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# **HPE 3PAR StoreServ Management Console 3.1 Administrator Guide**

## **Abstract**

This document describes the HPE 3PAR StoreServ Management Console (SSMC). The audience for this document includes storage administrators who monitor and manage system configurations and resource allocation for HPE 3PAR StoreServ Storage Systems.

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# HPE 3PAR StoreServ Management Console (SSMC)

The HPE 3PAR StoreServ Management Console (SSMC) is a standalone product that you install as a single package. SSMC provides contemporary browser-based interfaces, including a Main console and an Administrator console, for monitoring 3PAR StoreServ Storage Systems.

- **Main Console**—Links to information and tutorials for monitoring and managing your storage, including functionality for Block Persona, File Persona, Replication, Security, Federation, Optimization, and System Reporter.
- **Administrator Console**—Add, edit, connect, disconnect, and remove StoreServ systems. Accept certificates, and view connected and disconnected systems.

## More information

[HPE 3PAR StoreServ Management Console Release Notes](#)

[HPE 3PAR StoreServ Management Console User Guide](#)

[HPE 3PAR StoreServ Management Console Online Help](#)

## SSMC feature summary (limited)

The following list provides a limited overview of SSMC features. For additional details, and for information about using these features, see the *HPE 3PAR StoreServ Management Console User Guide*.



### TIP:

Some SSMC features require a specific HPE 3PAR OS version. See the *HPE 3PAR StoreServ Management Console Release Notes* for OS-dependent details

- **GENERAL**—View storage system capacities, performance, activity, and state. View or change schedules and global settings. Change the layout of your dashboard screen by moving, removing, and adding panels. Choose the screen you want to list in the compact version of the main menu.
- **BLOCK PERSONA**—Create, edit, and delete CPGs, virtual volume sets, virtual volumes, host sets, hosts, and virtual volume templates. Convert and tune actions for virtual volumes. Export and unexport virtual volumes and virtual volume sets. Create, edit, delete, and promote snapshots (virtual copies) and clones (physical copies). Stop and resync clones. Start data migration actions for virtual volumes, virtual volume sets, hosts, and host sets.
- **FILE PERSONA**—Create, edit, and delete file personas, FPGs, virtual file servers, file stores, and file shares. View static route information in VFS view. Multi-select on LHS view. SSMC 3.1 and later supports FTP file share and Enterprise File Lock mechanisms.
- **STORAGE SYSTEMS**—Includes options for managing Controller Nodes, Drive Enclosures, Federations, Physical Drives, Ports, and Systems.

Detailed views include:

- **Controller Nodes** – Short and expanded default views, so you can manage Schematics, Adapter Cards, Power Supplies, Microcontrollers, System Fans, Internal Drives, Batteries, Performance, Activity, and Maps.
- **Drive Enclosures** – Pane views include Summary, Capacity Summary, SSD Summary, FC Summary, and NL Summary, so you can manage Schematics, Magazines, Interface Cards, Power Supplies, Cooling Fans, Physical Drives, SFPs, Activity, and Maps.
- **Federations** – Manage peer links, recommended zones, Peer Motion activity, maps, and subsets of virtual volumes in a VVset. Create, edit, delete, and auto-detect federation configurations; add, edit, or remove migration sources; synchronize Federation, import configuration, start Peer Motion. Manage

Peer Motion migrations (one instance of SSMC at a time), and change the managing instance of SSMC if the current instance becomes unavailable. Create and manage storage federations (managed by a single SSMC instance only).

Add Legacy 3PAR or IBM XIV (non-3PAR) sources to a storage federation as a migration source and import a configuration, start data migration, and refresh external systems.

- **Physical Drives** – Pane views include Summary, Capacity, Connectivity, Error Counts, and State, so you can manage schematics, performance, activity, and maps.
- **Ports** – From the Summary or Error rates pane, manage schematics, settings, hosts, sessions, performance, activity, and maps. Available actions include edit, edit label, set offline, reset port, initialize, disable interface, enable interface, clear, and reload.
- **Systems** – Pane views include Device Type Capacity, System Capacity, Ports, Physical Drives, so you can manage configuration, capacity, compaction, encryption, System Reporter, settings, services, software, licenses, layout, performance, activity, and maps. Available actions include edit, locate, stop locate, tune, refresh snapshot efficiency, add license, enable encryption, and export. The summary view for Controller Nodes, Physical Drives, and Drive Enclosures Includes a Safe to remove feature.
- **SYSTEM REPORTER**—Short and expanded pane views include Charts, Schedules, Summary, and Activity, so you can Create, Create multiple reports, Edit, Make private, Make public, Delete, and Reset zoom. You can also increase the size of a System Reporter volume on a storage system. The report feature provides on-node sampling with high availability. If a node failure occurs, data collection continues because the 3PAR OS automatically starts System Reporter on a different node.

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**!** **IMPORTANT:**

The System Reporter “compare by” functionality is only available on systems running 3PAR OS 3.2.2 and later.

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- **STORAGE OPTIMIZATION**—Create, edit, enable, disable, and delete Priority Optimization configurations. Edit, enable, and disable Adaptive Flash Cache and Adaptive Optimization configurations.
  - **REPLICATION**—Support for Remote Copy group operations: Create, edit, delete, start, stop, sync, failover, recover, and restore; start Peer Motion actions; add Remote Copy links, remove Remote Copy links and Remote Copy groups. Supports 1-to-1, N-to-1, 1-to-N, and M-to-N configurations. Supports SLD remote copy configuration and the revert failover, switch failover, and switchover group operations. Other remote copy configurations require the HPE 3PAR Management Console (MC) or 3PAR OS Command Line Interface.
  - **SECURITY**—Manage StoreServ users, LDAP (including replications from one connected storage system to another), roles, user connections, and domains. Supports Two factor authentication (2FA).
  - **VMWARE**—Create and delete VMware storage containers, and view VMware virtual machines configured for use with SSMC.

For information on the windows associated with each bulleted item, see *Main Console quick tours* in *HPE 3PAR StoreServ Management Console User Guide*. For instructions on using these features, see *HPE 3PAR StoreServ Management Console Online Help*.

## Storage system management with SSMC

With the release of the HPE 3PAR Operating System 3.2.2, SSMC is the default management tool for 3PAR arrays that support 3PAR OS 3.2.2 and later. The final major release of the HPE 3PAR Management Console (MC) was 4.7. For information about MC and its functionality, see the version-specific MC user guide.

For information about the 3PAR CLI, see the latest version of *HPE 3PAR OS Command Line Interface Reference* and the *HPE 3PAR OS Command Line Interface Administrator Manual*.

### More information

[HPE Storage Information Library](#)

## SSMC supported features by category

Category	Features	Supported in SSMC 3.1
VMware Vvol Management	Storage container management Virtual machine mapping	Yes
Hardware Management	DAR Encryption	Yes
	FIPS 140–2 Support	Display only
	Configuring and displaying iSCSI VLAN tag support on Ports	Yes
Health Management	Events	No (supported through CLI)
Online Import	Data Migration	Yes
Federation (Peer Motion)	Data Mobility	Yes
	Smart SAN	Yes (NEW!!)
Provisioning	Adaptive Optimization	Yes
	Adaptive Flash Cache	Yes (3PAR OS 3.2.1 and later)
	Dynamic Optimization	Yes
	Deduplication	Yes (3PAR OS 3.2.1 MU2 and later)
	Compact CPG	Yes
	Templates	Yes (Virtual Volume only)
	Physical Copy (Clone)	Yes
	Convert Virtual Volume	Yes
	Smart SAN	Yes (NEW!!)
	Virtual Volume compression	Yes (NEW!!) (3PAR OS 3.2.1 and later)
Remote Copy	Create RC Configuration	Yes
	Edit RC Configurations (add new systems)	Yes
	Remove targets	Yes
	Edit targets	Yes

*Table Continued*



Category	Features	Supported in SSMC 3.1	
	Add links to targets	Yes	
	Remove links from targets	Yes	
	Configure RC Port	Yes	
	Create RC Group	Yes	
	Start RC Group	Yes	
	Edit RC Group	Yes	
	Delete RC Group	Yes	
	Stop RC Group	Yes	
	Sync RC Group	Yes	
	Failover	Yes	
	Revert Failover	Yes	
	Recover	Yes	
	Restore	Yes	
	Peer Persistence	Yes	
	Three data center (3DC) Peer Persistence	Yes	
Security & Domains	Domain Management	Yes	
	LDAP	Yes	
	Two factor authentication (2FA)	Yes (NEW!!)	
Performance and Reports	AO Configurations	Region I/O Density	Yes
		Cumulative Region IO Density	Yes
		Space Moved	Yes
	CPG	Region I/O Density	Yes
		Cumulative Region IO Density	Yes
		Space	Yes

Table Continued

Category	Features	Supported in SSMC 3.1	
	<b>Physical Drives</b>	<b>PD Usage —Total IOPS</b>	Yes
		<b>I/O Time and Size Distribution</b>	Yes
		<b>Space</b>	Yes
		<b>Performance Statistics</b>	Yes
	<b>Ports (Data)</b>	<b>Disks – Total Throughput</b>	Yes
		<b>Hosts – Total Throughput</b>	Yes
		<b>Peers – Total Throughput</b>	Yes
		<b>RCFCs – Total Throughput</b>	Yes
		<b>RCIPs – Total Throughput</b>	Yes
		<b>I/O Time and Size Distribution</b>	Yes
		<b>Performance Statistics</b>	Yes
	<b>VLUNs</b>	<b>I/O Time and Size Distribution</b>	Yes
		<b>Performance Statistics</b>	Yes
	<b>Virtual Volumes</b>	<b>Space</b>	Yes
	<b>Virtual Volume Set</b>	<b>QoS</b>	Yes
	<b>Domain</b>	<b>QoS</b>	Yes
	<b>Controller Node</b>	<b>CPU Performance</b>	Yes
		<b>Cache Performance</b>	Yes
	<b>Logical Drives</b>	<b>I/O Time and Size Distribution</b>	No

*Table Continued*

Category	Features		Supported in SSMC 3.1
		Space	No
		Performance Statistics	No
Custom Charts	Physical Drives		Yes
	Logical Drives		No
	Virtual Volumes		Yes
	VLUNs		Yes
	Ports (Data)		Yes
	Ports (Control)		Yes
	iSCSI		Yes
	iSCSI Session		Yes
	CMP Node		Yes
	Virtual Volume Cache (was CMP VV)		Yes
	CPUs		Yes
	Remote Copy Link		Yes
	Remote Copy VV		Yes
	FCOE		Yes
QoS		Yes	
Node links		Yes	

# SSMC compatibility and interoperability

For the most current and detailed information on supported browsers, server models, firmware, and operating systems, see [Accessing SSMC information in SPOCK](#).

## Accessing SSMC information in SPOCK

### Procedure

1. Log into [SPOCK](#).
2. In the left navigation pane of the SPOCK Home page, scroll down to Software, and then click **Array Software: 3PAR**.
3. Scroll down to HPE 3PAR Operating System Software: Array Software, and then click the latest SSMC version under HPE 3PAR StoreServ Management Console.

## System requirements

Minimum system requirements include:

- Supported 64-bit operating system (see, [Accessing SSMC information in SPOCK](#))
- Core i5 dual core CPU
- 4GB of installed RAM (see, [Server sizing information](#) for recommended memory and core sizing)
- 2 GB free disk space
- 1366 x 768 or better screen resolution
- Federation membership and compatibility requires the following:
  - 3PAR Operating System 3.2.2 or later
  - Peer Motion, Storage Federation, and Online Import licenses
  - Cabling and port configuration requirements (see, [Hewlett Packard Enterprise Information Library](#))



### **IMPORTANT:**

A storage federation can be managed by a single SSMC instance only.

Recommended additional system requirements include:

- Core i5 or i7 quad core CPU
- 8 GB RAM (see, [Server sizing information](#) for recommended memory and core sizing)

## Server sizing information

The SSMC server uses up to 65% of system RAM, which can impact other software installed on the same system. Hewlett Packard Enterprise recommends installing SSMC on a dedicated system (not a laptop). SSMC does not support laptop power saving features.

Total # of objects managed by SSMC <sup>1</sup>	Number of managed arrays				
	2	4	8	16	32
	CPU cores / system memory				
32,000	2 cores	2 cores	4 cores	8 cores	16 cores
	4 GB	4 GB	4 GB	4 GB	4 GB
64,000	2 cores	2 cores	4 cores	8 cores	16 cores
	8 GB	8 GB	8 GB	8 GB	8 GB
128,000	2 cores	2 cores	4 cores	8 cores	16 cores
	16 GB	16 GB	16 GB	16 GB	16 GB
256,000+	2 cores	2 cores	4 cores	8 cores	16 cores
	32 GB	32 GB	32 GB	32 GB	32 GB

<sup>1</sup> For help calculating the total number of objects managed by SSMC, see the [SSMC log files, metrics.log](#).

## Creating an SSMC CA-signed browser certificate using a non-keytool method

If your environment uses methods other than keytool, such as openssl, use the following procedure:

1. Generate a private key and public certificate using tools and options appropriate for your security environment. For example:

- a. `openssl genrsa -out private.key 2048`
- b. `openssl req -new -sha256 -key private.key -out csr.txt`
- c. Send `csr.txt` to the CA to have it signed.

The expected result is a file containing the public certificate containing the phrase `-----BEGIN CERTIFICATE-----`. The file contains:

- A private key in a file named something like `private.key`.
- A public certificate (built using the private key) in a file named something like `public.cer`.

2. Import the `private.key` and `public.cer` files into the keystore as follows:

- a. Delete the existing SSMC keystore (not used).
- b. At the prompt, enter each of the following commands:

```
openssl pkcs12 -inkey private.key -in public.cer -export -out
jetty.pkcs12keytool -list -keystore jetty.pkcs12 -storetype PKCS12
```

Look for an entry with an alias (possibly "1").

- c. Enter the following command. Use the alias created in the previous step: `keytool -importkeystore -srckeystore jetty.pkcs12 -srcstoretype PKCS12 -destkeystore keystore -destalias jetty -srcaias 1`

## Supported browsers for SSMC

SSMC supports the following browsers (64-bit preferred):

- Microsoft Internet Explorer
- Microsoft Edge

- Google Chrome
- Mozilla Firefox

To access the most current version information, see [Accessing SSMC information in SPOCK](#).

## Supported HPE 3PAR StoreServ arrays for SSMC

- HPE 3PAR StoreServ 7000 Storage
- HPE 3PAR StoreServ 8000 Storage
- HPE 3PAR StoreServ 10000 Storage
- HPE 3PAR StoreServ 20000 Storage

SSMC 2.2 and later allows you to connect and manage a maximum of 32 3PAR StoreServ Storage arrays.

To access the most current information, see [Accessing SSMC information in SPOCK](#).

## Supported HPE 3PAR Operating Systems for SSMC

- HPE 3PAR 3.1.3 (includes all MUs)
- HPE 3PAR 3.2.1 (includes all MUs)
- HPE 3PAR 3.2.2 (includes all MUs)
- HPE 3PAR 3.3.1

To access the most current information, see [Accessing SSMC information in SPOCK](#).

# SSMC deployment model

SSMC is server based, meaning that the SSMC server runs continuously to monitor storage arrays. Users log into the SSMC Server with their web browser to view management data.

Management tools for the StoreServ arrays, like SSMC, must open network sessions with the arrays to monitor activity and provide management functions. This means that SSMC opens multiple network sessions from each instance of the management server to each array that it manages. Even after a user closes the browser session, the SSMC server continues to monitor the arrays, which means it holds connections to the arrays open in order to gather data.

Install SSMC on a server only, and then use desktop and laptop clients to connect to the server using the SSMC web interface. In some cases, such as a multi-site, disaster tolerant configuration, you can install multiple SSMC instances on different servers. Do not install SSMC on individual desktop or laptop systems.

The default URL for communicating with the SSMC server is `https://<IP_address_or_DNS_name>:8443`. To choose a different port number (see, **Changing the default SSMC inbound port**).

SSMC also has a screen that lets the user manage the connections to the array. Users can access this screen from the SSMC **Security** menu under **Connections**.

See the *HPE 3PAR StoreServ Management Console User Guide* for additional information.

## **More information**

Hewlett Packard Enterprise Information Library

# Federation requirements for SSMC

Federation systems and migration sources used with SSMC must meet the following requirements:

- Federation systems require:
  - Two ports configured in peer mode (must be from partner nodes, and do not require identical slot and port numbers). Used exclusively for inter-system communication and data transfer, and cannot be used for host I/O.
  - Ports cabled to the fabric switch and in ready state (requires 3PAR OS 3.2.2 or later).
- Migration sources for a Federation require:
  - Two ports configured in host mode or free (must be from partner nodes and do not require identical slot and port numbers).
  - Ports cabled to the fabric switch and in ready state.



# Security settings for SSMC

SSMC requires specific ports for communication. Hewlett Packard Enterprise also recommends configuring an LDAP server as an authentication method for connecting to a 3PAR StoreServ array.

## Inbound and outbound port settings

To allow inbound communication from a browser, SSMC uses inbound port 8443 (default). You can change this port to another secured port setting without reinstalling SSMC (see [Changing the default SSMC inbound port](#)).

To communicate with an array, SSMC uses outbound port 5783. You cannot change this port.

SSMC also uses port 443 to communicate with [Hewlett Packard Enterprise StoreFront Remote](#) and retrieve version information about SSMC and the HPE 3PAR operating system.

For the most current port information, see the Site Planning Guide for your platform, available from the [HPE Storage Information Library](#).

## LDAP settings

The LDAP server is an authentication method for connecting to the 3PAR StoreServ Storage System array (see, [LDAP Authentication Best Practices](#)). For configuration information, see [Setting up LDAP using the HPE 3PAR CLI](#).

## Changing the default SSMC inbound port

You can change the inbound port between the client browser and the SSMC server without reinstalling SSMC.



### IMPORTANT:

In Windows, if you are using the desktop shortcut to open SSMC, you must also change the port number in the Web Document tab of the **Properties** dialog box. The format is `https://<localhost>:<port number>/`.

## Procedure

1. Shut down the SSMC server:
  - **Windows command:** `sc stop ssmc`
  - **Linux command:** `service ssmc stop`
2. Edit the `jetty-ssl.xml` file:
  - **Windows location:** `C:\Program Files\Hewlett Packard Enterprise Enterprise\SSMC\ssmcbase\etc\jetty-ssl.xml`
  - **Linux location:** `/opt/hpe/ssmc/ssmcbase/etc/jetty-ssl.xml`
3. Locate the following line in the file, and then specify the new port number: `default="port_number"`:
  - **Windows location:** `<Set name="port"><Property default="8443" deprecated="ssl.port" name="jetty.ssl.port"/></Set>`
  - **Linux location:** `<Set name="port"><Property name="jetty.ssl.port" deprecated="ssl.port" default="8443" /></Set>`
4. Save the file, and then restart the service.
  - **Windows command:** `sc start ssmc`
  - **Linux command:** `service ssmc start`

# Setting up LDAP using the HPE 3PAR CLI

Capturing the AD configuration for LDAP provides details and information required to simplify and direct your SSMC experience.

See, [LDAP Authentication Best Practices](#).

## Procedure

1. Set the LDAP service account fields:

```
setauthparam -f ldap-service-account <account_name>
```

```
setauthparam -f ldap-service-account-password <password>
```

2. Set the cert field and object attribute fields:

```
setauthparam -f ldap-2FA-cert-field <value>
```

```
setauthparam -f ldap-2FA-object-attr <value>
```

# Installing SSMC

SSMC is available for various Windows and Linux environments, and includes silent install options for both. SSMC does not support remote installation, installation using a symbolic link, or other installation methods.

---

 **IMPORTANT:**

If you are upgrading from an earlier version of SSMC, the upgrade process overwrites the CA certificate. If you have imported a CA certificate to replace the SSMC self-signed certificate, you must import your CA certificate again (see, [Managing CA-signed certificates for SSMC](#)).

---

**More information**

**Software Depot**

*HPE 3PAR StoreServ Management Console Release Notes*

## Prerequisites

### Procedure

1. Configure security settings (ports and LDAP) (see, [Security settings for SSMC](#)) on the server where you will install SSMC.
2. Make sure all Federated systems and migration sources meet the requirements for Federation (see, [Federation requirements for SSMC](#)).

## Installing SSMC in a Windows environment

---

 **IMPORTANT:**

Hewlett Packard Enterprise does not ship installation CDs with the system. If you selected the LTU (License to Use) as the physical delivery method when ordering your system, use the installation media that shipped at the time of your order. If you selected electronic delivery, see the Hewlett Packard Enterprise e-Software Delivery Confirmation email for detailed instructions.

To install SSMC in a Windows environment:

---

### Procedure

1. Double-click the setup file to start the installation wizard.
  2. If prompted, select your preferred language. Otherwise, read the Introduction screen, and then click **Next**.
  3. Accept the License Agreement, and then click **Next**.
- 

 **TIP:**

If you are reinstalling or upgrading SSMC and you did not remove existing data, the system prompts you to keep or remove this information. Select **Yes** to keep pre-existing data. Select **No** to remove all previous SSMC data.

---

4. Select a destination folder for the installation or accept the default folder (recommended), and then click **Next**.
5. Enter the secure TCP port number that the browser uses to access SSMC, or keep the default port 8443 (recommended), and then click **Next** (see, [Changing the default SSMC inbound port](#)).

The summary screen displays the settings you selected and the amount of disk space required for the installation.

6. To accept these settings and continue with the installation, click **Install**. To change these settings, click **Previous** until you see the screen containing the settings you want to change.

If the system does not meet the minimum installation requirements, the installer displays an error message. For information on error messages, see [Windows installation issues for SSMC](#)

The **Installing...** screen displays the progress of the installation.

When the installation is complete, the system displays the following message:

```
If you are using a firewall to protect this system, please ensure that the
inbound SSMC TCP port 8443 is accessible from an outside system.
```

7. Click **Next** to complete the installation.
8. Click **Done** to exit the installation wizard.

## Using the SSMC silent install option with Windows

You can install silently using either the default settings or using non-default settings.

### Installing SSMC silently using default settings

#### Procedure

1. Open a command prompt window.
2. Run the installer with the `-i silent` option

### Installing SSMC silently using non-default settings

#### Procedure

1. Open a command prompt window.
2. Generate a response file by running the installer with the `-r <response file>` option.
3. Run the installer using the `-i silent -f <response file>` option.

## Installing in a Linux environment

### Prerequisites

Because SSMC requires the use of libraries not found in the headless version of Linux, be sure that you have the headfull version installed for your environment.

### Procedure

1. As superuser, execute the following command to start the installation:

```
sh HPESSMC-<version number>-linux-x86_64.bin.HPb
```

As an alternative, you can change the file permissions and start the installation with the following commands:

```
chmod 775 HPESSMC-<version number>-linux-x86_64.bin.HPb
```

```
./HPESSMC-<version number>-linux-x86_64.bin.HPb
```

2. Enter **Yes** to accept the displayed End User License Agreement (EULA).
3. Enter the secure TCP port number the browser uses to access SSMC, or press the **Enter** key to accept the default port 8443 (recommended).

The summary message displays the settings you selected, plus the amount of disk space required for installation.

If the system does not meet the minimum installation requirements, the installer displays an error message. For information on error messages, see [Linux installation issues for SSMC](#).

## Using the silent install option in Linux

### Procedure

1. Extract the files from the `bin.HPb` package using the Linux command:

```
sh HPESSMC-<version number>-linux-x86_64.bin.HPb --tar xvf
```

This extracts the file `hpessmc-<version number>-x86_64.rpm`

2. Execute the following Linux commands to install the product:

```
chmod 775 hpessmc-<version number>-x86_64.rpm
```

```
rpm -i hpessmc-<version number>-x86_64.rpm
```

If you want to change the default secure port, you must do so manually after the installation.

3. Once installed, enter the Linux command to start the service:

```
service ssmc start
```

# Configuring SSMC

Process overview:

1. [Accessing SSMC](#)
2. [Setting the SSMC Administrator credentials](#)
3. [Adding storage systems to SSMC](#)
4. [Connecting to SSMC managed systems from the Administrator Console](#)

More information

[CA certificates in SSMC](#)

## Accessing SSMC

Use one of the following methods to access SSMC:

- From the system on which it is installed:
  - **Windows:** Double-click the SSMC program icon on your desktop.  
Your browser opens to the following URL:  
`https://<localhost>:<port_number>`
  - **Linux:** Open your browser, and then enter the following location in the address bar using port number 8443, or the secure port number you entered during installation:  
`https://<localhost>:<port_number> .`
- From a remote system:  
To access SSMC from a remote system, open a supported browser and enter `https://<server name or IP>:<port_number> .`



### TIP:

If your browser displays a message indicating a problem with the website security certificate, you can safely continue to the website. To remove the windows message, see [CA certificates in SSMC](#).

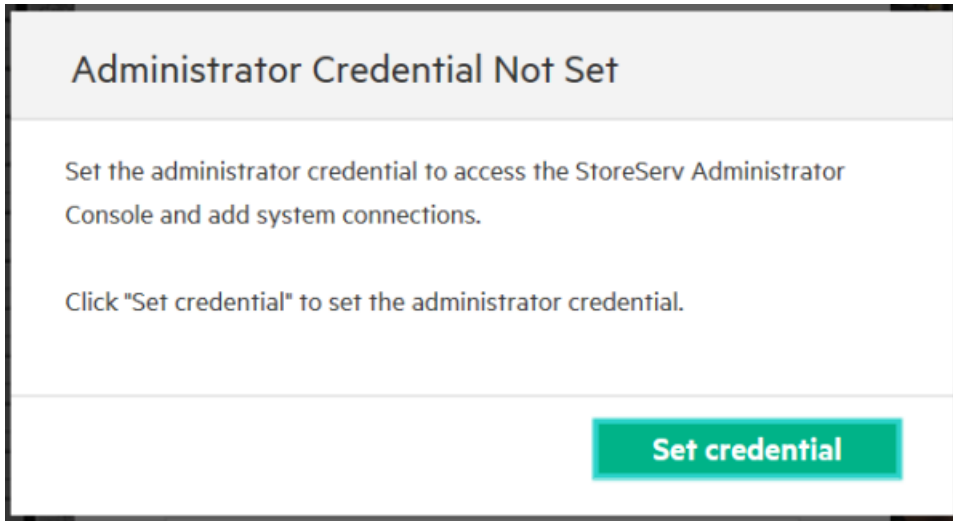
---

## Setting the SSMC Administrator credentials

The first time you open SSMC after installation, the system prompts you to set up the user name and password for the administrator account in SSMC. This account provides access to the SSMC Administrator Console only.

### Procedure

1. Access the newly installed SSMC (see, [Accessing SSMC](#)).
2. At the system prompt, click **Set credential**.



3. In the Set Administrator Credential dialog, enter the user name for the administrator account. User names must be at least two characters long and contain no spaces. You can use any characters, including UTF-8.
- 4.

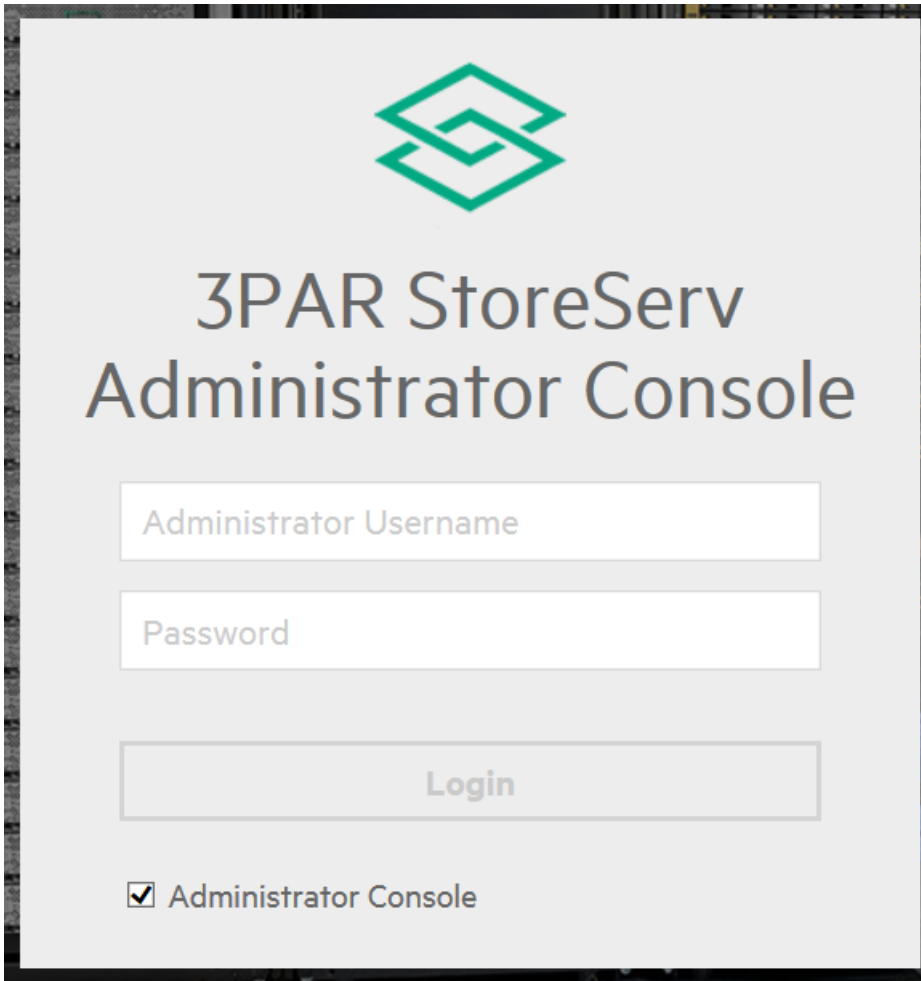
5. Enter the password for the account. Passwords must be 8 to 32 characters and contain at least one uppercase character, one lowercase character, one digit, and one nonalphanumeric character.
6. Enter the password again to confirm.
7. Click **Set**.

After setting the administrator credential, you must log in to the Administrator Console and add a 3PAR StoreServ Storage System before you can continue.

## Logging in to the Administrator Console

### Procedure

1. Access SSMC (see, [Accessing SSMC](#)).
  - a. If this is the first time you have logged in to SSMC, select **Administrator Console** in the dialog box that appears.
  - b. For subsequent log in to the Administrator Console, select the **Administrator Console** check box on the SSMC login screen.
  - c. For subsequent log in to the Main Console, make sure the check box for **Administrator Console** is unchecked.
2. Enter the SSMC administrator user name and password.



3. Click **Login**.

- The Administrator Console displays in a new browser window.
- The first time you attempt to display the Administrator Console, your browser might issue a warning that pop up windows from the host (SSMC server) are not allowed. In most cases, you can click the warning icon to enable pop-up windows.

## Adding storage systems to SSMC

### Procedure

1. From the Administrator Console, select **Actions**, and then click **Add**.
2. In the **Add Storage Systems** dialog box, enter the DNS names or IP addresses of the storage systems to add, separated by commas or spaces (or you can press **Enter** key on the keyboard after each system name or IP address).
  - If you want to add multiple storage systems at the same time, they must have the same credentials.
  - You can add up to 32 3PAR StoreServ Storage System for each SSMC server.
3. Enter the credentials for the storage systems.
4. To connect to the storage systems immediately, select the **Connect to the systems** check box.

If you do not select this check box, you can connect after you add a system by selecting the storage system, and then selecting **Actions—>Connect**.
5. Click **Add**.
6. If the value in State Description indicates that certificate acceptance is required, select that storage system, and then select **Actions—>Accept certificate** (see, ).



For more information, see, [Accepting SSMC CA-signed array certificates](#).

After making the connection to the storage system, the **Connection State** column in the detail panel displays a green icon and the text **Connected**.

7. To add a storage array that uses different login credentials, repeat steps 1 through 6.
8. When you have finished adding storage systems, click **Close** to return to the SSMC login screen.

To manage storage systems that have the same credentials, clear the **Administrator Console** check box on the SSMC login screen, and then enter the credentials for accessing the storage systems.

## Connecting to SSMC managed systems from the Administrator Console

### Procedure

1. Log in to the SSMC Administrator Console on the SSMC server, and then select the storage system to which you want to connect.
2. Select **Actions**—>**Connect**.
3. In the **Connect** dialog, click **Connect**.

After the connection is made to the storage system, the Connection State column displays the text **Connected** and the **State Description** column displays the text **Connection established**.

## SSMC directories for backup

SSMC stores reports and other data in the following directory:

```
C:\Program Files\Hewlett Packard Enterprise\SSMC\ssmcbase\data
```

This directory also maps to the hidden directory:

```
C:\ProgramData\Hewlett Packard Enterprise\SSMC\data
```

Backup one of these directory paths as part of your regular backup schedule. Contact Hewlett Packard Enterprise Support if you need to recover a backup for SSMC.

# HPE 3PAR Excel add-in for System Reporter in SSMC

The 3PAR Excel add-in provides the ability to extract and report data from the HPE 3PAR StoreServ Management Console RESTful API to Microsoft Excel. The add-in extracts data using SSMC. For currently supported versions of Microsoft Excel, see [Accessing SSMC information in SPOCK](#).

## Installing the 3PAR Excel add-in for SSMC

### Prerequisites

Requires Microsoft .Net Framework 4.5 or later.

#### **IMPORTANT:**

If you do not have Microsoft .Net Framework installed on your system, the 3PAR Excel add-in installation installs it for you, and might require a reboot.

After installing the 3PAR Excel add-in, when you open Microsoft Excel the program might perform some internal configuration that requires a reboot.

For more information on installing Microsoft add-in programs, see the [Microsoft Support website](#).

### Procedure

1. Locate the **HPE 3PAR SSMC Excel client installer SW** in [Software Depot](#).

Follow the instructions to copy the installer software to a CD ROM. You can also use any ISO mounter software to install the 3PAR Excel add-in.

2. Save and close any Microsoft Excel windows, and then close the program.
3. On the client system, run `HPESMCSRExcelAddin.exe` and follow the instructions.

The 3PAR Excel add-in installs to the default path `C:\Program Files\Hewlett Packard Enterprise\HPE3PARSRExcelAddin`, or to `C:\Program Files (x86)\Hewlett Packard Enterprise\HPE3PARSRExcelAddin`.

## Using the 3PAR Excel Add-in

1. Launch Microsoft Excel.
2. Select the **System Reporter** tab.
3. Enter the SSMC Server name and port, and then enter the username and password (3PAR StoreServ Storage System credentials).
4. Click **Connect to SSMC**.



#### **TIP:**

When you generate performance data, scroll to the top left of the Excel spreadsheet to view the CSV data.

## Date formats for created reports

The 3PAR Excel add-in uses the following date formats to plot reports:

- HIRES—mm/dd/yyyy hh:mm
- HOURLY—mm/dd/yyyy hh:mm
- DAILY—mm/dd/yyyy

Users can change the date format found in the Time Stamp column using the Format Cells option in Microsoft Excel.

## Uninstalling the 3PAR Excel add-in

1. In Windows, navigate to **Programs and Features**.
2. Select **HPE 3PAR SSMC System Reporter Excel Add-in** from the list of installed programs, and then click **Uninstall**.

## Troubleshooting the 3PAR Excel add-in

### Link to add-in does not appear in Microsoft Excel.

#### Symptom

After installing the 3PAR Excel add-in, the add-in does not appear in Microsoft Excel.

#### Cause

Microsoft Excel settings disable add-ins.

#### Action

#### Procedure

1. If you do not see the 3PAR Excel add-in in the list under ADD-INS in Microsoft Excel, use the following steps to enable the add-in:
  1. Click **File** in Microsoft Excel, and then click **Options**.
  2. Click **Add-Ins**.
  3. Select **Disabled Items** in the Manage box at the bottom of the page, and then click **GO**.
  4. Select **Add-In (SR Excel Addin)**, and then click **Enable**.
  5. Click **OK**, and then close and reopen Excel.

# CA certificates in SSMC

SSMC uses two types of CA certificates. One is a CA-signed browser certificate (see, [Creating an SSMC CA-signed browser certificate for SSMC](#)), which validates a connection between SSMC and the corporate network. By default, SSMC uses a self-signed certificate, which causes security warnings in the browser. Replacing the SSMC self-signed certificate with a CA-signed certificate eliminates the browser warnings.

The other is a CA-signed array certificate (see, [Managing CA-signed array certificates for SSMC](#)), which validates a connection between an SSMC server and a 3PAR array. Each array has its own certificate that must be managed separately. However, if your certificates have a common CA authority chain, you can import the authority chain into SSMC one time for all arrays. For more information about certificate authority chains, see the Oracle website for [keytool](#) or the [openssl](#) website.

Although there are many methods available for managing CA certificates, Hewlett Packard Enterprise addresses only Java `keytool` and `openssl`.



## TIP:

When editing system files, use a text editor such as Notepad or VI. Do not use document editors such as Wordpad or MS Word. The latter can append program-specific information to the file, which can make the file unreadable for its original purpose.

---

## Managing CA-signed certificates for SSMC

### Prerequisites

Before you edit the text files associated with CA certificates, make sure you have reviewed the following best practices and documentation:

- Review [Keytool – Key and certificate management tool](#)
- Review [Jetty how to for configuring SSL](#)
- Review [Jetty how to for secure passwords](#)

### Importing root and intermediate CA certificates into the client web browser

1. In Microsoft Internet Explorer, go to **Tools > Internet Options > Content > Certificates**.
2. Click **Import**, and use the wizard to import the root certificate into the Trusted Root Certification Authority store.
3. Click **Import**, and use the wizard to import the intermediate certificate into the Intermediate Certification Authorities store.

### Creating an SSMC CA-signed browser certificate for SSMC

By default, SSMC uses a self-signed certificate, which causes security warnings in the browser. Replacing the SSMC self-signed certificate with a CA-signed certificate eliminates the browser warnings.

# Creating an SSMC CA-signed browser certificate using Java keytool

## Prerequisites

- The following procedure uses Java **keytool** to manage public and private keys. **keytool** is located in `C:\Program Files\Hewlett Packard Enterprise\SSMC\jre\bin`. Add this directory to the path or prepend the keytool commands used in the procedure with the path.
- Gather the appropriate security information for CA certificates at your site. This includes the fully qualified domain name (FQDN), which is accessible through DNS, your organization name, organization unit, and the City, State, and Country.
- Understand who the certificate authorities are for your organization, and where to send a certificate authority request.
- Download the root and intermediate, PEM encoded CA certificates from your corporate website.
- Import the root and intermediate CA certificates into the client web browser (see, [Importing root and intermediate CA certificates into the client web browser](#)).
- Install SSMC onto a dedicated server (not a laptop) that is connected to your network (see, [Installing SSMC](#)).
- Verify that SSMC connects to the arrays, and that the browser warning displays.

## More information

<http://docs.oracle.com/javase/7/docs/technotes/tools/windows/keytool.html>

## Create a keytool certificate

## Procedure

1. From the system where you installed SSMC, rename the default keystore so you have a backup:

### Windows:

- a. Navigate to `C:\Program Files\Hewlett Packard Enterprise\SSMC\ssmcbase\etc\`.
- b. Rename `keystore.` to `keystore.original`.

### Linux:

```
[root@server2 etc]# pwd
/opt/hpe/ssmc/ssmcbase/etc
[root@server2 etc]# mv keystore keystore.orig
```

2. Use keytool to create a new public/private key pair in a new keystore file:

```
keytool -genkeypair -keystore keystore. -alias jetty -keyalg RSA
```

3. At the prompt, enter the security information you gathered as part of the prerequisites.

Be sure to enter this information correctly for your organization. The output should look similar to the following:

```
CN=<FQDN.com>, OU=<unit_name>, O=<company_name>, L=<city>, ST=<state>,
C=<country>
```

4. At the prompt, verify that you entered the security information correctly. Enter **Yes** to continue or **No** to edit the information provided.
5. Enter a new password, or press the **Enter** key to use the existing keystore password.
6. Generate a certificate signing request (CSR):  

```
keytool -certreq -keystore keystore. -alias jetty -file
<certificate.request.txt>
```
7. Cat out, or use notepad to edit the file you just created:  

```
cat certificate.request.txt
```
8. Copy the contents of the file (include the BEGIN and END lines) to your cut/paste buffer.

The file content should look similar to this:

```
-----BEGIN NEW CERTIFICATE REQUEST-----
MIIDAzCCAesCAQAwgY0xCzAJBgNVBAYTA1VTREwDwYDVQQIEwhDb2xvcmFkbzEZMBCGA1UEBxMQ
Q29sb3JhZG8gU3ByaW5nczEYMBYGA1UEChMPSGV3bGV0dC1QYWNrYXJkMQ0wCwYDVQQLEWRTU01D
MScwJQYDVQQDEs5ib3VsZGl1YjQuYW1lcm1jYXMuHBXy29ycC5uZlZlZG9wZG9wEiMA0GCSqGSIb3DQEBA
. . .

jksX/6ml5BHowjjJuYoNtMcKk0p+wkgMusGTN0oWK3qTzSGBtKiOb+Q0u12fV0hp6wIX3BXub10D
9Rj6irOLSuA7FpB0EJFASXk4uDtZjM7AYhmkidJgPb5OudpnrN5Ftwom7CCKHYia+RITB9NqeYZ9
F9avjhMaJVfUfLP25B4zZPeEjO3XfgFp9SqUyC/WubeuawoWFgyT6rx6ybdyJTKkP0VY3F39Y1MY
P8wAk1Zlhagi84SkC369DN5xE08CkLtSg+4A1/dqARkObZXmc1UIefPX1amdAgMBAAGgMDAuBgkq
hkiG9w0BCQ4xITAFMB0GA1UdDgQWBQSCOpXLIzpy21zVkm1n4/BOShU6TANBgkqhkiG9w0BAQsF
. . .

diE9nfpu2J4z9/8Hi+wK0m6h/ania17hGJ2X+rPaSdoHuDN0YuPKLoGv+lJ/Nen+kLN5dVwydAsf
E84/8X+LZiqlH0dlt2w+7Lo8nRdQOMfgxgds0JLB6HISEfdG19fYGJavmraz+2tkIKjgdgdG3ipq
6ppzN3Cn2lGpAEW74+YnHSTJamrFtB4REt1PO5S0xzhtx5qYTyukzJTMbXm19N7r92htv6hApNP
B0XlyGdnCwsSterAsKYUyxg2kIRSvXPT+SPUIeC/VZHMtw==
-----END NEW CERTIFICATE REQUEST-----
```

- 9. Go to your corporate security site and use the copied file information to request a signed certificate.
- 10. Get the signed certificate from the resulting email or web site. It should look similar to the following

```
-----BEGIN CERTIFICATE-----
MIIGoTCCBymgAwIBAgIQl6hBGubWdXyMFXBoILHAaDANBgkqhkiG9w0BAQUFADCB
nJEPMA0GA1UEChMGaHAuY29tMR0wGAYDVQQLEExFJVCBJmZyYXN0cnVjdHVyZTEl
MAkGA1UEBhmCVVMxIDAeBgNVBAoTF0hld2xldHQtUGFja2FyZCBDb21wYW55MUAw
PgYDVQQDEzdIZXdsZXROLVBhY2thcmQgUHJpdmF0ZSBDbGFzcyAyIENlcnRpZmlj
YXRpb24gQXV0aG9yaXR5MB4XDTE1MDIyODAwMDAwFjQxMDEyODIyNTk1OVow
XTEgMB4GA1UEChQXSXSV3bGV0dC1QYWNrYXJkIENvbnRlbnR1eXN0cnVjdHVyZTEl
cnZlcmluMxJzA1BGNVBA0GA1UdDgQWBQSCOpXLIzpy21zVkm1n4/BOShU6TANBgkqhkiG9w0BAQsF
ASIdDQYJKoZIhvcNAQEBBQADggEPADCCAQoCggEBBAJZDjTcTlCFPnAbKh9GCCNey
sqd0JvPOJgJhVNdXMSWxaAKX3i/X8o6OSxf/qaXkEc7COMm5ig20xwqTsn7CSAy6
wZM3ShYrepNmWYG0qI5v5DS7XZ9U6GnrAhfcFe5uXQPlGPqKs4tK4DsWkHQQkVpJ
eTl4030MzsBiGaSJ0mA9vk652mes3kW3CibSjXqfKJr5EhMH02p5hn0X1q+OExo1
V9R8s/bkHjNk94SM7dd+AWn1KpTIL9a5t65rChYWDJPqvHrJt3I1MqQ/RVjcxXf1i
. . .

b25zaXRlY3J5LnZlcmlzaWduLmNvbS9IZXdsZXROUGFja2FyZENvbXBhbml1UEl1
RzIvTGFOZXN0Q1JMLmNyblIaBuWxkYXA6Ly9sZGFwLmhwLmNvbS9DTj1lZXdsZXRO
LVBhY2thcmQ1MjYXR1JTJwQ2xhc3M1MjYyJTJwQ2VydG1maWNhdGlvbiUy
MEF1dGhvcml0eSxPPUhl2xldHRtUGFja2FyZCUyMENvbXBhbncsQz1VUyxPVT1J
VCUyMEluZnJhc3RydWN0dXJ1LE89aHAuY29tP2N1cnRpZmljYXRlcmlvZmV2b2NhdGlv
bmxc3Q7YmluYXJ5MCA0GA1UdJQEB/wQgMB4GCCsGAQUFBwMBBggrBgEFBQcDAgYI
KwYBBQUHAwQewYDVR0gBHQwYjBwBgorBgEEAQsEAwUBMGIwKQYIKwYBBQUHAQEw
HWh0dHA6Ly9kaWdpdGFsYmFkZUuHAuY29tL2NwMDUGCCsGAQUFBwICMCAkA1Ro
aXMgYXV0aG9yaXR5IGlzIGZvcilBIUCBidXNpbmVzcyBvbmx5LjCB6QYIKwYBBQUH
AQEEgdwwgdkwJgYIKwYBBQUHMAGGGmh0dHA6Ly9ocC1vY3NwLnN5bWF1dG9uY29t
MIGuBggrBgEFBQcwAqSB0TCBnjEPMA0GA1UEChMGaHAuY29tMR0wGAYDVQQLEExFJ
VCBmZyYXN0cnVjdHVyZTElMAkGA1UEBhmCVVMxIDAeBgNVBAoTF0hld2xldHQt
UGFja2FyZCBDb21wYW55MUAwPgYDVQQDEzdIZXdsZXROLVBhY2thcmQgUHJpdmF0
ZSBDbGFzcyAyIENlcnRpZmljYXRpb24gQXV0aG9yaXR5MA0GCSqGSIb3DQEBBQUA
A4IBAQA1PaoebXz9gJ9Q2+LG2upBVR1VrrUgPcbPOVA3Eiv+L1ZH1jTgOSqSvQ2B
yTtq8pKuHr5LMybXpUWgtK1sirIazeka3Do8Nu7pnZH8yTc7x6ECYWAwYGi0Xr2w
o/pJzDWU/UmmUZBZ2TuVNe5oEn6bXoeVC/v3LsHVkmKHWdI039SdRskVhfcRNaL5
. . .

Dm6NmvrhHeR8NSbvpDmD/raoCyzZenD0JtiMnuYMF3Vd7DtwEjSZ27BvQbs8skp+
c6LVqo9nbzpnwrHFQIuk1W2saNxu
-----END CERTIFICATE-----
```

- 11. Place the CA root certificate, the intermediate certificate (if it exists), and the signed machine certificate inside the keystore. Add all certificates to the same keystore in this order:
  - a. The CA root certificate (alias is root and not jetty here):

**Windows:** C:\Program Files\Hewlett Packard Enterprise\SSMC\ssmcbase\etc>"C:\Program Files\Hewlett Packard Enterprise\SSMC\jre\bin\keytool" -import -alias root -keystore keystore. -trustcacerts -file <rootcert.cer>

**Linux:** [root@server2 etc]# /opt/hpe/ssmc/jre/bin/keytool -import -alias root -keystore keystore -trustcacerts -file <RootCA.cer>

```
Enter keystore password:
.
.
.
Trust this certificate? [no]: yes
Certificate was added to keystore
```

**b. Any intermediate certificates (same command as above without -alias):**

**Windows:** C:\Program Files\Hewlett Packard Enterprise\SSMC\ssmcbase\etc>"C:\Program Files\Hewlett Packard Enterprise\SSMC\jre\bin\keytool" -import -keystore keystore. -trustcacerts -file <intcert.cer>

**Linux:** [root@server2 etc]# /opt/hpe/ssmc/jre/bin/keytool -import -keystore keystore -trustcacerts -file <IntermediateCA.cer>

**c. The CA signed certificate (alias is jetty here):**

**Windows:** C:\Program Files\Hewlett Packard Enterprise\SSMC\ssmcbase\etc>"C:\Program Files\Hewlett Packard Enterprise\SSMC\jre\bin\keytool" -import -alias jetty -keystore keystore. -trustcacerts -file <signedbyca.txt>

**Linux:** [root@server2 etc]# /opt/hpe/ssmc/jre/bin/keytool -import -alias jetty -keystore keystore -trustcacerts -file <signedbyca.txt>

All certificates must reside in the same keystore.

**12. Update the jetty-ssl-context.xml file with the passwords used by the new keystore:**

**Windows:** C:\Program Files\Hewlett Packard Enterprise\SSMC\ssmcbase\etc\jetty-ssl-context.xml

**Linux:** /opt/hpe/ssmc/ssmcbase/etc/jetty-ssl-context.xml

- If you changed the default password to the keystore as a whole, modify the **KeyStorePassword** entry.
- If you changed the password to the private key **inside** the keystore, change the **KeyManagerPassword**.
- You can find the jetty-util-<version>.jar file in the following locations:

**Windows:** C:\Program Files\Hewlett Packard Enterprise\SSMC\jetty\lib.

**Linux:** /opt/hpe/ssmc/jetty/lib

**13. The following example displays the file configuration with password instructions See [Jetty HowTo](#) for more details.**

```
<Set name="KeyStorePassword"><Property
name="jetty.sslContext.keyStorePassword"
deprecated="jetty.keystore.password"
default="OBF:1v2jluum1xtv1zej1zer1xtnluvk1v1v"/></Set>
<Set name="KeyStoreType"><Property
name="jetty.sslContext.keyStoreType"
default="JKS"/></Set>
<Set name="KeyStoreProvider"><Property
name="jetty.sslContext.keyStoreProvider"/></Set>
<Set name="KeyManagerPassword"><Property
name="jetty.sslContext.keyManagerPassword"
```

```
deprecated="jetty.keymanagerpassword"  
default="OBF:1v2j1uum1xtv1zej1zer1xtn1uvk1v1"/></Set>
```

14. Restart the 3PAR StoreServ Management Console Server service.
15. Launch a browser using the FQDN, and then verify that the session uses the certificate.

## Creating an SSMC CA-signed browser certificate using a non-keytool method

If your environment uses methods other than keytool, such as openssl, use the following procedure:

1. Generate a private key and public certificate using tools and options appropriate for your security environment. For example:
  - a. `openssl genrsa -out private.key 2048`
  - b. `openssl req -new -sha256 -key private.key -out csr.txt`
  - c. Send `csr.txt` to the CA to have it signed.

The expected result is a file containing the public certificate containing the phrase `-----BEGIN CERTIFICATE-----`. The file contains:

- A private key in a file named something like `private.key`.
  - A public certificate (built using the private key) in a file named something like `public.cer`.
2. Import the `private.key` and `public.cer` files into the keystore as follows:
    - a. Delete the existing SSMC keystore (not used).
    - b. At the prompt, enter each of the following commands:

```
openssl pkcs12 -inkey private.key -in public.cer -export -out  
jetty.pkcs12keytool -list -keystore jetty.pkcs12 -storetype PKCS12
```

Look for an entry with an alias (possibly "1").
    - c. Enter the following command. Use the alias created in the previous step: `keytool -importkeystore -srckeystore jetty.pkcs12 -srcstoretype PKCS12 -destkeystore keystore -destalias jetty -srcalias 1`

## Managing CA-signed array certificates for SSMC

The purpose of this certificate is to prove the identity of the SSMC server to the 3PAR OS. You can create this certificate in any way that satisfies your internal CA requirements, as long as you set the SSL Client purpose flag. For details see, `createcert` in the *HPE 3PAR OS Command Line Interface Reference* available from the [Hewlett Packard Enterprise Storage Information Library](#)

## Installing SSMC CA-signed array certificates

### Procedure

1. Copy the CA certificates (root CA and intermediate CA or CA authority chain) to the following directory on the SSMC server:

**Windows:** `C:\Program Files\Hewlett Packard Enterprise\SSMC\ssmcbase\data\StoreServMC\security`

**Linux:** `/opt/hpe/ssmc/ssmcbase/data/StoreServMC/security`
2. Select the storage system that requires CA certificate installation.
3. Select **Actions**, and then click **Connect**.
4. Select **Actions**, and then click **Accept certificate**.



## Accepting SSMC CA-signed array certificates

The first time you attempt to connect to a storage system that has a CA-signed certificate (or, if the certificate has been changed to CA-signed since the last login), the system requires that you accept the certificate.



### **IMPORTANT:**

Only users with the **Super**, **Browse**, or **Edit** role can accept a certificate.

### Procedure

1. Log in to SSMC as a user with Super, Browse, or Edit roles.
2. Select the storage system that requires certificate acceptance.
3. Select **Actions**—>**Accept certificate**.
4. (Optional) To view certificate details, expand **Certificate details for <system>**.
5. Click **Accept and cache**.

If the certificate is expired, you must renew the certificate to connect to the storage system.

# Using SSMC

## Best practices for SSMC performance

- **Limit bulk operations to 100 objects at a time.**

SSMC allows you to perform some operations on multiple objects at the same time, either by selecting multiple objects from a table, or by choosing them within a dialog. Performing actions on large numbers of objects in parallel requires SSMC to gather more data and issue more commands to the storage arrays, which can lead to timeout errors or disconnect messages.

- **Use Chrome or Firefox for the best performance.**

SSMC supports both Internet Explorer 11 and Microsoft Edge, but users sometimes experience unacceptable performance in larger configurations when using these browsers.

- **Use a mouse instead of the keyboard arrow keys when navigating through a table.**

Each press of an up or down arrow key causes SSMC to select a new item in the table, and then fetch the full set of properties for that item. Pressing an arrow key a number of times in quick succession creates a corresponding number of property requests. On large or heavily loaded configurations, this can lead to timeout errors or UI disconnects.

- **Filter the list of systems to those you are using.**

Use the **System** selector to filter the list of systems to show only the systems you are working with. In large environments this can significantly reduce the object count, which makes SSMC more responsive.

- **Follow the memory and CPU guidelines in the System Requirements section.**

SSMC installs on virtually any supported operating system. However, installing SSMC on an operating system that does not meet the recommendations can result in unacceptable performance or responsiveness.

- **Limit the number of Scheduled Reports to be executed concurrently to 50.**
- **Use filters.**

When creating Volume-related (Exported volume, Virtual volume, or Virtual volume cache) reports, Hewlett Packard Enterprise recommends using filters rather than selecting the **All objects** option.

## Changing the SSMC administrator account password

### Procedure

1. Log in to the Administrator Console.
2. Click the **Session** icon in the main menu.
3. Click **Change credential**.
4. Enter the current password for the displayed name.
5. Enter the new password.
6. Enter the password again to confirm.
7. Click **Change**.

## Logging out of the SSMC Administrator Console

### Procedure

1. Click the **Session** icon in the main menu, and then click **Logout and close**.
2. In the **Logout** confirmation dialog, click **Yes**, or click the **X** in the upper-right corner of the window to return to the login screen.

## Disconnecting SSMC managed systems

Disconnecting a managed system terminates its connection to the network. It does not remove the system from the list of systems managed through SSMC. Disconnecting a system allows you to reestablish a connection later without having to add the system again. For information on removing a managed system, see, [Removing SSMC managed systems](#).

### Procedure

1. To disconnect a managed system:
  1. From the SSMC Administrators console, select the system you want to disconnect.
  2. Select **Actions**, and then click **Disconnect**.
  3. Click **Disconnect** in the Disconnect dialog.
  4. Click **Yes, disconnect** in the Disconnect confirmation dialog box.

After disconnecting the system, the Connection State column displays the text **Not Connected** and the State Description column displays the text **User disconnected**.

## Removing SSMC managed systems

Removing a managed system disconnects and then removes it from the list of systems managed through SSMC. To manage that storage system again, you must add it as described in [Adding storage systems to SSMC](#) on page 24.

To remove a managed system:

### Procedure

1. From the SSMC Administrators Console, select the storage system you want to remove.
2. Select **Actions**, and then click **Remove**.
3. Click **Remove** in the Remove dialog.
4. Click **Yes, remove** in the Remove confirmation dialog.

After removing the storage system, it no longer appears in the list of managed systems.

## Switching from one console to the other

You can switch from the Main console to the Admin console only.

### Procedure

1. **Accessing the Administrator Console from the Main Console**
  1. While logged in to the Main Console, click the **Session** icon in the main menu.
  2. Click **Administrator Console**.
  3. The **Administrator Console** login dialog box is displayed in a new browser window.
  4. To log out and close the window, click **Logout and close**.
  5. When the Logout confirmation appears, click **Yes** or click the **X** in the upper-right corner of the window to return to the login screen.

## Using the SSMC Main console dashboard and tutorials

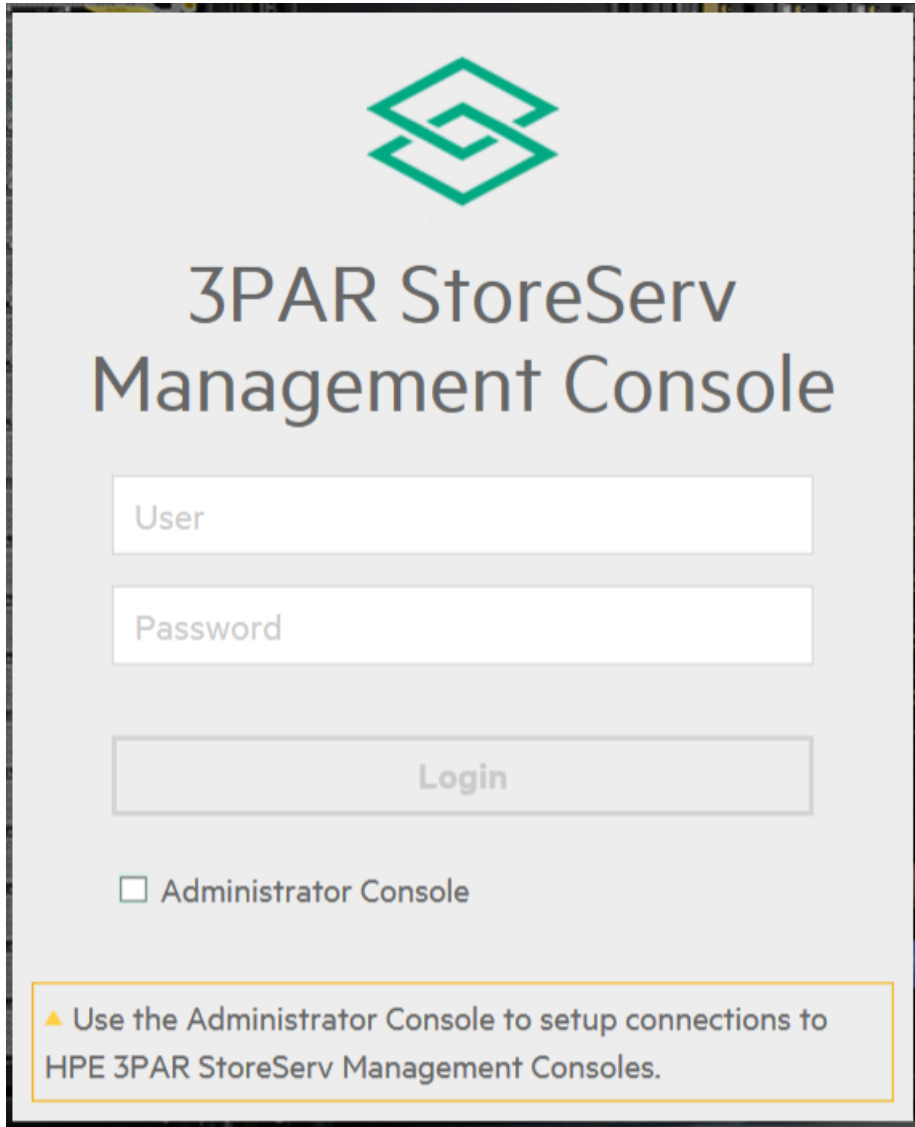
### Procedure

1. Browse to the server that has the SSMC software installed:

```
https://<IP address or FQDN>:<secure_port>
```

The login screen opens.


2. Log in to the management console:
  - a. At the SSMC login screen, enter your 3PAR account user name and password.



**Figure 1: SSMC login screen**

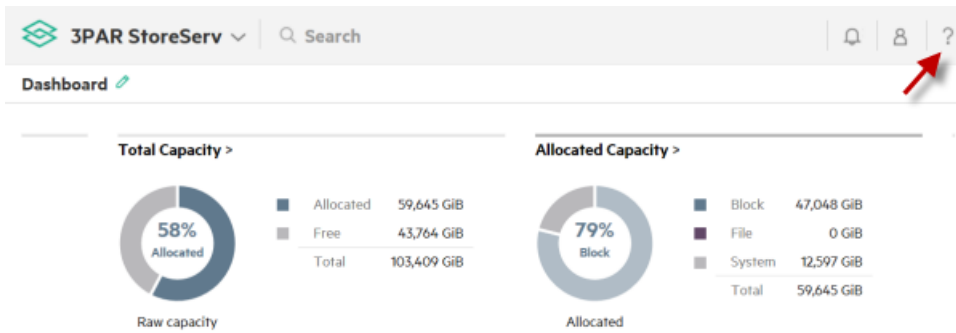
- b. To access the Main console, make sure that the check box next to Administrator Console is **unchecked** (default).
- c. Click **Login**.

---

 **TIP:** If this is your first login to the Main console, a navigation tutorial automatically starts. You can click **Next** to navigate manually through the tutorial, click **Play** to run the tutorial automatically, or click **Close** to view the tutorial at a later time.

---

3. To open the Help window from any location within the management console, click the question mark (?) in the upper right corner of the dashboard window.



**Figure 2: Access help in the management console**

- a. To run the tutorials, click either **Navigation tutorial** or **Provisioning tutorial**.
- b. For context-sensitive help on this or any page, click **Help on this page**.

For more information about the management console and the available help features, see the *HPE 3PAR StoreServ Management Console User Guide*, available from the [HPE Storage Information Library](#).

# Uninstalling SSMC

**IMPORTANT:**

SSMC does not support remote uninstall, or any uninstall methods other than those described in the current *HPE 3PAR StoreServ Management Console Administrator's Guide*.

## Uninstalling SSMC in a Windows 7 or Windows Server 2008 environment

### Procedure

1. Select **Start**, and then click **Control Panel**.
  - If you are viewing by small Icons, click **Programs and Features**.
  - If your view is by category, click **Uninstall a Program** under the Programs group.
2. Right-click **HPE 3PAR StoreServ Management Console Server**, then select **Uninstall/Change**.
  - To keep existing data when uninstalling SSMC, select **Do not remove the data**.
  - To delete all stored data in addition to uninstalling SSMC, select **Remove all the data**. This also removes all reports and associated schedules.

## Uninstalling SSMC in a Windows 8, Windows 10, or Windows Server 2012 or 2016 environment

### Procedure

1. Hover the cursor over the bottom left of the screen to display the **Start Menu**, and then right-click **Start**.
2. Click **Programs and Features**.
3. Right-click **HPE 3PAR StoreServ Management Console Server**, and then select **Uninstall/Change**.
  - To keep existing data when uninstalling SSMC, select **Do not remove the data**.
  - To delete all stored data in addition to uninstalling SSMC, select **Remove all the data**.

## Uninstalling SSMC manually in a Windows environment

If you are unable to uninstall the product using the standard procedure, you can uninstall it using the following commands.

1. At an administrator command prompt (assumes the product was installed using the defaults), enter each of the commands as shown in the following figure:

Use double quotes for paths with spaces in them.

```
sc stop ssmc
sc delete ssmc
del /S /Q /F "C:\Program Files\Hewlett Packard Enterprise\SSMC"
rmdir /S /Q "C:\Program Files\Hewlett Packard Enterprise\SSMC"
del /S /Q /F "C:\ProgramData\Hewlett Packard Enterprise\SSMC"
rmdir /S /Q "C:\ProgramData\Hewlett Packard Enterprise\"
net user hpe3parssmcuser /delete
```

**Figure 3: Manual uninstall for Windows**

2. Remove the SSMC entry from the Zero G Registry.

You can find the Zero G Registry in C:\Program Files\Zero G Registry \.com.zerog.registry.xml. If SSMC is the only InstallAnywhere application installed, you can delete the entire “Zero G Registry” folder.



**TIP:**

If the uninstall entry still exists in the Control Panel Programs and Features applet, you can remove the entry by trying to uninstall the product using the applet. This produces an error similar to the following:

```
An error occurred while trying to uninstall HPE 3PAR StoreServ Management Console Server. It may have already been uninstalled. Would you like to remove HPE 3PAR StoreServ Management Console Server from the Programs and Features list?
```

Click **Yes** to remove the entry.

## Uninstalling SSMC in a Red Hat Enterprise Linux environment

### Procedure

1. Log in as a super user.
2. Run the following script: `/opt/hpe/ssmc/uninstall.sh`

If this does not work, see, [Uninstalling SSMC manually in a Red Hat Enterprise Linux environment](#)

## Uninstalling SSMC manually in a Red Hat Enterprise Linux environment

If you are unable to uninstall the product using the `/opt/hp/ssmc/uninstall.sh` script, execute the following commands manually to remove the product:

```
service ssmc stop
rm -f /etc/rc.d/rc2.d/S20ssmc
rm -f /etc/rc.d/rc1.d/K20ssmc
rm -f /etc/rc.d/rc0.d/K20ssmc
rm -f /etc/rc.d/rc3.d/S20ssmc
rm -f /etc/rc.d/rc5.d/S20ssmc
rm -f /etc/rc.d/init.d/ssmc
rm -f /etc/rc.d/rc6.d/K20ssmc
rm -f /etc/rc.d/rc4.d/S20ssmc
rm -fr /var/opt/hpe/ssmc
rm -fr /opt/hpe/ssmc
userdel hpe3parssmcuser
rm -fr /home/hpe3parssmcuser
rm -fr /var/mail/hpe3parssmcuser
```

# Troubleshooting for SSMC installation and configuration

When you are logged in to SSMC, the Activity pane displays activity for the current session. A green icon preceding an activity indicates that the activity completed successfully. A yellow or red icon preceding an activity indicates an error.

## Windows installation issues for SSMC

### Insufficient Privileges

#### Symptom

Error message

You must have administrator privileges before you can install the product.

#### Action

#### Procedure

- Make sure that a user with the required administrator privileges installs the product.

### Detected Uninstaller Running

#### Symptom

Error message

The installer has detected that the uninstaller is running.

#### Action

#### Procedure

- Finish the uninstall process before attempting to install the product. Rerun the installer when you have completed the uninstall process.

### Detected Multiple Instances of Installer

#### Symptom

Error message:

The installer detected that the 3PAR StoreServ Management Console Server you are trying to install is already installed on the machine.

#### Action

#### Procedure

- Cancel additional instances of the installer.
- If there are no additional instances running, you might need to delete the lock files. For example:  
C:\Users\<ad540182-1f13-11b2-8c51-9c2bf64fc32>-install



```
C:\Users\<<logonUser>\AppData\Local\Temp\  
<ad540182-1f13-11b2-8c51-9c2bf64fc32>-uninstall
```

## Detected 3PAR StoreServ Management Console Server

### Symptom

Error message:

The installer detected that a version of the 3PAR StoreServ Management Console Server is already installed on the machine.

### Action

#### Procedure

- Choose one of the following:
- Click **OK** to remove the installed product before continuing with the installation.
- Click **Cancel** to terminate the current installation.

## Detected 3PAR StoreServ Management Console Server service

### Symptom

Error message

The 3PAR StoreServ Management Console Server service still exists.

### Action

#### Procedure

1. Verify that the previous version of 3PAR StoreServ Management Console Server was uninstalled and that the service was removed.
2. Reboot the system, and then rerun the installer.

If you still receive this error after rebooting, delete the service from the Windows registry by entering the following command in a Command Prompt window:

```
sc delete ssmc
```

## Invalid Secure Port Value

### Symptom

Error message

The secure port number is out of range or is a non-numeric value.

### Action

#### Procedure

- Enter a value between 1024 and 65002.

## Port Is Already in Use

### Symptom

Error message:

The port entered for the secure port is not available.

#### Action

#### Procedure

- Enter an available port number between 1024 and 65002.

## Password contains unacceptable characters

#### Symptom

Error message

Provided password contains unacceptable characters.

#### Action

#### Procedure

- Provide a password that does not contain the following characters: spaces, percent (%), dollar (\$), double quote ("), or caret (^).

## Unable to create hpe3parssmcuser

#### Symptom

Error message

There was an error trying to add the user hpe3parssmcuser .

#### Action

#### Procedure

- Depends on the error. See your administrator for more information.

## Not running 64-bit OS

#### Symptom

Error message

The software detected a non 64-bit operating system.

#### Action

#### Procedure

- Occurs only when attempting to install on a 32-bit machine. Install on a supported 64-bit operating system (see, [System requirements](#)).

## Recommended Operating System Not Met

#### Symptom

Error message

The software detected a nonsupported operating system.

## Action

### Procedure

- You can attempt to continue with the installation (not recommended), or install on a system that supports the minimum requirements (see, [System requirements](#)).

## Recommended Minimum Processors Requirement Not Met

### Symptom

Error message:

Detected fewer than the minimum number of processors required for installation.

## Action

### Procedure

- You can attempt to continue with the installation (not recommended), or install on a system that supports the minimum requirements (see, [System requirements](#)).

## Recommended Operating System Not Met

### Symptom

Error message

The software detected a nonsupported operating system.

## Action

### Procedure

- You can attempt to continue with the installation (not recommended), or install on a system that supports the minimum requirements (see, [System requirements](#)).

## Recommended Minimum Free Disk Space Requirement Not Met

### Symptom

Error message:

The amount of free space detected was less than the recommended amount.

## Action

### Procedure

- You can attempt to continue with the installation (not recommended), or install on a system that supports the minimum requirements (see, [System requirements](#)).

## Service Not in Running State

### Symptom

Error message:

The 3PAR StoreServ Management Console Server failed to start.

## Action

## Procedure

- Try starting the service manually from a Command Prompt window using the following command:  

```
sc start ssmc
```

## Detected Installer Running

### Symptom

Error message:

When trying to uninstall the product, the uninstaller detected that the installer is running.

## Action

## Procedure

- Finish or stop the installation, and then rerun the uninstaller.

## Linux installation issues for SSMC

### rmdir: failed to remove '/opt/hpe': Not a directory

### Symptom

Error message

Attempt to remove SSMC from symbolic link.

## Action

## Procedure

- You can continue to remove SSMC (not recommended) or install SSMC on a supported location.<

### Port xxxxx is not valid

### Symptom

Error message

You must have a valid port number to install the product.

## Action

## Procedure

- Set the secure port number to a value between 1024 and 65002.

## Detected Installer Running

### Symptom

Error message:

When trying to uninstall the product, the uninstaller detected that the installer is running.

## Action

## Procedure

- Finish or stop the installation, and then rerun the uninstaller.

## Port xxxxx is not available

### Symptom

Error message

The port you selected is not available for the secure port.

## Action

## Procedure

- Set the secure port number to an available port with a value between 1024 and 65002.

## Detected a non 64-bit operating system

### Symptom

Error message

A non 64-bit operating system was detected.

## Action

## Procedure

- Occurs only when attempting to install on a 32-bit machine. Install on a supported 64-bit operating system (see, [System requirements](#)).

## Your current operating system is xxxxx which is NOT supported

### Symptom

Error message:

A nonsupported operating system was detected.

## Action

## Procedure

- You can attempt to continue with the installation (not recommended) or install on a system that meets the requirements (see, [System requirements](#)).

## Did not meet the minimum requirement of two processors

### Symptom

Error message

Detected fewer than the minimum number of processors required for installation.

## Action

## Procedure

- You can attempt to continue with the installation (not recommended) or install on a system that meets the requirements (see, [System requirements](#)).

## Minimum RAM requirement of 4194304 KB is NOT met

### Symptom

Error message

Less than the minimum required RAM was detected.

## Action

## Procedure

- You can attempt to continue with the installation (not recommended) or install on a system that meets the requirements (see, [System requirements](#)).

## Minimum free disk space requirement of 2097152 KB is NOT met

### Symptom

Error message

The amount of free space detected was less than the recommended amount.

## Action

## Procedure

- You can attempt to continue with the installation (not recommended) or install on a system that meets the requirements (see, [System requirements](#)).

## Unable to connect to secure port xxxxx

### Symptom

Error message:

A connection could not be made to the secure port.

## Action

## Procedure

- Check log files for troubleshooting information.

## Configuration issues for SSMC

### Invalid certificate error on iPad when logging into SSMC using Google Chrome

### Symptom

Unable to log into SSMC from iPad using Google Chrome

**Cause**

The connection error `NET:ERR_CERT_INVALID` indicates that there is no trusted certificate installed.

**Action****Procedure**

- Install a trusted certificate on the SSMC server.
- See, *HPE 3PAR StoreServ Management Console Administrator's Guide*.

**No data available in table****Symptom**

File Persona – Node Pairs error message.

**Cause**

No nodes appear for selection.

**Action****Procedure**

- To make sure that the system has a File Persona license and nodes that support File Persona, run the 3PAR CLI commands `showlicense`, `showport`, and `showfs`.
- If the system has a File Persona license and supporting nodes, check the system status to see if the system is in a degraded state that could affect the nodes.

**SSMC UI will not load using Microsoft Internet Explorer****Symptom**

SSMC UI doesn't load from the browser and is non-responsive.

**Cause**

Microsoft Internet Explorer prevents SSMC from loading when SSMC requires a self signed certificate.

**Action****Procedure**

- Set the SSMC host as a trusted host in Windows Remote Manager to allow connectivity.
- See, [Microsoft Windows 7 help page](#).

**System <name> does not have enough available ports.****Symptom**

Federation error message. Cannot add the system to the Federation

**Cause**

There are not enough available ports to complete this action.

## Action

### Procedure

- Take the desired ports offline to make them ports available for Federation.

## SSMC log files

SSMC has four logging levels, in increasing levels of severity.

- INFO** Designates informational messages that show the progress of a request at a high level.
- WARN** Designates potentially harmful situations, or errors that the server was able to handle.
- ERROR** Designates errors that should not occur per the design of the system, but would allow the server to continue operating.
- FATAL** Designates severe errors that would prevent the server from starting successfully, or would cause the server to crash if already running.

A list of log files and their default locations follows.



Log file name	Directory location	Contents
audit.log	<p><b>Windows logical location:</b>C:\Program Files\Hewlett Packard Enterprise\SSMC\ssmcbase\data\logs</p> <p><b>Windows physical location:</b>C:\ProgramData\Hewlett Packard Enterprise\SSMC\data\logs</p> <p><b>Linux logical location:</b>/opt/hpe/ssmc/ssmcbase/data/logs</p> <p><b>Linux physical location:</b>/var/opt/hpe/ssmc/data/logs</p>	<p>Helps the Security Administrator audit the storage environment, and monitor and enforce security policy. Retention/rollover policy: 10 files of 1 Mb each.audit.log contains the following columns:</p> <p>timestamp — time/date for entry</p> <p>clientIP — IP address of client that made the request</p> <p>systemName — IP address/serial number of related array</p> <p>user — name of user making request</p> <p>userSession — Identifier of user's session</p> <p>action — CREATE/DELETE/UPDATE/READ/STARTUP/SHUTDOWN/ARRAY_ACTION/LOGIN/UNKNOWN</p> <p>actionName — descriptive name of action performed</p> <p>result — SUCCESS/FAILURE/SOME_FAILURES/CANCELLED/KILLED/INFO/OPERATION/FORBIDDEN/UNAUTHORIZED/TASK CREATED/UNKNOWN</p> <p>severity — INFO/WARNING/CRITICAL/UNKNOWN</p> <p>objectType — type of object affected by change</p> <p>objectName — name of object</p> <p>msg — entry detail</p>
fatal.log		<p>Lists errors that prevent the server from starting correctly, and errors that cause an unexpected shutdown of the server. Retention/rollover policy: Two files of 1 Mb each.</p>
HPE_3PAR_StoreServ _Management_Console _Server_Install_ MM_DD_YYYY_ hh_mm_ss.log	C:\Program Files\Hewlett Packard Enterprise\SSMC\installLogs	<p>Summary of installation operations.</p> <ul style="list-style-type: none"> <li>• MM is month</li> <li>• DD is day</li> <li>• YYYY is year</li> <li>• hh is hour</li> <li>• mm is minute</li> <li>• ss is second</li> </ul>

Table Continued

Log file name	Directory location	Contents
hpessmcInstall.log	/var/log	Linux cumulative install and uninstall logs.
metrics.log	<p><b>Windows logical location:</b>C:\Program Files\Hewlett Packard Enterprise\SSMC\ssmcbase\data\logs</p> <p><b>Windows physical location:</b>C:\ProgramData\Hewlett Packard Enterprise\SSMC\data\logs</p>	Shows the number of objects in the SSMC cache. Use the Metrics Cache stats output to calculate the total number of objects managed by SSMC. Includes three log files named metrics.log.<1-3>), each one is 10MB.
rest_history.log	<p><b>Linux logical location:</b>/opt/hpe/ssmc/ssmcbase/data/logs</p> <p><b>Linux physical location:</b>/var/opt/hpe/ssmc/data/logs</p>	Audit entries for GET, POST, PUT, and DELETE requests. Intended for internal development and troubleshooting.
ssmc.log	<p><b>Linux logical location:</b>/var/opt/hpe/ssmc/data/logs</p>	<p>Helps the Application Administrator gauge the health of the product and troubleshoot customer issues along with field support.</p> <p>Retention/rollover policy: Two files of 100 Mb each.</p>
tclapi.audit	<p><b>Windows logical location:</b>C:\Program Files\Hewlett Packard Enterprise\SSMC\ssmcbase\data\logs</p> <p><b>Windows physical location:</b>C:\ProgramData\Hewlett Packard Enterprise\SSMC\data\logs</p> <p><b>Linux logical location:</b>/opt/hpe/ssmc/ssmcbase/data/logs</p> <p><b>Linux physical location:</b>/var/opt/hpe/ssmc/data/logs</p>	<p>Audit entries for commands sent to each connected 3PAR StoreServ Storage System array. tclapi.audit records object create/delete/modify commands we send to the array, including:</p> <ul style="list-style-type: none"> <li>timeFinished — time the command processing completed</li> <li>systemIp — Array IP address</li> <li>systemSerial — Array serial number</li> <li>socketId — socket id consisting of "{internal id}:{array connection id}"</li> <li>user — name of the user making the array request</li> <li>timeout — socket read timeout value in milliseconds</li> <li>responseTime — amount of time it took array to start returning data</li> <li>totalTime — total amount of time to send/receive/process data</li> <li>size — number of characters in response from array</li> <li>status — SUCCESS/FAIL</li> <li>auditValue — detail for command</li> </ul>

*Table Continued*

Log file name	Directory location	Contents
HPE_3PAR_StoreServ _ Management_Console _ Server_Uninstall_ MM_DD_YYYY_ hh_mm_ss.log	C:\Program Files\Hewlett Packard Enterprise\SSMC\ installLogs	Actions performed during the uninstall process. <ul style="list-style-type: none"> <li>• MM is month</li> <li>• DD is day</li> <li>• YYYY is year</li> <li>• hh is hour</li> <li>• mm is minute</li> <li>• ss is second</li> </ul>
wrapper.log	<b>Windows logical location:</b> C: \Program Files\Hewlett Packard Enterprise\SSMC\ ssmcbase\data\logs  <b>Windows physical location:</b> C: \ProgramData\Hewlett Packard Enterprise\ SSMC\data\logs  <b>Linux logical location:</b> /opt/hpe/ ssmc/ssmcbase/data/logs  <b>Linux physical            location:</b> /var/opt/hpe/ssmc/ data/logs	This file contains all the logging information from the YAJSW (Yet Another Java Service Wrapper), and all the console output from the SSMC product. This file might not mirror all the content of <code>ssmc.log</code> . If SSMC output goes to the log file only, then the wrapper.log does not contain the data. Wrapper information includes the YAJSW version, OS type, JVM version, working directory, service start info, the PID of the started application, and so on. The console output of the application contains the PID instant of "wrapper" in the output line in the second field.
archive.log		

# Glossary

<b>AFC</b>	Adaptive Flash Cache
<b>AO</b>	Adaptive Optimization
<b>CA</b>	Certificate Authority
<b>CLI</b>	Command Line Interface
<b>CPG</b>	Common Provisioning Group
<b>DAR</b>	Data At Rest
<b>DIT</b>	Directory Information Tree
<b>DN</b>	Distinguished Name
<b>DO</b>	Dynamic Optimization
<b>FIPS</b>	Federal Information Processing Standards
<b>FPG</b>	File Provisioning Group
<b>LDAP</b>	Lightweight Directory Access Protocol
<b>MC</b>	HPE 3PAR Management Console
<b>QoS</b>	Quality of Service
<b>RC</b>	Remote Copy
<b>SLD</b>	Synchronous Long Distance
<b>SSMC</b>	HPE 3PAR StoreServ Management Console

# Open source code

The following table lists open source code tools and license information. For the latest and most up to date listing, see [thirdPartyManifest.pdf](#), located in the Licenses directory on the SSMC DVD ISO image.

Tool name	Version	License URL or location
<a href="#">activation by javax.activation</a>	1.1.1	<a href="#">CDDL</a>
<a href="#">Apache James Mime4j</a>	0.6	<a href="#">Apache 2.0</a>
<a href="#">Apache Lucene</a>	4.10.4	<a href="#">Apache 2.0</a>
<a href="#">Avalon Framework</a>	4.2.0	<a href="#">Apache 2.0</a>
<a href="#">awaitility</a>	2.0.0	<a href="#">Apache 2.0</a>
<a href="#">Barcode4j</a>	2.0	<a href="#">Apache 2.0</a>
<a href="#">Bouncy Castle</a>	1.52	<a href="#">Bouncy Castle MIT</a>
<a href="#">castor by org.codehaus.castor</a>	1.2	<a href="#">Apache 2.0</a>
<a href="#">cglib</a>	3.1	<a href="#">Apache 2.0</a>
<a href="#">ColReorderWithResize</a>	1.1.0-dev2	<a href="#">BSD-3-Clause</a>
<a href="#">commons-beanutils</a>	1.9.2	<a href="#">Apache 2.0</a>
<a href="#">commons-cli-1.2.jar</a>	1.2	<a href="#">Apache 2.0</a>
<a href="#">commons-codec-1.9.jar (master: commons-codec-1.6.jar)</a>	1.9	<a href="#">Apache 2.0</a>
<a href="#">commons-collections</a>	3.2.2	<a href="#">Apache 2.0</a>
<a href="#">commons-digester</a>	2.1	<a href="#">Apache 2.0</a>
<a href="#">commons-io</a>	2.1	<a href="#">Apache 2.0</a>
<a href="#">commons-lang</a>	2.6	<a href="#">Apache 2.0</a>
<a href="#">commons-lang3</a>	3.4	<a href="#">Apache 2.0</a>
<a href="#">commons-logging</a>	1.1.3	<a href="#">Apache 2.0</a>
<a href="#">commons-net</a>	3.5	<a href="#">Apache 2.0</a>
<a href="#">commons-pool</a>	2.4.2	<a href="#">Apache 2.0</a>
<a href="#">commons-vfs2</a>	2.0	<a href="#">Apache 2.0</a>

*Table Continued*

Tool name	Version	License URL or location
<a href="#"><u>commons-xml-apis</u></a>	1.4.01	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>Dom4J</u></a>	1.6.1	<a href="#"><u>BSD-3-Clause</u></a>
<a href="#"><u>Dynamic Reports</u></a>	4.0.0	<a href="#"><u>LGPL v3</u></a>
<a href="#"><u>ecj by org.eclipse.jdt.core.compiler</u></a>	4.3.1	<a href="#"><u>EPL 1.0</u></a>
ECMA262-5.js	Public Domain	NA
<a href="#"><u>ElasticSearch Server</u></a>	1.7.4	<a href="#"><u>Apache 2.0</u></a>
excanvas.js	None/r3	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>ExpiringMap (JHalterman)</u></a>	0.5.7	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>FastInfoset by com.sun.xml.fastinfoset</u></a>	1.2.7	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>gentlyWEB</u></a>	1.1	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>Globalize</u></a>	0.1.1	<a href="#"><u>MITJquery Globalize License</u></a>
<a href="#"><u>gson-2.3.1.jar</u></a>	2.3.1	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>Guava</u></a>	19.0	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>html5.js</u></a>	2.1pre	<a href="#"><u>MIT</u></a>
<a href="#"><u>httpClient by org.apache.httpcomponents</u></a>	4.3.6	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>httpcore by org.apache.httpcomponents</u></a>	4.3.3	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>ICU4j</u></a>	2.6.1	<a href="#"><u>ICU License</u></a>
<a href="#"><u>istack-commons-runtime by com.sun.istack</u></a>	2.1.6	<a href="#"><u>CDDL 1.0</u></a>
<a href="#"><u>itextpdf by com.itextpdf</u></a>	5.5.0	<a href="#"><u>LGPL 2.1</u></a>
<a href="#"><u>Jackson</u></a>	1.9.13	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>jackson-annotations by com.fasterxml.jackson.core</u></a>	2.8.0	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>jackson-core by com.fasterxml.jackson.core</u></a>	2.8.4	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>jackson-core-asl by org.codehaus.jackson</u></a>	1.9.13	<a href="#"><u>Apache 2.0</u></a>

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Tool name	Version	License URL or location
<a href="#"><u>jackson-databind by com.fasterxml.jackson.core</u></a>	2.8.4	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>jackson-datatype-guava by com.fasterxml.jackson.datatype</u></a>	2.8.4	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>jackson-jaxrs by org.codehaus.jackson</u></a>	1.9.12	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>jackson-mapper-asl by org.codehaus.jackson</u></a>	1.9.13	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>jackson-xc by org.codehaus.jackson</u></a>	1.9.12	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>jasperreports by net.sf.jasperreports</u></a>	6.0.0	<a href="#"><u>LGPL 2.1</u></a>
<a href="#"><u>Java Hamcrest</u></a>	1.3	<a href="#"><u>BSD-3-Clause</u></a>
<a href="#"><u>Javassist</u></a>	3.18.2-GA	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>javax.mail by com.sun.mail</u></a>	1.5.5	<a href="#"><u>CDDL 1.0</u></a>
<a href="#"><u>jaxb-api by javax.xml.bind</u></a>	2.2.7	<a href="#"><u>CDDL 1.0</u></a>
<a href="#"><u>jaxb-core by com.sun.xml.bind</u></a>	2.2.7	<a href="#"><u>CDDL 1.0</u></a>
<a href="#"><u>jaxb-impl by com.sun.xml.bind</u></a>	2.2.7	<a href="#"><u>CDDL 1.0</u></a>
<a href="#"><u>Jaxen</u></a>	1.1-beta6	<a href="#"><u>The Werken Company License</u></a> <a href="#"><u>BSD 3-Clause</u></a>
<a href="#"><u>jboss-annotations-api_1.2_spec by org.jboss.spec.javax.annotation</u></a>	1.0.0 Final	<a href="#"><u>CDDL 1.0</u></a>
<a href="#"><u>jboss-jaxrs-api_2.0_spec by org.jboss.spec.javax.ws.rs</u></a>	1.0.0 Final	<a href="#"><u>CDDL 1.0</u></a>
<a href="#"><u>jboss-logging by org.jboss.logging</u></a>	3.1.4 GA	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>jcip-annotations by net.jcip</u></a>	1	<a href="#"><u>CCA 2.5</u></a>
<a href="#"><u>jcommon by jfree</u></a>	1.0.15	<a href="#"><u>LGPL 2.1</u></a>
<a href="#"><u>Jcraft Jsch</u></a>	0.1.53	<a href="#"><u>BSD-3-Clause</u></a>
<a href="#"><u>Jetty</u></a>	9.3.12.v20160915	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>Jfreechart</u></a>	1.0.13	<a href="#"><u>LGPL v2.1</u></a>
<a href="#"><u>Joda Time</u></a>	2.2	<a href="#"><u>Apache 2.0</u></a>

Table Continued

Tool name	Version	License URL or location
<a href="#"><u>josql</u></a>	2.2.0	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>jquery</u></a>	1.8.3	<a href="#"><u>MIT</u></a>
<a href="#"><u>jquery.ba-hashchange.js</u></a>	1.3	<a href="#"><u>MIT</u></a>
<a href="#"><u>jquery.browser.js</u></a>	2.3	<a href="#"><u>MIT</u></a>
<a href="#"><u>jquery.columnizer.js</u></a>	1.6.0	<a href="#"><u>Creative Commons Attribution 3.0</u></a>
<a href="#"><u>jquery.cookie.js</u></a>	1.3.1	<a href="#"><u>MIT</u></a>
<a href="#"><u>jquery.dataTables.js</u></a>	1.9.4	<a href="#"><u>MIT</u></a>
<a href="#"><u>jquery.dataTables.rowReordering.js</u></a>	1.0.0	<a href="#"><u>MIT</u></a>
<a href="#"><u>jquery.dateFormat.js</u></a>	1.0 (June 15, 2011)	<a href="#"><u>MIT</u></a>
<a href="#"><u>jquery.flot.categories.js</u></a>	None/1	<a href="#"><u>MIT</u></a>
<a href="#"><u>jquery.flot.fillbetween.js</u></a>	None/0.8	<a href="#"><u>MIT</u></a>
<a href="#"><u>jquery.flot.js</u></a>	0.8.0	<a href="#"><u>MIT</u></a>
<a href="#"><u>jquery.flot.pie.js</u></a>	None/0.7	<a href="#"><u>MIT</u></a>
<a href="#"><u>jquery.flot.selection.js</u></a>	None/0.7	<a href="#"><u>MIT</u></a>
<a href="#"><u>jquery.flot.time.js</u></a>	None/0.7	<a href="#"><u>MIT</u></a>
<a href="#"><u>jquery.js</u></a>	1.8.3	<a href="#"><u>MIT</u></a>
<a href="#"><u>jquery.knob.js</u></a>	1.2.0	<a href="#"><u>MIT</u></a>
<a href="#"><u>jquery.mask.js</u></a>	1.6.5	<a href="#"><u>MIT</u></a>
<a href="#"><u>jquery.maskedinput-1.3.js</u></a>	1.3	<a href="#"><u>MIT</u></a>
<a href="#"><u>jquery.selectBox.js</u></a>	1.0.7	<a href="#"><u>MIT</u></a>
<a href="#"><u>jquery.sparkline.js</u></a>	2.1	<a href="#"><u>BSD-3-Clause</u></a>
<a href="#"><u>jquery.ThreeDots.js</u></a>	1.0.10	<a href="#"><u>MIT</u></a>
<a href="#"><u>jquery.timeago.js</u></a>	1.4.1	<a href="#"><u>MIT</u></a>
<a href="#"><u>jquery-ui.js</u></a>	1.9.2	<a href="#"><u>MIT</u></a>
<a href="#"><u>jquery-ui-sliderAccess.js</u></a>	0.3	<a href="#"><u>MIT</u></a>

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Tool name	Version	License URL or location
<a href="#"><u>jquery-ui-timepicker-addon.js</u></a>	1.1.2	<a href="#"><u>MIT</u></a>
<a href="#"><u>jquery.validate.js</u></a>	1.10.0	<a href="#"><u>MIT</u></a>
<a href="#"><u>JSON</u></a>	20080701	<a href="#"><u>JSON License</u></a>
<a href="#"><u>Json.NET 6.0 Release 8</u></a>	6.0, Rel 8	<a href="#"><u>Codeplex MITOpenSource MIT</u></a>
<a href="#"><u>json2.js</u></a>	none/40597	NA
<a href="#"><u>JSON-path</u></a>	0.8.0	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>json-smart by net.minidev</u></a>	1.1	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>JSR305</u></a>	2.0.3	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>JUnit</u></a>	4.12	<a href="#"><u>Eclipse Public License v1.0</u></a>
<a href="#"><u>krukow/clj-ds</u></a>	0.0.4	<a href="#"><u>Eclipse Public License v1.0</u></a>
<a href="#"><u>Log4J</u></a>	1.2.17	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>Lucerne</u></a>	4.6.1	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>Makeself</u></a>	2.1.5	<a href="#"><u>GNU GPL v2.txt</u></a>
<a href="#"><u>MapDB</u></a>	1.0.9	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>maven-scm-api by org.apache.maven.scm</u></a>	1.4	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>maven-scm-provider-svn-commons by org.apache.maven.scm</u></a>	1.4	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>maven-scm-provider-svnexe by org.apache.maven.scm</u></a>	1.4	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>modernizr.js</u></a>	2.6.2	<a href="#"><u>MIT</u></a>
<a href="#"><u>objenesis by org.objenesis</u></a>	2.1	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>OpenCSV</u></a>	2.3	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>plexus-utils by org.codehaus.plexus</u></a>	1.5.6	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>Reflections</u></a>	0.9.9-RC1	Public Domain
<a href="#"><u>regexp by regexp</u></a>	1.3	<a href="#"><u>Apache 2.0</u></a>
<a href="#"><u>require.js</u></a>	2.1.4	<a href="#"><u>MIT</u></a>

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<b>Tool name</b>	<b>Version</b>	<b>License URL or location</b>
<b><u>RESTeasy</u></b>	3.0.19.Final	<b><u>Apache 2.0</u></b>
<b><u>sblim-cim-client</u></b>	2.2.5	<b><u>Eclipse Public License v1.0</u></b>
<b><u>shBrushCss.js</u></b>	None/3.0.83	<b><u>MIT</u></b>
<b><u>shBrushJScript.js</u></b>	None/3.0.83	<b><u>MIT</u></b>
<b><u>shBrushPlain.js</u></b>	3.0.83	<b><u>MIT</u></b>
<b><u>shBrushXml.js</u></b>	None/3.0.83	<b><u>MIT</u></b>
<b><u>shCore.js</u></b>	None/3.0.83	<b><u>MIT</u></b>
<b><u>SLF4J</u></b>	1.7.10	<b><u>MITSLF4J</u></b>
<b><u>snakeyaml by org.yaml</u></b>	1.12	<b><u>Apache 2.0</u></b>
<b><u>spatial4j by com.spatial4j</u></b>	0.4.1	<b><u>Apache 2.0</u></b>
<b><u>text.js</u></b>	2.0.4	<b><u>MIT</u></b>
<b><u>Touch Punch</u></b>	0.2.3	<b><u>MIT</u></b>
<b><u>Trove4J</u></b>	3.0.3	<b><u>MIT</u></b> <b><u>LGPL v2.1</u></b>
<b><u>use.js</u></b>	0.3.0	<b><u>MIT</u></b>
<b><u>xml-apis-1.4.01.jar</u></b>	1.4.01	<b><u>Apache 2.0</u></b>
<b><u>xregexp.js</u></b>	1.5.1	<b><u>MIT</u></b>
<b><u>Yet Another Java Service Wrapper (YAJSW)</u></b>	11.11	<b><u>LGPL v2.1</u></b>
<b><u>YourKit (yjpagent.dll)</u></b>		<b><u><a href="https://www.yourkit.com/purchase/license.html">https://www.yourkit.com/purchase/license.html</a></u></b>
<b><u>Zulu: Multi-platform Certified OpenJDK</u></b>	1.8.0_45	<b><u>GPL v2</u></b>