# CSM Server User Guide

# What is CSM Server?

CSM Server is a web-based, server-side automation and orchestration framework. It gives service providers the ability to simultaneously schedule and deploy IOS-XR (ASR9K, CRS, and NCS6K) SMUs & software upgrades across hundreds of routers in a scheduled manner through a simple point and click Web interface.

CSM Server leverages the Accelerated Upgrade Tool (AUT) to automate and relieve our customers of having to perform tedious & manual install steps themselves.

## **CSM Server**



## Requirements

- Runs on Linux machine
- Python interpreter 2.7.6 & supported libraries
- MySQL 5.6 or above
- Gunicorn web server
- Safari/Google Chrome/Firefox Browser

#### Installation

- Refer to the Installation Guide.
- The Installation Guide will provide instructions on installing CSM Server and various components on different Linux distributions, as well as how to launch it.

#### CSM Server Modules

#### CSM Server

- Provides a Web GUI to provision hosts, jump servers, regions, and servers.
- Schedules different types of installation jobs.
- Browses database information and views system and session logs.
- Performs administrative tasks.

#### CSM Dispatcher

- Runs scheduled download and install jobs.
- Collects software inventory information from hosts.
- Performs housekeeping tasks.

## **High Level Overview**

## Login

Use default Admin user authentication to login.

## Modify User Password

Click Tools – Edit My Profile.

#### Create CSM Server Users

Click Admin – Create User.

## Create Server Repositories

Define TFTP/FTP/SFTP server information.

## Create Regions

 Create regions and link them with server repositories.

## Create Jump Servers

 Define jump servers if managed hosts are behind them.

## Create Managed Hosts

- Define connection information and assign a region to a managed host.
- Once a host is defined, CSM Server will connect to the host to retrieve software inventory information.

#### Host Dashboard

- Click the hostname under the Managed Hosts tab.
- Display the host connection information, software packages, scheduled installations, and the install and software inventory history.
- Allows installation to be scheduled.

#### Schedule Install

 From Host Dashboard, click Action - Schedule an Install.

#### Install Dashboard

View scheduled/in-progress/failed/completed installations.

# Start & Stop CSM Server

## **Start CSM Server**

For detailed information, refer to the installation guide.

## Follow only if CSM Server is running inside virtualenv:

- To enter the virtual environment, from csmserver directory, type "source env/bin/activate".
- The shell prompt will display "(env)" which indicates you are inside the virtual environment.
- Follow the instructions below to start CSM Server.
- To leave the virtual environment, type "deactivate". This will return you to the regular shell prompt.

#### To Start CSM Server

From csmserver directory, type "./csmserver start".

## To Start CSM Server Securely

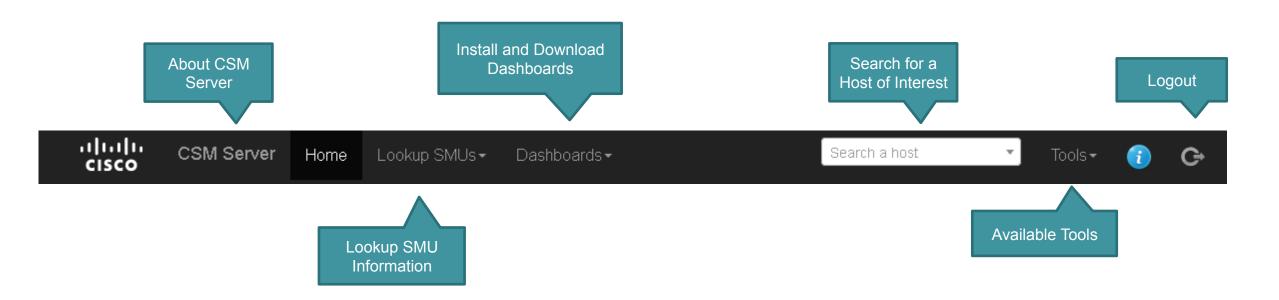
- Must have ssl.key and ssl.cert files.
- From csmserver directory, type "./csmserver start secure".

## **Stop CSM Server**

- For detailed information, refer to the installation guide.
- Before stopping CSM Server, the following precautions will help eliminate unexpected results:
  - On the Admin Dashboard, disable 'Allow Scheduled Installs to Run'.
  - Go to the Install Dashboard to see if there is any in-progress installation.
  - If there is no in-progress installation, follow the instructions below to stop CSM Server.
  - 'Allow Scheduled Installs to Run' will need to be re-enabled when CSM Server starts again.
- If CSM Server is running inside virtualenv
  - Follow the instructions on the previous slide to enter the virtual environment.
- To Stop CSM Server
  - From csmserver directory, type "./csmserver stop".

# Main Menu Bar

## Main Menu Bar



# CSM Server Home

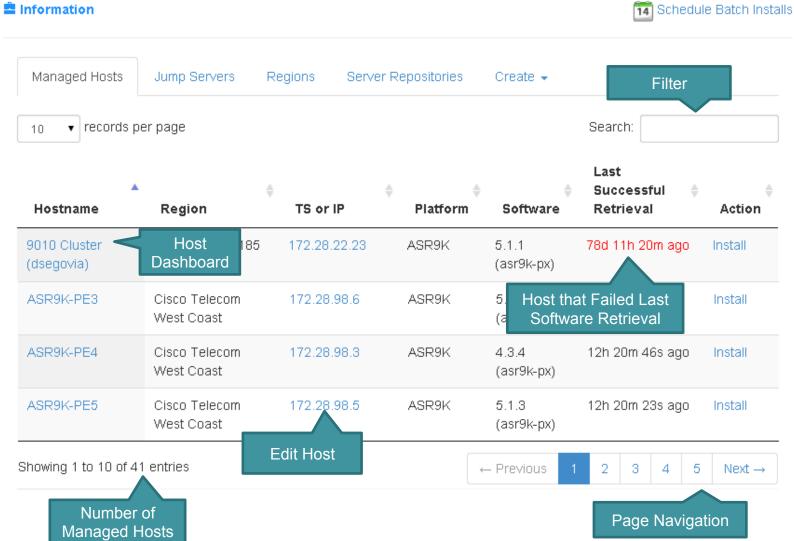
## Home



#### **†** Home

| CSM Server  |                     |
|-------------|---------------------|
| Server Time | 05/13/2015 12:21 PM |
| Version     | 1.0                 |
| Login User  | root                |
| Privilege   | Admin               |

| Total Managed Hosts: 41 |           |        |
|-------------------------|-----------|--------|
| Platform                | Software  | # Host |
| asr9k-px                | 4.3.1     | 1      |
| asr9k-px                | 4.3.4     | 1      |
| asr9k-px                | 5.1.1.530 | 1      |
| asr9k-px                | 5.1.1     | 1      |
| asr9k-px                |           | 1      |



## **Home Tab Options**



Managed Hosts

Jump Servers

Regions

Server Repositories

Create -

## Managed Hosts

- Managed hosts are Cisco IOS-XR devices on which scheduling tasks can be performed.
- Each row represents one Cisco device.

## Jump Servers (Optional)

- A jump server is the server that CSM logs into in order to connect to the managed hosts.
- Many service provider environments place their devices behind a jump server. CSM first logs into the jump server, then to the router.

### Regions

- A region is mapped to multiple server repositories.
- All devices from the same region share the same set of TFTP, FTP, SFTP servers.

#### Server Repositories

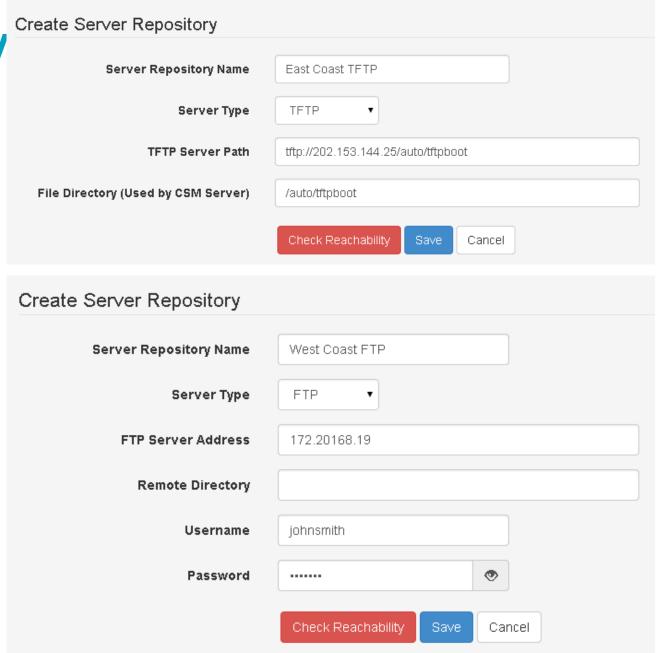
 Where you define the TFTP, FTP, and SFTP server repositories.

#### Create

 Where you go to create managed hosts, jump servers, regions, and server repositories.

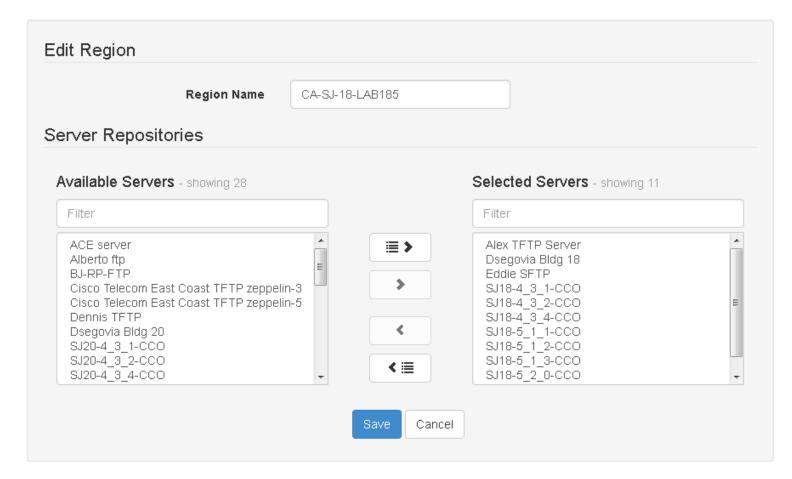
## **Create a Server Repository**

- Specify a unique server repository name.
- Select a server type for the server repository where the software packages reside.
- For TFTP server, specify the TFTP server path (e.g. tftp://202.153.144.25/auto/tftpboot). A TFTP server path usually has a corresponding Unix file directory (e.g. /auto/tftpboot). Specify that directory in the File Directory so that CSM Server can browse the software packages.
- For FTP/SFTP server, specify the FTP/SFTP server address (e.g. <a href="ftp.easycgi.com">ftp.easycgi.com</a> or an IP address). If applicable, specify the remote directory. The remote directory is optional and should be relative to the default directory where FTP/SFTP client first connects.
- When scheduling an install, CSM Server uses this server repository information to provide the file and directory browsing function.



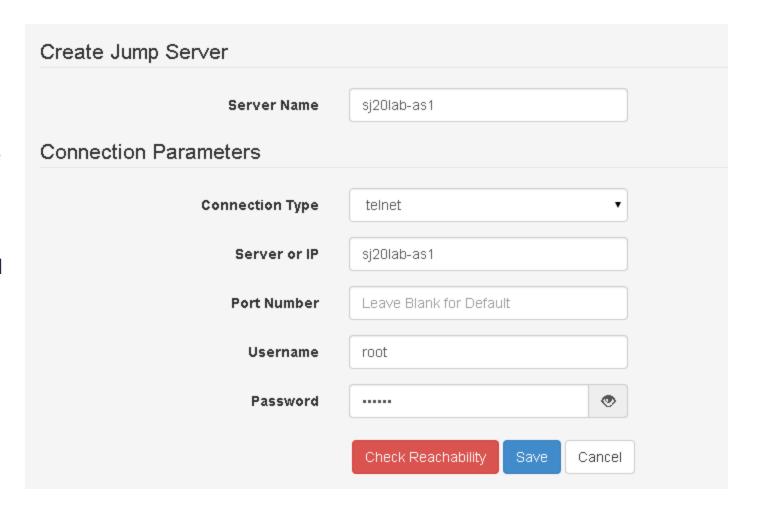
## **Create a Region**

- Specify a unique region name.
- Assign server repositories to the region.
- When creating a new host, a region is attached to the host.
- When scheduling an install, CSM Server uses the host's region to lookup server repositories and provide the file and directory browsing function.



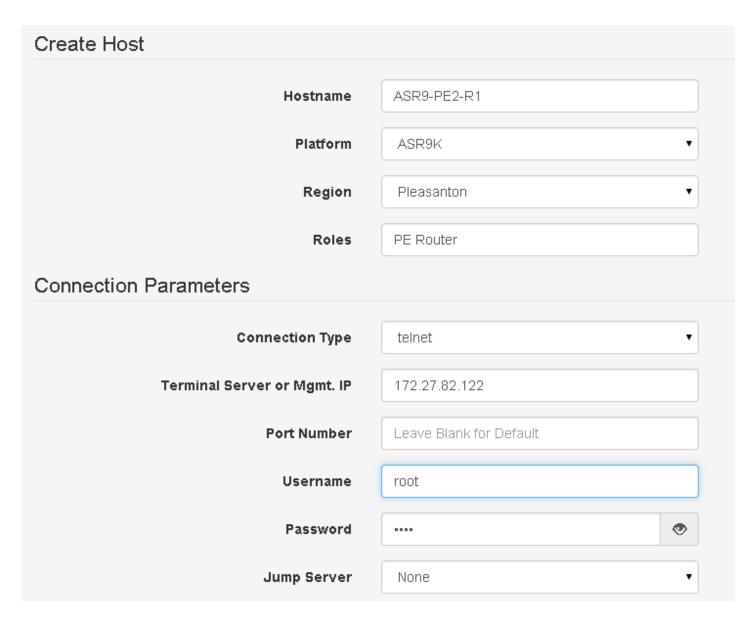
## **Create a Jump Server**

- Specify a unique jump server name.
- Specify a connection type.
- Specify a sever name or the IP address of the server.
- Specify a telnet or ssh port number.
- A jump server may be assigned to a managed host if the managed host is behind the jump server.



## **Create a Host**

- Specify a unique host name.
- Select a platform and region for the managed host. Optionally, you may specify the role of the device. This will enable further filtering when creating batch schedule installs.
- If the device is attached to a terminal server, specify the terminal server IP.
- If the device is on the management network, specify the management IP.
- Multiple management IPs (i.e. RSP0 and RSP1) can be entered in the Terminal Server or Mgmt. IP field. Use a comma as the delimiter.
- Multiple terminal server ports can be entered in the Port Number field. Use a comma as the delimiter.



## **Connect via Host Console Port**

When a host console port is used for the connection, the syslog logging on the console should be disabled. Otherwise, it will interfere with the installation.

- To disable logging
  - RP/0/RSP0/CPU0:GW# config
  - RP/0/RSP0/CPU0:GW(config)# logging console disable
  - RP/0/RSP0/CPU0:GW(config)# commit

# Host Dashboard

## **Host Dashboard**

#### Invocation

- Navigate to this page by clicking the hostname under the Managed Hosts tab on the Home page.
- Also invoked by using the "Search a host" search bar on the main menu bar.

#### Overview

 The Host Dashboard is a dynamic view. It refreshes every 10 seconds to display up-to-date information.

#### General

Display the host connection information.

## Software Packages

Display the software packages of the host.

#### Scheduled Installations

 Display all the scheduled installations. When an installation is executing, a runner icon is displayed next to the scheduled installation.

## Install/Software Inventory History

- Display both the install and software inventory history.
- By default, only the last 10 records are displayed.
   To change the default, select a different number from the selector.

#### Action

- Schedule an Install.
- Delete All Scheduled Installs.
- Delete All Failed Installs.
- Retrieve the Latest Software.
- Edit Host.

## **Host Dashboard**

ill Host: ASR9K-PE1-R0

Region Cisco Telecom
West Coast

Platform ASR9K

Software 5.1.3

Host or IP 172.28.98.2

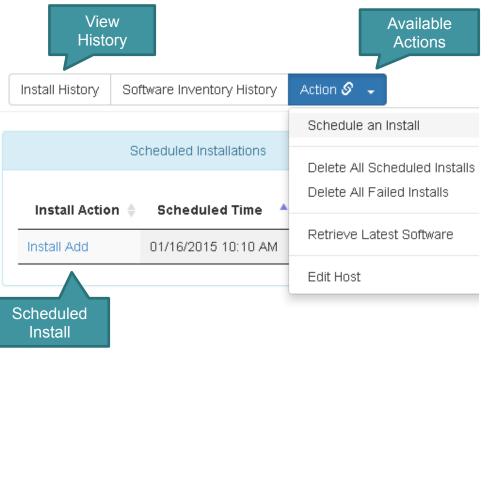
Username cisco

Connection telnet

Created By root

Last Successful Retrieval: 12h 13m 56s ago





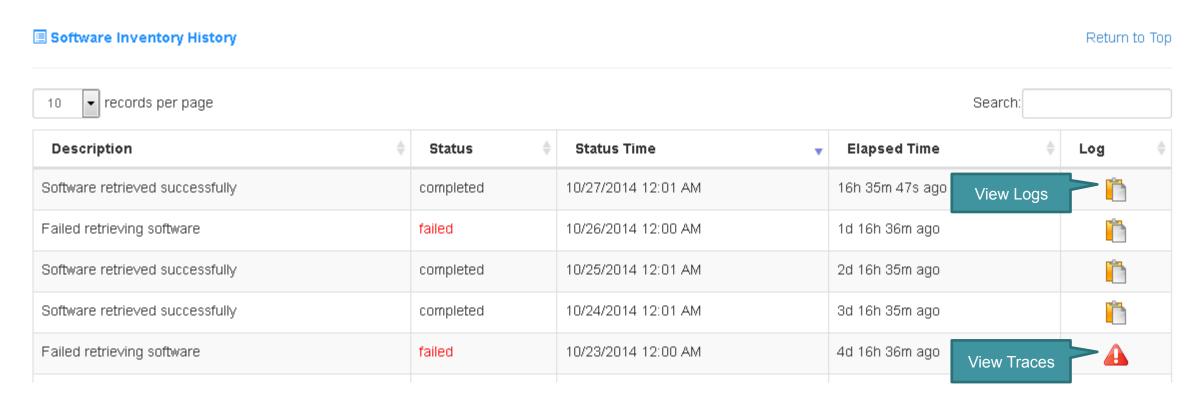
## **Install History**



Install History Return to Top Number of Records to Retrieve Last 10 Records: 10 Retrieve from the Database records per page Search: Install Action **Scheduled Time Start Time Packages** Status **Status Time** Log Created By Install Add 10/05/2014 11:38 PM 10/05/2014 11:38 PM failed 10/05/2014 11:39 PM root View Logs Install Add 10/05/2014 11:19 PM 10/05/2014 11:19 PM completed 10/05/2014 11:19 PM Install Add 10/05/2014 11:09 PM 10/05/2014 11:09 PM completed 10/05/2014 11:09 PM root 0/01/2014 09:18 PM Install Add 10/01/2014 09:18 PM 10/01/2014 09:18 PM root View **Packages** 

## **Software Inventory History**





## Schedule an Install

## **Available Install Actions**

## Pre-Upgrade

- Establishes initial device connection.
- Records running software version.
- Records the running configuration and stores it in a file.
- Checks the state of all nodes on the system.
- Verifies server repository reachability.
- Records inactive, active, committed package list.

#### **Optional Plugins:**

- Records OSPF and ISIS neighbors.
- Sets ISIS set-overload-bit if ISIS is running.
- Records total number of BGP neighbors.
- Records total number of MPLS LDP neighbors.
- Records total number of PIM neighbors.
- Records total number of HSRP neighbors and states.
- Records total number of VRRP neighbors and states.

#### Install Add

Copies software packages to the device.

#### Activate

Activates packages on the device.

#### Post-Upgrade

- Checks node status, standby role status, configuration failure, software package states, etc.
- Verifies error/tracebacks/core files.

#### Commit

Executes Install Commit on the device.

## **Available Install Actions - Continue**

#### - ALL

 CSM Server will create Pre-Upgrade, Install Add, Activate, Post-Upgrade, and Commit installation actions with the successor depending on the predecessor. Until the predecessor has executed successfully, the successor will not run.

#### Remove

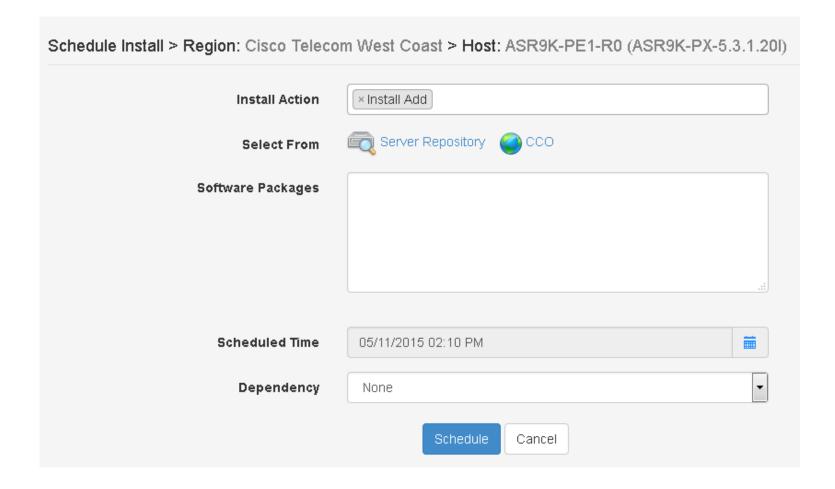
Remove inactive packages on the device.

#### Deactivate

Deactivate active packages on the device.

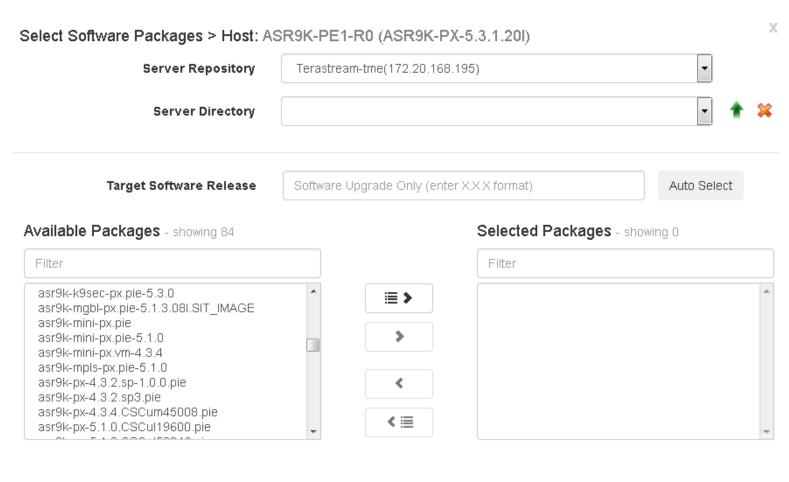
## Schedule an Install

- Invoked from the Host Dashboard's Action menu.
- Select an install action. Multiple install actions may be selected at once.
- Depending on the selected install action, software packages can be selected from Server Repository, CCO, Inactive Packages, or Install History.
- If a dependency is selected, the scheduled installation will not proceed until the dependency is completed successfully. The dependency can only be specified when only one install action is selected (not available for batch installs).



## **Browse Server Repository**

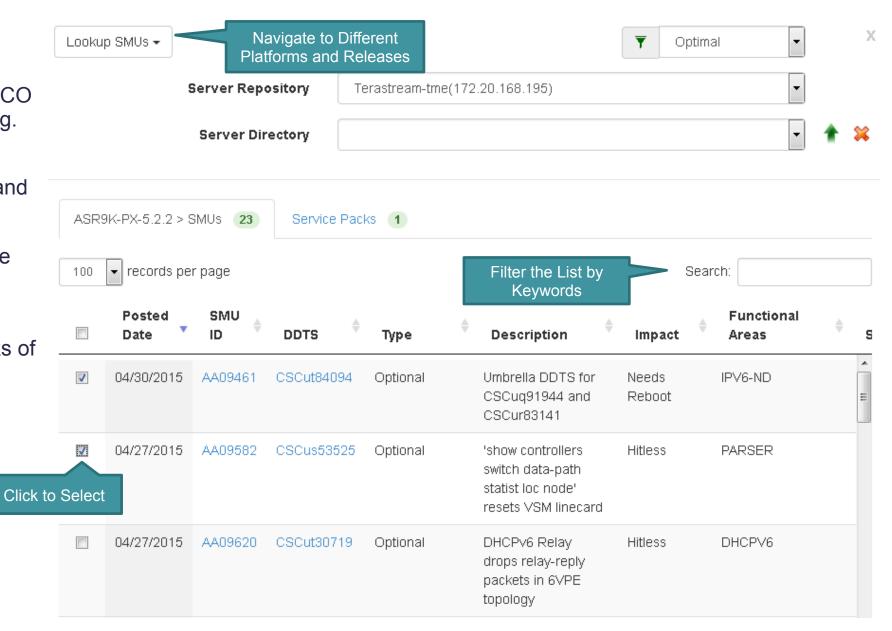
- Invoked by clicking the Server Repository icon on the Schedule Install dialog.
- Select a server repository.
- Use the Server Directory selector to navigate to the desired directory on the server repository. The software packages in the selected directory will be displayed in the dual list box.
- For Software upgrade, enter the target software release and click Auto Select. This will select packages from the Available Packages list box which match the device software packages.



Cancel

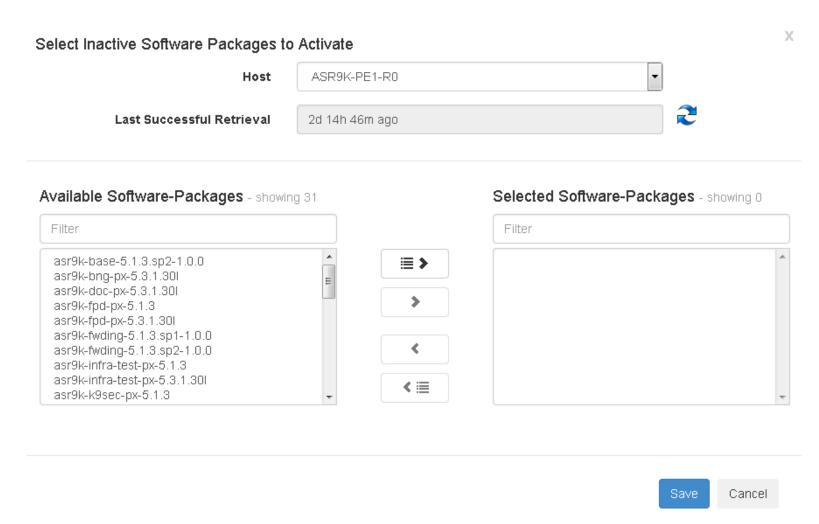
## **Browse CCO**

- Invoked by clicking the Browse CCO icon on the Schedule Install dialog.
- Use the Lookup SMUs button to navigate to the desired platform and release.
- Select the server repository where the downloaded SMUs should be stored.
- Select the SMUs or Service Packs of interest.



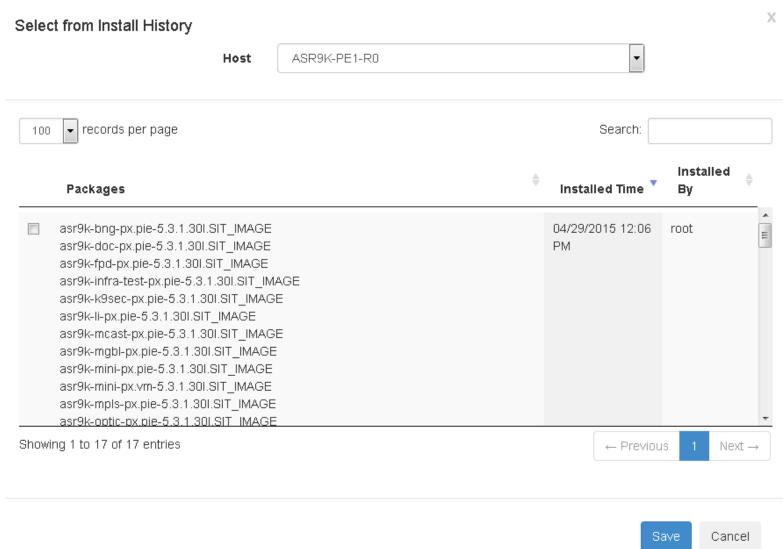
## **Browse Inactive Packages**

- Invoked by clicking the Browse Inactive Pkgs icon on the Schedule Install dialog.
- The Last Successful Retrieval text field displays the elapsed time since the software packages was last successfully retrieved.
- Click the Retrieve Latest Software icon to retrieve latest software.



## **Browse Install History**

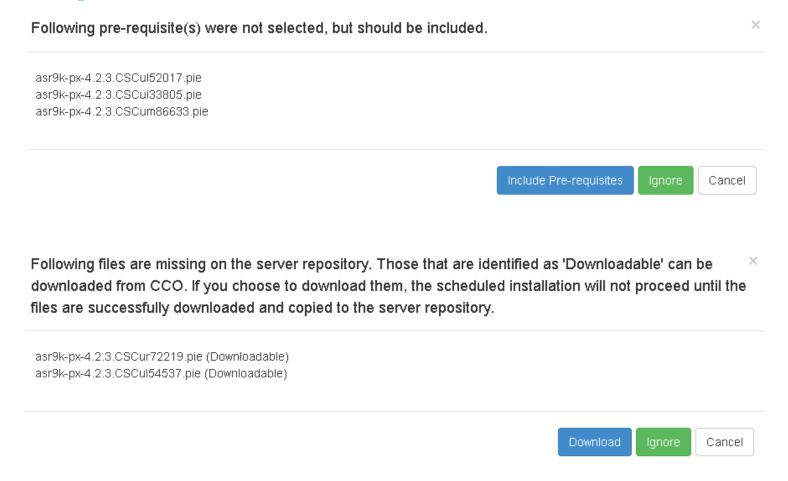
- Invoked by clicking the Browse Install History icon on the Schedule Install dialog.
- Select the packages from one of the successful Install Add operations.



## Schedule Install – Prerequisite Checks

After clicking the Schedule button, CSM Server performs the following functions:

- It checks for missing pre-requisites on selected software packages.
- It determines whether selected software packages are on the server repository. If they are not, CSM Server prompts the user to download them.
- The scheduled install will not proceed at its scheduled time until the software packages are successfully downloaded and copied to the server repository.

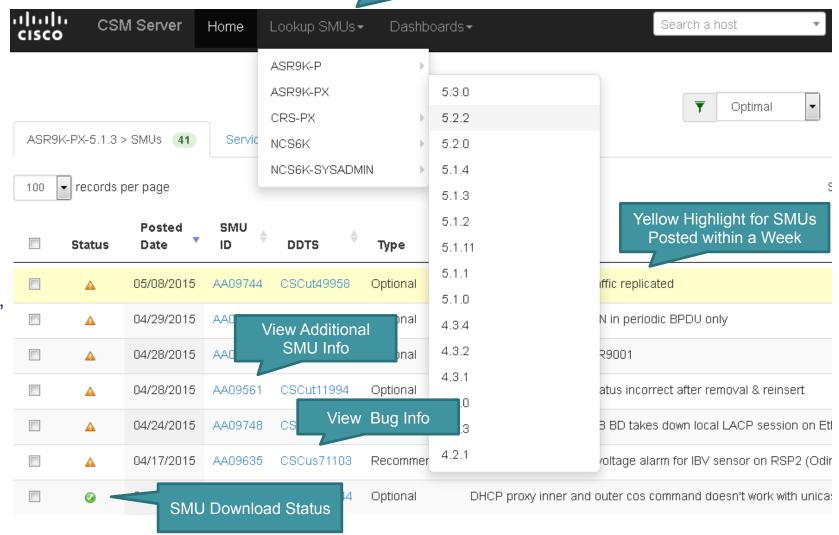


# Lookup SMUs Menu

## Lookup SMUs Menu

Navigate Different
Platforms and Releases

- From the Lookup SMUs menu, users can query SMUs and Service Packs information on various IOS-XR platforms and releases.
- Go to Tools User Preferences to exclude certain platforms and releases from displaying under the Lookup SMUs menu.
- If a SMU has already been downloaded to the internal repository, a green check icon is displayed.
- Download a SMU by checking the checkbox and selecting Action – Download SMU/Service Pack. Then, select the server repository that will store the downloaded image.



## Install Dashboard

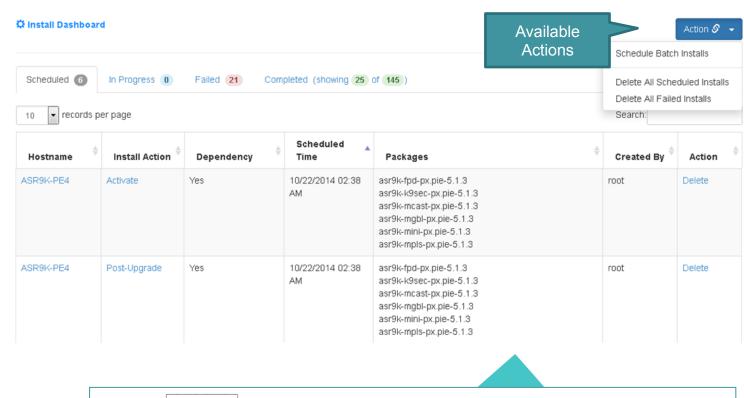
## **Install Dashboard**

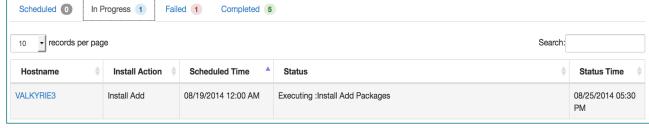
#### Action

- Schedule Batch Installs.
- Delete All Scheduled Installs.
- Delete All Failed Installs.

#### Install Dashboard Tabs

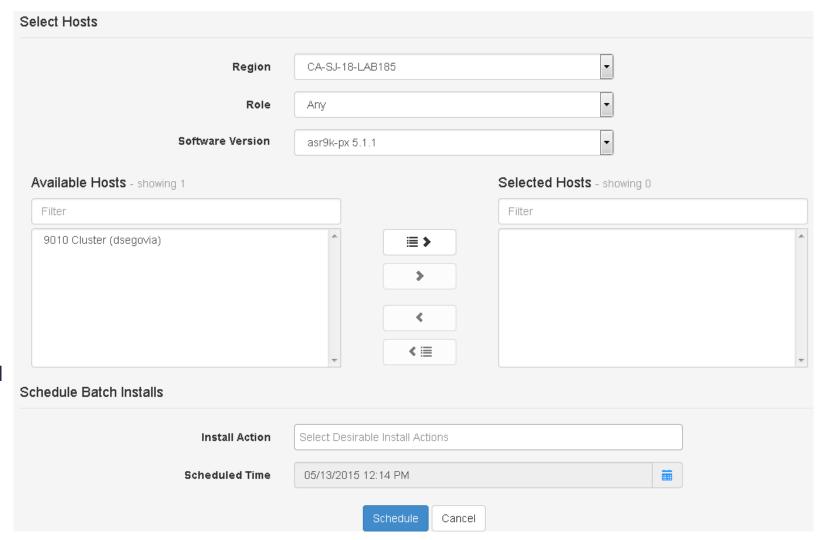
- Scheduled
  - Lists any pending scheduled tasks.
- In Progress
  - Lists currently executing tasks.
- Failed
  - Lists any task that failed & provides links to appropriate logs.
- Completed
  - Lists of completed tasks plus install logs.





## **Schedule Batch Installs**

- Select a region of interest.
- Select a role and/or software version to further filter hosts.
- All managed hosts belonging to the selected region and role will be displayed.
- Use the dual list box to select multiple hosts for the same scheduled installation.
- By default, the scheduled time is now. The installation will be executed immediately. Click the calendar icon next to the Scheduled Time to select a different date and time.



# Download Dashboard

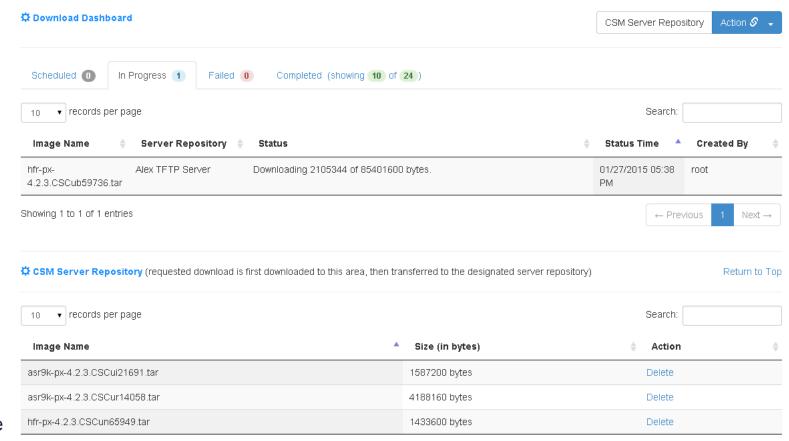
## **SMU/SP Download Dashboard**

#### Action

- Delete All Scheduled Downloads.
- Delete All Failed Downloads.

#### Download Dashboard Tabs

- Scheduled
  - Lists any pending downloads.
- In Progress
  - Lists downloads that are in progress.
- Failed
  - Lists all failed downloads.
- Completed
  - Lists completed downloads.
- CSM Server Repository
  - Lists SMU tar files that have been downloaded. All requested downloads are first saved in this repository before being transferred to the designated server repository.



# Tools Menu – Non Admin

## **Tools Menu**

#### List Hosts

Displays all managed hosts with their connection information. To make changes, click the host name of interest.

#### Optimize List

Given a SMU list, this produces an optimized list that includes any missing pre-requites.

#### Edit User

Modifies the current user authentication and other information.

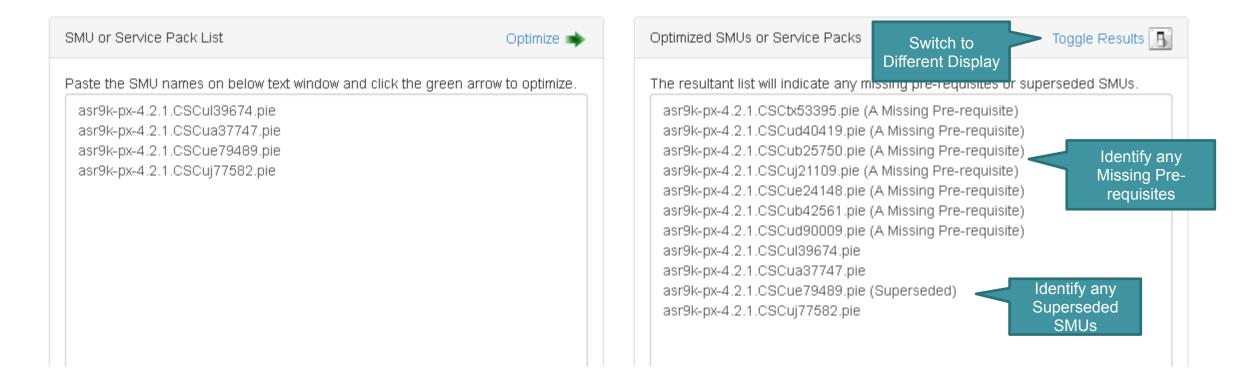
#### User Preferences

- Excludes platforms from the Lookup SMUs menu.
- Defines Cisco authentication.

.

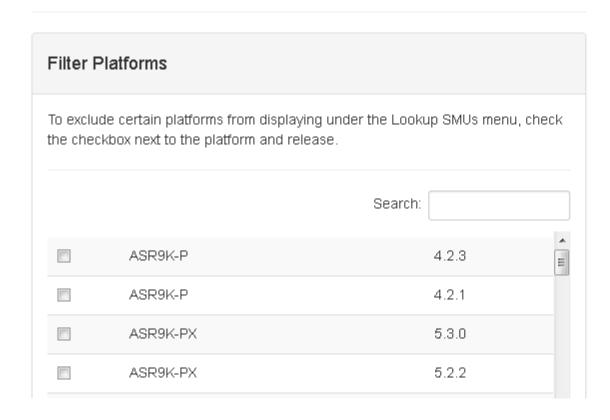
## **Optimize List**

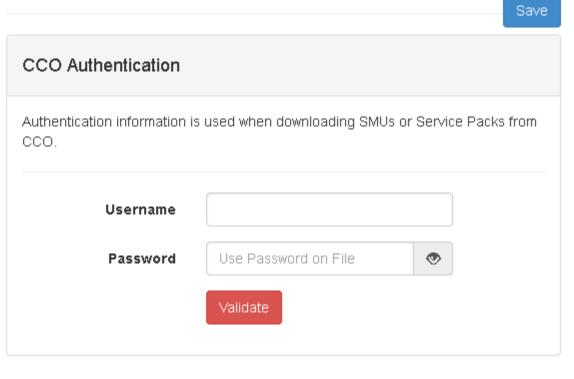
- Given a SMU list, CSM Server identifies any missing pre-requisites as well as superseded SMUs and returns an optimal list.
- The SMU names in the list can be in different formats so long as the platform and release are identifiable.



## **User Preferences**

 Defines the per-user preferences. This includes excluding certain platforms and releases from displaying under the Lookup SMUs menu and CCO authentication information.





# Tools Menu - Admin

## Admin Menu – Requires Admin Privilege

#### Admin Dashboard

Allows the administrator to configure CSM Server.

#### Import Hosts

Imports hosts via comma delimited texts.

#### Create User

Creates new users on the system.

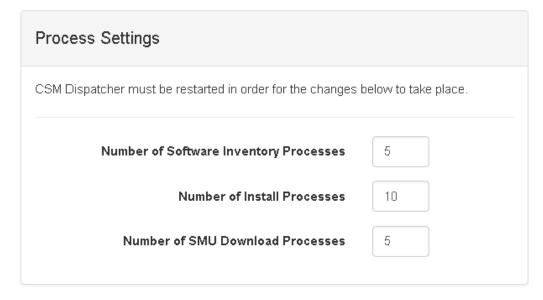
#### List All Users

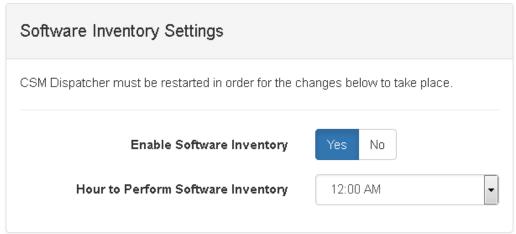
Displays all the users defined in the system. To make changes, click the user name of interest.

#### System Logs

 Displays all the system logs captured by CSM Server. These logs help determine anomalies that have occurred on CSM Server.

## **Admin Dashboard**





#### Process Settings

- The number of processes to use to retrieve software inventory information.
- The number of processes to use to perform scheduled installation.
- The number of processes to use to download SMUs or Service Packs.

#### Software Inventory Settings

- Enabled by default.
- Specify the hour of the day to perform the software inventory function (i.e. retrieving software package information from managed hosts).
- After the software inventory function is performed, CSM Server will perform other housekeeping tasks (see Housekeeping Settings).

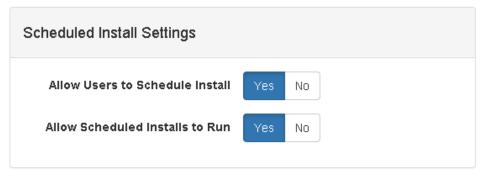
## **Admin Dashboard**

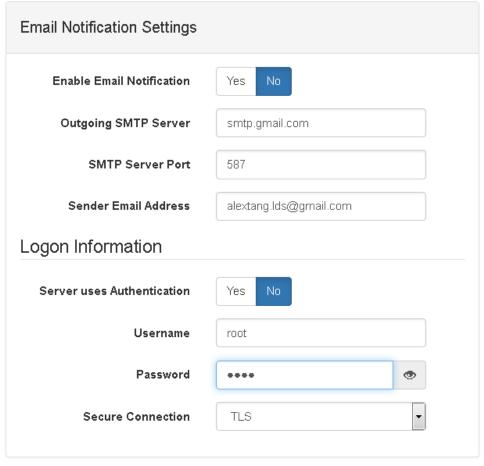
#### Scheduled Install Settings

- By default, CSM Server enables users to schedule installations on managed hosts.
- By Default, CSM Server enables scheduled installations to run.

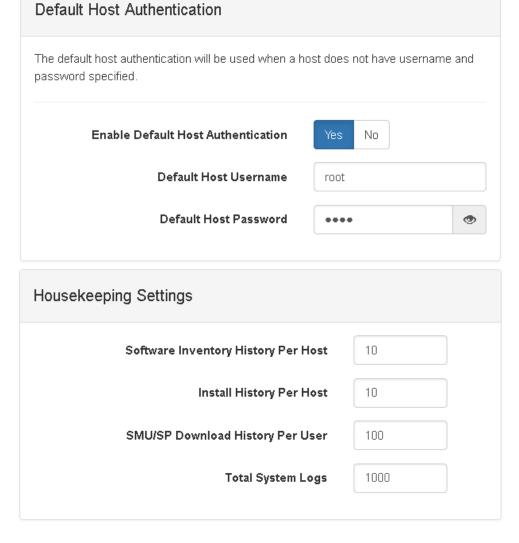
#### Email Notification Settings

- Email notification is disabled by default. Click Yes to enable it.
- Define the SMTP server information. Some SMTP servers may require user authentication. If that is the case, click Yes and define the user authentication information.
- CSM Server uses the SMTP settings to email users about scheduled install status





## **Admin Dashboard**



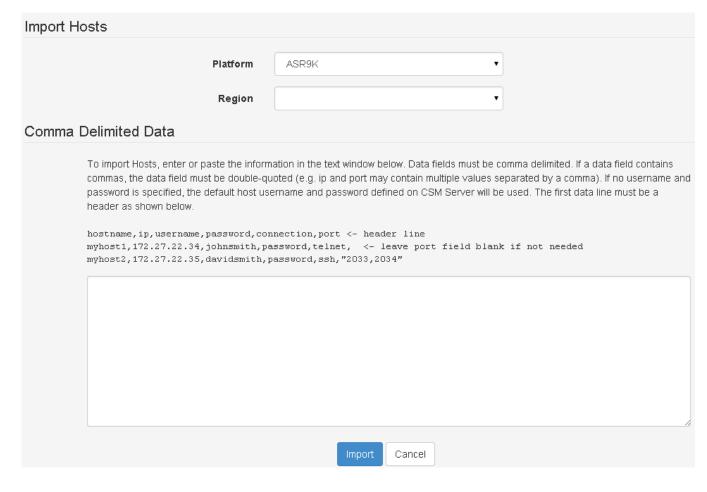
#### Default Host Authentication

- Disabled by default.
- The default host authentication will be used when a host does not have username and password specified.

#### Housekeeping Settings

- Specify the number of software inventory history records to keep per host.
- Specify the number of install history records to keep per host.
- Specify the number of SMU/SP download history records to keep per user.
- Specify the number of system log records to keep on the system.
- CSM Server will purge the history records based on the numbers specified on a daily basis (see Software Inventory Settings).

## **Import Hosts**



#### **Import Hosts**

- Select the platform type of the hosts to be imported.
- Select the region for the hosts to be imported.

#### **Comma Delimited Data**

- Paste the comma delimited data in the text window.
   The first line must be a header line followed by the host data fields to be imported.
- The username and password fields are not mandatory. If no hostname and password is specified, CSM Server will use the default host authentication defined on the Admin Dashboard if it is enabled.
- The ip and port data fields support comma delimited values. In this case, double quotes must be used to quote the values.

# Additional Topics

Password Encryption Security Privileges System & Session Logs Navigate Between Hosts Software Inventory Installation Dependency Dynamic Views

## **Password Encryption**

#### User Password

 All user passwords are encrypted with a one-way hash algorithm. It is impossible to decrypt the password. If a user forgets the password, the administrator will have to reset it.

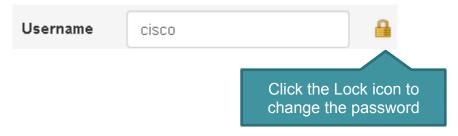
#### Other Passwords

- Passwords for hosts, jump servers, server repositories, and SMTP mail server are encrypted as well.
- When a password is first defined, it will be masked by dots. To see the password unencrypted, click the eye icon.

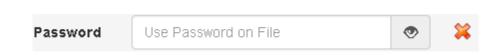


#### Saved Passwords

Once the password is saved, it will no longer be viewable. Instead, the password field shows 'Use Password on File'. To modify the password, click the lock icon next to the Username field. Then, enter the new password.



To remove the password (i.e. no password), click the red cross icon.



## **Security Privileges**

## Three levels of security privileges:

#### Admin

- Users with this privilege have no limitation.
- Only admin users can create hosts, jump servers, regions, and server repositories.
- Only admin users can access the Admin menu.
- Only admin users can view and modify other users.

#### Operator

- Users with this privilege can only schedule/modify/delete installations.
- They cannot create hosts, jump servers, regions, and server repositories.

#### Viewer

Users with this privilege can only view information.

## **System & Session Logs**

#### System Logs

- Click Admin System Logs from the main menu bar.
- These logs are created when exceptions are encountered. They can be used for system debugging. These exceptions may or may not affect system stability and performance.

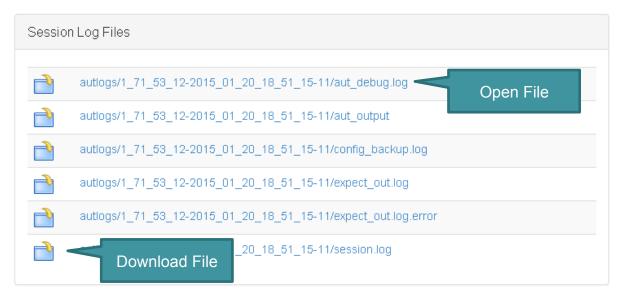
#### Session Logs

- Session logs are created during software inventory or installation operation.
- CSM Server uses the Accelerated Upgrade Tool (AUT) to perform software inventory and installation. These logs provide valuable insights on what has taken place on the router.
- If an error condition happens, a file called "expect\_out.log.error" will be created. This file provides information on error encountered.

#### **System Logs**

|                   | Search:             |         |  |
|-------------------|---------------------|---------|--|
|                   | Create Time         | Trace 🛊 |  |
| ventory job = 642 | 10/31/2014 12:00 AM | View    |  |
| ventory job = 641 | 10/31/2014 12:00 AM | View    |  |

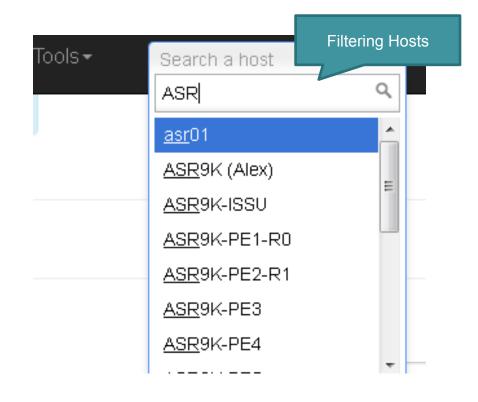
#### Session Logs: ConPE\_dmahisek\_PE8



## **Navigate Between Hosts**

#### Search a host

- The Search a host bar provides a quick way to navigate in real-time between managed hosts.
   When a host is selected, the Host Dashboard is displayed.
- Further filtering can be done by typing the string matching part of the hostname.

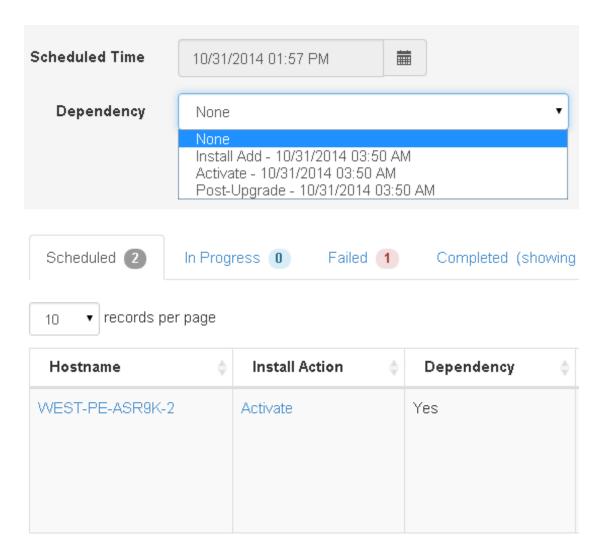


## **Software Inventory**

- Through the Admin Dashboard, the administrator can enable software inventory and specify the hour of the day to perform this operation.
- When the hour is reached, CSM Dispatcher will connect to the managed hosts and collect software inventory information.
- Hosts that fail the software inventory retrieval will have a red highlight on the Last Successful Retrieval field on the Home page.
- Software Inventory history can be viewed on the Host Dashboard. The Last Successful Retrieval label provides information on the last successful software inventory time.
- To retrieve the latest software, click Action Retrieve Latest Software from the Host Dashboard.

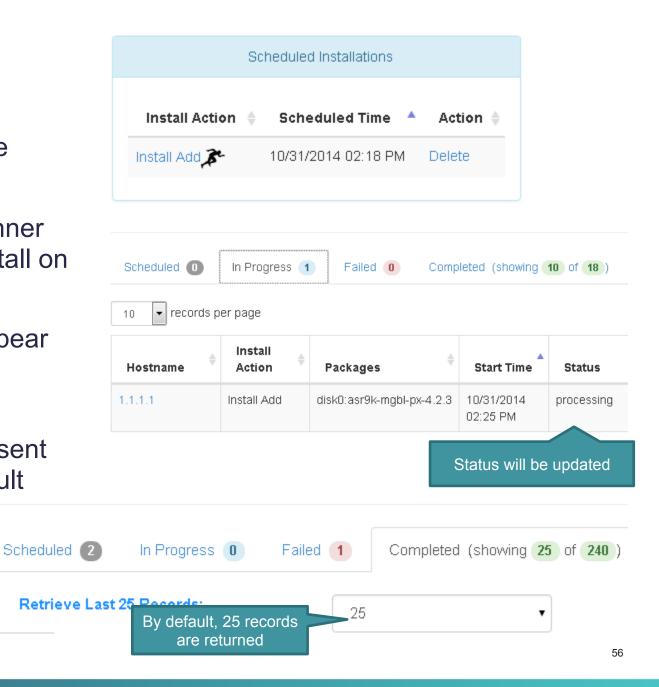
## **Installation Dependency**

- A dependency can be specified when creating a scheduled install. For example, Install Activate should not be performed unless Install Add is successful.
- If an installation failed, any scheduled install that has the failed installation as its dependency will not execute.
- When multiple install actions or 'ALL' is selected, CSM Server will create the dependency automatically.
- Deleting a scheduled install will also delete all of its dependencies.



## **Dynamic Views**

- The Host, Install, and SMU Download Dashboards are dynamic views. They are updated in every 10 seconds.
- When a scheduled install is running, a runner icon will appear next to the scheduled install on the Host Dashboard.
- The running scheduled install will also appear under the In Progress tab on the Install Dashboard.
- In order to reduce the number of records sent between client and CSM Server, the default number of records to return is 25.





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CSM Server

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Thank you.

