



Ocularis

Installation and Licensing Guide



On-Net Surveillance Systems, Inc.
One Blue Hill Plaza, 7th Floor, PO Box 1555
Pearl River, NY 10965
Phone: (845) 732-7900 | Fax: (845) 732-7999
Web: www.onssi.com

Ocularis 5.0 SP1

000072.12015-1630-5.0.1.100

Legal Notice

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US patent # 8,390.684 B2 for Ocularis Client

Patents Applied For in the U.S. and Abroad

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Introduction

Ocularis 5 is OnSSI's newest and most innovated and cost effective open platform Video Management Software (VMS) and is designed to enhance your security while simplifying your daily workload.

These instructions should be used by administrators installing an Ocularis system.

Ocularis Models

Ocularis version 5 is offered in three models, designed to meet the needs of organizations of all sizes and structures, from single-location retail outlets or schools, to multiple-site, complex municipal and campus installations.

Ocularis Professional (PRO) – Scalable video management for small to medium single and multi-site applications.

Ocularis Enterprise (ENT)– Surveillance for locally managed or centrally managed mid to large scale installations.

Ocularis Ultimate (ULT) – Surveillance video management for mobile applications and complex environments with multiple, simultaneous viewing clients..

The **Ocularis™ Platform**, regardless of model, consists of the following components:

- **Ocularis Base** – server software application which regulates and manages the flow of data between video client users, recording servers, video wall management and an integrated alerting application.
- **Ocularis Administrator** - The front end software application used to manage Ocularis Base.
- **Ocularis Recorder** - An application is required to supply camera configuration and recording.
- **Ocularis Client** – OnSSI's award winning video client application.
- **Optional Add-On Applications** – these include Remote Video Wall, Ocularis Media Server, and Ocularis OpenSight™. Add-ons are made available as they are introduced. See our website www.onssi.com or call OnSSI Sales for information on Ocularis Add-Ons.

These instructions provide detailed instructions for installing Ocularis and its components. For a more concise installation guide, see the *Ocularis Quick Start Guide*.

Where to Install Components

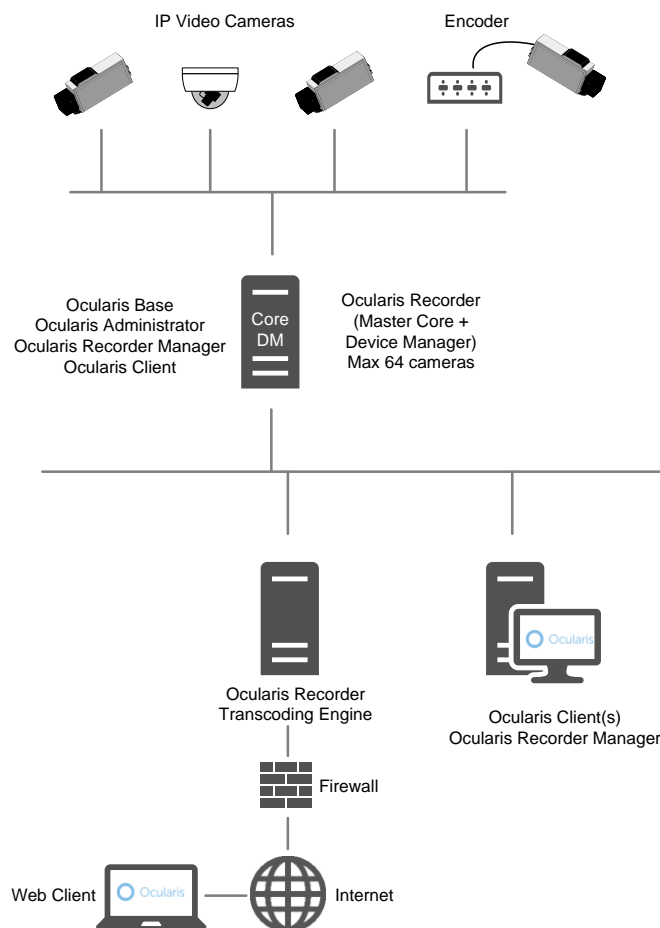
Ocularis 5 sample system diagrams are shown below and are only an example to represent where the different components of Ocularis may be installed. These are by no means the only way the system can be laid out.

It is important to note:

- For Ocularis Ultimate and Ocularis Enterprise, there must be at least one 'Core'. The first Core that is installed is called the 'Master' Core. It is the only core that is required on these systems and there should be only one Master Core installed. Optionally, you may install an additional core, known as a 'Slave' core that automatically provides redundancy for the Master core. It is not necessary to install more than two cores in these models but you may do so if desired. Install a 'Device Manager' or DM on each additional computer to support additional cameras. Only one recorder SLC is required in these models.
- For Ocularis Professional only, there must be a Master Core and DM on each server. There are no Slave Cores in this model. Each Master Core requires a unique SLC available from OnSSI Sales.

Ocularis Professional

Ocularis Professional has a maximum limit of 64 cameras per server. Each server contains a Core (Master) and Device Manager (DM). The Master Core is what is licensed so if you need additional servers, contact OnSSI Sales to obtain additional SLCs. **This is the ONLY model where a Master Core is required on each server.**

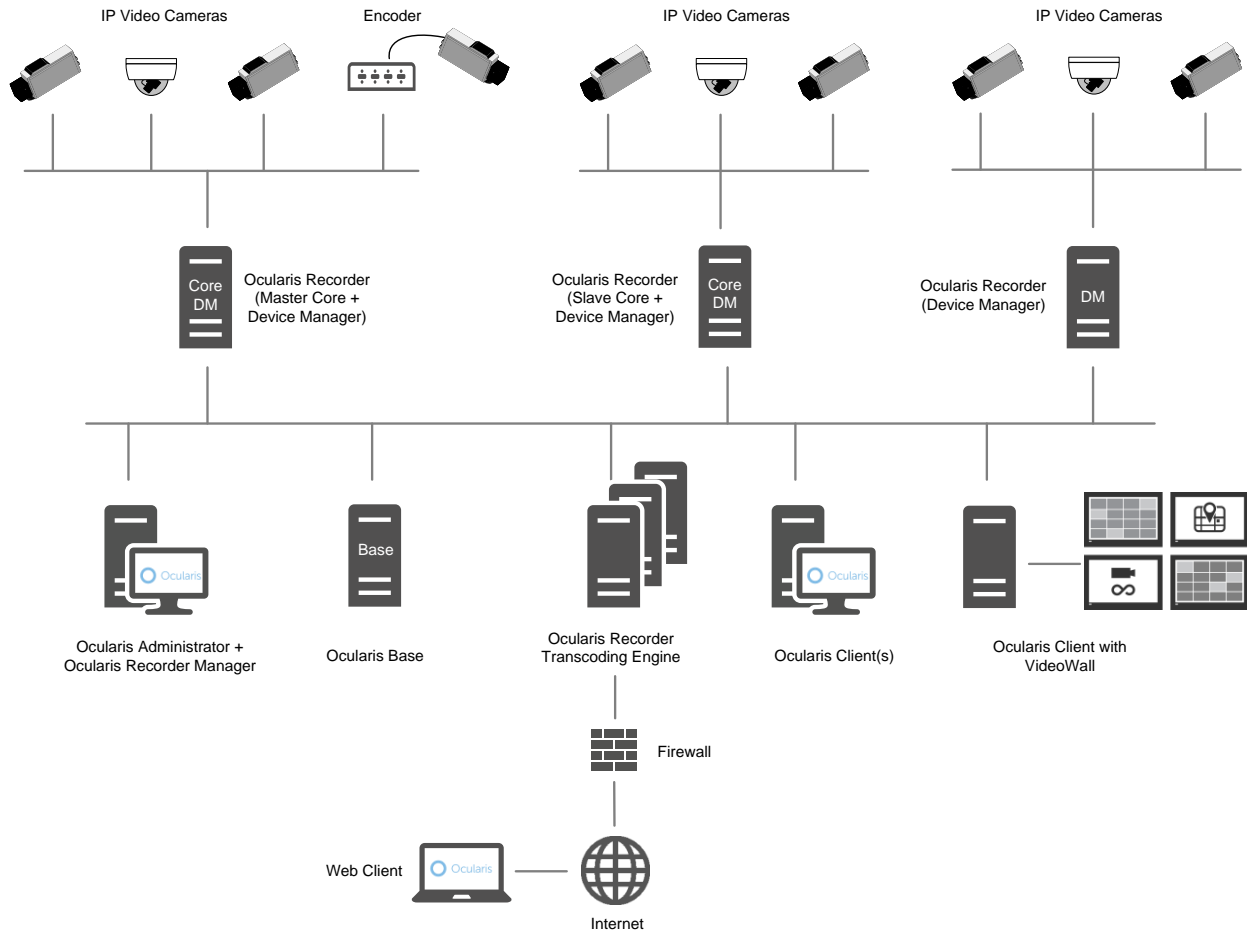


Ocularis Enterprise

Ocularis Enterprise has no imposed software limitation on the number of cameras per server. It is only limited by the available hardware resources.

On the first server, install a Master Core and Device Manager (DM). Add additional DM servers if you want to add more cameras on a separate machine. You may install a 'Slave' core as an optional redundant backup for the Master Core.

You do not need to add a core to each server, nor do you typically need more than 2 cores in any environment.



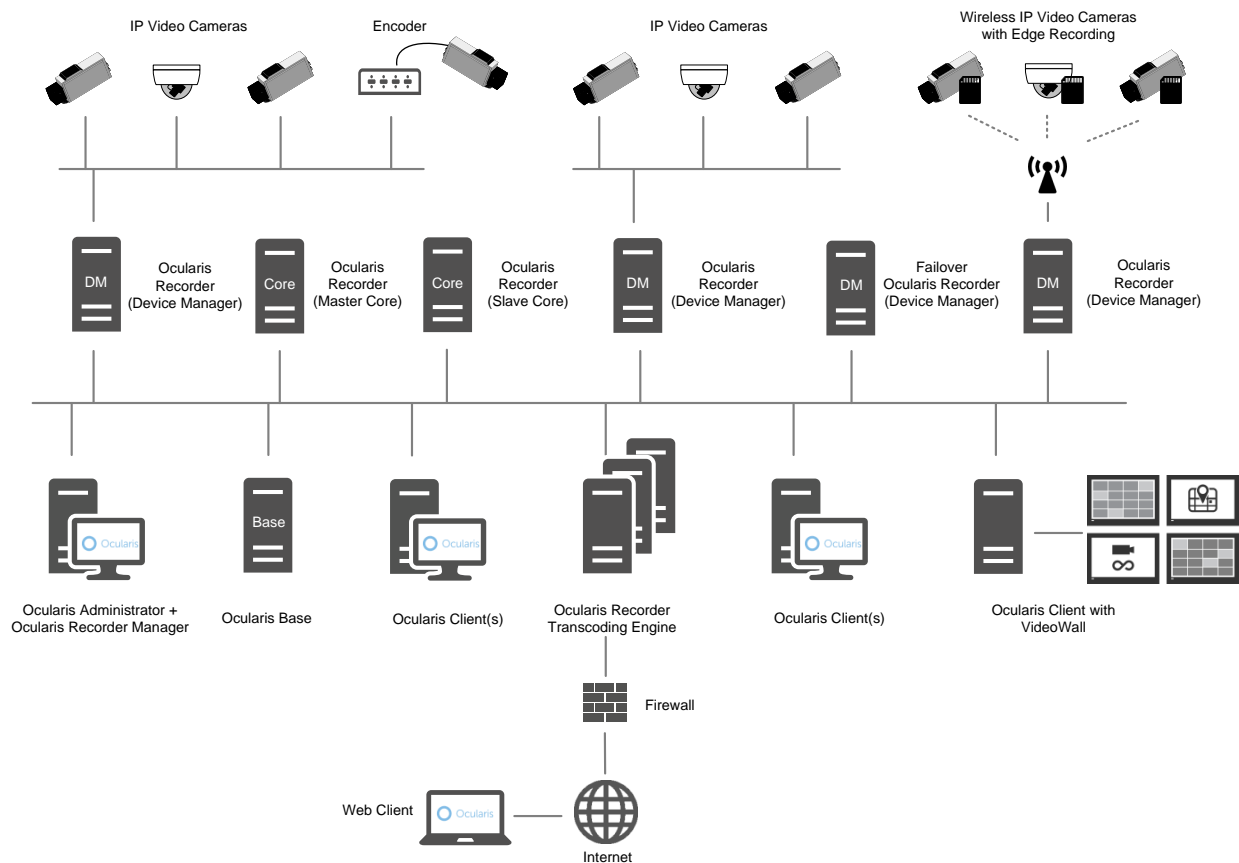
Ocularis Ultimate

Ocularis Ultimate has no imposed software limitation on the number of cameras per server. It is only limited by the available hardware resources.

On the first server, install a Master Core and optionally a Device Manager (DM). Add additional DM servers if you want to add more cameras on a separate machine. You may install a 'Slave' core as an optional redundant backup for the Master Core.

You do not need to add a core to each server, nor do you typically need more than 2 cores in any environment.

If you have multiple Device Managers, you may configure them as failover services for each other or configure a standalone machine dedicated as a backup DM. This configuration is done after installation.



If you have any questions or concerns whatsoever regarding where to install components, contact OnSSI Sales Engineering at se@onssi.com.

Getting Started with Ocularis

Minimum System Requirements

Requirements for individual components may be found at: <http://www.onssi.com/hardware-recommendations>.

Installing Ocularis on a New System

Regardless of model, a recommended process flow to prepare the video management environment with Ocularis on a new system is as follows:

1. Download and extract the Ocularis feature set installation file(s) from <http://www.onssi.com/support/downloads>.
2. Install the Ocularis Base software component.
 - In large environments, the Base component should be installed on a dedicated server. In some cases, a dedicated server is not necessary. For Ocularis Professional, for instance, Ocularis Base may be installed on the same PC as the other Ocularis components. As the system grows, additional recorders may be added.
 - System requirements may be found on the <http://www.onssi.com/hardware-recommendations> website for detailed hardware and operating system specifications.
 - Refer to [Installing Ocularis Base](#) on page 9 for details on the software installation.
 - Anti-Virus software must be disabled during the installation of the Ocularis Base component.
3. License Ocularis.
 - Prior to using Ocularis components, you must license your copy of Ocularis Base. See [Licensing Ocularis Base](#) on page 17 for more details on how to activate the software.
4. Install the *Ocularis Administrator* application.
 - This component must be installed on a workstation with network connectivity to the Ocularis Base component. It may reside on the same PC as the Base provided that graphic card requirements are met. You may install it on as many PCs as needed.
 - Refer to [Installing Ocularis Administrator](#) on page 23 for details on the software installation.
5. Install the Ocularis recording component software.
 - The Ocularis Professional, Enterprise and Ultimate recorders contain the following components supported in this version:
 - 1.) Master Core Server – this is the service which manages the recorder configuration
 - 2.) Device Manager (DM) – this is the server which manages the cameras and video storage
 - 3.) Recorder Manager – this is the application used to configure the Core and DM
 - 4.) Slave Core Server (optional and only in Ocularis ENT and ULT)
 - 5.) Event Proxy
 - Most of these components may all be installed on the same PC or separately.
 - If applicable, run any Recorder Update patches that are available.
6. Use the Ocularis Recorder Manager application to change the default administrator password of the recorder. This account will be used to import the recorder into Ocularis.
7. Add and configure video cameras and devices on the recording component.
8. Install the *Ocularis Client* on at least one workstation.
 - See [Installing Ocularis Client](#) on page 24 for additional instructions on installation.
9. Configure Ocularis Base using *Ocularis Administrator*.
 - Refer to the *Ocularis Administrator User Manual* for further instructions.

10. Test connectivity of cameras by logging into Ocularis Base with *Ocularis Client*.
11. Install any remaining workstations with *Ocularis Client*.
12. Configure the event proxy to forward events from the recorder to the Ocularis Base Server.
 - Installation and configuration of Event Proxies can be found at the end of this document.
13. Within 30 days of installing cameras on the recording component(s), you must register the Master Core.
 - See Ocularis Camera License RegistrationRecorder Licensing on page 34 for further instructions.

Upgrading to Ocularis Version 5.0 SP1

Refer to the document *Upgrading to Ocularis 5.0 SP1* for full details on upgrading an Ocularis system. Use the instructions found here for new installations.

Ocularis Installation & Configuration

Items to consider prior to installation:

- Once all components are installed, synchronize the date and time between the server and workstations.

Note: *The time and date tolerance for all PCs using Ocularis is a maximum of five (5) minutes. If the time is off by more than 5 minutes between the Ocularis Base machine and Ocularis Client workstations, log in attempts will fail.*

- The Ocularis Base component should be installed first. After that, the order of installing each component does not matter.
- You must either be logged in as the Windows account 'Administrator' when licensing Ocularis Base or as a user with administrative privileges and select 'Run as Administrator' when launching the licensing application.
- Depending on your current Windows configuration, you may be asked to insert your original Windows installation CD in order to install additional Windows components.
- You will need to have your Ocularis Software License Code (SLC) on hand when you license the application.

The following components are outlined in this document:

- [Download the Ocularis Installation File](#)
- [Extract Ocularis Installation File](#)
- [Installing Ocularis Base](#)
- [Licensing Ocularis Base](#)
- [Installing Ocularis Components](#)
- [Installing Ocularis Administrator](#)
- [Installing Ocularis Client](#)
- [Installing Ocularis Recorder](#)
- [Recorder Update Patch](#)
- [Ocularis Recorder Manager](#)
- [Ocularis Recorder Event Proxy](#)
- [Installing Ocularis](#)

Download the Ocularis Installation File

If necessary, Ocularis software may be obtained from the OnSSI website. Follow these instructions to download the installation file.

1. Open a browser and go to the 'Support → Download Software' page on the OnSSI website.
2. On the 'Downloads' page, click the link for the Ocularis feature set you wish to download (e.g. **Ocularis Enterprise 5.0 SP1**)
3. A short web form appears. Fill out the form and click **Submit**.
You will receive an email containing the link to the download file, any relevant recorder patch updates and links to relevant documentation.
4. Click the link to download the Ocularis installation file.
5. You will be prompted to save the file. Select the desired file location and click **Save**.
6. Click the link to download the Recorder Update Patch file.

The file downloads may take several minutes depending on your connection speed. Be sure to remember the path to the directory where the files were saved.

Extract Ocularis Installation File

These steps outline the extraction of the Ocularis installation files and may be used for all Ocularis models and for new or existing installations.

1. Locate the Ocularis installation file. This file may have been downloaded from the OnSSI website or obtained through other means. The file will have one of the following formats depending on the feature set:

Ocularis Feature Set	Filename
Ocularis Professional	Ocularis_ PRO_5.0 SP1.exe
Ocularis Enterprise	Ocularis_ ENT_5.0 SP1.exe
Ocularis Ultimate	Ocularis_ ULT_5.0 SP1.exe

Executable files are shared across Ocularis models. The SLC determines the model once it is applied.

WARNING: THIS PROCESS SHOULD BE PERFORMED ON THE SYSTEM WHERE OCULARIS BASE EXISTS (IF AN UPGRADE) OR WHERE IT WILL BE INSTALLED (NEW).

2. If it is not already there, copy the installation file from step 1 above to the Ocularis Base machine.
3. Double-click the file from step 1 above to launch and begin the file extraction.

You'll see messages regarding the installation validation which may take several minutes.

The *Welcome to the Ocularis Installer Extraction Wizard* screen appears.



Figure 1 Ocularis Installer Extraction Wizard

4. Click **Next**.

On the *Destination Folder* screen, you may modify the path for the installation files to be placed.

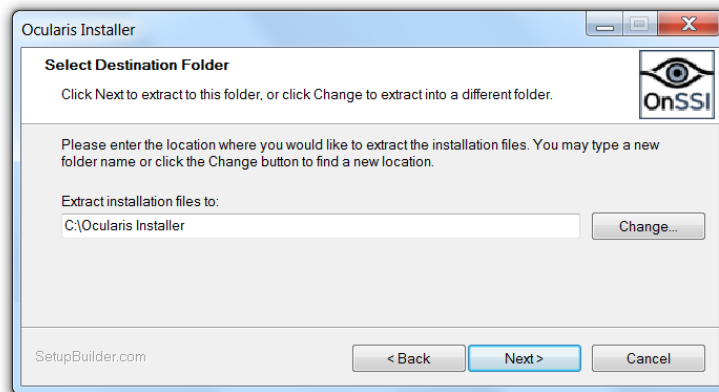


Figure 2 Select Destination Folder

Click **Next**.

5. The *Ready to Extract* summary screen is next. Click **Back** to make changes or click **Next** to proceed.

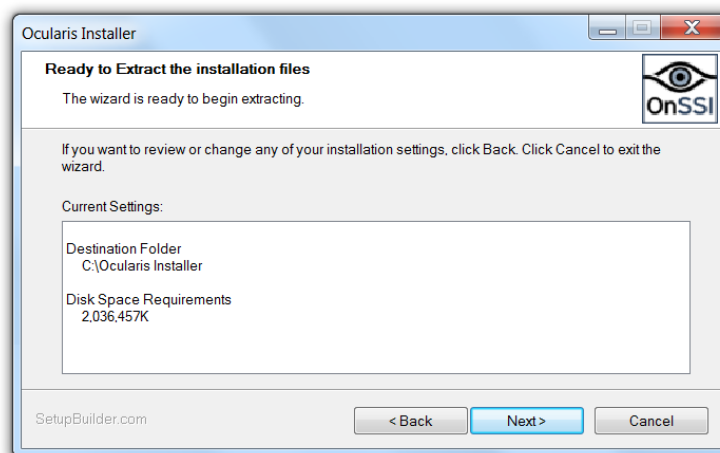


Figure 3 Installation Summary

Files are extracted and copied to the location specified. This may take several minutes. When all files are extracted, a *Setup Wizard Complete* screen appears. The installation files have been downloaded and unpacked. No applications or components have been installed.



Figure 4 Extraction Setup Wizard Complete

6. If you choose to:
 - a. Install Ocularis Base now: make sure the corresponding checkbox is selected and click **Finish**. Proceed to *Installing Ocularis Base* below.
 - b. If you choose to install Ocularis Base later: uncheck the *Install Ocularis Base* checkbox and click **Finish**. Proceed to *Installing Ocularis Base* below.

You have completed the extraction of the Ocularis installation files.

Installing Ocularis Base

Reminder:

- Anti-Virus software must be disabled during the installation of the Ocularis Base component.
- Follow this procedure when installing a new system or upgrading an existing Ocularis Base component.
- Ocularis Base uses SQL Server to store configuration data. By default, SQL Server Express 2008 will be used unless otherwise specified. Alternate instances of SQL Server may be used for advanced users.

To INSTALL OCULARIS BASE

Use these steps for all feature sets of Ocularis.

WARNING: THIS PROCESS SHOULD BE PERFORMED ON THE SYSTEM WHERE OCULARIS BASE EXISTS (IF AN UPGRADE) OR WHERE IT WILL BE INSTALLED (NEW).

1. To install Ocularis Base after extracting the installer files (from *Extract Ocularis Installation File* on page 10), go to the directory where the *Ocularis* files were extracted.

These installation files should be located on the Ocularis Base machine. If they are not, copy them to the Ocularis Base system.

2. The next step differs depending on the installation:
 - a. For new installations, a notice appears recommending that you activate Ocularis now before continuing with the installation. This is recommended

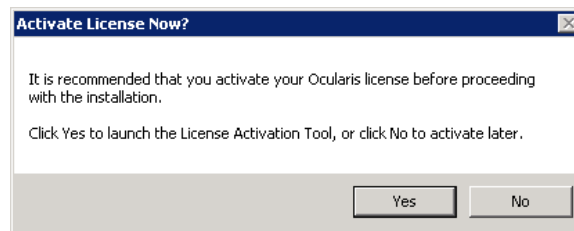


Figure 5 Activate Now?

You will need your Ocularis SLC to activate. Activation will be required at the end of the Base installation if you do not do it now.

1. Click **Yes** to activate Ocularis now.

The *Ocularis License Activation* screen appears as shown in Figure 9 on page 17.
 2. Enter the Ocularis SLC and click **Activate License**.
 3. Click **OK** on the License Activate pop-up.
 4. Click **Close** on the *Ocularis License Activation* screen.
 5. Proceed to step 3 below.
- b. If upgrading Ocularis, a message that a previous installation of this software has been detected. Click **Yes** to proceed with the installation. Be sure to have your new SLC in hand. Click **Yes** when ready

3. The *Ocularis Base Setup Wizard* screen appears.



Figure 6 Ocularis Base Setup Wizard

Click **Next**.

4. The *License Agreement* appears. Please read, click the “*I accept.*” radio button and then click **Next**.
5. Select the type of installation: **Typical** or **Custom**. *Typical* will install all new files using default settings for file locations and database instance. *Custom* allows you to change these settings. The vast majority of installations should choose ‘Typical’.

Typical:

- a. Select the *Typical* radio button and click **Next**.

Ocularis Base is installed using these default settings:

- Base installation files are placed in `c:\Program Files\OnSSI\Ocularis Base`
- Bookmark location is designated as:
`c:\inetpub\wwwroot\OcularisService\Bookmarks`
- Windows IIS is installed
- SQL Server 2008 Express is installed with a Server Name of OCULARISSEVER, SA User Name of sa and an encrypted SA password.

This installation may take several minutes.

Note: You may see a warning message if you are installing Ocularis Base on Windows 7 or other non-server level operating system. For demos and small applications, click ‘Yes’ to continue with the installation. For most standard production systems we recommend installing Ocularis Base on a server class operating system.

Note: You may also see a message about dependencies required such as .Net Framework 4.0, SQL Server 2008, VC++ Redistributable 2010 and DirectX9c. Click ‘OK’ to install these (any missing components will be access from the OnSSI website).

Custom:

- a. Select the *Custom* radio button and click **Next**.
- b. On the *SQL Server instance* page, most users will use the default selection.

SQL Server Options Defined:

Use Ocularis default SQL Server instance – this default option will install SQL Server 2008 Express for use with Ocularis.

Edit System Administrator login - If you wish to modify the administrator login for the SQL Server instance, click the *Edit System Administrator* login checkbox. The corresponding fields will open to allow entry of the required criteria.

Use another SQL Server 2008 instance - If you have an existing SQL Server database that you wish to use, you may select this option. You will be required to enter login credentials for this SQL Server instance..

- c. When ready, click Next.
- d. On the *Select Bookmarks Folder* screen, you have the option to specify the location for the storage of Ocularis Bookmarks. Change the default location if necessary. When ready, click **Next**.
- e. On the *Select Destination Folder* for Ocularis Base you may modify the directory path for the Ocularis Base files. We recommend using the default but you may modify the path here. Click **Next**.
- f. The next screen summarizes the installation folders and size. Click **Back** to make changes or click **Next**.

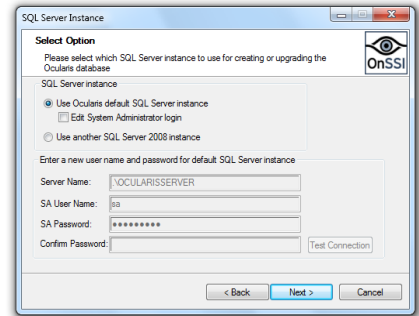


Figure 7 SQL Server Instance

Note: You may see a warning message if you are installing Ocularis Base on Windows 7 or other non-server level operating system. For demos and small applications, click 'Yes' to continue with the installation. For most standard production systems we recommend installing Ocularis Base on a server class operating system.

Note: You may also see a message about dependencies required such as .Net Framework 4.x, SQL Server 2008, VC++ Redistributable 2010 and DirectX9c. Click 'OK' to install these (any missing components will be access from the OnSSI website).

The Ocularis Base files are installed to the specified directory and may take several minutes. A new installer website is also created.

- 6. When installation is completed, the *Setup Wizard Complete for Ocularis Base* screen appears.

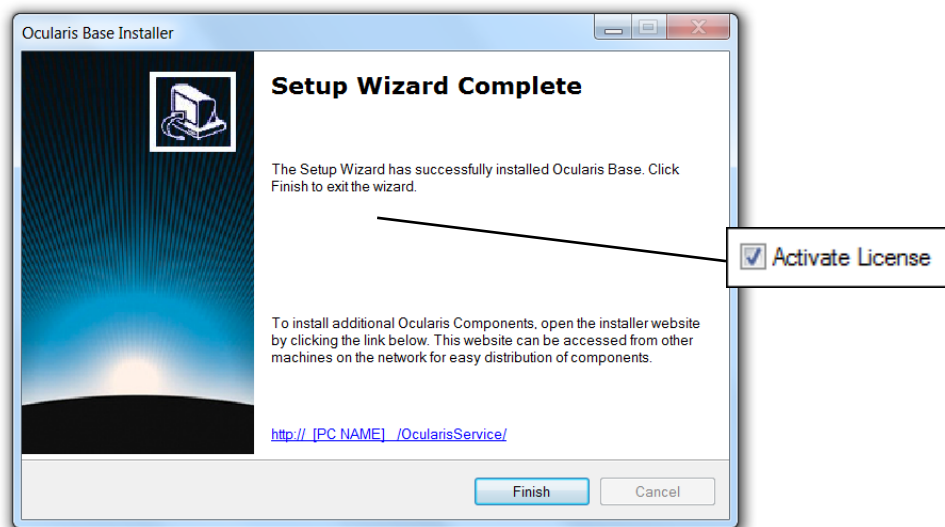


Figure 8 Ocularis Base Setup Wizard Complete

- 7. If you licensed Ocularis at the beginning of this procedure, you are done. If you chose not to license Ocularis earlier, you are given the option to activate the Ocularis license upon

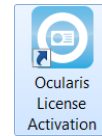
completion of the wizard. It is recommended (but not mandatory) to do this at this time if you haven't already done so. Ocularis must be licensed before use.

- a. If you choose to license Ocularis now, verify that the *Activate License* checkbox is checked and click **Finish**. The *Ocularis License Activation* application is automatically launched. Proceed to [Licensing Ocularis Base](#) below.
- b. If you choose to activate the Ocularis license later, uncheck the *Activate License* checkbox and click **Finish**.

When you are ready to license Ocularis, launch the *Ocularis License Activation* application from the desktop icon. Proceed to *Licensing Ocularis Base* below.

8. If you want to launch the Ocularis component download page, click the link above the **Finish** button. If you are finished installing on this computer, click **Finish**.

The installation of Ocularis Base will create the following icon on the desktop:



Licensing Ocularis Base

Once the Ocularis Base component software is installed, an additional licensing step is required.

- All new installations require the Ocularis Base to be licensed with an Ocularis 5 SLC.
- You may license Ocularis automatically, any time of the day or night, 24/7/365!
- Licensing may be done online or offline.

The actions related to Ocularis licenses include:

- **Activating the Ocularis SLC**– Use when licensing Ocularis for the first time or with certain upgrades.
- **Refreshing the Ocularis SLC**– Use when the license status of Ocularis changes.
- **Deactivating the Ocularis SLC**– Use when you need to move Ocularis Base from one computer to another or during certain upgrades.

Note: To use the license activation application, you must be logged into the computer using an account with Windows Administrator privileges.

Activating the Ocularis SLC

Activating an Ocularis SLC is done the first time Ocularis is installed. This applies when the installation is on a brand new system or if you are upgrading from Ocularis versions 3.5 or earlier.

The steps to activate are different based on whether the Ocularis Base computer is connected to the internet or not.

- To Activate an Ocularis license with Internet Connectivity
- To Activate an Ocularis license without Internet Connectivity

To Activate an Ocularis license with Internet Connectivity

1. Launch the *Ocularis License Activation* application.
2. The first time you license Ocularis, you need to enter your new SLC. You receive this SLC when you purchase the product.

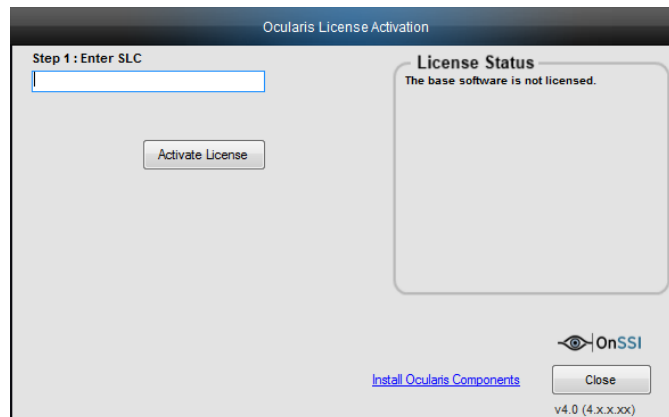
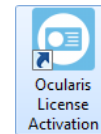


Figure 9 Unlicensed Ocularis Base

- Click the **Activate License** button. You will receive a pop-up with the message reminding you that there is no internet connectivity and you should use offline activation. Click **OK** to close this dialog. The screen updates with additional steps:

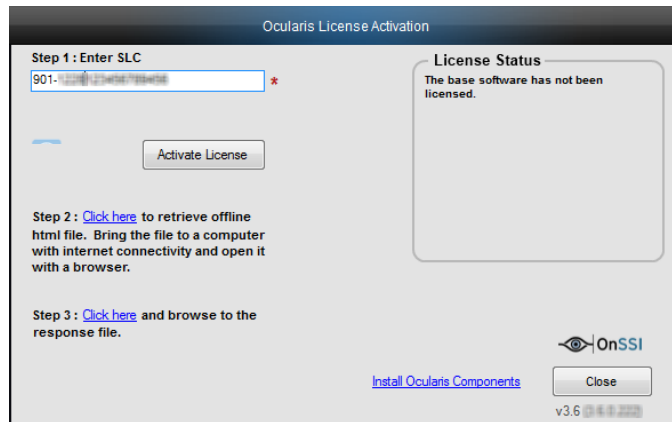


Figure 11 Additional Steps for Offline Licensing

- Click the link in *Step 2: Click here to retrieve offline html file.*
An html file is created named `OcularisActivationRequest.html` and stored in:
`c:\Program Files (x86)\OnSSI\Ocularis Licensing Activation\OfflineActivation`
- Copy this file to portable media and bring to a computer that has internet connectivity.
- Launch the `OcularisActivationRequest.html` file (double-click it).
- The default web browser should launch and load a page with a Download button. Click the **Download** button.
- The browser may ask you if you want to save a file called `response.xml` from `licensing.onssi.com`. Choose **Save As** and save it to portable media.
- Bring the `response.xml` file back to the Ocularis Base computer.
- On the Ocularis License Activation screen (see Figure 11), click the link in *Step 3: Click here and browse to the response file.*
- In the resulting Windows' Open dialog, browse to the `response.xml` file you just brought from the internet connected machine. Select the file and click **Open**.
- You should see a 'License Activation Successful' pop-up. Click **OK**.

You are done! The **License Status** area of the *Ocularis License Activation* screen displays updated camera counts and other information based on your SLC. The 'Activate License' changes to 'Refresh' to accommodate future updates.

Proceed with *Installing Ocularis Components* below.

Refreshing the Ocularis SLC

Refreshing your Ocularis SLC is done when a change is made to your Ocularis License. For instance, you add additional camera licenses to Ocularis or you upgrade from a demo version to a retail version. Refreshing is simple but the process differs, depending on the Ocularis Base computer having internet connectivity.

To Refresh an Ocularis license with Internet Connectivity

- Launch the *Ocularis License Activation* application.
- Click the **Refresh** button. The licensing application will collect relevant data including the SLC and send this over the internet to OnSSI's licensing server. OnSSI's licensing server validates the information and sends back the activation required to license the software. This process is nearly instantaneous.

Once activation is complete, a confirmation pop-up appears. Click **OK**.

You are done! The **License Status** area of the *Ocularis License Activation* screen displays updated license information based on your SLC.

To Refresh an Ocularis license without Internet Connectivity

1. Launch the *Ocularis License Activation* application.
2. Click the **Refresh** button. You will receive a pop-up with the message reminding you to check internet connectivity or refresh offline. Click **OK** to close this dialog. The screen updates with additional steps.
3. Click the link in *Step 2: Click here to retrieve offline html file*.

An html file is created named `OcularisActivationRequest.html` and stored in:

```
c:\Program Files (x86)\OnSSI\Ocularis Licensing Activation\OfflineActivation
```


4. Copy this file to portable media and bring to a computer that has internet connectivity.
5. Launch the `OcularisActivationRequest.html` file (double-click it).
6. The default web browser should launch and load a page with a Download button. Click the **Download** button.
7. The browser may ask you if you want to save a file called `response.xml` from `licensing.onssi.com`. Choose **Save As** and save it to portable media. For subsequent licensing, the file may have the format 'response(x).xml' where the 'x' is 1, 2, etc. based on the number of response files created.
8. Bring the `response.xml` file back to the Ocularis Base computer.
9. On the Ocularis License Activation screen, click the link in *Step 3: Click here and browse to the response file*.
10. In the resulting Windows' Open dialog, browse to the `response.xml` file you just brought from the internet connected machine. Select the file and click **Open**.
11. You should see a 'License Successfully Refreshed' pop-up. Click **OK**.

You are done! The **License Status** area of the *Ocularis License Activation* screen displays updated information based on your SLC.

Deactivating the Ocularis SLC

Deactivating your Ocularis SLC is done when you want to move the Ocularis Base software from one computer to another computer or during certain upgrades. Before you begin, consider that when you move Ocularis Base from one computer to another, the database which stores Ocularis settings, as well as existing Bookmarks, must be moved manually from the source computer to the destination computer. There is also a limit to the number of deactivations for each license. Typically, you may deactivate an Ocularis SLC up to five times. Beyond that, you need to contact OnSSI Technical Support for further assistance.

To Deactivate an Ocularis license

1. Launch the *Ocularis License Activation* application.
2. Notice the *Deactivate License* icon. 

Click the *Deactivate License* icon. You will receive a pop-up with a warning message reminding you that license deactivation stopped the Base from functioning.

3. If you are sure you want to proceed, click **Yes** to deactivate the Ocularis SLC.

On the destination computer, install Ocularis Base (see *Installing Ocularis Base* on page 13) and activate the same SLC on this computer (see *Activating the Ocularis SLC* on page 17). Restore the Ocularis SQL Database and bookmarks (see the document *Ocularis Base Database Backup*). If you had events configured on the original Ocularis Base computer, the event proxies will need to be updated to direct events to this new Ocularis Base IP address.

If the computer does not have internet connectivity, contact [OnSSI Tech Support](#) to deactivate the SLC.

Installing Ocularis Components

Certain components of Ocularis, namely: *Ocularis Client*, *Ocularis Administrator* and Ocularis recording components, are downloaded and installed from a central webpage located on the Ocularis Base machine. This makes installation easy as system administrators need not obtain separate installation files and move them from computer to computer. Since computers running Ocularis components need to have network connectivity to the Ocularis Base system anyway, the installation files for Ocularis components may be accessed from the Base machine.

A local webpage must be launched in order to download Ocularis components.

Ocularis Component Location

Ocularis components may be installed in various locations on a network. The configuration chosen depends on many factors including (but not limited to): the number of cameras licensed, the recording component used and the availability of computer hardware for the system.

Single Server System

In most cases, a single server system will suffice. In this layout, a central server is used as the primary location for the following components:

- Ocularis Base
- Recording Component
- and perhaps even the *Ocularis Administrator* (depending on the graphics card)

The 'Single Server' is a good system to start with when first implementing Ocularis, especially on smaller systems (those with less than 30 cameras). In an Ocularis Professional environment, it is even acceptable to run the components on a Windows 7 or 8 PC, rather than a server class machine, provided the camera count is low. Networked workstations will have the *Ocularis Client* installed on them. You may install the *Ocularis Client* component on an unlimited number of workstations.

As the system grows and cameras are added or upgraded, the capacity of the recording component computer will be reached. The expansion process would be to then simply add an additional server on the network to house an additional instance of the recording component and install the new cameras on the new recorder. With Ocularis, the location of the camera is seamless to the operator.

Distributed System

In cases where the systems are larger or with Ocularis Enterprise or Ocularis Ultimate, a multiple server system (also called 'Distributed System') is recommended. In a Distributed System, separate dedicated servers are used with single components installed on each. The Ocularis Base may reside on one server (with or without a recording component), recording components each on their own servers, and the *Ocularis Administrator* and *Ocularis Client* on one or more networked workstations.

Which system is best for me?

It is important to determine the general layout of where you want components to be installed on new Ocularis installations. In general, it is safe for most users to select a Single Server System and grow into a Distributed System. If you have hundreds of cameras (or more), use a Distributed System as a model. Otherwise, most installations will be fine with a Single Server layout to start.

There is no set formula to determine the layout for each installation, as each organization is unique. The system layouts described here are simply for use as a general guideline. Contact [OnSSI Sales Engineering](#) for system layout advice if you are unsure.

To Access the Ocularis Component Downloads Page

Note: Be sure to turn off any Firewalls running on the Ocularis Base machine.

1. Determine the layout of the Ocularis system and go to the machine where you want to install the component.
2. Access the download webpage located on the Base computer through a browser using the following URL:

```
http://[BASE_IP]:[port]/OcularisService
```

where **[BASE-IP]** is either the IP Address or computer name of the Ocularis Base machine and port is the IIS port number. In most cases, the default port 80 is used and it is not necessary to enter it here. This URL will redirect to a longer one, which may also be used:

```
http://[BASE_IP]:[port]/OcularisService/InstallerWebsite/install.html
```

The following web page appears:

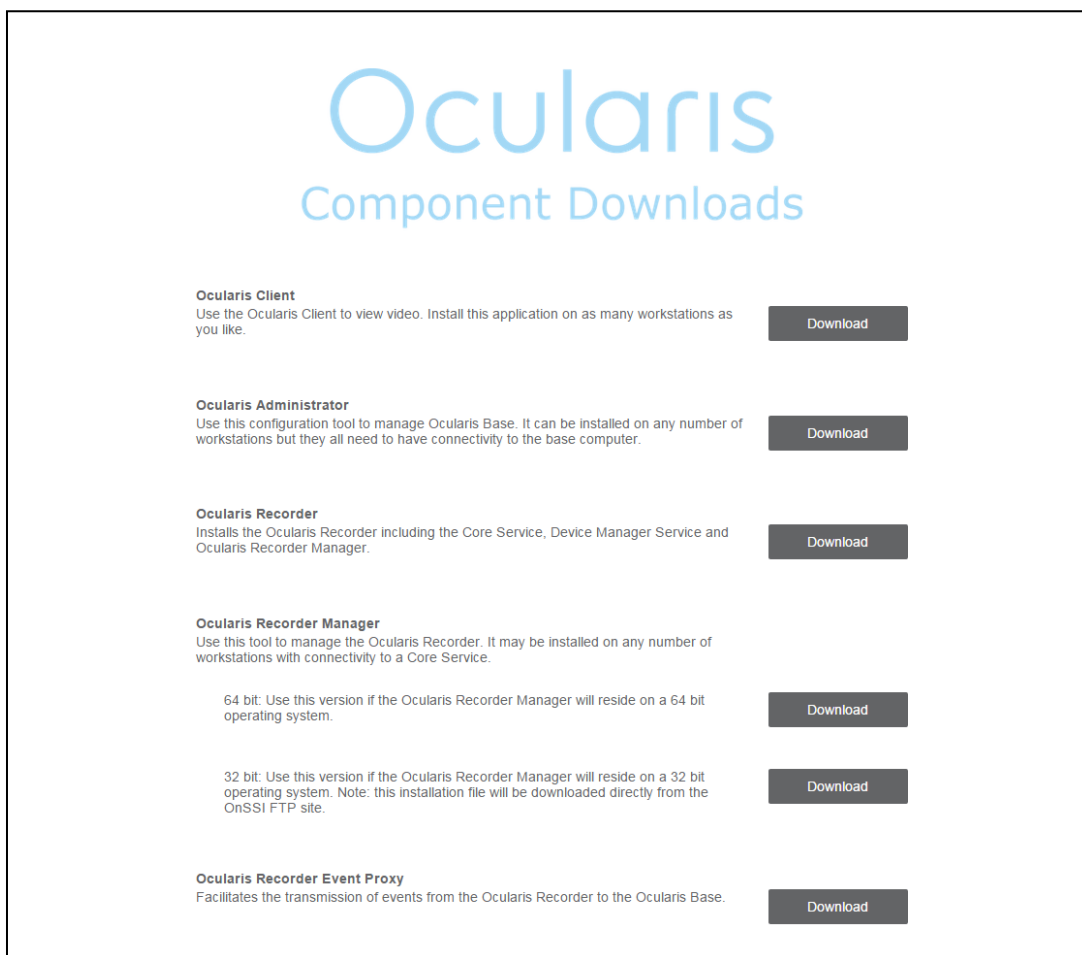


Figure 12 Install Ocularis Components Web Page

3. Click the **Download** button next to the component you wish to download and install.
4. You may be asked whether to run or save the installation file for the component. You may save the file locally and run it later or simply run it now. Click the file to launch the installer.

The installation for each component will continue. See the instructions below specific to each component.

Installing Ocularis Administrator

- Refer to the system requirements defined on the OnSSI website for hardware specifications.
- The *Ocularis Administrator* must have network connectivity to the computer where the Ocularis Base software is installed.
- Prior to using *Ocularis Administrator* on a new system, you must license your copy of Ocularis Base. See [Licensing Ocularis Base](#) on page 17 for more details.
- Follow this procedure when installing a new system or upgrading an older version of *Ocularis Administrator*.

To INSTALL OCULARIS ADMINISTRATOR

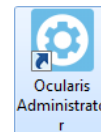
These instructions assume that you have installed Ocularis Base and are located at the system on which you wish to install *Ocularis Administrator*. Use these steps for all feature sets of Ocularis.

1. From the 'Ocularis Component Downloads' web page, click the **Download** button next to Ocularis Administrator.
2. You may be prompted to run or save the file; you may choose to either run it now or save it and run the installation later. In a new installation, an extraction wizard screen will appear. Follow the prompts to extract the files and then you'll see the *Welcome to Ocularis Administrator Setup Wizard* screen.
3. Launch file to run. Once **Run** has been selected, the *Welcome to Ocularis Administrator Setup Wizard* appears. Click **Next**.
4. The *License Agreement* appears. Please read, click the "I accept.." radio button, and then click **Next**.
5. If a previous version of the *Ocularis Administrator* is detected, a notice will appear asking for your confirmation to uninstall the older version and install the new version. Click **Yes**.
 - a. An "Are you sure you want to remove Ocularis Administrator...?" screen appears. Click **Yes**.
 - b. When the uninstall is complete, click **OK**.
6. The *Select Destination Folder* screen appears.

You may leave the default directory path as is or change it if necessary according to your organization. If installing a version to be used as a demo, keeping the default path is recommended. Click **Next**.
7. The next screen, *Ready to Install the Program*, will confirm the file path and disk space requirements. Click **Next** if OK. Click **Back** to make changes to the directory path or the folder.

The *Ocularis Administrator* software is installed.
8. When completed, the *Setup Wizard Complete for Ocularis Administrator* screen appears.
9. Click **Finish**.

The installation of *Ocularis Administrator* will create the following icon on the desktop:



Installing Ocularis Client

- The *Ocularis Client* may be installed on as many systems as desired.
- Refer to the system requirements defined on the OnSSI website for hardware specifications.
- Follow this procedure when installing a new system or upgrading existing copies of *Ocularis Client*.

To INSTALL OCULARIS CLIENT

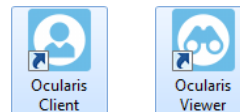
These instructions assume that you have installed Ocularis Base and are located at the system on which you wish to install *Ocularis Client*. Use these steps for all feature sets of Ocularis.

1. From the 'Ocularis Component Downloads' web page, click the **Download** button next to Ocularis Client.
2. You may be prompted to run or save the file, you may choose to either run it now or save it and run the installation later. In a new installation, an extraction wizard screen will appear. Follow the prompts to extract the files and then you'll see the *Welcome to Ocularis Client Setup Wizard* screen.
3. Once **Run** has been selected, if a previous version of the *Ocularis Client* is detected, a notice will appear asking for your confirmation to uninstall the older version and install the new version. Click **Yes**.
 - a. An "Are you sure you want to remove Ocularis Client...?" screen appears. Click **Yes**.
 - b. When the uninstall is complete, click **OK**.
4. The *Welcome to Ocularis Client Setup Wizard* appears. Click **Next**.
5. The *License Agreement* appears. Please read, click the "I accept.." radio button and then click **Next**.
6. The *Select Destination Folder* screen appears.

You may leave the default directory path as is or change it if necessary according to your organization. If installing a version to be used as a demo, keeping the default path is recommended. Click **Next**.
7. The *Select Language* screen appears. Select the desired language for *Ocularis Client* from the drop-down menu. The language may be changed again after the software has been installed. Click **Next**.
8. The next screen, *Ready to Install the Program*, will confirm the file path and disk space requirements. Click **Next** if OK. Click **Back** to make changes to the directory path or the folder.

The *Ocularis Client* software is installed.
9. When the *Ocularis Client* Setup is completed, the *Setup Wizard Complete for Ocularis Client* screen appears. Click **Finish**.

The software installation will result in the display of the following desktop icons:



Installing Ocularis Recorder

- The Ocularis Recorder may be installed on the same computer as other components.
- Refer to the system requirements defined on the OnSSI website for hardware specifications.
- Multiple scripts are used for installation, so you should disable any active virus scanners for the duration of installation.
- The Ocularis Recorder must not be installed on a compressed drive, since this can result in problems with the database. A drive on which Ocularis Recorder is already installed must not be compressed subsequently.
- DirectX is installed during installation, and Microsoft .NET Framework 4 as well, which may require a restart in the case of a first time installation.
- The recording component included with Ocularis 5 require a corresponding recorder license (SLC). This code is used to generate a file (license.key or license.zip) that is imported using the Ocularis Recorder Manager after the software is installed.
- The server software (Core Service) can only be installed on computers with the NTFS file system.

Firewalls

- Multiple ports on the computer must be available by default to allow the Ocularis Recorder software to function correctly in a network environment with a firewall. These are in the range from 60000 to 60008 (TCP communication), 63000 (TCP) and 60007 (UDP, image transmission).
- The TCP alarm ports of the camera must also be accessible on the server computer that administers a camera to guarantee alarm processing.
- Some cameras use the 'RTSP over RTP over UDP' standard for MPEG4 image transmission. In this case, the server sends the requirements (e.g. frame rate and resolution) to the camera via TCP port 554. The camera sends the image data to the server via a UDP port.

The corresponding ports must therefore not be blocked between the camera and the server.

The versions of recording components included with Ocularis 5 include:

Ocularis Professional Recorder	v6.6.1
Ocularis Enterprise Recorder	v6.6.1
Ocularis Ultimate Recorder	v6.6.1

Recorder Components

These recorders have the following components:

- **Core Service** – This service authenticates users, permissions and some alarms. It runs as a service. There may be many cores in an installation. In Ocularis Enterprise and Ocularis Ultimate you can set up one core ('the slave') to be redundant for the primary ('the master') core.
- **Device Manager (DM)** – This service communicates with devices (cameras) and clients. There may be many DMs in an installation. In Ocularis Ultimate, you may set up one DM to be a failover (redundant recorder) for another DM in the event of a DM failure.
- **Ocularis Recorder Manager** – This is the software application used to configure the Core and DM(s).

Recorder Component Installation

These instructions assume that you have installed Ocularis Base and are located at the system on which you wish to install the Ocularis v5 Recorder.

Reminder: the operating system on which you install this component must be 64-bit.

There are four set up types for installation:

- a. [Standard installation \(Manager & Server\)](#)
Use this set up type to install all components on the current system.
- b. [Manager Installation only](#)
Use this set up type to install only the Ocularis Recorder Manager software on the current system.
- c. [Device Manager Installation](#)
This set up type installs the Device Manager (DM) component as well as the Ocularis Recorder Manager software on the current system. A 'Device Manager' is equivalent to 'Recorder' and the terms are used interchangeably.
- d. [Custom Installation](#)
This setup type allows you to pick and choose which component you would like to install on the current system.

The steps below outline each of the four set up types.

NOTE:

- With Ocularis Professional **ONLY** you must install a Master Core along with a DM on each server. You may use the 'Manager & Server' option for each recording server. Each server requires a unique SLC from OnSSI Sales.
- With Ocularis Enterprise or Ultimate there should be only one Master Core and optionally one or more Slave Cores in the entire environment. Use the 'Manager & Server' option **only** on the first computer. Each additional server will have just a 'Device Manager' or use 'Custom' to install a DM and a 'Slave' core. These models use only one SLC per environment.

Standard installation (Manager & Server)

The standard installation installs the system with the managers (configuration application also called the 'Ocularis Recorder Manager' and device manager) and Server ('Core') on a single system ('Manager & Server').

1. From the 'Ocularis Component Downloads' web page, click the **Download** button next to Ocularis Recorder.
2. Choose to *Run* the application to launch the installer.
3. Select the installation language. You can configure the language of the user interface after installation.
4. Click **OK** to start installation.
5. At the *Welcome* screen, click **Next**.
6. Read the software license agreement, accept the terms and then click **Next**.
7. Change the destination folder if desired. Click **Next**.

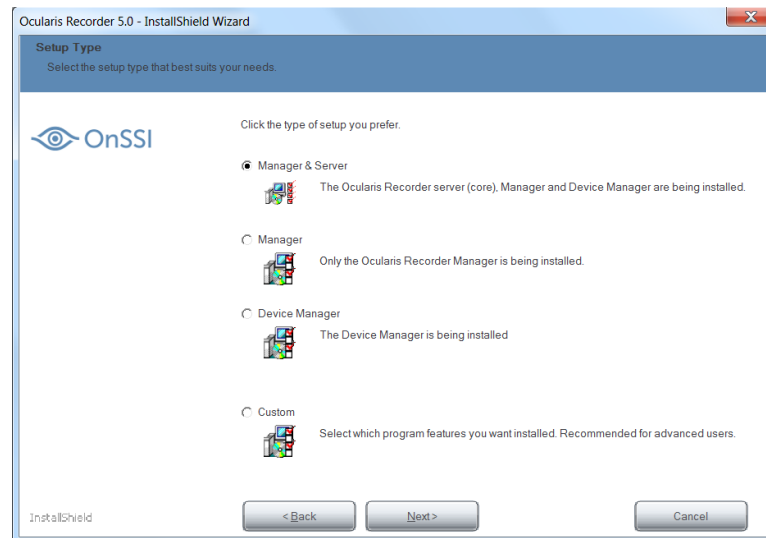


Figure 13 Select the Set up Type

8. Select 'Manager & Server' as the Setup Type and click Next.

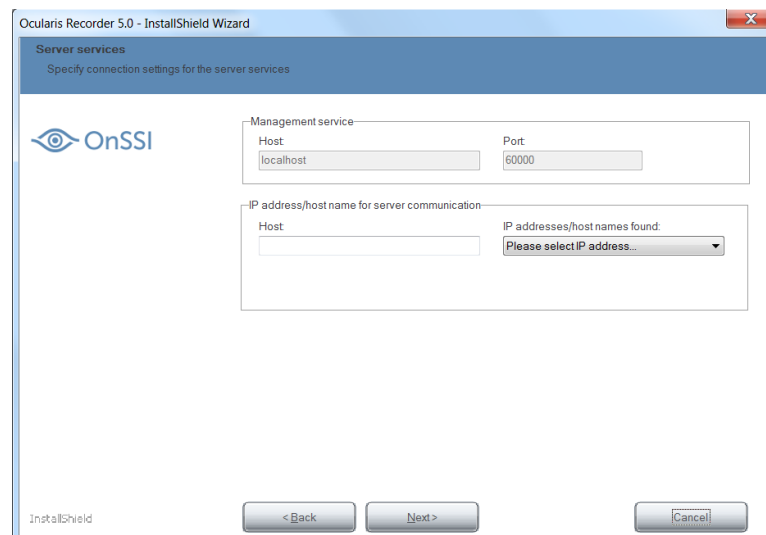


Figure 14 Communication Information

The port number of the Management service is set at '60000'. If the port number must be changed, contact Tech Support.

9. In the Host field under 'IP address/hostname for server communication', enter the IP Address for the Device Manager. You can do this typing it in or selecting it from the drop-down list labeled 'IP addresses/host names found'. This should be the IP Address of the computer you are running the installation on.

Neither the IP 127.0.0.1 nor the host name 'localhost' may be used for communication with the server.

Click **Next**.

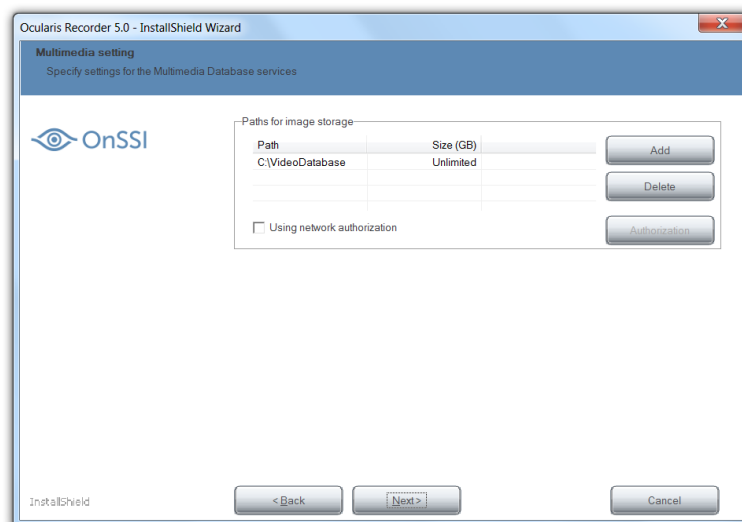


Figure 15 Video Database (Zone) Setup

10. If you want, alter the existing path for image storage, or delete or add additional folder paths. Additional locations or 'zones' for video storage may be added now or after the software has been installed. If the folder is created on a network drive, enter the complete UNC path.

Example: \\IP Address\Release name\path

If the network drive is protected with a user name and password, select **Using network authorization** and click **Authorization**.

Enter the user name and password for accessing the network drive, and then click **OK**. Ensure that the specified user is available locally and that the domain is included in the user name field (e.g. "Domain\User name").



A Note About Zones

- A zone should never be as large as the available maximum storage space on the hard disk.
- The hard drive's cluster size should be 64KB.
- You can use a maximum of 10 zones per DM; each zone should be on its own dedicated partition; it is better to have few larger zones than many smaller zones that this impacts performance
- It is recommended to store video data on a separate hard disk or RAID system. Do **NOT** use a hard disk connected via USB or firewire.
- Zones on the network may be identified with a UNC path. You'll also need to provide network username and password.
- **Note: it is STRONGLY recommended to use a storage location with a minimum of 200 GB available space and set the maximum size of the zone to 'Unlimited'. Otherwise, there is a risk of running out of disk space and having the recording stop.**

Click **Next**.

11. Click **Install**.
12. When asked, accept the EULA (End User License Agreement) for installing the Microsoft DirectX 9 component. This window may appear behind the primary installation window.

The Ocularis Recorder components: Core Server, Device Manager and Recorder Manager are now installed on your computer.

Manager Installation

There are two ways to install only the application to configure the recorder (aka Ocularis Recorder Manager).

From the main recorder installation:

1. From the 'Ocularis Component Downloads' web page, click the Download button next to Ocularis Recorder.
2. Choose to *Run* the application to launch the installer.
3. Select the installation language. You can configure the language of the user interface after the installation.
4. Click **OK** to start installation.
5. At the *Welcome* screen, click **Next**.
6. Read the software license agreement, accept the terms and then click **Next**.
7. Change the destination folder if desired. Click **Next**.
8. Select 'Manager' as the Setup Type (see *Figure 13*) and click **Next**.
9. Click **Install** to begin the installation.
10. When asked, accept the EULA (End User License Agreement for installing the DirectX 9 component. This window may appear behind the primary installation window

From the Ocularis Component Downloads page:

1. From the 'Ocularis Component Downloads' web page, click the Download button next to Ocularis Recorder Manager (either 64-bit or 32-bit).
2. Choose to *Run* the application to launch the installer (or save the file and launch manually).
3. Change the destination folder for the installation files if desired. Click **Next**. The installation files are extracted.
4. At the *Extraction Complete* screen, make sure the 'Install Ocularis Recorder Manager' checkbox is checked. Click **Finish**.
5. Select the installation language. You can configure the language of the user interface after the installation.
6. Click **OK** to start installation.
7. At the *Welcome* screen, click **Next**.
8. Read the software license agreement, accept the terms and then click **Next**.
9. Change the destination folder for the application files if desired. Click **Next**.
10. Click **Install** to begin the installation.
11. When asked, accept the EULA (End User License Agreement for installing the DirectX 9 component. This window may appear behind the primary installation window.
12. On the Wizard Complete screen, click **Finish**.

Device Manager Installation

In the Device Manager installation, only the database modules for the video database are installed together with the Ocularis Recorder Manager on a different computer from the already installed Ocularis Recorder Manager and Core server. The Device Manager reduces the utilization of the core server because the image database is located partially or entirely on another server.

In order to configure the Device Manager server, you need an installed and configured Ocularis Recorder Manager and Core server .

1. From the 'Ocularis Component Downloads' web page, click the Download button next to Ocularis Recorder.
2. Choose to *Run* the application to launch the installer.

3. Select the installation language. You can configure the language of the user interface after installation.
4. Click **OK** to start installation.
5. At the *Welcome* screen, click **Next**.
6. Read the software license agreement, accept the terms and then click **Next**.
7. Change the destination folder if desired. Click **Next**.
8. Select 'Device Manager' as the setup type (see *Figure 13*) and click **Next**.

Figure 16 ;Communication Information

9. In the Management service area, specify the IP address of the Master Core in the Host field. Leave the port number unchanged at '60000'.



It is important to enter the IP address of the Master Core in the Host field of the Management service area in order for the system to function properly. Leave the port as 60000

In the *IP address/host name for server communication* area, the IP address of the Device Manager should be placed in the *Host* field. This can be done either by typing it in or by selecting it from the *IP address/host names found* in the drop-down list. The list shows you all of the existing network addresses and host names of the PC or server. If there is more than one network adapter on this computer, be sure to select the correct one.

Neither the IP 127.0.0.1 nor the host name 'localhost' may be used for communication with the server.

Click **Next**.

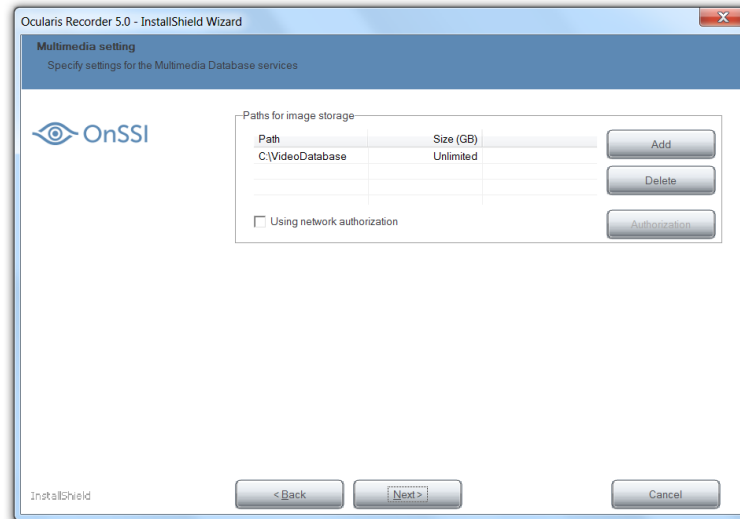


Figure 17 Video Database Setup

10. If you want, alter the existing path for image storage, or delete or add additional folder paths. Additional locations, or 'zones', for video storage may be added now or after the software has been installed. If the folder is created on a network drive, enter the complete UNC path.

Example: "\\Server name\Release name\Path..." or "\\IP address\Release name\Path..."

If the network drive is protected with a user name and password, check **Using network authorization** and click **Authorization**.

Enter the user name and password for accessing the network drive, and then click **OK**. Ensure that the specified user is available locally and that the domain is included in the user name field (e.g. "Domain\User name").



A Note About Zones

- A zone should never be as large as the available maximum storage space on the hard disk.
- The hard drive's cluster size should be 64KB.
- You can use a maximum of 10 zones per DM; each zone should be on its own dedicated partition; it is better to have few larger zones than many smaller zones that this impacts performance
- It is recommended to store video data on a separate hard disk or RAID system. Do **NOT** use a hard disk connected via USB or firewire.
- Zones on the network may be identified with a UNC path. You'll also need to provide network username and password.
- **Note: it is STRONGLY recommended to use a storage location with a minimum of 200 GB available space and set the maximum size of the zone to 'Unlimited'. Otherwise, there is a risk of running out of disk space and having the recording stop.**

11. Click **Next**.
12. Click **Install**. The Device Manager server is installed on your computer.

Custom Installation

In a custom installation you can install selected modules. In certain Ocularis models, it is also possible to install an additional core server in slave mode that serves as a redundant server and thus increases the reliability of the core server.

1. From the 'Ocularis Component Downloads' web page, click the Download button next to Ocularis Recorder.
2. Choose to *Run* the application to launch the installer.
3. Select the installation language. You can configure the language of the user interface after installation.
4. Click **OK** to start installation.
5. At the *Welcome* screen, click **Next**.
6. Read the software license agreement, accept the terms and then click **Next**.
7. Change the destination folder if desired. Click **Next**.
8. Select 'Custom' as the setup type (see *Figure 13*) and click **Next**.
9. Select the desired services and features. **Core Service Slave and Core Service Master cannot both be installed simultaneously on the same machine.**

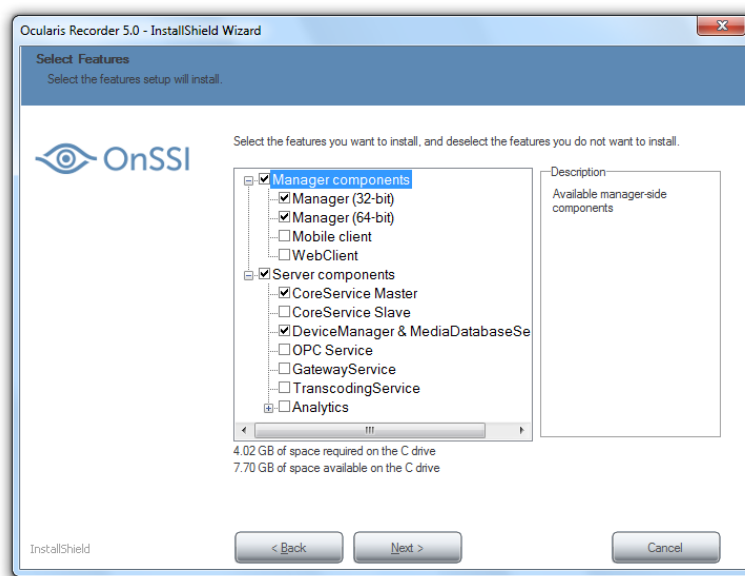


Figure 18 Select Components to Install

You can deselect services and features that are not required.

IMPORTANT: if a previously installed service is deselected, it will be removed.

10. Click **Next**.

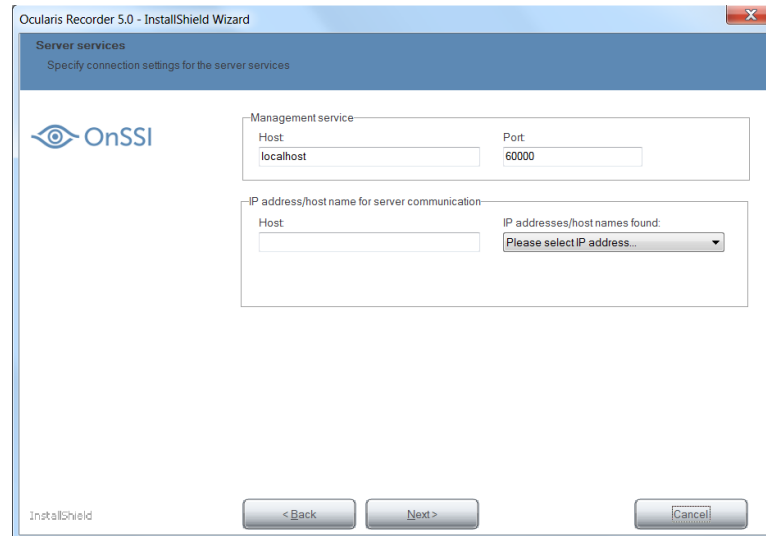


Figure 19 Communication Information

11. This screen is dynamic based on the components you selected to install.

- If you are installing only a Master Core Server:
 - *Management service/Host and Port:* these fields are disabled but should contain 'localhost' and '60000'
 - *IP address/host name for server communication-Host:* this field should contain the IP Address of the Master Core Server
- If you are installing only a Master Save Server:
 - *Management service/Host and Port:* Enter the IP Address of the Master Core in the Host field and '60000' in the Port field
 - *IP address/host name for server communication-Host:* these fields are disabled
- If you are installing only a Device Manager:
 - *Management service/Host and Port:* Enter the IP Address of the Master Core in the Host field and '60000' in the Port field
 - *IP address/host name for server communication-Host:* this field should contain the IP address of the Device Manager
- If you are installing a Master Core Server and a Device Manager:
 - *Management service/Host and Port:* these fields are disabled but should be 'localhost' and '60000'
 - *IP address/host name for server communication-Host:* this field should contain the IP Address of the Device Manager
- If you are installing a Slave Core Server and a Device Manager:
 - *Management service/Host and Port:* Enter the IP Address of the Master Core in the Host field and '60000' in the Port field
 - *IP address/host name for server communication-Host:* this field should contain the IP address of the Device Manager

The Host field in the IP address/host name for server communication area should be populated by selecting it from the drop-down menu or you may enter it manually. The drop-down list shows you all of the existing network addresses of the PC or server. If there is more than one network adapter on this computer, be sure to select the correct one

12. When ready, click **Install**.

13. If asked, accept the EULA (end user license agreement) for installing the Microsoft DirectX 9 component. This window may be behind the primary installation window.

The modules and services are now installed on your computer. Ocularis Recorder and its corresponding components will not put an icon on the computer desktop. All relevant components appear in the Windows Start menu under OnSSI→Ocularis Recorder.

Recorder Update Patch

The v5 recording components are typically updated on a monthly basis between major versions. These updates address minor fixes or issues in the software. They are available to any customer regardless of the status of their StayCURRENT plan. There may be times when no update is available if a version was recently released.

1. Obtain the Recorder Update executable file from the OnSSI website (<http://onssi.com/software-downloads/>).
2. On **each and every** computer that has any recording component, run the executable file. Components include:
 - Master Core
 - Slave Core
 - Ocularis Recorder Manager
 - Device Manager
 - Transcoding Service/SGS Service
3. Follow the on-screen prompts to install the update. This is a very quick process.

Ocularis Recorder Licensing

Unlike many other recorders, the Ocularis 5 Recorder does not license specific cameras. There is no need to identify device MAC addresses to OnSSI. Rather, the number of channels (or streams) is licensed on the recorder's Master Core. The license process for the Ocularis 5 Recorders has been streamlined and simplified. With these recorders, simply activate your recorder SLC from within the software. Licensing is available using an online or offline method.

Supported Recorders

The recorders supported using the license methods described here are: Ocularis Professional Recorder, Ocularis Enterprise Recorder and Ocularis Ultimate Recorder. To register camera licenses for any other Ocularis recorder (such as RC-E) use the instructions provided in the document *Ocularis Camera License Registration*.

For the supported recorders, the software provides a free 30-day trial. You may add cameras, configure the system, and add the recorder to Ocularis Base all during this period. You must, however, be sure to license the recorder within the 30 day period, otherwise, the recorder will cease to function. The seven digit v5 recorder SLCs contain the prefix '500'.

The process to license a demo version is slightly different than licensing a retail version.

Licensing Online

Licensing should be done prior to the end of the 30-day trial. Licensing may be done online or offline.

Licensing a Retail Version Online

Use these steps when you need to license a production system:

From the *Ocularis Recorder Manager* application:

1. From the *Info* menu, select **Activate license**.
2. Click **OK** to the message reminding you that this feature requires a connection to the internet.
3. Verify that the *Personalize License* radio button is selected. (this is the default selection).
4. Enter your recorder SLC. This SLC should start have 7 digits starting with '500'
5. Fill out the remainder of the form.
6. Click **OK** to confirm your entries.

The application connects to the OnSSI registration server and obtains the license.

You are done!

To view your licensing information, from the *Info* menu, select **Show license**.

Licensing a Demo Version Online

Use these steps to license a demo system.

1. You will receive a demo license file from OnSSI.
2. In the *Ocularis Recorder Manager* application, choose the *Info* menu and select **Import license file**.
3. Click **Select** to navigate to the license file from step 1. Select the file and then click **Open**.
4. Click **Import** to use the license key.

You are done!

To view your licensing information or expiration date, from the *Info* menu, select **Show license**.

Licensing Offline

Offline licensing must be done via webpage on the OnSSI website (www.onssi.com/support/recorderlicensing)

First Time Licensing

The first time (initial) license of the recorder software may be done online or offline. Offline instructions are shown here.

1. Open the *Ocularis Recorder Manager*. In the *Info* menu, select **Request Product ID**.
2. Click **Copy** to copy the Product ID to the Windows clipboard.
3. Click **OK** to close the Product ID pop-up.
4. Paste the contents of the clipboard to a Notepad or other text file. Save the file to portable media and bring it to a computer that does have internet connectivity.
5. From a browser, go to the URL: www.onssi.com/support/recorderlicensing
6. In the section: 'Initial installation: New license code', enter your SLC (i.e. the 7 digit SLC with the prefix '500') and fill out the remainder of the form. In the Product-ID field, paste the contents of the text file that you created from the *Ocularis Recorder Manager* in step 4.
7. When done, click **Submit**.
8. The SLC is verified with the OnSSI licensing server. A license key is emailed to the email account specified on the form. There may be a delay of up to 10 minutes to receive the email from the licensing server.
9. Detach the license key file from the email attachment and bring the file to the offline computer running the *Ocularis Recorder Manager*.
10. In the *Ocularis Recorder Manager* application, choose the *Info* menu and select **Import license file**.
11. Click **Select** to navigate to the license file from step 5. Select the file and then click **Open**.
12. Click **Import** to use the license key.

You are done!

To view your licensing information or expiration date, from the *Info* menu, select **Show license**.

Changes to Server Hardware

If you need to use new hardware with an existing Ocularis Recorder, you need to update the license. This procedure is currently only available by using a form on the website.

1. On the new hardware, install the software and restore the backup. (See the document *Ocularis Recorder Database Management Guide* on how to restore a backup).
2. On the new system, open the *Ocularis Recorder Manager*. In the *Info* menu, select **Request Product ID**.
3. Click **Copy** to copy the Product ID to the Windows clipboard.
4. Click **OK** to close the Product ID pop-up.

5. If the computer you are on has internet connectivity, skip to step 7.
6. If the computer you are on does not have internet connectivity, paste the contents of the clipboard to a Notepad or other text file. Save the file to portable media and bring it to a computer that does have internet connectivity.
7. Open a browser and go to the URL: www.onssi.com/support/recorderlicensing
8. In the section 'Modified server hardware: New product ID', fill out the form providing your SLC and personal credentials. Copy and paste the Product ID from the text file to the last field on the form. Click **Submit**.
9. You will receive a new license key via the email you provided on the form. Extract the attachment.
10. On the new system's *Ocularis Recorder Manager*, choose the *Info* menu and select **Import license file**.
11. Click **Select** to navigate to the license file from the email. Select the file and then click **Open**.
12. Click **Import** to use the updated license key.

You are done!

Updating A License

If you have updated an existing installation, expanded your system or lost your license code, you can request a new license code from our website.

1. Open a browser and go to the URL: www.onssi.com/support/recorderlicensing
2. Scroll to the section 'License update: Re-licensing'. Enter your recorder SLC. This 7 digit SLC should start with the prefix '500'. Click **Submit**.
3. You will receive a new license key via the email account you provided when you first personalized the original license. Extract the license key attachment.
4. In the *Ocularis Recorder Manager*, choose the *Info* menu and select **Import license file**.
5. Click **Select** to navigate to the license file from the email. Select the file and then click **Open**.
6. Click **Import** to use the updated license key.

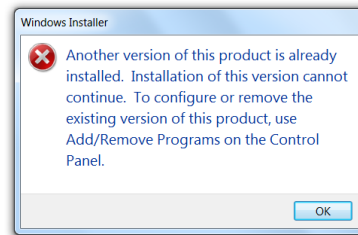
You are done!

Ocularis Recorder Manager

The Ocularis Recorder Manager is the client application used to configure the v5 Ocularis Recorder. This software application may be installed on any computer with network connectivity to the recorder. It is included with the download and installation of the Ocularis Recorder download link.

The Ocularis Component Downloads webpage provides a separate installer which allows you to download and install just this recorder component on another computer, saving you the time from having to download the entire recorder package. Installing this component separately is optional. This application is available for 32-bit or 64-bit operating systems so be sure to select the correct download link for your operating system.

Note: if you attempt to install this application on a computer on which it is already installed, you will see an error message:



These instructions assume that you have installed Ocularis Base and are located at the system on which you wish to install the *Ocularis Recorder Manager*. There should be no other instance of *Ocularis Recorder Manager* installed on the local machine.

To Install only the Ocularis Recorder Manager

1. From the 'Ocularis Component Downloads' web page, click the **Download** button next to Ocularis Recorder Manager (32-bit or 64-bit).

Note: *The 32-bit version will download the installation file from the OnSSI ftp server so the computer must have access to the internet.*

2. You may be prompted to run or save the file; you may choose to either run it now or save it and run the installation later.
3. Launch file to run. Once **Run** has been selected, you are prompted to select an installation language. Select a language and click **OK**. You may change the language after installation if desired.
4. At the *Welcome* screen of the installation wizard, click **Next**.
5. The *License Agreement* appears. Please read, click the "I accept.." radio button, and then click **Next**.
6. The *Choose Destination Location* screen appears.

You may leave the default directory path as is or change it if necessary according to your organization. Click **Next**.

7. The next screen, *Ready to Install the Program*, click **Install** if OK or click **Back** to make changes to the directory path or the folder.

The *Ocularis Recorder Manager* software is installed.

8. A Microsoft DirectX Setup software license agreement should appear. (it may be behind the installation window). Click **Yes** to accept the terms of the agreement.
9. When completed, the *Wizard Complete* screen appears. Click **Finish**.

Ocularis Recorder Event Proxy

Event Proxies are used to route events and other information from a server or recording component to the Ocularis Base or other 3rd party system. The Ocularis 5 models all make use of the event proxy for events from the recorder.

To Install the Ocularis Event Proxy

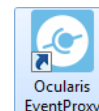
These instructions assume that you have installed Ocularis Base and are located at the system on which you wish to install *Ocularis Recorder Event Proxy*. Use these steps for all feature sets of Ocularis.

1. From the 'Ocularis Component Downloads' web page, click the **Download** button next to Ocularis Recorder Event Proxy.
2. You may be prompted to run or save the file, you may choose to either run it now or save it and run the installation later. In a new installation, you'll see the *Welcome to Ocularis Event Proxy Setup Wizard* screen.
3. Once **Run** has been selected, if a previous version of the *Ocularis Recorder Event Proxy* is detected, a notice will appear asking for your confirmation to uninstall the older version and install the new version. Click **Yes**.
 - a. An "Are you sure you want to remove Ocularis Event Proxy...?" screen appears. Click **Yes**.
 - b. When the uninstall is complete, click **OK**.
4. The *Welcome to Ocularis Event Proxy Setup Wizard* appears. Click **Next**.
5. The *Select Destination Folder* screen appears.

You may leave the default directory path as is or change it if necessary according to your organization. If installing a version to be used as a demo, keeping the default path is recommended. Click **Next**.
6. The next screen, *Ready to Install the Program*, will confirm the file path and disk space requirements. Click **Next** if OK. Click **Back** to make changes to the directory path or the folder.

The *Ocularis Recorder Event Proxy* software is installed.
7. When the *Ocularis Recorder Event Proxy Setup* is completed, the *Setup Wizard Complete for Ocularis Recorder Event Proxy* screen appears. Click **Finish**.

The software installation will result in the display of the following desktop icons:



To Configure the Ocularis Event Proxy

1. Launch the event proxy from the desktop icon or the Windows Start menu. (**Start** → **All Programs** → **OnSSI** → **Ocularis Event Proxy**)



Figure 20 Ocularis Event Proxy

2. The **Recorder Settings** button is the only one enabled. Click this button to enter recorder criteria.

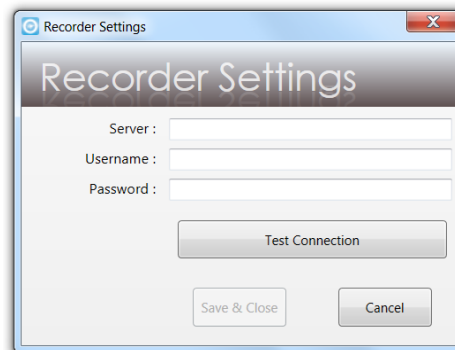


Figure 21 Recorder Settings

3. Enter the **Server** IP Address for the recorder. Note that *localhost* is not supported. Also provide a username and password for an administrative account that is on the recorder.
4. Click **Test Connection**. Communication with the server is tested and if successful, a pop-up message appears indicating as such.
5. Click **Save & Close**.

Once the recorder is configured, the Base Settings button becomes enabled.

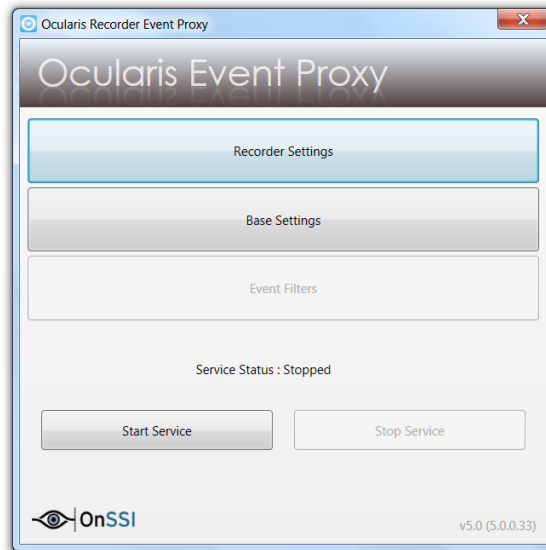


Figure 22 Configure Base Settings

6. Click **Base Settings**.

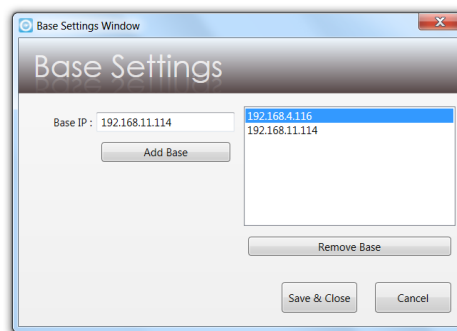


Figure 23 Base Settings

7. Enter the IP address of Ocularis Base in the **Base IP** field and click **Add Base**. You can add multiple IP addresses in the Base IP field if you need to send events to additional servers (for example: OpenSight). If you need to remove a Base IP from the list, select it and click **Remove Base**.
8. When done, click **Save & Close**.

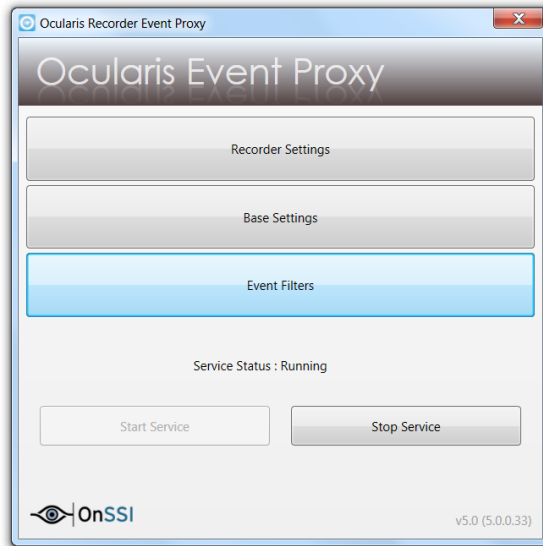


Figure 24 Select Events

9. The last step is to select the events that you wish the proxy to forward to the Base IP(s) you listed. Click **Event Filters**.

The events you see listed are grouped by Camera Events and System Events. Check the events you want transferred from the recorder to the Base. Note: any alarms that you have configured on the recorder will automatically be transferred to the Base.

10. Select the events you wish to monitor.
11. Click **Save & Close**.

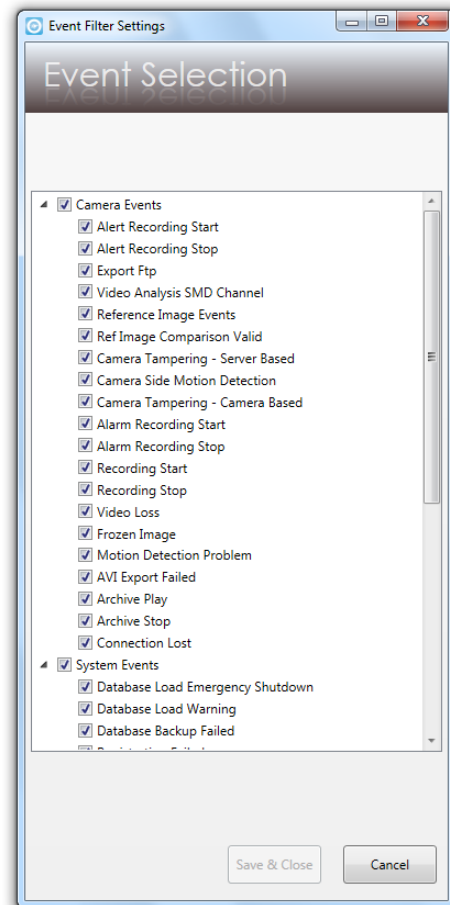


Figure 25 Select Events

Installing Ocularis Recorder Web Client

The Ocularis Recorder included with v5 contains its own web client. These steps instruct you on how to install the necessary server side components. You should install the web client services on a separate computer (i7 or better). Depending on the number of streams that will be used simultaneously you may be able to install these services together with other Ocularis components. The following browsers are supported: Google Chrome (recommended), Mozilla Firefox, Microsoft Internet Explorer, Apple Safari and Opera. The web client can be used with all models of Ocularis v5. You may install multiple instances of web client components for redundancy or to support additional users.

Ocularis Media Server is not supported with Ocularis version 5 at this time.

TO INSTALL OCULARIS RECORDER WEB CLIENT

These instructions assume that you have installed Ocularis Base and are located at the system on which you wish to install the Ocularis Recorder web client services. You'll be using the 'Custom' option in the Ocularis Recorder installation procedure.

1. From the 'Ocularis Component Downloads' web page, click the Download button next to Ocularis Recorder.
2. Choose to *Run* the application to launch the installer.
3. Select the installation language.
4. Click **OK** to start installation.
5. At the *Welcome* screen, click **Next**.
6. Read the software license agreement, accept the terms and then click **Next**.
7. Change the destination folder if desired. Click **Next**.
8. Select 'Custom' as the setup type (see *Figure 13*) and click **Next**.
9. Make sure that the following are checked: Under 'Manager components', **WebClient**. Under 'Server components', **GatewayService** and **TranscodingService**.

Note: Remember that if there are other Ocularis Recorder components on this computer, you must be sure that those components are also checked. Otherwise, you risk uninstalling a necessary component. If a previously installed service is deselected, it will be removed.

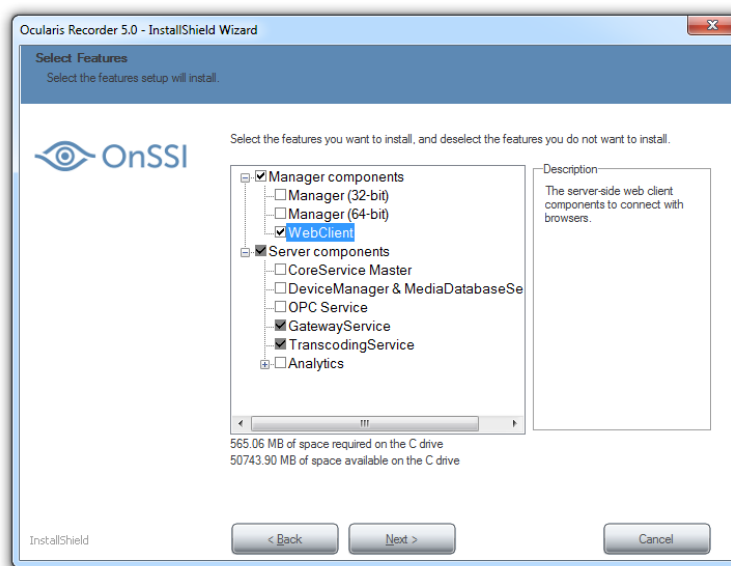


Figure 26 Installing Web Client Services

10. Click **Next**.

11. On the next screen ('Server services' as shown in Figure 19), enter the IP address for the Master Core in the Host field of the 'Management service' section. The port should be left as '60000'.
12. Select the IP address of the current computer for the Host field in the section 'IP address/host name for server communication'.
13. Click **Next**.

The modules and services are installed.

Additional configuration is required in order to use the web client. Refer to the document *Ocularis Recorder Web Client Installation Manual* for detailed instructions.

Appendix A

Ocularis Ports

Please note the following ports should be open for data traffic on the network when using Ocularis.

Port Number <i>(inbound and outbound)</i>	Description
20 and 21	Used when devices use FTP for sending event messages. FTP (File Transfer Protocol) is a standard for exchanging files across networks.
25	Used when recording servers listen for SMTP information. Also, some devices use SMTP (e-mail) for sending event messages and /or for sending images to the surveillance system server via e-mail. SMTP (Simple Mail Transfer Protocol) is a standard for sending e-mail messages between servers.
80	Port 80 is typically used by the IIS (Internet Information Services).
554	Used by some camera manufacturers.
1024 and above <i>(outbound only)</i>	(Except ports listed below): Used for HTTP traffic between cameras and servers.
1801	Used for Message Queuing.
5432	Used when recording servers listen for alert socket/TCP information; some devices use TCP for sending event messages.
7008	Used by Ocularis.net (communication with video walls and push video)
7210	Internal port (MaxDB) - Do not open this port in your Firewall
7563	Used for handling PTZ camera control commands and for communication with Ocularis Client.
9100	RTSP Port
60000-60008 <i>(inbound & outbound)</i>	Recorder Core/DM/MDS
60021	SIP/VOIP
63000-63001	Update Service
64222	AV Export
60601-60724	LPR/Analytics/Transcoding Engine
Any other port numbers you may have selected to use	Examples: If you have changed the IIS Default Web Site port from its default port number (80) to another port number.

Contact Information

On-Net Surveillance Systems (OnSSI)

One Blue Plaza

7th Floor

P.O. Box 1555

Pearl River, NY 10965

Website:	www.onssi.com	
General:	info@onssi.com	845.732.7900
Fax:		845.732.7999
Sales Support:	sales@onssi.com	845.732.7900 x 1
PreSales Support	se@onssi.com	845.732.7900 x 2
Technical Support:	support@onssi.com	845.732.7979
Training:	training@onssi.com	845.732.7900 x 4
Marketing:	marketing@onssi.com	845.732.7900 x 5

Ocularis Recorder 5.0

Web Client Installation Manual

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Legal notice

This document is an integral part of the software shipped by On-Net Surveillance Systems, Inc. (OnSSI) (referred to hereinafter as the vendor) and describes how to use and configure the software and the associated components.

The English version of the document is the original version. All translations are based on the English original.

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Patents Applied For in the U.S. and Abroad

Address

On-Net Surveillance Systems, Inc.

One Blue Hill Plaza

Pearl River, NY 10965

Tel: (845)732-7900

Email: info@onssi.com

Internet: <http://www.onssi.com>

Subject to alterations, errors and misprints.

Rev code: 0003252015-1626-007

Support

Reporting a software problem

If you discover a software problem, report it to us. Refer to www.onssi.com/support for more information.

Introduction

Ocularis is OnSSI's innovative and cost effective open platform Video Management Software (VMS) designed to enhance your security while simplifying your daily workload. From convenience stores to city-wide deployments and everything in between, Ocularis can scale up to accommodate an infinite number of cameras to match your growing system needs.

Ocularis lets you record both analog video and video from newly integrated IP network cameras, and can become your Physical Security Information Management (PSIM) platform, putting you in control of advanced tools and enhanced integrations like smart motion detection, access control, biometrics, and behavior analytics.

The Ocularis platform is offered in three feature sets – Professional, Enterprise and Ultimate – to meet the needs of organizations of all sizes and types.

In addition to using OnSSI's award winning Ocularis Client software to view video, a web client is also supported. This document discusses the installation and configuration of the web client included with Ocularis 5.0.

For more information, go to www.onssi.com.

System requirements

Modules

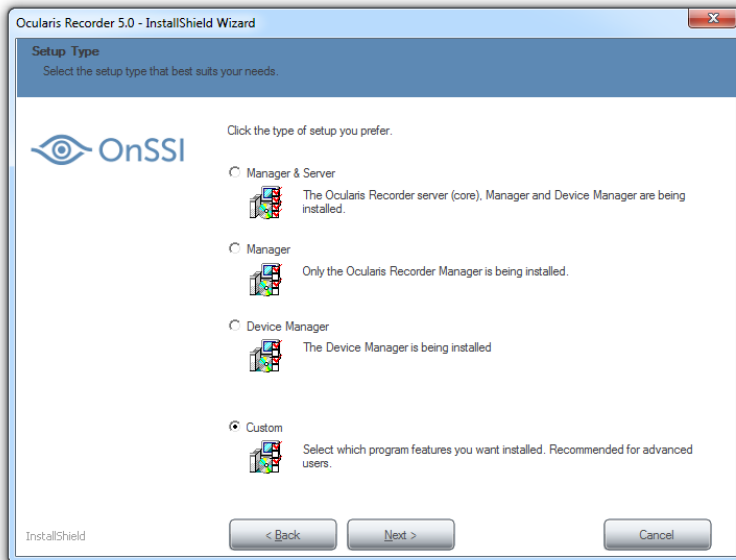
Modules	Supported operating systems	Notes
Web client	■ Google Chrome 35.0	■ Google Chrome recommended

Modules	Supported operating systems	Notes
	<ul style="list-style-type: none"> ■ Mozilla Firefox 29.0 ■ Microsoft Internet Explorer 11 ■ Apple Safari ■ Opera 	

Installing Components for the Ocularis Recorder Web Client

Use the 'Custom' option to install components for use with the web client (browser). These instructions assume that you have already installed Ocularis v5 recording components (Core, DM, etc.) elsewhere and focus solely on components for the web client. The web client components may be installed on any computer on the network and even on the Core PC provided that there are enough system resources. You may install multiple instances of web client components for redundancy or to support additional users.

1. Click the download button for the Ocularis Recorder to download the installation files from the *Ocularis Component Downloads* web page.
2. Choose to *Run* the application to launch the installer.
3. Select the installation language. You can configure the language of the user interface after installation.
4. Click **OK** to start installation.
5. At the *Welcome* screen, click **Next**.
6. Read the software license agreement, accept the terms and then click **Next**. The program can only be installed if the End User License Agreement is accepted.
7. Change the destination folder if desired. Click **Next**.



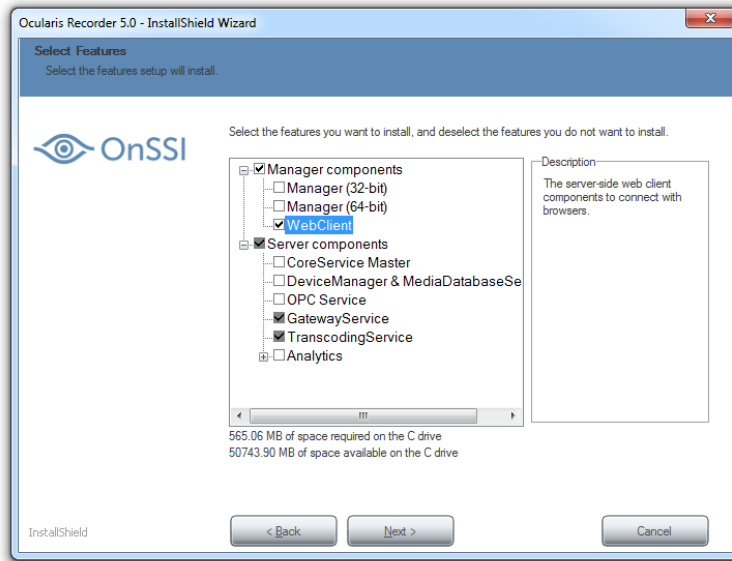
8. Select 'Custom' as the setup type and click **Next**.
9. Select the desired services and features. For web client, select 'WebClient' and it will also select 'GatewayService' and 'TranscodingService'. You need all three to use the web client.

Manager Components:

- WebClient: this is the server-side web client component to connect with web browsers. If you check this option, the required services (Gateway and Transcoding Services) will automatically be checked.

Server Components:

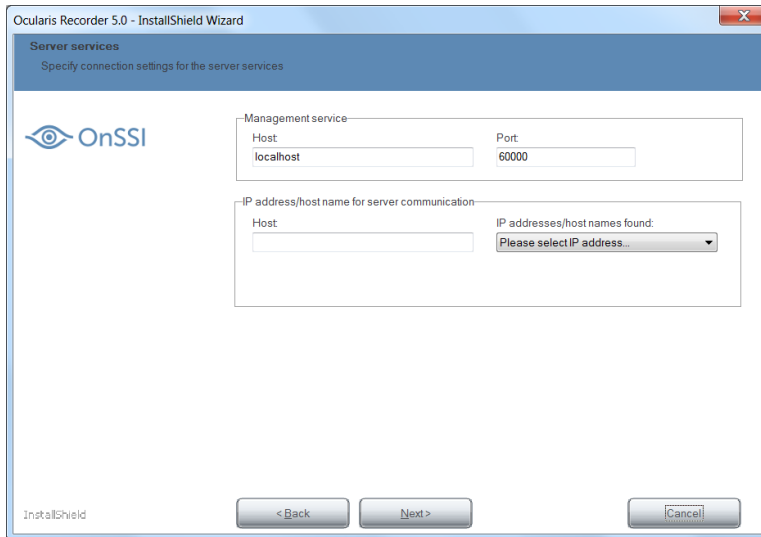
- Gateway Service: this service is required in order to use the web client.
- Transcoding Service: this service is required in order to use the web client.



You can deselect services and features that are not required.

IMPORTANT: if a previously installed service is deselected, it will be removed.

10. Click **Next**.



11. This screen is dynamic based on the components you selected to install.
- If you are installing web client services only (i.e. Web Client manager component, Gateway Service and Transcoding Service):
 - *Management service/Host and Port:* Enter the IP Address of the Master Core in the Host field and '60000' in the Port field

- *IP address/host name for server communication-Host*: this field should contain the IP Address of the current PC

The Host field in the IP address/host name for server communication area should be populated by selecting it from the drop-down menu or you may enter it manually. The drop-down list shows you all of the existing network addresses of the PC or server. If there is more than one network adapter on this computer, be sure to select the correct one

12. When ready, click **Next**.

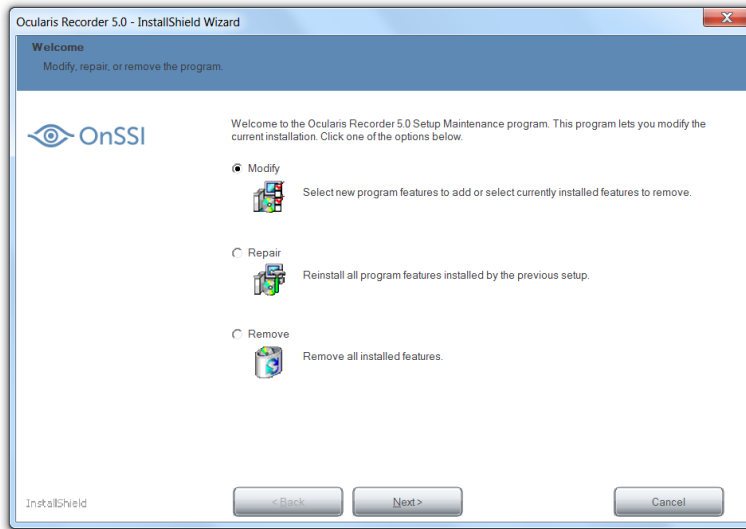
The modules and services are now installed on your computer.

Updating, customizing, repair and uninstallation

Customization and repair

Use this option if you need to modify the installation (i.e. add or remove components) of the current PC.

1. Open the Windows Control Panel and select Programs and Features.
2. Select Ocularis Recorder, and then click **Change or Repair**.



3. Select the desired option.
4. To update the program, select "Modify" and then **Next**. This allows you to carry out a user-defined installation, in which you can install and uninstall the modules and services you choose (see "Updating, customizing, repair and uninstallation").
5. To repair the program, select "Repair" and then **Next**. Ocularis Recorder tries to repair and reinstall any damaged program components itself.
6. To remove the program from the hard disk, select "Remove" and then **Next**. All components of the program except for the configuration settings are deleted from the hard disk and removed from the directory services.
7. To completely remove all traces of the program after uninstallation, delete the remaining folder in C:\Program Files manually.

Uninstallation

1. Open the Windows Control Panel and select Programs and Features.
2. Select Ocularis Recorder, and then click **Uninstall**. All components of the program except for the configuration settings are deleted from the hard disk and removed from the directory services.
3. To completely remove all traces of the program after uninstallation, delete the remaining folder in C:\Program Files manually.

This step is necessary when performing a "clean installation", as the MaxDB data base will be migrated when not removed manually.

Configuration mode

You need adequate administrator rights for configuration mode.

In the Ocularis Recorder Manager configuration mode, the web client configuration settings can be made.

To change to configuration mode, click the **Configuration mode** tab.

Web Client Users

User accounts for access to the web client are different than those used with Ocularis Client. Ocularis Client users are created and managed on Ocularis Base using the Ocularis Administrator application.

User accounts for Ocularis Web Client are created and managed on the Master Core with the Ocularis Recorder Manager application.

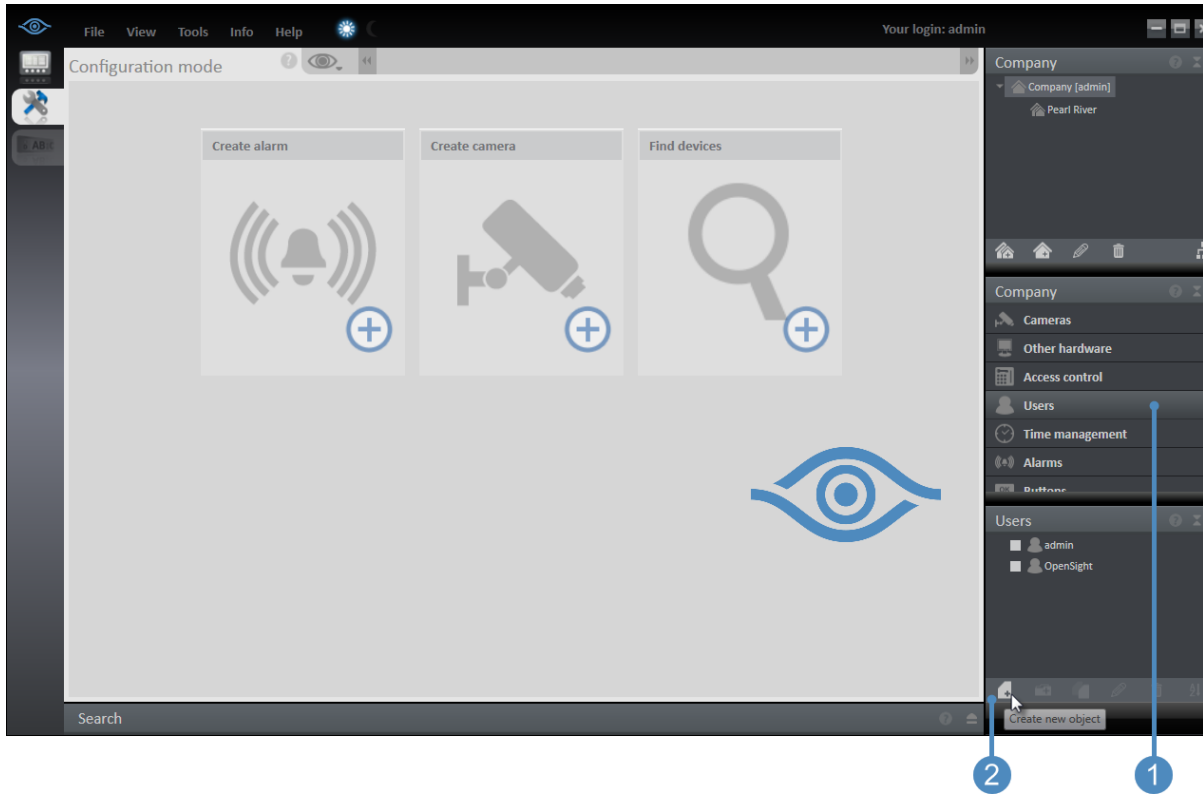
Create one or more user accounts with the Ocularis Recorder Manager to distribute to users who wish to view video with a web browser.

Note: Ocularis Professional customers must create a user account on each Master Core. The accounts can use the same credentials. Users must log in and log out of each Master Core Server in order to see video from cameras on each one.

Add A User Account

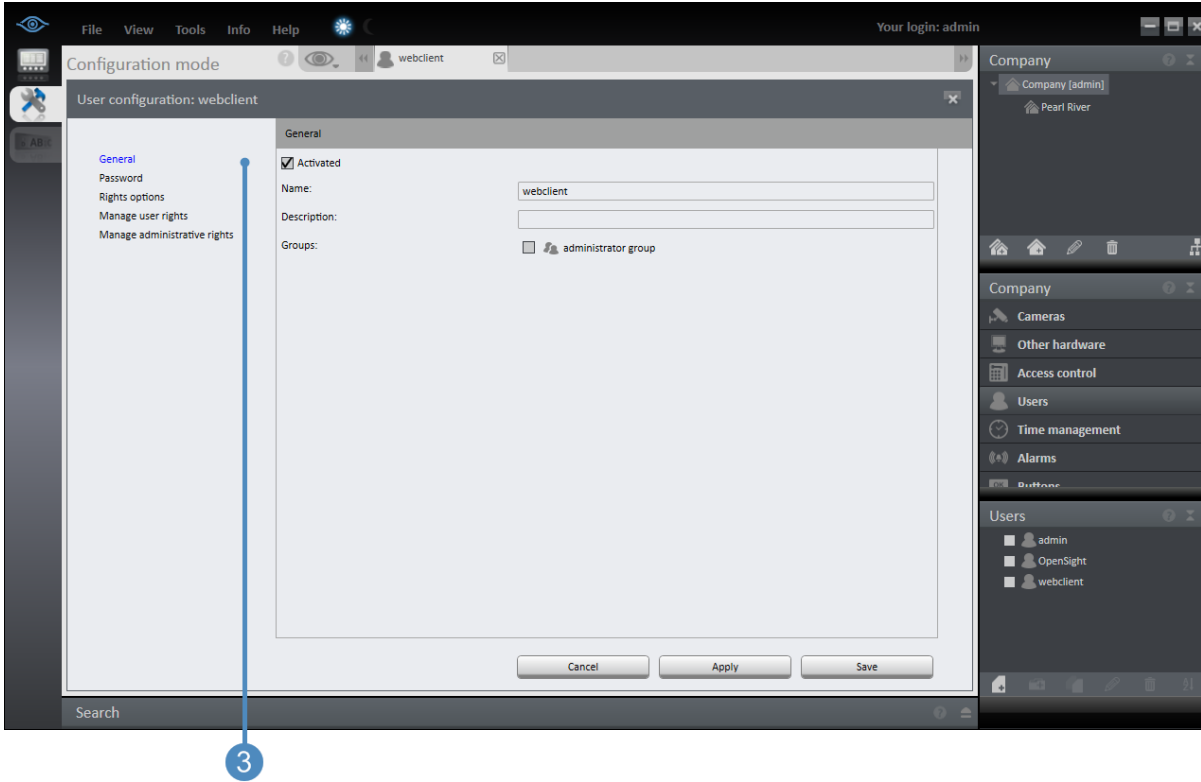
To add a user account:

1. Log in to the Ocularis Recorder Manager.
2. Select **Users** from the Administrative section of the Control Bar (1).



3. Select **Create New Object** from the lower part of the Control Bar (2).

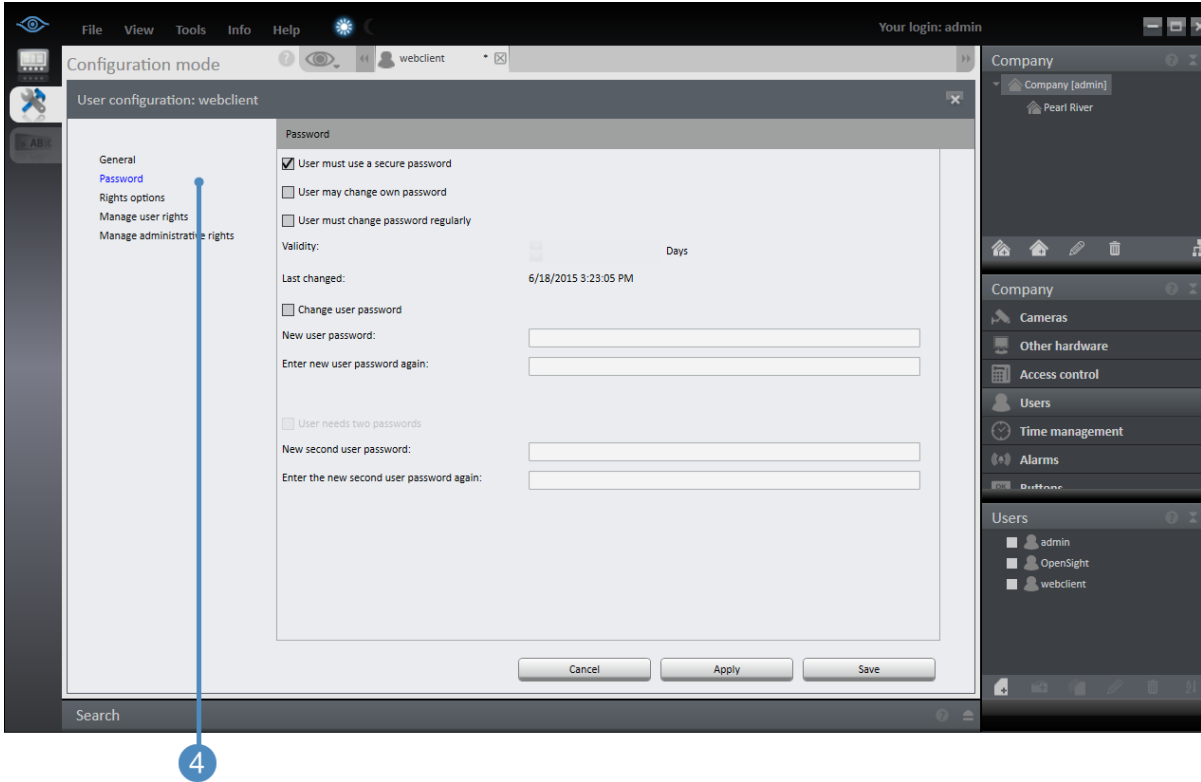
4. Enter a name and password for the user account. You may create a unique user account for each user or make one account and distribute to multiple users.
5. When done, click **OK**.



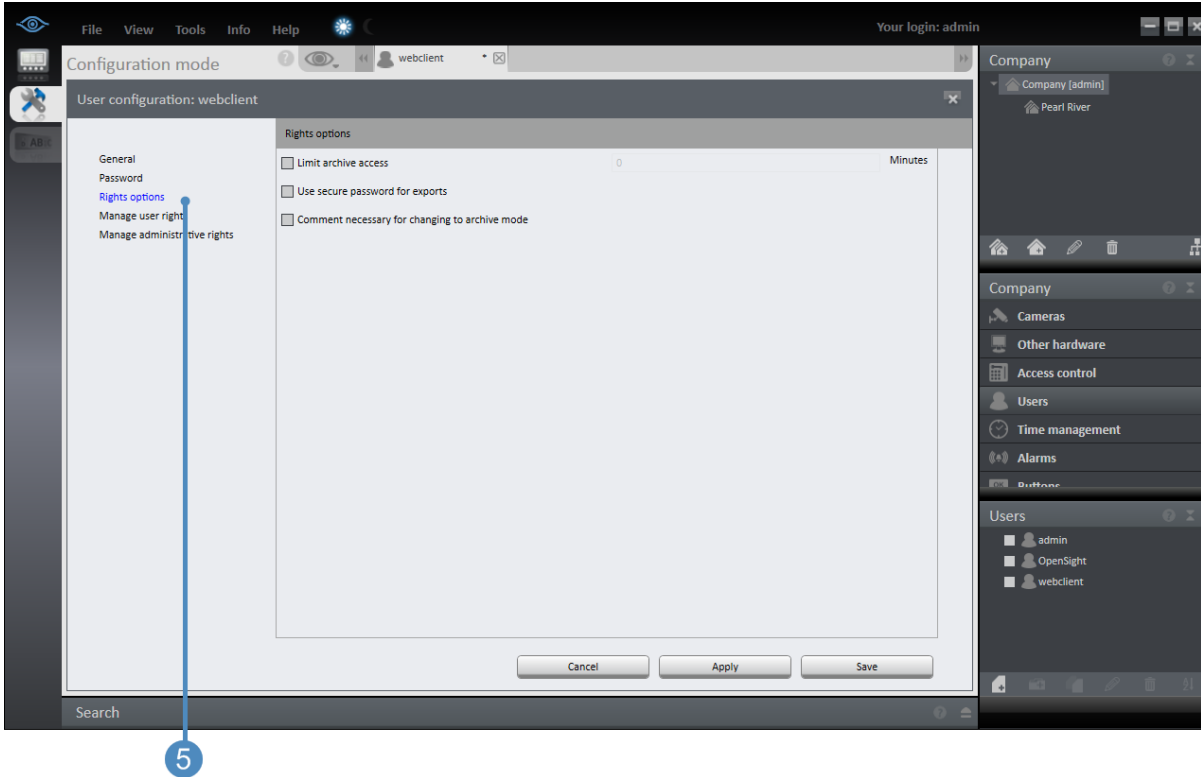
6. The **General** option for the user configuration appears. Make sure that the Activated (3) checkbox is checked.

If you want to provide full administrative access to this user account, click 'administrator group'. This is typically not recommended.

7. In the **Password** screen (4) , you have the options regarding the user's password. It is recommended to uncheck all boxes on this screen. You may come back to this screen to change the user's password if it is ever forgotten or for security reasons.

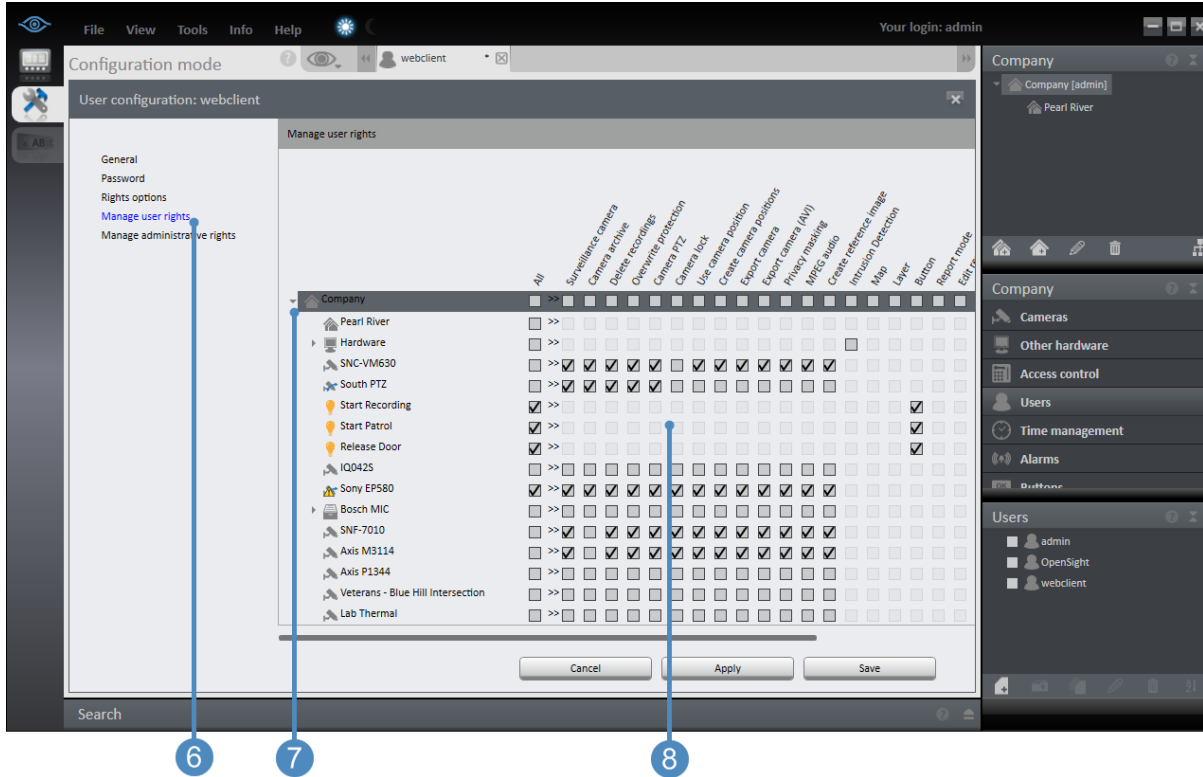


8. In the **Rights options** screen (5), you can limit the amount of recorded video the user account can access by clicking the 'Limit archive access' checkbox. This allows you to specify how many minutes of recorded video the user account may view.



The remaining options should be left unchecked.

9. In the **Manage user rights** screen (6), you set the granularity of privileges you want the user account to have. Click the expand icon next to the Company name (7) to expand the system and view cameras and buttons.



10. Check the checkbox for each function you would like to provide to the user account (8). You can restrict or grant all functions of a device or you can limit access based on the privileges at the top of the screen.

Note: Not all privileges are applicable in this version. Refer to the *Ocularis Recorder Configuration Manual* for a definition of these privileges.

- 11. In the **Manage administrative rights** screen, leave all checkboxes unchecked as these will provide access to the Ocularis Recorder Manager application.
- 12. When finished, click **Save**.

You may now provide your web client users with the credentials to this account.

Administration

The Administration control bar contains all configuration settings. The Administration control bar allows you to assign hardware (e.g. cameras), actions and the authorization manager to the specified "Administration" and manage new objects such as alarm scenarios, for example.

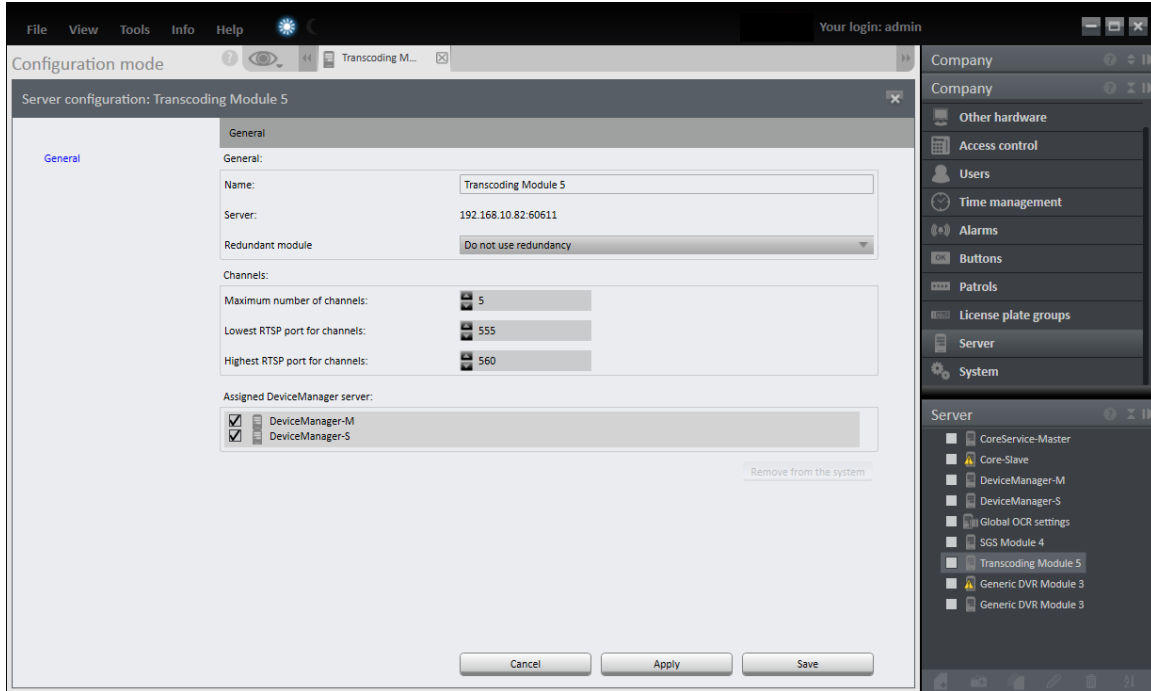
Server

The **Server** function on the Administration control bar allows you to configure the server services.

Configuring the transcoding module

The transcoding module is required for the configuration of the Ocularis Recorder web client.

1. After installing the Gateway and Transcoding services, from the Ocularis Recorder Manager, select 'Server' in the control bar.
2. In the lower right control bar area, select the Transcoding Module.



3. If desired, you may modify the **Name** of the module. This is helpful if you install more than one instance of the transcoding module.
4. If you have more than one Transcoding modules installed, you can make one redundant to the other by specifying this in the **Redundant module** drop-down list.
5. Specify the maximum number of channels. For each image requested by the web client, one channel is needed. To reduce the network load and the load on the transcoding module, limit the number of channels to a maximum of 25 channels per transcoding module. Keep in mind that this number applies to all users. So if you keep the setting as the default of '5', only 5 streams may be used at the same time by all logged in users.
6. Specify the **Lowest RTSP port** and the **Highest RTSP port** number for channels. If you have increased the maximum number of channels, there must be enough RTSP ports to accommodate. In other words, the Highest RTSP port number minus the lowest RSTP port number should equal the maximum number of channels.
7. Activate the **DeviceManagement** server(s) for all DMs that you would like users to access via the web client.
8. **Apply** the configured values if you want to make additional settings.
9. **Save** the values to apply the values and close the tab.

The **SGS Module** which appears as a result of installing the Gateway Service should automatically be configured.

The Ocularis Recorder Web Client

With the Ocularis Recorder web client, the system is displayed with a web based interface within a browser.

Overview

In live mode, the web interface provides basic functions of the client, such as:

- Accessing cameras
- Receiving alarms and confirm them
- Controlling PTZ cameras and activating PTZ preset positions
- Displaying buttons and triggering their actions
- Exporting the actual live image as JPEG

In browse mode, the web client provides

- Stepping forward/backward in single image steps in the archive
 - Playing the recorded video forward in real time (without speed choice and rewind)
 - Displaying the timeline of the camera's recorded video
 - Exporting a single JPEG image from a specific time.
-

Remarks, limitations and known issues

- It is recommended to use a current browser version (i.e. Chrome version 38 and newer, Firefox version 33 and newer, Internet Explorer version 11 and newer)
- Upload speed of at least 2 MB/s is required (for 2-3 simultaneous camera views). For increasing number of connections and camera views, more bandwidth is required.

- The following ports must be routed transparently if you are using a firewall:
 - Port 62000 (SGS, if changed after setup, change it in the file "webroot/seetec/restservice.js")
 - Port 9100 (RTSP proxy)
 - Port 443 (webserver)
 - Port 8081 (NodeJS, which is delivering the images)
- Newly added or deleted cameras only show after reloading the web client in the browser. They will not automatically appear in the Control Bar.
- No restriction of the number of cameras displayed simultaneously, but beware that the web browser has to render all images AND the images have to be delivered through the transcoding service which is only serving the number of channels configured. The image rendering also depends on the hardware.
- Grandeye IPC fisheye cameras are currently not supported; there is no live stream possible.
- Mobotix (MxPEG) cameras have a mirrored image if exporting a single image.
- If a layer contains an insecure (non-HTTPS) web page or a predefined insecure (non-HTTPS) web page in the web client is displayed, the browser may not display the webpage because it is blocked automatically as "unsafe" by the browser or system settings. You can deactivate these checks permanently or for the current session, depending on the browser.

Launching The Ocularis Recorder Web Client

Using a supported browser, type the following into the URL field:

https://[ip-address-of-master-core]

where:

ip-address-of-master-core is the IP Address of the computer containing the Master Core. For Ocularis Professional, you are limited to logging in to one Master Core at a time and therefore restricted to viewing cameras only on the local device manager within each session.

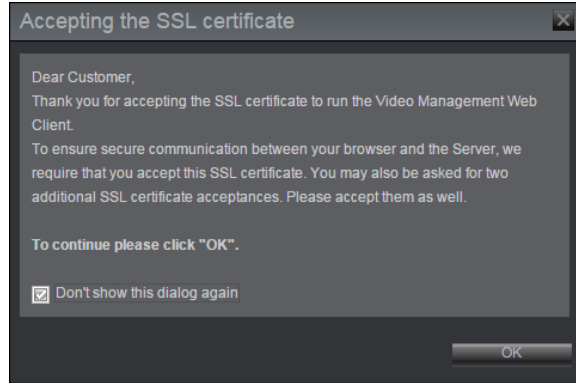
Browser Messages

When you launch the web client for the first time, you may see a message about the website's security certificate or the connection privacy. This is a known issue. In Microsoft Internet Explorer, click the link to 'continue to this website'. In Google Chrome, click the link labeled 'Advanced'.

Some browsers such as Chrome, may issue a second message about the security certificate. Click the link to proceed to the ip address anyway.

Accepting the SSL certificate

The next step is to accept the SSL certificate. You will see the following message:

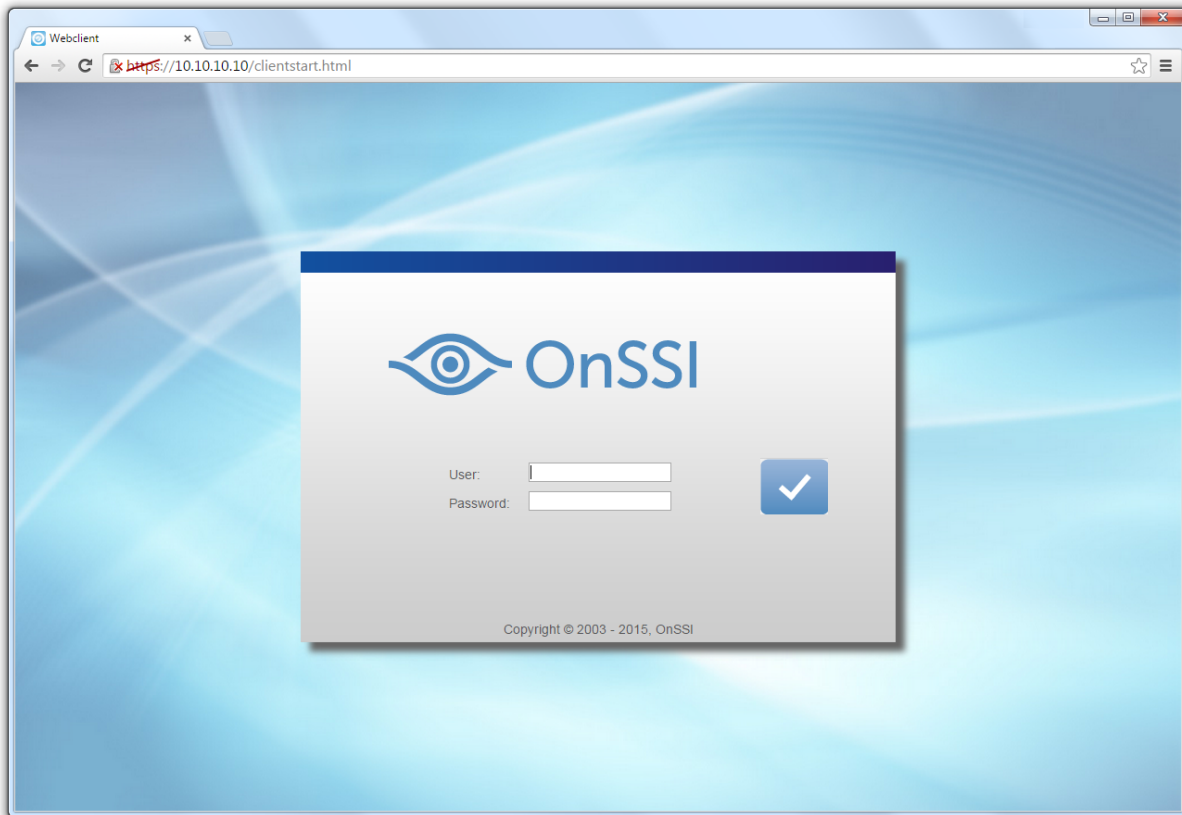


If you want to suppress this message for future log-ins, be sure the 'Don't show this dialog again' checkbox is checked. Click **OK**.

The web client login screen appears.

Web Client Login Screen

After accepting the SSL certificate, a web client login screen appears:



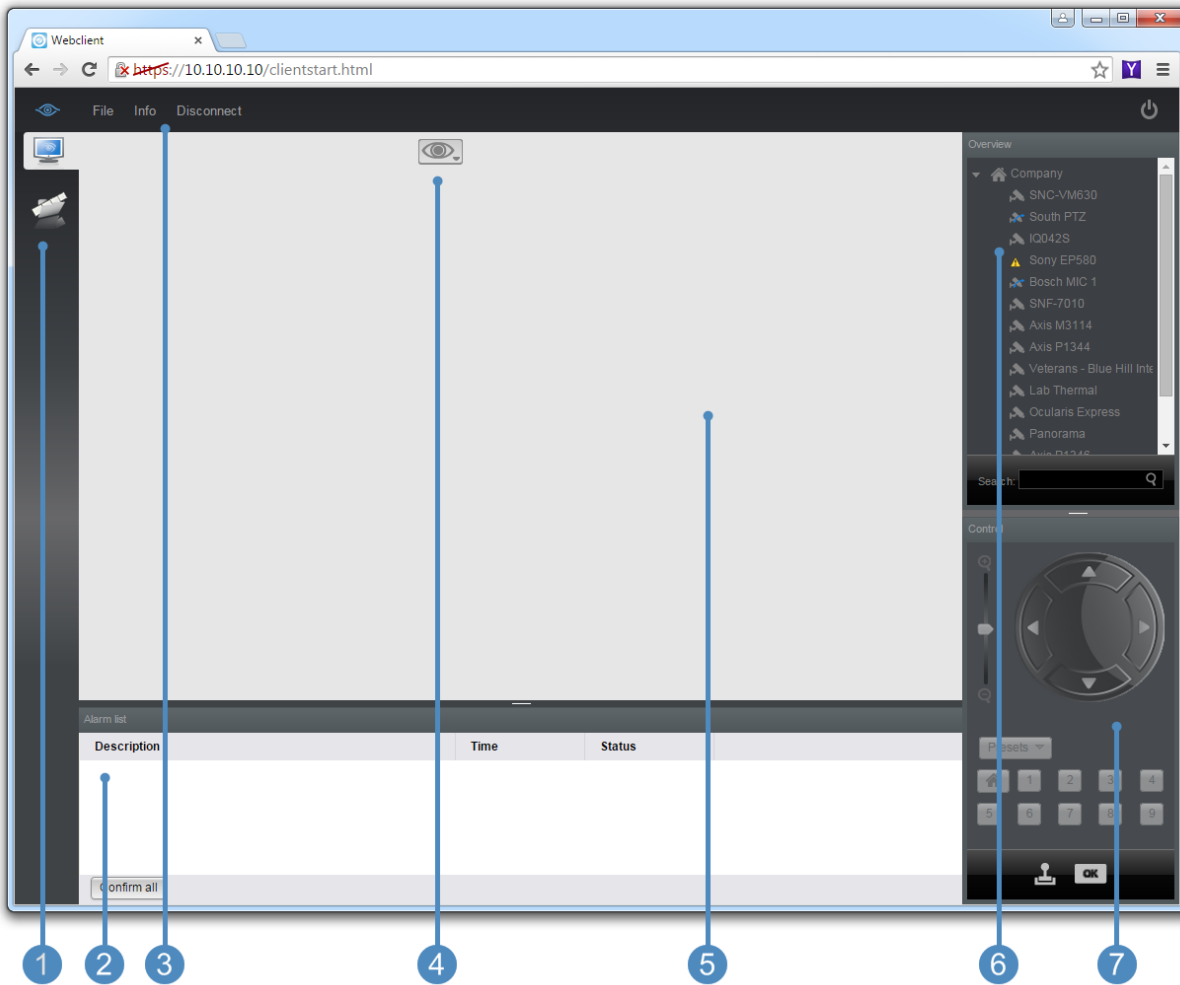
Enter the credentials for a user account located on the Master Core and click the checkmark to gain access.

User Accounts

The user account for the web client is different from the account someone uses when logging in with Ocularis Client. The Ocularis Client user account is configured on Ocularis Base via Ocularis Administrator. The account used with the web client is one that is created and configured within the Master Core using the Ocularis Recorder Manager. We recommend not using the 'admin' account for web client access. See **Add a User** in the section **Configuration mode** for more information.

Web Client Interface

The initial web client screen appears as follows:



The mode bar (1) displays tabs that allow you to switch between modes.



Live: click this tab to view live video.



Browse: click this tab to view recorded video.

Configured alarms that have occurred will appear in the **Alarm list** (2).

The menu bar (3) has three menu options:

1. **File** - use this menu to change the display language of the web client.
2. **Info** - use this option to view the version number of the software
3. **Disconnect** - click the menu to disconnect from the transcoding service or use the 'off' icon on the far right side of the menu bar.

The **Layer** icon (4) allows you to select from six pre-defined image layouts or to close the currently displayed layout. Layout options are: 1 x 1, 1 + 2, 2 + 1, 2 x 2, 1 + 3, 3 + 1

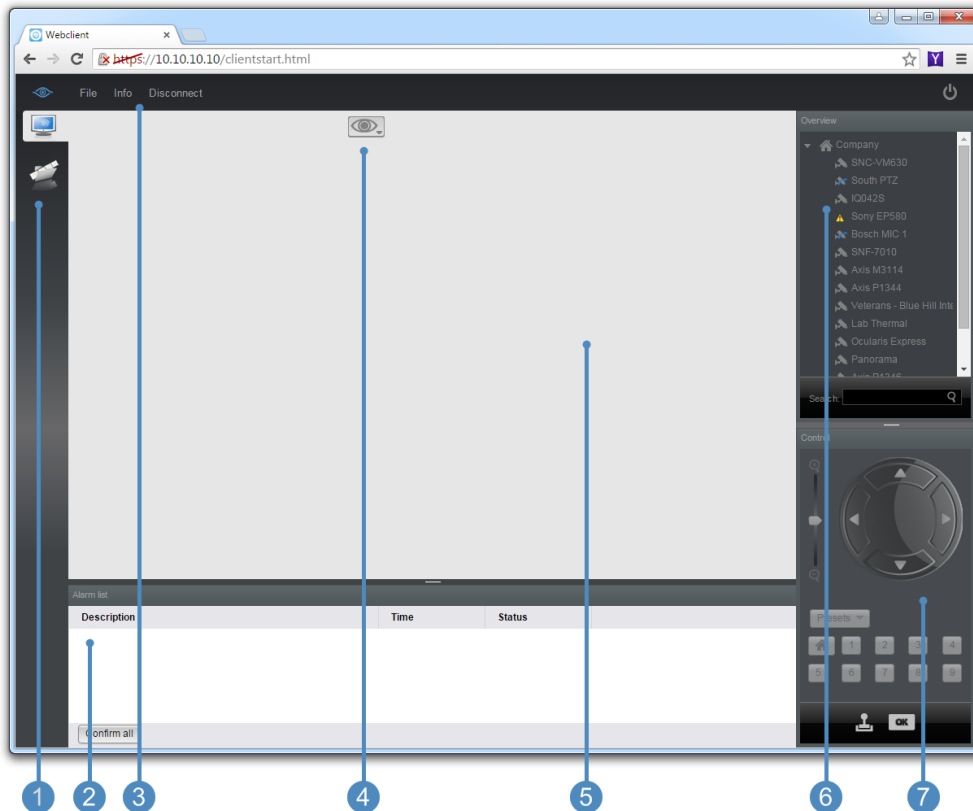
The main window for displaying video (5) is in the center of the screen.

The camera list (6) appears in the upper part of the Control Bar while a PTZ controller (7) appears in the lower part.

Also on the lower part of the control bar (7), you can toggle between PTZ mode (8) and Button mode (9).

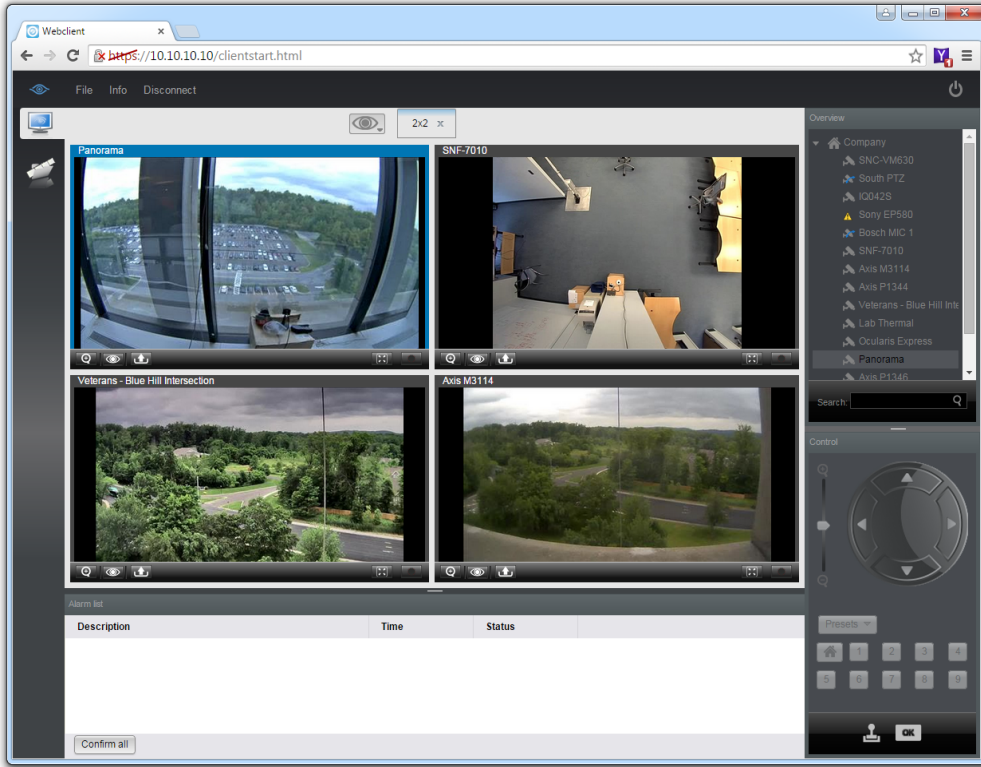


Viewing Live Video with the Web Client



To view live video

1. Select a layout from the Layer icon (4).
2. Drag and drop cameras from the camera list in the Control Bar (6) to the corresponding pane in the layout displayed.



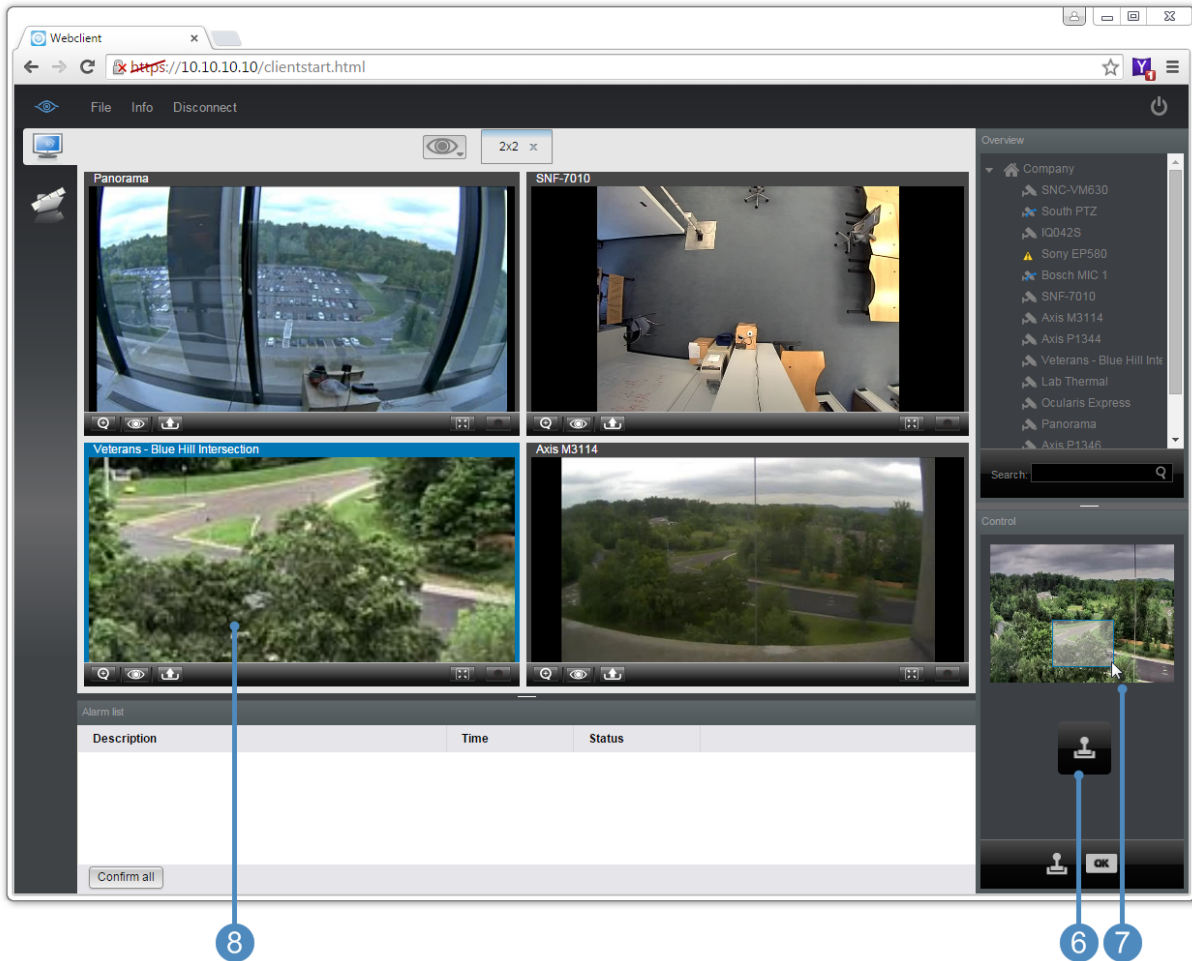
Only one pane can be selected at a time and it is shown with a blue outline around the tile's perimeter.

- Use the joystick controls (7) or PTZ presets for PTZ cameras.

Web Client Pane Tools



For fixed cameras, use the zoom tool (1), to zoom in on the image. Click the tool in the desired pane to display the image in the control bar (7).



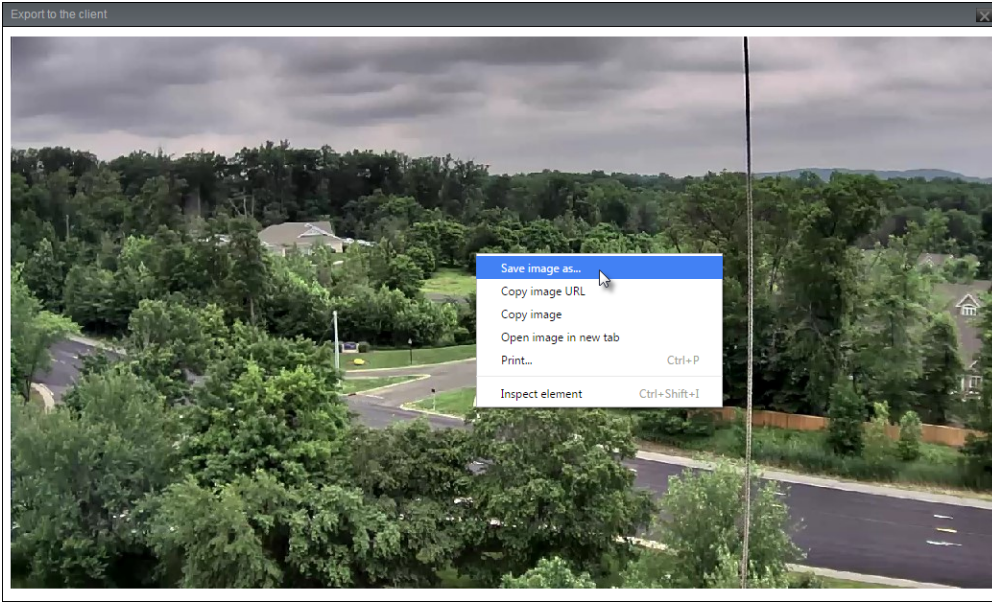
Use the mouse to draw a rectangle on the image in the control bar (7). Release the mouse and then click the icon for digital zoom in (6). The pane updates to reflect the zoom (8). To return the image back to normal, click on the thumbnail image (7) to remove the box and then click the digital zoom icon (6) again.

Close A Pane

Use the Close icon (2) to remove a camera from a pane. Click the icon and then click the label 'Close'.

Image Snapshot

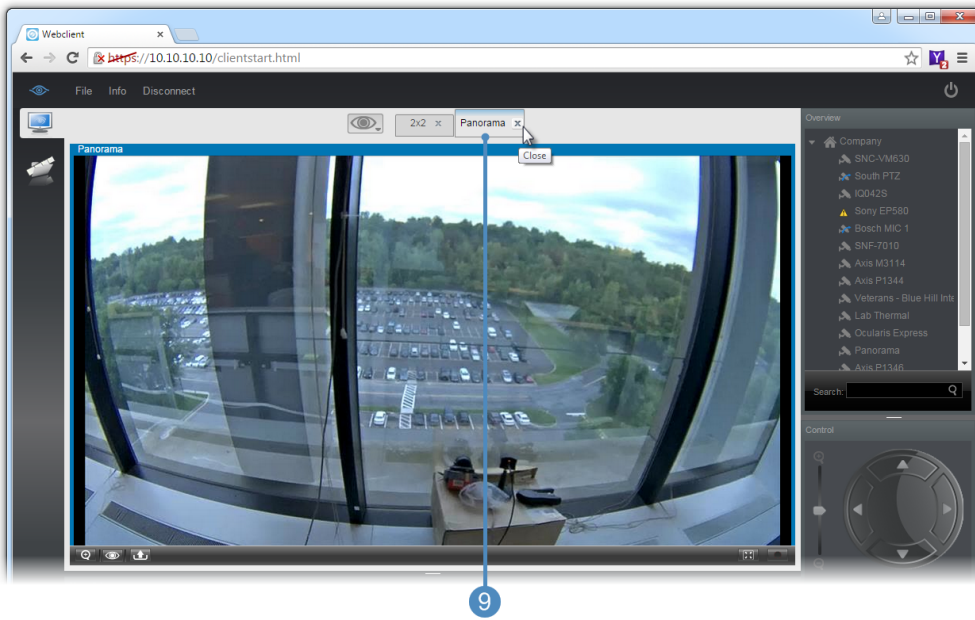
If you want to take a snapshot image of a pane, click the pane image (to make it the active tile) and then click the export icon (3).



A pop-up appears with a snapshot of the image. Right-click on the image and select **Save image as...** In the Windows Save As dialog, navigate to the desired storage location. Enter a filename for the snapshot and be sure to include a .jpg suffix to the filename. Click **Save**. Close the pop-up by clicking the 'X' in the upper right corner.

Maximize a Pane

Click the maximize icon (4) to maximize the pane to the full size of the view. To restore the image and go back to the view, close the tab (9) for the maximized pane.



Start Alarm Recording

As you watch live video, if you see something of interest that you want to be recorded using the alarm recording settings, click the Start Alarm Recording icon in the pane of the camera of interest. (5)

The icon will switch to a red dot for the duration of the recording.



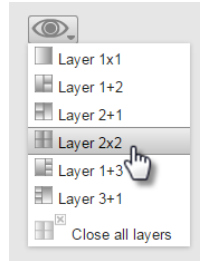
To stop alarm recording, click the icon again and the red dot will disappear.



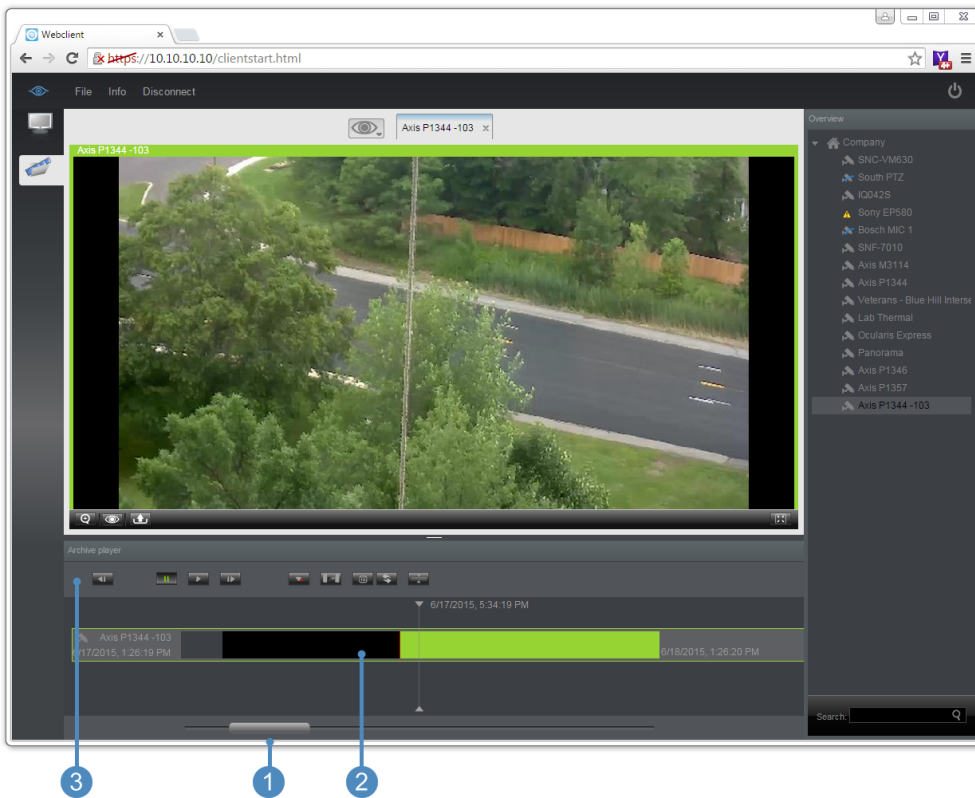
Viewing Recorded Video with the Web Client

The Ocularis Recorder Web Client supports viewing live and recorded video.

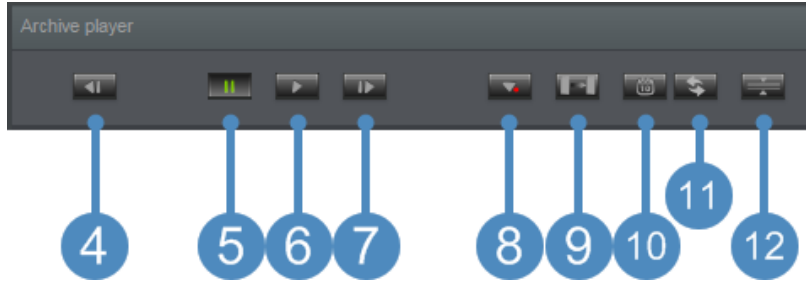
1. Click the browse tab to view recorded video.
2. Select a view layout from the Layers icon.



3. Drag and drop cameras from the list in the control bar to the pane of the view.



- Use the slider bar (1) to move the video to an earlier or later time.
The timeline (2) displays green for recorded video.
The tools on the Archive player (3) can be defined as follows:



- | | | |
|----|-----------------------|---|
| 4 | Previous Frame | Click to move backwards one frame at a time |
| 5 | Pause | Click to pause video that is playing |
| 6 | Play Forward | Play video forward |
| 7 | Next Frame | Click to move forward one frame at a time |
| 8 | Next Alarm Recording | Click to move to next frame recorded due to an alarm |
| 9 | Skip Pauses | Click to skip pauses between video segments |
| 10 | Calendar Direct Input | Click to go to date and or time based on menu selection |
| 11 | Update Timeline | Click to update timeline to current time |
| 12 | Synchronized Mode | When playback starts, visible cameras are synchronized to the time of the selected camera |

Admin Tools

NOTE: Do not configure the VA Administration Tool unless instructed to do so by OnSSI Technical Support. These instructions are listed here for informational purposes only. Configurations made haphazardly can result in a non-functional system.

The Ocularis Recorder admintools contain a suite of administration tools required to manage the servers, clients and additional modules.

- [Ocularis Recorder VA Administration Tool](#) The VA Administration tool is used to configure the settings for the core server and installing the "Versatile Application" extension. The extension parameters are then configured from within the client.
- [Ocularis Recorder Administration Tool](#): The Administration Tool is used to configure the image database and the administration database of the servers.
- [Ocularis Recorder ServiceManager](#). The ServiceManager is used for starting and stopping services.

Ocularis Recorder VA Administration Tool	26
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Ocularis Recorder VA Administration Tool

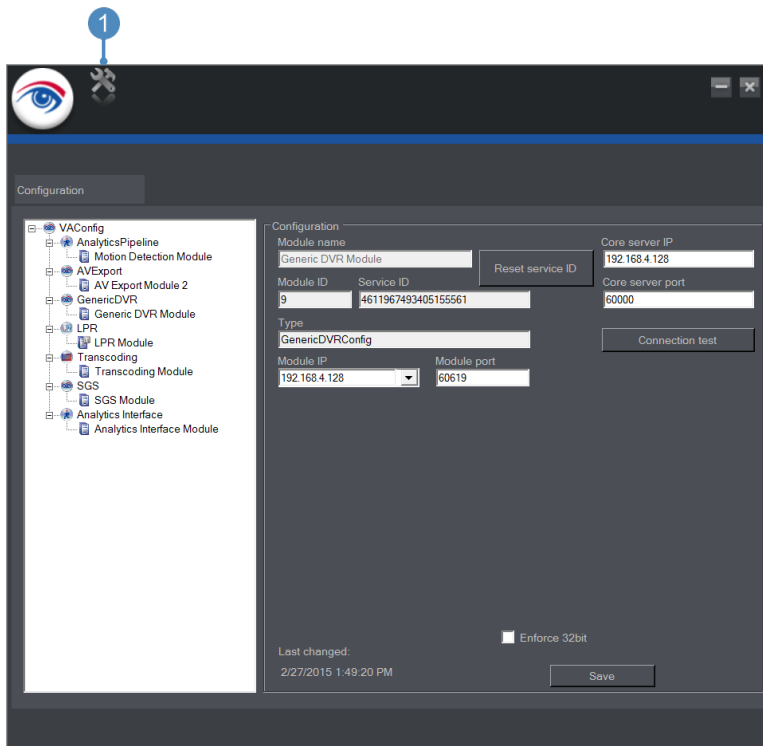
The Ocularis Recorder VA Administration tool is used to configure the settings for the core server and installing the "Versatile Application" extension. The extension parameters are then configured from within the Ocularis Recorder Manager.

NOTE: Do not configure the VA Administration Tool unless instructed to do so by OnSSI Technical Support. These instructions are listed here for informational purposes only. Configurations made haphazardly can result in a non-functional system.

1. Start the VA administration tool in the Ocularis Recorder installation folder.

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Creating a new configuration file



1. Click the **Settings** (1) icon, and then choose **Create new configuration file** from the **File** menu.

Adding a Transcoding engine module

1. Right-click the configuration file in the column on the left and choose **Transcoding engine** from the **Add new module** context menu.
A new entry is created under the configuration file in the menu tree.
2. Change the **module name**.
3. Enter the **IP address** of the core server.

Do not use localhost or 127.0.0.1 as the entry as other services must communicate via these IP addresses.

The service ID changes after the first connection to the server.

Do not reset the service ID without talking to Support first.

4. Click the **Connection test** button to check the connection between the module and the main server. If the module does not connect, check and configure the network and the firewall settings.
5. Select the **module IP**.
6. Enter the **module port** used by the transcoding module.
7. Select **Enforce 32bit** if the devices are not 64-bit capable. This setting only applies to devices that have not yet been released for 64bit.

Do not change to 32bit mode without talking to Support first.

8. Click **Save** to save the changes.
9. Restart the services, or add further modules.

Adding a gateway service module

1. Right-click the configuration file in the column on the left, and choose **Gateway service** from the **Add new module** context menu.
A new entry is created under the configuration file in the menu tree.
2. Change the **module name**.
3. Enter the **IP address** of the core server.

Do not use localhost or 127.0.0.1 as the entry as other services must communicate via these IP addresses.

The service ID changes after the first connection to the server.

Do not reset the service ID without talking to Support first.

4. Click the **Connection test** button to check the connection between the module and the main server. If the module does not connect, check and configure the network and the firewall settings.
5. Select the **module IP**.
6. Enter the **module port** used by the SGS module.
7. Enter the **SOAP IP** and the **SOAP port**.
8. If accessing the network from the intranet (internal access), enter the local IP of the server.
9. If accessing the network from the internet (external access), enter the public IP of the router or firewall. Additionally, transparent port forwarding must be activated at the router or firewall.
10. Select **Enforce 32bit** if the devices are not 64-bit capable. This setting only applies to devices that have not yet been released for 64bit.

Do not change to 32bit mode without talking to Support first.

11. Click **Save** to save the changes.
12. Restart the services (see SeeTec VA Administration Tool) or add further modules.

Overview

HP MSA P2000 G3 Modular Smart Array Systems

Hewlett Packard's MSA P2000 Family of storage arrays features P2000 G3 arrays with the latest 8 Gb Fibre Channel, 6 Gb SAS, 10GbE iSCSI connected models, and an iSCSI model with four 1 Gb iSCSI ports per controller. The arrays are designed for entry-level customers and feature the latest in functionality and host-connect technology while offering excellent price/performance. They are ideal for companies with small budgets or limited IT expertise, and also larger companies with departmental or remote requirements. Each solution is designed to be easy to deploy, to be secure, along with low management costs, while driving rapid return on investment through efficient storage consolidation.

The MSA P2000 G3 arrays are 2U storage area network (SAN) or direct connect solutions (OS and protocol dependent) offering a choice of five controllers - two FC, one SAS, one 10GbE iSCSI and the newest model features a four port 1 Gb iSCSI. The first Fibre Channel controller is a high-performance, 8 Gb dual port model. The second offering is a unique dual-purpose Combo controller with two 8 Gb Fibre Channel ports with the addition of two 1GbE iSCSI ports. The third controller choice is 6Gb SAS with four ports per controller. There is also the addition of a two port 10 Gb iSCSI, while the latest controller introduction features four 1 Gb iSCSI ports per controller. Whatever the situation calls for, the P2000 G3 line-up has the right solution.

The dual-protocol MSA P2000 G3 MSA FC/iSCSI Combo Controller gives exceptional flexibility. The 8 Gb FC ports support a full FC SAN while the two 1GbE iSCSI ports can serve two purposes. With this combination you can economically share the array storage resource with a smaller department accessing it over iSCSI or enable the new optional Remote Snap functionality over iSCSI protocol (also available over FC).

The MSA P2000 G3 SAS is the follow-on product to the MSA2000sa G2, adding the latest 6 Gb SAS technology to the four host ports per controller. The P2000 G3 SAS array is designed for directly attaching up to four dual-path or eight single path rack servers. SAS array support for BladeSystems utilizes the HP 6 Gb SAS BL Switch.

The MSA P2000 G3 10GbE iSCSI brings the very latest in high-performance host connection with technology generally found only in higher priced arrays. The bandwidth it provides in conjunction with server consolidation is highly advantageous in shared storage configurations. Array connection to 10GbE switches that are in turn connected to 1GbE NICs is commonplace. Directly attached server support requires the server units to have 10GbE NICs.

Rounding out the controller choices is the MSA P2000 G3 iSCSI controller featuring four 1Gb iSCSI Ethernet ports, double the number of the G2 model. This allows an array that keeps the price of the components, particularly the interconnection, low while markedly increasing the performance capabilities.

All MSA P2000 G3 models can be equipped with single or dual controllers, feature the same scalability, and offer 6 Gb SAS back-end transmission speed to drives and JBODs. Significant data protection advances are delivered by the all P2000 G3 arrays. All G3 units come STANDARD with sixty-four snapshot capability at no extra cost and there is an option for the G3 series of five hundred and twelve snapshots. Volume Copy (clone) also comes standard. In a further move to protect the user's data, optional Remote Snap (replication) capability is offered on the FC, FC/iSCSI, and both iSCSI versions.

All MSA P2000 G3 models support hot plug replacement of redundant controllers, fans, power supplies, and I/O modules. Hot add of expansion enclosures is also supported.

The controller-less MSA P2000 chassis is offered in two models - one comes standard with twelve Large Form Factor (LFF) 3.5-inch drive bays, the other can accommodate twenty-four Small Form Factor (SFF) 2.5-inch drives. Both are able to simultaneously support enterprise-class SAS drives, SAS Midline, and archival-class SATA Midline drives. Either chassis can have one or two matching P2000 G3 controllers (same protocol) and are available with AC or DC power Supplies.

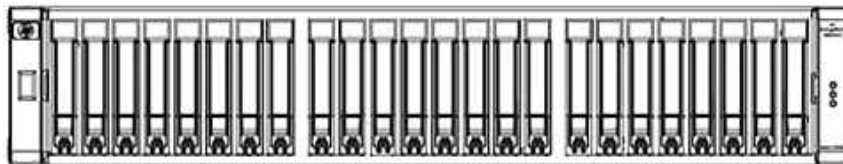
Overview

The HP modular approach to entry level SAN solutions enables incremental customer purchases, allowing the array to grow as needs grow, thus allowing a maximum return on investment. Choose a single controller unit for low initial cost with the ability to upgrade later; or decide on a model with dual controllers for the most demanding entry-level situations. There are no unexpected additional charges, licenses or fees as you add enclosures or hosts and users.

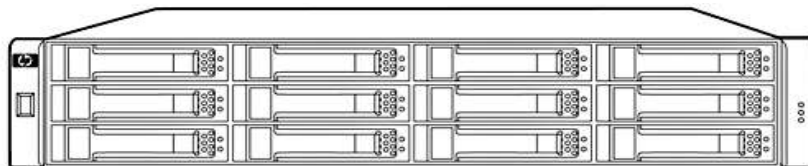
Capacity can easily be added as the need develops by attaching additional drive enclosures. Maximum capacity ranges with LFF drives up to 57.6 TB SAS, 576 TB SAS Midline or 192 TB SATA Midline with the addition of the maximum number of drive enclosures. Configurations utilizing the SFF drive chassis and the maximum number of drive enclosures can grow to 178 TB of SAS, 149 TB of SAS Midline or 74.5 TB SATA Midline with a total of 96 LFF or 149 SFF drives. The P2000 G3 Arrays do not support SSDs.

What's New in the P2000 G3 array family

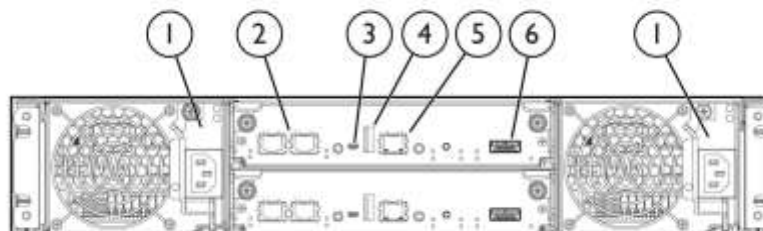
- Introducing support for 12G SFF Hard Disk Drives.
 - HP MSA 300GB 12G SAS 10K 2.5in Dual Port Enterprise 3yr Warranty Hard Drive
 - HP MSA 600GB 12G SAS 10K 2.5in Dual Port Enterprise 3yr Warranty Hard Drive
 - HP MSA 900GB 12G SAS 10K 2.5in Dual Port Enterprise 3yr Warranty Hard Drive
 - HP MSA 1.2TB 12G SAS 10K 2.5in Dual Port Enterprise 3yr Warranty Hard Drive



HP P2000 G3 SFF Modular Smart Array



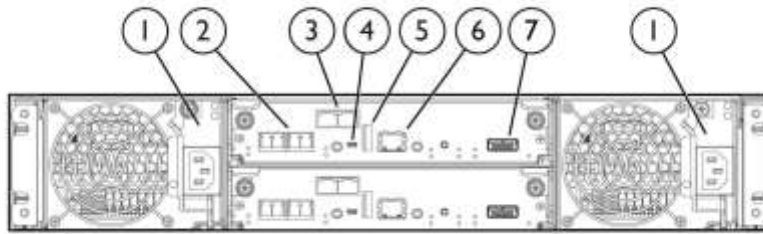
HP P2000 G3 LFF Modular Smart Array



P2000 G3 FC Controllers, 2 installed

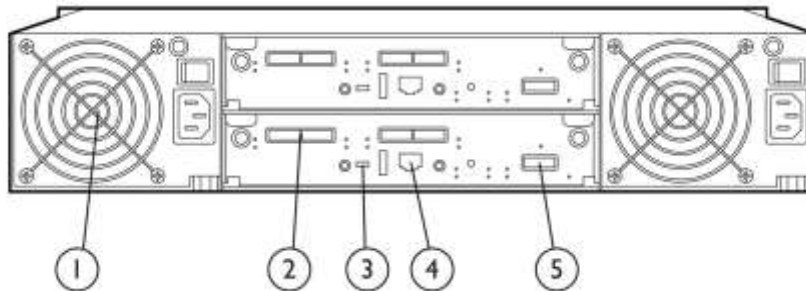
- | | |
|-----------------------------|-----------------------------|
| 1. Power supplies | 4. Reserved for future use |
| 2. 8 Gb Fibre Channel ports | 5. Management Ethernet port |
| 3. CLI port (mini-USB) | 6. Expansion port |

Overview



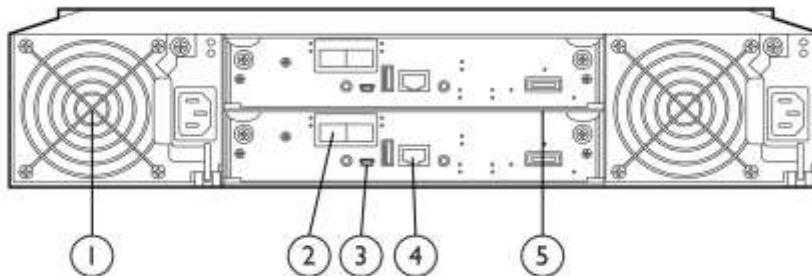
P2000 G3 FC/iSCSI Combo Controllers, 2 installed

- | | |
|-----------------------------|-----------------------------|
| 1. Power supplies | 5. Reserved for future use |
| 2. 8 Gb Fibre Channel ports | 6. Management Ethernet port |
| 3. 1GbE iSCSI ports | 7. Expansion port |
| 4. CLI port (mini-USB) | |



P2000 G3 SAS controllers, 2 installed

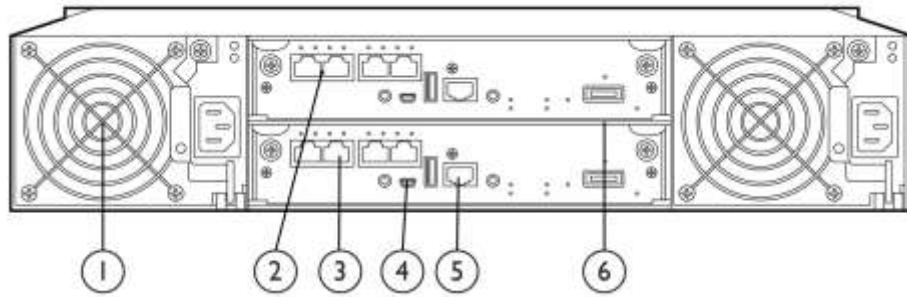
- | | |
|--|-----------------------------|
| 1. Power supplies | 4. Management Ethernet port |
| 2. 6Gb SAS ports (four per controller) | 5. Expansion port |
| 3. CLI port (mini-USB) | |



P2000 G3 10GbE iSCSI controllers, 2 installed

- | | |
|------------------------|-----------------------------|
| 1. Power supplies | 4. Management Ethernet port |
| 2. 10GbE iSCSI ports | 5. Expansion port |
| 3. CLI port (mini-USB) | |

Overview



P2000 G3 iSCSI dual controller

- | | |
|--------------------------|-----------------------------|
| 1. Power supplies | 4. CLI port (mini-USB) |
| 2. 1 GbE iSCSI ports (4) | 5. Management Ethernet port |
| 3. 1 GbE iSCSI ports (4) | 6. Expansion port |

Models

P2000 G3 Modular Smart Array

P2000 G3 Controllers

P2000 G3 Fibre Channel Controllers

HP P2000 G3 MSA Fibre Channel Controller AP836B

NOTE: two 8Gb FC ports per controller

HP P2000 G3 MSA FC/iSCSI Combo Modular Smart Array Controller AP837B

NOTE: two 8Gb FC ports and two 1GbE iSCSI ports per controller

P2000 G3 SAS Controller

HP P2000 G3 SAS MSA Array System Controller AW592B

NOTE: four 6Gb SAS ports per controller

P2000 G3 10GbE iSCSI controller

HP P2000 G3 10GbE iSCSI MSA Array System Controller AW595B

NOTE: two 10GbE iSCSI ports per controller

P2000 G3 iSCSI controller (1Gb Ethernet)

HP P2000 G3 iSCSI MSA Array System Controller BK829B

NOTE: four 1Gb iSCSI ports per controller

P2000 Chassis

P2000 Controller-less Chassis (AC-powered)

HP P2000 LFF Modular Smart Array Chassis AP838B

NOTE: Will accept one or two controllers or Disk Enclosure I/O modules

HP P2000 SFF Modular Smart Array Chassis AP839B

NOTE: Will accept one or two controllers, not I/O modules

P2000 G3 Configured Array Systems

Configured Units, 8 Gb Fibre Channel Systems

HP P2000 G3 MSA FC/iSCSI Dual Combo Controller LFF Array AW567B

HP P2000 G3 MSA FC/iSCSI Dual Combo Controller SFF Array AW568B

Configured Units, 6 Gb SAS Systems

HP P2000 G3 SAS MSA Dual Controller LFF Array System AW593B

HP P2000 G3 SAS MSA Dual Controller SFF Array System AW594B

Configured Units, 10GbE iSCSI Systems

HP P2000 G3 10GbE iSCSI MSA Dual Controller LFF Array System AW596B

HP P2000 G3 10GbE iSCSI MSA Dual Controller SFF Array System AW597B

Configured Units, 1Gb iSCSI Systems

HP P2000 G3 iSCSI MSA Dual Controller LFF Array System BK830B

HP P2000 G3 iSCSI MSA Dual Controller SFF Array System BK831B

P2000 G3 FC SAN Starter Kits

HP P2000 G3 FC MSA Dual Controller Small Business SAN Starter Kit AP847B

includes (1) HP P2000G3 MSA FC Dual Controller LFF Array (AP845B) , (2) HP SN6000 12port Single Power FC Switch (BK780B) , (4) HP 81Q PCI-e FC Single Port HBA (AK344A), (12) 8Gb Short Wave FC SFPs (AJ718A) , and (8) HP 5M OM3 FC Cables (AJ836A) .

Models

HP P2000 G3 FC MSA Dual Controller Virtualization SAN Starter Kit (includes (1) HP P2000G3 MSA FC Dual Controller SFF Array (AP846B) , (2) HP 8/24 Base 16 Ports Enabled SAN Switch (AM868B) , (6) HP 81B PCI-e 8Gb FC Single Port HBA (AP769A), (16) 8Gb Short Wave B Series FC SFPs (AJ716B) , and (10) HP 5M OM3 FC Cables (AJ836A)	AP848B
Disk Enclosures	
HP P2000 Dual I/O LFF Drive Enclosure	AP843B
HP P2000 LFF Drive Enclosure I/O Module	AP844B
HP D2700 Disk Enclosure	AJ941A
Controller-less Chassis (DC-powered)	
HP P2000 DC-power LFF Chassis (can add one or two P2000 G3 controllers or P2000 JBOD I/O modules)	AP840B
HP P2000 DC-power SFF Chassis	AP841B

P2000 G3 Array Bundles

In some areas HP is offering P2000 G3 Array bundles with SFF SAS drives. These bundles can simplify the process of ordering. HP offers these bundles with different type of P2000 G3 Array controllers for different storage capacity needs.

NOTE: These bundles are not offered worldwide so please check the availability for your region

Protocol	Raw Capacity	Regions Availability	Bundle Description	SKUs
Fully Populated Bundles:				
FC Bundles	3.5 TB	AMS APJ	HP P2000 G3 FC DC w/24 146GB SAS 15K SFF HDD 3.5TB Bundle	BV901B
	7.2 TB	AMS APJ	HP P2000 G3 FC DC w/24 300GB SAS 10K SFF HDD 7.2TB Bundle	BV902B
	14.4 TB	AMS APJ	HP P2000 G3 FC DC w/24 600GB SAS 10K SFF HDD 14.4TB Bundle	BV903B
	21.6 TB	AMS APJ	HP P2000 G3 FC 24x900GB SAS SFF Bundle	QR517B
	24 TB	AMS APJ	HP P2000 G3 FC 24x1TB SAS SFF Bundle	QR521B
	7.2 TB AMS	AMS APJ	HP P2000 G3 FC DC w/24 300GB SAS 15K SFF HDD 7.2TB Bundle	QW945B
SAS Bundles	7.2 TB	AMS APJ	HP P2000 SAS DC w/24 300GB SAS 10K SFF HDD 7.2TB Bundle	BV908B
	14.4 TB	AMS APJ	HP P2000 SAS DC w/24 600GB SAS 10K SFF HDD 14.4TB Bundle	BV909B
	21.6 TB	AMS	HP P2000 G3 SAS MSA DC w/24	QR519B

Models

		APJ	900GB SAS 10K SFF HDD 21.6TB Bundle	
	24 TB	AMS APJ	HP P2000 G3 SAS MSA DC w/24 1TB SAS 7.2K SFF MDL HDD 24TB Bundle	QR523A
1G iSCSI Bundles	7.2 TB	AMS APJ	HP P2000 G3 iSCSI DC w/24 300GB SAS 10K SFF HDD 7.2TB Bundle	BV911B
	21.6 TB	AMS APJ	HP P2000 G3 iSCSI MSA DC w/24 900GB SAS 10K SFF HDD 21.6TB Bundle	QR520B
	24 TB	AMS APJ	HP P2000 G3 iSCSI MSA DC w/24 1TB SAS 7.2K SFF MDL HDD 24TB Bundle	QR524B
Half Populated Bundles:				
FC Bundles	3.6 TB	AMS APJ	HP P2000 G3 FC DC w/12 300GB SAS 10K SFF HDD 3.6TB Bundle	BV913B
	7.2 TB	AMS APJ EMEA	HP P2000 G3 FC DC w/12 600GB SAS 10K SFF HDD 7.2TB Bundle	BV914B
	10.8 TB	AMS APJ	HP P2000 G3 FC MSA DC w/12 900GB SAS 10K SFF HDD 10.8TB Bundle	QR525B
	12 TB	AMS APJ	HP P2000 G3 FC MSA DC w/12 1TB SAS 7.2K SFF MDL HDD 12TB Bundle	QR529B
	3.6 TB	AMS APJ	HP P2000 G3 FC DC w/12 300GB SAS 15K SFF HDD 3.6TB Bundle	QW949B
FC/iSCSI Combo Bundles	10.8 TB	AMS APJ	HP P2000 G3 FC/iSCSI MSA DC w/12 900GB SAS 10K SFF HDD 10.8TB Bundle	QR526B
	12 TB	AMS APJ	HP P2000 G3 FC/iSCSI MSA DC w/12 1TB SAS 7.2K SFF MDL HDD 12TB Bundle	QR530B
SAS Bundles	3.6 TB	AMS APJ	HP P2000 G3 SAS DC w/12 300GB SAS 10K SFF HDD 3.6TB Bundle	BV917B
	7.2 TB	AMS APJ	HP P2000 G3 SAS DC w/12 600GB SAS 10K SFF HDD 7.2TB Bundle	BV918B
	10.8 TB	AMS APJ	HP P2000 G3 SAS MSA DC w/12 900GB SAS 10K SFF HDD 10.8TB Bundle	QR527B
	12 TB	AMS APJ	HP P2000 G3 SAS MSA DC w/12 1TB SAS 7.2K SFF MDL HDD 12TB Bundle	QR531B
	3.6 TB	AMS APJ	HP P2000 G3 SAS DC w/12 300GB SAS 15K SFF HDD 3.6TB Bundle	QW951B

Models

1G iSCSI G3 Bundles	3.6 TB	AMS APJ	HP P2000 G3 iSCSI DC w/12 300GB SAS 10K SFF HDD 3.6TB Bundle	BV919B
	7.2 TB	AMS APJ	HP P2000 G3 iSCSI DC w/12 600GB SAS 10K SFF HDD 7.2TB Bundle	BV920B
	10.8 TB	AMS APJ	HP P2000 G3 iSCSI MSA DC w/12 900GB SAS 10K SFF HDD 10.8TB Bundle	QR528B
	12 TB	AMS APJ	HP P2000 G3 iSCSI MSA DC w/12 1TB SAS 7.2K SFF MDL HDD 12TB Bundle	QR532B
	3.6 TB	AMS APJ EMEA	HP P2000 G3 iSCSI DC w/12 300GB SAS 15K SFF HDD 3.6TB Bundle	QW952B

Features

Key Features

The HP P2000 G3 Modular Smart Array family encompasses five controllers, each featuring different protocols or combination of protocols to match the exact needs of the user.

- P2000 G3 FC/iSCSI Combo MSA controller: this unique controller offers both 8 Gb Fibre Channel and 1 GbE iSCSI functionalities built into a single array controller. This allows customers to enable storage needing high performance through the FC ports while leveraging their SAN investment by sharing the array resources with smaller departments through low-cost iSCSI. It also enables optional Remote Snap (replication) for data protection.
- P2000 G3 FC MSA controller: Dual 8 Gb Fibre Channel host ports per controller give high performance with a mature topology and is compatible with the largest installed base of SAN users.
- P2000 G3 10GbE iSCSI MSA controller: HP was the first of the major modular array manufacturers that brought a high performance dual-ported 10GbE iSCSI solution to the entry level segment. Ideal for those who want to utilize cost-effective Ethernet as their infrastructure without sacrificing access time to their data. Now supports Remote Snap (replication).
- P2000 G3 SAS MSA controller: the P2000 G3 SAS model gives fast 6 Gb transmission rates with low cost SAS connections. Four host ports per controller support a highly efficient direct connect configuration.
- P2000 G3 iSCSI MSA controller offers four 1 Gb iSCSI ports utilizes the popular Ethernet infrastructure with its low cost and ease of management, while the additional ports assure increased performance over the previous generation. Now supports Remote Snap (replication).

All P2000 G3 models offer a common set of valuable features:

- Ease of management featuring browser-based out-of-band access. This allows a department or small company to effectively handle growing storage requirements, with the aid of an intuitive GUI to administer the unit with a minimum of complexity. Ideal for local or remote installations.
- All G3 models come standard with 64 controller-based snapshots and clone capability. The G3 arrays also support an optional 512 snaps.
- Choose either a low-cost single controller array or start with a configured dual controller array model to fit the budget, high availability, and performance needs.
- All models feature a wide variety of drives: enterprise-class SAS, SAS Midline, and archival-class SATA Midline in either P2000 LFF 3.5-inch or HP Storage SFF 2.5-inch drives.
- P2000 G3 models can have a maximum number of P2000 LFF drive enclosures (7), a maximum number of D2700 SFF enclosures (5), or mix both sizes. The array can grow incrementally from a few drives to 178 TB SAS, 576 TB of SAS MDL or 192 TB SATA MDL.
- 2 GB transportable read/write cache per controller. Battery-free cache backup with super capacitors and compact flash
- Vdisks can be spanned across multiple enclosures
RAID levels 0, 1, 3, 5, 6, 10, 50
- Maximums vary by RAID levels: 2 drive max for RAID level 1; max of 16 drives for RAID levels 0, 3, 5, 6, and 10; max of 32 drives for RAID level 50
- 512 LUNs with LUN sizes greater than 40TB depending on the RAID configuration chosen. The maximum LUN size is 64TB
- Non-disruptive on-line controller code upgrade (requires dual controllers w/ multi-pathing software)
- Upgradable by design. Owners of an original MSA2000 G1 or G2 array are able to do data-in-place controller upgrades to the P2000 G3 FC, Combo FC/iSCSI, 1 Gb or 10GbE iSCSI, or P2000 G3 SAS. Cross protocol upgrades are also supported between the protocols. This unique ability protects the earlier investments in chassis, drives, and JBODs

Features

Follow us on twitter and be a part of the conversation, and get the latest P2000 G3/MSA related news and information at: <http://www.twitter.com/MSAstorage>

HP P2000 G3 FC MSA SAN Starter Kits

The new P2000 G3 FC MSA SAN Starter kits are offered to simplify ordering and implementation of your SAN. HP includes all the necessary hardware components to build your own SAN solution in one package, just add the drives of your choice. These kits are offered at very affordable prices which reflect a savings over purchasing each SAN component separately.

Virtualization SAN Starter Kit

HP P2000 G3 FC MSA Dual Controller Virtualization SAN Starter Kit

AP848B

The HP P2000 G3 FC MSA Dual Controller Virtualization SAN Starter Kit addresses the growing need for server and storage administrators to deliver end-to-end storage, virtualization, and management capabilities across their network infrastructure. The hardware bundle consists of six Host Bus Adapters (HBAs), two FC switches, a P2000 G3 FC MSA Dual Controller Array (SFF Chassis), sixteen 8Gb FC SFPs, ten HP 5M FC cables as well as two licenses per switch enabling Server Application Optimization (SAO) and Adaptive Networking (AN). SAO is an adapter technology that offers Quality of Service (QoS) capabilities that can be used in conjunction with fabric wide QoS and to enable a high performing, virtualized infrastructure. With SAO deployed, administrators can protect a VM and its application by assigning its IO flow to a specific priority level. The QoS priorities are enforced at the hardware level, thereby providing adequate bandwidth during periods of high congestion. Applications such as email and databases achieve better performance when deployed in specific SAO and MSA configurations.

Small Business SAN Starter Kit

HP P2000 G3 FC MSA Dual Controller Small Business SAN Starter Kit

AP847B

The HP P2000 G3 FC MSA Dual Controller Small Business SAN Starter Kit is a unique end-to-end 8 Gbps SAN Solution, just add disks and power. This kit includes one 8 Gbps P2000 G3 FC MSA Dual Controller Array (LFF Chassis), four 8 Gbps FC HBAs, two HP SN6000 Stackable 8 Gbps 8-port FC switches, twelve 8Gb FC SFPs, eight HP 5M FC cables and HP unique Simple SAN Connection Manager (SSCM) SAN management software, cables, rails and optics. SSCM is the only SAN management software that can manage the FC switch, HBA and provision HP storage from a single pane of glass.

Application Solutions

The HP P2000 SAN is the ideal solution for customers running Oracle, Microsoft, SAP environments and those customers who are deploying virtual server technologies like VMware, Hyper-V, and Oracle Virtual Machine. The HP P2000 SAN delivers enterprise functionality that enhances virtual environments, simplifies management, and reduces costs. Easy to deploy, scale and maintain, HP P2000 SANs ensure that crucial business data remains available.

HP has developed best-in-class expertise in Oracle, Microsoft, SAP, and Virtualization Hypervisor technology through extensive testing with the HP P2000 SAN, HP servers, and management software; high availability and disaster recovery solutions; and backup and recovery on the Oracle, Microsoft, and SAP application platforms. As a result, our customers can expect a wide range of operational and business benefits where they can:

- Deploy IT assets across multiple locations.

Features

- Incrementally grow storage without interruption.
- Enable high availability and disaster recovery capabilities for critical applications.
- Deploy a remote disaster recovery site.

Learn more

To learn more about specific HP Storage Solutions that are built with Oracle, Microsoft, SAP and Virtualization environments in mind, visit the solution sites supporting each of these applications.

HP Storage for Oracle hyperlink to: <http://www.hp.com/storage/oracle>

HP Storage for Microsoft hyperlink to: <http://www.hp.com/storage/microsoft>

HP Storage for SAP hyperlink to: <http://www.hp.com/storage/sap>

HP Storage for VMware hyperlink to: <http://www.hp.com/go/vmware/storage>

Family Information

	P2000 G3 FC	P2000 G3 SAS	P2000 G3 10GbE iSCSI	P2000 G3 iSCSI (1GbE)
Capacity Minimum / with maximum additional drive enclosures	LFF: 7.2 TB SAS or 72 TB SAS MDL or 24 TB SATA MDL w/ 7 LFF enclosures: 57.6 TB SAS, 576 TB SAS MDL or 192 TB SATA SFF: 28 TB SAS or 24 TB SAS MDL or 12 TB SATA MDL w/ 5 D2700 JBODs: 178 TB SAS or 149 TB SAS MDL or 74.5 TB SATA MDL	LFF: 7.2 TB SAS or 72 TB SAS MDL or 24 TB SATA MDL w/ 7 LFF enclosures: 57.6 TB SAS, 576 TB SAS MDL or 192 TB SATA SFF: 28 TB SAS or 24 TB SAS MDL or 12 TB SATA MDL w/ 5 D2700 JBODs: 178 TB SAS or 149 TB SAS MDL or 74.5 TB SATA MDL	LFF: 7.2 TB SAS or 72 TB SAS MDL or 24 TB SATA MDL w/ 7 LFF enclosures: 57.6 TB SAS, 576 TB SAS MDL or 192 TB SATA SFF: 28 TB SAS or 24 TB SAS MDL or 12 TB SATA MDL w/ 5 D2700 JBODs: 178 TB SAS or 149 TB SAS MDL or 74.5 TB SATA MDL	LFF: 7.2 TB SAS or 72 TB SAS MDL or 24 TB SATA MDL w/ 7 LFF enclosures: 57.6 TB SAS, 576 TB SAS MDL or 192 TB SATA SFF: 28 TB SAS or 24 TB SAS MDL or 12 TB SATA MDL w/ 5 D2700 JBODs: 178 TB SAS or 149 TB SAS MDL or 74.5 TB SATA MDL
Controller Cache	2 GB per controller	2 GB per controller	2 GB per controller	2 GB per controller
Total LUNs LUN sizes greater than 40TB depending on the RAID configuration chosen	512 maximum LUN size: 64TB	512 maximum LUN size: 64TB	512 maximum LUN size: 64TB	512 maximum LUN size: 64TB
Host connect P2000 & MSA2000 have 1 or 2 controllers, EVA has 2 controllers standard	Two 8 Gb Fibre Channel ports or Two 8Gb FC and two 1GbE iSCSI ports per controller	Four 6 Gb (x4) SAS ports per controller	Two 10 GbE iSCSI ports per controller	Four 1 Gb iSCSI ports per controller
Maximum Drives w/ expansion	96 LFF/149 SFF	96 LFF/149 SFF	96 LFF/149 SFF	96 LFF/149 SFF
Maximum host supported (dual controller)	64	64 w/ SAS switch: 32 single blade servers (2x c7000), or 16 dual density blade servers	64	64
Optional software: Snapshot, clone, Remote Snap	Snapshot, 64 standard (max 512) Clone (standard) Remote Snap (optional)	Snapshot, 64 standard (max 512) Clone (standard)	Snapshot, 64 standard (max 512) Clone (standard) Remote Snap (optional)	Snapshot, 64 standard (max 512) Clone (standard) Remote Snap (optional)
Use for Storage	Primary Storage with SAS drives. Secondary with SATA	Primary Storage with SAS drives. Secondary with SATA	Primary Storage with SAS drives. Secondary with SATA	Primary Storage with SAS drives. Secondary with SATA

NOTE: maximum available storage capacity depends on the RAID level being implemented

Product Technology

8Gb Fibre Channel controller

Two host ports per FC controller shipped with SFPs. The P2000 G3 FC controller can run in either point-to-point or FCAL (loop). The default is FCAL which is used in Direct Connect, particularly with two

Family Information

controllers. The PtP (fabric) mode is used with almost all switches.

Combo controller with FC and iSCSI ports This ingenious dual-protocol "combo" controller supports a full FC SAN through the 8Gb FC ports, while designating the two 1 GbE iSCSI ports to enable remote replication over iSCSI protocol and perform as an iSCSI target. This allows economical sharing of the storage resource (the P2000 G3 array) with one department needing the performance afforded by the 8 Gb FC ports while simultaneously supporting another department with lesser performance needs and a budget only allowing a 1GbE iSCSI network.

6Gb SAS controller Four 4x host ports per 6Gb SAS controller.

10GbE iSCSI controller Two 10GbE ports per G3 10GbE iSCSI controller. Ports are ready for the choice of SFP (none included) Supports the ProCurve and ISS versions of the following 10GbE parts for use in the controllers:

HP 10Gb Cables

- HP SFP+ 10GbE Copper Cable
- HP ProCurve 10-GbE SFP+-SFP+ Direct Attach Cable

HP SFP+ Transceivers

- HP BladeSystem 10Gb SR SFP+ and HP BladeSystem 10Gb LRM SFP+
- HP ProCurve 10-GbE SFP+ SR Transceiver and HP ProCurve 10-GbE SFP+ LRM Transceiver
- No SFP+ LR Transceiver support

1 Gb iSCSI controller Four 1 Gb Ethernet iSCSI ports per G3 iSCSI controller

Modular Chassis 2U rack height. 12 Large Form Factor or 24 Small Form Factor drive bays, accommodating SAS and SATA. Comes with space for one or two controllers, or P2000 3.5-inch disk Enclosure I/O modules (LFF chassis only)

Drives available The P2000 G3 controllers support both the P2000 3.5-inch Large Form Factor (LFF) drives, and the HP Storage 2.5-inch Small Form Factor (SFF) drives.

- Serial Attached SCSI (SAS) enterprise-class drives are designed for high demand, 24x7 usage.
- SAS Midline and SATA Midline are usually reserved for archival of data as they are both relatively inexpensive and are available in very large capacities.

The HP entry-level family of arrays can accommodate both SAS and SATA drives within the same enclosure making it ideal to have both business-critical, high activity files on SAS drives while using Snapshot, clone, or Remote Snap capability to keep back-up or archival data on the less expensive drives.

For investment protection, the controllers will support single and dual port SAS & SATA drives in a legacy single - or dual - domain MSA70. This support allows current owners of MSA70s to migrate their single port drives (in their MSA70 only, not into the array head) to be attached to a P2000 G3 FC or SAS. They can only cascade to another single I/O MSA70. This is not a data-in-place transition, and overall performance could be impacted.

SAS drive performance can be approximately 30% greater than SATA performance on sequential host I/O. SAS performance excels in sequential lower latency response time and random I/O per second transaction performance due to higher rpm disk speeds yielding lower seek times. SAS drive random performance is generally twice that of SATA drives.

Family Information

NOTE: P2000 and MSA2 3.5-inch Large Form Factor (LFF) drives are for use only in the P2000 G3 or MSA2000 models. The 2.5-inch Small Form Factor (SFF) drives are supported only with the P2000 G3 or the MSA2300 G2 controllers and are Storage hot-plug 2.5-inch drives.

Optional Disk enclosures Just as the user has a choice of chassis for the array head (LFF and SFF drive bays, AC or DC powered), so also do they have a choice of expansion disk enclosures accommodating either drive size. Both the P2000 and the D2700 disk enclosures can be hot-added to an operating array.

(NOTE: these are not supported as part of a NEBS-certified configuration with the MSA Carrier Grade Chassis. There is a certified JBOD listed in the Carrier-grade section)

P2000 3.5 - inch drive enclosure. This 2U storage enclosure (AP843B) is designed to support twelve Storage 3.5 - inch Universal form factor (LFF) 6Gb SAS or SATA hard drives. It ships standard with dual I/O modules installed.

- This 3.5-inch drive enclosure can be attached to either the P2000 G3 FC or SAS LFF or SFF array head.
- Each configured model ships standard with two .5m mini-SAS to mini-SAS cables for cascading to other P2000 drive enclosures
- Up to seven P2000 3.5-inch enclosures can be attached to a P2000 G3 FC, FC/iSCSI Combo, or SAS controller in the array head.

D2700 2.5-inch drive enclosure. This 2U storage enclosure (AJ941A) is designed to support twenty five ProLiant 2.5-inch Universal form factor (SFF) 6Gb SAS or SATA hard drives. It ships standard with dual I/O modules installed.

- This 2.5-inch drive enclosure can be attached to a P2000 G3 controller (SFF or LFF) array head
- The D2700 enclosure ships with a two .5m miniSAS to miniSAS cable.
- Up to five D2700 may be attached to the P2000 G3 array head, given total support for 149 SFF drives.

Scalability

The P2000 G3 FC, Combo FC/iSCSI, SAS, 1 Gb or 10GbE iSCSI controllers are designed to allow an installation to begin with smaller capacity and be able to grow gradually as needed. The flexibility of SAS or SATA drive technology, form factors, sizes, speeds, and costs per GB allows a system to easily fit in almost any budget.

- Large Form Factor configurations can scale up to 7.2 TB SAS, 72 TB SAS MDL or 24 TB SATA, expandable to 57.6 TB SAS, 576 TB SAS MDL or 192 TB SATA with the addition of a maximum of seven P2000 3.5-inch Drive Enclosures.
- Small Form Factor configurations can scale from 21.6 TB SAS, 24 TB SAS MDL or 12 TB SATA MDL. With the addition of five D2700 JBODs, the P2000 G3 can support 134 TB SAS, 149 TB SAS MDL or 74.5 TB SATA MDL.
- Users may configure a 24-drive P2000 G3 SFF array head with 12-drive LFF P2000 3.5-inch disk enclosures. This is an excellent method for a configuration that supports fast SFF enterprise-class SAS drives in the array head, combined with economical LFF drives staged for archival purposes, all in the same array.
- Qualification of larger capacity drives is ongoing.

Family Information

- Vdisks** Vdisks can span across multiple enclosures, where drives used in the Vdisk can be contained in different enclosures. The maximum number of drives that can be used in RAID 1 Vdisk is 2; RAID 0, 3, 5, 6, and 10 is 16; and for RAID 50 Vdisk is 32.
- LUNs** The HP 2000 family of arrays supports 512 LUNs (total volumes in a dual controller system) and LUN sizes up to 64 TB depending on the RAID configuration chosen. The array supports expansion and deletion of any LUN.
- RAID 0, 1, 3, 5, 6, 10, 50** In addition to the usual RAID levels, the P2000 G3 features several important additional levels. RAID 6 is the highest level of RAID protection. It allocates two sets of parity data across drives and allows simultaneous write operations. It can withstand two simultaneous drive failures without downtime or data loss. RAID 10 is mirroring and striping without parity. It is the most popular of the multiple RAID levels, allowing large arrays with high performance in most cases and superior fault tolerance. RAID 50 combines the block striping and parity of RAID 5 with the straight block striping of RAID 0, yielding higher performance than RAID 5 through the addition of RAID 0, particularly during writes.
- Performance** Performance numbers are a guideline as established by tests using RAW I/O in an Operating System Agnostic test lab environment. 144 GB 15K SAS drives were used in a dual controller configuration of 12 vdisks consisting of twelve disks per vdisk, 1.6 TB volumes, and 3 volumes per host. 4 hosts directly attached to the P2000 G3 array were used in this test configuration (results cannot be expected with a single host). Results were achieved in Sequential Writes with 256K blocks; all random tests were based on 8K block sizes.

NOTE: Number and type of applications, drive type and number of drives, operating system used, and the number of hosts will affect overall performance. This table is provided strictly as a test-lab comparison. Note: These numbers reflect a full array configuration with the maximum number of front-end ports, disks, and controllers. The test results shown for the P2000 G3 are designed to give a conservative reference point for comparisons.

2000 Array Performance	P2000 G3 FC	P2000 G3 SAS	P2000 G3 10GbE iSCSI	P2000 G3 1GbE iSCSI
Protocol (host connect)	8 Gb Fibre Channel	6 Gb SAS	10Gb Ethernet	1 Gb Ethernet
2000 RAID 10 Performance Results				
Sequential Reads MB/s	1,650	1,650	1,600	550
Sequential Writes MB/s	850	850	800	525
Random Mix IOPs 60/40 read/write	20,500	23,500	18,500	17,200
2000 RAID 5 Performance Results				
Sequential Reads MB/s	1,650	1,650	1,600	550
Sequential Writes MB/s	1,300	1,350	1,000	525
Random Mix IOPs 60/40 read/write	14,000	16,000	12,500	9,400
2000 RAID 6 Performance Results				
Sequential Reads MB/s	1,650	1,650	1,600	550

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Sequential Writes MB/s	1,300	1,100	1,000	525
Random Mix IOPs 60/40 read/write	8,300	9,800	7,500	5,600

Refer to the paper titled "Upgrading the HP MSA2000 (G1 or G2) to the P2000 G3 MSA ", available in the Resource Library at: www.hp.com/go/p2000.

DC-power chassis

HP is making the two models of controller-less chassis available with direct current (DC) power supplies. They each have the two empty bays where users can insert one or two P2000 G3 controller(s). In addition, the P2000 chassis with LFF drive bay can have P2000 3.5-inch I/O modules inserted to create a LFF DC-power JBOD.

The 500 watt power supply is designed to operate over the input range of -40VDC to -75VDC.

HP P2000 DC-power LFF Chassis (supports up to 2 controllers or I/O modules)

SKU
AP840B

HP P2000 DC-power SFF Chassis

AP841B

Configuration and Management Tools

HP Storage Management Utility (SMU). Management access, out-of-band: WEB GUI, CLI. Interface Types: USB, 10/100 Ethernet. Protocols Supported SNMP, SMI-S, SSL, SSH, SMTP, FTP, HTTP, Telnet

P2000 Software and Documents Support CD

- All product documentation (CD can be used on ALL supported server Operating Systems.)
- MSA Device Discovery Tool (Win and Linux) - reports P2000/MSA HW devices, and supported storage software
- Host Software Bundles (Win and Linux for both ProLiant x86, ProLiant x64 and Integrity IA64servers)
- CD updated quarterly on HP.com with sustaining firmware updates
- The P2000 G3 contains an embedded SMI-S provider for use by SMI-S client applications. The embedded provider is designed to support P2000 configurations with up to 24 hard drives, and up to 250 mapping paths. A mapping path is defined as a P2000 volume presented through a P2000 target port to a Host initiator.

Hot Plug Expansion and Replacement Support

All P2000 G3 models support hot plug expansion and replacement of redundant controllers, enclosures, fans, power supplies, and I/O modules for simple, fast installation and maintenance. Hot add expansion of disk enclosures is also supported.

Snapshot and Clone

All G3 arrays come standard with 64 snaps, 512 snaps available. Controller based functionality. Offers higher levels of data protection, enabling an almost instant recovery from data failure or corruption. Offers alternative development testing of 'offline' production data and the ability to backup snapped/cloned data.

Overview	<p>The P2000 G3 arrays come integrated with web browser and CLI based software for storage and RAID management, setup, configuration, and troubleshooting. This reduces the cost of ownership by reducing the training and technical expertise necessary to install and maintain your HP storage solution.</p> <p>The SPOCK database provides interoperability information for thousands of components and millions of component combinations. It is available to all users at http://www.hp.com/storage/spock.</p>
Server Compatibility NOTE: depends on protocol	<p>Supports most HP ProLiant, BladeSystems and Integrity servers including</p> <ul style="list-style-type: none"> • HP ProLiant DL, ML

Family Information

	<ul style="list-style-type: none"> • HP c-Class Blade Servers • Integrity servers, IA64 (FC and FC/iSCSI support only) • Compatibility must be confirmed at: http://www.hp.com/storage/spock
Industry Standard servers support	<ul style="list-style-type: none"> • Supports most multi-vendor industry standard 32-bit Intel and AMD based (x86) servers. HP requires the Third-Party Server to be logo'd and listed on the Microsoft Windows Server Catalog. • Refer to the Microsoft website: http://www.microsoft.com/windows/catalog/server/ • HP Division recommends that the Third-Party Server Vendor is an active member of TSANet. Refer to the TSANet website for details: www.tsanet.com • Non-HP servers will generally be supported if the HP storage stack is used. This includes supported HP branded HBAs and drivers, and supported FC switches.
OS Support Fibre Channel ports	<p>Refer to the HP support statements for complete current OS version support: http://www.hp.com/storage/spock</p> <ul style="list-style-type: none"> • Microsoft Windows Server 2012 • Microsoft Windows Server 2008 IA32, x64, IA64 (Standard, Enterprise, Datacenter) • Microsoft Windows Server 2008 R2 x64 • Microsoft Windows 2003 SP1, SP2, and R2 and 2003 R2 IA32, x64 • HP-UX • Red Hat Linux (32/64) • SuSE SLES (32/64) • Microsoft Windows Server 2008 x64 Hyper-V • VMware • OpenVMS • Apple Mac OS X (requires ATTO Celerity 8Gb FC HBA) • Solaris 10 (x86)
OS Support Fibre Channel Ports (Integrity)	<ul style="list-style-type: none"> • HP-UX • Windows • OpenVMS • Linux
OS Support 1GbE iSCSI ports on the G3 Combo FC/iSCSI Controller	<ul style="list-style-type: none"> • Microsoft Windows Server 2012 • Microsoft Windows Server 2008 and 2008 R2 (x64, IA64) • Microsoft Windows Server 2008 x64 Hyper-V • Microsoft Windows 2003 (SP1, SP2, and R2) and 2003 R2 (IA32, x64) • Red Hat Enterprise Linux (32/64) • SuSE Linux IA32, x64 • VMware ESX
OS Support G3 SAS Controller	<p>Refer to the HP support statements for complete current OS version support: http://www.hp.com/storage/spock</p> <ul style="list-style-type: none"> • Microsoft Windows Server 2012 • Microsoft Windows Server 2008 IA32, x64 • Microsoft Windows Server 2008 R2

Family Information

	<ul style="list-style-type: none"> • Microsoft Windows 2003 and 2003 R2 IA32, x64 • Red Hat Linux (32/64) • SuSE SLES (32/64) • Microsoft Windows Server 2008 x64 Hyper-V • VMware • Solaris 10 (x86)
OS Support G3 1Gb iSCSI Controller	<ul style="list-style-type: none"> • Microsoft Windows Server 2012 • Microsoft Windows Server 2008 SP1, SP2, R2 • Microsoft Hyper-V (x64 only) • Microsoft Windows Server 2003 and 2003 R2, SP2 • VMware • Red Hat Linux (32/64) • SuSE SLES (32/64)
OS Support G3 10GbE iSCSI Controller	<ul style="list-style-type: none"> • Microsoft Windows Server 2012 • Microsoft Windows Server 2008 SP1, SP2, R2 • Microsoft Hyper-V (x64 only) • Microsoft Windows Server 2003 and 2003 R2, SP2 • Red Hat Linux (32/64) • SuSE SLES (32/64) • VMware <p>NOTE: the G3 10GbE array must connect to a 10GbE switch; direct connect to the G3 10GbE array must be to a 10GbE NIC and supported by the OS.</p>
Web Browser support	<ul style="list-style-type: none"> • The P2000 G3 and the older MSA2000 support target based management, and include a Web interface and a telnet interface, and require a web browser for management. • The P2000 G3 FC requires Microsoft Internet Explorer V7.x or V8.x • The original MSA2000 and the MSA2000 G2 arrays require Microsoft Internet Explorer V6.X and V7.X (strongly encouraged) • Mozilla Firefox 1.0.7 or later is supported

Hardware

VMware Site Recovery Manager (SRM)

VMware Site Recovery Manager (SRM)

VMware vCenter Site Recovery Manager (SRM) is an extension to VMware vCenter that delivers business-continuity and disaster-recovery solution that helps you plan, test, and execute the recovery of vCenter virtual machines. SRM can discover and manage replicated datastores, and automate migration of inventory from one vCenter to another. Site Recovery Manager integrates with the underlying replication product through a Storage Replication Adapter (SRA).

HP P2000 Site Recovery Adapter (SRA)

The HP P2000 SRA, a free-to-use plugin, is the program that integrates the VMware vCenter SRM with HP P2000 G3 arrays. It enables full-featured use of the VMware SRM. It is a host-software component installed on a Microsoft Windows Server that enables disaster recovery management (DRM) software on the host to communicate and control certain aspects of the replication feature in storage systems connected to the server. It allows the VMware SRM software to automatically coordinate virtual machine failover and failback between a protected data center and a disaster recovery site by employing a disaster recovery solution called Remote Snap. A perfect combination of the Remote Snap replication and VMware SRM provides an unfailing automated solution for implementing and testing the disaster recovery between sites located across geographies. It enables communication between the HP P2000 Remote Snap replication functionality that is embedded in HP P2000 Fibre Channel, iSCSI, and Combo Fibre Channel systems. Users are required to acquire Remote Snap license for their local and remote HP P2000 G3 arrays to use the HP P2000 SRA.

Site Recovery Manager Requirements/Dependencies:

- Requires vSphere 5.0/SRM 5.0
 - Not compatible with SRM 4.x
- Requires HP's P2000 SRA 2.0 Plug-in (downloadable from Hp.com)
- SRM works with Remote Snap functionality
 - Requires purchase of P2000 G3 Remote Snap licenses (one for each site)
- Customers must upgrade to T240 or the latest firmware
- SRM works with FC, iSCSI or Combo controllers only

HP Insight Control Storage Module for vCenter

HP Insight Control Storage Module for vCenter

HP Insight Control Storage Module for vCenter is a component within the HP Insight Control plug-in for vCenter. It provides VMware administrators that are using VMware's vSphere management console (vCenter) with the ability to see how virtual machines are mapped to datastores and individual P2000 volumes. By providing these clear relationships between VM's, datastores and storage, the VMware administrator's productivity increases, as does the ability to ensure quality of service. Roles for administrators can be defined on an individual basis, providing the ability to apply specific permissions for both view and control functions.

The HP Insight Control Storage Module for vCenter supports mixed array environments including EVA, P4000, P2000 (MSA), and the XP array series including the P9500.

Hardware

When deployed with the P2000 array, provides the following:

- Active Management functionality for the P2000 array:
 - Create/Expand/Delete a Datastore
 - Create a Virtual Machine from a template
- Monitors the health and status of the P2000
- Displays LUN / volume connections from VMs and ESX servers to the arrays and provides the location and attributes of the P2000 within the SAN
- Identifies what storage features are available to allow administrators to match the features available on the P2000 to their requirements
- Provide a cluster-level view of the storage

HP Insight Control Storage Module for vCenter is downloadable from Software Depot:

<https://h20392.www2.hp.com/portal/swdepot/displayProductInfo.do?productNumber=HPVPR>

For more information on HP Insight Control Storage Module for vCenter visit: www.hp.com/go/vmware

vStorage API for Array Integration (VAAI)

The vStorage API for Array Integration (VAAI) is one of the storage application programming interface (API) sets in vSphere 4.1. VAAI is an API storage partners can leverage to enhance performance of virtual machine (VM) management operations by delegating these operations to the storage array. With hardware offload, ESX/ESXi hosts perform certain operations faster and consume less server CPU and memory resources, and also storage port and storage fabric bandwidth. VAAI includes high performance and scalable VM data path primitives. HP introduced VAAI support for HP MSA P2000 Storage array products starting with the T230 firmware release.

Storage Hardware Primitives for VAAI

In the VMware vSphere 4.1 release, the HP StorageWorks P2000 G3 MSA Array Systems offload capabilities support the following three primitives:

- Full Copy or Hardware Assisted Move
- Block Zeroing or Hardware Assisted Zeroing
- Hardware Assisted Locking or Atomic Test and Set (ATS)

HP Storage Management Pack for Microsoft System Center

The HP Management Pack for Systems Center Operations Manager provides seamless integration with Microsoft Systems Center Operations Manager and now System Center Essentials by integrating predefined discovery and state monitoring policies, event processing rules and tasks, and diagram and topology views for the storage system.

For more information:

http://h18000.www1.hp.com/products/quickspecs/14249_div/14249_div.html

HP Storage Management Pack can be downloaded free from the following website:

<https://h20392.www2.hp.com/portal/swdepot/displayProductInfo.do?productNumber=SCOM>

Hardware

Snapshot and Volume Copy Software for the P2000 G3

Product Features

Data Protection

- Snapshots create up to 512 point-in-time pictures of data (512 snaps are exclusive to the P2000 G3)
- Volume Copies create up to 128 point-in-time copies of data
- Recovery is instant - revert data from any previous Snapshot or Volume Copy
- Backup 'snapped' data to disk, virtual tape, or physical tape without a backup window
- A 64 snapshot license and Volume Copy are included with all P2000 G3 models.
- Support and updates are desired for bundled software functionalities (such as 64 LTU Snap and/or Volume Copy etc. in the P2000 G3 products) a combination HW + SW support care pack must be purchased.
- HP does not provide warranty assistance for software products included with our base hardware products. This would either be SupportPlus or SupportPlus24. The hardware warranty component of these services is accounted for in the pricing of the SP and SP24 care packs.

Data Testing

- Snap or clone data to test the performance of a software application on 'offline' production data
- Snap or clone data to test how a software patch or enhancement will function on 'offline'; production dat0061

P2000 G3 Snapshot and Clone:

G3 controllers/models come STANDARD with 64 snapshots and Volume Copy software
512 Snapshot option is ONLY available and supported with the G3, not the prior generation MSA2000 models

HP P2000 Array System Snapshot 512 Software LTU

TA806A

HP P2000 Array System Snapshot 512 Software E-LTU

TA806AAE

MSA2000 and MSA2000 G2 Snapshot and Volume Copy (clone) software:

Snapshot and Volume Copy software is optional on models other than the P2000 G3.

The following skus are designated for use by the MSA2000 G2 models. They are neither necessary nor available for the P2000 G3 FC.

HP 2000 Modular Smart Array Volume Copy Software LTU

T5514A

HP MSA Recovery Manager Software

Overview

MSA Recovery Manager (RM) intelligently creates and manages application specific snapshots that can be used to quickly restore application instances or databases. This optional software delivers a standalone solution to augment your existing backup software strategy. It provides seamless integration with HP P2000 G3 storage hardware.

Recovery Manager currently supports Microsoft Exchange and Microsoft SQL. Integrated with HP and 3rd party back up applications, RM provides reliable data recovery. Recovery Manager is integrated with Microsoft Volume Shadow Copy Service (VSS) to make non-disruptive point-in-time copies of Microsoft Exchange and Microsoft SQL databases for constant data protection. RM eases costs and

Hardware

	<p>administration by providing rapid, affordable online recovery of Microsoft® SQL Server databases from multiple, highly granular point-in-time snapshots. Quickly recover a database to a known point in time, speeding up a variety of operations including rapid recovery of the production SQL server.</p> <p>For more information please visit www.hp.com/go/recoverymanager</p>	
What's New	<ul style="list-style-type: none"> • Support for Microsoft Exchange and Microsoft SQL. • Integration with HP and 3rd party backup tool allowing backup to tape and/or disk. • Instant Recovery designed to respond to your needs for 24x7 application availability. • Support on multiple Windows platforms. 	
Models	HP MSA Recovery Manager Software LTU	TC399A
	HP MSA Recovery Manager Software E-LTU	TC399AAE
Licensing	<ul style="list-style-type: none"> • HP Recovery Manager Software is licensed per single array. One license is required for each array that contains data, specific to applications being supported by RM, intended for backup and recovery scenarios. • The above license is applicable for all the applications currently supported. • License bought for a specific array may not work on another similar array. <p>NOTE: Electronic software is available in all countries except China and Japan. For China and Japan should order the physical equivalent</p>	
Product Highlights	<p>Features</p> <ul style="list-style-type: none"> • Creates VSS based Point-In-Time snapshots. • Supports mount, deletion of snapshots. • Schedules snapshot creation. • Single GUI & CLI for managing SQL and Exchange and for performing all management. • Auto-discovers applications - SQL and Exchange. • Group level (Instance/Storage group) or single database level snapshot creation. • Recovery of database based on point-in-time snapshots or media backup. • Exchange Database Integrity check using Microsoft utilities. • Integrates with HP Data Protector & Symantec Netbackup for Media Backup & recovery. • Supports 2 types of recovery: <ul style="list-style-type: none"> • Volume Recovery • File Copy Recovery • Supports recovery from tape backup. • Supports snapshot policy management (snapshot rotation). • Supports Microsoft Cluster Server (MSCS), Cluster Continuous Replication (CCR) and Data Availability Group (DAG) environments. <p>Applications and Platform</p> <ul style="list-style-type: none"> • Supports SQL 2005, 2008 & R2, Exchange 2007, 2010. • Supports Windows platforms as supported by the above applications. • Supports P2000 G3 (FC/ISCSI/SA). 	

Hardware

HP P2000 Remote Snap Software (G3 FC and FC/iSCSI, 1GbE and 10GbE iSCSI controllers only)

- HP P2000 Remote Snap Software is array based software that provides remote replication on the HP P2000 G3 MSA Array products (except SAS model). HP Remote Snap is a form of asynchronous replication which consists of replication of block-level data from a volume on a local system to a volume that may be on the same system or on a second independent system. This second system may be collocated with the first system or may be located at a remote site. It requires T230Rxx controller firmware or higher.
- HP Remote Snap functionality is based on existing Snapshot technology offered by HP P2000 SAN Array products. Snapshots are used to track the data to be replicated as well as to determine the differences in data updated on the master volume, minimizing the amount of data to be transferred.
- HP Remote Snap replication technology provides the ability to accomplish key data management and protection capabilities. First, because Remote Snap uses snapshots as the underlying technology it creates multiple local recovery points which can be used for such tasks as to complement daily backups; second, replication provides the ability to access data in a remote site which could be used for dispersed operations; and third but definitely not least important replication allows for business continuance in the event of a failure on the primary site.
- In order to perform a replication, a snapshot of the volume to be replicated is taken, creating a point-in-time image of the data. This point-in-time image is then replicated to the destination volume by copying the data represented by the snapshot via a transport medium such as TCP/IP (iSCSI) or Fibre Channel. The amount of data transferred is minimized through the use of snapshots whenever possible.

HP P2000 Array System Remote Snap Software LTU

TA808A

HP P2000 Array System Remote Snap Software E-LTU

TA808AAE

(NOTE: One license per array is required for replication. For example, if you have two P2000 arrays performing replication (from Primary system to Remote System), you will need 2 licenses).

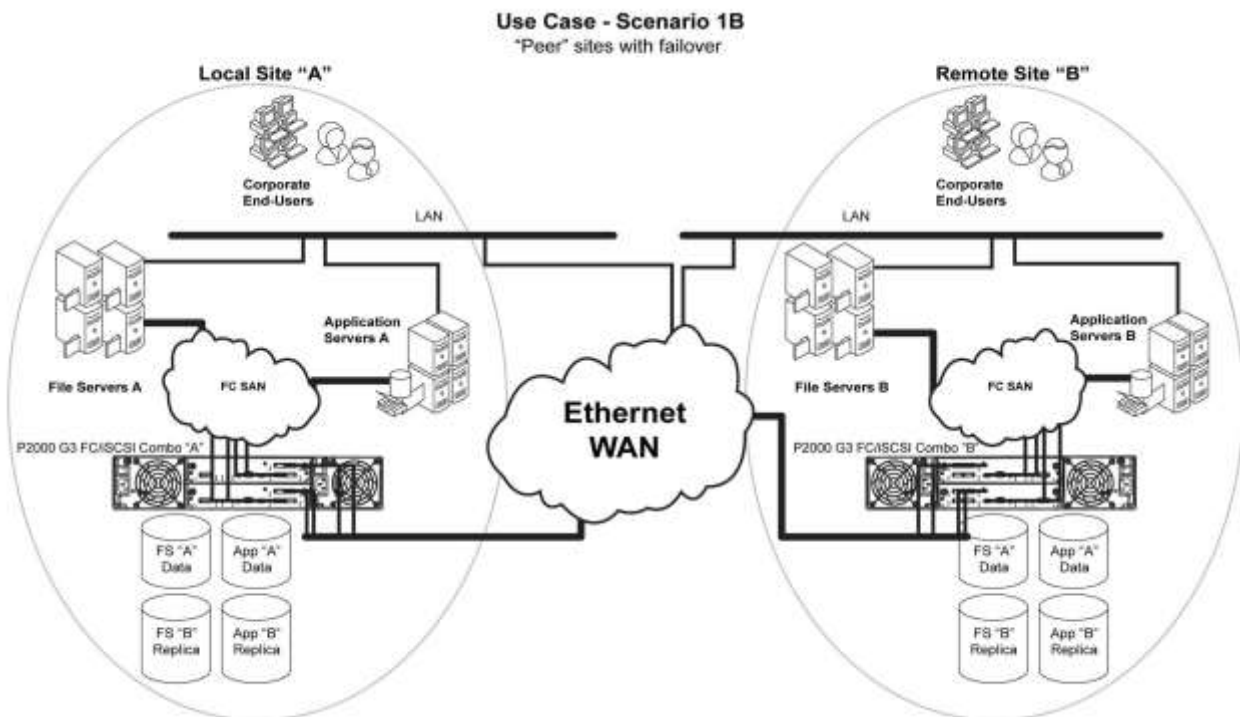
Product Features

- Storage based asynchronous snapshot replication
- Initial copy of data can be performed locally, reducing burden on wide area networks
- Support of both Ethernet and Fiber Channel interconnects provides flexible options to the application environments.
- Snapshot based replication technology means only changed data will be replicated to alternate site
- Many to 1 replication (up to 4 nodes) - primary use case is to replicate from "many" branch offices to the home office for the purpose of backing up data from the branches
- Single controller to single controller replication
- Mixed controller replication - replication between P2000 G3 Fibre Channel and P2000 G3 FC/iSCSI Combo arrays
- Advanced scheduler provides several options to IT administrators for business continuance
- Flexible architecture allows remote replication between P2000 G3 Fibre Channel and/or P2000 G3 FC/iSCSI Combo arrays. You can also join dissimilar controllers; for instance a Combo controller can snap remotely to a 1 or 10 GbE iSCSI array. Protects existing investments and enhances business continuity planning objectives.
- Replication Wizard simplifies the task of setting up and establishing replication pairs from one unified, easy to use GUI.
- Snapshot based replication enables both local and remote recovery depending on the need.

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Snapshot replication isolates problems to a specific point in time which can be selected by the administrator. Additionally snapshot replication supports longer distance replication.

- Multiple relationships provide greater storage flexibility and utilization.
- Bundled 64 Snapshots and Volume Copy integration provides better efficiencies by combining the management and array technologies to create local copies.
- Fast application recovery with minimal or no transaction loss
- Creation of disaster tolerant copies of your critical business data
- No-single-point-of-failure solution to increase the availability of your customers data



Customer Benefits

Disaster Recovery

Replication technology has typically been used to address disaster recovery issues. Disaster recovery is still the driving business case behind replication. Remote replication can be implemented from the production site to one or more remote sites across a campus, across town, across a state or across the country. When a disaster strikes the primary location, the applications can be brought up at the remote site and continue processing against the replicated copies. When the primary site is back online, the replication can be reversed and when the data is resynchronized, processing can be switched back to the primary site and business can continue. In the past, if an e-mail system experienced a disaster it was an "oh well" moment. The loss of a day or more of e-mail was not considered important. Today, e-mail is a critical component of many companies' business plans and recovering e-mail after a disaster quickly and completely is required.

Maintenance

HP Remote Snap software can also be used to solve other business needs. For instance, E-mail servers may need periodic maintenance that can take hours to complete. With remote replication in place, the downtime can be minimal (as long as it takes to bring the remote peer of the primary e-mail server online). The primary server can be worked on (patches, hardware upgrades, etc.) and then brought back

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online and into production. A whole datacenter can be failed over to a remote site on purpose to perform maintenance on generators, air conditioning, etc. Replication can also be used to perform a datacenter move with minimal downtime (fail everything to the DR site, move the production datacenter to its new location then fail the DR site back to the new datacenter).

Storage Based

Data replication is performed at the storage subsystem controller level and is totally transparent to the host, alleviating unnecessary host cycles to perform the data mirroring functions. Unlike a fabric based or host based solution, the storage based solution dedicates its resources to managing the replication process between arrays, with minimal impact to applications, other data or devices on the SAN.

Bi-Directional

The bidirectional HP P2000 Array solution addresses the growing need among businesses to ensure continuous availability of applications that are critical to daily business operations. HP P2000 enables two sites in a remote replication connection to use each other as a destination to maintain replicated copies of online data. This maximizes resource utilization while enabling business continuance, even in the event of disaster.

Disaster Tolerance

The P2000 G3 FC products utilize snapshot data online and in real time to a remote P2000 G3 through a local or extended storage area network (SAN). Additionally, data replication can be bidirectional, meaning that a storage array can be both a source and a destination. A particular LUN can be replicated in only one direction between the two storage arrays. Write I/O data sent to the source is replicated by HP P2000 Array to the destination. A pair of properly configured HP P2000 G3 FC arrays is a replication solution that guarantees data integrity in the event of a storage system or site failure.

Normalization (first initial copy)

When a DR site is initially created a normalization or initial copy of the data from the source volume to the target volume must occur. The P2000 G3 array allows this first copy to take place locally. After completion the disks can be manually moved to the remote location. Subsequent changes will only remotely copy the changed blocks.

SAN Extensions

HP P2000 G3 Array provides the capability to replicate data over direct Fibre Channel. The distances supported over dark fiber are determined by the speed of the dark fiber connection and the technology used to communicate over the dark fiber.

Path failover (MPIO)

MPIO for Windows provides a single multi-path solution for HP P2000 G3 Modular Smart Array on HP servers.

Support for Windows 2003 and Windows 2003 R2 operating systems is provided by HP MPIO Full Featured DSM. For the P2000 G3 this version is 2.6.1.7 or greater.

Support for Microsoft Windows 2008 is bundled within the operating system

Support for Linux distributions is with Device Mapper 4.4.0 or greater.

Support for HP-UX is native multipathing in HP-UX v3 and PV-Links in HP-UX v2.

HP StoreEasy 3000 Gateway Storage

Add more value to your P2000 array

HP MSA combined with HP StoreEasy 3840 Gateway Storage enables you to consolidate block and file storage onto a single, high-performance system - giving your business the flexibility to meet changing business needs on-demand.

The HP StoreEasy 3840 delivers efficient, secure, and highly available file services that help address your changing file-serving needs. It reduces your cost of ownership by simplifying management,

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increasing resource utilization, centralizing growth, and protecting data. HP StoreEasy 3840 provides a simple and consistent experience for managing block and file storage for multiple workloads centrally.

HP StoreEasy 3840 Gateway Storage	E7X03A
HP StoreEasy 3840 Gateway Storage Blade	E7X08A

NOTE: For more information visit: www.hp.com/go/StoreEasy

HP P2000 G3 Carrier-Grade Components

The P2000 G3 is an 8 Gb Fibre Channel connected 2U storage area network (SAN) or direct connect solution designed for network equipment providers (NEPs) and communication service providers. Suited for those who need a robust telecom infrastructure--- they need storage devices to catch videos, photos, text, new services --- and need a place to have the data stored and cached.

The HP P2000 Carrier-Grade Chassis AP841B (RoHS Compliant SKU) is a controller-less 6Gb chassis capable of supporting one or two P2000 G3 8Gb Fibre Channel controllers (AP836A (Retiring SKU) or AP836B (RoHS Compliant SKU)) and has twenty-four Small Form Factor (SFF) drive bays. It comes equipped with two DC-power power supplies.

The HP P2000 2.5-in Dual I/O JBOD is a special model disk enclosure designed only for use with the carrier-grade array heads. It has 24 drive bays (unlike the D2700 with 25 drive bays) and has dual DC-power supplies. It is only sold with a carrier grade array. Five of these JBODs may be cascaded from the array head.

When used in conjunction with specific Storage SFF SAS drives, the solution is NEBS certified. NEBS level-3 certification provides the assurance that the equipment is safe to operate and sturdy enough to withstand certain physical and environmental (for example, fire, earthquakes) conditions. For Seismic Zone 4 rating, the P2000 must be mounted in an HP Seismic Rack (AH335A)

P2000 DC-power Carrier-grade SFF Chassis	RoHS Compliant SKU
HP P2000 DC-power SFF Chassis NOTE: NEBS certified	AP841B
G3 Controller 8Gb FC	
HP P2000 G3 MSA Fibre Channel Controller NOTE: (1 or 2) With two 8Gb FC ports per controller. NEBS certified.	AP836B
G3 Controller 10GbE iSCSI	
HP P2000 G3 10GbE iSCSI MSA Array System Controller NOTE: two 10GbE iSCSI ports per controller NEBS certified.	AW595B
G3 Controller 6Gb SAS	
HP P2000 G3 SAS MSA Array System Controller NOTE: (1 or 2) with four 6Gb SAS ports per controller. NEBS certified.	AW592B
HP Modular Smart Array SC08e 2-ports Ext PCIe x8 SAS Host Bus Adapter	614988-B21
SFF Carrier-grade (only) DC-power JBOD	

Hardware

HP P2000 Dual I/O DC-power Carrier-Grade SFF Drive Enclosure BV921B

NOTE: NEBS certified.

24-drive SFF bays, NEBS certified, **NOTE:** only sold with carrier-grade arrays

HP MSA P2000 G3 Arrays support both the HP ProLiant Server SFF Hard Disk Drives and HP MSA SFF Hard Disk Drives

HP ProLiant Server Hard Disk Drives

HP 146GB 6G SAS 15K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive 512547-B21

HP 300GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive 507127-B21

HP 450GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive 581284-B21

HP 600GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive 581286-B21

HP 900GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive 619291-B21

HP 300GB 6G SAS 15K rpm SFF (2.5-inch) Hot Plug Enterprise 3yr Warranty Hard Drive 627117-B21

HP MSA Hard Disk Drives

Drives, carrier-grade (all NEBS certified)

HP MSA 146GB 6G SAS 15K SFF(2.5-inch) Dual Port Ent 3yr Warranty Hard Drive E2D54A

HP MSA 300GB 6G SAS 10K SFF(2.5-inch) Dual Port Ent 3yr Warranty Hard Drive E2D55A

HP MSA 450GB 6G SAS 10K SFF(2.5-inch) Dual Port Ent 3yr Warranty Hard Drive E2D56A

HP MSA 600GB 6G SAS 10K SFF(2.5-inch) Dual Port Ent 3yr Warranty Hard Drive C8S58A

HP MSA 900GB 6G SAS 10K SFF(2.5-inch) Dual Port Ent 3yr Warranty Hard Drive C8S59A

HP MSA 300GB 6G SAS 15K SFF(2.5-inch) Dual Port Ent 3yr Warranty Hard Drive C8S61A

Carrier-grade HBA

HP 82E 8Gb 2-port PCIe Fibre Channel Host Bus Adapter AJ763B

NOTE: Emulex 82E

For more information on HP Carrier Grade Platforms go to

http://www.hp.com/products1/servers/carrier_grade/index.html?jumpid=reg_R1002_USEN

HP P2000 Remote Snap Software (G3 FC and FC/iSCSI, 1GbE and 10GbE iSCSI controllers only)

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- HP Remote Snap functionality is based on existing Snapshot technology offered by HP P2000 SAN Array products. Snapshots are used to track the data to be replicated as well as to determine the differences in data updated on the master volume, minimizing the amount of

Hardware

data to be transferred.

- HP Remote Snap replication technology provides the ability to accomplish key data management and protection capabilities. First, because Remote Snap uses snapshots as the underlying technology it creates multiple local recovery points which can be used for such tasks as to complement daily backups; second, replication provides the ability to access data in a remote site which could be used for dispersed operations; and third but definitely not least important replication allows for business continuance in the event of a failure on the primary site.
- In order to perform a replication, a snapshot of the volume to be replicated is taken, creating a point-in-time image of the data. This point-in-time image is then replicated to the destination volume by copying the data represented by the snapshot via a transport medium such as TCP/IP (iSCSI) or Fibre Channel. The amount of data transferred is minimized through the use of snapshots whenever possible.

HP P2000 Array System Remote Snap Software LTU

TA808A

HP P2000 Array System Remote Snap Software E-LTU

TA808AAE

(NOTE: One license per array is required for replication. For example, if you have two P2000 arrays performing replication (from Primary system to Remote System), you will need 2 licenses).

Service and Support, HP Care Pack, and Warranty Information

Warranty

Three-year limited warranty, parts exchange Next Business day delivery

Enclosures, Hard drives, and Options for the P2000 G3 FC carry their own warranty. Refer to HP's Limited Warranty Statement for more information.

The P2000 G3 FC has been designed with customer self repairable parts to minimize repair time and provide greater flexibility in performing defective parts replacement. Please refer to HP's limited warranty Statement and parts replacement instructions for further details.

<http://h18006.www1.hp.com/products/storageworks/warranty.html>

Products included in various kits carry their own individual warranties.

NOTE: The warranty of the hard drive options purchased with the P2000 G3 FC, SAS, and 10GbE iSCSI products is different for SAS hard drives versus SAS MDL and SATA hard drives. SAS hard drive options have a three year warranty and SAS MDL and SATA hard drives options have a one year warranty.

Service and Support

Services to accelerate time to results

HP Storage Services bring you a rich portfolio of consulting and support services designed to add value to our core storage products and solutions. We have the know-how and experience to put storage technology to work for you. We work closely with you as your strategic partner, leveraging our full services portfolio to make sure that everything works to optimize your enterprise.

Choose from services aligned to our storage product offerings and lifecycle. From mission-critical onsite services to innovative web-based remote support, you choose the precise level of attention and support your business demands.

Discover, plan, and design

Choose from a rich portfolio of services to make the most of P2000 G3 MSA Array Systems (Goose Island - PL Li), so you can efficiently and affordably consolidate, manage, and extract value from unstructured data.

HP Services can help you discover needs and create a plan for simplifying the environment, reducing risk, and maximizing your storage investments

HP Storage Efficiency Analysis - The HP Storage Efficiency Analysis provides customers with a view of their storage infrastructure and operating environment; highlighting recommendations for improvements. The report provides extensive insight about the existing storage environment, opportunities for efficiency gains, asset aging and replacement through interaction with key decision makers

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA3-6727ENW.pdf>

HP Storage Impact Analysis (SIA) - The HP Storage Impact Analysis service provides a 2-4 week discovery engagement with executive summary presentation. The goal of this service is to help provide customers guidance on storage related issues and develop remediation plans.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA4-1174ENW.pdf>

Service and Support, HP Care Pack, and Warranty Information

HP Storage Cloud Design Service - Build a scalable, low-cost enterprise storage environment with inherent cloud benefits to meet big data needs.

HP Storage Modernization Service - The HP Storage Modernization service is a 4-6 week service that defines the customers envisioned target storage environment based on a proven solution design methodology. HP architects will quickly perform tool-assisted automatic discovery and facilitate a two-day strategy workshop with all key stakeholders involved in the storage infrastructure initiative
<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA3-4620ENW.pdf>

Deploy and integrate

We can help you configure, set up, and efficiently use P2000 G3 MSA Array Systems (Goose Island - PL Li), as well as help migrate data, improve capacity utilization, and establish information management standards used across backup, replication, and archiving needs.

HP MSA/P2000 Family Disk Array Installation and Startup Service - Implement right from the start, as HP experts install, test, and configure your hardware and software onsite. We deliver a tailored storage deployment properly integrated into your environment.
<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA0-3048ENW.pdf>

HP Storage Data Migration Services - End-to-end data migration service providing seamless discovery, assessment, planning, and design, completely customizable to your organization's storage area network or network attached storage environment and using innovative software to help you migrate to HP storage quickly and efficiently.
<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA3-0774ENW.pdf>

HP Storage and Data Residency Service - Strategic augmentation of your current environment with HP resources who become your trusted advisor to provide answers that are right for your storage and backup environment. <http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA3-9481ENW.pdf>
HP Proactive Select - A flexible way to purchase services to fit your environment with an extensive menu of HP Proactive Select event and technical services, such as onsite firmware upgrades, health checks, assessments, and education.
<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA2-3842ENW.pdf>

Operate and support

Choose the right support to maximize uptime, free up your resources, and achieve improved value- as you get the most out of the existing IT assets while accelerating time-to-revenue.

HP Proactive Care 24x7 - Hardware and software support services designed specifically for your technology with rapid access to Advanced Solution Center Specialists plus firmware and software management and best practice advice
<http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-8855ENW.pdf>

HP Proactive Care Advanced - Building on HP Proactive Care to give you personalized technical and operational advice from an assigned local Account Support Manager for personalized technical collaboration, flexible access to specialist skills to help fine-tune business critical IT, and Enhanced Critical Incident Management to help make sure your business is not affected if you experience a system or device outage.

HP Proactive Care Personalized Support - An option-if you have HP Proactive Care- to bring increased personalization of the Proactive Care support experience through the assignment of an Account

Service and Support, HP Care Pack, and Warranty Information

Service Manager (ASM) who provides IT best practice advice to help address IT issues and projects.
<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA4-3446ENW.pdf>

HP Foundation Care 24x7 Service - HP Foundation Care 24x7 connects you to HP 24 hours a day, seven days a week for assistance on resolving issues - hardware onsite response within four hours and software call back within two hours after opening your case. Three years' coverage recommended with HP Care Pack Service.

HP Education Services - Comprehensive training for new, as well as experienced, storage administrators designed to expand your skills and keep you up to speed with the latest storage and virtualization technology from HP Storage.
<http://education.hp.com/curr-storsan.htm>

Optimized Care - Delivers the highest levels of performance and stability through deployment and proactive management practices

Choose from three levels of operate and support care

HP 6hr CTR Proactive Care Service

Additional options - HP Proactive Care Personalized Support (once per Proactive Care support new environment), an additional day of HP Personalized Support, and 10 additional HP Proactive Select credits per year, per array

Standard Care - maintains high level of uptime, along with expert help to cut the cost and complexity of implementation and support

HP Proactive Care 24x7

Additional options - HP Proactive Care Personalized Support (once per Proactive Care support new environment), an additional day of HP Personalized Support, and 10 additional HP Proactive Select credits per year, per array

Basic Care - Minimum recommended support

HP Foundation Care 24x7

Additional options - 10 Proactive Select Credits per Year

Remote Support Automation

HP Automation provides 24x7 coverage, proactive problem prevention, accurate problem diagnosis and faster problem resolution, as well as interactive support portals and tools. This is an integral, and cost-free, part of your HP support relationship and we are continually investing in additional cutting-edge capabilities to make it better.

For more information

www.hp.com/services/storage

To learn more on HP Storage Services, please contact your HP sales representative or HP Authorized Channel Partner

HP Care Pack Services are sold by HP and HP Authorized Service Partners:

- Services for customers purchasing from HP or an enterprise reseller are quoted using HP order configuration tools.
- Customers purchasing from a commercial reseller can find HP Care Pack Services at www.hp.com/go/lookuptool

Configuration Information

Configure to Order Program Information

HP has a very successful Configure to Order program for the P2000 G3 family. The P2000 G3 models and options may or may not be factory installed in a rack with add-on controllers, switches, P2000 disk enclosures and hard drives. The P2000 G3 arrays may be integrated with ProLiant servers or as standalone storage.

Orders to be shipped through the CTO process must have a minimum of two drives of the same type (SAS, SAS MDL, or SATA) ordered per controller. SAN Starter Kits are not eligible for CTO.

Description	Product Number
P2000 G3 Controllers & Controller-less Chassis	
HP P2000 G3 FC Modular Smart Array Controller NOTE: two 8Gb FC ports	AP836B#0D1
HP P2000 G3 FC/iSCSI Combo Modular Smart Array Controller NOTE: two 8Gb FC ports and two 1GbE iSCSI ports	AP837B#0D1
HP P2000 G3 SAS Modular Smart Array Controller NOTE: four 6Gb 4x SAS ports	AW592B#0D1
HP P2000 G3 10GbE iSCSI Modular Smart Array Controller NOTE: two 10GbE iSCSI ports	AW595B#0D1
HP P2000 G3 iSCSI MSA Array System Controller NOTE: four 1 Gb Ethernet iSCSI ports	BK829B#0D1
HP P2000 Modular Smart Array 3.5-in Drive Bay Chassis (LFF) NOTE: Will accept one or two controllers or Disk Enclosure I/O modules	AP838B#0D1
HP P2000 Modular Smart Array 2.5-in Drive Bay Chassis (SFF) NOTE: Will accept one or two controllers, not I/O modules	AP839B#0D1
Disk Enclosures	
HP P2000 Dual I/O LFF Drive Enclosure, NOTE: twelve 3.5" drive bays Used with single or dual controller LFF or SFF array head	AP843B#0D1
HP P2000 LFF Drive Enclosure I/O Module NOTE: no cable included. Designed for use with blank LFF chassis AP838A	AP844B#0D1
Configured Units	
HP P2000 G3 FC MSA Dual Controller LFF Modular Smart Array System	AP845B#0D1
HP P2000 G3 FC MSA Dual Controller SFF Modular Smart Array System	AP846B#0D1
HP P2000 G3 FC/iSCSI MSA Dual Combo Controller LFF Array	AW567B#0D1
HP P2000 G3 FC/iSCSI MSA Dual Combo Controller SFF Array	AW568B#0D1
HP P2000 G3 SAS MSA Dual Controller LFF Modular Smart Array System	AW593B#0D1
HP P2000 G3 SAS MSA Dual Controller SFF Modular Smart Array System	AW594B#0D1
HP P2000 G3 10GbE iSCSI MSA Dual Controller LFF Array System	AW596B#0D1
HP P2000 G3 10GbE iSCSI MSA Dual Controller SFF Array System	AW597B#0D1

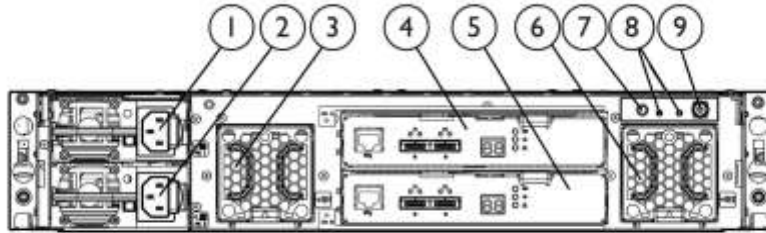
Configuration Information

HP P2000 G3 iSCSI MSA Dual Controller LFF Array System

BK830B#0D1

HP P2000 G3 iSCSI MSA Dual Controller SFF Array System

BK831B#0D1



HP D2700 Disk Enclosure

Rear Panel components

- | | | |
|-------------------|-----------------|----------------------------|
| 1. Power Supply 1 | 4. I/O Module A | 7. Rear UID push button |
| 2. Power Supply 2 | 5. I/O Module B | 8. Enclosure LEDs |
| 3. Fan 1 | 6. Fan 2 | 9. Power on/standby button |

D2700	HP D2700 Disk Enclosure	AJ941A#0D1
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NOTE: 25 Small Form Factor (SFF) drive bays

HP MSA P2000 G3 Arrays support both the HP ProLiant Server SFF Hard Disk Drives and HP MSA SFF Hard Disk Drives

HP ProLiant Server SAS & SATA Drives (SFF 2.5-inch)	HP 300GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	507127-B21
	HP 450GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	581284-B21
	HP 600GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	581286-B21
	HP 900GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	619291-B21
	HP 1.2TB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	718160-B21
	HP 146GB 6G SAS 15K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	512547-B21
	HP 300GB 6G SAS 15K rpm SFF (2.5-inch) Hot Plug Enterprise 3yr Warranty Hard Drive	627117-B21
	HP 300GB 12G SAS 15K rpm SFF (2.5-inch) Enterprise 3yr Warranty Hard Drive	785099-B21
	HP 450GB 12G SAS 15K rpm SFF (2.5-inch) Enterprise 3yr Warranty Hard Drive	785101-B21
	HP 600GB 12G SAS 15K rpm SFF (2.5-inch) Enterprise 3yr Warranty Hard Drive	785103-B21
	HP 1TB 6G SAS 7.2K rpm SFF (2.5-inch) Dual Port Midline 1yr Warranty Hard Drive	605835-B21

HP MSA SAS & SATA 12G SFF 10K SAS HDDs

	HP MSA 300GB 12G SAS 10K SFF(2.5in) Dual Port Enterprise 3yr Warranty Hard Drive	J9F44A
	HP MSA 600GB 12G SAS 10K SFF(2.5in) Dual Port Enterprise 3yr Warranty Hard Drive	J9F46A
	HP MSA 900GB 12G SAS 10K SFF(2.5in) Dual Port Enterprise 3yr Warranty Hard Drive	J9F47A

Configuration Information

HP MSA 1.2TB 12G SAS 10K SFF(2.5in) Dual Port Enterprise 3yr Warranty Hard Drive	J9F48A
6G SFF 10K SAS HDDs	
HP MSA 300GB 6G SAS 10K SFF(2.5-inch) Dual Port Ent 3yr Warranty Hard Drive	E2D55A
HP MSA 450GB 6G SAS 10K SFF(2.5-inch) Dual Port Ent 3yr Warranty Hard Drive	E2D56A
HP MSA 600GB 6G SAS 10K SFF(2.5-inch) Dual Port Ent 3yr Warranty Hard Drive	C8S58A
HP MSA 900GB 6G SAS 10K SFF(2.5-inch) Dual Port Ent 3yr Warranty Hard Drive	C8S59A
HP MSA 1.2TB 6G SAS 10K SFF(2.5-inch) Dual Port Ent 3yr Warranty Hard Drive	E7W47A
HP MSA 146GB 6G SAS 15K SFF(2.5-inch) Dual Port Ent 3yr Warranty Hard Drive	E2D54A
HP MSA 300GB 6G SAS 15K SFF(2.5-inch) Dual Port Ent 3yr Warranty Hard Drive	C8S61A
HP MSA 300GB 12G SAS 15K SFF(2.5-inch) Dual Port Ent 3yr Warranty Hard Drive	J9F40A
HP MSA 450GB 12G SAS 15K SFF(2.5-inch) Dual Port Ent 3yr Warranty Hard Drive	J9F41A
HP MSA 600GB 12G SAS 15K SFF(2.5-inch) Dual Port Ent 3yr Warranty Hard Drive	J9F42A
HP MSA 1TB 6G SAS 7.2K SFF (2.5-inch) Dual Port Midline 3yr Warranty Hard Drive	C8S62A

NOTE: Go to the [HP Hard Drive Compatibility table](http://www.hp.com/products/harddiskdrives) for complete drive compatibility information (<http://www.hp.com/products/harddiskdrives>). Using hard drives in unsupported configurations will result in voiding the warranty and could result in damage to the drive and/or loss of data.

Step 1 - P2000 G3 - Base Configuration

Select one:

Model Name	SKU
HP P2000 Modular Smart Array 3.5-inch Drive Bay Chassis	AP838B
<ul style="list-style-type: none"> Controller-less chassis with twelve Large Form Factor (LFF) drive bays. Space for two controllers. 	
HP P2000 Modular Smart Array 2.5-inch Drive Bay Chassis	AP839B
<ul style="list-style-type: none"> Controller-less chassis with twenty-four Small Form Factor (SFF) Storage drives bays. Space for two controllers. 	

There are two array-head chassis - one with twelve 3.5-inch large form factor bays, the other with twenty-four 2.5-inch small form factor drive bays. For an additional twelve drive bays purchase a P2000 3.5-inch Disk Enclosure. You may attach a total of seven P2000 Drive Enclosures for a total of ninety-six LFF drive bays. For 25 additional SFF drive bays purchase D2700 JBOD. You may attach a total of five D2700 JBODs for a total of one hundred and forty nine SFF drive bays. Dual I/O modules JBODS support both single and dual controller arrays.

Step 2 - Options

Select each option with quantities specified.

Step 2a - Options

Quantity	Description with Parts Shipped:	SKU
1 or 2	HP P2000 G3 MSA Fibre Channel Controller	AP836B

Configuration Information

	NOTE: for either the LFF or SFF P2000 or the two DC-powered chassis	
1 or 2	HP P2000 G3 MSA FC/iSCSI Combo Modular Smart Array Controller NOTE: for either the LFF or SFF P2000 or the two DC-powered chassis	AP837B
1 or 2	HP P2000 G3 SAS MSA Array System Controller NOTE: for either the LFF or SFF P2000 or the two DC-powered chassis	AW592B
1 or 2	HP P2000 G3 10GbE iSCSI MSA Array System Controller NOTE: for either the LFF or SFF P2000 or the two DC-powered chassis	AW595B
1 or 2	HP P2000 G3 iSCSI MSA Array System Controller NOTE: for either the LFF or SFF P2000 or the two DC-powered chassis	BK829B

Step 2b - SAS and SATA Drive Options

NOTE: SATA drives are designed for archival or reference data. They should not be used in a heavy or intense I/O environment. Those situations require the use of enterprise-class SAS drives. P2000 3.5-inch drives are for use only with P2000 products.

P2000 Large Form Factor (LFF) SAS drives for P2000 G3 FC and P2000 3.5-inch Disk Enclosure

HP MSA 300GB 12G SAS 15K LFF (3.5in) Converter Enterprise 3yr Warranty Hard Drive	J9V68A
HP MSA 450GB 12G SAS 15K LFF (3.5in) Converter Enterprise 3yr Warranty Hard Drive	J9V69A
HP MSA 600GB 12G SAS 15K LFF (3.5in) Converter Enterprise 3yr Warranty Hard Drive	J9V70A

P2000 Large Form Factor (LFF) SAS MDL DP drives for P2000 G3 FC and P2000 3.5-inch Disk Enclosure

HP P2000 1TB 6G SAS 7.2K rpm LFF (3.5-inch) Dual Port MDL Hard Drive	AP861A
HP P2000 2TB 6G SAS 7.2K rpm LFF (3.5-inch) Dual Port MDL Hard Drive	AW555A
HP P2000 3TB 6G SAS 7.2K LFF (3.5- inch) Dual Port MDL 1yr Warranty Hard Drive	QK703A
HP MSA 4TB 6G SAS 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	C8R26A
HP MSA 6TB 6G SAS 7.2K 3.5in Midline 1yr Warranty Hard Drive	J9F36A

NOTE: Before installing >3TB HDDs in an P2000 G3 Array please update P2000 array controller firmware to version TS230Rxxx or later

MSA2 Large Form Factor (LFF) SATA drives for P2000 array head an P2000 disk enclosure

HP MSA2 1TB 7.2K rpm LFF (3.5 inch) Dual-port SATA Hard Disk Drive	AJ740B
HP P2000 2TB 3G SATA 7.2K rpm LFF MDL Hard Drive	AW556B

HP MSA P2000 G3 Arrays support both the HP ProLiant Server SFF Hard Disk Drives and HP MSA SFF Hard Disk Drives

HP ProLiant Server Small Form Factor (SFF) SAS drives for P2000 G3 Array (24 drive bay) and the D2700 JBOD (25 drive bay)

HP 300GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	507127-B21
HP 450GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	581284-B21
HP 600GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	581286-B21
HP 900GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	619291-B21
HP 1.2TB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	718160-B21
HP 146GB 6G SAS 15K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	512547-B21
HP 300GB 6G SAS 15K rpm SFF (2.5-inch) Hot Plug Enterprise 3yr Warranty Hard Drive	627117-B21

Configuration Information

HP 300GB 12G SAS 15K rpm SFF (2.5-inch) Enterprise 3yr Warranty Hard Drive	785099-B21
HP 450GB 12G SAS 15K rpm SFF (2.5-inch) Enterprise 3yr Warranty Hard Drive	785101-B21
HP 600GB 12G SAS 15K rpm SFF (2.5-inch) Enterprise 3yr Warranty Hard Drive	785103-B21

HP MSA Small Form Factor (SFF) SAS drives for P2000 G3 Array (24 drive bay) and the D2700 JBOD (25 drive bay)

12G SFF 10K SAS HDDs

HP MSA 300GB 12G SAS 10K 2.5in Dual Port Enterprise 3yr Warranty Hard Drive	J9F44A
HP MSA 600GB 12G SAS 10K 2.5in Dual Port Enterprise 3yr Warranty Hard Drive	J9F46A
HP MSA 900GB 12G SAS 10K 2.5in Dual Port Enterprise 3yr Warranty Hard Drive	J9F47A
HP MSA 300GB 12G SAS 10K 2.5in Dual Port Enterprise 3yr Warranty Hard Drive	J9F48A

6G SFF 10K SAS HDDs

HP MSA 300GB 6G SAS 10K 2.5in Dual Port Enterprise 3yr Warranty Hard Disk Drive e	E2D55A
HP MSA 450GB 6G SAS 10K 2.5in Dual Port Enterprise 3yr Warranty Hard Disk Drive	E2D56A
HP MSA 600GB 6G SAS 10K 2.5in Dual Port Enterprise 3yr Warranty Hard Disk Drive	C8S58A
HP MSA 900GB 6G SAS 10K 2.5in Dual Port Enterprise 3yr Warranty Hard Disk Drive	C8S59A
HP MSA 1.2TB 6G SAS 10K 2.5in Dual Port Enterprise 3yr Warranty Hard Disk Drive	E7W47A
HP MSA 146GB 6G SAS 15K 2.5in Dual Port Enterprise 3yr Warranty Hard Disk Drive	E2D54A
HP MSA 300GB 6G SAS 15K 2.5in Dual Port Enterprise 3yr Warranty Hard Disk Drive	C8S61A
HP MSA 300GB 12G SAS 15K SFF(2.5-inch) Dual Port Ent 3yr Warranty Hard Drive	J9F40A
HP MSA 450GB 12G SAS 15K SFF(2.5-inch) Dual Port Ent 3yr Warranty Hard Drive	J9F41A
HP MSA 600GB 12G SAS 15K SFF(2.5-inch) Dual Port Ent 3yr Warranty Hard Drive	J9F42A

HP ProLiant Server Small Form Factor (SFF) SAS MidLine drive for P2000 G3 Array (24 drive bay) and the D2700 JBOD (25 drive bay)

HP 1TB 6G SAS 7.2K 2.5in Dual Port Midline 1yr Warranty Hard Drive	605835-B21
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HP MSA Small Form Factor (SFF) SAS MidLine drive for P2000 G3 Array (24 drive bay) and the D2700 JBOD (25 drive bay)

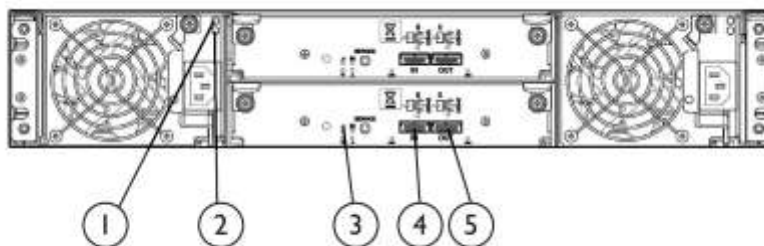
HP 1TB 6G SAS 7.2K 2.5in Dual Port Midline 1yr Warranty Hard Drive	C8S62A
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HP ProLiant Server Small Form Factor (SFF) SATA MidLine drive for P2000 G3 Array (24 drive bay) and the D2700 JBOD (25 drive bay)

(NOTE: SFF SATA drives are single ported and therefore do not have a fail-over path intrinsic to their design)

HP 500GB 3G SATA 7.2K rpm SFF (2.5-inch) Midline 1yr Warranty Hard Drive	507750-B21
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Step 2c - Drive Enclosure Options



P2000 Dual I/O 3.5-inch 12 Drive Enclosure

Rear Panel components

Configuration Information

- | | | |
|--------------------|-----------------|-----------------|
| 1. Power Indicator | 3. Unit Locator | 5. SAS Out Port |
| 2. Fault Indicator | 4. SAS In Port | |

Use either disk enclosure with Large or Small Form Factor, single or dual controller array heads. Each ship with two .5m mini-SAS to mini-SAS cables.

HP P2000 Dual I/O LFF Drive Enclosure	AP843B
HP D2700 Disk Enclosure	AJ941A
HP P2000 LFF Drive Enclosure I/O Module	
NOTE: Only used in conjunction with the P2000 blank chassis (AP838A) if a single I/O disk enclosure is desired. No cable included)	AP844B

Step 2c - SAS Cable Options

miniSAS to miniSAS Cables:

Connecting P2000 G3 FC or SAS controller to a JBOD if a longer cable is desired. Also used for attaching the P2000 G3 SAS host ports to servers

HP External Mini SAS 2m Cable	407339-B21
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Step 3 - Other P2000 G3 Options

Choose optional AC Power Cords (2 required)

NOTE: Two PDU cables: one 142263-008 (Black) and one 1422633-013 (Grey), ship standard with all AC-powered enclosures.

Power Cord, (Australia/China/New Zealand)	227098-001
Power Cord, (Central Europe)	157215-001
Power Cord, (United Kingdom/Hong Kong)	157216-001
Power Cord, (Switzerland)	157219-001
Power Cord, (Italy)	157217-001
Power Cord, (Denmark)	157218-001
Power Cord, (Japan)	139867-001
Power Cord, (South East Asia/India)	157220-001

Step 4a - Choose Supported Options For Fibre Channel Infrastructure

Fibre Channel	Model	Description	SKU
Host Bus Adapters - X86 servers	BladeSystem c-Class Fibre Channel Mezzanine HBAs		
		QLogic QMH2562 8Gb FC HBA for HP c-Class BladeSystem	451871-B21
		HP BLc Emulex LPe1205- 8Gb FC HBA for HP c-Class BladeSystem	456972-B21
		Brocade 804 8Gb FC HBA for HP BladeSystem c-Class, Windows, VMware, Linux	590647-B21
	Fibre Channel HBAs		
	NOTE: Please visit www.hp.com/go/fchba for product details and www.hp.com/storage/spock for compatibility details.		
	<u>Brocade Fibre Channel HBAs</u>		

Configuration Information

HP 81B PCI-e FC HBA Single Port	AP769B
HP 82B PCI-e FC HBA Dual Port	AP770B
HP 41B 4Gb PCI-e FC HBA	AP767B
HP 42B 4Gb Dual-Port PCI-e FC HBA	AP768B

Emulex Fibre Channel HBAs

HP 81E PCI-e FC HBA Single Port	AJ762B
HP 82E PCI-e FC HBA Dual Port	AJ763B
HP FC2142 4Gb PCI-e HBA	A8002B

QLogic Fibre Channel HBAs

HP 81Q PCI-e FC HBA Single Port	AK344A
HP 82Q PCI-e FC HBA Dual Port	AJ764A
HP FC1142 4Gb PCI-e HBA	AE311A
HP FC1242 Dual Channel 4Gb PCI-e HBA	AE312A

Fibre Channel Host Bus Adapters - Integrity servers

Integrity	HP 4Gb 1-port PCI-X 2.0 Fibre Channel Host Bus Adapter	AB378B
	HP 4Gb 2-port PCIe Fibre Channel Host Bus Adapter	AD300A
	HP 4Gb 1-port PCIe Fibre Channel Host Bus Adapter	AD299A
	HP 4Gb 2-port PCIe Fibre Channel Host Bus Adapter	AD355A
	HP PCIe 1-port 4Gb and 1-port 1000BT Adapter	AD221A
	HP PCIe 2-port 4Gb and 2-port 1000BT Adapter	AD222A
	HP PCIe 2-port 4Gb and 2-port 1000BSX Adapter	AD393A
	HP PCI-X 1-port 4Gb FC and 1-port 1000BT Adapter	AD193A
	HP PCI-X 2-port 4Gb FC and 2-port 1000BT Adapter	AD194A
	HP PCI Express 1-port 8Gb Fibre Channel SR (QLogic) Adapter	AH400A
	HP PCI Express 2-port 8Gb Fibre Channel SR (QLogic) Adapter	AH401A
	HP 8Gb 1-port PCIe Fibre Channel Host Bus Adapter	AH402A
	HP 8Gb 2-port PCIe Fibre Channel Host Bus Adapter	AH403A
Integrity server blades	QLogic QMH2562 8Gb Fibre Channel Host Bus Adapter for c-Class BladeSystem	451871-B21
	Emulex LPe1205 8Gb Fibre Channel Host Bus Adapter for c-Class BladeSystem	456972-B21

Fibre Channel Switches

HP 8/8 Base SAN Switch	AM866B
HP 8/8 SAN Switch	AM867B
HP 8/24 Base SAN Switch	AM868B
HP 8/40 Base SAN Switch	AM869B
HP 8/40 Power Pack+ SAN Switch	AM870B
HP 8/80 Power Pack+ SAN Switch	AM872B
HP 8/80 Base SAN Switch	AM871B

Configuration Information

HP 1606 Power Pack+ Extension SAN Switch	AP864B
HP 1606 Full Extension SAN Switch	AP863B
HP 1606 Base Extension SAN Switch	AP862B
HP 2408 FCoE Base Converged Network Switch	AP801B
HP 2408 FCoE Power Pack+ Converged Network Switch	AP802B
Brocade 8/12c SAN Switch for HP BladeSystem c-Class	AJ820B
Brocade 8/24c SAN Switch for HP BladeSystem c-Class	AJ821B
Brocade 8/24c SAN Switch for HP BladeSystem c-Class Power Pack+	AJ822B
Brocade 16Gb/16 SAN Switch for HP BladeSystem c-Class	C8S45A
Brocade 16Gb/28 SAN Switch for HP BladeSystem c-Class	C8S46A
Brocade 16Gb/28 SAN Switch Pwr Pk+ for HP BladeSystem c-Class	C8S47A
	SKU
	AQ233A
HP 8/20q Fibre Channel Switch	AK241A
NOTE: 8 device ports active, upgradeable to 20 device ports active	
HP 8Gb Simple SAN Connection Kit	AK242A
NOTE: 8 device ports active, upgradeable to 20 device ports active	
HP 8/20q Fibre Channel Switch	AW575B
NOTE: 16 switch ports active	
HP SN6000 Stackable 8Gb 24-port single power supply FC Switch	AW576B
NOTE: 20 device ports active/4 stacking (ISL) ports active	
HP SN6000 Stackable 8Gb 24-port dual power supply FC Switch	BK780B
NOTE: 20 device ports active/4 stacking (ISL) ports active	
HP SN6000 Stackable 8 Gb 12-port Single Power Fibre Channel Switch	AG646A
NOTE: 8 device ports/4 stacking (ISL) ports active, upgradeable to 20 device ports active	
Cisco MDS 9124 8-ports Active Fabric Switch	AG647A
Cisco MDS 9124 16-ports Active Fabric Switch	AG648A
Cisco MDS 9124 24-ports Active Fabric Switch	AW563A
Cisco MDS 8Gb 12-port Fabric Switch for HP BladeSystem c-Class	AW564A
Cisco MDS 8Gb 24-port Fabric Switch for HP BladeSystem c-Class	AG641A
Cisco MDS 9124e 12-port Fabric Switch for HP c-Class BladeSystem	AG642A
Cisco MDS 9124e 24-port Fabric Switch for HP c-Class BladeSystem	AG874A
Cisco MDS 9134 24-ports Active Fabric Switch	AG875A
Cisco MDS 9134 32-ports Active Fabric Switch	AG851B
Cisco MDS 9222i Fabric Switch	AW585A
HP SN6000C 16-ports Active Fabric Switch	AW586A
HP SN6000C 32-ports Active Fabric Switch	AP775A
HP Nexus 5010 Converged Network Switch	AP776A
HP Nexus 5020 Converged Network Switch	QK732A
PremierFlexOM4+ type cable	
1m HP PremierFlex OM4 LC/LC Multi-mode Optical Cable	QK733A
2m HP PremierFlex OM4 LC/LC Multi-mode Optical Cable	QK734A

Configuration Information

P2000 G2	5m HP PremierFlex OM4 LC/LC Multi-mode Optical Cable	QK735A
	15m HP PremierFlex OM4 LC/LC Multi-mode Optical Cable	QK736A
	30m HP PremierFlex OM4 LC/LC Multi-mode Optical Cable	QK737A
	50m HP PremierFlex OM4 LC/LC Multi-mode Optical Cable	AJ833A
OM3 FC LC-LC cables options for the P2000 G3	LC-LC Multi-Mode OM3 Fibre Channel Cable 0.5m	AJ834A
	LC-LC Multi-Mode OM3 Fibre Channel Cable 1m	AJ835A
	LC-LC Multi-Mode OM3 Fibre Channel Cable 2m	AJ836A
	LC-LC Multi-Mode OM3 Fibre Channel Cable 5m	AJ837A
	LC-LC Multi-Mode OM3 Fibre Channel Cable 15m	AJ838A
	LC-LC Multi-Mode OM3 Fibre Channel Cable 30m	AJ839A
	LC-LC Multi-Mode OM3 Fibre Channel Cable 50m	AJ839A

Step 4b - Choose Supported Options For 10GbE Infrastructure

- verify that the cable/transceiver is supported with the connecting device (i.e. switch or NIC/iSCSI HBA)

Copper Cable	HP BladeSystem c-Class 10GbE SFP+ to SFP+ 1m Direct Attach Copper Cable	487652-B21
	HP BladeSystem c-Class 10GbE SFP+ to SFP+ 3m Direct Attach Copper Cable	487655-B21
	HP BladeSystem c-Class 10GbE SFP+ to SFP+ 5m Direct Attach Copper Cable	537963-B21
	HP BladeSystem c-Class 10GbE SFP+ to SFP+ 7m Direct Attach Copper Cable	487658-B21
	HP BladeSystem c-Class 10Gb SFP+ SR Transceiver	455883-B21
SFP	HP BladeSystem c-Class 10Gb SFP+ LRM Transceiver	455889-B21
	HP X242 10G SFP+ to SFP+ 1m Direct Attach Copper Cable	J9281B
	HP X242 10G SFP+ to SFP+ 3m Direct Attach Copper Cable	J9283B
	HP X242 10G SFP+ to SFP+ 7m Direct Attach Copper Cable	J9285B
	HP X132 10G SFP+ LC SR Transceiver	J9150A
	HP X132 10G SFP+ LC LRM Transceiver	J9152A
	HP X240 10G SFP+ to SFP+ 0.65m Direct Attach Copper Cable	JD095C
	HP X240 10G SFP+ to SFP+ 1.2m Direct Attach Copper Cable	JD096C
	HP X240 10G SFP+ to SFP+ 3m Direct Attach Copper Cable	JD097C
	HP X240 10G SFP+ to SFP+ 5m Direct Attach Copper Cable	JG081C
	HP X240 10G SFP+ SFP+ 7m Direct Attach Copper Cable	JC784C
	NIC	HP NC532m Dual Port 10GbE Multifunction BL-c Adapter
HP NC552SFP 10Gb 2-port Ethernet Server Adapter		614203-B21
HP NC552SFP 10GbE 2P Svr Adapter		Reference sell

iSCSI HBA - standup

iSCSI HBA - mezz

Configuration Information

NIC - mezz

Step 4c - Choose Supported Options For SAS connection

HP H221 PCIe 3.0 SAS Host Bus Adapter	729552-B21
HP Smart Array P712m/256 6Gb 2-ports Int/2-ports Ext Mezzanine SAS Controller	488348-B21
HP Smart Array P711m/1G 6Gb FBWC 4-ports Ext Mezzanine SAS Controller	513778-B21
HP 6Gb SAS Switch Single Pack for HP BladeSystem c-Class	BK763A
HP 6Gb SAS Switch Dual Pack for HP BladeSystem c-Class	BK764A
HP External Mini SAS 2m Cable	407339-B21
HP External Mini SAS 4m Cable	432238-B21
HP External Mini SAS 4m Cable	432238-B21

Step 5 - Choose Rack Options

Please refer to the HP Infrastructure products page for more information on HP racks and rack options or the HP 10000 G2 Series Rack QuickSpec.

<http://h18004.www1.hp.com/products/servers/platforms/rackandpower.html>

http://h18000.www1.hp.com/products/quickspecs/12402_div/12402_div.HTML

Technical Specifications

P2000 G3 FC P2000 G3 FC/iSCSI P2000 G3 SAS P2000 G3 10GbE iSCSI P2000 G3 iSCSI (1Gb)	POWER REQUIREMENTS	
	Input Power Requirements (typical-running I/O) SFF/LFF arrays	<ul style="list-style-type: none"> 8G FC (2 Port - 8G FC) 110VAC 3.32A, 344-390 W; 220VAC 1.61A,374-432W FC/iSCSI Combo (2 Port - 8G FC + 2 Port -1G iSCSI) 110VAC; 3.64A,357-418W, 220VAC 1.77 A, 365-424W 6G SAS (4 Port - 6G SAS) 110VAC 3.49A,344-390W, 220VAC 1.7A 374-432W 10GbE iSCSI (2 Port - 10 GbE iSCSI) 110VAC 3.67A, 395W, 220VAC,1.95A 388.2W 1G iSCSI (4 Port - 1GbE iSCSI) 110VAC 3.3A 363W, 220VAC, 1.63A 360W
	Max Input Power	100-240 VAC, 50/60 Hz., 4.5-1.9A; 48-60 VDC 10.4A/8.3A
	Heat Dissipation	1622 BTU/hr
	TEMPERATURE AND HUMIDITY RANGES	
	Operating Temperature	41°F to 104°F (5°C to 40°C)
	Shipping Temperature	-40°F to 158°F (-40°C to 70°C)
	Operating Humidity	10% to 90% RH @ 104°F (40°C) non-condensing
	Non-Operating Humidity	Up to 93% RH @ 104°F (40°C)
	DECLARED ACOUSTIC NOISE LEVELS	
	Sound Power	A weighted sound power LWAd=6,75 B
	Sound Pressure	A weighted sound pressure LpAm - 55dB
	SHOCK AND VIBRATION	
	Shock, Operational	10G's for 10 milliseconds
	Shock, Non-Operational	15G 11ms half sine
Vibration, Operational	5-500Hz, 0.21 Grms flat	
Vibration, Non-Operational	3-365-3Hz, 1.22 Grms,z-axis,0.85 Grms, X&Y axis shaped spectrum	
PHYSICAL		
Height	3.5 in/ 8.9 cm	
Depth (excluding cables) (back of ear to back of controller handle)	P2000 G3 SFF 24-bay array: 20.28 in / 51.510 cm P2000 G3 LFF 12-bay array: 21.3 in. / 55.1 cm	
Width (body only)	17.6 in / 44.7 cm (w/ ears 19 in / 48.26 cm)	
Chassis Weight (no controllers)	P2000 LFF chassis: 34.1 lbs. (DC-pwr model: 37.9 lbs) P2000 SFF chassis: 32.3 lbs (DC-pwr model: 36.1 lbs)	

P2000 G3 FC Controller FC/iSCSI Combo Controller P2000 G3 SAS Controller	User Interface	Status and activity provided via management interfaces. Status Indicators on front of Controller
	RAID Support	0, 1, 3, 5, 6, 10, 50
	Cache Memory	2GB Read/Write. ECC protection with backup to Flash memory (indefinite backup)

Technical Specifications

P2000 G3 10GbE iSCSI Controller P2000 G3 iSCSI Controller (1Gb)	Cache Backup	ECC protection with back up to flash memory (indefinite backup)
	Upgradeable Firmware	yes
	Disk Drive and Enclosure Protocol Support	6 Gb SAS - Serial Attached SCSI
	Host Ports	FC: 2 x 8Gb Fibre Channel SFP+ SAS: 4 -4x lane 6 Gb SAS Host Connections 10GbE iSCSI: 2 x 10GbE SFP+ 1GbE iSCSI: 4 x 1GbE RJ45
	Expansion Port	SAS (SFF8088) 4x lane 6 Gb SAS
	Weight, controller	P2000 G3 Fibre Channel, FC/iSCSI, SAS, and 10GbE iSCSI MSA Controllers 4.5lbs. 1GbE iSCSI is 4.89 lbs

P2000 G3 Regulatory Info	Safety	UL 60950-1 (USA)
		CAN/CSA-C22.2 No.60950-1-03 (Canada)
		EN 60950-1 (European Union)
		GS mark (Germany)
		IEC 60950-1 (International)
		CCC Mark (power supply only, China PRC)
	Electromagnetic Compatibility	VCCI:2008-04 Class A (Japan)
		FCC 15:109(g) Class A (USA)
		ICES-003:2004 Class A (Canada)
		EN55022 : (European Union Class A); CISPR 22 (International Class A)
		EN61000-3-2 : (Harmonics) (European Union)
		EN61000-3-3 : (Flicker) (European Union)
		EN 55024 (European Union, Immunity, Class A);CISPR 24 (International Immunity, Class A)
		AS/NZS CISPR 22, Class A (Australia, New Zealand)
	CNS 13438 Taiwan, Class A (Taiwan)	
	KN22 Class A (Emissions Class A); KN24 (Immunity) (S Korea)	
	RoHS and WEEE	RoHS-6/6 Compliance, China RoHS, WEEE
Country Approvals	United States ,Australia/New Zealand, Canada, China (PRC), European Union, Germany (GS Mark), Japan, South Korea, Taiwan	

Summary of Changes

Date	Version History	Action	Description of Change:
19-Jun-2015	From Version 44 to 45	Changed	Replaced AJ941A with AP843B on page 14 since it was a cut and paste error.
15-May-2015	From Version 43 to 44	Changed	Changes were made throughout the QuickSpecs.
30-Mar-2015	From Version 42 to 43	Changed	SKUs descriptions were updated, Obsolete SKU were removed.
		Added	Support for 12G SFF and LFF w Hard Disk Drives
01-Dec-2014	From Version 41 to 42	Changed	Changes were made throughout the QuickSpecs.
03-Oct-2014	From Version 40 to 41	Changed	Changes in the Family Information Section
29-Sep-2014	From Version 39 to 40	Changed	Changes were made throughout the QuickSpec
09-May-2014	From Version 38 to 39	Changed	Operate and Support and Basic Care were revised.
28-Mar-2014	From Version 37 to 38	Changed	SFP cables and Supported options for SAS connection were revised in Configuration Information.
16-Jan-2014	From Version 36 to 37	Changed	Corrected an invalid part number in the Hardware Support section.
09-Dec-2013	From Version 35 to 36	Changed	Models, Family Information, Hardware, and Configuration Information were revised.
04-Oct-2013	From Version 34 to 35	Changed	Corrected an error in the Hardware section.
13-Sep-2013	From Version 33 to 34	Changed	Updated the following: Optional Software - Drives, carrier-grade (all NEBS certified) - HP 600GB 6G SAS 10K 2.5in Dual Port Enterprise=3yr Warranty Storage Hard Disk Drive - changed part number from E2D57A to C8S58A.; Configuration Information - D2700 SAS & SATA Drives (SFF 2.5-inch) - HP 600GB 6G SAS 10K 2.5in Dual Port Enterprise 3yr Warranty Storage Hard Disk Drive - changed part number from E2D57A to C8S58A; HP 900GB 6G SAS 10K 2.5in Dual Port Enterprise 3yr Warranty Storage Hard Disk Drive - changed part number from E2D58A to C8S59A.
19-Aug-2013	From Version 31 to 33	Changed	Capacity, Drives available, Optional Disk enclosures, and Scalability were revised in Family Information HP P2000 G3 Carrier-Grade Components and SAS & SATA Drives were revised in Configuration Information HP MSA 4TB 6G SAS 7.2K rpm LFF Midline Hard Drive was added to SATA and SATA Drive Options in Configuration Information Brocade 16Gb/16 and 16Gb/28 SAN Switches for HP BladeSystem c-Class and Brocade 16Gb/28 SAN Switch Pwr Pk+ for HP BladeSystem c-Class were added to Fibre Channel Switches in Configuration Information HP 2000 Modular Smart Array Snapshot 255, 64, and 8

Summary of Changes

			Software LTUs and 8 to 255, 64 to 255, and 8 to 64 Upgrade Software LTUs were removed from MSA2000 and MSA2000 G2 Snapshot and Volume Copy software in Options Software
19-Jun-2013	From Version 30 to 31	Removed	HP MSA 4TB 6G SAS 7.2K rpm Hard Drive was removed
13-May-2013	From Version 29 to 30	Removed	Configuration Information: Removed PremierFlex OM3+ type cables P2000 G3 sections from Step 4a
		Changed	<p>Overview: Updated What's New with</p> <p>Adding support for the new HP P2000 4TB Large Form Factor SAS MDL HDD</p> <p>HP MSA 4 TB 6G SAS 7.2K 3.5 in MDL HDD</p> <p>Microsoft Windows Server 2012 support</p> <p>Support with HP StoreEasy 3830 Gateway Storage or StoreEasy 3830 Gateway Storage Blades</p> <p>Models: Updated P2000 G3 Modular Smart Array section.</p> <p>Features: Updaed Virtualization SAN Starter Kit section.</p> <p>Family Information: Updated Capacity, Scalability, DC-power chassis and P2000 Software and Documents Support CD sections.</p> <p>Optional Software: Updated Snapshot and Volume Copy Software for the P2000 G3, HP P2000 Remote Snap Software (G3 FC and FC/iSCSI, 1GbE and 10GbE iSCSI controllers only), HP StoreEasy 3000 Gateway Storage and HP P2000 G3 Carrier-Grade Components sections.</p> <p>Configurations Information: Update d SAS & SATA Drives (SFF 2.5-inch), Step 2b, Step 3 and Step 4a.</p>
29-Mar-2013	From Version 28 to 29	Changed	Updated the following: What's new; Family Information - P2000 Software and Documents Support CD; OS Support - Fibre Channel ports; OS Support 1GbE iSCSI ports on the G3 combo FC/iSCSI controller; OS Support G3 SAS Controller; OS Support G3 1Gb 8SCSI Controller; OS Support G3 10GbE iSCSI controller; added section on HP StoreEasy 3000 Gateway Storage
21-Dec-2012	From Version 27 to 28	Changed	<p>Changes made in the following sections:</p> <p>Overview: in Overview and What's New</p> <p>Models: updated part numbers in P2000 G3 Modular</p>

Summary of Changes

			<p>Smart Array and P2000 G3 Array Bundles</p> <p>Features: updated part numbers in HP 2000 G3 FC MSA SAN Starter Kits</p> <p>Family Information: updated part numbers in Scalability, DC-Power Chassis,</p> <p>Optional Software: updated part numbers in HP2000 G3 Carrier Grade Components</p> <p>Configuration Information: update product numbers in Configure to Order Program Information, D2700 SAS & SATA Drives, in Step 1, Step 2 and Step 4a.</p>
		Removed	Removed hyperlink in Service & Support, HP Care Pack and Warranty Information: For More Information section.
23-Aug-2012	From Version 26 to 27	Changed	Changes made to the North America and Canada versions only.
13-Aug-2012	From Version 25 to 26	Changed	Changes made throughout the entire QuickSpec.
14-May-2012	From Version 24 to 25	Changed	Changes made throughout the entire QuickSpec. Note that the title has changed.
06-Apr-2012	From Version 23 to 24	Changed	URL was changed for HP Storage Management Pack for Microsoft System Center.
09-Mar-2012	From Version 22 to 23	Changed	URL was changed in Optional Software.
02-Mar-2012	From Version 21 to 22	Changed	Updated the following: Overview; What's New updated to reflect new 300GB 6G SAS 15K SFF drives; Key Features; Family Information - Performance; Optional Software - Product Features; HP P2000 G3 Carrier-Grade Components; Configuration Information - D2700 - added new drive; Configuration Information - Step 2b - added new drive; Configuration Information - Step 4c.
13-Feb-2012	From Version 20 to 21	Added	All the HP Storage Management Pack for Microsoft System Center section.
13-Jan-2012	From Version 19 to 20	Changed	<p>P2000 G3 Array Bundles was revised</p> <p>G3 Controller 10GbE iSCSI and HP 450GB and 600GB SAS 10K rpm SFF Dual Port Enterprise 3yr Warranty Hard Drives were added and G2 Controller 3Gb SAS were removed from HP P2000 G3 Carrier-Grade Components</p> <p>Related Option: MSA2000 G2 Controllers were removed from P2000 G3 Modular Smart Array models</p>
14-Nov-2011	From Version 18 to 19	Changed	<p>P2000 G3 Array Bundles chart was revised in Models</p> <p>Citrix XenServer HP Enterprise Edition was removed from Family Information</p> <p>HP Storage Mirroring was removed from Optional</p>

Summary of Changes

			Software
02-Sep-2011	From Version 17 to 18	Changed	<p>Total LUNs, Maximum host supported and Optional Software were updated in the Family Information chart and Product Technology was revised in Family Information</p> <p>HP Insight Control Storage Module for vCenter, HP P2000 Remote Snap Software and Product Features were revised and vStorage API for Array Integration (VAAI) was added to Optional Software</p> <p>Fibre Channel Switches was updated in Step 4a of the Configuration Information</p>
20-Jun-2011	From Version 16 to 17	Changed	<p>Capacity was revised in the Family Information chart</p> <p>HP 450GB and 600GB 6G SAS 10K 2.5 inch DP ENT HDDs were added to SAS and SATA Drives</p> <p>HP P2000 3TB 6G SAS 7.2K LFF DP MDL HDD was added to P2000 Large Form Factor (LFF) SAS MDL DP drives for P2000 G3 FC and P2000 3.5-inch Disk Enclosure</p> <p>StorageWorks was removed throughout, including from the title</p>
09-Jun-2011	From Version 15 to 16	Removed	Mentions of StorageWorks were removed.
09-May-2011	From Version 14 to 15	Changed	<p>HP Insight Control Storage Module for vCenter and HP P2000 G3 Carrier-Grade Components were completely revised</p> <p>SAS and SATA Drives descriptions were revised</p> <p>Apple MAC OS X was added and Citrix XenServer HP Enterprise Edition was removed from OS Support</p> <p>HP StorageWorks 2300fc G2 Modular Smart Array Controller - 4 Gb FC was removed from Models</p>
01-Apr-2011	From Version 13 to 14	Changed	<p>Server Compatibility was revised in Product Technology</p> <p>HP Smart Array P712m Controller/256 for Server Blades, HP Smart Array P711m Controller 1 for Server Blades and HP StorageWorks 6Gb/s SAS BL Switch - Single and Dual Port for BladeSystems were added to Step 4c</p>
18-Mar-2011	From Version 12 to 13	Changed	<p>Small Form Factor SAS Capacity was increased</p> <p>SuSE Linux IA32, x64 and Citrix XenServer HP Enterprise Edition were added to OS Support in Family Information</p> <p>HP Ext Mini SAS 2m and 4m cables were added to Step 4c</p>

Summary of Changes

07-Feb-2011	From Version 10 to 12	Changed	HP 450GB and 600GB 6G SAS 10K 2.5 inch DP ENT HDD were added to ProLiant Small Form Factor (SFF) SAS drives for P2000 G3 Array and the D2700 JBOD in Step 2b Note was removed from P2000 G3 Array Bundles Model HP StorageWorks Encryption SAN Switch was removed from Fibre Channel Switches in Step 4a
10-Jan-2011	From Version 9 to 10	Added	P2000 G3 Array Bundles was added to Models and HP 72 GB 6G 15K 2.5 inch SAS DP HDD was added to HP P2000 G3 and MSA2000 G2 Carrier-Grade Components.
15-Nov-2010	From Version 8 to 9	Changed	Changes made throughout the entire QuickSpec.
15-Oct-2010	From Version 7 to 8	Changed	Updated the Features - Application Solutions section only.
27-Sep-2010	From Version 6 to 7	Changed	Changes were made within the entire QuickSpec, including removing Models and adding HP StorageWorks P2000 G3 10GbE iSCSI Modular Smart Array Controller and HP StorageWorks P2000 G3 10GbE iSCSI MSA Dual Controller LFF and SFF Array Systems to Configure to Order Program Information.
18-Aug-2010	From Version 5 to 6	Added	Added new Smart Buys to the Models section in the North America and Canada versions.
23-Jul-2010	From Version 4 to 5	Added	Added new Smart Buys to the Models section in the North America and Canada versions.
29-Jun-2010	From Version 3 to 4	Changed	Note the title has changed.
21-Jun-2010	From Version 2 to 3	Changed	Changes made throughout the entire QuickSpec.
29-Mar-2010	From Version 1 to 2	Added	P2000 1TB and 2TB 6G SAS 7.2K LFF Hard Drives were added throughout the QuickSpec.

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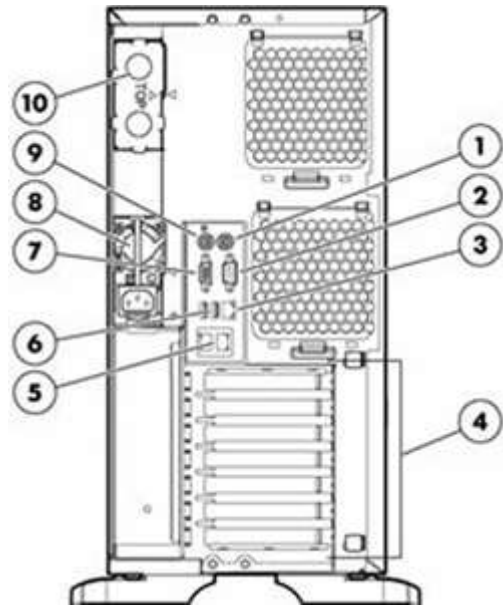
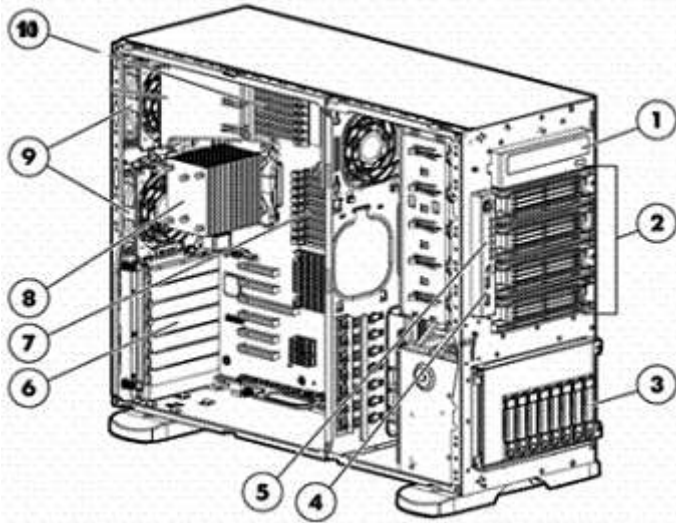
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Overview

HP ProLiant ML350 Generation 6 (G6)

The HP ProLiant ML350 G6 is the best price-performance, dual-processor Tower server that delivers excellence with performance, expandability and availability. The G6 server has more memory capacity and HDD expandability than previous generations. It combines the latest Intel Xeon 5600 processors with QPI technology, best-in-class availability features, and unsurpassed flexibility in a system ideal for growing businesses and especially well suited to meet the needs of remote branch offices.



Front View:

1. SATA DVD ROM or DVD RW optical drive
2. Four (4) removable media bays
3. Eight (8) 2.5" (shown) or six (6) 3.5" SAS or SATA hot plug drive bays
4. Two (2) USB ports
5. LEDs: System power, Health, Power cap, NIC 1&2, UID
6. Six (6) expansion slots
7. Nine (9) DIMM slots (Processor 2): DDR3 Registered (RDIMM) or Unbuffered (UDIMM) memory
8. Processor heatsink
9. Three (3) system fans
10. Nine (9) DIMM slots (Processor 1): DDR3 Registered (RDIMM) or Unbuffered (UDIMM) memory

Rear View:

1. PS/2 mouse port
2. Serial port
3. Dedicated remote management port
4. Six (6) expansion slots
5. Two (2) network ports
6. Two (2) USB ports
7. Video port
8. Power supply bay 1
9. PS/2 keyboard port
10. Power supply bay 2

What's New

- Support for new HP Hard Drive.

Standard Features

NOTE: For the Standard Features shipped in the "Factory Integrated Models", please see the "Configuration Information - Factory Integrated Models" section.

Processor

One of the following depending on Model

Six-Core Processors

Intel® Xeon® X5675 (3.06GHz/6-core/12MB/95W, DDR3-1333, HT, Turbo 1/1/2/2/3/3) Processor

Intel® Xeon® X5670 (2.93GHz/6-core/12MB/95W, DDR3-1333, HT, Turbo 1/1/2/2/3/3) Processor

Intel® Xeon® X5660 (2.80GHz/6-core/12MB/95W, DDR3-1333, HT, Turbo 1/1/2/2/3/3) Processor

Intel® Xeon® X5650 (2.66GHz/6-core/12MB/95W, DDR3-1333, HT, Turbo 1/1/2/2/3/3) Processor

Intel® Xeon® E5649 (2.53GHz/6-core/12MB/80W, DDR3-1333, HT, Turbo 1/1/2/2/3/3) Processor

Intel® Xeon® E5645 (2.40GHz/6-core/12MB/80W,DDR3-1333, HT, Turbo 1/1/2/2/3/3) Processor

Quad-Core Processors

Intel® Xeon® X5672 (3.20GHz/4-core/12MB/95W,DDR3-1333, HT, Turbo 1/1/2/2/3/3) Processor

Intel® Xeon® E5620 (2.40GHz/4-core/12MB/80W, DDR3-1066, HT, Turbo) Processor

Intel® Xeon® E5603 (1.60GHz/4-core/4MB/80W) Processor

Intel® Xeon® X5570 (2.93GHz/4-core/8MB/95W, DDR3-1333, HT, Turbo 2/2/3/3) Processor

Intel® Xeon® X5560 (2.80GHz/4-core/8MB/95W, DDR3-1333, HT, Turbo 2/2/3/3) Processor

Intel® Xeon® X5550 (2.66GHz/4-core/8MB/95W, DDR3-1333, HT, Turbo 2/2/3/3) Processor

Intel® Xeon® E5540 (2.53GHz/4-core/8MB/80W, DDR3-1066, HT, Turbo 1/1/2/2) Processor

Intel® Xeon® E5607 (2.26GHz/4-core/8MB/80W, DDR3-1333, HT, Turbo 1/1/2/2/3/3) Processor

Intel® Xeon® L5630 (2.13GHz/4-core/12MB/40W, DDR3-1066, HT, Turbo 1/1/2/2) Processor

Intel® Xeon® L5520 (2.26GHz/4-core/8MB/60W, DDR3-1066, HT, Turbo 1/1/2/2) Processor

Intel® Xeon® L5506 (2.13GHz/4-core/4MB/60W, DDR3-800) Processor

Intel® Xeon® E5606 (2.13 GHz/4-core/8MB/80W,DDR3-1066, Turbo 1/1/2/2/3/3) Processor

Dual-Core Processors

Intel® Xeon® E5502 (1.86GHz/2-core/4MB/80W, DDR3-800) Processor

NOTE: HT indicates that the processor model supports Intel® Hyper-Threading Technology.

NOTE: Turbo indicates the maximum potential frequency increment when using Intel® Turbo Boost Technology, with 4, 3, 2, and 1 cores active.

NOTE: DDR3 speed is the maximum memory speed of the processor. Actual memory speed may depend on the quantity and type of DIMMs installed.

NOTE: For the Intel 5600 and 5500 Series, the letter preceding the model number indicates the performance/wattage of the processor. "X" denotes High Performance/Wattage; "E" denotes Enterprise Performance/Wattage (Mainstream); and "L" denotes Lower Wattage.

NOTE: Customers transitioning from 5500 series processors to 5600 series processors must include a third fan along with the two fans present on the server

Cache Memory

One of the following depending on Model

12MB (1 x 12MB) Level 3 cache

NOTE: For 5600 series processors (other than those indicated below)

8MB (1 x 8MB) Level 3 cache

NOTE: For E5606/E5607/X5570/X5560/X5550/E5540/L5520 processors

4MB (1 x 4MB) Level 3 cache

NOTE: For E5603/E5507/E5502/L5506 processors

Chipset

Intel® 5520 Chipset

NOTE: For more information regarding Intel® chipsets, please see the following URL:

<http://www.intel.com/products/server/chipsets/>.

Upgradeability

Upgradeable to two processors

Standard Features

NOTE: total 4, 8 or 12 cores

Memory Protection	Advanced ECC Mirroring mode Lock-step mode Online Spare (Requires X5600 or E5600 processor family)
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Memory One of the following depending on model	Type	DDR3 Registered (RDIMM) or Unbuffered (UDIMM)
	Standard (Performance Models)	12 GB (6 x 2 GB) RDIMM
	Standard (Base Models)	6 GB (3 x 2 GB) RDIMM
	Standard (Entry Models)	4 GB (2 x 2 GB) RDIMM
	Standard (Entry Models)	4 GB (1 x 4 GB) RDIMM
	Maximum (RDIMM)	288 GB (18 x 16 GB) RDIMM
	Maximum (UDIMM)	48 GB (12 x 4 GB)

NOTE: Depending on the memory configuration and processor model, the memory speed may run at 1333MHz, 1066MHz, or 800MHz. Please see the Online Memory Configuration Tool at: www.hp.com/go/ddr3memory-configurator.

NOTE: The 16 GB memory module is a quad ranked 800MHz DDR3 memory.

Network Controller	Embedded NC326i PCI Express Dual Port Gigabit Server Adapter
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Expansion Slots

Expansion Slot #	Technology	Bus Width	Connector Width	Bus Number	Form Factor	Notes
6	PCI Express Gen2	x4	x8	5	Standard Height/Length	
5	PCI Express Gen2	x4	x8	8	Standard Height/Length	
4	PCI Express Gen2	x8	x16	11	Standard Height/Length	
3	PCI Express Gen2	x8	x8	14	Standard Height/Length	
2	PCI Express Gen2	x4	x8	17	Standard Height/Length	
1	PCI Express Gen2	x4	x8	20	Standard Height/Length	

NOTE: Bus number - Default bus assignment (in decimal). Inserting cards with PCI bridges may alter the actual bus assignment number

** Indicates the number of physical electrical lanes running to the connector.

NOTE: Six total expansion slots. One PCI-Express x16 Gen2 (x8 speed); One PCI-Express x8 Gen2 (x8 speed); Four PCI-Express x8 Gen2 (x4 speed). Optional PCI-X Expander provides additional two 64-bit/100-MHz PCI-X slots by using a single PCI Express slot.

Storage Controller One of the following depending on model	Entry Models	Embedded HP Smart Array P410i/Zero Memory Controller (RAID 0/1/1+0)
	Base Models	Embedded HP Smart Array P410i/256MB Controller (RAID 0/1/1+0/5/5+0) Embedded HP Smart Array P410i/512 MB BBWC Controller (RAID 0/1/1+0/5/5+0)
	Performance Models	Embedded HP Smart Array P410i/1GB FBWC Controller

Standard Features

Available upgrades: 256MB, 512MB with BBWC, Battery kit upgrade (for BBWC), and Smart Array Advanced Pack (SAAP)

Internal Storage Devices	Diskette Drive	None included standard (not supported)
	Optical Drives	HP Half-Height SATA DVD-ROM Optical Drive
	Hard Drives	None standard

Maximum Internal Storage One of the following depending on model	Hot Plug LFF SAS	24TB	8 x 3TB
	Hot Plug LFF SATA	24TB	8 x 3TB
	Hot Plug SFF SAS	16TB	16 x 1TB
	Hot Plug SFF SATA	16TB	16 x 1TB
	Hot Plug SFF SSD	6.4TB	16 x 400GB

Interfaces	Serial	1
	Network RJ-45	3 (1 dedicated for HP Integrated Lights-Out 2 (iLO2))
	Keyboard	1
	Pointing Device (Mouse)	1
	Graphics	1
	SD slot	1 (internal)
	USB 2.0 Ports	6 (2 front, 2 rear, 2 internal)

Industry Standard Compliance	<ul style="list-style-type: none"> ACPI V2.0 Compliant PCI-Express Gen2 PXE Support WOL Support PCI-X 1.0a Compliant Novell Certified Microsoft® Logo certifications USB 2.0 Support SMBIOS 2.6.1
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Server Power Cords	<p>ProLiant ML servers in a rack-mount configuration no longer ship standard with NEMA power cords that allow connection to 110V US wall outlets in a home or office. These servers are primarily connected to PDU's in data center racks so they now ship standard with only a PDU power cord (416151-B21). If a user wishes to power a ProLiant ML rack-mount server using a 110V receptacle (NEMA-15), the NEMA power cord must be ordered separately. The 12' cord (AF556A) or 6' cord (187335-001) can be purchased online at HP.COM. In a tower configuration, the servers ship standard with a 6' country specific NEMA power cord. If customers require a local power cord, they can check the power cord matrix for the appropriate country specific sku. Please see the following power cord matrix: http://www.hp.com/go/powercordmatrix.</p>
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Power Supply One of the following depending on Model	<ul style="list-style-type: none"> HP 750W CS HE Gold Power Supply (standard on some models) HP 460W CS HE Gold Power Supply (standard on some models)
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Common Slot Power Supplies	<p>HP has a new design for ProLiant power- the new Common Slot Power Supply bay. This design provides the customer with commonality in power supplies across multiple platforms to save on the cost of spares and allows HP to offer multiple power solutions to fit the customers' needs. Many HP ProLiant Servers come with Common Slot, High Efficiency and Right-Size Power Supplies. The new HP Common Slot power supplies are designed for the highest power efficiency without degrading performance of the ProLiant server. Power Supplies have efficiency ratings up to 92%. There are three</p>
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Standard Features

Right Size power options available depending on the configuration of your server. To make sure you select the correct power supply to meet your configuration, please use the HP Power Advisor at: www.hp.com/go/proliant-energy-efficient or www.hp.com/go/hppoweradvisor. All HP Common Slot power sources are UL, CE Mark Compliant, Hot Plug and Redundant.

It is highly recommended that you use the HP Power Advisor in defining the "Right-Size" power supply for your needs.

The HP ProLiant Common Slot Power supplies meet multiple Energy Efficiency Initiatives: Climate Savers Computing Initiative GOLD and ECOS Consulting 80PLUS GOLD for the 460w and 750w Power Supplies and Climate Savers Computing Initiative Silver, ECOS Consulting 80PLUS Silver for 1200w Power Supply. HP has also been working with the EPA on developing an ENERGY STAR? Computer Server specification and plans on offering models that meet the requirements when they are published. Please visit the ENERGY STAR website at www.energystar.gov for updates on the specification development process and approved platforms.

The HP Power Advisor is located at: www.hp.com/go/proliant-energy-efficient or www.hp.com/go/hppoweradvisor

System Fans

3 system fans ship standard

NOTE: Does not include power supply or processor heat sink fans.

N+1 fan redundancy optional with redundant fan kit

Required Cabling

For required cabling information, refer to the HP ProLiant ML350 G6 cabling matrix at: <http://www.hp.com/servers/proliantML350>.

NOTE: Please see the "Storage" section of this QuickSpecs for important information on controllers and cables required to support SAS or SATA hard drives as well as storage management software available for SATA hard drives.

Operating Systems and Virtualization Software Support for ProLiant Servers

[Microsoft Windows Server](#)

[Red Hat Enterprise Linux \(RHEL\)](#)

[SUSE Linux Enterprise Server \(SLES\)](#)

[NetWare](#)

NOTE: NetWare support on Intel Xeon 5500 family only.

[VMware](#)

[HP Citrix Essentials for XenServer](#)

NOTE: For more information on HP's Certified and Supported ProLiant Servers for OS and Virtualization Software and latest listing of software drivers available for your server, please visit our Support Matrix at: <http://www.hp.com/go/ossupport>

Graphics

Integrated ATI RN50, 64MB video standard

- 16 bit color: maximum resolution of 1600 x 1200
- 32 bit color: maximum resolution of 1280 x 1024

NOTE: Maximum resolution available via iLO remote console is 1280 x 1024.

Form Factor

Tower or Rack (5U)

NOTE: Rack models (with a Tower to Rack conversion kit) support:

- Square or round hole racks 24"- 36" deep, including HP Rack System /E and HP Systems
- Telco racks with 3rd part option kit from Rack Solutions

Standard Features

<http://www.racksolutions.com/hp>

HP Insight Management	HP Insight Foundation	<p>Managing the growing number of servers can be complex and expensive for your organization. IT managers need to address changing business needs with tools that meet the challenges of managing today's complex Datacenters.</p> <p>HP provides management solutions that are designed to simplify a server's installation, configuration and maintenance throughout the entire server lifecycle. This provides the customer with higher levels of operational efficiency and highly reliable systems: http://www.hp.com/go/foundation</p> <p>The foundation pack includes:</p> <ul style="list-style-type: none">• HP SmartStart• HP Management DVD• HP ProLiant Smart Update Firmware DVD <p>NOTE: In an effort to support reducing our environmental impact, the HP Insight Foundation Suite for ProLiant media will be available as a selectable option for this server at time of order of a CTO SKU. This will allow customers to order the number of media kits that best meet their needs and eliminate receiving unnecessary duplicate media.</p>
	HP Integrated Lights-Out (iLO)	<p>HP Integrated Lights-Out (iLO) simplifies server setup, health monitoring, power and thermal control, and lights-out remote administration of ProLiant ML, DL, and BL servers. HP iLO functions without additional software and can be accessed from any location via a web browser. HP iLO works hand-in-hand with HP Systems Insight Manager, Insight Control suites, and Insight Dynamics for ProLiant, helping customers unleash the value of the ProLiant platform and deliver the highest possible quality of IT service. For more information, visit: www.hp.com/go/iLO</p>

Intelligent Manageability	HP Systems Insight Manager SmartStart Redundant ROM System Firmware Update ROMPaq ProLiant RBSU (ROM-Based Setup Utility) Automatic Server Recovery-2 (ASR-2) Dynamic Sector Repairing (with Smart Array Controller) Drive Parameter Tracking (with Smart Array Controller) Pre-Failure Warranty (covers processors, memory, and SAS hard drives)
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Security	Power-on password Setup password Serial interface control Disk configuration lock Power switch security
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Warranty	This product is covered by a global limited warranty and supported by HP Services and a worldwide network of HP Authorized Channel Partners resellers. Hardware diagnostic support and repair is available for three years from date of purchase. Support for software and initial setup is available for 90 days from date of purchase. Enhancements to warranty services are available through HP Care Pack
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Standard Features

services or customized service agreements. Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.

NOTE: Server Warranty includes 3-Year Parts, 3-Year Labor, 3-Year Onsite support with next business day response. Warranty repairs may be accomplished through the use of Customer Self Repair (CSR) parts. These parts fall into two categories: 1) Mandatory CSR parts are designed for easy replacement. A travel and labor charge will result when customers decline to replace a Mandatory CSR part; 2) Optional CSR parts are also designed for easy replacement but may involve added complexity. Customers may choose to have HP replace Optional CSR parts at no charge. Additional information regarding worldwide limited warranty and technical support is available at: <http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html>

Optional Features

HP Insight Management HP Insight Control

HP Insight Control, a product option, delivers essential infrastructure management that can help save time and money by making it easy to deploy, migrate, monitor, remote control, and optimize your IT infrastructure through a single, simple management console. For more information, see <http://www.hp.com/go/insightcontrol>.

HP Insight Control includes one year of 24 x 7 HP Software Technical Support and Update Service ensuring rapid access to HP support staff and proactive delivery of software updates. For more information about this service, see: <http://www.hp.com/services/insight>.

HP Insight Dynamics

HP Insight Dynamics for ProLiant, a product option, is advanced infrastructure management software that enables IT staff to instantly adjust their environments to meet dynamic business demands by provisioning, optimizing and protecting complex infrastructure in minutes. It's a powerful toolkit, integrated-by-design, that accelerates complex technology projects and simplifies daily operations, transforming data center economics. With Insight Dynamics IT professionals can plan capacity and power continuously, balance workloads across physical and virtual resources, and ensure cost-effective high availability. It also enables IT organizations to provision infrastructure consistently and automatically from pools of shared resources using a self-service portal. Resources provisioned can range from a single virtual machine to complex multi-tier environments and their associated physical and virtual resource requirements. In addition to the previous functional benefits, it also provides a cost-effective disaster recovery for physical and virtual environments that works with HP Continuous Access software for both the Enterprise Virtual Array and the XP storage array allowing application environments to be reactivated in minutes with the touch of a button to a remote location.

NOTE: For more information, visit: <http://www.hp.com/go/insightdynamics>

Storage Software

Whether you need to solve a specific data protection, archiving, or storage command and control challenge, or deliver on strategic consolidation, compliance, or continuity initiatives, look no further than HP storage software. Our storage software helps you reduce costs, simplify storage infrastructure, protect vital assets and respond faster to business opportunities.

Storage software that gets the job done:

- **Data Protection and Recovery Software**
Whether you're a large enterprise or a smaller business, HP data protection and recovery software will cost-effectively protect you against disaster and ensure business continuity.
- **Data Archive and Migration Software**
HP's storage software enables you to comply with data retention and retrieval requirements, improve application performance, and reduce costs by efficiently migrating infrequently accessed or less valuable data to lower cost storage.
- **Storage Resource Management Software (SRM)**
HP's storage resource management software reduces operational costs and provides the command and control foundation you need to efficiently manage and visualize your physical and virtual environments.
- **Data Replication Software**
HP offers array-based and host-based replication software for use in disaster recovery, testing, application development and reporting.

Optional Features

- **Storage Device Management Software**
Maximize your investment in HP storage and networking with software that enables hardware-specific configuration, performance tuning and connectivity management.
- **HP StoreVirtual VSA**
With HP StoreVirtual VSA you can use the power of virtualization to turn a set of heterogeneous and disconnected physical disk drives in your servers and storage devices into a single pool of logical storage capacity.

NOTE: For more information available Storage Software including QuickSpecs, please see: <http://www.hp.com/go/storage/software>

HP Proactive Insight experience

Prevent problems with innovative, automated monitoring tools and proactive services. The HP Proactive Insight experience consist of using Insight Online, Insight Remote Support, and Proactive Care Support Service as one integrated solution. The Proactive Insight experience provides you with expert advice and personalized, cloud-based automated IT support, helping to prevent unplanned down time and solve problems quickly. For more information, visit: www.hp.com/go/proactiveinsightexperience

Factory Express Portfolio for Servers and Storage

HP Factory Express offers configuration, customization, integration and deployment services for HP servers and storage products. Customers can choose how their factory solutions are built, tested, integrated, shipped and deployed.

Factory Express offers service packages for simple configuration, racking, installation, complex configuration and design services as well as individual factory services, such as image loading, asset tagging, and custom packaging. HP products supported through Factory Express include a wide array of servers and storage: HP Integrity, HP ProLiant, HP ProLiant Server Blades, HP BladeSystem, HP 9000 servers as well as the MSAxxxx, VA7xxx, EVA, XP, rackable tape libraries and configurable network switches.

For more information on Factory Express services for your specific server model please contact your sales representative or go to: <http://www.hp.com/go/factory-express>

HP Simple Configurator

SCE is a guided self service tool to help sales and non technical people provide customers with initial configurations in 3 to 5 minutes. You may then send the configuration on for configuration help, or use in your existing ordering processes. If you require "custom" rack configuration or configuration for products not available in SCE, please contact HP's Customer Business Center or an Authorized Partner for assistance. <http://www.hp.com/products/configurator>

Service and Support

Service and Support

HP Technology Services for Industry Standard Servers and BladeSystem

Capitalizing on HP ProLiant server and HP BladeSystem capabilities requires a service partner who understands your increasingly complex business technology environment. That's why it makes sense to team up with the people who know HP infrastructure hardware and software best - the experienced professionals at HP Services.

What HP ProLiant and BladeSystem Services can do for you

HP ProLiant and BladeSystem Services can help you design, deploy, test, integrate, support, and manage IT and infrastructure solutions. This way, HP proposes services solutions that include more than just uplift of base warranty. You can get the support you need by choosing from one of a number of service packaged solutions we have designed to address wider set of customer support needs:

HP Technology Services meets business challenges with services offered in three packages -

Optimized Care Package, Standard Care Package, and Basic Care Package - available for each product group. Such packaged solutions enable customers to optimize technology operations, minimize risk and drive better business outcomes with easy-to-buy, easy-to-use scalable support packages for servers, storage, networking and software.

Optimized Care Package Supports maintaining servers at optimum performance availability

HP ProLiant Server Hardware Installation

Provides for the basic hardware installation of HP branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner <http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-9356EN>

HP Installation and Startup for Insight Control Software

Provides for the deployment and basic configuration of HP Insight Control on HP ProLiant ML and DL series servers or HP BladeSystem servers <http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA0-9972ENW.pdf>

3-Year HP Critical Advantage

Provides end-to-end infrastructure support solution for business critical applications running on virtualized/x86 infrastructures, enabling the customers to cost effectively build, operate, and continuously improve their IT environment <http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=4AA3-1772ENW>

Additional Services: Microsoft or Linux or VMware education courses + Facility & technology environmental assessment services + Energy Efficiency Design, Factory Express

Standard Care Package Package that maintains high level of server availability

HP ProLiant Server Hardware Installation

Provides for the basic hardware installation of HP branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner <http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-9356EN>

HP Installation and Startup for Insight Control Software

Provides for the deployment and basic configuration of HP Insight Control on HP ProLiant ML and DL series servers or HP BladeSystem servers <http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA0-9972ENW.pdf>

3-Year HP 6 hour Hardware Support Onsite Call-to-Repair Service

Provides an IT manager with a team of support specialists who will quickly begin troubleshooting the system to help return the hardware to operating condition within 6 hours of the initial service request

Service and Support

to the HP Global Solution Center

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6547EN.pdf>

3-Year , HP 24x7 Software Support for Insight Control

Provides for the deployment and basic configuration of HP Insight Control on HP ProLiant ML and DL series servers or HP BladeSystem servers

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-6645EEE.pdf>

Additional Services - Software OS (Microsoft, Linux (SUSE/Red Hat) & VMware Installation & Start Up, and Software Support; Install and Startup Services for Insight Control; Microsoft or Linux or VMware education courses; +30 Proactive Select Credits, Factory Express

Basic Care Package

Delivers minimum recommended support service level

HP ProLiant Server Hardware Installation

Provides for the basic hardware installation of HP branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-9356EN>

HP Installation and Startup for Insight Control Software

Provides for the deployment and basic configuration of HP Insight Control on HP ProLiant ML and DL series servers or HP BladeSystem servers

<http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA0-9972ENW.pdf>

3-Year HP 24x7 4 hour Response, Hardware Support Onsite Service

Provides for the deployment and basic configuration of HP Insight Control on HP ProLiant ML and DL series servers or HP BladeSystem servers

<http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA0-9972ENW.pdf>

3-Year , HP 24x7 Software Support for Insight Control

Provides for the deployment and basic configuration of HP Insight Control on HP ProLiant ML and DL series servers or HP BladeSystem servers

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-6645EEE.pdf>

Additional Services: Software OS (Microsoft, Linux (SUSE/Red Hat) & VMware Installation & Start Up and Software Support); +10 Proactive Select Credits, Factory Express

Insight Remote Support

The packages include HP Insight Remote Support that uses proven technology to deliver secure, reliable 24x7 remote monitoring, diagnoses, and problem resolution. It is available at no additional cost to all warranty, HP Care Pack Service, and service agreement customers.

For more information

To learn more on HP ProLiant servers and HP BladeSystem servers, please contact your HP sales representative or HP Authorized Channel Partner. Or visit: <http://www.hp.com/services/proliant>

Pre-configured Models

NOTE: For the Standard Features shipped in the "Factory Integrated Models", please see the "Configuration Information - Factory Integrated Models" section.

NOTE: Pre-configured models ship with the configurations below. Options can be selected from the Core or Additional options section of this QuickSpecs.

NOTE: HP does not allow factory integration of options into pre-configured models. Any additional options purchased will be shipped separately.

NOTE: If you desire a custom configuration please see "Configuration Information - Factory Integrated Models" section of this QuickSpecs.

NOTE: Not all models are available in all regions. Check with your local country HP offices for availability.

Entry Models

HP ProLiant ML350 G6 E5606 1P 4GB-R P410i/ZM 460W RPS LFF Tower Server 638180-xx1	Processor	(1) Intel® Xeon® E5606 (2.13GHz/4-core/8MB/80W, DDR3-1066, Turbo 1/1/2/2/3/3) Processor
	Cache Memory	8MB (1 x 8MB) L3 cache
	Memory	4GB (1 x 4GB) PC3-10600R (DDR3-1333) Registered DIMMs
	Network Controller	Embedded NC326i PCI Express Dual Port Gigabit Server Adapter
	Storage Controller	HP Smart Array P410i/Zero Memory Controller
	Hard Drive	None ship standard
	Internal Storage	(6) LFF SATA/SAS HDD bays; upgradeable to (8) in total
	Optical Drive	HP Half-Height SATA DVD-ROM Optical Drive
	Power Supply	(1) 460 Watt Hot-Plug (Redundancy enabled) power supply
	Fans	3 fans ship standard
	Accessories	PS/2 Keyboard and Mouse ship standard NOTE: EURO (-421) Models excludes the keyboard.
	Form Factor	Tower (5U)
	Warranty	Server Warranty includes 3-Year Parts, 3-Year Labor, 3-Year Onsite support with next business day response

Base Models

HP ProLiant ML350 G6 E5645 1P 6GB-R P410i/256 750W RPS SFF Server 638181-xx1	Processor	(1) Intel® Xeon® E5645 (2.40GHz/6-core/12MB/80W, DDR3-1333, HT, Turbo 1/1/2/2/3/3) Processor
	Cache Memory	12MB (1 x 12MB) L3 cache
	Memory	6GB (3 x 2GB) PC3-10600 (DDR3-1333) Registered DIMMs
	Network Controller	Embedded NC326i PCI Express Dual Port Gigabit Server Adapter
	Storage Controller	Embedded HP Smart Array P410i/256MB Controller
	Hard Drive	None ship standard
	Internal Storage	(8) SFF SAS/SATA HDD Bays; upgradeable to (16)
	Optical Drive	HP Half-Height SATA DVD-ROM Optical Drive
	Power Supply	(1) 750 Watt Hot-Plug (Redundancy enabled) power supply
	Fans	3 fans ship standard
	Accessories	PS/2 Keyboard and Mouse ship standard NOTE: EURO (-421) Models excludes the keyboard.
	Form Factor	Tower (5U)
	Warranty	Server Warranty includes 3-Year Parts, 3-Year Labor, 3-Year Onsite support with next business day response

Pre-configured Models

HP ProLiant ML350 G6 E5620 1P 6GB-R P410i/256 460W RPS Tower Server 594869-xx1	Processor	(1) Intel® Xeon® E5620 (2.40GHz/4-core/12MB/80W, DDR3-1066, HT, Turbo (1/1/2/2) Processor
	Cache Memory	12MB (1 x 12MB) L3 cache
	Memory	6GB (3 x 2GB) PC3-10600R (DDR3-1333) Registered DIMMs
	Network Controller	Embedded NC326i PCI Express Dual Port Gigabit Server Adapter
	Storage Controller	Embedded HP Smart Array P410i/256MB Controller
	Hard Drive	None ship standard
	Internal Storage	(8) SFF SAS/SATA HDD Bays; upgradeable to (16)
	Optical Drive	SATA DVD ROM
	Power Supply	(1) 460 Watt Hot-Plug (Redundancy enabled) power supply
	Fans	3 fans ship standard
Accessories	PS/2 Keyboard and Mouse ship standard NOTE: EURO (-421) Models excludes the keyboard.	
Form Factor	Tower (5U)	
Warranty	Server Warranty includes 3-Year Parts, 3-Year Labor, 3-Year Onsite support with next business day response	

Performance Models

HP ProLiant ML350 G6 X5650 2P 12GB-R P410i/1GB FBWC 750W RPS Tower Server 594874-xx1	Processor	(2) Intel® Xeon® X5650 (2.66GHz/6-core/12MB/95W, DDR3-1333, HT, Turbo 1/1/2/2/3/3) Processors
	Cache Memory	12MB (1 x 12MB) L3 cache
	Memory	12 GB (6 x 2GB) PC3-10600R (DDR3-1333) Registered DIMMs
	Network Controller	Embedded NC326i PCI Express Dual Port Gigabit Server Adapter
	Storage Controller	Embedded HP Smart Array P410i/1G FBWC Controller
	Hard Drive	None ship standard
	Internal Storage	(8) SFF SAS/SATA HDD Bays; upgradeable to (16)
	Optical Drive	SATA DVD ROM
	Power Supply	(2) 750 Watt Hot-Plug Redundant power supplies
	Fans	4 full Redundant fans
Accessories	PS/2 Keyboard and Mouse ship standard NOTE: EURO (-421) Models excludes the keyboard.	
Form Factor	Tower (5U)	
Warranty	Server Warranty includes 3-Year Parts, 3-Year Labor, 3-Year Onsite support with next business day response	

Country Code Key

xx=00
xx=01
xx=03
xx=04
xx=05
xx=20
xx=29
xx=37
xx=42

xx=AA

Tower Code Key

US
Australia
UK
Germany
France
Brazil
Japan
APD
Europe
NOTE: EURO (-421) Models excludes the keyboard.
PRC

Rack Code Key

US
N/A
N/A
N/A
N/A
N/A
Japan
APD
Europe

PRC

Configuration Information - Factory Integrated Models

NOTE: This section lists some of the steps required to configure a Factory Integrated Model. To ensure only valid configurations are ordered, HP recommends the use of an HP approved configurator. Contact your local sales representative for information on configurable product offerings and requirements.

NOTE: Configure-to-order (CTO) servers must start with a CTO Chassis.

NOTE: FIO indicates that this option is only available as a factory installable option.

Step 1: Base Configuration (choose one of the following configurable models)

HP Models

ML350G6 Tower Models

HP ProLiant ML350 G6 SFF Configure-to-order Tower Chassis 483447-B21

Includes:

Embedded NC326i PCI Express Dual Port Gigabit Server Adapter
 Embedded Smart Array P410i Controller
 Eight (8) Hot-Plug (SFF) SAS/SATA Drive Bays
 Seven (7) HDD blanks
 Six (6) Expansion slots: One Express x16 Gen2 (x8 speed); One PCI-Express x8 Gen2 (x8 speed); Four PCI-Express x8 Gen2 (x4 speed)
 Six (6) USB ports
 PS/2 Keyboard & Mouse (selection required)
 Tower Form Factor

HP ProLiant ML350 G6 LFF Configure-to-order Tower Chassis 483448-B21

Includes:

Embedded NC326i PCI Express Dual Port Gigabit Server Adapter
 Embedded Smart Array P410i Controller
 Six (6) Hot-Plug (LFF) SAS/SATA Drive Bays
 Five (5) HDD blanks
 Six (6) Expansion slots: One Express x16 Gen2 (x8 speed); One PCI-Express x8 Gen2(x8 speed); Four PCI-Express x8 Gen2 (x4 speed)
 Six (6) USB ports
 P/S 2 Keyboard & Mouse (selection required)
 Tower Form Factor

ML350G6 Rack Models

HP ProLiant ML350 G6 SFF Configure-to-order Rack Server 483443-B21

Includes:

Embedded NC326i PCI Express Dual Port Gigabit Server Adapter
 Embedded Smart Array P410i Controller
 Eight (8) Hot-Plug (SFF) SAS/SATA Drive Bays
 Seven (7) HDD blanks
 Six (6) Expansion slots: One Express x16 Gen2 (x8 speed); One PCI-Express x8 Gen2 (x8 speed); Four PCI-Express x8 Gen2 (x4 speed)
 Six (6) USB ports
 Rack (5U) Form Factor

HP ProLiant ML350 G6 LFF Configure-to-order Rack Server 483444-B21

Includes:

Embedded NC326i PCI Express Dual Port Gigabit Server Adapter
 Embedded Smart Array P410i Controller
 Six (6) Hot-Plug (LFF) SAS/SATA Drive Bays
 Five (5) HDD blanks
 Six (6) Expansion slots: One Express x16 Gen2 (x8 speed); One PCI-Express x8 Gen2 (x8 speed); Four PCI-Express x8 Gen2 (x4 speed)
 Six (6) USB ports
 Rack (5U) Form Factor

Configuration Information - Factory Integrated Models

Step 2: Choose Required Options (only one of the following from each list unless otherwise noted)

HP Processors

Six-Core Processors

HP ML350 G6 Intel® Xeon® X5675 (3.06GHz/6-core/12MB/95W) FIO Processor Kit	638315-L21
HP ML350 G6 Intel® Xeon® X5660 (2.80GHz/6-core/12MB/95W) FIO Processor Kit	601238-L21
HP ML350 G6 Intel® Xeon® X5650 (2.66GHz/6-core/12MB/95W) FIO Processor Kit	601240-L21
HP ML350 G6 Intel® Xeon® E5649 (2.53GHz/6-core/12MB/80W) FIO Processor Kit	638316-L21
HP ML350 G6 Intel® Xeon® E5645 (2.40GHz/6-core/12MB/80W) FIO Processor Kit	638317-L21

Quad-Core Processors

HP ML350 G6 Intel® Xeon® X5672 (3.20GHz/4-core/12MB/95W) FIO Processor Kit	638314-L21
HP ML350 G6 Intel® Xeon® E5620 (2.40GHz/4-core/12MB/80W) FIO Processor Kit	601246-L21
HP ML350 G6 Intel® Xeon® E5607 (2.26GHz/4-core/8MB/80W) FIO Processor Kit	638318-L21
HP ML350 G6 Intel® Xeon® E5606 (2.13GHz/4-core/8MB/80W) FIO Processor Kit	638319-L21
HP ML350 G6 Intel® Xeon® E5603 (1.60GHz/4-core/4MB/80W) FIO Processor Kit	638320-L21
HP ML350 G6 Intel® Xeon® L5630 (2.13GHz/4-core/12MB/40W) FIO Processor Kit	601252-L21

NOTE: Low Voltage DIMMs can only be used with Intel® Xeon® processor 5600 series processors

HP Memory

Registered DIMMs (RDIMMs)

NOTE: Low Voltage DIMMs can only be used with Intel® Xeon® processor 5600 series processors

HP 2GB (1x2GB) Dual Rank x8 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500656-B21
HP 4GB (1x4GB) Single Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	593339-B21
HP 4GB (1x4GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500658-B21
HP 8GB (1x8GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500662-B21
HP 16GB (1x16GB) Quad Rank x4 PC3-8500 (DDR3-1066) Registered CAS-7 Memory Kit	500666-B21
HP 4GB (1x4GB) Single Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 Low Power Memory Kit	604504-B21
HP 8GB (1x8GB) Dual Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 Low Power Memory Kit	604506-B21
HP 16GB (1x16GB) Dual Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 LP Memory Kit	627812-B21

NOTE: Low Voltage DIMMs can only be used with Intel® Xeon® processor 5600 series processors

Unbuffered with ECC DIMMs (UDIMMs)

NOTE: All DDR3 memory option kits consist of one DIMM per kit. For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool: www.hp.com/go/ddr3memory-configurator.

NOTE: Kits described as LP include Low Power DIMMs. For more information on ProLiant Energy Efficient Features, see: <http://h18004.www1.hp.com/products/servers/platforms/energyefficient/>

HP 1GB (1x1GB) Single Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500668-B21
HP 2GB (1x2GB) Dual Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500670-B21

Configuration Information - Factory Integrated Models

	HP 4GB (1x4GB) Dual Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500672-B21
	HP 4GB (1x4GB) Dual Rank x8 PC3L-10600 (DDR3-1333) Unbuffered CAS-9 Low Power Memory Kit	619488-B21
HP Power Supplies	NOTE: Prior to making a power supply selection it is highly recommended that the HP Power Advisor is run to determine the right size power supply for your server configuration. The HP Power Advisor is located at: www.hp.com/go/hppoweradvisor	
	HP 460W Common Slot Gold Hot Plug Power Supply Kit	503296-B21
	HP 750W Common Slot Gold Hot Plug Power Supply Kit	512327-B21
	HP 1200W Common Slot Silver Hot Plug Power Supply Kit	500172-B21
	NOTE: Option Kits contain optional power supply, an IEC power cable and PDU IEC cables.	

Step 3: Choose Additional Factory Integratable Options

HP Storage Controllers	HP Smart Array P212/256 BBWC 1-ports Int/1-ports Ext PCIe x8 FIO SAS Controller NOTE: SAS Controller supporting RAID 0/1/1+0/5.	491191-B21
	HP Smart Array P411/256 BBWC 2-ports Ext PCIe x8 FIO SAS Controller NOTE: SAS Controller supporting RAID 0/1/1+0/5.	491193-B21
	Upgrade Options	
	HP 256MB Factory Integrated P-Series Cache Module NOTE: Available for P410i only.	534108-B21
HP Insight Software	HP Insight Control including 1yr 24x7 Support ProLiant ML/DL/BL-bundle Single Server FIO License	582765-B21

Step 4: Choose Additional Options for Factory Integration

NOTE: For additional options, please refer to the "Core Options" and "Additional Options" section below.

Core Options

NOTE: Some options may not be integrated at the factory. To ensure only valid configurations are ordered, HP recommends the use of an HP approved configurator. Contact your local sales representative for additional information.

HP Unique Options	HP ML350 G6 Redundant Fan/Baffle Kit	515081-B21
	HP ML350/ML330G6 2 Slot PCI-X Riser Kit	488413-B21
	NOTE: The HP PCI-X Expander kit converts a single PCI Express slot (Slot 1) into two full height, full length 64-bit 100MHz PCI-X slots. The PCI-X Expander Kit can only be plug in Slot 1.	
	HP ML350G6 Tower to Rack Conversion Kit	534534-B21
	NOTE: See "Redundant Options" section below for Hot Plug Redundant Power supplies.	
	HP 2.5 Hard Disk Drive Blank Kit	503771-B21

HP Processors

Six-Core Processors

HP ML350 G6 Intel® Xeon® X5675 (3.06GHz/6-core/12MB/95W) Processor Kit	638315-B21
HP ML350 G6 Intel® Xeon® X5670 (2.93GHz/6-core/12MB/95W) Processor Kit	601236-B21
HP ML350 G6 Intel® Xeon® X5660 (2.80GHz/6-core/12MB/95W) Processor Kit	601238-B21
HP ML350 G6 Intel® Xeon® X5650 (2.66GHz/6-core/12MB/95W) Processor Kit	601240-B21
HP ML350 G6 Intel® Xeon® E5649 (2.53GHz/6-core/12MB/80W) Processor Kit	638316-B21
HP ML350 G6 Intel® Xeon® E5645 (2.40GHz/6-core/12MB/80W) Processor Kit	638317-B21

Quad-Core Processors

HP ML350 G6 Intel® Xeon® X5672 (3.20GHz/4-core/12MB/95W) Processor Kit	638314-B21
HP ML350 G6 Intel® Xeon® E5620 (2.40GHz/4-core/12MB/80W) Processor Kit	601246-B21
HP ML350 G6 Intel® Xeon® E5607 (2.26GHz/4-core/8MB/80W) Processor Kit	638318-B21
HP ML350 G6 Intel® Xeon® E5606 (2.13GHz/4-core/8MB/80W) Processor Kit	638319-B21
HP ML350 G6 Intel® Xeon® E5603 (1.60GHz/4-core/4MB/80W) Processor Kit	638320-B21
HP ML350 G6 Intel® Xeon® L5630 (2.13GHz/4-core/12MB/40W) Processor Kit	601252-B21

HP Memory

Registered RDIMMs

HP 2GB (1x2GB) Dual Rank x8 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500656-B21
HP 4GB (1x4GB) Single Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	593339-B21
HP 4GB (1x4GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500658-B21
HP 8GB (1x8GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500662-B21
HP 16GB (1x16GB) Quad Rank x4 PC3-8500 (DDR3-1066) Registered CAS-7 Memory Kit	500666-B21
HP 4GB (1x4GB) Single Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 Low Power Memory Kit	604504-B21
HP 8GB (1x8GB) Dual Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 Low Power Memory Kit	604506-B21
NOTE: Low Voltage DIMMs can only be used with Intel® Xeon® processor 5600 series processors	
HP 16GB (1x16GB) Dual Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 LP Memory Kit	627812-B21

Unregistered with ECC UDIMMs

Core Options

HP 1GB (1x1GB) Single Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500668-B21
HP 2GB (1x2GB) Dual Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500670-B21
HP 4GB (1x4GB) Dual Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500672-B21
HP 4GB (1x4GB) Dual Rank x8 PC3L-10600 (DDR3-1333) Unbuffered CAS-9 Low Power Memory Kit	619488-B21

NOTE: All DDR3 memory option kits consist of one DIMM per kit. For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool: www.hp.com/go/ddr3memory-configurator.

NOTE: Kits described as LP include Low Power DIMMs. For more information on ProLiant Energy Efficient Features, see: www.hp.com/go/proliant-energy-efficient.

HP Drive Cage Options

HP ML350/370 G6 8 Small Form Factor (SFF) 2nd Drive Cage Kit	507803-B21
NOTE: The Second drive cage installation replaces 2 internal optical bays. It is required to purchase a SAS RAID controller or SAS Expander Card to support over 8 HDD	
NOTE: To cover an empty SFF HDD slot, please order the following SFF hard drive blank spare kit: 392613-001	
HP ML350/ML/DL370G6 2 Large Form Factor Drive Kit	487936-B21
NOTE: The Second drive cage installation replaces 2 internal optical bays.	
NOTE: To cover an empty LFF HDD slot, please order the following LFF hard drive blank spare kit: 389015-001	

HP Optical Drives

HP Half-Height SATA DVD-ROM Optical Drive	447326-B21
HP Half-Height SATA DVD-RW Optical Drive	447328-B21
NOTE: Please note that some of the earlier BTO models may not support adding SATA Optical Drives. To ensure compatibility of the SATA Optical Drives, please add additional optical drives only on models with Quad-Core 5400 Series.	

HP Hard Drives

NOTE: The components of a storage subsystem (e.g. the drive, the HBA/controller, firmware, and the server backplane) should operate at the same data transfer rate or the system bandwidth will be negotiated down to an acceptable level for all components.

NOTE: Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.

SAS Hot Plug SFF (2.5-inch) Enterprise (ENT) Drives

HP 900GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	619291-B21
HP 600GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	581286-B21
HP 450GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	581284-B21
HP 300GB 6G SAS 15K rpm SFF (2.5-inch) Hot Plug Enterprise 3yr Warranty Hard Drive	627117-B21
HP 300GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	507127-B21
HP 146GB 6G SAS 15K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	512547-B21

SAS Hot Plug LFF (3.5-inch) Enterprise (ENT) Drives

Core Options

HP 600GB 6G SAS 15K rpm LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	516828-B21
HP 450GB 6G SAS 15K rpm LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	516816-B21
HP 300GB 6G SAS 15K rpm LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	516814-B21
SAS Hot Plug LFF (3.5-inch) Midline (MDL) Drives	
HP 3TB 6G SAS 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	625031-B21
HP 2TB 6G SAS 7.2K rpm LFF (3.5-inch) Dual Port Midline 1yr Warranty Hard Drive	507616-B21
HP 1TB 6G SAS 7.2K rpm LFF (3.5-inch) Dual Port Midline 1yr Warranty Hard Drive	507614-B21
NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12244_div/12244_div.html (Worldwide)	
SAS Hot Plug SFF (2.5-inch) Midline (MDL) Drives	
HP 1TB 6G SAS 7.2K rpm SFF (2.5-inch) Dual Port Midline 1yr Warranty Hard Drive	605835-B21
HP 500GB 6G SAS 7.2K rpm SFF (2.5-inch) Dual Port Midline 1yr Warranty Hard Drive	507610-B21
SATA Hot Plug SFF (2.5-inch) Midline (MDL) Drives	
HP 1TB 3G SATA 7.2K rpm SFF (2.5-inch) Hot Plug Midline 1yr Warranty Hard Drive	625609-B21
HP 500GB 3G SATA 7.2K rpm SFF (2.5-inch) Midline 1yr Warranty Hard Drive	507750-B21
SATA Hot Plug LFF (3.5-inch) Midline (MDL) Drives	
HP 3TB 3G SATA 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	628059-B21
HP 2TB 3G SATA 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	507632-B21
HP 1TB 3G SATA 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	454146-B21
HP 500GB 3G SATA 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	458928-B21
SATA Hot Plug LFF (3.5-inch) Entry (ETY) Drives	
HP 250GB 3G SATA 7.2K rpm LFF (3.5-inch) Entry 1yr Warranty Hard Drive	571230-B21
NOTE: SATA hard drives have a 1-year warranty. Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13021_div/13021_div.html (Worldwide)	
3G SATA MLC Hot Plug SFF (2.5-inch) Enterprise Mainstream Solid State Drives	
HP 400GB 3G SATA MLC SFF (2.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive	636597-B21
HP 200GB 3G SATA MLC SFF (2.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive	636595-B21
HP 100GB 3G SATA MLC SFF (2.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive	636593-B21
3G SATA MLC Hot Plug LFF (3.5-inch) Enterprise Mainstream Solid State Drives	
HP 400GB 3G SATA MLC LFF (3.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive	636611-B21
HP 200GB 3G SATA MLC LFF (3.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive	636609-B21
HP 100GB 3G SATA MLC LFF (3.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive	636607-B21
6G SAS SLC Hot Plug Enterprise Performance Solid State Drives	
HP 400GB 6G SAS SLC SFF (2.5-inch) Enterprise Performance 3yr Warranty Solid State Drive	632494-B21

Core Options

HP 200GB 6G SAS SLC SFF (2.5-inch) Enterprise Performance 3yr Warranty Solid State Drive 632492-B21

NOTE: Please see the QuickSpecs for Technical Specifications and additional information:
http://h18000.www1.hp.com/products/quickspecs/14038_div/14038_div.html
 (Worldwide)

Hard Drive Kits

HP 2.5 Hard Disk Drive Blank Kit 503771-B21

HP Networking

Gigabit Ethernet adapters

HP NC112T PCI Express Gigabit Server Adapter 503746-B21

HP NC360T PCI-E Dual Port Gigabit Server Adapter 412648-B21

HP NC364T PCI-E Quad Port Gigabit Server Adapter 435508-B21

NOTE: Does not support Windows 2000.

NOTE: There is a maximum of five NC364T PCI Express Quad Port Gigabit Server Adapter NICs allowed in this server.

HP NC365T 4-port Ethernet Server Adapter 593722-B21

HP NC373F PCI-E Multifunction 1000SX Gigabit Svr Adapter 394793-B21

HP NC373T PCI-E Multifunction Gigabit Server Adapter 394791-B21

HP NC375T PCI Express Quad Port Gigabit Server Adapter 538696-B21

HP NC382T PCI Express Dual Port Multifunction Gigabit Server Adapter 458492-B21

10 Gigabit Ethernet adapters

HP NC522SFP Dual Port 10GbE Gigabit Server Adapter 468332-B21

HP NC523SFP 10Gb 2-port Server Adapter 593717-B21

HP NC550SFP Dual Port 10GbE Server Adapter 581201-B21

HP NC552SFP 10Gb 2-port Ethernet Server Adapter 614203-B21

NOTE: Please see the QuickSpecs for Technical Specifications and additional information: www.hp.com/go/ProLiantNICs

HP I/O Expansion Options

HP ML350/ML330G6 2 Slot PCI-X Riser Kit 488413-B21

NOTE: The HP PCI-X Expander kit converts a single PCI Express slot (Slot 1) into two full height, full length 64-bit 100MHz PCI-X slots. The PCI-X Expander Kit can only be plug in Slot 1.

HP Power Supplies

NOTE: Prior to making a power supply selection it is highly recommended that the HP Power Advisor is run to determine the right size power supply for your server configuration. The HP Power Advisor is located at:

www.hp.com/go/hppoweradvisor.

Power Supplies

HP 460W Common Slot Gold Hot Plug Power Supply Kit 503296-B21

HP 750W Common Slot Gold Hot Plug Power Supply Kit 512327-B21

HP 1200W Common Slot Silver Hot Plug Power Supply Kit 500172-B21

NOTE: Option Kits contain optional power supply, an IEC power cable and PDU IEC cables.

HP Cooling Options

HP ML350 G6 Redundant Fan/Baffle Kit 515081-B21

Additional Options

NOTE: Some options may not be integrated at the factory. To ensure only valid configurations are ordered, HP recommends the use of an HP approved configurator. Contact your local sales representative for additional information.

HP Insight Software	HP Insight Control	
	HP Insight Control including 1yr 24x7 Technical Support and Updates Electronic License	T9074BAE
	HP Insight Control including 1yr 24x7 Support ProLiant ML/DL/BL-bundle Electronic License	TC278AAE
	HP Insight Control including 1yr 24x7 Technical Support and Updates Single Server License	452148-B22
	HP Insight Management Media Kit	436222-B21
	NOTE: HP Insight Management Media Kit contains DVDs without licenses. Contains HP Systems Insight Manager, HP Insight Control, HP Matrix Operating Environment, and Virtual Connect Enterprise Manager software. Uses an integrated installer to perform quick and accurate software installation and updates.	
	HP Insight Control Server Deployment including 1yr 24x7 Support Electronic License	T9082AAE
	HP Insight Control Server Deployment including 1yr 24x7 Support Single Server License	452151-B21
	NOTE: Electronic and Flexible-Quantity licenses can be used to purchase multiple licenses with a single activation key.	
	NOTE: Customer will receive a license entitlement certificate. The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support and Update Service.	
	NOTE: Licenses ship without media. Media kits can be ordered separately, or can be downloaded at: http://www.hp.com/go/insightupdates .	
	NOTE: For additional license options please see the QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/12631_div/12631_div.html	
	HP Integrated Lights-Out (iLO)	
	HP Integrated Lights-Out (iLO) Advanced for ProLiant	
	HP iLO Advanced including 1yr 24x7 Technical Support and Updates Electronic License	TA850AAE
	HP iLO Advanced Electronic License with 3yr 24x7 Tech Support and Updates	BD506AAE
	HP iLO Advanced including 1yr 24x7 Technical Support and Updates Single Server License	512485-B21
	HP iLO Advanced 1 Server License with 3yr 24x7 Tech Support and Updates	BD505A
	NOTE: For additional license options please see the QuickSpecs at: http://h18004.www1.hp.com/products/quickspecs/14276_div/14276_div.html	
	NOTE: For more information, visit: http://www.hp.com/go/ilo .	

HP I/O Accelerator Options

Second Generation Accelerators

HP 365GB Multi Level Cell G2 PCIe ioDrive2 for ProLiant Servers	673642-B21
HP 785GB Multi Level Cell G2 PCIe ioDrive2 for ProLiant Servers	673644-B21
HP 1205GB Multi Level Cell G2 PCIe ioDrive2 for ProLiant Servers	673646-B21
HP 2410GB Multi Level Cell G2 PCIe ioDrive2 Duo for ProLiant Servers	673648-B21

First Generation Accelerators

HP 160GB Single Level Cell PCIe ioDrive for ProLiant Servers	600278-B21
NOTE: A low-profile PCI bracket is included for use in low-profile slots.	
HP 320GB Multi Level Cell PCIe ioDrive for ProLiant Servers	600279-B21

Additional Options

NOTE: A low-profile PCI bracket is included for use in low-profile slots.

HP 320GB Single Level Cell PCIe ioDrive Duo for ProLiant Servers	600281-B21
HP 640GB Multi Level Cell PCIe ioDrive Duo for ProLiant Servers	600282-B21
HP 1.28TB Multi Level Cell PCIe ioDrive Duo for ProLiant Servers	641027-B21

NOTE: Please see the QuickSpecs for Technical Specifications and additional information:

http://h18000.www1.hp.com/products/quickspecs/13587_div/13587_div.html
(Worldwide)

HP Graphics Options	HP 350/370G6 Graphic Card Cable Kit	537721-B21
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HP Security	HP Trusted Platform Module Option	488069-B21
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NOTE: The TPM (Trusted Platform Module) is a microcontroller chip that can securely store artifacts used to authenticate the server platform. These artifacts can include passwords, certificates and encryption keys. Windows® BitLocker™ Drive Encryption (BitLocker) is a data protection feature available in Windows Server® 2008. BitLocker leverages the enhanced security capabilities of a Trusted Platform Module (TPM) version 1.2. The TPM works with BitLocker to help protect user data and to ensure that a server running Windows Server 2008 has not been tampered with while the system was offline. For more information about TPM, including a white paper, go to: www.hp.com/go/TPM.

NOTE: ProLiant OS pre-installed units will come with the partition required for TPM deployment.

NOTE: The TPM key is unique to every TPM deployed server and must be retained. Misplacing or losing the key could result in data loss.

HP Storage Controllers	SAS Controllers	
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HP Smart Array P212 Controller

HP Smart Array P212/ZM 1-ports Int/1-ports Ext PCIe x8 SAS Controller	462828-B21
HP Smart Array P212/256 1-ports Int/1-ports Ext PCIe x8 SAS Controller	462834-B21

HP Smart Array P410 Controller

HP Smart Array P410/256 2-ports Int PCIe x8 SAS Controller	462862-B21
HP Smart Array P410/512 BBWC 2-ports Int PCIe x8 SAS Controller	462864-B21
HP Smart Array P410/512 FBWC 2-ports Int PCIe x8 SAS Controller	578230-B21
HP Smart Array P410/1G FBWC 2-ports Int PCIe x8 SAS Controller	572532-B21

NOTE: HP NHP Internal SAS/SATA 4 Port Cable Kit (487734-B21) is required when adding Smart Array P410 Controller on Non-Hot Plug SATA/SAS server models.

HP Smart Array P411 Controller

HP Smart Array P411/256 2-ports Ext PCIe x8 SAS Controller	462830-B21
HP Smart Array P411/512 BBWC 2-ports Ext PCIe x8 SAS Controller	462832-B21
HP Smart Array P411/512 FBWC 2-ports Ext PCIe x8 SAS Controller	578229-B21
HP Smart Array P411/1G FBWC 2-ports Ext PCIe x8 SAS Controller	572531-B21

Smart Array P812 Controller

HP Smart Array P812/1G FBWC 2-ports Int/4-ports Ext PCIe x8 SAS Controller	487204-B21
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Optional Upgrades

HP 256MB P-series Cache Upgrade	462968-B21
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NOTE: Supported on HP Smart Array P212 & HP Smart Array P410/ZM Controller only.

HP 512MB P-Series Battery Backed Write Cache Upgrade	462967-B21
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Additional Options

NOTE: Supported on HP Smart Array P410 Controller, and HP Smart Array P411 Controller only.	
HP 650 mAh P-Series Battery	462969-B21
NOTE: Supported on HP Smart Array P212 Controller, HP Smart Array P410 Controller, and HP Smart Array P411 Controller only.	
HP 15 Position 24in SFP Battery Cable Assembly	496029-B21
NOTE: Supported on HP Smart Array P212 Controller, HP Smart Array P410 Controller, and HP Smart Array P411 Controller only.	
HP 512MB Flash Backed Write Cache	534916-B21
NOTE: Supported on the Smart Array P410i Controller only.	
HP 1GB Flash Backed Cache	534562-B21
NOTE: Supported on the Smart Array P410i Controller only.	
HP 24 Bay SAS Expander Card	468406-B21
HP Smart Array Advanced Pack including 1yr 24x7 Technical Support and Updates Single Server License	516471-B21
NOTE: This part number can be used to purchase a single license or to order multiple licenses with a single activation key. Customers will receive a license entitlement certificate via e-mail. The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Include one year of 24x7 HP Software Technical Support Services.	
NOTE: Please see the QuickSpecs for Technical Specifications and additional information:	
http://h18000.www1.hp.com/products/quickspecs/13203_div/13203_div.html (Smart Array P212 Controller)	
http://h18000.www1.hp.com/products/quickspecs/13201_div/13201_div.html (Smart Array P410 Controller)	
http://h18000.www1.hp.com/products/quickspecs/13202_div/13202_div.html (Smart Array P411 Controller)	
http://h18000.www1.hp.com/products/quickspecs/13558_div/13558_div.html (Smart Array P812 Controller)	
http://h18000.www1.hp.com/products/quickspecs/13200_div/13200_div.html (Smart Array Advanced Pack)	
SAS HBA	
HP Modular Smart Array SC08e 2-ports Ext PCIe x8 SAS Host Bus Adapter	614988-B21
NOTE: Please see the QuickSpecs for additional information:	
http://h18004.www1.hp.com/products/quickspecs/13082_div/13082_div.html	
SCSI HBA	
HP SC11Xe Ultra320 Single Channel/ PCIe x4 SCSI Host Bus Adapter	412911-B21
NOTE: Supports external drive attach.	
NOTE: Please see the following QuickSpecs for additional information:	
http://h18000.www1.hp.com/products/quickspecs/12566_div/12566_div.html	

HP Tape Backup

NOTE: For the complete range of tape drives, autoloaders, libraries and media see: http://www.hp.com/go/tape . For hardware and software compatibility of HP tape backup products see: http://www.hp.com/storage/SPOCK and www.hp.com/go/ebs .	
HP StoreEver DAT 160 SAS Internal Tape Drive	Q1587B
NOTE: Connection using HP Smart Array P212 Controller (462828-B21) recommended.	
HP StoreEver LTO-2 Ultrium 448 SAS Internal Tape Drive	DW085B
HP StoreEver LTO-4 Ultrium 1760 SAS Internal WW Tape Drive	EH919B
NOTE: Connection using HP Smart Array P212 Controller (462828-B21)	

Additional Options

recommended.

HP StoreEver LTO-4 Ultrium 1840 SAS External Tape Drive EH861B

NOTE: Connection using HP Smart Array P212 Controller (462828-B21)

recommended.

HP StoreEver LTO-5 Ultrium 3000 SAS Internal Tape Drive EH957B

NOTE: Connection using HP Smart Array P212 Controller (462828-B21)

recommended.

HP StoreEver LTO-5 Ultrium 3000 SAS External Tape Drive EH958B

NOTE: Connection using HP Smart Array P212 Controller (462828-B21)

recommended.

HP StoreEver LTO-6 Ultrium 6250 Tape Drive in 1U Rack-mount Kit C0L99A

HP StoreEver LTO-6 Ultrium 6650 SAS Internal Tape Drive EH963A

HP StoreEver LTO-6 Ultrium 6650 SAS External Tape Drive EH964A

HP StoreEver LTO-6 Ultrium 6250 Internal Tape Drive EH969A

HP StoreEver LTO-6 Ultrium 6250 External Tape Drive EH970A

HP Disk Backup

HP D2D Backup Systems with Backup Data Deduplication

HP StoreOnce D2D4112 Backup System EH993C

HP StoreOnce D2D2502i Backup System EJ001C

HP StoreOnce D2D2504i Backup System EJ002C

HP RDX Removable Disk Backup Systems USB

HP RDX320 USB3.0 Internal Disk Backup System B7B62A

HP RDX500 USB3.0 Internal Disk Backup System B7B64A

HP RDX1000 USB3.0 Internal Disk Backup System B7B67A

HP StoreOnce Backup systems

HP StoreOnce 2620 iSCSI Backup BB852A

HP StoreOnce 4220 Backup BB855A

HP Storage Options

NOTE: The following is a list of all Fibre Channel Host Bus Adapters for Windows and Linux. For detailed compatibility information please see:

<http://h18006.www1.hp.com/storage/saninfastructure/hba.html>

Brocade Fibre Channel HBAs

HP 82B 8Gb 2-port PCIe Fibre Channel Host Bus Adapter AP770B

HP 81B 8Gb 1-port PCIe Fibre Channel Host Bus Adapter AP769B

HP 41B 4Gb 1-port PCIe Fibre Channel Host Bus Adapter AP767B

HP 42B 4Gb 2-port PCIe Fibre Channel Host Bus Adapter AP768B

Emulex Fibre Channel HBAs

HP 82E 8Gb 2-port PCIe Fibre Channel Host Bus Adapter AJ763B

HP 82Q 8Gb 2-port PCIe Fibre Channel Host Bus Adapter AJ764A

HP 81E 8Gb 1-port PCIe Fibre Channel Host Bus Adapter AJ762B

HP FC2142SR 4Gb 1-port PCIe Fibre Channel Host Bus Adapter A8002B

HP FC2242SR 4Gb 2-port PCIe Fibre Channel Host Bus Adapter A8003B

QLogic Fibre Channel HBAs

HP 81Q 8Gb 1-port PCIe Fibre Channel Host Bus Adapter AK344A

HP FC1142SR 4Gb 1-port PCIe Fibre Channel Host Bus Adapter AE311A

HP FC1242SR 4Gb 2-port PCIe Fibre Channel Host Bus Adapter AE312A

Additional Options

Converged Network Adapter

HP CN1100E Dual Port Converged Network Adapter	BK835A
HP CN1000Q Dual Port Converged Network Adapter	BS668A

HP Disk Storage Systems Disk Enclosures

HP D2600 Disk Enclosure	AJ940A
HP D2700 Disk Enclosure	AJ941A

NOTE: Please see the QuickSpecs for additional options and configuration information at:
http://h18000.www1.hp.com/products/quickspecs/13404_div/13404_div.html
 (Worldwide)

HP Uninterruptible Power Systems

HP Tower UPS

HP T1500 G3 UPS Models

HP T1500 G3 1400VA INTL Tower Uninterruptible Power System	AF451A
HP T1500 G3 1400VA NA Tower Uninterruptible Power System	AF450A
HP T1500J JP Uninterruptible Power System	AF458A

NOTE: Please see the QuickSpecs for additional information:
http://h18000.www1.hp.com/products/quickspecs/13160_div/13160_div.html
 (Worldwide)

HP T1000 G3 UPS Models

HP T1000 G3 1000VA INTL Tower Uninterruptible Power System	AF449A
HP T1000 G3 1000VA NA Tower Uninterruptible Power System	AF448A
HP T1000J JP Uninterruptible Power System	AF457A

HP R1500 G3 Uninterruptible Power Supply (UPS)

HP R1.5kVA G3 1U NA Uninterruptible Power System	AF469A
HP R1.5kVA G3 1U JP/TW Uninterruptible Power System	AF470A
HP R1.5kVA G3 1U INTL Uninterruptible Power System	AF471A

NOTE: Please see the QuickSpecs for additional information:
http://h18000.www1.hp.com/products/quickspecs/14059_div/14059_div.html
 (Worldwide)

R5000 Uninterruptible Power System (UPS)

HP R5KVA 3U IEC309-32A High Voltage INTL Uninterruptible Power System	AF461A
HP R5KVA 3U L630 High Voltage NA/JP Uninterruptible Power System	AF460A

NOTE: Please see the QuickSpecs for additional information:
http://h18000.www1.hp.com/products/quickspecs/14109_div/14109_div.html
 (Worldwide)

R7000 Uninterruptible Power System (UPS)

HP R7KVA 4U 50A High Voltage NA/JP Uninterruptible Power System	AF462A
HP R7KVA 4U IEC-32A High Voltage INTL Uninterruptible Power System	AF463A
HP R5KVA and R7KVA 3U Extended Runtime Module	AF464A

NOTE: Please see the QuickSpecs for additional information:
http://h18000.www1.hp.com/products/quickspecs/14110_div/14110_div.html
 (Worldwide)

HP R/T3000 G2 Uninterruptible Power System (UPS)

HP R/T3000 G2 2U Detachable Cord High Voltage INTL Uninterruptible Power System	AF468A
HP R/T3000 G2 2U L530 Low Voltage NA/JP Uninterruptible Power System	AF466A

Additional Options

HP R/T3000 G2 2U L620 High Voltage NA/JP Uninterruptible Power System AF467A

NOTE: Please see the QuickSpecs for additional information:

http://h18000.www1.hp.com/products/quickspecs/14058_div/14058_div.html
(Worldwide)

NOTE: For additional information on HP Uninterruptible Power Systems please go to:
www.hp.com/servers/rackups.

NOTE: For additional information on sizing your server, please reference:
<http://www.upssizer.com>.

NOTE: Please see the UPS and PDU cable matrix's on the HP Power Protection and Management page. Under Power Cords, click on the "HP Power Cord Matrix" link. That link will list cable descriptions, requirements, and specifications for UPS and PDU units. Please see the following link: www.hp.com/products/powercords.

HP Power Distribution Units

Monitored PDUs

HP Monitored Power Distribution Unit: Full Rack Version

HP 8.6kVA 24A Single Input Three Phase NA/JP Monitored Power Distribution Unit AF504A

HP 8.3kVA 40A Single Input Single Phase NA/JP Monitored Power Distribution Unit AF506A

HP 11kVA 16A Single Input Three Phase INTL Monitored Power Distribution Unit AF508A

HP 7.3kVA 32A Single Input Single Phase INTL Monitored Power Distribution Unit AF510A

HP Monitored Power Distribution Unit: Half Rack Version

HP 4.9kVA 24A Single Input Single Phase NA/JP Monitored Power Distribution Unit AF914A

HP 7.3kVA 32A Single Input Single Phase INTL Monitored Power Distribution Unit AF915A

NOTE: Please see the following QuickSpecs for additional information:

http://h18000.www1.hp.com/products/quickspecs/12118_div/12118_div.html
(Worldwide)

Modular PDUs 1U/0U

NOTE: 1U/0U mounting brackets shipped with the unit (optimized for 10000 G2 and 9000 series racks).

HP 3.6kVA 16A High Voltage INTL Modular Power Distribution Unit 252663-B24

HP 4.9kVA 24A High Voltage NA/JP Modular Power Distribution Unit 252663-D72

HP 8.3kVA 40A High Voltage NA/JP Modular Power Distribution Unit 252663-D73

HP 7.3kVA 32A High Voltage INTL Modular Power Distribution Unit 252663-B31

NOTE: For additional information on HP Power Distribution Units including accessories please go to: www.hp.com/go/pdu.

NOTE: Please see the UPS and PDU cable matrix's on the HP Power Protection and Management page. Under Power Cords, click on the "HP Power Cord Matrix" link. That link will list cable descriptions, requirements, and specifications for UPS and PDU units. Please see the following link: www.hp.com/products/powercords.

NOTE: This PDU has a detachable input power cord and allows for adaptability to country specific power requirements.

NOTE: Please see the following QuickSpecs for additional options including shorter jumper cables and country specific power cords:

http://h18000.www1.hp.com/products/quickspecs/11041_div/11041_div.html
(Worldwide)

HP Intelligent Power Distribution Units (iPDU)

iPDU Core Units

HP 4.9kVA 24A Single Phase NA/JP Core Intelligent Modular Power Distribution Unit AF520A

HP 8.6kVA 24A Three Phase NA/JP Core Intelligent Modular Power Distribution Unit AF522A

HP 7.3kVA 32A Single Phase INTL Core Intelligent Modular Power Distribution Unit AF525A

Additional Options

HP 11kVA 16A Three Phase INTL Core Intelligent Modular Power Distribution Unit AF526A

iPDU Extension Bars

HP 5xC13 Intelligent PDU Extension Bar G2 Kit AF547A

HP 5xC13 Outlets Power and UID LEDs Pair Standard Extension Bar AF528A

NOTE: Please see the [QuickSpecs for Technical Specifications and additional information:](#)

http://h18000.www1.hp.com/products/quickspecs/13650_div/13650_div.html
(Worldwide)

HP Rack Options

HP TFT7600 G2 KVM Console Rackmount Keyboard Monitor

HP TFT7600 G2 KVM Console Rackmount Keyboard US Monitor AZ870A

HP TFT7600 G2 KVM Console Rackmount Keyboard UK Monitor AZ871A

HP TFT7600 G2 KVM Console Rackmount Keyboard DE Monitor AZ872A

HP TFT7600 G2 KVM Console Rackmount Keyboard FR Monitor AZ873A

HP TFT7600 G2 KVM Console Rackmount Keyboard IT Monitor AZ874A

HP TFT7600 G2 KVM Console Rackmount Keyboard ES Monitor AZ875A

HP TFT7600 G2 KVM Console Rackmount Keyboard DK Monitor AZ876A

HP TFT7600 G2 KVM Console Rackmount Keyboard NO Monitor AZ877A

HP TFT7600 G2 KVM Console Rackmount Keyboard SE/FI Monitor AZ878A

HP TFT7600 G2 KVM Console Rackmount Keyboard CH Monitor AZ879A

HP TFT7600 G2 KVM Console Rackmount Keyboard PT Monitor AZ880A

HP TFT7600 G2 KVM Console Rackmount Keyboard BE Monitor AZ881A

HP TFT7600 G2 KVM Console Rackmount Keyboard JP Monitor AZ882A

HP TFT7600 G2 KVM Console Rackmount Keyboard RU Monitor AZ883A

HP TFT7600 G2 KVM Console Rackmount Keyboard Intl Monitor AZ884A

HP TFT7600 G2 KVM Console Rackmount Keyboard US TAA Monitor AZ885A

NOTE: Please see the [QuickSpecs for Technical Specifications and additional information:](#)

http://h18000.www1.hp.com/products/quickspecs/13731_div/13731_div.html
(Worldwide)

HP 1U Rackmount Keyboard with USB

HP 1U IT Rackmount Keyboard with USB AG076A

HP 1U US Rackmount Keyboard with USB AG072A

HP 1U BE Rackmount Keyboard with USB AG083A

HP 1U DK Rackmount Keyboard with USB AG078A

HP 1U FR Rackmount Keyboard with USB AG075A

HP 1U DE Rackmount Keyboard with USB AG074A

HP 1U INT Rackmount Keyboard with USB AG086A

HP 1U NO Rackmount Keyboard with USB AG079A

HP 1U PT Rackmount Keyboard with USB AG082A

HP 1U RU Rackmount Keyboard with USB AG085A

HP 1U ES Rackmount Keyboard with USB AG077A

HP 1U SE/FI Rackmount Keyboard with USB AG080A

HP 1U Rackmount Keyboard with USB AG081A

HP 1U UK Rackmount Keyboard with USB AG073A

HP 1U JP Rackmount Keyboard with USB AG084A

Additional Options

NOTE: Please see the QuickSpecs for Technical Specifications and additional information:

http://h18000.www1.hp.com/products/quickspecs/12465_div/12465_div.html (Worldwide)

HP USB Keyboard and Mouse

HP USB BFR with PVC Free IN Keyboard/Mouse Kit 672097-D63

NOTE: Please see the QuickSpecs for Technical Specifications and additional information:

http://h18000.www1.hp.com/products/quickspecs/13972_div/13972_div.html (Worldwide)

NOTE: For additional information regarding Rack Options, please see the following URL: <http://www.hp.com/go/rackandpower>.

HP Server Console Switches

HP Server Console 0x2x8 Port Analog Switch AF616A

HP Server Console 0x2x16 Port Analog Switch AF617A

HP TAA 0x2x16xKVM Server Console G2 Switch AF626A

HP KVM CAT5 1-pack USB Interface Adapter 336047-B21

HP Server Console Switch G2 with Virtual Media & CAC

HP 0x2x16 KVM Server Console Switch G2 with Virtual Media CAC Software AF618A

HP 0x2x32 KVM Server Console Switch G2 with Virtual Media CAC Software AF619A

HP KVM CAT5 1-pack USB Interface Adapter 336047-B21

NOTE: Please see the QuickSpecs for Technical Specifications and additional information:

http://h18000.www1.hp.com/products/quickspecs/13475_div/13475_div.html (Worldwide)

HP IP Console Switch G2 with Virtual Media & CAC

HP 1x4 USB/PS2 KVM Console Switch AF611A

HP 1x1Ex8 KVM IP Console Switch G2 with Virtual Media CAC Software AF620A

HP 2x1Ex16 KVM IP Console Switch G2 with Virtual Media CAC Software AF621A

HP 4x1Ex32 KVM IP Console Switch G2 with Virtual Media CAC Software AF622A

NOTE: Please see the QuickSpecs for Technical Specifications and additional information:

http://h18000.www1.hp.com/products/quickspecs/13474_div/13474_div.html (Worldwide)

Rack Kits

HP ML350G6 Tower to Rack Conversion Kit 534534-B21

HP USB and SD Options

HP 2GB USB Flash Media Drive Key Kit 608447-B21

NOTE: HP qualified blank USB key for use with HP ProLiant servers that support the VMware virtualization environment and other HP value-add software. HP recommends this industry standard USB flash device for use with VMware ESXi. USB device must be installed in the internal slot of the ProLiant server for use with VMware ESXi. Refer to HP VMware Getting Started Kit Guide for installation instructions.

HP 4GB SD Enterprise Performance Flash Media Kit 580387-B21

NOTE: Blank SD media device is supported for use with VMware and Citrix. SD media must be installed in the internal slot of the ProLiant server. Learn more at <http://www.hp.com/go/proliantvirtualization>.

HP USB 2-Button Optical Scroll Mouse DC172B

HP USB Standard Keyboard DT528A ABA DT528A#ABA

Additional Options

HP Care Pack Services

Hardware Services On-site Service

HP 3 year 4 hour 13x5 ProLiant ML350(p) Hardware Support U4512E

HP 3 year 4 hour 24x7 ProLiant ML350(p) Hardware Support U4513E

HP 3 year 6 hour 24x7 Call to Repair ProLiant ML350(p) Hardware Support U4514E

Proactive Care Personalized Support Option

NOTE: To add an onsite Account Support Manager (ASM) to Proactive Care. ASM is an assigned resource who delivers support planning and brings technical expertise and best practices advice for the customer's environment.

HP 3 year ISS ProactiveCare Personalized Support U6W98E

Installation Services

NOTE: Reduce the time required to get your system up and running and help minimize disruptions to your business.

HP Install ProLiant ML350(p) Service U4522E

HP Startup ProLiant ML350(p) Service U4523E

NOTE: For more information, customer/resellers can contact:
<http://www.hp.com/services/carepack>

Memory

NOTE: Memory configurations listed do not apply to "Factory Integrated Models".

DDR3 memory population guidelines

For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool:

www.hp.com/go/ddr3memory-configurator

Some DIMM installation guidelines are summarized below:

- For servers with eighteen (18) memory slots:
 - There are three (3) channels per processor; six (6) channels per server
 - There are three (3) DIMM slots for each memory channel; eighteen (18) total slots
 - Memory channel 1 consists of the three (3) DIMMs that are closest to the processor
 - Memory channel 3 consists of the three (3) DIMMs that are furthest from the processor
- DIMM slots that are white should be populated first
- Do not mix Unbuffered memory (UDIMMs) with Registered memory (RDIMMs)
- Do not install DIMMs if the corresponding processor is not installed
- If only one processor is installed in a 2CPU system, only half of the DIMM slots are available
- To maximize performance, balance the total memory capacity between all installed processors
- It is not required, but it is recommended to load the channels similarly if possible
- If any Quad rank DIMMs are installed, all channels are limited to only 2 DIMMs per channel
- You can only install two quad-rank DIMMs per channel
- You can only install two UDIMMs per channel; if available, the third slot in the channel must remain empty
- Populate DIMMs from heaviest load (quad-rank) to lightest load (single-rank) within a channel
- Heaviest load (DIMM with most ranks) within a channel goes furthest from the chipset
- For memory mirroring mode, channel 3 must be unpopulated. Channels 1 and 2 are populated identically
- For lock-step mode, channel 3 must be unpopulated. DIMMs in channels 1 and 2 will be installed in pairs. The paired slots will be 1,4; 2,5; 3,6 on a 3DPC system or 1,4; 2,5; on a 2DPC system
- Low Voltage DIMMs can only be used with Intel® Xeon® processor 5600 series processors
- If mixing DIMM voltage is a requirement, please note that the DIMMs will run at 1.5V since all 1.35V are capable of supporting 1.5V operations

DIMM slot/capacity/populated speed table

DIMM Type ->	Registered DIMMS (RDIMMs)								Unbuffered with ECC DIMMs (UDIMMs)		
DIMM Rank ->	Single Rank (1R)	Dual Rank (2R)				Quad Rank (4R)		Single Rank (1R)	Dual Rank (2R)		
DIMM Capacity ->	4GB	2GB	4GB	8GB	8GB	16GB	4GB	16GB	1GB	2GB	4GB
DIMM Native Speed (MHz) ->	1333	1333	1333	1067	1333	1333	1067	1067	1333	1333	1333
Voltage	LV/Std	Std	Std	Std	LV/Std	LV/Std	Std	Std	Std	Std	Std

SLOTS THAT CAN BE POPULATED

18 slot servers	18	18	18	18	18	18	12	12	12	12	12
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MAXIMUM CAPACITY (GB)

18 slot servers	72	36	72	144	144	288	48	192	12	24	48
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Memory

POPULATED DIMM SPEED (MHz)											
1 DIMM Per Channel	1333	1333	1333	1067	1333	1333	1067	1067	1333	1333	1333
2 DIMM Per Channel	1333*	1333*	1333*	1067	1333*	1066/ 1333**	800	800	1333	1333	1333*
3 DIMM Per Channel	800	800	800	800	800	800***	n/a	n/a	n/a	n/a	n/a

* Supported with ROM update via ROM Based Setup Utility (RBSU). UDIMM support is only on 12-slot servers.
 ** 2DPC: LV runs at 1066, Std voltage runs at 1333
 *** 3DPC: LV/Std voltage runs at 800

NOTES:

- PC3-10600 DIMMs have a maximum speed of 1333MHz. PC3-8500 DIMMs have a maximum speed of 1066MHz
- Mixing DIMM speeds is allowed, but the system processor speed rules always override the DIMM capabilities
- If you do mix DIMM speeds, the memory bus will default to the minimum clock rate of all DIMMs in the system - even if the slower DIMM is on the other processor
- If you install 1x 1066MHz DIMM in channel 1 and 1x 1333MHz DIMM in channel 2, the maximum speed will be 1066MHz. If you install 1x 1066MHz DIMM in channel 1 and 5x 1333MHz DIMMs with 1 DIMM Per Channel (DPC) in each of the other channels, the maximum speed will be 1066MHz
- If you install 1x 1066MHz DIMM in channel 1 and 5x 1333MHz DIMMs with 1 DIMM Per Channel (DPC) in each of the other channels, you run at 1066MHz
- If you install 3DPC in one channel (if applicable) and 1DPC in all other channels, you run at 800MHz
- Maximum memory speed will also depend on the processor installed
- References to the above MHz speeds are for the various speeds of DDR3 DIMMs; 1333 refers to DDR3-1333, etc.

DIMM slot and configuration diagrams

Basic memory slot & population diagram

- Population order; start with "A" first, "B" second, "C" third, etc.

18 DIMM SLOTS (9 per CPU node)					
	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	G	1	G	Chnl 1
	2	D	2	D	
	3	A	3	A	
Chnl 2	4	H	4	H	Chnl 2
	5	E	5	E	
	6	B	6	B	
Chnl 3	7	I	7	I	Chnl 3
	8	F	8	F	
	9	C	9	C	

Standard memory configuration (1 CPU model)

- 6GB, consisting of three (3) 2GB dual-rank PC3-10600 RDIMMs (Base Model)

Memory

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	G; empty	1	G; empty	Chnl 1
	2	D; empty	2	D; empty	
	3	A; 2GB RDIMM	3	A; empty	
Chnl 2	4	H; empty	4	H; empty	Chnl 2
	5	E; empty	5	E; empty	
	6	B; 2GB RDIMM	6	B; empty	
Chnl 3	7	I; empty	7	I; empty	Chnl 3
	8	F; empty	8	F; empty	
	9	C; 2GB RDIMM	9	C; empty	

Standard memory plus optional memory (1 CPU model)

- 54GB, consisting of three (3) 2GB RDIMMs plus six (6) 8GB RDIMMs (Base Model)
 - 3x 2GB dual-rank PC3-10600 RDIMMs
 - 6x 8GB dual-rank PC3-8500 RDIMMs

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	G; 8GB RDIMM	1	G; empty	Chnl 1
	2	D; 8GB RDIMM	2	D; empty	
	3	A; 2GB RDIMM	3	A; empty	
Chnl 2	4	H; 8GB RDIMM	4	H; empty	Chnl 2
	5	E; 8GB RDIMM	5	E; empty	
	6	B; 2GB RDIMM	6	B; empty	
Chnl 3	7	I; 8GB RDIMM	7	I; empty	Chnl 3
	8	F; 8GB RDIMM	8	F; empty	
	9	C; 2GB RDIMM	9	C; empty	

Standard memory replaced with optional memory (1 CPU model) RDIMM maximum configuration (1 CPU model)

- 96GB, consisting of six (6) 16GB quad-rank PC3-8500 RDIMMs

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	G; empty	1	G; empty	Chnl 1
	2	D; 16GB RDIMM	2	D; empty	
	3	A; 16GB RDIMM	3	A; empty	
Chnl 2	4	H; empty	4	H; empty	Chnl 2
	5	E; 16GB RDIMM	5	E; empty	
	6	B; 16GB RDIMM	6	B; empty	

Memory

Chnl 3	7	I; empty	7	I; empty	Chnl 3
	8	F; 16GB RDIMM	8	F; empty	
	9	C; 16GB RDIMM	9	C; empty	

UDIMM maximum configuration (1 CPU model)

- 24GB, consisting of six (6) 4GB dual-rank PC3-10600 UDIMMs

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	G; empty	1	G; empty	Chnl 1
	2	D; 4GB UDIMM	2	D; empty	
	3	A; 4GB UDIMM	3	A; empty	
Chnl 2	4	H; empty	4	H; empty	Chnl 2
	5	E; 4GB UDIMM	5	E; empty	
	6	B; 4GB UDIMM	6	B; empty	
Chnl 3	7	I; empty	7	I; empty	Chnl 3
	8	F; 4GB UDIMM	8	F; empty	
	9	C; 4GB UDIMM	9	C; empty	

Standard memory replaced with optional memory (2 CPU model)

RDIMM maximum configuration (2 CPU model)

- 288GB, consisting of eighteen (18) 16GB dual-rank PC3L-10600 RDIMMs

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	G; empty	1	G; empty	Chnl 1
	2	D; 16GB RDIMM	2	D; 16GB RDIMM	
	3	A; 16GB RDIMM	3	A; 16GB RDIMM	
Chnl 2	4	H; empty	4	H; empty	Chnl 2
	5	E; 16GB RDIMM	5	E; 16GB RDIMM	
	6	B; 16GB RDIMM	6	B; 16GB RDIMM	
Chnl 3	7	I; empty	7	I; empty	Chnl 3
	8	F; 16GB RDIMM	8	F; 16GB RDIMM	
	9	C; 16GB RDIMM	9	C; 16GB RDIMM	

UDIMM maximum configuration (2 CPU model)

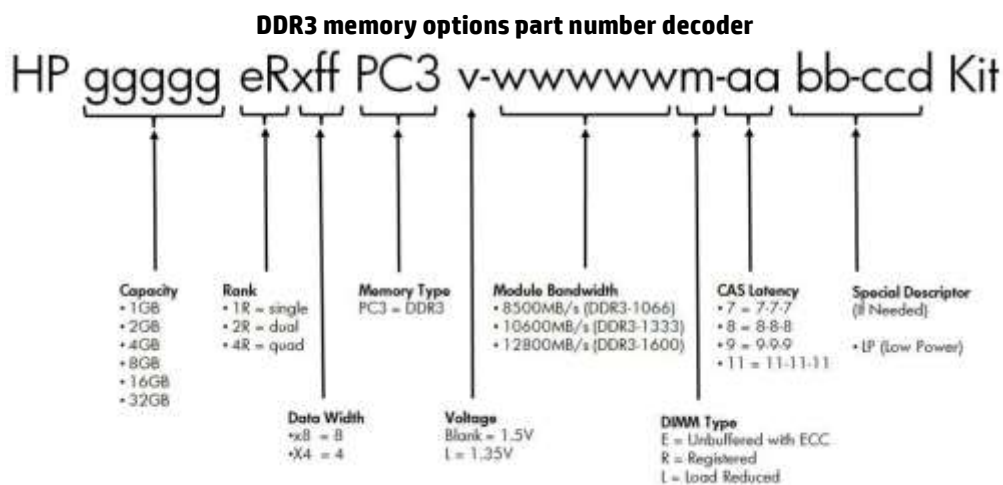
- 48GB, consisting of twelve (12) 4GB dual-rank PC3-10600 UDIMMs

Memory

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	G; empty	1	G; empty	Chnl 1
	2	D; 4GB UDIMM	2	D; 4GB UDIMM	
	3	A; 4GB UDIMM	3	A; 4GB UDIMM	
Chnl 2	4	H; empty	4	H; empty	Chnl 2
	5	E; 4GB UDIMM	5	E; 4GB UDIMM	
	6	B; 4GB UDIMM	6	B; 4GB UDIMM	
Chnl 3	7	I; empty	7	I; empty	Chnl 3
	8	F; 4GB UDIMM	8	F; 4GB UDIMM	
	9	C; 4GB UDIMM	9	C; 4GB UDIMM	

NOTE: Capacity references are rounded to the common Gigabyte values.

- 1GB = 1024MB
- 2GB = 2048MB
- 4GB = 4096MB
- 8GB = 8192MB
- 16GB = 16384MB



Following are memory options available from HP:

Memory

Registered DIMMs (RDIMMs)

HP 2GB (1x2GB) Dual Rank x8 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500656-B21
HP 4GB (1x4GB) Single Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	593339-B21
HP 4GB (1x4GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500658-B21
HP 8GB (1x8GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500662-B21
HP 16GB (1x16GB) Quad Rank x4 PC3-8500 (DDR3-1066) Registered CAS-7 Memory Kit	500666-B21
HP 4GB (1x4GB) Single Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 Low Power Memory Kit	604504-B21

Memory

HP 8GB (1x8GB) Dual Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 Low Power Memory Kit 604506-B21

NOTE: Low Voltage DIMMs can only be used with Intel® Xeon® processor 5600 series processors

HP 16GB (1x16GB) Dual Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 LP Memory Kit 627812-B21

Unbuffered with ECC DIMMs (UDIMMs)

HP 1GB (1x1GB) Single Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit 500668-B21

HP 2GB (1x2GB) Dual Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit 500670-B21

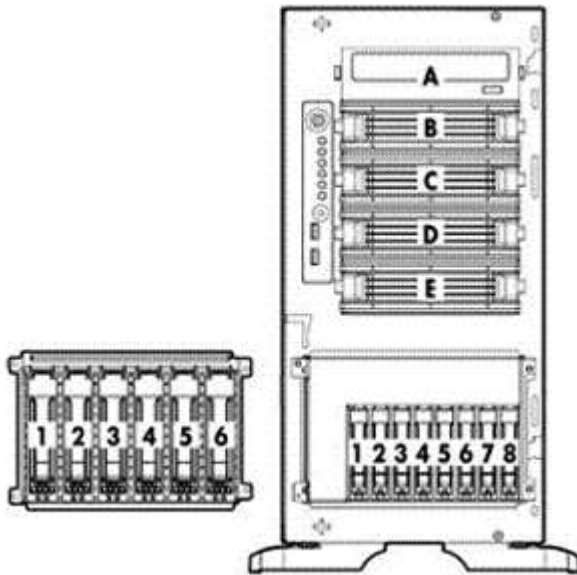
HP 4GB (1x4GB) Dual Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit 500672-B21

HP 4GB (1x4GB) Dual Rank x8 PC3L-10600 (DDR3-1333) Unbuffered CAS-9 Low Power Memory Kit 619488-B21

NOTE: All DDR3 memory option kits consist of one DIMM per kit. For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool: www.hp.com/go/ddr3memory-configurator.

NOTE: Kits described as LP include Low Power DIMMs. For more information on ProLiant Energy Efficient Features, see: <http://h18004.www1.hp.com/products/servers/platforms/energyefficient/>

Storage



- 1 - 6 6 x 3.5" (LFF) Hot-Plug SAS/SATA hard drive bays
Or
- 1 - 8 8 x 2.5" (SFF) Hot-Plug SAS/SATA hard drive bays
- B,C,D,E Available half height media bays
- A-E Removable Optical Drive
- D+E 8 x 2.5" (SFF) Hot-Plug SAS/SATA hard drive bays
or
- 2 x 3.5" (LFF) Hot-Plug SAS/SATA hard drive bays

Drive Support

	Quantity Supported	Position Supported	Controller
Removable Media			
HP Half-Height SATA DVD-ROM Optical Drive	Up to 1	A-E	Integrated SATA Controller
HP Half-Height SATA DVD RW Optical Drive	Up to 1	A-E	Integrated SATA Controller

Hard Drives

NOTE: The components of a storage subsystem (e.g. the drive, the HBA/controller, firmware, and the server backplane) should operate at the same data transfer rate or the system bandwidth will be negotiated down to an acceptable level for all components.

NOTE: Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.

SAS Hot Plug SFF (2.5-inch) Enterprise (ENT) Drives

	Quantity Supported	Position Supported	Controller
900GB 6G SAS 10K	Up to 16 SFF	1-8 and D+E	HP Smart Array P212/Zero Memory Controller
600GB 6G SAS 10K			HP Smart Array P212/ 256 MB Controller
450GB 6G SAS 10K			HP Smart Array P410/256 MB Controller
300GB 6G SAS 10K			HP Smart Array P410/512 MB BBWC Controller
300GB 6G SAS 15K			HP Smart Array P410/512 MB FBWC Controller
146GB 6G SAS 15K			HP Smart Array P410/1G FBWC Controller
			HP Smart Array P411/256 MB Controller
			HP Smart Array P411/512 MB BBWC Controller
			HP Smart Array P411/512 MB FBWC Controller
			HP Smart Array P411/1G FBWC Controller
			HP Smart Array P812/1G Flash Backed Cache Controller

SAS Hot Plug LFF (3.5-inch) Enterprise (ENT) Drives

	Quantity Supported	Position Supported	Controller
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Storage

600GB 6G SAS 15K	Up to 8 LFF	1-6 and D+E	HP Smart Array P212/Zero Memory Controller
450GB 6G SAS 15K			HP Smart Array P212/ 256 MB Controller
300GB 6G SAS 15K			HP Smart Array P410/256 MB Controller
			HP Smart Array P410/512 MB BBWC Controller
			HP Smart Array P410/512 MB FBWC Controller
			HP Smart Array P410/1G FBWC Controller
			HP Smart Array P411/256 MB Controller
			HP Smart Array P411/512 MB BBWC Controller
			HP Smart Array P411/512 MB FBWC Controller
			HP Smart Array P411/1G FBWC Controller
			HP Smart Array P812/1G Flash Backed Cache Controller

SAS Hot Plug LFF (3.5-inch) Midline (MDL) Drives

	Quantity Supported	Position Supported	Controller
3TB 6G SAS 7.2K	Up to 6 LFF	1-6 and D+E	HP Smart Array P212/Zero Memory Controller
2TB 6G SAS 7.2K			HP Smart Array P212/ 256 MB Controller
1TB 6G SAS 7.2K			HP Smart Array P410/256 MB Controller
			HP Smart Array P410/512 MB BBWC Controller
			HP Smart Array P410/512 MB FBWC Controller
			HP Smart Array P410/1G FBWC Controller
			HP Smart Array P411/256 MB Controller
			HP Smart Array P411/512 MB BBWC Controller
			HP Smart Array P411/512 MB FBWC Controller
			HP Smart Array P411/1G FBWC Controller
			HP Smart Array P812/1G Flash Backed Cache Controller

SAS Hot Plug SFF (2.5-inch) Midline (MDL) Drives

	Quantity Supported	Position Supported	Controller
1TB 6G SAS 7.2K	Up to 16 SFF	1-8 and D+E	HP Smart Array P212/Zero Memory Controller
500GB 6G SAS 7.2K			HP Smart Array P212/ 256 MB Controller
			HP Smart Array P410/256 MB Controller
			HP Smart Array P410/512 MB BBWC Controller
			HP Smart Array P410/512 MB FBWC Controller
			HP Smart Array P410/1G FBWC Controller
			HP Smart Array P411/256 MB Controller
			HP Smart Array P411/512 MB BBWC Controller
			HP Smart Array P411/512 MB FBWC Controller
			HP Smart Array P411/1G FBWC Controller
			HP Smart Array P812/1G Flash Backed Cache Controller

SATA Hot Plug SFF (2.5-inch) Midline (MDL) Drives

	Quantity Supported	Position Supported	Controller
1TB 3G SATA 7.2K	Up to 16	1-8 and D+E	HP Smart Array P212/Zero Memory Controller
500GB 3G SATA 7.2K			HP Smart Array P212/ 256 MB Controller
			HP Smart Array P410/256 MB Controller
			HP Smart Array P410/512 MB BBWC Controller
			HP Smart Array P410/512 MB FBWC Controller
			HP Smart Array P410/1G FBWC Controller
			HP Smart Array P411/256 MB Controller
			HP Smart Array P411/512 MB BBWC Controller
			HP Smart Array P411/512 MB FBWC Controller

Storage

HP Smart Array P411/1G FBWC Controller
 HP Smart Array P812/1G Flash Backed Cache Controller

	Quantity Supported	Position Supported	Controller
SATA Hot Plug LFF (3.5-inch) Midline (MDL) Drives			
3TB 3G SATA 7.2K	Up to 6 LFF	1-6 and D+E	HP Smart Array P212/Zero Memory Controller
2TB 3G SATA 7.2K			HP Smart Array P212/ 256 MB Controller
1TB 3G SATA 7.2K			HP Smart Array P410/256 MB Controller
500GB 3G SATA 7.2K			HP Smart Array P410/512 MB BBWC Controller
			HP Smart Array P410/512 MB FBWC Controller
	HP Smart Array P410/1G FBWC Controller		
	HP Smart Array P411/256 MB Controller		
	HP Smart Array P411/512 MB BBWC Controller		
	HP Smart Array P411/512 MB FBWC Controller		
	HP Smart Array P411/1G FBWC Controller		
	HP Smart Array P812/1G Flash Backed Cache Controller		

	Quantity Supported	Position Supported	Controller
SATA Hot Plug LFF (3.5-inch) Entry (ETY) Drives			
250GB 3G SATA 7.2K	Up to 8	1-6 and D+E	HP Smart Array P212/Zero Memory Controller
			HP Smart Array P212/ 256 MB Controller
			HP Smart Array P410/256 MB Controller
			HP Smart Array P410/512 MB BBWC Controller
			HP Smart Array P410/512 MB FBWC Controller
			HP Smart Array P410/1G FBWC Controller
			HP Smart Array P411/256 MB Controller
			HP Smart Array P411/512 MB BBWC Controller
			HP Smart Array P411/512 MB FBWC Controller
			HP Smart Array P411/1G FBWC Controller
			HP Smart Array P812/1G Flash Backed Cache Controller

	Quantity Supported	Position Supported	Controller
SATA Hot Plug 2.5" Enterprise Mainstream Solid State Drives			
400GB 3G SATA MLC SFF	Up to 16	1-8 and D+E	HP Smart Array P212/Zero Memory Controller
200GB 3G SATA MLC SFF			HP Smart Array P212/ 256 MB Controller
100GB 3G SATA MLC SFF			HP Smart Array P410/256 MB Controller
			HP Smart Array P410/512 MB BBWC Controller
			HP Smart Array P410/512 MB FBWC Controller
	HP Smart Array P410/1G FBWC Controller		
	HP Smart Array P411/256 MB Controller		
	HP Smart Array P411/512 MB BBWC Controller		
	HP Smart Array P411/512 MB FBWC Controller		
	HP Smart Array P411/1G FBWC Controller		
	HP Smart Array P812/1G Flash Backed Cache Controller		

	Quantity Supported	Position Supported	Controller
SATA Hot Plug 3.5" Midline (MDL) Solid State Drives			
400GB 3G SATA MLC LFF	Up to 8	1-6 and D+E	HP Smart Array P212/Zero Memory Controller
200GB 3G SATA MLC LFF			HP Smart Array P212/ 256 MB Controller

Storage

100GB 3G SATA MLC LFF

HP Smart Array P410/256 MB Controller
 HP Smart Array P410/512 MB BBWC Controller
 HP Smart Array P410/512 MB FBWC Controller
 HP Smart Array P410/1G FBWC Controller
 HP Smart Array P411/256 MB Controller
 HP Smart Array P411/512 MB BBWC Controller
 HP Smart Array P411/512 MB FBWC Controller
 HP Smart Array P411/1G FBWC Controller
 HP Smart Array P812/1G Flash Backed Cache Controller

6G SAS Hot Plug Enterprise Performance Solid State Drives

	Quantity Supported	Position Supported	Controller
400GB 6G SAS SLC SFF	Up to 16	1-8 and D+E	HP Smart Array P212/Zero Memory Controller HP Smart Array P212/ 256 MB Controller HP Smart Array P410/256 MB Controller HP Smart Array P410/512 MB BBWC Controller HP Smart Array P410/512 MB FBWC Controller HP Smart Array P410/1G FBWC Controller HP Smart Array P411/256 MB Controller HP Smart Array P411/512 MB BBWC Controller HP Smart Array P411/512 MB FBWC Controller HP Smart Array P411/1G FBWC Controller HP Smart Array P812/1G Flash Backed Cache Controller
200GB 6G SAS SLC SFF			

6G SAS Hot Plug Enterprise Performance Solid State Drives

	Quantity Supported	Position Supported	Controller
800GB 6G SAS MLC SFF	Up to 16	1-8 and D+E	HP Smart Array P212/Zero Memory Controller HP Smart Array P212/ 256 MB Controller HP Smart Array P410/256 MB Controller HP Smart Array P410/512 MB BBWC Controller HP Smart Array P410/512 MB FBWC Controller HP Smart Array P410/1G FBWC Controller HP Smart Array P411/256 MB Controller HP Smart Array P411/512 MB BBWC Controller HP Smart Array P411/512 MB FBWC Controller HP Smart Array P411/1G FBWC Controller HP Smart Array P812/1G Flash Backed Cache Controller
400GB 6G SAS MLC SFF			
200GB 6G SAS MLC SFF			

External Storage

	Quantity Supported	Position Supported	Host Controller or Adapter
D2700 Disk Enclosure	Up to 2 Up to 4	External	HP Smart Array P411/256 MB Controller HP Smart Array P411/512 MB BBWC Controller HP Smart Array P411/512 MB FBWC Controller HP Smart Array P411/1G FBWC Controller HP Smart Array P812/1G Flash Backed Cache Controller

Tape and Disk-Based Backup

NOTE: For the complete range of tape drives, autoloaders, libraries and media, including the internal fitting models, see: <http://www.hp.com/go/tape>. For the complete range of D2D Backup Systems see: <http://www.hp.com/go/d2d>. For the complete range of RDX drives and media see: <http://www.hp.com/go/rdx>. For hardware and software compatibility of HP disk and tape

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backup products see: <http://www.hp.com/storage/SPOCK>.

	Position Supported	Controller	Controller/HBA Option Kit Part Number
HP SCSI Tape Drives LTO-1 Ultrium 232 LTO-2 Ultrium 448 LTO-3 Ultrium 920 LTO-3 Ultrium 960 LTO4 Ultrium 1760 LTO-4 Ultrium 1840 DAT 40 DAT 72 DAT 160	Internal or External	HP SC11Xe Ultra320 Single Channel/ PCIe x4 SCSI Host Bus Adapter NOTE: Please check the full compatibility information at: http://www.hp.com/storage/SPOCK	412911-B21
HP SCSI Rack Mount Kits 1U Rack-Mount Kit 3U Rack-Mount Kit	External	HP SC11Xe Ultra320 Single Channel/ PCIe x4 SCSI Host Bus Adapter	412911-B21
HP USB Tape Drives DAT 40 DAT 72 DAT 160 DAT 320	Internal or External	USB 2.0 Port	N/A
HP USB Rack Mount Kits 1U USB Rack-Mount Kit	External	USB 2.0 Port	
HP SAS Tape Drives DAT 160 DAT 320 LTO-2 Ultrium 448 LTO-3 Ultrium 920 LTO-4 Ultrium 1760 LTO-4 Ultrium 1840 LTO-5 Ultrium 3000 LTO-5 Ultrium 3280	Internal or External	HP Smart Array P212/ZM 1-ports Int/1-ports Ext PCIe x8 SAS Controller NOTE: Please check the full compatibility information at: http://www.hp.com/storage/SPOCK	462828-B21
HP SAS Rack Mount Kits 1U Rack-Mount Kit 3U Rack-Mount Kit	External	HP Smart Array P212/ZM 1-ports Int/1-ports Ext PCIe x8 SAS Controller NOTE: Please check the full compatibility information at: http://www.hp.com/storage/SPOCK	462828-B21
HP SCSI Tape Autoloaders DAT 72x10 Autoloader 1/8 G2 Autoloader	External	HP SC11Xe Ultra320 Single Channel/ PCIe x4 SCSI Host Bus Adapter	412911-B21
HP SCSI Tape Libraries MSL2024 MSL4048 MSL8096	External	NOTE: Please check the full compatibility information at: http://www.hp.com/storage/SPOCK	

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MSL6000

<p>HP SAS Tape Autoloaders and Libraries 1/8 G2 Autoloader MSL2024 MSL4048 MSL8096</p>	<p>External</p>	<p>HP Smart Array P212/ZM 1-ports Int/1-ports Ext PCIe x8 SAS Controller NOTE: Please check the full compatibility information at: http://www.hp.com/storage/SPOCK</p>	<p>462828-B21</p>
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<p>HP Fibre Channel Tape Libraries MSL2024 MSL4048 MSL8096 MSL6000</p>	<p>External</p>	<p>Please consult the EBS connectivity matrix at: http://www.hp.com/go/ebs for connectivity information and the supported Fibre Channel HBAs shown in this QuickSpec.</p>	
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<p>HP USB RDX Removable Disk Backup System RDX160 RDX320 RDX500 RDX750 RDX1TB</p>	<p>Internal or External</p>	<p>USB 2.0 port</p>	<p>N/A</p>
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<p>HP D2D Backup Systems, iSCSI D2D2500i D2D4000i</p>	<p>External</p>	<p>Embedded Network Controller. If the server requires a hardware iSCSI initiator, the QLogic QLA4050 Host Bus Adapter is recommended.</p>	
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<p>HP D2D Backup Systems, Fibre Channel D2D4000fc</p>	<p>External</p>	<p>Direct server attach is not supported, requires connection via SAN fabric. See: http://www.hp.com/storage/SPOCK</p>	
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Power Specifications

HP 460W Common Slot Gold Hot Plug Power Supply Kit							
Part Number	503296-B21						
Input Voltage Range (Vrms)	100 to 240						
Frequency Range (Nominal) (Hz)	50/60						
Nominal Input Voltage (Vrms)	100	120	200	208	220	230	240
Maximum Rated Output Wattage Rating	460	460	460	460	460	460	460
Nominal Input Current (A rms)	5.5	4.5	2.6	2.5	2.4	2.3	2.2
Maximum Rated Input Wattage Rating (Watts)	526	520	505	505	503	503	503
Maximum Rated VA (Volt-Amp)	548	542	527	527	524	524	524
Efficiency (%)	87.5	88.5	91	91	91.5	91.5	91.5
Power Factor	0.97						
Leakage Current (mA)	0.42	0.50	0.83	0.87	0.92	0.96	1.00
Maximum Inrush Current (A peak)	30						
Maximum Inrush Current duration (mS)	20						
Maximum British Thermal Unit Rating (BTU-Hr)	1794	1773	1725	1725	1715	1715	1715

HP 750W Common Slot Gold Hot Plug Power Supply Kit							
Part Number	512327-B21						
Input Voltage Range (Vrms)	100 to 240						
Frequency Range (Nominal) (Hz)	50/60						
Nominal Input Voltage (Vrms)	100	120	200	208	220	230	240
Maximum Rated Output Wattage Rating	750	750	750	750	750	750	750
Nominal Input Current (A rms)	8.9	7.4	4.3	4.1	3.9	3.7	3.6
Maximum Rated Input Wattage Rating (Watts)	857	847	824	825	820	820	820
Maximum Rated VA (Volt-Amp)	894	884	859	859	854	854	854
Efficiency (%)	87.5	88.5	91	91	91.5	91.5	91.5
Power Factor	0.97						
Leakage Current (mA)	0.42	0.50	0.83	0.87	0.92	0.96	1.00
Maximum Inrush Current (A peak)	30						
Maximum Inrush Current duration (mS)	20						
Maximum British Thermal Unit Rating (BTU-Hr)	2925	2892	2812	2812	2797	2797	2797

HP 1200W Common Slot Silver Hot Plug Power Supply Kit							
Part Number	500172-B21						
Input Voltage Range (Vrms)	100 to 240						
Frequency Range (Nominal) (Hz)	50/60						
Nominal Input Voltage (Vrms)	100	120	200	208	220	230	240
Maximum Rated Output Wattage Rating	800	900	1200	1200	1200	1200	1200
Nominal Input Current (A rms)	9.7	9.0	7.0	6.8	6.4	6.1	5.9

Power Specifications

Maximum Rated Input Wattage Rating	930	1034	1348	1348	1348	1348	1348
Maximum Rated VA (Volt-Amp)	970	1079	1406	1406	1406	1406	1406
Efficiency (%)	86	87	89	89	89	89	89
Power Factor	0.97						
Leakage Current (mA)	0.42	0.50	0.83	0.87	0.92	0.96	1.00
Maximum Inrush Current (A peak)	30						
Maximum Inrush Current duration (mS)	20						
Maximum British Thermal Unit Rating (BTU-Hr)	3174	3530	4600	4600	4600	4600	4600

NOTE: To review typical system power ratings use the HP Power Advisor which is available online located at url: www.hp.com/go/proliant-energy-efficient or www.hp.com/go/hppoweradvisor.

NOTE: Option Kits contain optional power supply, an IEC power cable and PDU IEC cables.

Technical Specifications

System Unit	Tower Dimensions (H x W x D) (with feet/bezel)	18.5 x 8.59 x 23.46 in (47 x 21.8 x 59.6 cm)	
	Rack Dimensions (H x W x D) (with feet/bezel)	8.54 x 17.5 x 21.9 in. (21.7 x 44.5 x 55.7cm)	
	Tower Weight (approximate)	Maximum (all hard drives, power supplies, and processors installed)	70 lb (31.8 kg)
		Minimum (one hard drive, power supply, and processor installed)	54 lb (24.5 kg)
	Rack Weight (approximate)	Maximum (all hard drives, power supplies, and processors installed)	66 lb (29.9 kg)
		Minimum (one hard drive, power supply, and processor installed)	48 lb (21.8 kg)
	Input Requirements (per power supply)	Rated Line Voltage	100 to 240 VAC
		Rated Input Current	7.1 Amps (at 120VAC) to 3.5 Amps (at 240 VAC)
		Rated Input Frequency	50 to 60 Hz
		Rated Input Power	852 W
	BTU Rating	Maximum	460W - 1773 BTU / hr (at 120 VAC), 1715 (at 240 VAC) 750W - 2892 BTU / hr (at 120 VAC), 2797 (at 240 VAC) 1200W - 3530 BTU / hr (at 120 VAC), 4600 (at 240 VAC)
		Power Specifications	
		To review typical system power ratings use the HP Power Advisor which is available via the online tool located at URL: www.hp.com/go/proliant-energy-efficient	
	Power Supply Output (per power supply)	Rated Steady-State Power	460(750) W (at 100 VAC), 460(750) W (at 200 VAC)
		Maximum Peak Power	460(750) W (at 100 VAC), 460(750) W (at 200 VAC)
	System Inlet Temperature	Operating	10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 304.8 m (1.8°F per every 1000 ft) above sea level to a maximum of 3048 m (10,000 ft), no direct sustained sunlight. Maximum rate of change is 10°C/hr (18°F/hr). The upper limit may be

Technical Specifications

		limited by the type and number of options installed.	
		System performance may be reduced if operating with a fan fault or above 30°C (86°F).	
Relative Humidity (non-condensing)	Non-operating	-30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/hr (36°F/hr).	
	Operating	10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.	
	Non-operating	5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing.	
Altitude	Operating	3048 m (10,000 ft). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 457 m/min (1500 ft/min).	
	Non-operating	9144 m (30,000 ft). Maximum allowable altitude change rate is 457 m/min (1500 ft/min).	
Acoustic Noise	Listed are the declared A-Weighted sound power levels (LWAd) and declared average bystander position A-Weighted sound pressure levels (LpAm) when the product is operating in a 23°C ambient environment. Noise emissions were measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109).		
	Idle		
		L WAd	4.7 B (1P Non-Redundant) 4.6 B (2P Redundant)
		L pAm	32.48dB (1P Non-Redundant) 31.18dB (2P Redundant)
	Operating		
		L WAd	4.8 B (1P Non-Redundant) 4.7 B (2P Redundant)
		L pAm	32.39dB (1P Non-Redundant) 31.62dB (2P Redundant)
Emissions Classification (EMC)	FCC Rating	Class B	
	Normative Standards	CISPR 22; EN55022; EN55024; FCC CFR 47, Pt 15; ICES-003; CNS13438; GB9254; K22;K24; EN 61000-3-2; EN 61000-3-3; EN 60950-1; IEC 60950-1	
	NOTE: The Listed sound levels apply to standard shipping configurations. Additional options may result in increased sound levels.		
NOTE: Product conformance to cited product specifications is based on sample (type) testing, evaluation, or assessment. This product or family of products is eligible to bear the appropriate compliance logos and statements.			

Smart Array P410i Controller

Dimensions	Embedded
Disk Drive and Enclosure Interface - Transfer rate	6Gb/s SAS (Serial Attached SCSI) 3Gb/s SATA (Serial ATA)
SAS Connectors	2 internal 4X connectors
Cache Memory Speed	DDR2-800MHz with 40 or 72-bit wide bus

Technical Specifications

Server Interface	x4 PCIe 2.0 provides 2GB/s maximum bandwidth
SAS Speed	8 6Gb/s SAS links provide 4.8GB/s maximum bandwidth
Cache Memory	Zero Memory RAID has no cache memory 40-bit 256MB ECC protected cache (battery upgrade available) 72-bit 512MB BBWC or 72-bit 512MB and 1G FBWC
Logical Drives Supported	Zero Memory, Up to 2 logical volumes (8 physical drives) Up to 64 logical drives with cache
Host Memory Addressing	64-bit, supporting greater than 4GB server memory space
RAID Support	RAID 6, 6+0 (Advanced Data Guarding) NOTE: RAID 6, 6+0 can be enabled with one of the following combinations: <ul style="list-style-type: none"> 256 MB cache, Battery kit and Smart Array Advanced Pack License key option upgrades 512 MB BBWC/FBWC and Smart Array Advanced Pack License key option upgrades 1G FBWC and Smart Array Advanced Pack License key option upgrades
	RAID 5, 5+0 (Distributed Data Guarding) NOTE: A minimum of 256 MB cache is required to enable RAID 5, 5+0 support
	RAID 1+0 (Striping & Mirroring)
	RAID 0 (Striping), RAID 1 (Mirroring)

Embedded NC326i PCI Express Dual Port Gigabit Server Adapter	Network Interface Compatibility	10Base-T/100Base-TX/1000Base-TX IEEE 802.3 10Base-T IEEE 802.3ab 1000Base-T IEEE 802.3u 100Base-TX	
	Data Transfer Method Controller	PCI Express, four lanes (x4) BCM5715	
	Network Transfer Rate	10Base-T (Half-Duplex)	10 Mb/s
		10Base-T (Full-Duplex)	20 Mb/s
		100Base-TX (Half-Duplex)	100 Mb/s
		100Base-TX (Full-Duplex)	200 Mb/s
		1000Base-TX (Half and Full-Duplex)	2000Mb/s
	Connector	RJ-45	
	Cable Support	10Base-T	Categories 3, 4 or 5 UTP; up to 328 ft (100 m)
		10/100/1000Base-TX	Category 5 UTP; up to 328 ft (100 m)

Environment-friendly Products and Approach	End-of-life Management and Recycling	Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: http://www.hp.com/go/green . To recycle your product, please go to: http://www.hp.com/go/green or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.
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The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment

Technical Specifications

facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: <http://www.hp.com/go/green>. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

Summary of Changes

Date	Version History	Action	Description of Change:
30-Jul-2014	From Version 74 to 75	Changed	Product descriptions updated throughout the QuickSpec.
		Removed	HT support for Intel® Xeon® E5606 processor.
05-Mar-2013	From Version 73 to 74	Added	Optional Features: Added HP Proactive Insight experience section.
19-Feb-2013	From Version 72 to 73	Changed	Changes made in the Standard Features, Optional Features and Additional Options sections.
31-Jan-2013	From Version 71 to 72	Removed	Deleted information from the HP Insight Software Section. Deleted information from the HP Tape Backup section. Deleted information from the HP Care Pack Services section
		Added	HP I/O Expansion Options HP R5KVA and R7KVA 3U Extended Runtime Module was added to HP UPS HP Power Distribution Units and HP Intelligent Power Distribution Units (iPDU) sections
		Changed	Updated HP Insight Management Software throughout the document. Renamed several of the categories in Hard Drives Revised HP Tape Backup and HP Disk Backup Revised HP Rack Options, specifically the Keyboards and Monitors section, USB Keyboard and Mouse section, HP Server Console Switch G2 with Virtual Media & CAC and HP IP Console Switch G2 with Virtual Media & CAC In Storage/HP SCSI Tape Drives, updated the name of the controller
07-Dec-2012	From Version 70 to 71	Removed	Removed HP Performance Packs from Step 3 of Configuration Information. Removed 6G SAS Hot Plug Enterprise Mainstream Solid State Drives from the Hard Drives section Removed HP Backup & Recovery Software
		Added	HP I/O Expansion Options HP R5KVA and R7KVA 3U Extended Runtime Module was added to HP UPS HP Power Distribution Units and HP Intelligent Power Distribution Units (iPDU) sections
		Changed	Updated HP Insight Management Software throughout the document. Renamed several of the categories in Hard Drives Revised HP Tape Backup and HP Disk Backup Revised HP Rack Options, specifically the Keyboards and Monitors section, USB Keyboard and Mouse section, HP Server Console Switch G2 with Virtual Media & CAC and HP IP Console Switch G2 with Virtual Media & CAC In Storage/HP SCSI Tape Drives, updated the name of the controller
24-Sep-2012	From Version 69 to 70	Changed	Changes made to the Optional Features section.
24-Aug-2012	From Version 68 to 69	Changed	Changes made to the Core Options, Standard Features, and Additional Options.
17-Aug-2012	From Version 67 to 68	Changed	Changes made throughout the QuickSpec.
17-May-2012	From Version 66 to 67	Changed	Changes made in the Options section.
14-May-2012	From Version 65 to 66	Changed	HP Insight Software was revised

Summary of Changes

			Second Generation Accelerators were added to HP I/O Accelerator Options
			HP ML350 G6 Intel Xeon X5560, X5550, E5540, L5520, L5506 and E5502 Processors were removed
26-Mar-2012	From Version 64 to 65	Added	New models were added to HP Insight Software
			HP D2D Backup Systems with Backup Data Deduplication was added to HP Disk Backup
			HP USB Keyboard and Mouse was added to HP Rack Options
19-Mar-2012	From Version 63 to 64	Changed	Changes made in Step 1 Configuration Information and the Options sections.
16-Mar-2012	From Version 62 to 63	Changed	Country Code was revised in Pre-Configured Models.
06-Mar-2012	From Version 61 to 62	Changed	Changed a link in the Hard Drives section of Core Options. Changes also made in the Models section.
13-Feb-2012	From Version 60 to 61	Changed	Changes made in the Standard Features, Options and Storage sections only.
20-Jan-2012	From Version 59 to 60	Changed	URL was revised in HP Tape Backup section.
13-Jan-2012	From Version 58 to 59	Changed	URL was revised in Tape and Disk Backup
			HP CN1000Q Dual Port Converged Network Adapter was added to HP Storage Options
02-Dec-2011	From Version 56 to 58	Changed	Change made to the Canada version only.
18-Nov-2011	From Version 55 to 56	Changed	Changes made to the North America and Canada versions only.
14-Nov-2011	From Version 54 to 55	Changed	Changes made throughout the QuickSpec.
10-Oct-2011	From Version 53 to 54	Removed	HP CN1000Q Dual Port Converged Network Adapter was removed from HP Storage Options.
26-Sep-2011	From Version 52 to 53	Changed	Changes made throughout the QuickSpec.
14-Sep-2011	From Version 51 to 52	Changed	Change made to a Note in the System Fans section.
09-Sep-2011	From Version 50 to 51	Changed	Corrections made in the HP Tape Backup section.
08-Sep-2011	From Version 49 to 50	Changed	Corrections made in the HP Tape Backup section.
06-Sep-2011	From Version 48 to 49	Changed	Changes made within the Standard Features, Models and Options sections.
25-Aug-2011	From Version 46 to 48	Changed	Changes made to the Canada version only.
01-Aug-2011	From Version 45 to 46	Changed	Hard Drive descriptions were revised.
11-Jul-2011	From Version 44 to 45	Changed	Changes made in the Standard Features, Models, Options and Storage sections.
23-Jun-2011	From Version 43 to 44	Changed	Link was corrected in Service and Support.
13-Jun-2011	From Version 42 to 43	Changed	Changes made to the North America and Canada versions only.
13-May-2011	From Version 41 to 42	Changed	Changes made throughout the QuickSpec.
29-Apr-2011	From Version 40 to 41	Changed	Changes made to the North America and Canada versions only.
19-Apr-2011	From Version 39 to 40	Changed	Changes made throughout the QuickSpec.
16-Mar-2011	From Version 37 to 38	Changed	Changes made to processor descriptions in Step 2 of the Configuration Information section.
14-Feb-2011	From Version 36 to 37	Changed	Changes made throughout the QuickSpec.
10-Jan-2011	From Version 35 to 36	Changed	HP NC523SFP 10Gb 2-port Server Adapter was added to HP Networking
			HP CN1000Q 2P Converged Network Adapter was added

Summary of Changes

			to HP StorageWorks Options Oracle Enterprise Linux (OEL) was removed from Operating Systems and Virtualization Software Support for ProLiant Servers
10-Dec-2010	From Version 34 to 35	Changed	Changes made to the North America and Canada versions only.
03-Dec-2010	From Version 33 to 34	Changed	Activated a link in the High Performance Clusters section.
23-Nov-2010	From Version 32 to 33	Changed	Smart Array P812 Controller product description was revised.
18-Nov-2010	From Version 31 to 32	Changed	<p>Urls for Common Slot Power Supplies and notes for Power Supplies were revised</p> <p>Smart Array P410i Controller was completely revised</p> <p>HP Management DVD and HP ProLiant Smart Update Firmware DVD were added to HP Insight management software</p> <p>HP I/O Accelerator Options was added to Additional Options</p> <p>HP StorageWorks RDX 1TB Internal Removable Disk Backup System was added to HP Disk Backup</p> <p>HP 10642G2 and 10647G2 1200mm deep Rack cabinet Shock Rack were added to HP Rack Series</p> <p>What's New was removed from the Overview</p>
03-Nov-2010	From Version 30 to 31	Changed	Changes made to the North America and Canada versions only.
21-Oct-2010	From Version 29 to 30	Added	Added a NOTE to the HP Storage Controllers section.
19-Oct-2010	From Version 28 to 29	Changed	Changes made throughout the QuickSpec.
24-Sep-2010	From Version 27 to 28	Changed	Changes made to the Smart Buys section of the North America and Canada versions only.
10-Sep-2010	From Version 26 to 27	Changed	Processor was updated for Model 594874.
27-Aug-2010	From Version 25 to 26	Changed	Changes made in the Processor section of Standard Features and in the HP Disk Backup section of Additional Options.
16-Aug-2010	From Version 24 to 25	Changed	Changes made throughout the QuickSpec.
13-Jul-2010	From Version 23 to 24	Added	Added new Smart Buys to the North America and Canada versions only.
08-Jul-2010	From Version 22 to 23	Changed	Corrected an inactive link in the At A Glance section.
21-Jun-2010	From Version 21 to 22	Changed	Changes made throughout the QuickSpec.
28-Apr-2010	From Version 20 to 21	Changed	Changes made within the At A Glance, Additional Options and Storage sections.
22-Apr-2010	From Version 19 to 20	Added	Electronic software is available in all countries except China and Japan. Customers in China and Japan should order the physical equivalent note was added to HP Integrated Lights-Out (iLO) Advanced.
19-Apr-2010	From Version 18 to 19	Removed	Removed the following from the Infrastructure Management section in At A Glance:

Summary of Changes

			Convenient slide-out Systems Insight Display for quick and easy front view server diagnostics, along with status LEDs, Automatic Server Recovery (ASR), ROM Based Setup Utility (RBSU)
09-Apr-2010	From Version 17 to 18	Changed	Changes made within the Standard Features, Models and Core and Additional Options sections.
29-Mar-2010	From Version 16 to 17	Changed	Changes made throughout the entire QuickSpec.
16-Feb-2010	From Version 15 to 16	Changed	Changes made throughout the entire QuickSpec.
29-Jan-2010	From Version 14 to 15	Changed	Changes made within the HP Insight Software section of the Additional Options section.
18-Dec-2009	From Version 13 to 14	Changed	Changes made within the Core and Additional Options sections and in the Power Specifications section.
23-Nov-2009	From Version 12 to 13	Removed	Removed 580385-B21.
16-Nov-2009	From Version 11 to 12	Changed	Changes made within the At A Glance, Standard Features, Core and Additional Options sections.
19-Oct-2009	From Version 10 to 11	Added	Added the HPC Interconnects section.
		Changed	Changes made within the At A Glance, Standard Features, Core and Additional Options sections.
16-Sep-2009	From Version 9 to 10	Changed	Changes made throughout the entire QuickSpec.
03-Aug-2009	From Version 8 to 9	Changed	Changes made within the At A Glance, Standard Features, Core and Additional Options sections.
15-Jul-2009	From Version 7 to 8	Added	Added part number 500666-B21 to the Memory section within Core Options.
13-Jul-2009	From Version 6 to 7	Changed	Changes made throughout the entire QuickSpec.
02-Jun-2009	From Version 5 to 6	Added	Added the What's New section.
		Changed	Changes made within the At A Glance, Standard Features, Models, Core Options, Additional Options, Storage and Technical Specifications sections.
18-May-2009	From Version 4 to 5	Changed	Changes made to the North America and Canada versions only.
15-May-2009	From Version 3 to 4	Changed	RAID 5, 5+0 (Distributed Data Guarding) NOTE was changed for the Smart Array P410i Controller in the Technical Specifications section.
27-Apr-2009	From Version 2 to 3	Added	HP 8GB 2Rx4 PC3-10600R-9 Kit to Memory throughout the QuickSpec Secure Digital (SD) Memory Cards to the Additional Options section Battery Kit and HP Smart Array Advanced Pack (SAAP) to Storage Controllers in the Additional Options section HP StorageWorks LTO-3 Ultrium 920 SAS Internal Tape Drive to Tape Drives in the Additional Options section
		Changed	Updated System Fans in the Standard Features section, HP KVM Switch Options in the Additional Options section and Power Supply Output in the Technical Specifications section Completely revised High Availability Cluster Options in the Options section HP ProLiant Essentials Accelerated Pack was removed from Server Management Stand Alone Software Products

Summary of Changes

			in the Standard Features and Additional Options section HP Smart Array P411/256 MB and P411/512 MB Controllers were removed from Storage Controllers in Step 3 of the Configuration Information - Factory Integrated Models section and the Additional Options section
03-Apr-2009	From Version 1 to 2	Changed	Corrected a part number error in the Unique Options section.

Summary of Changes

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For hard drives, 1GB = 1 billion bytes. Actual formatted capacity is less.