

HP Serviceguard for Linux Order and Configuration Guide



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Introduction

This document defines the HP supported server cluster configurations for interconnection of specified industry standard servers and storage with the high-availability clustering middleware—HP Serviceguard for Linux (A.11.18). These configurations provide both high server and high cluster availability and minimize single points of failure (SPOFs). A configuration certified and supported by HP should be adhered to. Deviations from the supported configurations can result in an inoperative cluster, an operating cluster with degraded performance, or hidden SPOFs. Therefore, deviations are not supported.

What's new

Introducing HP Serviceguard for Linux A.11.18, which enables improved application availability and provides support of emerging industry standard technologies:

- Reduce costs and improve quality of service with A.11.18 version
 - Eliminate costly downtime through new online configuration capabilities
 - Increase control by building application dependencies into high availability configurations
 - Make it easy to write multi-node, HA-aware applications
- Bring high availability to applications into your virtual Linux environment (Autumn 2007)
 - Support for Serviceguard for Linux within VMware Virtual Machines Linux guests
 - Extend support for Serviceguard for Linux within HP Integrity VM guests
- Increase availability over distances up to 100km based on open-source components
 - Extended Distance Cluster (XDC) now supports up to 4 nodes
- Support for Industry standards ensures investment protection
 - Integrates with broadly-used system management standards to simplify monitoring of entire cluster environment
 - Supports applications that require failover with the emerging IPv6 standard for cluster node network addresses
 - Introduces support for Red Hat EL

Special note on configurations

Serviceguard is dependent on a number of other components: the operating system, drivers, etc. Because of this, there are sometimes more restrictions on versions of drivers, connectivity, etc. The most up-to-date information on supported configurations can be found in the [Certification Matrix](#).

Cluster configuration elements

This section identifies the hardware components, system software, network interfaces, and power distribution arrangement required to build an operational server cluster supported by HP. The various server cluster elements are listed below, and their associated configuration data is detailed in separate tables and illustrations that follow.

System software

HP Serviceguard for Linux

- Serviceguard Manager
- Quorum Service

HP Serviceguard for Linux contributed toolkits

HP Serviceguard for Linux Oracle Toolkit

HP Serviceguard Extension for SAP for Linux

HP Serviceguard Developers Toolbox

HP Serviceguard Extended Distance Cluster (XDC) for Linux

HP Serviceguard for Linux and Red Hat Global File System

Hardware components

Servers for cluster

PC or server for Quorum Service if 2-node cluster (optional)

Storage and storage switches

Power configuration

Description on how to configure cluster power connections for highest availability

System software

HP Serviceguard for Linux

Description

HP Serviceguard for Linux is a high availability clustering solution that leverages the strength of HP's experience in the HA business, bringing the best-in-class mission critical HP-UX technologies to the Linux. The software provides critical applications the high availability that enterprise customers require for 24x7 business operations. It is designed to protect applications from a wide variety of software and hardware failures, monitoring the health of each server (node) and quickly responding to failures including system processes, system memory, LAN media and adapters, and application processes.

Features

HP Serviceguard for Linux monitors the health of various components within each node and quickly responds to failures in a way that eliminates or minimizes application downtime. Serviceguard is able to detect and respond to failures in:

- SPU
- System memory
- System and application processes
- LAN media and adapters
- Storage subsystem and adapters

For ease of management and outstanding flexibility, Serviceguard for Linux allows all of the resources needed by an application to be organized into entities called "packages." Packages consist of any

resource needed to support a specific application service such as disks, network resources, and application or system processes. Packages are the entities that are managed and moved within the enterprise cluster.

Serviceguard for Linux is an important component in creating a complete and robust environment for highly-available critical applications. In order to create a complete solution, the application environment should be designed to eliminate all single points of failure and to minimize the impact of various component failures.

Memory required

Serviceguard requires approximately 15.5 MB of lockable memory.

Disk space required

HP Serviceguard for Linux uses approximately 50MB of disk space after installation. Additional disk space requirements for toolkits and package scripts depend on the specifics of the environment but can add to this requirement.

Software required

For ProLiant servers, one HP Serviceguard for Linux license must be ordered for each system (node). For other x86 servers, the guidelines provided for ProLiant servers apply. For Integrity servers, one HP Serviceguard for Linux for Integrity license must be ordered for each core. The product 3055199-B27 includes 2 licenses. All other products include 1 license.

Product number:

If you are ordering for ProLiant servers through HP-UX sales channels [PN#: B9903BA]

If you are ordering for Integrity servers [PN#: T2391AA]

If you are ordering through ProLiant sales channels:

- HP Serviceguard for Linux ProLiant Cluster (305199-B27) – one SKU for all components (up to 2 nodes) needed to create high availability environment
- HP Serviceguard for Linux (307754-B27) – single license to provide ordering flexibility for clusters with an odd number of nodes or an existing cluster requiring one additional node

Your HP salesperson or HP reseller will know which product number is appropriate.

What's included

For versions used with ProLiant Servers

HP Serviceguard for Linux ProLiant Cluster (305199-B27)

- 2 software licenses
- Ethernet crossover cable (for 2-node clusters)

HP Serviceguard for Linux (307754-B27 or B9903BA)

- 1 software license

Each contains 1 CD with the following structure:

- Serviceguard for Linux software (A.11.18)
 - Managing HP Serviceguard for Linux
 - HP Serviceguard for Linux Version A.11.18 Release Notes
- Serviceguard Manager software (B.01.01 - HP-UX, Windows, and Linux)
 - Serviceguard Manager Version B.01.01 Release Notes
- Quorum Service software (A.02.01 - HP-UX and Linux)
 - Quorum Service Version A.02.01 Release Notes

Documentation is localized in English and Japanese on CD

For versions used with Integrity Servers

HP Serviceguard for Linux for Integrity (T2391AA #2AH)

- 1 software license per core
- 1 CD with the following structure:
 - Serviceguard for Linux for Integrity software (A.11.18)
 - Managing HP Serviceguard for Linux
 - HP Serviceguard for Linux Version A.11.18 Release Notes
 - Serviceguard Manager software (B.01.01 - HP-UX, Windows, and Linux)
 - Serviceguard Manager Version B.01.01 Release Notes
 - Quorum Service software (A.02.01 - HP-UX and Linux)
 - Quorum Service Version A.02.01 Release Notes

Documentation is localized in English and Japanese on CD

Updated documentation is available from <http://docs.hp.com/hpux/ha/>

Serviceguard Manager

HP Serviceguard Manager is a web-based, HP System Management Homepage (HP SMH) plug-in tool that allows users to visually configure, monitor, manage and administer a cluster and its components (e.g. nodes, packages). Intuitive color-coded icons will help quickly identify problems with the cluster so users can quickly react and resolve issues. HP Serviceguard Manager integrates with HP System Insight Manager (HP SIM) to enable management of multiple clusters running on Linux and HP-UX from a single browser.

Serviceguard Manager screens, online help, and release notes are in English, German, French, Italian, Spanish, Japanese, Korean, Simplified Chinese, Traditional Chinese.

The Quorum Service

The Quorum Service (QS) acts as a tie-breaker when a failure in a cluster leaves exactly 50% of the nodes running. When used, it must be installed and run on a system outside the cluster being serviced. The Quorum Service is a separate application provided on the "Serviceguard Distributed Components" CD. The node on which the Quorum Service is running must have network connectivity to the clusters for which it is providing services. Ensure that the connection with each node is independent of the cluster heartbeat connection so that both are not likely to fail at the same time. The Quorum Service is supported for 2- to 16-node configurations. The Quorum Service in a Linux environment can manage up to 50 heterogeneous Linux and HP-UX clusters up to a total of 100 nodes. The Quorum Service and clustered nodes may be on different subnets. Starting with the A.11.15 version of Serviceguard for Linux, cluster lock LUN may be used as an alternative to the Quorum Service. The Serviceguard A.11.18 CD has the SLES10, Red Hat 5, and Red Hat 4 versions of the Quorum Service as well as HP-UX versions. All other versions, including versions for older distributions, are available from www.hp.com/go/softwaredepot.

For more information on the QS, please see "Arbitration for Data Integrity in MC/Serviceguard Clusters" whitepaper at <http://www.docs.hp.com/en/ha.html>.

The Quorum Server running on HP-UX can also be used as quorum for Serviceguard for Linux clusters. The same cluster and node limits apply.

HP Serviceguard for Linux toolkits

Available from www.hp.com/go/softwaredepot/ha at no additional charge are MySQL, Apache, NFS, Samba, PostgreSQL, Tomcat, and SendMail Toolkits for Linux. These provide a separate set of shell scripts that allow you to configure Serviceguard packages that start, stop, and monitor these highly-available applications.

HP Serviceguard for Linux Oracle toolkit

A toolkit for Oracle (T2376A) is available for purchase from the same site or through normal channels. The shell scripts can be modified by you for your specific environment. You cannot use Serviceguard Toolkits without the associated applications. The applications must be installed on your Linux system before you install, configure, and test your package. (When installing the Red Hat Linux distribution, select the "NFS Server" option for use with the NFS Toolkit. The Red Hat installation program will install components required for NFS).

HP Serviceguard Extension for SAP for Linux

HP Serviceguard Extension for SAP for Linux simplifies the integration of complex high availability SAP environments with world-class support, delivering a standardized, consistent solution backed by HP and SAP. It is available for x86 servers (T1227AA) and Integrity servers (T2392AA) running SLES9, Red Hat EL 3, and Red Hat EL 4. Serviceguard for Linux A.11.18 support will be released in the Autumn 2007.

HP Serviceguard Developer's Toolbox Program

HP Serviceguard Developers Toolbox Program (SGDTP) is a framework to facilitate the quick and easy integration of an application with HP Serviceguard on HP-UX and/or Linux. It is the same framework used by HP to create tools in the HP Enterprise Cluster Master Toolkit (ECMT) and Linux toolkit.

This toolbox contains a user's guide, a template that may be customized for your application to create a Serviceguard toolkit, and a test tool to help validate the toolkit in a Serviceguard environment.

HP Serviceguard Extended Distance Cluster (XDC) for Linux

XDC (T2808AA) offers failover capabilities for mission-critical data and applications between sites located up to 100 kilometers apart, ensuring that your business remains running in the event of a system failure or disaster. XDC employs software-based mirroring to replicate data and represents the most cost-effective Linux solution for customers seeking to protect their data, maximize application availability, and retain flexibility in their cluster configurations. It is available for x86 or Integrity servers running SLES9 SP2 (for Serviceguard version A.11.16) or later, SLES10, and Red Hat EL 4 Update 3 or later. Support for Serviceguard version A.11.18 and Red Hat EL 5 will be available Summer 2007.

Hardware components

Servers

HP Serviceguard for Linux supports most HP Integrity servers, HP ProLiant servers, HP BladeSystems, Packaged Clusters, and select 3rd party servers. This list is added to frequently so it is not included in this document. Instead, please see the Serviceguard for Linux certification matrix. The matrix is available at www.hp.com/info/sglx. Please note that you MUST refresh your browser when viewing this list to get the latest updates. To learn more about using Serviceguard for Linux with cell-based Integrity servers, please see "HP Serviceguard Cluster Configuration for HP-UX 11i v2 or Linux partitioned systems" at <http://www.docs.hp.com/en/ha.html>.

NOTE: Integrity AND ProLiant servers are not supported in the cluster together. Also, except during rolling upgrades, the servers in a cluster should all be running the same version of Linux. Servers running the x86_64 version of a distribution can have AMD64 based servers mixed with EM64T based servers. Servers running the x86_64 version of a distribution cannot be mixed with those running the 32-bit version.

Supported Quorum Service Linux platforms

- Any HP server or PC that supports Red Hat EL 4, Red Hat EL 5, SUSE SLES9, or SUSE SLES10

Supported configuration with no shared mass storage

Certain applications do not require shared storage. Serviceguard supports configurations without shared storage as well as those with shared storage. Note that a 2-node cluster with no shared storage requires the quorum service because there is no disk for the cluster lock LUN.

Supported mass storage for SCSI

SCSI-based shared storage is supported for x86-based clusters ONLY. Supported configurations are specified in the QuickSpecs at www.hp.com/go/sglx and the certification matrix at www.hp.com/info/sglx.

Note: Unlike Serviceguard for HP-UX, storage without integrated RAID, such as the MSA30MI, is not supported as shared storage.

Supported mass storage for Fibre Channel

Supported storage systems and HBAs are described in the Certification Matrix at www.hp.com/info/sglx.

Disk drives: Any drive supported in the selected storage subsystem

Fibre Channel switch: any switch supported with the selected storage subsystems

Drivers: If a driver is available from the HP website it should be used. If none is available then the driver delivered with the distribution is supported.

Multipath: for distributions supported by 11.16 and 11.18, only the multipath function delivered with the driver is supported.

Note: Please contact your HP Storage representative for the latest firmware revision and support information for the storage subsystems and for Fibre Channel fabric connectivity support on Linux. The version of drivers may vary with the distribution. Check the HP Support and Drivers website.

Networking

HP Serviceguard for Linux supports redundant networks through the use of channel bonding. Channel bonding is a process in Linux that groups together several LAN interfaces (NICs). Channel bonding can be configured in High Availability mode and Load Balancing mode. In the bonded group (HA mode), one interface is used to transmit and receive data, while the others are available as backups. If one interface fails, another interface in the bonded group takes over. Load balancing mode allows all interfaces to transmit data in parallel, in an active/active arrangement. In this case, high availability is provided by the fact that the bond still continues to function (with less throughput) if one of the component LANs should fail. It is strongly recommended to use channel bonding in each critical IP subnet to achieve highly-available network services. Failover from one NIC to another prevents a package, or the entire system, from failing over to another system. This minimizes impact to the application and to the users.

Any Gigabit Server Adapter that is listed in the server's current QuickSpecs is supported.

Fabric Adapters and "Combo Switch" Adapters are not supported.

If available, drivers that are delivered from the HP website or as part of the PSP should be used. If none are available then the driver delivered with the distribution is supported. This lists only currently available NICs that are supported. Older NICs may be supported in older configurations.

Configuration rules

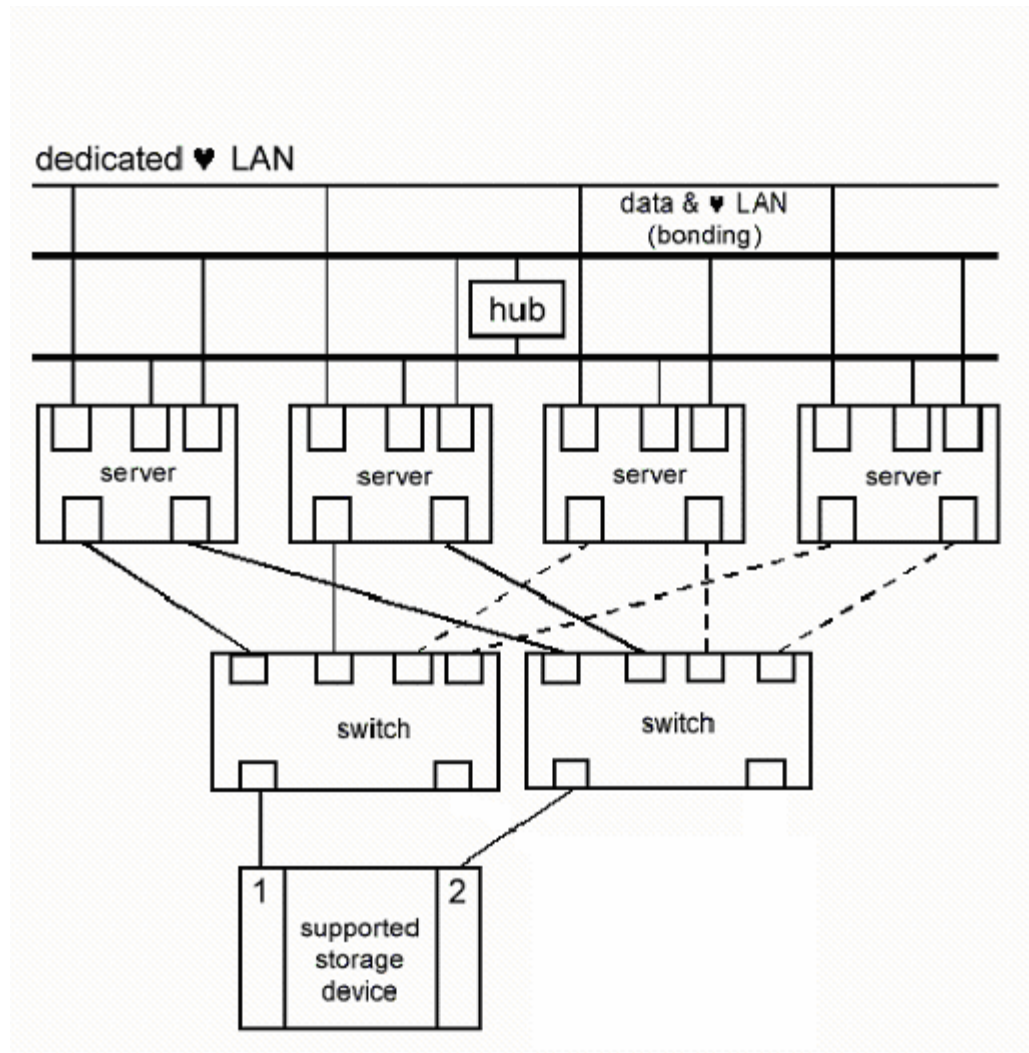
Configuration rules - Overview

The picture below (Figure 1) represents a 4-node Fibre Channel cluster. The servers can be either x86 OR Integrity servers. Figure 2 represents a 2-node SCSI cluster, supported for x86 servers ONLY. Referring to these figures can be helpful while reviewing the rules.

This section explains the process for selecting the appropriate components in a cluster. There are five parts to this section:

1. General configuration rules for a HP Serviceguard for Linux cluster
2. Ordering licenses for a Serviceguard for Linux cluster
3. Configuring a server for use in a HP Serviceguard for Linux cluster
 - Server Selection
 - Server network configuration
 - Server FibreChannel configuration
 - Server configuration for MSA500 family shared storage
4. Configuration rules for storage for use in a Serviceguard Cluster
5. Power considerations in a Serviceguard Cluster

Figure 1 This is HP's recommended cluster configuration for Fibre Channel with a redundant network for data.



General configuration rules for a HP Serviceguard for Linux cluster

When learning how to configure a cluster, the goal is to understand the impact to the cluster when ANY component fails. Some of the sections here will explain the impact of some of these failures.

The term "single point of failure" (SPOF) is often used in describing high availability clusters. The configuration sections will also use that term. The term is broad and it should be refined slightly. It is necessary to understand the difference between a SPOF for a cluster and a SPOF for a component within the cluster, such as a server. For example, a configuration has a single point of failure for a server if, in the case of a Fibre Channel-based cluster, there is only one Fibre Channel HBA. Most failures of that HBA that would deny access to shared storage for a server. This may be true even if it is a dual-channel HBA. That failure makes the server unusable in the cluster, assuming that all of the packages running on that server use shared storage. This, and many other failures, would be a SPOF for the server.

If there is only one Fibre Channel switch in a cluster, then the failure of that switch disconnects all servers from shared storage. The cluster becomes inoperable so that is an example of a cluster SPOF. Cluster SPOFs are not supported. It is recommended that there be no server SPOFs but they are allowed. Users should ensure that any server SPOF still allows for failure detection and package failover.

Ordering licenses for a Serviceguard for Linux cluster

There are four possible license part numbers that can be ordered: B9903BA, 305199-B27, 307754-B27, and T2391AA. B9903BA and 307754-B27 are single licenses for ProLiant servers while 305199-B27 has two licenses for ProLiant servers. These are ordered per server, no matter how many processors are in each server or what type of processor is used. Not all part numbers can be ordered from all HP resellers. Check with your reseller or salesperson.

The T2391AA is the license for Integrity servers. The number of licenses must match the number of cores in the cluster. For example, a 4-node cluster requires 16 licenses, when each node has 4 single-core processors. Dual-core processors require two licenses, one for each core. So, if a 4-node cluster where each node has four dual-core processors, the number of licenses required is 32.

Configuring a server for use in a HP Serviceguard for Linux cluster

Server Selection

Select a server from the certification matrix. (The link to the matrix is available at www.hp.com/info/sqlx.) Select the number of processors and the amount of memory based on performance needs. Consider the performance of the applications when a failover has occurred and more packages are running on a server than when all servers in the cluster are available. There are no specific requirements for internal storage. It is recommended that some form of RAID be used to protect against a disk failure. Without RAID protection for internal storage, a single disk failure can cause a server to fail.

Server network configuration

Serviceguard requires a minimum of two network connections per server but three or more are recommended. When two network connections are used, they will either be configured as:

- A bonded pair running heartbeat and public network connections.

Or (not recommended)

1. private heartbeat
2. public network and heartbeat

The bonded pair has higher availability and is recommended in this case. If three network connections are used, then one would be configured in a private heartbeat network and the other would be a bonded pair for public and heartbeat. If more than 3 network connections are available they would be configured as combinations of private heartbeats and bonded pairs for public network (and heartbeats if required.) The manual "Managing HP Serviceguard for Linux" goes into more detail. Also note that if the connections in a bonded pair are on a dual-channel NIC then the server has a SPOF so each channel should be bonded with another NIC for highest availability. The integrated NICs of many servers are dual channel.

Server Fibre Channel configuration

HP Serviceguard for Linux supports the HP Fibre Channel HBAs listed in the certification matrix as long as they are also supported in the server. A minimum of two Fibre Channel connections are required (most configurations will have only two connections from each server to storage). These can be implemented on a dual-channel HBA but the server will have a SPOF. If practical two Fibre Channel HBAs should be used.

The use of two connections requires that multipathing software be used. The HP Fibre Channel drivers have this capability built in and should be used for this function.

Server configuration for MSA500 family shared storage

Serviceguard for Linux supports either a single or dual connection from each server when used with shared storage from the MSA500 family. The MSA500 only supports one connection per server while the MSA500 G2 supports up to two. Refer to the documentation for the specific family member to determine which HBAs are supported. Integrated HBAs are supported by Serviceguard if they are supported by the specific MSA500 family member.

The multipath function of the Linux MD driver is used when two connections from each server are used with the MSA500 G2. Details are available in the MSA500 G2 documentation and the Serviceguard for Linux "managing" manual.

Configuration rules for storage for use in a Serviceguard Cluster

Storage configuration

All storage supported by HP Serviceguard for Linux has either built-in or optional dual (redundant) controllers that support failover and provide high availability for storage. Serviceguard requires the use of redundant controllers in shared storage. If a single controller is used, then the failure of that controller means that shared storage is unavailable and the entire cluster will fail.

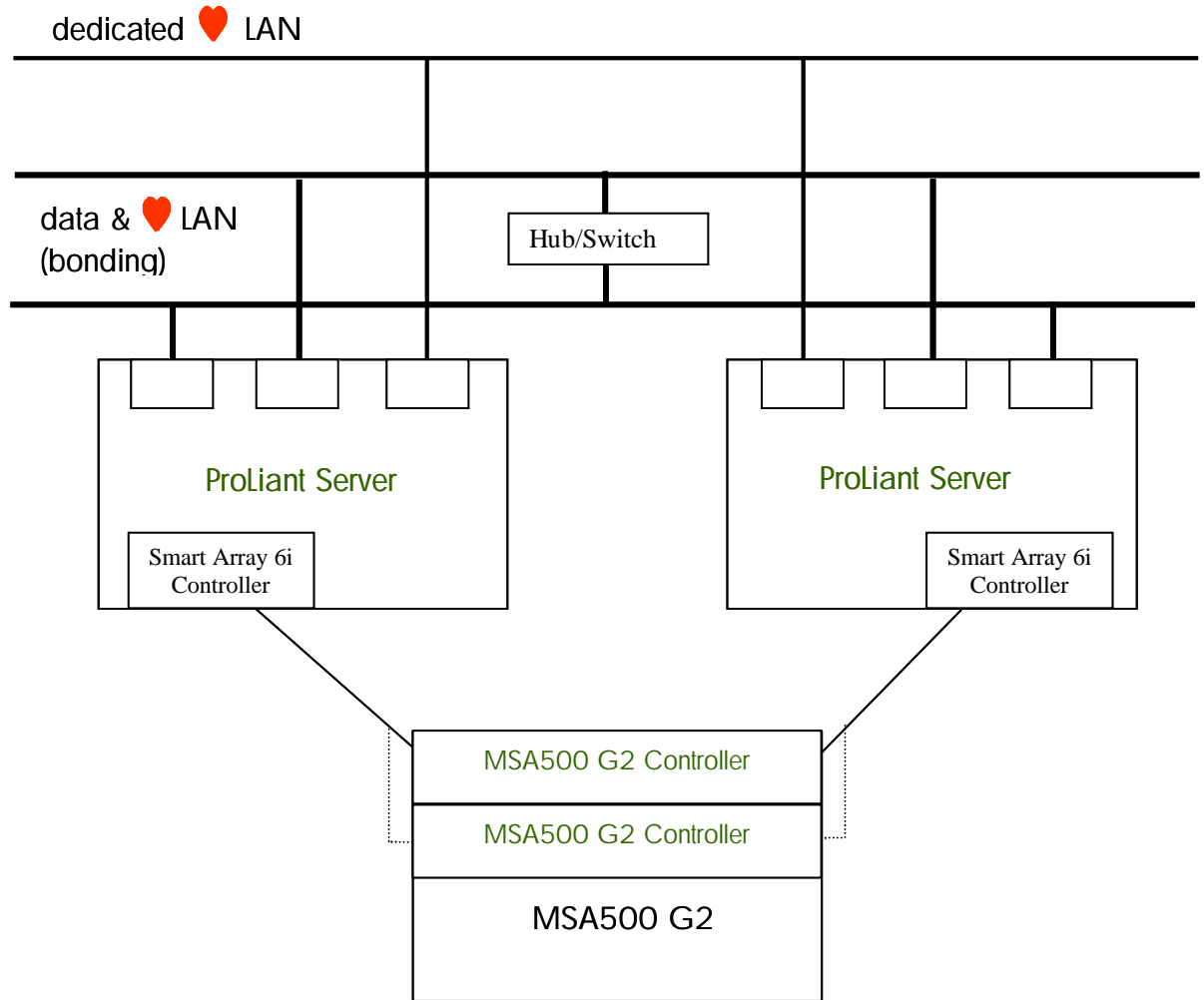
With Fibre Channel storage, a minimum of two Fibre Channel switches must be used. Any switch shown as supported by the shared storage documentation is also supported by HP Serviceguard for Linux. Figure 1 shows an example of how the various Fibre Channel connections should be configured. This is simply expandable up to 16 nodes. During testing, each Fibre Channel switch should be failed and restarted, one at a time, to ensure there is no cluster SPOF.

Some Fibre Channel storage systems allow the use of expansion cabinets (generally the MSA30 or the MSA20). Great care should be taken in configuring LUNs using these expansion cabinets to ensure that the failure of one cabinet, or failure of the connection to that cabinet, does not cause the LUN to fail. Again, testing should be done, by failing various components, before deployment to ensure that all shared LUNs are always available.

Figure 2 shows a graphical representation of a SCSI configuration. This figure shows a single connection from each server to storage. If redundant connections to storage are used, a second Smart Array HBA would be added to each server.

SCSI configuration example

Figure 2. This is HP's recommended cluster configuration for SCSI with a redundant network for data.



Power considerations in a Serviceguard Cluster

Power considerations

To ensure high availability, it is recommended that the power source be configured in such a way that there should not be power loss to 50% or more of the nodes in the cluster, including the computer running the Quorum Service, if it is used.

Implementing the recommended power configuration will improve the availability of the cluster. In many cases, failure of a server or storage component from loss of AC power can be prevented. This prevents Package Failover and restart. This section can also be used as guidelines in case the recommendations cannot be followed.

Local regulations

Local codes and regulations that relate to power must be followed, even if they differ from these recommendations.

Redundant power supplies

Most servers and storage equipment have optional or included redundant power supplies. These should be used and configured as described in the “Power distribution” section below.

Site power circuits

It is recommended that the cluster use two or three power circuits. This will prevent the loss of one circuit from affecting more than 50% of the nodes of the cluster.

Uninterruptible power supply (UPS)

It is recommended that a UPS be used for each power circuit or that a site UPS be used. If a site UPS is used, then analysis should be done to ensure that loss of one circuit does not cause the failure of more than 50% of the nodes.

Power distribution

Multiple power distribution units (PDUs) should be used. They should be connected to at least two different power circuits. When a component (server, switch, etc.) has two power cords, then each should be connected to PDUs that are powered from different circuits.

- If a component has more than two power cords, then they can be connected to different PDUs that are all powered from separate power circuits. If this is not possible, then all of the power cords of the component should be connected to the same PDU. In this case, follow the guideline of ensuring that there is no power loss to 50% or more of the servers in the cluster.

Power calculations for a PDU should be done with the assumption that another PDU or power circuit in the cluster could be down. For example, if a server with two power supplies has one power cord connected to a PDU, then assume that all of the power for the server needs to be supplied by that PDU. Assume this for all plugs in the PDU to calculate the maximum current draw. This technique accounts for PDU, power supply, and power circuit failures.

Power distribution testing

It is important to test a cluster after it is configured. Part of that test should include resilience to power circuit, PDU, or UPS failures. Each of these components should be “failed” in turn to ensure that the cluster will not fail.

Disaster tolerant configurations

If complete (site) power failures may be an issue, then either a CLX or XDC configuration should be considered.

Web-Based Tools

Two Web-based tools can be useful when planning a Serviceguard for Linux cluster. The HP Enterprise Configurator <http://www.hp.com/products/configurator>, can be used to select the specific servers, storage, and rack components.

There is also power calculation tool available on the HP website at <http://h30099.www3.hp.com/configurator/calc/Power%20Calculator%20Catalog.xls>. This tool can be used to determine which servers to assign to the various PDUs.

No details are shown for LAN connection to switches. White papers are available on the Procurve section of the HP website (<http://www.hp.com/rnd/index.htm>), describing how to set up your LAN.

Critical configuration information

This section has information that is critical in setting up a cluster. It usually refers to information that is specific to a component, such as an HBA driver or storage system.

Fibre Channel multipathing (failover) and driver versions

The Fibre Channel HBAs require the HP supported drivers which are available on the HP Support webpage (use the “support and drivers” link on the hp.com webpage). The drivers delivered in the distributions do not always have the HP-tested versions.

For all supported Fibre Channel storage, multi-pathing is enabled by the driver and is documented in the driver download.

The driver and any utilities are available on the driver download page “download drivers and software” and select your HBA. Then select the appropriate distribution.

Note: customers with existing configurations using Secure Path for Linux may continue to use that as the multi-path solution. Be sure to validate Secure Path support for Serviceguard for Linux and Linux distribution versions.

Supported Network Drivers

The most recent version of the NIC driver from the HP website is supported and recommended. Use the driver recommended on the support website.

Distribution restrictions

As of the update of this document, the latest Updates, ServicePacks or errata that are supported are:

- HP Serviceguard for Linux A.11.18 running on Red Hat EL 5 - (2.6.18-8.el5)
- HP Serviceguard for Linux A.11.18 running on Red Hat EL 4 - Update 5 (2.6.9-55.EL)
- HP Serviceguard for Linux A.11.16 running on Red Hat EL 3 - Update 8 (2.4.21-47.0.1.EL)
- HP Serviceguard for Linux A.11.18 running on SUSE SLES 9 - ServicePack 3 (2.6.5-7.253).
- HP Serviceguard for Linux A.11.18 running on SUSE SLES 10 - (2.6.16-0.8)

New installations are recommended to install HP Serviceguard for Linux version A.11.18. For Red Hat EL 3 or SUSE SLES9, please refer to HP Serviceguard for Linux version A.11.16. For updates to this list and for information on the support of other distributions with earlier versions of Serviceguard for Linux, refer to the certification matrix link at <http://www.hp.com/info/sqlx>.

For more information

To learn more about HP's other high availability products and solutions, please visit:

<http://www.hp.com/go/highavailability/>

and for HP Serviceguard product family:

<http://www.hp.com/go/serviceguard/>

and for HP Serviceguard for Linux:

<http://www.hp.com/go/sqlx/>

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XXXX-XXXXEN, 07/2007

