HP Server RAID
Quick Start guide to Smart Array P400

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1. OVERVIEW

This will discuss some general use and troubleshooting tips with the HPs P400 RAID controller that is included with several of the HP ProLiant Servers. The server list using this controller includes:

- ML370G5
- DL380G5

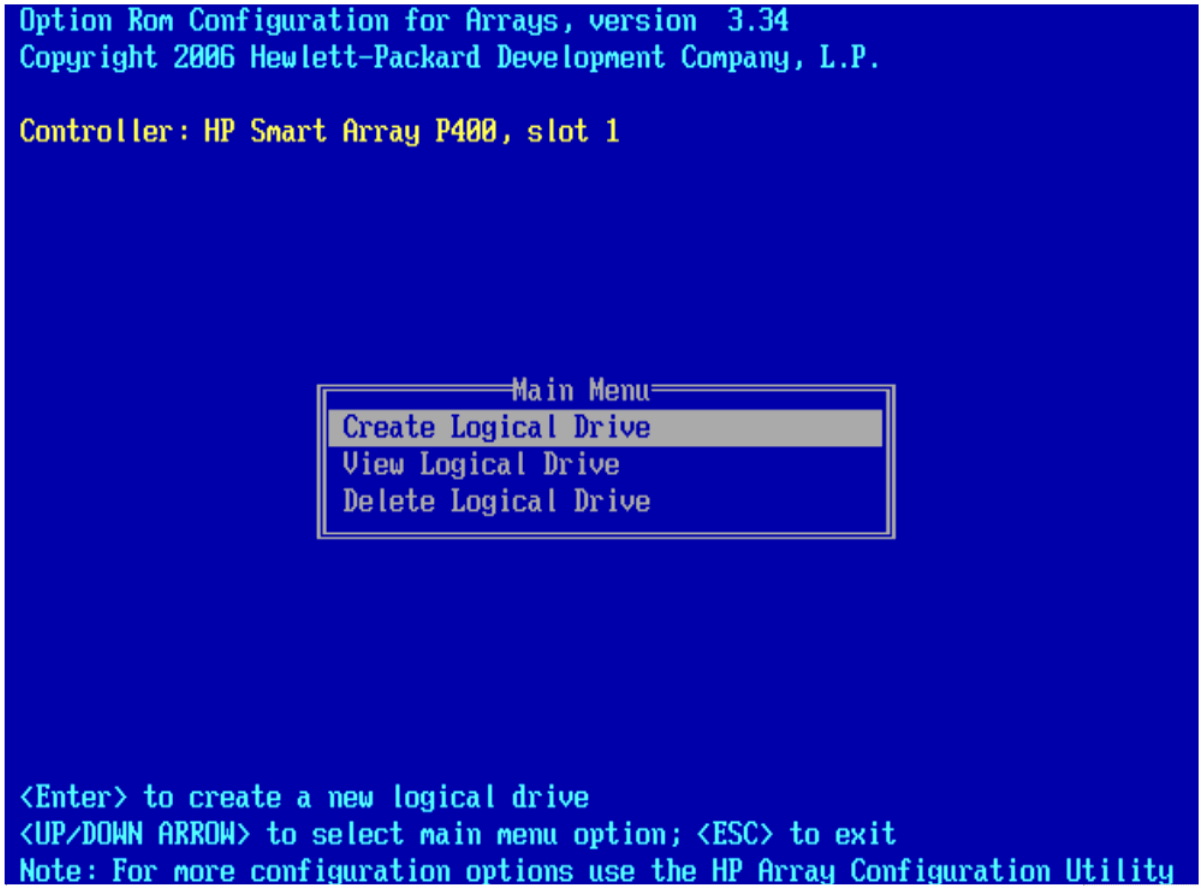
Other documentation reference:

- For a much more thorough user guide please refer to HP's **ACU User Guide.pdf** in TechPlanet > Software > HP Platforms > ML370G5 > Reference > User Guides.

2. GETTING INTO THE RAID CONFIGURATION TOOL

2.1 From the BIOS

Reboot the server and hit <**F8**> at the Smart Array BIOS prompt. You should see the following.



2.1.1 BIOS Menu Tree

The BIOS menus break down as follows:

Table 1

Create Logical Drive	Choose the drives, raid type, spares, max boot partition.
View Logical Drive	Will show all the Existing Logical Drives, RAID type, Capacity, and Status
Select logical RAID	Will show all the disks, SCSI Port, ID, Size, and Status
Delete Logic Drive	
Select logical RAID	Hit <F8> then <F3> to delete

2.2 ACU From windows

The **Array Configuration Utility** (ACU) is your primary method of configuring and monitoring the P400 RAID controller.

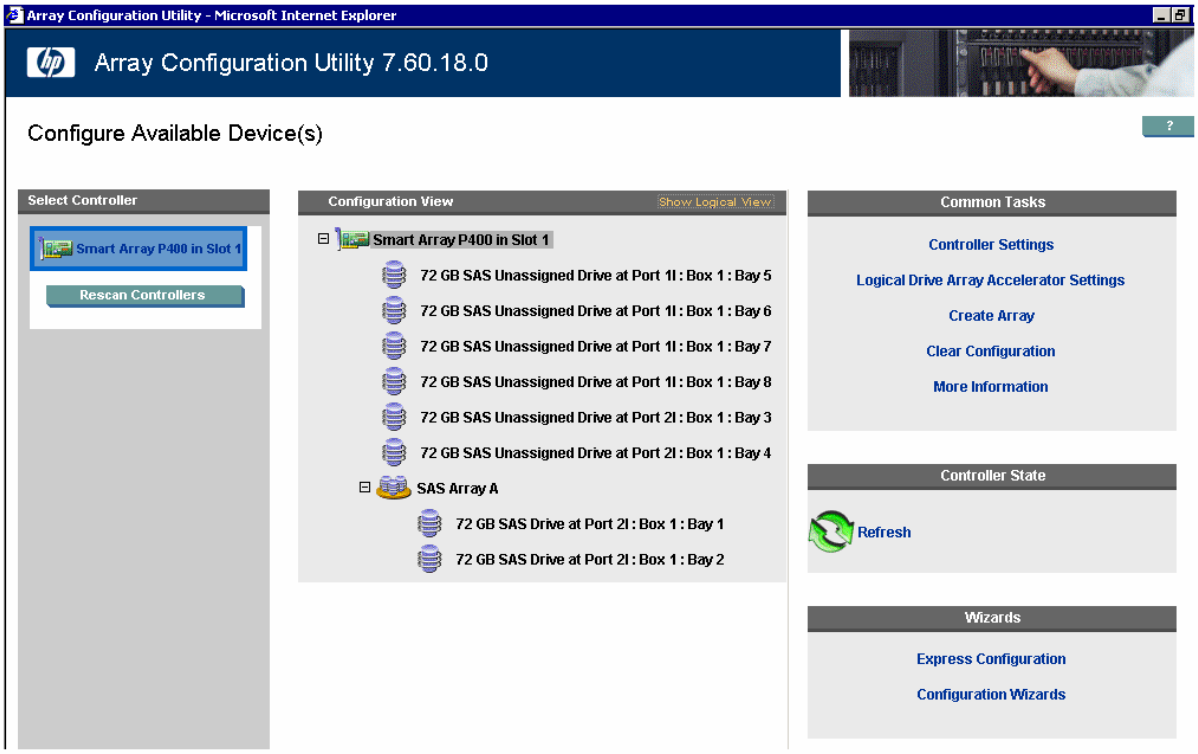
Setting up for Local Control.

a) Select Programs > HP System Tools > HP Array Configuration Utility > Setup HP Array Configuration Utility.

Select **Local Application Mode**. If this is currently not selected then select it.

b) Start the ACU. Select Programs > HP System Tools > HP Array Configuration Utility > HP Array Configuration Utility. You should see the following:

Figure 1 ACU Overview



2.2.1 Windows Menu tree

For the Windows ACU the menus break down as follows:

Table 2

Help	Online manual detailing how to use the ACU
Smart Array P400 in Slot 1	
Controller settings	
Expand Priority	High, Medium, Low (default)
Rebuild Priority	High, Medium, Low (default)
Cache Ratio	Assigns priority to Read or Write cache. Default is (50% Read, 50% Write)
Surface Scan Delay	How much idle time before background surface scans are performed (15sec default).
Logical Drive Array Accelerator Settings	Select which drives will allow for Array Acceleration to be enabled. By default, all logical volumes should be selected.

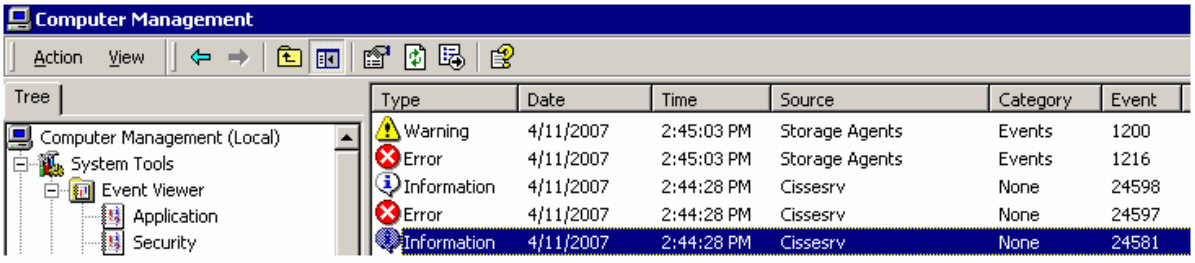
Clear Configuration	Deletes the configuration for all the logical drives. Confirmation box is displayed.
More Information	
SAS Array A	Displays all the Logic/Physical drives under the selected bus
Expand Array	Select Drives to add to this Array
Spare Management	Select Drive to add or remove as Spares
Delete	Deletes the configuration for the all the logical volumes under this bus. Confirmation box is displayed.
More Information	
Show Physical View	Toggle between • Show Physical Disk • Show Logical Disk
In “Show Logical Disk” view Logical Drive 1	Shows Logical Drive#, Capacity, RAID Type
Migrate RAID / Stripe Size	
Fault Tolerance	Change the RAID type (ie. from RAID0 to RAID5). Is dependant upon how many disks are in the system.
Stripe Size	Change the stripe on the disk. Default is 64K. Best performance for Creo Workflow is 128K.
Delete	Deletes the configuration for the selected logical volume. Confirmation box is displayed.
More Information	
In “Show Physical Disk” view 72 GB SAS Drive	Shows DiskSize, Interface Type, Port, and SCSI ID
More Information	

3. REPAIRING A FAILED DISK

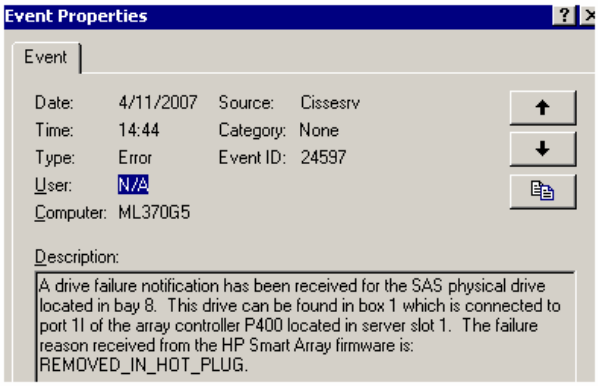
There is no audible alarm for the P400. The only notification you will get if a disk has failed is an amber flashing failed light on the failed disk, the NT Event Log, and the ACU.

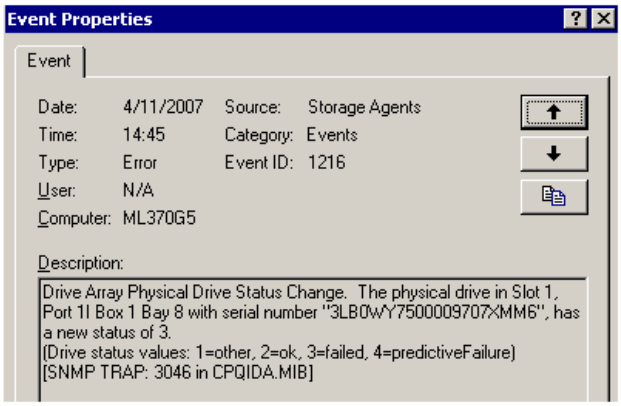
3.1 Detecting the failed disk

1) NT Event log. You should see the following message in the System log.



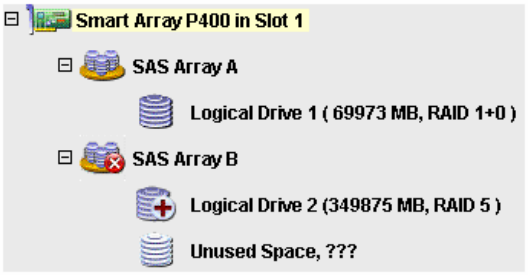
Double clicking the error will display the Slot#, SCSI ID and Port the failed drive was on.



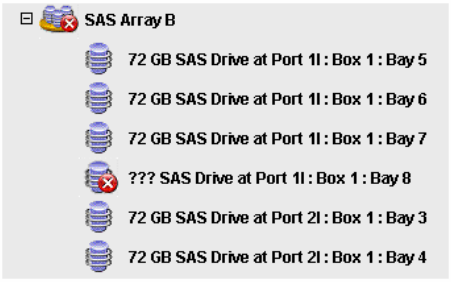


The following will be displayed in the ACU

Logical Disk View

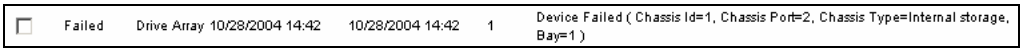


Physical Disk View



The following will be displayed in HP Insight Diagnostics (see section 6 Getting Historical Error Logs on using HP's Insight) you should see:

Under **Logs** tab:



Locating the failed physical disk.

Close the ACU. In ACU whichever Disk, Array, or RAID Controller you have selected, all the disks that belong to it will flash amber. Turn off ACU so no disks are flashing.

Normally the failed drive will be flashing amber on the front of the drive. If not then find the **Box#** and **Bay#** as listed above.

Refer to the Physical Drive Layout for your particular server as listed in section 7 Disk Location Matrix.

Determine the capacity of the failed disk.

The Capacity, RPM, and Interface Connection of the drive should be listed on the front of the drive. Collect this information for the HP call.

If for some reason you can not get access to look at the drive then the only other method is to determine the disk capacity based on the other disks in the RAID set as shown from ACU.

i) In the ACU select Show Physical Disk Layout.

ii) Look at another "Good" disk in the same Array Set as the failed disk. That disk should be of the same type as the failed disk.

iii) Right lick this "Good" disk and select **More Information**. Document the Size, Interface, Transfer Speed, and Model of the Good disk. This will be used for the call into HP Logistics.

3.2 Removing the failed disk

Normally the failed drive will show an amber failed flag on the drive. Note: In ACU all the selected disks will flash amber. Turn off ACU so there is no confusion when trying to select the failed disk. Once a replacement drive arrives the customer can unplug the failed drive and replace it with the new drive.

1) Do all work with the Server Online.

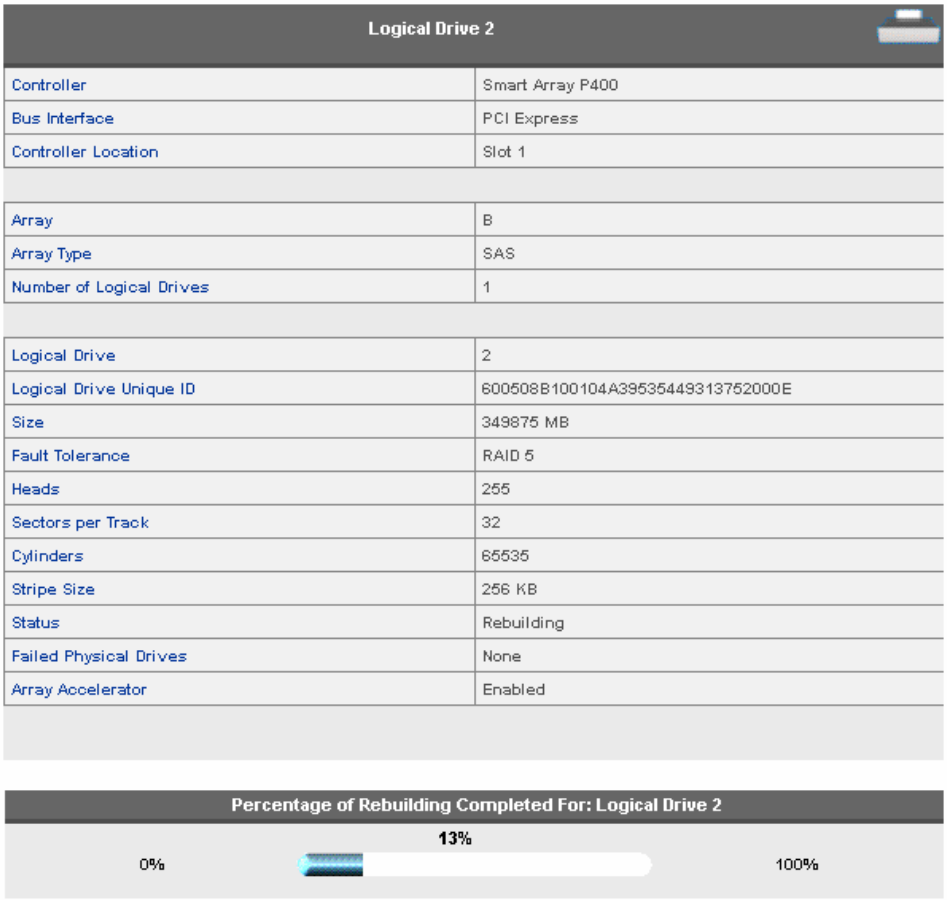
2) Based on the Physical Port and SCSI ID as listed above, refer to the drive layout in section 7 Disk Location Matrix and remove the failed drive.
   a) Each drive will have a Wine colored button. Press in the button and the drive level will swing open.
   b) Open the drives lever all the way to unlock the drive from the media bay.
   c) Pull the drive out.

3) Take your replacement drive and install it into the server.
   a) Open the drives locking level all the way.
   b) Push the drive in and close the drives lever in until you hear it click locked.
   c) The drive should power up and you should see a green status light(10secs).

4) Start the **ACU** and select **Show Logical View**. You should see the disk in the failed LUN rebuilding as denoted by the Disks animation on the Logical Drive.



5) Right click the LUN being rebuilt and select More Information. you should see the following(*example only*):



Logical Drive 2	
Controller	Smart Array P400
Bus Interface	PCI Express
Controller Location	Slot 1
Array	B
Array Type	SAS
Number of Logical Drives	1
Logical Drive	2
Logical Drive Unique ID	600508B100104A39535449313752000E
Size	349875 MB
Fault Tolerance	RAID 5
Heads	255
Sectors per Track	32
Cylinders	65535
Stripe Size	256 KB
Status	Rebuilding
Failed Physical Drives	None
Array Accelerator	Enabled

Rebuild of a 73GB disk should take about **15 minutes**.

6) Once the rebuild is complete you should see the following.

Logical Drive 2	
Controller	Smart Array P400
Bus Interface	PCI Express
Controller Location	Slot 1
Array	B
Array Type	SAS
Number of Logical Drives	1
Logical Drive	2
Logical Drive Unique ID	600508B100104A39535449313752000E
Size	349875 MB
Fault Tolerance	RAID 5
Heads	255
Sectors per Track	32
Cylinders	65535
Stripe Size	256 KB
Status	Background Parity Initializing/Queued
Failed Physical Drives	None
Array Accelerator	Enabled

4. CREATING A NEW RAID VOLUME

If you want to create a new RAID Logical Disk do the following.

1) Power down the Server and add the new disks. Power the Server back up and log in.
2) Start the ACU. As listed in Figure 1 ACU Overview you will notice some unassigned physical disks.
3) Create the new RAID Array.
   a) Select **Under Common Tasks > Create an Array**.
   b) Confirm the Drive Type of Array > **SAS**.
   c) Select the disks you want to include and hit **OK**.
4) Create a logical volume for your new Array.
   a) **Right click** the Array you have just configured and select **Create Logical Drive**.
   b) Select the following and hit **OK**.

Function	# Disks	Fault Tolerance	Stripe Size	Max Boot	Array Accelerator
OS Disks	2	RAID 1	128KB	Disabled	Enabled
Jobs Drive	1	RAID 0	128KB	Disabled	Enabled
Jobs Drive	2	RAID 1	128KB	Disabled	Enabled
Jobs Drive	3+	RAID 5	128KB	Disabled	Enabled

   c) Under Controller State. Select **Save > OK**.



5) Select **Programs > Admin Tools > Computer Management** and select **Disk Management**. Create a new Partition on your new disk.

5. EXPANDING/CONVERTING AN EXISTING RAID

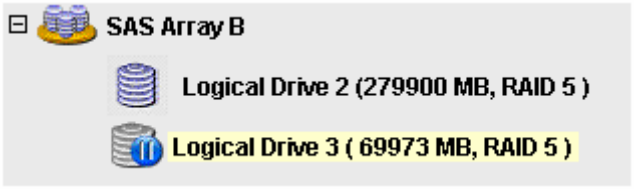
This section will describe how to add disks to an existing RAID set. You must understand though that Windows will not be able to expand its existing partition with the new set unless it was originally created as a Dynamic Disk. Conversion from Basic to Dynamic will not help in this regard. Because Dynamic Disks do not support Ghost as destination devices we do not configure volumes as Dynamic Disk from the factory. If you expand your raid you will have to add a separate new partition onto this expanded capacity. *** *Please note that this section is for reference only and is not a supported option for the customer ! ! !* The only supported option is to backup the current data and rebuild the RAID with the new disk.***

Your choice is to

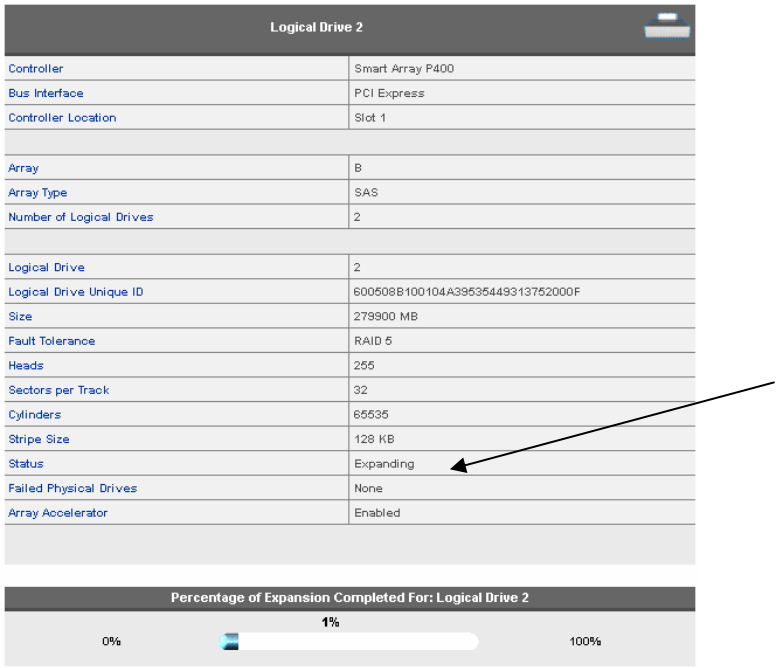
- Create a separate partition on the expanded disk. This will have a new drive letter, etc.
- Backup, Destroy, Create a New Partition utilizing the entire content of the expanded disk, and then Restore your data.

6) Create the new RAID group
   a) Select from the **ACU** main screen **Express Configuration > Begin**.
   b) Select Expand existing arrays > Next
   c) Select YES to save the configuration > Finish

Your Logical Disk View will looks like this:



Right click, on the Logical drive being rebuilt. Select more information, you should see the following: This process took 2 hours for a 73GB disk.



Logical Drive 2	
Controller	Smart Array P400
Bus Interface	PCI Express
Controller Location	Slot 1
Array	B
Array Type	SAS
Number of Logical Drives	2
Logical Drive	2
Logical Drive Unique ID	600508B100104A3953544931375200OF
Size	279900 MB
Fault Tolerance	RAID 5
Heads	255
Sectors per Track	32
Cylinders	65535
Stripe Size	128 KB
Status	Expanding
Failed Physical Drives	None
Array Accelerator	Enabled

7) Utilizing the new additional capacity.
   a) Select **Programs > Admin Tools > Computer Management** and select **Disk Management**.
   b) Right click Computer Management and select **Rescan Disks**. The new capacity drive should now show up as a separate drive(i.e. Disk 2) with unallocated space.
   c) Add a new partition:
      i) Right click the unallocated space and select **Create Partition**.
      ii) Follow the prompts and create as your normally would.

6. GETTING HISTORICAL ERROR LOGS

Logs will be taken from HP's Insight Diagnostics utility. This can be copied into a text file and sent to HP for further diagnostics.

1) Start HP's Insight.
   a) From your task bar select **Start > HP System Tools > HP Insight Diagnostics Online Edition for Windows**
   b) Select **OK** to the Secure Connection window if prompted.
2) Look at the History.
   a) Select the **Log** tab.

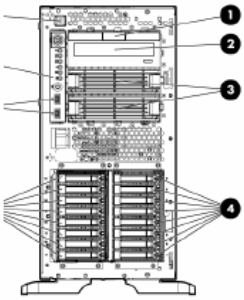
b) Click the Initial Update column until the items listed are newest to oldest (top down).

c) Any item where description contains Drive Array is a listing of the P400 RAID controller.

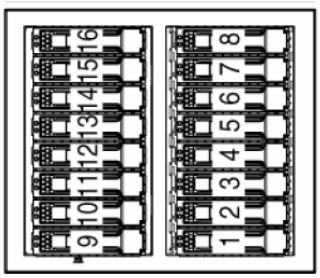
3) Copy the logs over the last few weeks into a text editor. Save this so it can be sent to HP support for further information.

7. DISK LOCATION MATRIX

The physical location of disks for various HP ProLiant Servers is located below.



Front View(Bays 1-8 Area #4)



Bay Numbers

(Right side, Bottom right #1)