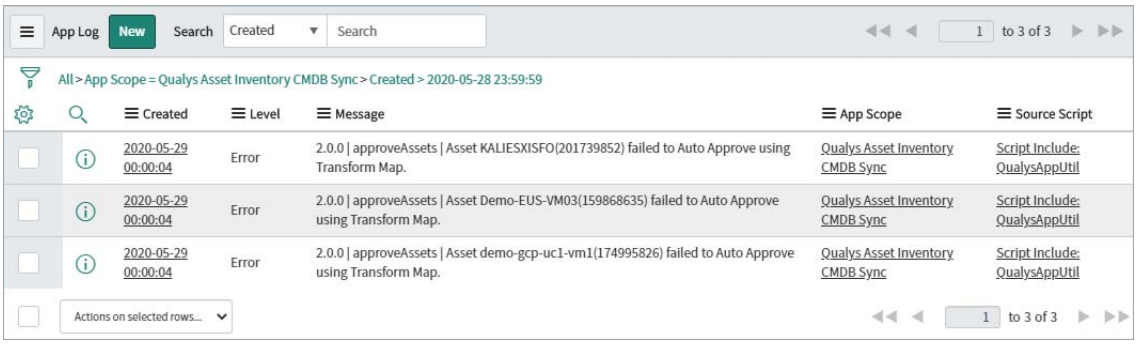


You can then view the details for the added columns in **Related Links** section.



Application Log

Log entries are listed under Advanced > Application Logs.



Logged activities include:

- API Response. For example, when you click Test Connection and if the account does not have access to Global IT Asset Inventory module.

- Schedule Lifecycle (Start, Run, and Finish)

- Lifecycle of Download Processor and Upload Processor (Start, Run, and Finish)

- Transform Type being used (Transform Map or Identification Engine)

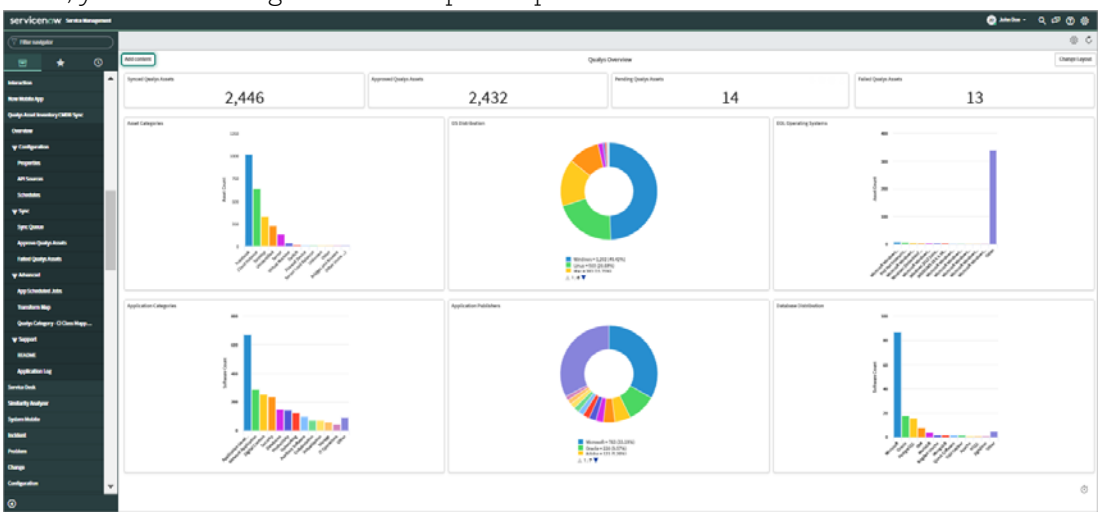
- Asset Approval type (Manual or Auto Approval)

- Fetching Asset Tags and Asset Groups

View Reports

Go to Qualys Asset Inventory CMDB Sync App > Overview. The Overview page displays a consolidated view of all the reports. If you view this page before syncing the assets, it may display all values as zero.

Note: From version 1.0 onwards, the Reports option is merged in the Overview option. Thus, you will no longer see the Reports option in the menu.



When the Overview page is launched for the first time, you see a list of 10 default reports. However, the reports can be customized based on your preference. For more information, see, Customize Overview Page.

Types of reports that you can configure:

Report Name	Description
Qualys Assets Reports	
Approved Qualys Assets	The Approved Qualys Assets report lists the assets auto/manually approved. This number is listed on the production table.
Asset Categories	The Asset Categories report gives a clear picture of the various types of assets across your organization. The chart is a diagrammatic representation of the asset categories. Click the bar to view additional details about the respective asset category.
End of Life Operating Systems	The End of Life (EOL) Operating Systems report gives a clear picture of the various types of operating systems with the end of life across your organization. The chart is a diagrammatic representation of the operating systems. Click the bar to view additional details about the respective operating system.
Failed Qualys Assets	The Failed Qualys Assets lists the number of assets that are not transformed into the CMDB table.

Report Name	Description
Hardware Manufacturers	The Hardware Manufacturers report gives a clear picture of the various manufacturers of hardware across your organization. The chart is a diagrammatic representation of the hardware manufacturers. Click the slice to view additional details about the respective manufacturer.
OS Distribution	The OS Distribution report gives a clear picture of the operating systems installed on the assets across your organization. The chart is a diagrammatic representation of the operating systems. Click the slice to view additional details about the respective operative system.
Pending Qualys Assets	The Pending Qualys Assets report lists the assets which are not approved.
Synced Qualys Assets	The Synced Qualys Assets report lists the assets synced from Qualys to ServiceNow.
Software Report	
Application Categories	The Application Categories report gives a clear picture of the various types of applications installed on the assets across your organization. The chart is a diagrammatic representation of the various applications. Click the bar to view additional details about the respective application category.
Application Publishers	The Application Publishers report gives a clear picture of the various publishers of the application installed on assets across your organization. The chart is a diagrammatic representation of the publishers. Click the bar to view additional details about the respective publisher.
Database Distribution	The Database Distribution report gives a clear picture of the various types of the database used across your organization. The chart is a diagrammatic representation of the database distribution. Click the bar to view additional details about the respective database type.
End of Life Application	The End of Life (EOL) Application report gives a clear picture of the various types of applications with end of life across your organization. The chart is a diagrammatic representation of the Application. Click the bar to view additional details about the respective operating system.
Software Distribution	The Software Distribution report gives a clear picture of the various types of software used across your organization. The chart is a diagrammatic representation of the software distribution. Click the bar to view additional details about the respective database type.
Software Lifecycle Stage	The Software Lifecycle Stage report lists the lifecycle stages of applications. Example: GA, EOL/EOS.

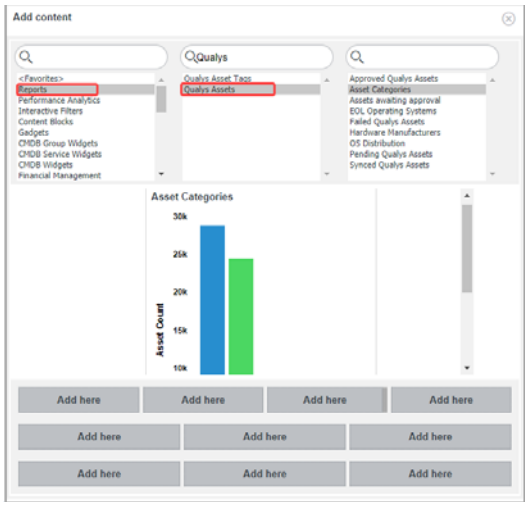
Customize Overview Page

You can add or remove the reports from the Overview page.

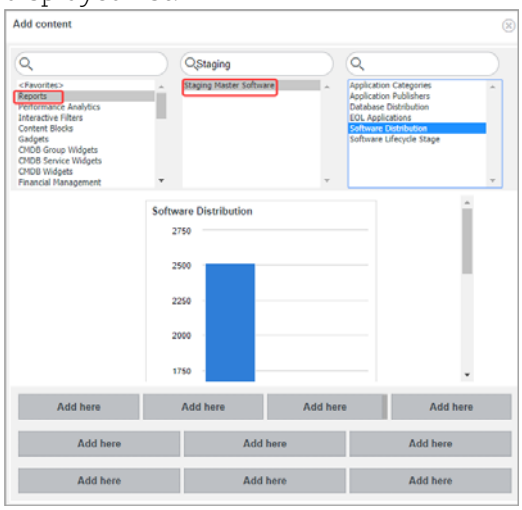
Add a Report

Click on **Add content**, the Add content pop-up appears. Select one of the following options to add reports:

-To add Qualys Assets reports: Select Reports from the first column, Qualys Assets from the second column and in the third column, select the required report from the displayed list.



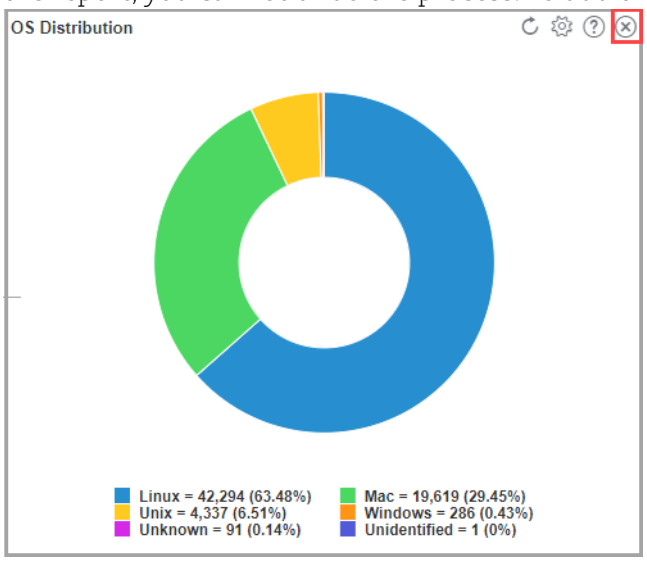
-To add Software reports: Select Reports from the first column, Staging Master Software from the second column and in the third column, select the required report from the displayed list.



Once you select the required report, click one of the **Add here** options. The 10 Add here options indicate different locations where you can add the report on the Overview page.

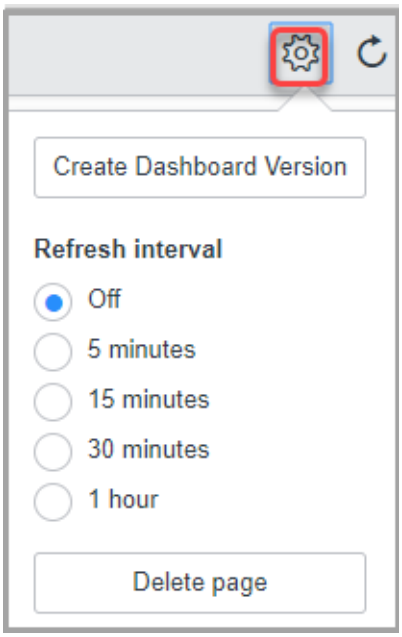
Remove a Report

To remove a report from the overview page, click on the close ⊗ option. Once you delete the report, you cannot undo the process. To add the same report again, see Add a Report.



Refresh Overview page

To refresh all the reports on the Overview page at a fixed interval, click on the Homepage Settings ⚙ icon and select the required Refresh interval.



Debugging and Troubleshooting

Here are scenarios that will help you debug certain common issues.

How to debug

In case of any unexpected application behavior one should check the application logs.

The application log has four different levels of logging: Information, Error, Warning, Debug

The application writes log entries after important transitions. For example, Schedule run, on click of test connection to API Server ['Qualys Asset Inventory CMDB Sync App > Advanced > Application Log]

Observed Issues

Scenario: Sometimes clicking on 'Test Connection" gives 'error' response to user.

Workaround: Check the error message.

- Try to repeat the 'Test Connection' a couple more times (if all input parameters are correct then 'success' message will be displayed)

- One can get the error message under 'Schedule Logs' for related entries in schedule record

- If no valid error is displayed (i.e. you are sure that the credentials are correct but API reported "unauthorized"), try again after some time. If error persists, contact Qualys Support

Scenario: When Download processor takes too much time to process

Workaround: Go to Properties and lower the Size of Download batch.

Scenario: Download Processor failed to process Sync Queue record(s)

Workaround: This may leave the corresponding Sync Queue entry in 'Error' state and the error details can be verified from 'Processing Notes/Message'

User should manually change the status back to

- 'Queued', and reset the 'Processor GUID' if he/she wants to process that response again.

If you reprocess any response, it will not lead to duplicate data, as application checks whether the record already exists in staging tables before inserting.

- 'Error', if he/she does not want to process it again.

Scenario: Failed to approve asset using Identification Engine/Invalid Update

This error is displayed when the application finds some error with Identification and Reconciliation APIs.

To verify the issue, you can to navigate to Failed Qualys Assets > Open the asset record and see the Notes section. This section contains the detailed error response, as received from Identification and Reconciliation API.

Scenario: Sometimes it is observed that 'approving' manually multiple assets gives 'Transaction Timeout' by ServiceNow

Workaround:

- In such case there is no data loss observed in asset transformation

- To overcome transaction timeout error, it is recommended to use 'Auto Approval' in schedule

Scenario: Duplicate entries found in cmdb_ci_computer for assets which were synced from ServiceNow to Qualys, scanned and then synced back from Qualys to ServiceNow

Workaround:

- If the user has added only IP address for the asset in the 'cmdb_ci_computer' table

Reason: Name is a mandatory parameter for ServiceNow IRE mechanism.

- If user added both name (any dummy name) and IP Address for the asset in 'cmdb_ci_computer' table

Reason: After scanning the asset, the name discovered during the authenticated / unauthenticated scan and the dummy name that was provided could be different.

Note: There would be no duplicate entry in 'cmdb_ci_computer' if the name is exactly same for the asset before sending the data from ServiceNow to SericeNow

Anticipated Issues

It is quite frequent to have error in opening/viewing attached 'response.xml' from sync queue records. Those response.xmls are considered as incomplete.

List of expected failure modes

- Qualys API server is undergoing maintenance/downtime

- Qualys subscription expired

- User credentials used are incorrect

- User credentials are correct, but user has no Qualys App subscription from Qualys

Common Questions

Do you currently support the Identification and Reconciliation API for CMDB CRUD actions?

Yes, Qualys App supports Identification and Reconciliation APIs. The goal of this API is to maintain the integrity of the database, and to correctly identify CIs so that new records are created only if CI is truly new to CMDB. See CMDB Identification and Reconciliation

You can change how to add data in CMDB from default Transform Map to Identification Engine from Properties page. You also need to create CI Identifier Rule for Target table.

Can user add data to ServiceNow app from different Qualys servers?

Yes, user can add asset data from different Qualys PODs. User needs to create different API Sources and Schedules as per Qualys servers.

What are Upload and Download type records in Queue?

It can be easily differentiated by Type field available in the table. For Downloading data to ServiceNow app (i.e syncing assets from Qualys to ServiceNow) Type will be Download. For Uploading data to Qualys (Syncing assets from ServiceNow to Qualys servers) Type will be Upload.

Where can I find Assets which failed to transform in ServiceNow table?

You'll find these assets in Failed Qualys Assets. Users can then approve these assets again.

Why do I view timestamps in GMT for schedules despite configuring a different timezone?

In the schedule scripts, we use ServiceNow's new GlideDateTime().getDisplayValueInternal(); function to update the schedule last_run_timestamp. When this object is directly instantiated and used (e.g. in scoped application background script), it returns time in GMT, irrespective of the timezone configured for user under whom this script runs. That's how it is designed.

Also, since ServiceNow does not allow scoped applications to set the timezone, the app cannot do that on behalf of the user who created the schedule. However, the time value you see on the UI is shown in the user set timezone - even if you set GMT date-time in this column. When the schedule runs next time, it fetches value in GMT, and not the one you see on UI. That may lead to confusion, and log entries show time in GMT, for this reason we recommend that the ServiceNow user sets his or her time to GMT.

The Schedules I defined pulled the data accurately till yesterday. But, today, the same schedule is unable to fetch any assets or related data.

Check your application logs. The reason the schedules are unable to fetch assets is because either your trial period or your subscription has expired. Contact your TAM to extend your subscription. Once you have an active subscription, you need to activate your API Source and the schedules will fetch the assets.

If an asset is purged from Qualys, what will its status be in ServiceNow CMDB?

The asset purged from Qualys will not automatically be purged in ServiceNow CMDB. The asset must be manually purged from ServiceNow.

Backward Compatibility Issues and Observations

The Qualys Asset Inventory CMDB Sync App 2.1 (Qualys App) does not support backward compatibility. As a result, you may notice few scenarios that you may have not encountered earlier. We are highlighting some of the common scenarios that you may come across.

Application Log

After you upgrade 2.1 version, when the transformation mode set to 'Transform Map' and if you have assets in the staging area, on approval of such assets, the assets are transformed to the correct CI Classes. But, the application log may not reflect this correctly.

For example: Asset abcd (AssetID) Manually Approved using Transform Map updated in x_qual5_itam_app_computers_extended.

Although the asset has been correctly transformed to the CI Class, the application log incorrectly states name of computer extended table instead of the CI class name where the asset has been correctly moved.

Resolution: Ignore the application log in such cases.

Custom Transform Map Fails to Work

The latest version of the app is designed to move assets to the out of box tables provided by ServiceNow. As a result, the custom transform maps that were created in previous version will not work in version 2.1. However, the custom transform map that you create in 2.1 version will work fine.

Cause: The Import Set Row Tables have changed.

Resolution: Refrain usage of custom transform maps that were created in previous versions. If you need to use custom transform maps, you need to rewrite or create new transform map as per the new set of import set row tables.

Sync Queue is blank for Approved Assets

The 'Queue ID' is displayed empty in 'Approve Qualys Assets' for the approved Qualys assets. However, the clicking 'Preview' (on the 'i' icon) displays the correct the sync queue details.

Table structure has changed...updated fields

Resolution: Ignore Queue ID field and instead view the preview to verify the information.

Number Mismatch Between Staging and Production Tables: Software

Scenario: When transformation method is IRE, 100 assets in staging area, only 98 are moved to production after upgrade.

Causes for discrepancy:

- IRE version needs name and version of the data being transformed. Name being mandatory parameter for transformation. If name is missing for asset, then the asset may not get approved and instead get failed. Such entries are listed in the application log.

For example, if a software has no Name/Version: The software without a name doesn't make any sense, The Software (OOB table) uses a 'key' attribute consisting of name and version. Thus, empty names causes assets to fail.

- If there are multiple records with same name. Assets get approved, on production class, not all will be added as separate records. The first asset which is approved gets added as a separate record. All the other assets with same name get approved, but the IRE version creates multiple records or skips records.

For example, software have same name and version number in staging area. In such case, duplicate entries may be created. Check application log. Skipping duplicate entry.

Number Mismatch Between Staging and Production Tables: Assets

Assets with Same Name: When transformation method is IRE, 100 assets in staging area, only 98 are moved to production after upgrade. If there are multiple assets with same name. Assets get approved, on production class, not all will be added as separate records. The first asset which is approved gets added as a separate record. All the other assets with same name get approved, but the IRE version updates the same record.However, the same record may contain multiple values for same fields.

Discrepancy is observed in following scenarios:

-Assets discrepancy could be there in the production table if the assets have same names

- If serial number is missing and assets have same name,

Cause: IRE version uses name to identify the CI class. Name being mandatory parameter for transformation.

Field name missing in production tables

If you notice few fields that exist on Qualys UI or API response, but cannot locate it in ServiceNow out of box (OOB) tables.

Cause: Mapping for such fields may not exist. For complete list of mappings, refer to Field Mapping for Tables. If field mappings does not exist in the OOB tables, then such fields are not transformed to production tables.

For example, the 'hostname' for network adapter exists in staging table but missing from production table (cmdb_ci_network_adapter).

Cause: The cmdb_ci_network_adapter table does not have mapping for the hostname field. Hence the field value is not available in the production table.

Truncated Value

If the field value exceeds the field limit then the value may get truncated. The application does not update any of the OOB table structures: like field value lengths.

Asset Sync Properties Retained

The Asset Sync Properties are retained after the upgrade to 2.1. If the set default transform mode is Identification Engine, the same properties are available after application upgrade. However, if you install the app (and not upgrade from a previous version), the default transform mode is set to Identification Engine.

Recommendations

We recommend following tips for better and smooth data migration.

Partial data migration observed while switching transformation mode

We recommend to not switch the transformation mode when the data migration is in process. The change in transformation mode will not reflect during migration.

Transformation mode IRE

Configuring transformation mode as IRE is recommended as usage of Transform Maps can cause higher time for approval of assets.

Field Mapping for Tables

This chapter lists the detailed field mapping (source to target) for classified as well as related tables.

Classified Tables

The classified table includes the mapping of source fields with target fields that are recommended/used by ServiceNow

Asset Data Model

Computer (SN Table)

Qualys Staging Table Attributes	ServiceNow Production Table Attributes
manufacturer	manufacturer
memory	ram
bios_asset_tag	asset_tag
os_full_name	os
os_update	os_service_pack
os_architecture	os_address_width
model	model_id
os_version	os_version
name	name
processor_cpu_counts	cpu_count
processor_description	cpu_name, cpu_manufacturer
ip_address	ip_address
iprocessor_speed	processor_speed

Serial Number (SN Table)

Qualys Staging Table Attributes	ServiceNow Production Table Attributes
bios_serial_number	serial_number
hardware_serial_number	serial_number
<additional field>	serial_number_type

File System (SN Table)

Qualys Staging Table Attributes	ServiceNow Production Table Attributes
name	name

free_size	free_space_bytes
total_size	size_bytes

Network Adapter (SN Table)

Qualys Staging Table Attributes	ServiceNow Production Table Attributes
netbios_name	name
interface_name	name
mac_address	mac_address

IP Address (SN Table)

Qualys Staging Table Attributes	ServiceNow Production Table Attributes
ip_address	ip_address
ip_address	name

Software Data Model

Master Software (SN Table)

Qualys Staging Table Attributes	ServiceNow Production Table Attributes
name	name
version	version
<additional field>	key

Software Instance (SN Table)

Qualys Staging Table Attributes	ServiceNow Production Table Attributes
name	name
install_date	install_date
<additional field>	<Reference to cmdb_ci_package>
<additional field>	Reference to the CI the software is installed on

Related Tables

The related tables list the custom field mappings that could not be accommodated in the classified tables. We recommend that you do not alter the mappings in the related tables.

Asset Data Model

Qualys Asset details

Qualys Related Table Attributes	ServiceNow Production Table Attributes
asset_lastloggedonuser	asset_lastloggedonuser
asset_mostfrequentuser	asset_mostfrequentuser
asset_id	qualys_asset_id
asset_uuid	asset_uuid
bios_description	bios_description
last_boot	last_boot
last_modified_date	last_modified_date
timezone	timezone
qweb_host_id	qweb_host_id
netbios_name	netbios_name
type	type

Qualys Operating System details

Qualys Related Table Attributes	ServiceNow Production Table Attributes
os_category	os_category
os_category_1	os_category_1
os_category_2	os_category_2
os_category_type	os_category_type
os_edition	os_edition
os_lifecycle_confidence	os_lifecycle_confidence
os_lifecycle_eol_date	os_lifecycle_eol_date
os_lifecycle_eol_support_stage	os_lifecycle_eol_support_stage
os_lifecycle_eos_date	os_lifecycle_eos_date
os_lifecycle_eos_support_stage	os_lifecycle_eos_support_stage
os_lifecycle_ga	os_lifecycle_ga
os_lifecycle_stage	os_lifecycle_stage
os_market_version	os_market_version
os_name	os_name

os_product_name	os_product_name
os_publisher	os_publisher

Qualys Hardware details

Qualys Related Table Attributes	ServiceNow Production Table Attributes
hardware_category	hardware_category
hardware_category_1	hardware_category_1
hardware_category_2	hardware_category_2
hardware_category_type	hardware_category_type
hardware_lifecycle_confidence	hardware_lifecycle_confidence
hardware_lifecycle_eos_date	hardware_lifecycle_eos_date
hardware_lifecycle_ga	hardware_lifecycle_ga
hardware_lifecycle_intro_date	hardware_lifecycle_intro_date
hardware_lifecycle_obsolete_date	hardware_lifecycle_obsolete_date
hardware_lifecycle_stage	hardware_lifecycle_stage
hardware_product	hardware_product
hardware_full_name	hardware_full_name

Qualys Open Ports details

Qualys Related Table Attributes	ServiceNow Production Table Attributes
description	description
detected_service	detected_service
port	port
protocol	protocol

Qualys Processors details

Qualys Related Table Attributes	ServiceNow Production Table Attributes
processor_cpu_counts	processor_cpu_counts
processor_description	processor_description
processor_speed	processor_speed

Software Data Model

Qualys Software details

Qualys Related Table Attributes	ServiceNow Production Table Attributes
architecture	architecture

category	category
category_1	category_1
category_2	category_2
category_type	category_type
component	component
edition	edition
is_ignored	is_ignored
is_ignored_reason	is_ignored_reason
language	language
license_category	license_category
type	type
update	update
lifecycle_ga	lifecycle_ga
lifecycle_stage	lifecycle_stage
market_version	market_version
product	product
publisher	publisher
software_lifecycle_confidence	software_lifecycle_confidence
software_lifecycle_eol_support_stage	software_lifecycle_eol_support_stage
software_lifecycle_eos_date	software_lifecycle_eos_date
software_lifecycle_eos_support_stage	software_lifecycle_eos_support_stage

Migration Support

We provide you with migration scheduled job to assist you with data migration from your previous versions of Qualys Asset Inventory CMDB Sync App to the latest version of the app. The Qualys Asset Inventory CMDB Sync App 2.1 provides you with usage of out of box production tables by ServiceNow.

Once upgrade to 2.1 version and before you sync assets or create schedules, we recommend you to migrate assets available in computer extended tables to out of box production tables provided by ServiceNow. To ease migration task, we provide you with a scheduled job for migration of assets (optional).

Why Migration Needed?

In the previous versions, the assets were spread across various extended tables such as computer extended table or software extended table. Once you upgrade, if we do not opt for migration, the assets in these extended table may not be transformed to the correct tables in production as per thew new CI class mappings. To prevent this issue, you need to migrate the assets from the computer extended tables. You can activate the scheduled job to initiate the migration of assets (approved assets).

Get Started

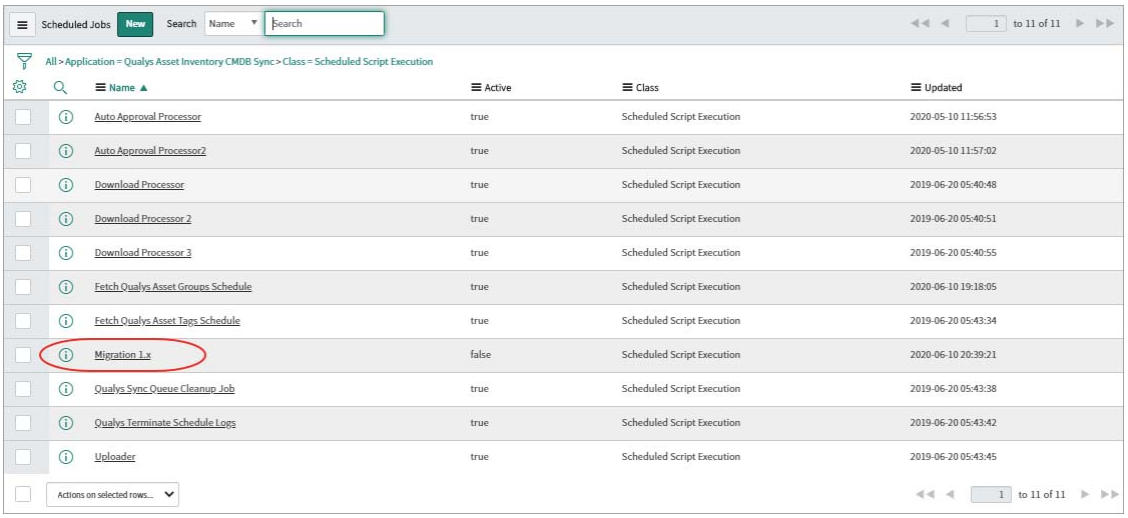
We provide the you with ready to use Migration 1.x app scheduled job. The function and frequency of execution this job is explained below. You can always update or change the frequency of the scheduled job as per your needs.

Migration 1.x- By default, this job is deactivated. The purpose of this job is only for migration of assets that belong to Computer Extended table and need to be migrated to production tables.

Assets that belong to Computer extended table are migrated to the respective CMDB tables on production. For example, assets in computer extended table that belong to Windows server are migrated to the Windows Server CI class.

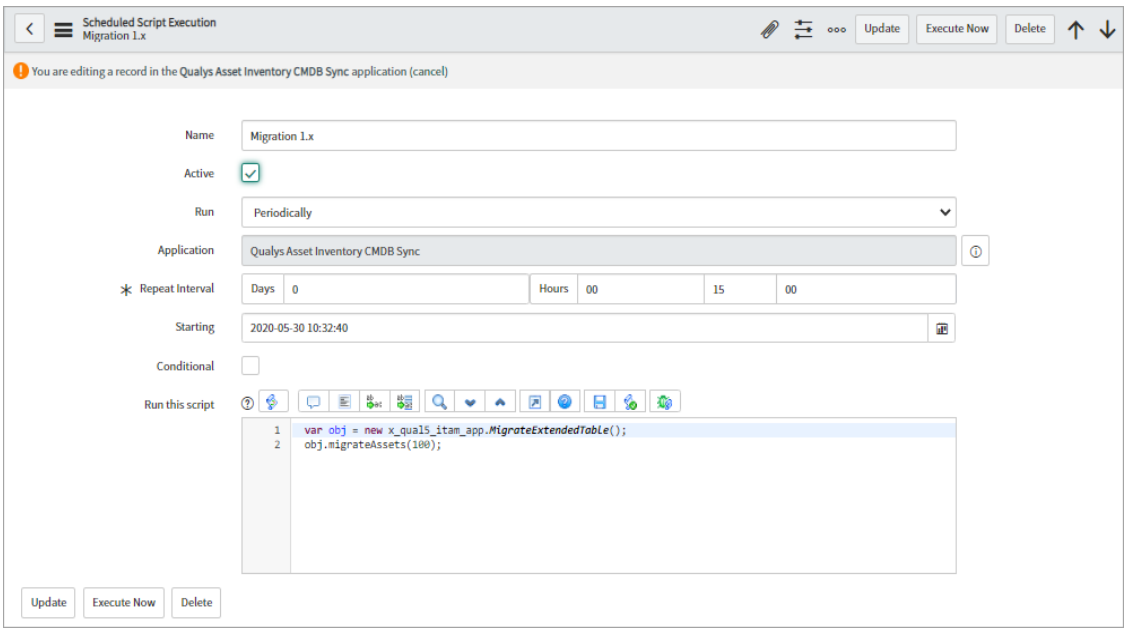
Steps to execute migration 1.x job.

1. Go to App Scsheduled Jobs and click Migration 1.x job.



2. Click Edit.

3. Select Active check box to enable activation.



If activated, the default configured frequency is 100 assets for every 15 minutes. You can also alter the frequency to suit your requirements of asset migration.

4. Click Update.

Alternately, you could click Execute Now to immediately run the job.

Once the job is executed, the application logs reflect migration. Once the migration is completed, the application log lists the number of assets are migrated.

If any assets fail to migrate, the Migration State and Migration Notes indicate that the migration has failed. Migration Notes field is available only for assets whose criteria is defined by Identification engine rule. For assets using transform maps, only migration state is available.

To trigger migration for failed migration assets, reset the migration state to None for all such assets and clear the Migration Notes field.

Once, all the assets are migrated, you can de-activate the Migration 1.x job.