StorageWorks by Compaq

Addendum - Support for 1 and 2 Gbps Compaq SAN Switch Models

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This document describes the configuration rules for Compaq Fibre Channel SANs consisting of mixtures of Compaq StorageWorks SAN Switch 8, 8-EL, 16, and 16-EL (1 Gbps speed) and SAN Switch 2/16, 2/8-EL, and 2/16-EL (2 Gbps speed) switches. This document also describes the configuration rules for the Compaq StorageWorks SAN Core Switch 2/64 (2 Gbps speed) as a single chassis, standalone switch, SAN fabric. This document is an addendum to the Heterogeneous Open SAN Design Reference Guide, 3rd edition (AA-RMPND-TE).

Obtain the latest version of the *Heterogeneous Open SAN Design Reference Guide* through this link:
http://www.compaq.com/products/storageworks/san/documentation.html

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Addendum Contents

This addendum covers the following major topics:

- StorageWorks by Compaq SAN Switch 2/16, 2/8-EL, 2/16-EL, and SAN Core Switch 2/64 product features

- Configuration rules for SAN fabrics using only the SAN Switch 2/16 model switches

- Configuration rules for SAN fabrics using only the SAN Switch 2/8-EL and 2/16-EL model switches

- Configuration rules for SAN fabrics using only the SAN Core Switch 2/64 model switch

- Configuration rules for SAN fabrics using combinations of SAN Switch 8, 8-EL, 16, and 16-EL, 2/16, 2/8-EL, and 2/16-EL model switches

- Configuration rules for SAN fabrics using only the SAN Switch 8, 8-EL, 16, and 16-EL are covered in the SAN Design Guide.

Intended Audience

This document is intended for customers who are interested in adding new 2 Gbps SAN infrastructure components to existing 1 Gbps installations, or who are migrating from 1 Gbps SAN installations using the SAN Switch products to 2 Gbps Fibre Channel using the SAN Switch 2/16, 2/8-EL, 2/16-EL, or SAN Core Switch 2/64 products. Customers who wish to build a new SAN using 2 Gbps Fibre Channel may also use these configuration rules.

SAN Fabrics with 1 and 2 Gbps SAN Switches

Overview

Compaq offers a range of 1 Gbps and 2 Gbps SAN infrastructure components. The StorageWorks by Compaq SAN switch family now includes the following products:

- SAN Switch 2/16
- SAN Switch 2/8-EL
- SAN Switch 2/16-EL
- SAN Core Switch 2/64
- SAN Switch 8
- SAN Switch 8-EL
- SAN Switch 16
- SAN Switch 16-EL

The new 2 Gbps products double the interconnect speed, offering higher performance to meet the most demanding I/O requirements.

Early introduction of 2 Gbps products into Compaq SAN fabrics makes it easy to plan for future growth. Support for mixed configurations offers a migration path from existing 1 Gbps fabrics to the newer 2 Gbps fabrics. SAN designers may continue to build 1 Gbps fabrics with confidence that any investment in 1 Gbps SAN fabric infrastructure will retain its value.

It is intended that future releases of 1 Gigabit SAN products will continue to be useful in 2 Gigabit fabrics. The configuration restrictions listed in this document will be relaxed as Fibre Channel technology development continues.

SAN Switch 2/16 Product Features

The SAN Switch 2/16 is a 16 port Fibre Channel switch offering full 2 Gbps performance in a 1U rack mount package. This switch features 2 Gbps (over 200 Megabytes per second) transfer speed and the optional ability to trunk or aggregate the throughput of up to four Inter-Switch Links (ISLs). The higher speed, coupled with the optional trunking feature, will allow users to install these switches in pairs for use as high speed backbone devices. Users will join SAN islands with little or no performance degradation. The increased performance of these switches is also appropriate in applications where high throughput needs exist. Examples include:

- Video streaming
- Intensive on-line transaction processing
- Medical imaging

It also features the new Small Form-factor Pluggable (SFP) connectors which allow for higher port density than was available using GBICs.

The switch contains redundant, hot-pluggable power supplies.

The following optional software is available for the SAN Switch 2/16:

- Trunking
- Advanced Performance Monitor
- Fabric Watch

The Compaq SAN Switch 2/16 is compatible with the SAN Switch 8, SAN Switch 8-EL, SAN Switch 16, and SAN Switch 16-EL. Refer to the SAN Switch 2/16 QuickSpecs document for additional information:

http://www.compaq.com/products/quickspecs/north_america/10490.html

SAN Switch 2/8-EL and 2/16-EL Product Features

The SAN Switch 2/8-EL and 2/16-EL are entry-level Fibre Channel SAN switches. They offer full 2 Gbps performance and compatibility with the other members of the Compaq Fibre Channel SAN switch family, with a slightly reduced feature set, slightly reduced configuration limits, and a substantially lower cost.

For the initial release the SAN Switch 2/8-EL and 2/16-EL products are supported in SAN fabrics with up to 4 switches in total. In the future Compaq will support upgrades for these switches to enable them to be usable in larger fabrics. The upgrade will be provided by purchase of a license that will enable additional feature support.

The following optional software is available for the SAN Switch 2/8-EL and SAN Switch 2/16-EL:

• Trunking

• Advanced Performance Monitor

• Fabric Watch

Refer to the SAN Switch 2/8-EL and 2/16-EL QuickSpecs for additional information about the features of these products.

http://www.compaq.com/products/quickspecs/north_america/10490.html

SAN Core Switch 2/64 Product Features

The SAN Core Switch 2/64 is the first of a new family of Compaq Storageworks Open SAN Core Switch products. The core switch products are intended for use in large, demanding SAN environments where high port count and performance are required.

The SAN Core Switch 2/64 is available in a single 14U Richmond chassis enclosure as a dual 64-port high capability Fibre Channel switch. Each switch enclosure may contain up to eight SAN core switch blade modules, each with sixteen 2 Gbps Fibre Channel ports. Two groups of four blades each form a total of two 64-port switches, each operating independently. Depending on the configuration, one SAN Core Switch 2/64 chassis can support up to 128 total ports with 126 user ports, see Figure 1. The SAN Core Switch 2/64 uses an all-new hardware and firmware foundation, providing the most advanced switching capability available. In addition to the features offered by the current 2 Gbps SAN Switch models, the SAN Core Switch 2/64 has redundant Control Processors and redundant hot swappable power supplies and fans.

Refer to the SAN Core Switch 2/64 QuickSpecs for additional information.

http://www.compaq.com/products/quickspecs/north_america/10490.html

SAN Switch Configuration Rules

Compaq Open SAN fabrics may be designed using the following Fibre Channel SAN switches and the listed combinations:

- SAN Switch 8, 8-EL, 16, 16-EL (1 Gbps switches) with 1 Gigabit per second speed (1 Gbps)

- SAN Switch 2/8-EL, 2/16-EL, and 2/16 (2 Gbps switches) with 2 Gigabit per second speed (2 Gbps)

- Mixture of SAN Switch 8, 8-EL, 16, 16-EL (1 Gbps switches) and SAN Switch 2/8-EL, 2/16-EL, and 2/16 (2 Gbps switches)

- Single chassis standalone switch SAN fabrics with SAN Core Switch 2/64 (2 Gbps switch)

NOTE: For the initial release, the SAN Core Switch 2/64 switch is supported in single switch fabric configurations of up to 128 ports total with 126 user ports. Future releases will provide support for using the SAN Core Switch 2/64 mixed with other Compaq SAN switch models.

If your fabric consists exclusively of 1 Gbps switches, then refer to the configuration rules in the *Heterogeneous Open SAN Design Reference Guide.*

If your fabric has any 2 Gbps switches, then refer to the configuration rules in this Addendum.

A port on a 2 Gbps switch operates at a maximum of 2 Gbps speed when connected to a port on another 2 Gbps switch. A port on a 2 Gbps switch operates at a maximum of 1 Gbps speed when connected to a port on a 1 Gbps switch.

Host Bus Adapter (HBA) connections and storage system connections operate at a maximum of 1 Gbps or 2 Gbps speeds, depending on the product features and depending on the communication speed supported by the HBA and the switch port to which they are connected. Products capable of operating at 2 Gbps speeds are designed to automatically operate at 2 Gbps speeds when connected to a 2 Gbps port and revert to 1 Gbps speeds when connected to a 1 Gbps port.

NOTE: The use of 2 Gbps HBAs or 2 Gbps storage systems does not mean that you have a 2 Gbps Fibre Channel fabric. The fabric speed is determined exclusively by the switches. If you have 2 Gbps HBAs or 2 Gbps storage systems, but your switches are all 1 Gbps devices (SAN Switch 8, 8-EL, 16, 16-EL), then your SAN is a 1 Gbps configuration and you should use the rules in the *Heterogeneous Open SAN Design Reference Guide.* If you have 2 Gbps HBAs or 2 Gbps storage systems and your switches are a mix of 1 Gbps and 2 Gbps or all 2 Gbps then a portion or all of your SAN is 2 Gbps and you should use the rules in this document.

Figure 1 shows a SAN Core Switch 2/64 with its maximum configuration of 128 total ports with 126 user ports. The number of user ports will vary depending on the number of ISLs used to connect the blades in SW0 to the blades in SW1. The SAN Core Switch 2/64 is the only switch in its fabric.
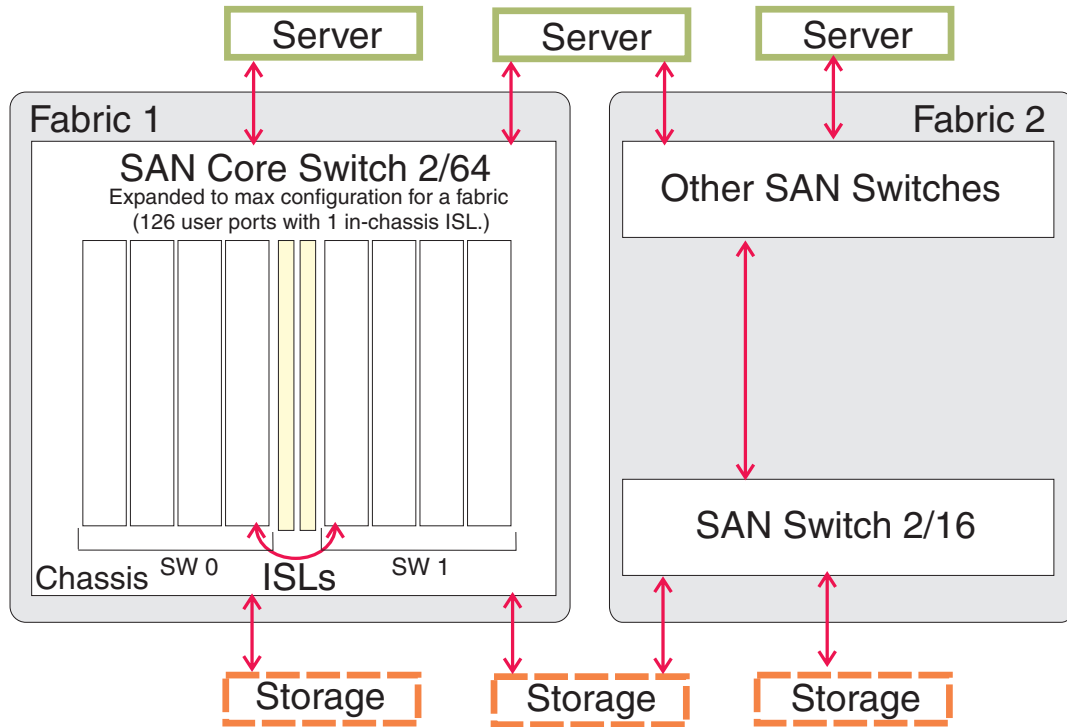
Figure 1: SAN Core Switch 2/64 Maximum Configuration

Switch Model Interoperability and Fabric Rules

Table 1 lists the interoperability between different models of Compaq SAN Switch models. The number indicates the maximum number of switches supported for a given mixture of switch models.

Table 1: SAN Switch Interoperability - Maximum Fabric Size

Switch Model Firmware Version	SAN Switch 8, 8-EL SAN Switch 16 SAN Switch 16-EL	SAN Switch 2/16	SAN Switch 2/8-EL SAN Switch 2/16-EL	SAN Core Switch 2/64
SAN Switch 8, 8-EL SAN Switch 16 SAN Switch 16-EL **FW: 2.6.0c**	20	20	4	N/A
SAN Switch 2/16 **FW: 3.0.2e**	20	20	4	N/A
SAN Switch 2/8-EL SAN Switch 2/16-EL **FW: 3.0.2e**	4	4	4	N/A
SAN Core Switch 2/64 **FW: 4.0.0**	N/A	N/A	N/A	1 chassis

NOTE: The discontinued Compaq Fibre Channel 8 and Fibre Channel 16 switches will *not* interoperate with 2 Gbps switches.

The following rules must be followed in all installations using Compaq 2 Gbps SAN switches. These rules reflect various technical limitations in the current products, and will be relaxed in the near future. *SANs that do not comply with these restrictions are not supportable by Compaq.*

The maximum number of switches that may be used in a configuration containing 2 Gbps switches varies depending on the switches that are chosen. This is shown in Table 1 above and described in detail in the following rules:

- A maximum of 20 switches and 7 hops may be configured in SAN fabrics containing 2 Gbps SAN Switch 2/16 switches.

- A maximum of 20 switches and 7 hops may be configured in fabrics containing a mixture of 2 Gbps SAN Switch 2/16 switches and 1Gbps SAN Switch 8, 8-EL, 16, or 16-EL switches.

- A maximum of 4 switches and and 3 hops may be configured in SAN fabrics containing 2 Gbps SAN Switch 2/8-EL or 2/16-EL only or mixed with other 2 Gbps or 1 Gbps SAN Switch models.

- For the switches listed above, any topology listed in the *Heterogeneous Open SAN Design Reference Guide* may be used.

- A maximum of 1 SAN Core Switch 2/64 chassis may be configured in a SAN fabric. No other switch models are supported in the same fabric at this time.

- For 1 Gbps SAN fabrics refer to the *Heterogeneous Open SAN Design Reference Guide* for the configuration rules.

- The maximum supported distance for ISLs running at 2 Gbps is 300 meters if using 50 micron multi-mode cable, or 150 meters if using 62.5 micron multi-mode cable.

- Zoning rules, SAN security, and SAN management for 2 Gbps switches are the same as for the 1 Gbps switches.

- Optional switch features may be used on any switch in the fabric if the feature is supported on that switch. For example, in a fabric consisting of four SAN Switch 16 switches and four SAN Switch 2/16 switches, the Fabric Watch feature may be used on the SAN Switch 2/16s.

- The trunking feature works only between 2 Gbps switches.

- Long distance links for 2 Gbps switches are not available at this time.

Cabling Rules

The 2 Gbps switch models use industry standard "LC" connectors for the Fibre Channel optical connections. Note that these are smaller than the "SC" connectors used in previous Compaq optical Fibre Channel storage products.

Cables are available with SC connectors on one end and LC connectors on the other end. Adapters are also available. Refer to the 2 Gbps switch QuickSpecs document for additional information.

Storage Rules

Refer to the *Heterogeneous Open SAN Design Reference Guide* for all primary (disk) storage configuration rules.

Refer to the Enterprise Backup Solution documentation for secondary storage support information at:

http://www.compaq.com/products/storageworks/ebs/documentation.html

Platform Support and Switch Model Firmware Versions

For a complete list of Compaq switch model firmware versions and platform support revisions refer to the latest SAN product support tables for the Compaq *Heterogeneous Open SAN Design Reference Guide* through this link:

http://www.compaq.com/products/storageworks/san/documentation.html