



# DELIVERING HIGHLY AVAILABLE LINUX SERVER CLUSTERS WITH HP SERVICEGUARD® FOR LINUX® AND RED HAT® GLOBAL FILE SYSTEM

HP and Red Hat offer an end-to-end solution to make business applications and data constantly available in a cluster of HP servers running Red Hat Enterprise Linux. HP Serviceguard for Linux creates a cluster that keeps services available despite hardware or software failures or planned downtime. Red Hat Global File System (GFS) enables multiple servers to simultaneously read and write to a single shared file system on a Storage Area Network.

HP Serviceguard for Linux and Red Hat GFS, working together, provide best-of-breed clustering technology for Linux. The combination offers greater application and data availability using low-cost Linux servers. They provide continuous access to both applications/services and data, and the ability to scale without worry.

HP Serviceguard for Linux uses software techniques and multiple hardware paths to keep an application running on the same node. If a node fails, HP Serviceguard for Linux fails over the workload to another node. Upon failover, Red Hat GFS serves up the same data to the new server.

## DEPLOYING LINUX FOR MORE COMPLEX AND CRITICAL BUSINESS FUNCTIONS

Increased demand for low-cost, flexible, scale-out architectures is fueling the growth of clustered servers. 20% of servers shipped in 2006 will be clustered, according to some analysts. Also driving the growth in clustered solutions is customer demand for continuous access to services and data. When services or data aren't available, business doesn't happen.

The Linux operating environment is robust and mature enough for use by many leading enterprise customers, who deploy Linux to support critical business functions. As more organizations become sophisticated in their use of Linux, there is an increased need for inexpensive Linux servers, to

perform tasks like data management, large scale file-serving, and business application processing. This requires clustering multiple Linux servers together, all of which need access to the same storage pool. They also require that the applications deployed on the cluster be highly available and not vulnerable to any single point of failure. And of course the cluster must be easy to manage.

HP and Red Hat have worked together for several years to offer customers the benefit of open source operating software on a full range of industry-proven, cost-effective platforms.

Now HP and Red Hat have teamed up to offer customers a highly available clustering solution for applications and data that includes leading components from each company. This solution combines the high-availability server capabilities of HP Serviceguard for Linux and Red Hat Global File System's cluster of servers sharing a common file system. Applications and data are safe and available at all times, with increased performance and manageability.

## HP SERVICEGUARD FOR LINUX

HP Serviceguard for Linux is high availability clustering software that groups servers, or nodes, to provide redundancy, making applications on those servers constantly available. HP Serviceguard for Linux puts all the resources needed to run an application into a flexible "package" used to start, halt, move or fail-over the application. Since the application resources are being managed by HP Serviceguard for Linux instead of the operating system on the server, the application is not tied to any one server. It can be moved to another server for planned downtime, without disrupting the application's function. HP Serviceguard for Linux can respond to single or multiple failures within a cluster. It is designed to protect applications from a wide variety of software and hardware failures by monitoring the health of each server (node) and quickly responding to failures in system processes, system memory,

LAN media and adapters, or application processes. Software techniques and multiple hardware paths keep applications running on the same node, further minimizing unplanned downtime. As a last resort, HP Serviceguard for Linux fails over and can restart applications on another node.

## **RED HAT GFS**

Red Hat GFS enables servers to share files with a common filesystem on a Storage Area Network (SAN). In a normal SAN, only one server at a time can have access to a disk or logical volume. GFS creates a common file system across multiple SAN disks or volumes and makes this file system available to multiple servers in a cluster. By eliminating the need for multiple copies of data, Red Hat GFS increases performance, reduces management complexity and reduces costs with consolidated storage resources.

Red Hat GFS protects data integrity by coordinating access to a file so that reads and writes are consistent between servers. Red Hat GFS improves availability by making the file system accessible to all servers in the cluster. If there is a failure in the cluster that causes an application to be moved from one server to another, the file system is immediately available to the application in its new location.

## **HP SERVICEGUARD FOR LINUX AND RED HAT GFS ACTING IN CONCERT**

In addition to the value each product provides, deploying HP Serviceguard for Linux and Red Hat GFS together on the same cluster means that they act together when a failure occurs, quickly bringing the application up on the new node.

HP Serviceguard for Linux moves the application package over to the new node and mounts the file system that the application needs. Red Hat GFS already makes this file system visible to the new server, so it can be used immediately with no time lost for file system checks.

## **TESTED AND VALIDATED TO WORK TOGETHER**

When multiple cluster-aware solutions like HP Serviceguard for Linux and Red Hat GFS are deployed on the same group of servers, care must be taken to ensure that they work correctly with each other. It is especially important to preserve data integrity if any component enters a failure mode.

To ensure that HP Serviceguard for Linux and Red Hat GFS can co-exist with no interference, HP and Red Hat engineers tested the two solutions in a variety of failure scenarios. The purpose was two-fold:

1. Verify the ability of HP Serviceguard for Linux to deal with packages whose file systems stay mounted at all times on all nodes.
2. Ensure cluster co-existence between HP Serviceguard for Linux and Red Hat GFS by testing for membership-related issues in failure scenarios.

The cluster software must monitor the state of both applications and nodes on the cluster. HP Serviceguard for Linux and Red Hat GFS both use a “heartbeat” mechanism that sends network messages between nodes to let each node know the others are “alive.”

Testing for co-existence has shown that when Serviceguard for Linux and Red Hat GFS are clustering the same set of nodes, there is no overlap in their monitoring activities. Further, the testing showed that when a node fails they are each able to recognize the failure and adjust cluster membership accordingly.

Stable co-existence of the two clustering solutions can be achieved with the proper choice of redundant hardware/software components, recommended configurations, and minor modifications to the control scripts — all of which are explained in a technical white paper, available at [www.hp.com/info/sglx](http://www.hp.com/info/sglx).

## **BACKED BY SERVICE ORGANIZATIONS**

Red Hat’s and HP’s worldwide support and consulting organizations each support their own component of this clustering solution. A cooperative support agreement assures customers that HP and Red Hat will work together to support the environment.

Both HP and Red Hat offer expert cluster consulting services to support and enhance the customer experience. HP has over 6,500 Linux-trained services professionals in more than 160 countries, providing rapid access to high-level Linux support. This newly tested and certified joint Red Hat GFS and HP Serviceguard for Linux clustering solution demonstrates why customers can look to both companies for expertise with clustering in Linux environments.

The combination provides a comprehensive availability solution for your Linux clusters- from applications to data. With Red Hat GFS and HP Serviceguard for Linux, you can scale for both performance and availability. And with a solution validated by both Red Hat and HP, support accountability of this business-critical environment is assured.

## WHERE TO GO FOR MORE INFORMATION

“Clustering Linux Servers with the Concurrent Deployment of HP Serviceguard for Linux and Red Hat Global File System”  
June 2005 white paper available at [www.hp.com/info/sglx](http://www.hp.com/info/sglx)

### HP RESOURCES

**Serviceguard for Linux** – [www.hp.com/go/sglx](http://www.hp.com/go/sglx)  
**Linux at HP** – [www.hp.com/go/linux](http://www.hp.com/go/linux)

### RED HAT RESOURCES

**GFS** – <http://www.redhat.com/software/rha/gfs/>  
**Red Hat Enterprise Linux at Red Hat** – <http://www.redhat.com/software/rhel/>

FEATURES	BENEFITS
<b>HP SERVICEGUARD FOR LINUX</b>	
Prompt allocation of new resources through rapid detection of hardware and software component failures	Enables quick application service restoration
Rolling upgrades to allow configuration changes with no interruption in services from applications on the cluster	Maximizes application availability for planned and unplanned downtime
Data protection from failed nodes	Ensures data integrity if applications are moved to another node
Cluster file system enables servers to share files on a SAN	Simplifies management of storage, making all files available to all applications and servers simultaneously
Coordinates access to a file so that reads and writes are consistent between servers	Assures the integrity of your data.
For high availability, provides shared storage pool for failover access	Applications can be brought up more quickly when they are moved to another node
Combination of SG and GFS	
When planned or unplanned downtime occurs, applications are brought up quickly on another node	End-to-end availability on Linux clusters and SANs
Tested for coexistence and includes instructions on configuration and modification	HP Serviceguard for Linux and Red Hat GFS are proven to work together
Cooperative support agreement	Ensures smooth handling of any customer support inquiries

## RED HAT SALES AND GENERAL INQUIRIES

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