# hp StorageWorks

## common software and switch options version 3.0.x/4.0.x release notes

Part Number: AV-RTQUA-TE

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This document contains last-minute and supplemental information about your common software and switch options. In the event of conflicting information between these Release Notes and other documents contained in this product release, the Release Notes contents take precedence.

For the latest version of these Release Notes and other product documentation, visit the StorageWorks website at: http://www.compaq.com/storage/index.html.

# Release Notes Contents

These Release Notes cover the following major topics:

- Common Software Descriptions

- Switch Options Descriptions and Requirements

  **NOTE:** All of the switch options listed above are either a preconfigured feature or a saleable option, depending on the product configuration purchased.

## Intended Audience

This document is intended for customers who purchased HP StorageWorks SAN or HP StorageWorks Core switches.

## Related Documentation

The common software and switch options documentation includes the following documents:

- *HP StorageWorks Advanced Performance Monitoring Version 3.0.x/4.0.x User Guide*, part number AA-RTS4A-TE

- *HP StorageWorks Common Software and Switch Options V3.0.x/V4.0.x Release Notes* (this document), part number AV-RTQUA-TE

- *HP StorageWorks Diagnostic and System Error Message Version 3.0.x/4.0.x Reference Guide*, part number AA-RS22A-TE

- *HP StorageWorks Extended Fabric Version 3.0.x/4.0.x User Guide*,
  part number AA-RTSDA-TE

- *HP StorageWorks Fabric OS Version 3.0.x/4.0.x Reference Guide*,
  part number AA-RS24A-TE

- *HP StorageWorks Fabric Operating System Procedures Version 3.0.x/4.0.x User Guide*,
  part number AA-RS23A-TE

- *HP StorageWorks Fabric Watch Version 3.0.x/4.0.x User Guide*,
  part number AA-RTSGA-TE

- *HP StorageWorks ISL Trunking Version 3.0.x/4.0.x User Guide*,
  part number AA-RTSAA-TE

- *HP StorageWorks Quickloop Fabric Assist Version 3.0.x User Guide*,
  part number AA-RTS1A-TE

- *HP StorageWorks Remote Switch Version 3.0.x/4.0.x User Guide*,
  part number AA-RTS7A-TE

- *HP StorageWorks SAN Switch 2/32 Version 4.0.x Release Notes*,
  part number AV-RTT4A-TE

- *HP StorageWorks Web Tools Version 3.0.x/4.0.x User Guide*,
  part number AA-RS25A-TE

- *HP StorageWorks Zoning Version 3.0.x/4.0.x User Guide*,
  part number AA-RS26A-TE

Additional documentation is available via the HP website at: http://www.compaq.com/storage/saninfrastructure.html

# Common Software Descriptions

The descriptions included in this section apply to the software and information that ships with all HP StorageWorks switches that run Fabric OS. Common software products include:

- Diagnostics and Error Messages Overview
- Fabric OS Procedures Overview
- Fabric OS Reference Overview
- Web Tools Overview
- Zoning Overview

Refer to the *HP StorageWorks SAN Switch 2/32 Version 4.0.x Release Notes* for late-breaking information relating to these products.

## Diagnostics and Error Messages Overview

The *HP StorageWorks Diagnostic and System Error Message Version 3.0.x/4.0.x Reference Guide* supports Fabric OS V3.0.x and Fabric OS V4.0.x, including software error messages and hardware error messages.

## Fabric OS Procedures Overview

The *HP StorageWorks Fabric Operating System Procedures Version 3.0.x/4.0.x User Guide* provides operating procedures for HP StorageWorks SAN and HP StorageWorks Core switches, including:

- Setting the initial configuration
- Basic configuration procedures
- Operating the SAN Core Switch 2/64
- Working with the Management Server
- Diagnostics and Status

## Fabric OS Reference Overview

The *HP StorageWorks Fabric OS Version 3.0.x/4.0.x Reference Guide* provides a detailed description of the commands in Fabric OS V3.0.x and V4.0.x. This guide also describes the Fabric OS commands for licensed products and provides a Fabric OS version comparison.

# Web Tools Overview

Web Tools provides a graphical interface that allows the administrator to monitor and manage entire fabrics and individual switches and ports from a standard workstation. It is a standard product that runs on all StorageWorks switches running the V3.0.x or 4.0.x firmware streams. Web Tools is documented in the *HP StorageWorks Web Tools Version 3.0.x/4.0.x User Guide*.

# Zoning Overview

Advanced Zoning allows partitioning of Storage Area Network (SAN) into logical groupings of devices that access each other. You can also arrange fabric-connected devices into logical groups, or zones, over the physical configuration of the fabric.

Zones can be configured dynamically and can vary in size depending on the number of fabric connected devices. Devices can also belong to more than one zone. Because zone members can access only other members of the same zone, a device not included in a zone is not available to members of that zone.

Zoning is documented in the *HP StorageWorks Zoning Version 3.0.x/4.0.x User Guide*.

# Switch Options Descriptions and Requirements

The descriptions and requirements in this section apply to the licensed options in Fabric OS, including:

- Advanced Performance Monitoring Overview

- Extended Fabric Overview and Configuration Support

- Fabric Watch Overview and Information

- ISL Trunking Overview and Requirements

- QuickLoop Fabric Assist Overview and Support

- Remote Switch Overview and Limitations

**NOTE:** All of the switch options listed in this section are either a preconfigured feature or a saleable option, depending on the product configuration purchased.

## Advanced Performance Monitoring Overview

Advanced Performance Monitoring is a comprehensive tool for monitoring the performance of networked storage resources. This tool helps reduce total cost of ownership and over-provisioning while enabling SAN performance tuning, reporting of service level agreements, and greater administrator productivity. Advanced Performance Monitoring is an optionally licensed product and is documented in the *HP StorageWorks Advanced Performance Monitoring Version 3.0.x/4.0.x User Guide*.

## Extended Fabric Overview and Configuration Support

Extended Fabric uses Fibre Channel technology to create a fabric interconnected at distances greater than 10 kilometers for 1 Gigabit or 5 kilometers for 2 Gigabit Inter Switch Links. Extended Fabric is an optionally licensed product that runs on:

- StorageWorks 1 Gigabit SAN switch series with version 2.0.x installed,

- StorageWorks 2 Gigabit SAN switch series with version 3.0.x installed, or

- HP StorageWorks ore Switch 2/64 (Core Switch 2/64) switches with version 4.0.x installed.

Extended Fabric requires the use of Long Wave GBIC or SFP transceivers to go beyond 500 meters for 1 Gigabit and 300 meters for 2 Gigabit links respectively.

The maximum number of 'HOPS' or inter-switch links allowed in a Fabric is seven and only one of these links can be a very long Extended Link (> 10 kilometers). The maximum distance for a very long Extended Link 1 Gigabit Link is 100 kilometers. Given these limits the maximum of 160 kilometers is possible with one 100-kilometer link and six 10-kilometer links.

## Extended Fabric Compatibility Support

HP has three series of switches as listed above; these switches can be divided into two classes based on the internal ASIC technology used in the switch. The two classes are switches limited to 1 Gigabit and those that are 2 Gigabit capable.

An extend fabric link can only exist between two switches of the same technology, meaning a StorageWorks 1 Gigabit SAN series switch can only have an extended fabric link to another StorageWorks 1 Gigabit SAN series switch. The StorageWorks 2 Gigabit SAN series switch can only have an extended fabric link to another StorageWorks 2 Gigabit SAN series or a HP StorageWorks Core Switch 2/64 switch. A StorageWorks 2 Gigabit SAN series or a HP StorageWorks Core Switch 2/64 switch cannot a have an extended fabric link to a StorageWorks 1 Gigabit SAN series switch.

## PortcfgLongDistance Setting

Extended Fabric optimizes the internal buffering algorithm for StorageWorks switches, which results in line speed performance of close to full Fibre Channel speed. The "PortcfgLongDistance" setting is used to configure the port with the appropriate amount of buffers based on the speed and distance of the extended link. The possible settings are:

- L0: 1 Gigabits links up to 10 kilometers or 2 Gigabit links up to 5 kilometers
  No Extended Fabric license required (Also referred to as an "E-Port")

- LE: 2 Gigabit links between 5 and 10 kilometers
  No Extended Fabric license required

- L1: Extended Links greater than 10 kilometer but not more than 50 kilometers Extended Fabric license required

- L2: Extended Links greater than 50 kilometer but not more than 100 kilometers Extended Fabric license required

These port settings modify the number of Buffer-To-Buffer credits a particular port is allocated and there are limited numbers of these credits available. Buffer-To-Buffer credits are allocated to a group of 4 ports or what is referred to as a "Quad". A quad consists of ports 0 through 3, 4 through 7, 8 through 11, 12 through 15 and so on. The following table lists the configuration limits for a "Quad".

| Speed | Port a | Port b | Port c | Port d |
|-------|--------|--------|--------|--------|
| 1 Gigabit/second | L2 | L1/L0 | Fx/LE | X |
| 1 Gigabit/second | L2 | Fx/LE | Fx/LE | Fx/LE |
| 1 Gigabit/second | L1/L0 | L1/L0 | L1/L0 | L1/L0 |
| 1 Gigabit/second | Fx/LE | Fx/LE | Fx/LE | Fx/LE |
| 2 Gigabit/second | L2 | X | X | X |
| 2 Gigabit/second | L1 | Fx/L0/LE/L1 | X | X |
| 2 Gigabit/second | L1 | L0/LE | L0/LE/Fx | X |
| 2 Gigabit/second | L1 | Fx | Fx | Fx |
| 2 Gigabit/second | L0/LE/Fx | L0/LE/Fx | L0/LE/Fx | L0/LE/Fx |
| **Legend:** Fx = Fabric port | | L0, LE, L1, L2 = Inter Switch Links | | |

## Fabric Long Distance Bit Setting

The Fabric Long Distance Bit needs to be set on all switches in the fabric when any pair of StorageWorks 1 Gigabit SAN series switches have an extended link greater than 10 kilometers (PortcfgLongDistance = L1 or L2).

Whenever a pair or pairs of StorageWorks 2 Gigabit SAN series or HP StorageWorks Core Switch 2/64 switches have a port configured for LE, L1, or L2 then the Fabric Long Distance Bit must be off.

In other words you cannot have an extended link of greater than 10 kilometers between a pair of StorageWorks 1 Gigabit SAN series switches and an extended link greater than 5 kilometer between a pair of StorageWorks 2 Gigabit SAN series or HP StorageWorks Core Switch 2/64 switches in the same fabric.

You can have extended links of up to 10 kilometers (PortcfgLongDistance = L0) between a pair of StorageWorks 1 Gigabit SAN series switches and any length extended link between a pairs of StorageWorks 2 Gigabit SAN series or HP StorageWorks Core Switch 2/64 switches in the same fabric. Likewise you can have an extended link over 10 kilometers between StorageWorks 1 Gigabit SAN series switches as long as there are no Inter Switch Links greater than 5 kilometers between a pairs of StorageWorks 2 Gigabit SAN series or HP StorageWorks Core Switch 2/64 switches in the same fabric.

# Fabric Watch Overview and Information

Fabric Watch software monitors the performance and status of StorageWorks SAN switches, and can alert storage area network (SAN) managers when problems arise. The real-time alerts from Fabric Watch software help SAN managers solve problems before they become costly failures. SAN managers can configure Fabric Watch software to monitor any of the following:

- Fabric events (such as topology reconfigurations and zone changes)
- Physical switch conditions (such as fans, power supplies, and temperature)
- Port behavior (such as state changes, errors, and performance)
- SFPs (for switches equipped with SMART SFPs)

Fabric Watch is documented in the *HP StorageWorks Fabric Watch Version 3.0.x/4.0.x User Guide*. Fabric Watch default settings can be found at the following HP website: http://www.compaq.com/storage/saninfrastructure.html

## Fabric Watch Profiles

The following Fabric Watch file is supported:

```
FW232.TXT                 11/13/2002
```

Refer to the *HP StorageWorks Fabric Watch Version 3.0.x/4.0.x User Guide* for more information.

## Fabric Watch Daemon

During switch startup or reboot, the Fabric Watch daemon is one of the last processes to become active. Depending on the size of the fabric, Fabric Watch may take several minutes to complete its start up sequence. Before Fabric Watch is completely active, it cannot monitor events occurring in the fabric. During this time, the switchstatuspolicyshow command shows the default settings instead of any custom settings.

# ISL Trunking Overview and Requirements

Interswitch Link (ISL) Trunking is an optionally licensed product available on the StorageWorks 2 Gb SAN switches running Fabric OS V3.0.x, and the StorageWorks SAN switches and StorageWorks Core switches running Fabric OS V4.0.x. ISL Trunking is managed using telnet commands or the Advanced Web Tools interface. ISL Trunking simplifies network design and reduces the cost of storage management by optimizing bandwidth use and enabling load sharing of traffic at the frame-level.

The ISL Trunking feature connects up to four ISLs, between two switches through an Expansion Port (E_Port), to merge logically into one link. With ISL Trunking, high speed links ensure that server-to-storage performance is efficient and shared under heavy network loads. When using ISL Trunking to aggregate bandwidth of up to four ports, the speed of the ISLs between switches in a fabric is quadrupled. For example, at 2 Gbps speeds, ISL Trunking delivers ISL throughput of up to 8 Gbps.

ISL Trunking is documented in the *HP StorageWorks ISL Trunking Version 3.0.x/4.0.x User Guide*.

## Trunking Requirements

The following sections describe Trunking requirements.

## Installation Requirements

There are no installation requirements as ISL Trunking is a built-in component of Fabric OS v3.0, Fabric OS v4.0, and later releases on all StorageWorks 2 Gbit/sec switches based on third generation HP ASIC technology. This includes:

- StorageWorks 2 Gb SAN switches
- StorageWorks Core switch

## Configuration Requirements

No software configuration is required to invoke ISL Trunking since it is enabled on any E_Port for which it is supported. To invoke Trunking, plug in ISLs and follow the following configuration guidelines:

- An ISL trunking license is required for each switch that participates in a trunked connection.
- ISL trunks must be established in port groups driven by a common ISL Trunking hardware driver. Trunking hardware drivers are connected to contiguous 4-port groups such as 0-3, 4-7, 8-11, and 12-15.
- ISL trunk groups can be established by using two, three, or four ISLs between switches--which enables ISLs capable of 4, 6, or 8 Gbit/sec of total throughput.
- Ports must be set to 2 Gbit/sec or auto-negotiate (AN).

You can easily build meshed switch fabrics by connecting trunk groups to any number of adjacent switches.

## Administration Requirements

You can administer ISL Trunking through Web Tools or through Fabric OS CLI.

## Cable Length Requirements

The switches exchange a set of Extended Link Service to calibrate the latency of each link between them. In order to ensure optimal performance, the lengths of the shortest ISL in a trunk and longest should differ by no more than 30 meters; if they differ by more than 400 meters, they will not be included in the trunk.

## Long Distance Trunking

Trunking is not supported with LE, L1, and L2 `portcfglongdistance` modes. Trunking is supported for normal E_Ports (referred to as L0 in `portcfglongdistance` command) with LWL media up to 5 km at the full speed permitted by the link. With LWL media, the throughput begins to fall off beyond 5 km, due to normal latency effects.

# QuickLoop Fabric Assist Overview and Support

QuickLoop is an optionally licensed product that allows arbitrated loops to be attached to a fabric. Without modifying their drivers, private storage devices on the arbitrated loops can be accessed by public or private hosts elsewhere on the fabric.

With the Zoning license that is provided by default, the set of storage devices visible to specific hosts can be carefully administered. QuickLoop Fabric Assist mode is also enabled, which allows private hosts on an arbitrated loop port to access any public or private storage device within the fabric, provided that they are assigned to a Fabric Assist mode zone.

The QuickLoop and Zoning combination allows a private host to fully participate in a Storage Area Network (SAN).

QuickLoop Fabric Assist is documented in the *HP StorageWorks Quickloop Fabric Assist Version 3.0.x User Guide*.

## QuickLoop is not Supported on Core Switches

The StorageWorks Core switch and the StorageWorks SAN Switch 2/32 do not support Quickloop, in either its original hub emulation mode, or its Fabric Assist mode. This means that direct attachment of private hosts to the StorageWorks Core switch or the StorageWorks SAN Switch 2/32 is not supported.

**NOTE:** Fabric or loop targets attached to the StorageWorks Core switch may be included in Fabric Assist Zones for private hosts attached to other switches in the fabric.

## Zoning Licensing

HP provides Zoning as a standard feature on its SAN and Core Fibre Channel switches. This means that the Zoning license is factory installed on each of these switches. You should ignore references in the product documentation to installing the Zoning license or to Zoning being an optionally purchased product.

# Remote Switch Overview and Limitations

The Remote Switch fabric functions with the aid of a "bridging device" or network-bridge. The network-bridge supports both a Fibre Channel physical interface, as well as a secondary non-Fibre Channel FCIP physical interface.

There are currently the following Remote Switch support limitations:

- The network-bridge supports both a Fibre Channel physical interface, as well as a secondary non-Fibre Channel IP physical interface.

- Remote Switch is currently supported with the CNT UltraNet Edge Model 1001 (firmware version 1.4) gateway device.

**IMPORTANT:** Remote Switch is supported when used with HP StorageWorks Data Replication Manager (DRM) only.