



# Hitachi Infrastructure Director

## Getting Started Guide

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# Preface

Hitachi Infrastructure Director is an infrastructure management solution that unifies storage management solutions such as storage provisioning, data protection, and storage management; simplifies the management of large scale data centers by providing smarter software services; and is extensible to provide better programmability and better control.

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## Intended Audience

This document is intended for system administrators, Hitachi Data Systems representatives, and authorized service providers who configure and operate the Hitachi Virtual Storage Platform G200, G400, G600 storage systems with Hitachi Infrastructure Director.

Readers of this document should be familiar with the following:

- RAID storage systems and their basic functions.
- Volume creation and management.
- Pool creation and management.
- Parity group creation and management.

## Product version

This document revision applies to Hitachi Infrastructure Director version 1.0.0 or later.





## Document conventions

This document uses the following typographic conventions:

Convention	Description
<b>Bold</b>	Indicates text on a window, other than the window title, including menus, menu options, buttons, fields, and labels. Example: Click <b>OK</b> .
<i>Italic</i>	Indicates a variable, which is a placeholder for actual text provided by the user or system. Example: <i>copy source-file target-file</i> <b>Note:</b> Angled brackets (< >) are also used to indicate variables.
Monospace	Indicates text that is displayed on screen or entered by the user. Example: <code>pairdisplay -g oradb</code>
< > angled brackets	Indicates a variable, which is a placeholder for actual text provided by the user or system. Example: <code>pairdisplay -g &lt;group&gt;</code> <b>Note:</b> Italic font is also used to indicate variables.
[ ] square brackets	Indicates optional values. Example: [ a   b ] indicates that you can choose a, b, or nothing.
{ } braces	Indicates required or expected values. Example: { a   b } indicates that you must choose either a or b.
vertical bar	Indicates that you have a choice between two or more options or arguments. Examples: [ a   b ] indicates that you can choose a, b, or nothing. { a   b } indicates that you must choose either a or b.



This document uses the following icons to draw attention to information:

Icon	Label	Description
	Note	Calls attention to important or additional information.
	Tip	Provides helpful information, guidelines, or suggestions for performing tasks more effectively.
	Caution	Warns the user of adverse conditions or consequences (for example, disruptive operations).
	WARNING	Warns the user of severe conditions or consequences (for example, destructive operations).

## Conventions for storage capacity values

Physical storage capacity values (for example, disk drive capacity) are calculated based on the following values:

Physical capacity unit	Value
1 kilobyte (KB)	1,000 ( $10^3$ ) bytes
1 megabyte (MB)	1,000 KB or $1,000^2$ bytes
1 gigabyte (GB)	1,000 MB or $1,000^3$ bytes
1 terabyte (TB)	1,000 GB or $1,000^4$ bytes
1 petabyte (PB)	1,000 TB or $1,000^5$ bytes
1 exabyte (EB)	1,000 PB or $1,000^6$ bytes

Logical storage capacity values (for example, logical device capacity) are calculated based on the following values:

Logical capacity unit	Value
1 block	512 bytes
1 KB	1,024 ( $2^{10}$ ) bytes
1 MB	1,024 KB or $1,024^2$ bytes
1 GB	1,024 MB or $1,024^3$ bytes
1 TB	1,024 GB or $1,024^4$ bytes
1 PB	1,024 TB or $1,024^5$ bytes
1 EB	1,024 PB or $1,024^6$ bytes

## Accessing product documentation

Product user documentation is available on the Hitachi Data Systems Portal: <https://portal.hds.com>. Check this site for the most current documentation, including important updates that may have been made after the release of the product.

## Getting help

[Hitachi Data Systems Support Portal](https://portal.hds.com) is the destination for technical support of your current or previously-sold storage systems, midrange and enterprise servers, and combined solution offerings. The Hitachi Data Systems customer support staff is available 24 hours a day, seven days a week. If you need technical support, log on to the Hitachi Data Systems Support Portal for contact information: <https://portal.hds.com>.

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## Comments

Please send us your comments on this document to [doc.comments@hds.com](mailto:doc.comments@hds.com). Include the document title and number, including the revision level (for example, -07), and refer to specific sections and paragraphs whenever possible. All comments become the property of Hitachi Data Systems Corporation.

**Thank you!**

# Hitachi Infrastructure Director environment

The Infrastructure Director environment must meet minimum requirements to support various storage systems, servers, and fabric switches.

- [Minimum system requirements](#)
- [Supported storage systems](#)
- [Supported file server](#)
- [Supported fabric switch models](#)
- [Supported hosts](#)

## Minimum system requirements

Verify that the Infrastructure Director server meets or exceeds the minimum requirements to take advantage of all the features of Infrastructure Director.

Server	Minimum requirements
Hypervisor operating system	VMware® ESXi 5.0
Available disk space	40 GB
Memory	12 GB RAM
CPU	4 vCPUs
A client computer that can run a supported browser	At least one of the following: <ul style="list-style-type: none"><li>• Internet Explorer 10 or later</li><li>• Firefox 31.3.0 ESR, 34.0.5, or later</li><li>• Chrome v38.0.2125.122 or later</li></ul>

Verify that Infrastructure Director ports do not overlap with those used by other programs in your environment.

Service	Port number
CCI	31001
HTTP	80
HTTPS	443
Reserved	1099, 8843, 8080, 8082, 8083, 8084, 8085, 8090, 8888, 51099, 51100
SNMP	161, 162

## Supported storage systems

Hitachi Infrastructure Director supports the midrange storage systems of the Virtual Storage Platform family.

Initial startup and initial setup of any supported storage system must be completed by a Hitachi Data Systems representative or an authorized service provider.

Hitachi Infrastructure Director supports the following storage systems:

- Hitachi Virtual Storage Platform G200
- Hitachi Virtual Storage Platform G400
- Hitachi Virtual Storage Platform G600

## Supported file server

Hitachi Infrastructure Director requires minimum file server firmware and system management unit software versions.

Hitachi Infrastructure Director supports the following file server configuration:

- **Hitachi NAS platform (HNAS) firmware:** 11.2.3319.14
- **System management unit (SMU) software:** 11.2.3319.02

## Supported fabric switch models

Infrastructure Director supports a variety of Brocade® fabric switches.

Model	Fiber OS version	Type
300	7.0 7.1 7.2	71
5300	7.0 7.1 7.2	64
6505	7.0 7.1 7.2	118
6510	7.0 7.1 7.2	109
6520	7.0 7.1 7.2	133
7800	7.0 7.1 7.2	83
DCX 8510-4	7.0 7.1 7.2	121

## Supported hosts

Hitachi Infrastructure Director can be used to provision storage to many servers running any one of various operating systems.

- VMware®

- Windows®
- HP-UX™
- Sun Solaris
- NetBSD®
- TRU64 UNIX®
- Novell NetWare®
- IBM® AIX®
- Linux®
- IRIX®

## Installing Infrastructure Director

Infrastructure Director is deployed on a virtual machine and accessed by a client computer. Review the minimum requirements before installing.

- [Installing Hitachi Infrastructure Director in a DHCP environment](#)
- [Installing Hitachi Infrastructure Director in a static environment](#)
- [Logging in to Infrastructure Director](#)
- [Generating and installing a signed SSL certificate](#)

# Installing Hitachi Infrastructure Director in a DHCP environment

If your environment includes DHCP servers, you can use the Virtual Appliance Manager to set up your Infrastructure Director server.

## Prerequisites

The initial setup of a discovered Virtual Storage Platform G200, G400, G600 storage system has been completed by a Hitachi Data Systems representative or authorized service provider.

## Procedure

1. From the installation media, deploy Infrastructure Director OVF to hypervisor to the ESXi host.
2. Start the Infrastructure Director virtual machine.
3. In the vSphere® client, wait for the **System status** to change to `Online`.

The status is just below the banner in the virtual machine output.

```
*****  
*****Hitachi Infrastructure Director*****  
*****
```

```
System status: Online  
Please wait for system to be online before using any  
services.
```

4. Open a browser and enter `https://ip-address/vam` in the address bar.

```
User name: service  
Password: Chang3Me!
```



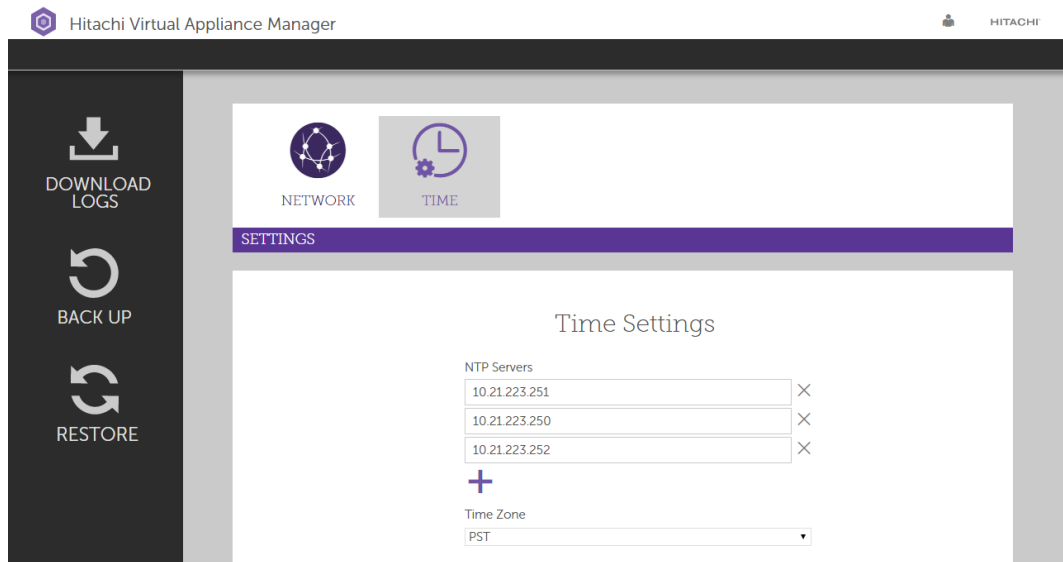
- From the Virtual Appliance Manager menu, click **Network** to configure the network settings.

The screenshot shows the Hitachi Virtual Appliance Manager interface. At the top, there is a header with the Hitachi logo and the text 'Hitachi Virtual Appliance Manager'. Below the header, there is a navigation menu with three options: 'DOWNLOAD LOGS', 'BACK UP', and 'RESTORE'. The main content area is titled 'Network Settings' and contains the following fields and controls:

- Docker Subnet:** A text input field containing '172.17.42.1/16'.
- Host Name:** A text input field containing 'hid'.
- DHCP:** A toggle switch set to 'On'.
- IP Address:** A text input field containing '10.20.90.253'.
- Subnet Mask:** A text input field containing '255.255.254.0'.
- Default Gateway:** A text input field containing '10.20.90.1'.
- Automatic DNS:** A toggle switch set to 'Off'.

- (Optional) If your data center is using the IP address scheme `172.17.*.*`, provide another IP range that is not currently used in your environment.  
Enter the IP range in the **Docker Subnet** field in the format `ip-address\range`. This is the specified range used by Infrastructure Director.
- Set the host name for the virtual machine (fully qualified domain name only).
- Set **DHCP** to `On`.
- Enter the IP address of the Infrastructure Director server.
- Set **Automatic DNS** to `On` or `Off`.  
If you set this to `Off`, enter the IP address of at least one DNS server.
- Click **Submit**.

6. (Optional) From the Virtual Appliance Manager menu, click **Time** and add Network Time Protocol (NTP) servers to the virtual machine.  
Adding NTP servers verifies that the Infrastructure Director servers are synchronized with the storage system environment.



- a. Click the plus button (+) to add a field for an NTP Server.
- b. Enter the host name of the NTP server.
- c. Select the time zone from the list.
- d. Click **Submit**.

### Postrequisites

Log in to Infrastructure Director and onboard a storage system.

Get a digitally signed SSL certificate from a trusted certificate authority (CA) by sending the CA a certificate signing request (CSR). After you obtain the signed certificate, you can import it to the server. By default, the Infrastructure Director installation package comes with a self-signed certification that you can use to initially log in to Infrastructure Director.

## Installing Hitachi Infrastructure Director in a static environment

If you do not have a DHCP server, use the command line interface to indicate the static IP address of the Infrastructure Director server.

## Prerequisites

The initial setup of a discovered Virtual Storage Platform G200, G400, G600 storage system has been completed by a Hitachi Data Systems representative or authorized service provider.

## Procedure

1. From the installation media, deploy Infrastructure Director OVF to hypervisor to the ESXi host.
2. Start the Infrastructure Director virtual machine.
3. In the vSphere® client, wait for the **System status** to change to *Online*.

The status is just below the banner in the virtual machine output.

```
*****  
*****Hitachi Infrastructure Director*****  
*****
```

```
System status: Online  
Please wait for system to be online before using any  
services.
```

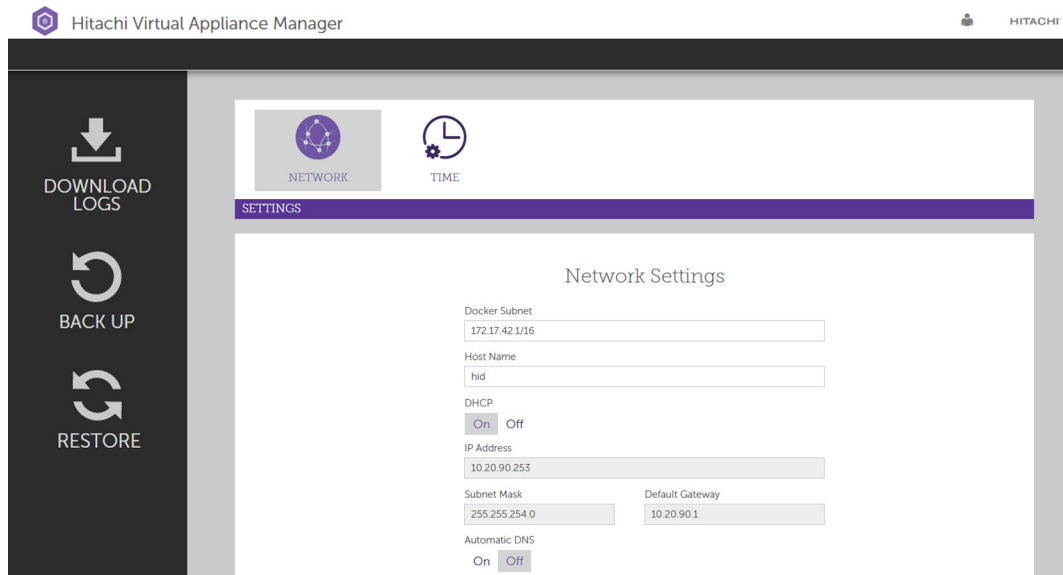
4. Press **Alt+F2**.
5. Log in with the service account.

```
User name: service  
Password: Chang3Me!
```

6. Enter the command `ip-change`.
7. Open a browser and enter `https://ip-address/vam` in the address bar.

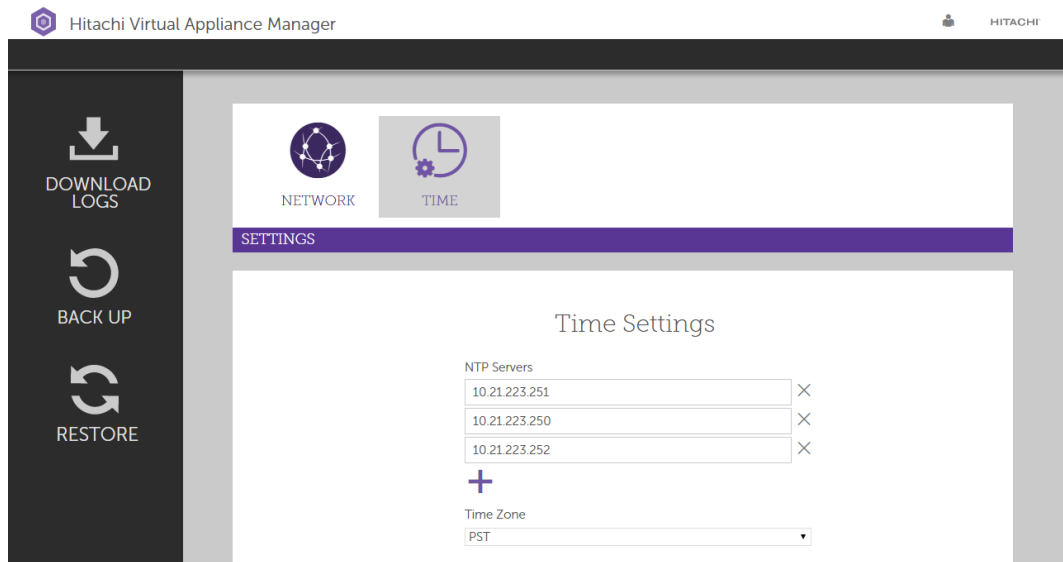
```
User name: service  
Password: Chang3Me!
```

8. From the Virtual Appliance Manager menu, click **Network** to configure the network settings.



- a. (Optional) If your data center is using the IP address scheme 172.17.\*.\*, provide another IP range that is not currently used in your environment.  
Enter the IP range in the **Docker Subnet** field in the format *ip-address\range*. This is the specified range used by Infrastructure Director.
- b. Set the host name for the virtual machine (fully qualified domain name only).
- c. Set **DHCP** to *Off*.
- d. Enter the IP address of the Infrastructure Director server.
- e. Set **Automatic DNS** to *On* or *Off*.  
If you set this to *Off*, enter the IP address of at least one DNS server.
- f. Click **Submit**.

9. (Optional) From the Virtual Appliance Manager menu, click **Time** and add Network Time Protocol (NTP) servers to the virtual machine. Adding NTP servers verifies that the Infrastructure Director servers are synchronized with the storage system environment.



- Click the plus button (+) to add a field for an NTP Server.
- Enter the host name of the NTP server.
- Select the time zone from the list.
- Click **Submit**.

### Postrequisites

Log in to Infrastructure Director and onboard a storage system.

Get a digitally signed SSL certificate from a trusted certificate authority (CA) by sending the CA a certificate signing request (CSR). After you obtain the signed certificate, you can import it to the server. By default, the Infrastructure Director installation package comes with a self-signed certification that you can use to initially log in to Infrastructure Director.

## Logging in to Infrastructure Director

Log in and verify that the installation is successful by accessing the Infrastructure Director web interface from a browser.

### Procedure

- Open a web browser.
- Enter the URL for Infrastructure Director in the address bar:

`https://ip-address:port-number` where

- *ip-address* is the IP address of the Infrastructure Director server.
- *port-number* is the port number of the Infrastructure Director server. The default port number is 443.

3. In the login window, log in to Infrastructure Director.

User name: `sysadmin`

Password: `sysadmin`

## Generating and installing a signed SSL certificate

By default, a self-signed certificate is used by the server. SSL certificates are used to verify the user's identity and to enhance security on the server. You can get a digitally signed SSL certificate from a trusted certificate authority (CA) by sending a certificate signing request (CSR). After you obtain the signed certificate, you can import it to the server.

The following is a sample procedure for generating and installing a signed SSL certificate. The process of obtaining a certificate may be different within each organization.

### Procedure

1. Open the virtual machine console and log in with the service account.
2. Start the `openssl` program:

```
openssl req -nodes -x509 -newkey rsa:2048 -sha1 -keyout /etc/nginx/certificates/server.key -out /etc/nginx/certificates/server.crt
```

The system returns the message `Generating a 2048 bit RSA private key.`

3. Provide the information as prompted.
  - **Country Name** (two-letter code)
  - **State or Province Name** (two-letter code)
  - **Locality name** (City)
  - **Organization Name** (Company)
  - **Organizational Unit Name** (Section or department)
  - **Common Name** (Your name or the server host name)
  - **Email Address**
4. (Optional) Enter the extra attributes to be included with your certificate request.
  - Challenge password
  - Optional company name
5. When you receive the CRT file, send it to a certificate authority to obtain an SSL certificate.

If you need help with this step, consult with your Hitachi Data Systems representative or authorized service provider.

6. When you receive the SSL certificate file, Copy the certificate to `/etc/nginx/certificates/`.
7. Restart the virtual machine.





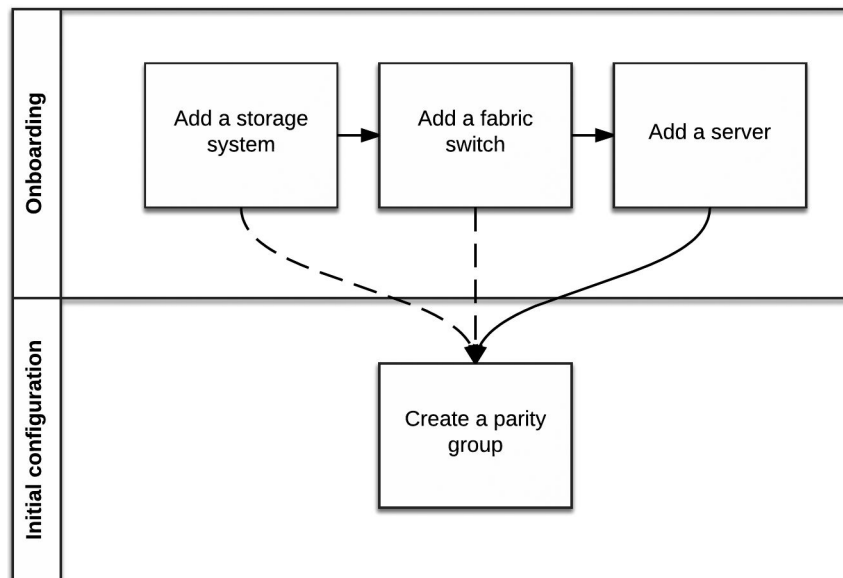
# Onboarding and configuring a storage system

- [Overview](#)
- [Adding the first storage system](#)
- [Verifying storage system initial settings](#)
- [Adding a fabric switch](#)
- [Adding servers](#)
- [Creating parity groups](#)

## Overview

Onboarding a storage system in Infrastructure Director is more than adding a storage system to a list. At least one fabric switch and server must be added for the storage system to fully function.

In the following workflow, the recommended path is marked by the solid arrows. The dashed arrows indicate the optional paths. Before a storage system is available for use in the network, all of the tasks in the workflow must be complete.



## Adding the first storage system

You must onboard a storage system the first time you start Infrastructure Director.

### Prerequisites

Infrastructure Director requires access to all resources groups on the storage system so that the workflows function correctly. Verify that the SVP user name used to onboard a storage system in Infrastructure Director has access to all custom resource groups and meta resource groups.

### Procedure

1. On the Infrastructure Director dashboard, click the plus sign (+) to add a storage system.

2. Enter values for the following parameters on the **Add Storage System** page.
  - **SVP IP Address:** Enter the IP address or server name of the external service processor for the storage system you want to discover.
  - **User name and password:** Log in as a user that has administrator privileges on this storage system. For example, you can log in as the user `maintenance`.
3. Click **Submit**.
4. (Optional) Onboard other storage systems.

### Result

The Jobs tab is updated with the job called `Create Storage System`.

Wait a while for the storage system to be onboarded. Refresh the Jobs tab to verify that storage system is onboarded.

### Postrequisites

Verify the storage system initial settings. Create parity groups.

## Verifying storage system initial settings

Look through the initial storage system setup to verify the settings for the storage system, which includes network configuration, date, time, and license keys.



**Note:** Do not change any of the initial setup information. The setup of a discovered Virtual Storage Platform G200, G400, G600 storage system has been completed by a Hitachi Data Systems representative or authorized service provider.

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### Prerequisites

Initial setup is complete.

### Procedure

1. From the **Dashboard**, click **Storage Systems** from the resource side panel.
2. Click on a storage system.
3. In the top right of the page, click the settings icon (⚙️) and select **Initial Setup Wizard (Settings)**.
4. On the **Common** page, verify the information provided.
  - The name of the storage system
  - The contact name for the storage system
  - The location of the storage system

- Click **Next**.
5. On the **Time-Zone** page, verify the information provided, then click **Next**.
    - Time zone
    - Current date and time on the storage system
    - NTP servers
  6. On the **Licenses** page, verify the list of product licenses and its information, then click **Next**.
    - Product name
    - License status
    - Information that specifies the type of the license and the used capacity
  7. On the **Notification** page, verify the information in the list shown.
    - The email address of the sender of the alerts
    - The email addresses of the recipients of the SNMP alerts for the selected storage system
    - The IP address of the mail server
    - The mail server user name and password
    - The SNMP community type and IP address
  8. Click **Submit** to close the initial setup wizard.

## Adding a fabric switch

Adding a fabric switch is an optional step after onboarding a storage system. You can add, update, and delete fabric switches in the Infrastructure Director interface.

After a fabric switch is added, you can choose to auto-create zones during volume provisioning.

### Prerequisites

- The Infrastructure Director server is connected to the same IP network and has access to SNMP broadcast of Fibre Channel switches.
- You have the required information about the fabric switch: Fabric Name, Fabric Switch IP Address, Principal Switch WWN, Username, and Password.
- You have the Admin role for the fabric switch.

### Procedure

1. On the Infrastructure Director dashboard, select **Fabric Switches** to open the Fabric Switches page.
2. Click the plus sign (+) to open the Add Fabric Switches page.
3. Enter the following information from the configuration of the switch you are adding:
  - **Fabric Name**

Any Unicode character is allowed except " or \ or control-characters:  
\" \/ \b \f \n \r \t \u.

- **Fabric Switch IP Address**

To add or update a core switch, use the Management IP address of the switch or the Active CP IP address.

- **Principal Switch WWN**

- **Username**

- **Password**

4. Click the plus sign (+) to add a row for the switch and click **Submit**.

### **Result**

A job is created to add the fabric switch.

## **Adding servers**

Add servers so you can attach volumes. You can add multiple server parameters from a file, or add one server at a time.

### **Procedure**

1. On the Infrastructure Director dashboard, click **Servers**. Then click the plus sign (+) to open the **Add Server** page.
2. On the **Add Server** page, do one of the following:
  - Click the upper plus sign (+) to open a csv (comma-separated values) file and select the headings for the types of values you want to include. A minimum of one server name and one WWN are required. Click **Import** to add the server values from the file.
  - Click the plus sign (+) in the table to add a row and enter a **Server Name, OS Type, WWN, and WWN Nickname**.
3. Click **Submit** to add the servers.

### **Result**

A job is started to add the servers.

### **Postrequisites**

Create volumes and attach them to the server. See the *Infrastructure Director User Guide* for this procedure.

## **Creating parity groups**

### **Prerequisites**

- The initial setup of any discovered Virtual Storage Platform G400, G600 storage system is complete.

- The storage system for which you will create a parity group is registered.
- You know the target storage system name.
- You know the total capacity that you expect to use. Plan to use all of the available disks in the system when you create parity groups.

### Procedure

1. On the Infrastructure Director dashboard, select **Storage Systems** in the resource side panel to see the inventory of registered storage systems.
2. Click a storage system to create and configure the parity groups for it.
3. Click **Parity Groups** to see the inventory of all parity groups in the storage system.
4. Click the plus sign (+). In the **Create Parity Groups** window, review the list of unused disk types in the storage system. This information is grouped by disk type, disk speed, and disk capacity, and includes the following details:
  - Number of available disks.
  - Available spares detected for each disk type, disk speed, and capacity.
  - Number of new or additional spares to reserve. This calculation is based on the total spares needed based on recommended best practices, and the number of existing spares in the system.
  - The recommended RAID configuration for the disk type.
  - The number of parity groups that can be created.
  - The total usable capacity that is available based on the number of parity groups and the RAID configuration.
5. Choose one of the following options:
  - Accept the recommended RAID configuration, which uses the full capacity of the installed drives.
  - Change the RAID configuration or create fewer parity groups. If you make changes, you might not use the full capacity of the installed drives.
6. Click **Submit**.

### Result

A job is started to create the parity group for the storage system. This job includes the following tasks:

- Identifies the appropriate number and position for the spare disk.
- Assigns a spare disk.
- Creates the required number of parity groups for the requested RAID layout.
- Creates and quick formats the necessary volumes on the parity group so that it is ready for pool creation.
- The job may create sub-jobs when multiple parity groups are being created. Each sub-job will show the status of the parity groups being created.



**Note:** If you are creating parity groups for the entire array, it may take several hours before the storage system is configured.

---

### **Postrequisites**

Both of these procedures are provided in the *Infrastructure Director User Guide* and online help.

- Create a pool
- Create and attach volumes







## **Hitachi Data Systems**

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