

Appendix **A**

SCSI ID Configurations

Introduction

The ProLiant CL380 supports various configurations of SCSI ID, Host I/O Channel Target ID, and host port numbers. This can sometimes be confusing because the relationship between these is not always clear. These can be configured from the Compaq System Configuration Utility, the CR3500 Configuration Utility, and other tools.

This appendix describes the configuration of the following components:

- SCSI ID numbering for the server node internal drives
- SCSI ID numbering for the Compaq 64-bit Dual Channel Wide Ultra2 SCSI Adapter in each server node
- Host I/O Channel Target IDs for CR3500 RAID controllers
- Host port numbering for CR3500 RAID controllers and logical drives
- SCSI ID numbering for disk drives

Internal Server Node Disk Drives

Each ProLiant CL380 server node comes standard with support for two internal hot-plug disk drives. Two additional hot-plug drives can be added to each server node by installing an optional Wide Ultra2 SCSI drive cage. The Integrated Smart Array Controller in each server node provides hardware level RAID fault tolerance for up to four hot-plug hard drives per node without using an expansion slot.

The internal disk drives in each server node use a separate SCSI bus, and therefore do not conflict with the SCSI IDs on the SCSI bus in the shared storage area.

Separate Logical SCSI Buses

The ProLiant CL380 shared storage area SCSI ID configuration uses two separate logical SCSI buses, each with its own SCSI ID numbering (see Figure A-1). The CR3500 RAID Controllers participate in both the host side SCSI bus and the disk side SCSI bus. Although there are two logical SCSI buses, the buses are separate, and each bus can use the same SCSI IDs.

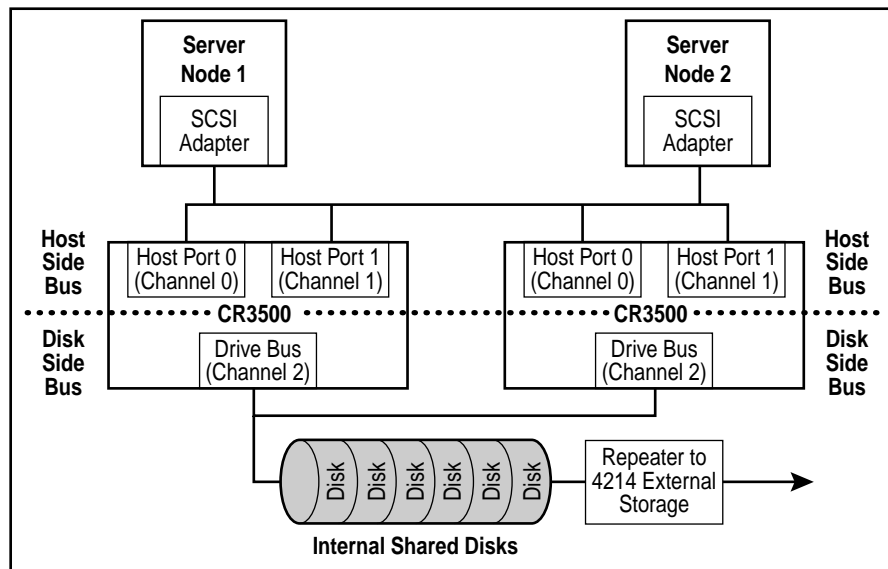


Figure A-1. Separate logical SCSI buses

The host side SCSI bus consists of the following components:

- Compaq 64-bit Dual Channel Wide Ultra2 SCSI Adapter in each server node
- Host I/O Channels 0 and 1 on each CR3500 RAID Controller

The disk side SCSI bus consists of the following components:

- CR3500 RAID Controller connection to the drive bus (Channel 2)
- Individual SCSI disk drives

Host Side SCSI Bus

The host side SCSI bus consists of the SCSI adapters in each server node, and the Host Port connections into the CR3500 RAID Controllers. Figure A-2 shows the SCSI bus numbering for the host side bus.

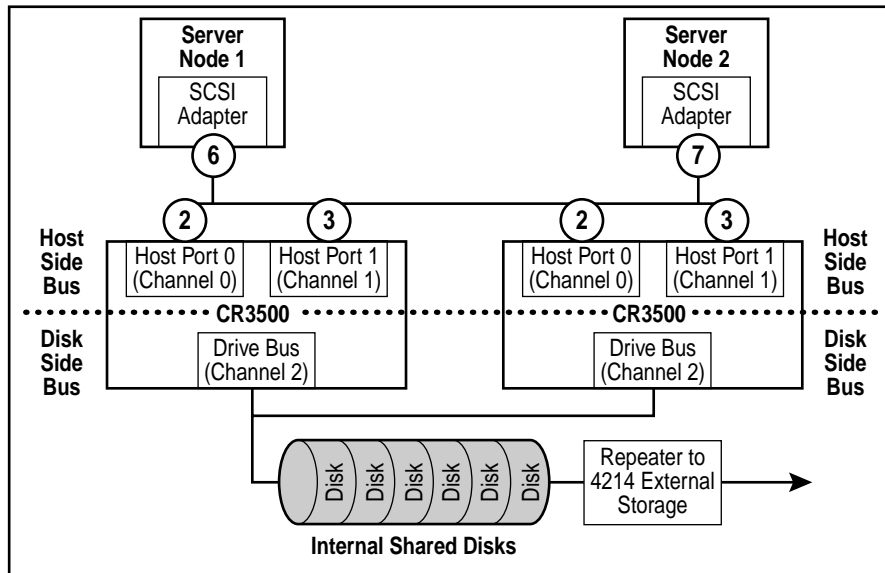


Figure A-2. Host side SCSI bus numbering

Server Node SCSI Adapters

The Compaq 64-bit Dual Channel Wide Ultra2 SCSI Adapter in each server node must be configured with a unique SCSI ID. This ID is assigned using the System Configuration Utility (as part of SmartStart) during the initial configuration. The only valid SCSI IDs that can be used with the controller are 6 and 7, with each server using a different ID. These are the Initiator SCSI IDs.

Host Channel Connections

Each CR3500 RAID Controller has two Host I/O Channels, numbered 0 and 1. These channels are assigned Target SCSI IDs using the CR3500 Configuration Utility (Controller Properties). Channel 0 is normally assigned to Target ID 2, and Channel 1 is normally assigned to Target ID 3. There is no need to change these from the default settings of 2 and 3. Also, when using two CR3500 RAID Controllers, the Channel Target IDs for each port should be the same on both controllers (for example, Channel 0 Target ID set to 2 on both controllers, and Channel 1 Target ID set to 3 on both controllers).

The host side SCSI bus uses a total of four SCSI IDs. The SCSI adapters in the server nodes use SCSI IDs 6 and 7, while the two Host I/O Channels on the CR3500 RAID Controllers use Target SCSI IDs 2 and 3. However, it is possible to have two CR3500 RAID Controllers, that each use SCSI IDs 2 and 3. The following section on failover modes explains how to avoid this conflict.

Failover Modes

In addition to a single stand-alone controller, there are two failover modes (Active/Active and Active/Passive) that can be configured when using dual redundant CR3500 RAID Controllers. The configuration of these failover modes eliminates the possibility of SCSI ID conflicts at the Host I/O Channels.

When using one stand-alone CR3500 RAID Controller, there is no possibility of a SCSI ID conflict. The SCSI adapters in the server nodes use SCSI IDs 6 and 7, while the two Host I/O Channels on the single CR3500 RAID Controller use Target SCSI IDs 2 and 3.

Active/Active Failover Mode (Performance)

The CR3500 Configuration Utility (Controller Properties) allows you to specify the two Host I/O Channels supported by the controller as either active or passive. The table below explains how the Host I/O Channel settings determine the failover method. If the system is configured with two CR3500 Controllers, refer to the settings in Table A-1.

Table A-1
Active/Active Failover Mode Performance

Active/Active Failover Mode	Controller 1 Performance	Controller 2 Performance
Host I/O Channel 0	Active (SCSI ID = 2)	Passive (SCSI ID = 2)
Host I/O Channel 1	Passive (SCSI ID = 3)	Active (SCSI ID = 3)

Although there are two instances of SCSI IDs 2 and 3 in this configuration, one is active and the other is passive (see Figure A-3). This prevents a SCSI ID conflict. It is not possible to configure all four Host I/O Channels to be active.

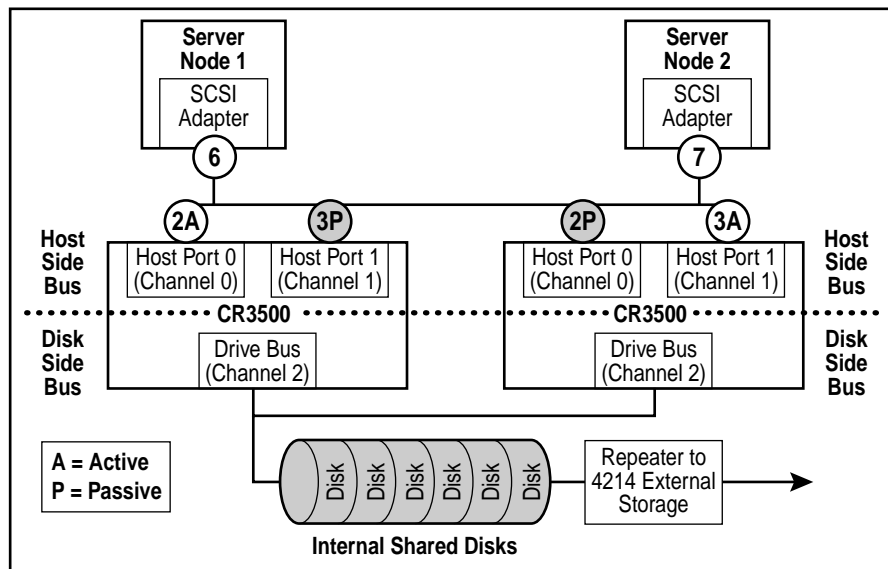


Figure A-3. Active/active failover mode

Figure A-4 shows the Controller Properties screen in the CR3500 Configuration Utility. This is where the Host I/O Channels and Target IDs are configured.



Figure A-4. Host ports configuration screen in the CR3500 configuration utility

Use the Active/Active Performance failover mode for configurations with applications that use multiple logical drives that can be spread across the two controllers. Assigning the logical drives to separate Host I/O Channels increases the overall resource availability on each controller. When you assign a logical drive to a host port, you are actually assigning it to a different CR3500 RAID Controller. This configuration manually balances the disk I/O load across the two CR3500 RAID Controllers.

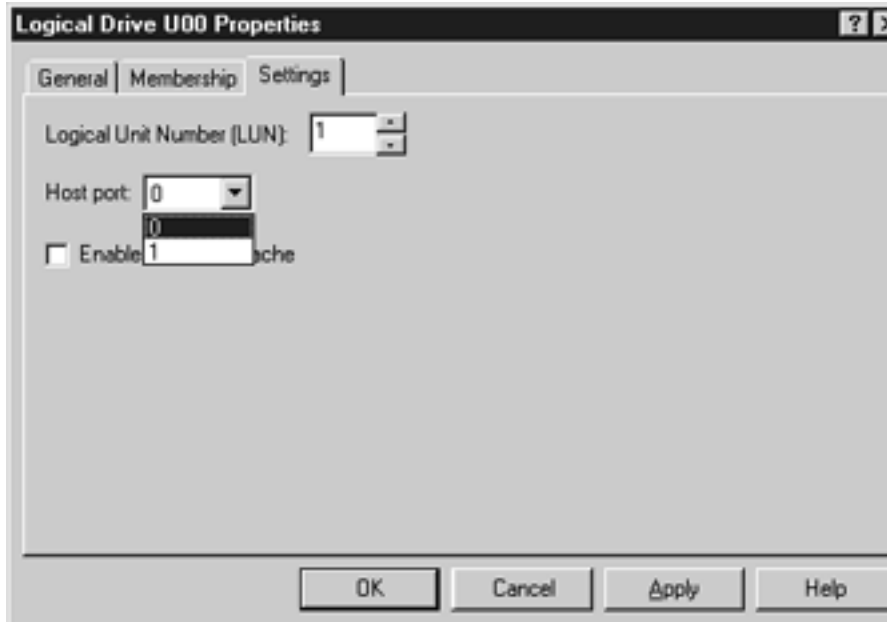


Figure A-5. Assigning a logical drive to a host port

NOTE: Compaq recommends the use of Active/Active dual CR3500 RAID Controller configurations for ProLiant CL380 clusters. This is the default setting when two CR3500 RAID Controllers are present.

Active/Passive Failover Mode (Availability)

If the system is configured with two CR3500 RAID Controllers, and the Host I/O Channel 0 is set to Active and the Host I/O Channel 1, is set to Active for Controller 1 and both channels are set to Passive for Controller 2, then the failover mode is Availability. Table A-2 shows explains how the Host I/O Channel settings determine the failover method.

Table A-2
Active/Passive Failover Mode Availability

Active/Passive Failover Mode	Controller 1 Availability	Controller 2 Availability
Host I/O Channel 0	Active (SCSI ID = 2)	Passive (SCSI ID = 2)
Host I/O Channel 1	Active (SCSI ID = 3)	Passive (SCSI ID = 3)

Although there are two instances of SCSI IDs 2 and 3 in this configuration, one is active and the other is passive. This prevents a SCSI ID conflict. It is not possible to configure all four Host I/O channels to be active.

Figure A-6 shows an active/passive failover mode. Note that all disk access is through a single CR3500 RAID Controller. This means that the disk I/O load cannot be balanced across the two CR3500 RAID Controllers. Only use the active/passive failover mode when a single logical drive is being used in the shared storage area.

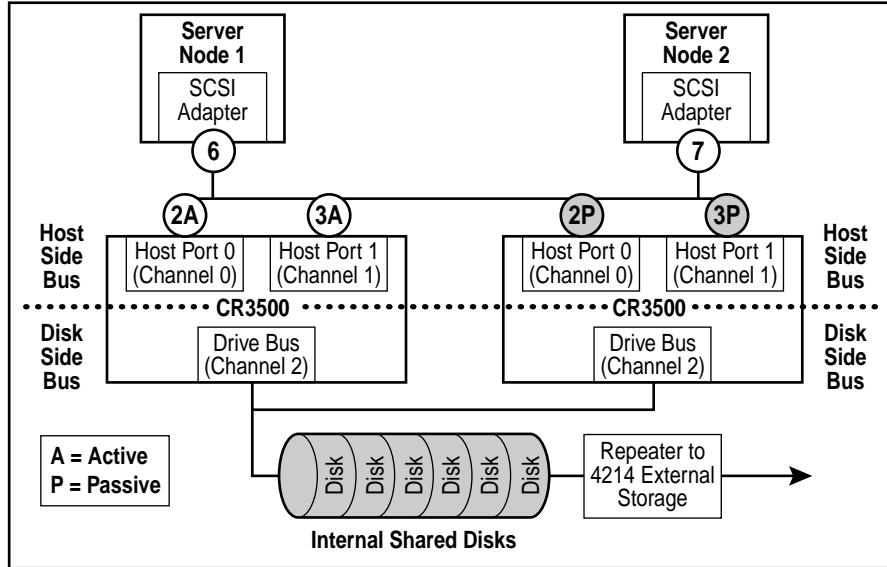


Figure A-6. Active/passive failover mode

Disk Side SCSI Bus

The disk side SCSI bus consists of the CR3500 RAID Controller connections to the disk bus, and the SCSI disk drives in the shared storage area. Since the disk side SCSI bus is separate from the host side SCSI bus, there is no chance for SCSI ID conflicts with any devices configured on the Host Side Bus. Figure A-7 shows the SCSI bus numbering for the disk side SCSI bus in a standard ProLiant CL380 configuration with no external expansion shared storage.

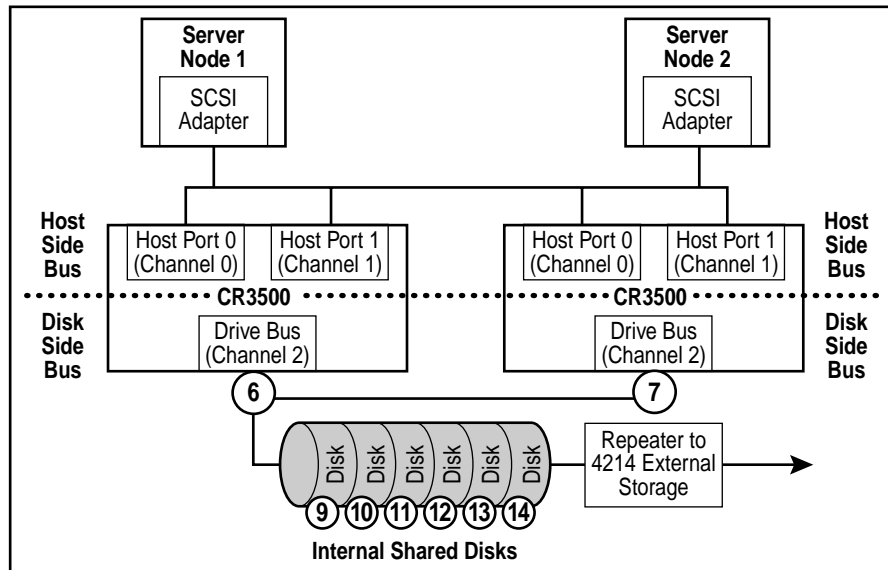


Figure A-7. Disk side SCSI bus numbering

CR3500 RAID Controller Connections

Each CR3500 RAID Controller has a connection to the disk side SCSI bus. These are automatically set to Initiator SCSI IDs 6 and 7, and cannot be changed. Since these are on a separate SCSI bus, there is no conflict with the SCSI IDs 6 and 7 that are used for the Compaq 64-bit Dual Channel Wide Ultra2 SCSI Controllers in each server node. In fact, these IDs were chosen to be the same to reduce confusion.

Internal Shared Disks

The CR3500 Configuration Utility uses the SCSI IDs when configuring physical drives into drive arrays, so it is important to relate the SCSI ID with the physical drive position. The SCSI IDs addressing the six internal shared storage drives are SCSI IDs 9 through 14. The remaining SCSI IDs, with the exception of SCSI IDs 6 and 7, which are reserved for use by the disk side SCSI bus connections to the CR3500 RAID controllers, represent drives in the external shared storage cabinet.

External Shared Storage Expansion

When more storage is needed than can be provided by the six internal shared storage drives, you can expand the shared storage capacity by adding a StorageWorks Enclosure 4214. Two configurations are supported. A single bus expansion configuration connects a single ProLiant CL380 to a StorageWorks Enclosure 4214, and up to eight additional drives can be used for shared storage. A dual bus expansion configuration connects two ProLiant CL380 systems to a StorageWorks Enclosure 4214 by splitting the bus in the expansion cabinet.

Single Bus Expansion Configuration

Figure A-8 illustrates the proper location of the drives in the StorageWorks Enclosure Model 4214T (Tower) or Model 4214R (Rack). This external enclosure extends the internal shared storage and uses SCSI IDs 0 through 5, 8, and 15 to support 14 drives. The drives must be placed carefully in the external shared storage enclosure.

When installing drives in the enclosure, begin at the bottom of a tower cabinet or on the left of a rack model. Place the drives consecutively in the first seven drive bays that are using SCSI IDs 0 through 5, and 8. Then skip six bays because the SCSI IDs for these six bays are being used by the internal shared storage drives. Lastly, place one drive in the bay following the six bay gap. This last bay will be located at the top of the tower model or at the far right in the rack model.

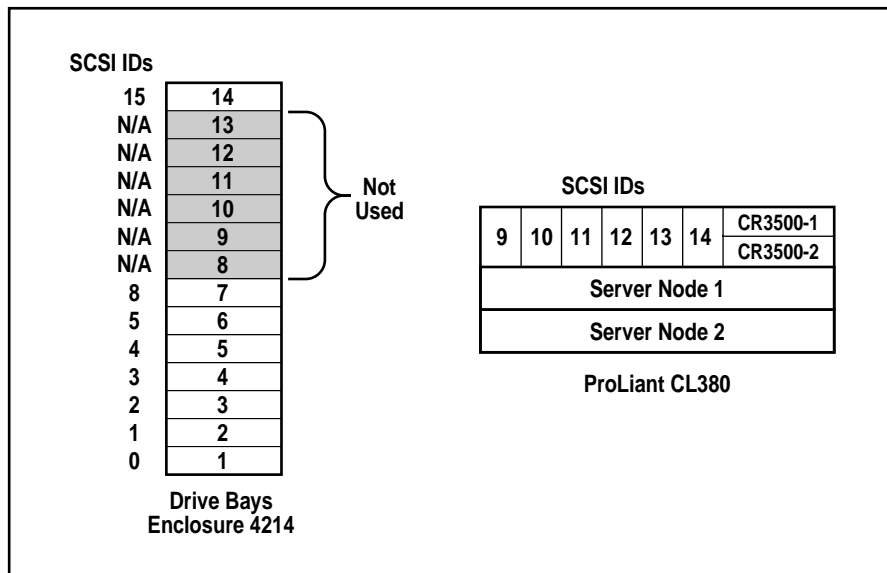


Figure A-8. SCSI IDs for single bus configuration

Dual Bus Expansion Configuration

In a dual bus configuration, a StorageWorks Enclosure 4214 is used to connect to two ProLiant CL380 systems. An optional Dual Bus I/O Module must be installed in the StorageWorks Enclosure 4214. The Dual Bus I/O Module splits the SCSI bus into two equal halves, each supporting seven disk drives. This configuration is illustrated in Figure A-9.

When configured with the Dual Bus I/O Module, the enclosure provides two separate channels that can be used by each of the ProLiant CL380 clusters. The external storage enclosure has two separate buses that can be accessed independently of one another. The drive bays on each bus are addressed as SCSI IDs 0 through 5 and 8. Each bus is connected by an external SCSI cable to the CR3500 RAID Controller in each ProLiant CL380. The seven drives in the external enclosure are seen as an extension of the six drives in the internal shared storage of each ProLiant CL380. This configuration provides support for 13 drives for each cluster.

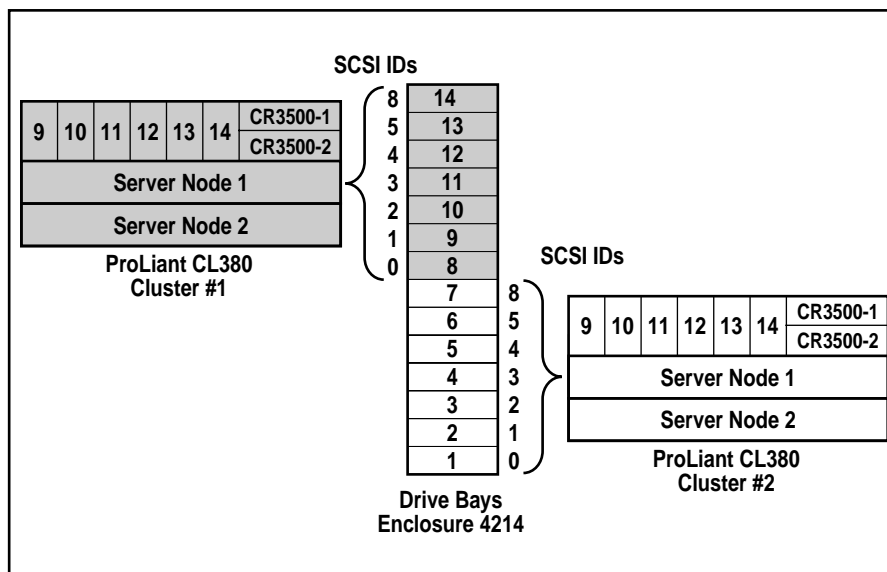


Figure A-9. SCSI IDs for dual bus expansion configuration

Summary

The Compaq ProLiant CL380 provides a high availability solution that is prepackaged in a cost-effective, space-efficient cabinet.

With proper planning and attention to best practice configuration guidelines, customers can deploy their ProLiant CL380 clusters with the confidence that they are backed by Compaq's experience as an industry leader in high availability solutions.

Additional information can be found on the Compaq High Availability website at

<http://www.compaq.com/highavailability>