

What's new with Serviceguard – Version A.11.19

April , 2009
Knowledge on Demand (KoD)



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Introducing the speaker (s)

- Randi Constable has been with HP for 11 years, working in the Availability Clusters Solutions Lab for the past 6 years.
- Her current responsibilities include bringing customer, partner and HP field needs into product planning, and development teams within ACSL as well as cross divisionally as it relates to ACSL product integration. Randi also provides consulting and collateral which enables our HP field, channel partners and customers to architect, implement and support mission-critical highly available and disaster tolerance solutions and services on HP-UX 11i, Linux, and Windows.



Introducing the speaker (s)

- John Foxcroft has been with HP for 25 years, working in the Availability Clusters Solutions Lab for the past 10 years.
- His current responsibilities include bringing customer, partner and HP field needs into product planning, and development teams within ACSL. John also provides consulting and collateral which enables our HP field, channel partners and customers to architect, implement and support mission-critical highly available and disaster tolerance solutions and services on HP-UX, Linux, and Windows.



Agenda

- HP Serviceguard Portfolio
- What's new with Serviceguard for HP-UX
- What's new with Serviceguard HPVM support
- What's new with SGeRAC
- What's with Disaster Tolerant Clusters Solutions
- References



HP Serviceguard portfolio for HP-UX 11iv3



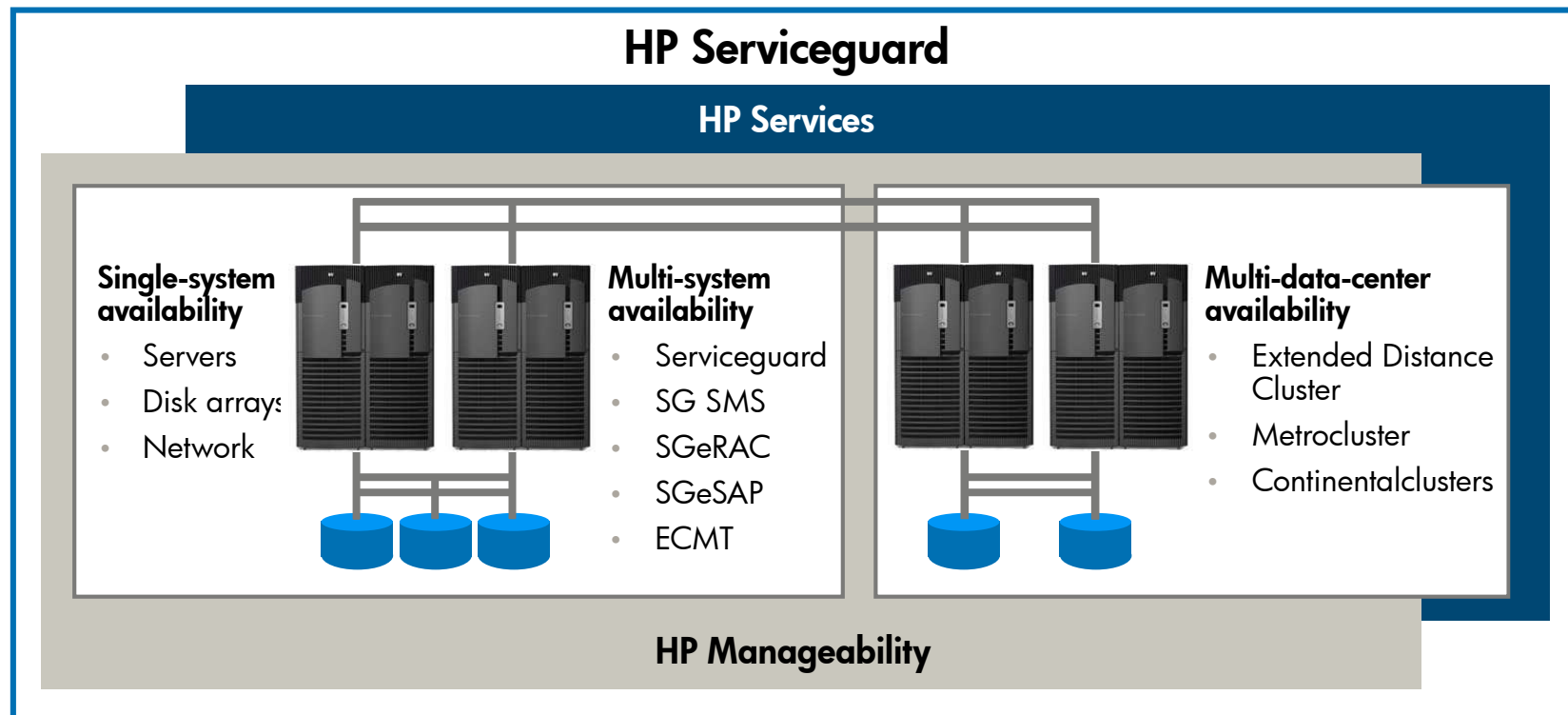
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Keep your applications up and running

HP Serviceguard portfolio for HP-UX 11i

- Preserve your data integrity to protect your business
- Optimize planned and unplanned downtime



Serviceguard for HP-UX update



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Serviceguard for HP-UX update

Agenda

- Serviceguard A.11.19 features
- New concepts
- Package Dependencies, Weights and Node Capacities
- IPv6 Support
- IP Monitor Support
- Network Auto Failback Support
- Online Cluster and Package Configuration
- New Preview Capabilities
- Partial-Startup Maintenance Mode

Serviceguard A.11.19 features



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Serviceguard A.11.19 features

- Supports HP-UX 11i v2, HP-UX 11i v3 and Linux Red Hat 5, SLES 10
- Supports Serviceguard Storage Management Suite A.02.01 (Veritas 5.0)
- New features (both HP-UX and Linux platforms)
 - New cluster manager (CM2), with integrated faster failover
 - Enhanced package dependencies, weights and node capacities
 - IPv6 Support
 - IP Monitor Support
 - Enhanced online cluster and package configuration
 - New preview capabilities
 - Partial startup maintenance mode
 - HPVM guest application monitor
 - **Configure a maximum of 300 packages**
 - **“package_description” parameter**
 - **QS supports up to 150 clusters and up to 300 nodes**
 - HP Serviceguard Manager B.02.00 enhancements



Serviceguard A.11.19 release themes

Better availability

- **Fast failover** – more easily configured with fewer limitations
- Online cluster/package reconfiguration
- Extended network monitoring
 - IP level monitoring and IPv6 networks

Better flexibility and manageability

- **More core features** that improve your customers' ability to manage highly available applications
 - Richer, more flexible application inter-dependencies
 - Simple workload management
 - Partial-Startup package maintenance mode
- More powerful management through **Serviceguard Manager**
 - Modular package configuration

Quicker, easier and better application integration

- More extensive toolkits
- Modular package features

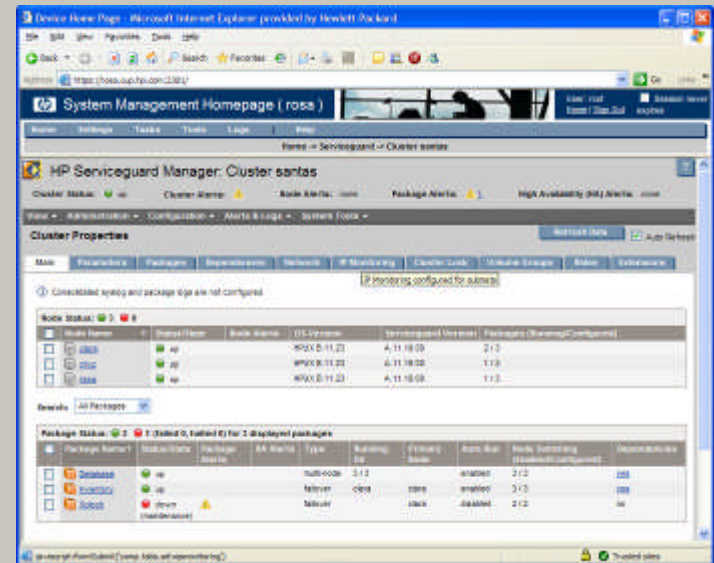
ECMT version B.05.00

The Enterprise Cluster Master Toolkit version B.05.00 contains:

- Support for Serviceguard version A.11.18 and A.11.19 on HP-UX 11iv2 and 11i v3
- **(New) Support for Modular Packages**
- Oracle 9i
- Oracle 9i RAC
- Oracle 10g R1
- **(New) Oracle 10g R2 Database Server with ASM**
- **(New) Oracle 11gR1 Database Server**
- **(New) Oracle 11g R1 Database Server with ASM on Itanium servers**
- **(New) IBM DB2 v9.5 on Itanium servers**
- **(New) MySQL server 5.0.56 and later**
- **(New) Sybase ASE 15.0.2 and later**
- HP Common Internet File System (CIFS)
- HP Apache
- HP Tomcat

SG Manager B.02.00 highlights

- Support new Serviceguard features
- Enhanced cluster monitoring
- Configuration enhancements
- Ease-of-use improvements



Serviceguard
A.11.19 new
concepts



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New Cluster Manager (CM2)

- Improves scalability beyond 16 node clusters
- Provides faster failover times
- Supports online Quorum Device changes
- Supports IPv6 Heartbeat
- Optimizes internal communications
- Minimizes false cluster reformations due to temporary hangs

Improved failover times in SG A.11.19

| Values in Seconds (rounded to nearest second) | Serviceguard A.11.18 or earlier* | Serviceguard A.11.19 | |
|--|--|--|--|
| | | 2 Nodes without CFS** | 2 Nodes with CFS**; 3,4,5...16 nodes with or without CFS** |
| Minimum Supported Values | With Dual Heartbeat NODE_TIMEOUT : 2 Failover Time : 30 seconds | With Dual Heartbeat MEMBER_TIMEOUT : 3 Failover Time : 4 seconds Improvement : 87% | With Dual Heartbeat MEMBER_TIMEOUT : 3 Failover Time : 5 seconds Improvement : 83% |
| | With Single Heartbeat NODE_TIMEOUT : 2 Failover Time: 38 | With Single Heartbeat MEMBER_TIMEOUT : 14 Failover Time : 18 Improvement : 53% | With Single Heartbeat MEMBER_TIMEOUT : 14 Failover Time : 21 Improvement : 45% |
| Appropriate values for most implementations | NODE_TIMEOUT: 5 – 8 Failover Time : 60 – 140 | MEMBER_TIMEOUT: 10 – 25 Failover Time: 13 – 29 (Linear to member_timeout) | MEMBER_TIMEOUT: 10 – 25 Failover Time : 14 – 39 (Linear to member_timeout) |
| Default Values | NODE_TIMEOUT : 6 Failover Time : 30 | MEMBER_TIMEOUT : 14 Failover Time : 18 | MEMBER_TIMEOUT :14 Failover Time : 21 |

* Failover time based on Quorum Server. Without lock, failover time is similar, while with LVM lock disk, values can be similar or higher.

** Failover time shown is based on Quorum Server, lock LUN or FC LVM lock.

For SCSI single LVM lock disk, failover time increases by 7 seconds; For SCSI dual LVM lock disk, failover time increases by 13 seconds.
For 3 or more nodes without cluster lock, failover time decreases by 0.1 to 0.2 times MEMBER_TIMEOUT



Package dependencies, weights and node capacities



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Complex dependencies

Simple dependencies

- SG A.11.18 added:
 - Same node dependencies
dependency parameters
 - dependency_name
 - dependency_condition
 - dependency_location

Complex dependencies

- SG A.11.19 adds:
 - Cross node dependencies
 - Exclusionary dependencies
 - Support for both modular and legacy packages
 - Support for online additions and modifications

Dependency parameters

dependency_name
dependency_condition
dependency_location

Cross node dependencies

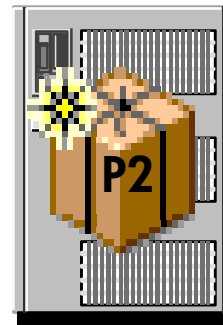
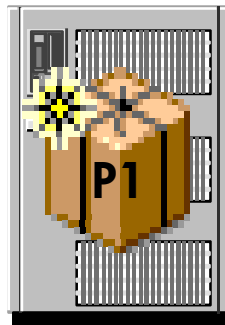
- Cross node dependencies
- New values for dependency_location parameter
 - different_node
 - any_node
- Priority of the predecessor package must be higher or equal to successor's; otherwise cmapplyconf will fail

Cross node dependencies example

- **p1** requires **p2** to be up on **some** node in cluster
 - Include the following in the configuration file for **p1**:

```
dependency_name    p2Dep
dependency_condition  p2 = up
dependency_location  any_node
```

- Priority for p2 must be higher or equal to priority of pkg 1



Exclusionary dependencies

- A package requires another package to be down on:
 - the same node
 - all nodes in the cluster
- New `dependency_condition` parameter: `down`
- New value `dependency_location` parameter: `all_nodes`
- Both packages must specify the same down dependency on each other
 - must be applied at the same time.

Exclusionary dependency example

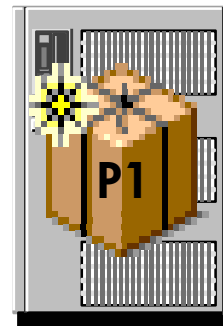
- **p1** requires **p2** to be down on all nodes in cluster
 - p1's config file:

```
dependency_name    p2Dep
dependency_condition p2 = down
dependency_location all_nodes
priority 10
```

- p2's config file:

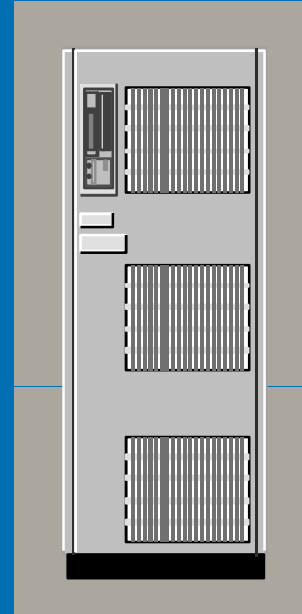
```
dependency_name    p1Dep
dependency_condition p1 = down
dependency_location all_nodes
priority 20
```

- Both packages must be applied at the same time
- If p2 is running, it will be halted in order to run p1



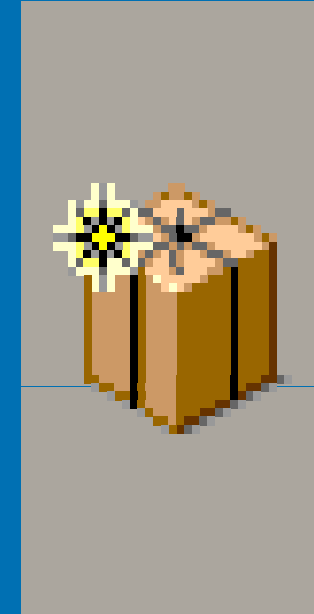
Package weight/node capacity

- Set capacity for cluster member nodes
 - node can have multiple capacities
- Set weights on packages
 - Package can have multiple weights
- Define up to four capacities/weights per cluster



Capacity 1
Capacity 2 ...

```
node_name    node1
capacity_name cap-1
capacity_value 70
```



Weight 1
Weight 2 ...

```
weight_name  cap-1
weight_value 30
```

IPv6 support



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IPv6 networks

- IPv4 or IPv6 networks can be used in any cluster subnets
 - Stationary IPs, heartbeat IPs and relocatable IPs
- With IPv6 support, new attribute introduced
 - `HOSTNAME_ADDRESS_FAMILY = IPv4 | ANY`
 - `ANY` – resolve names to both IPv4 and IPv6
 - To maintain performance for commonly used Serviceguard commands
 - Speeds up resolution of hostnames to IP addresses
 - Without this attribute, lab tests showed commands could be 5–50% slower
- Quorum Server A.04.00 supports IPv6
 - Quorum Server `QS_HOST` and `QS_ADDR`
 - ☞ If using an Alternate QS Subnet, upgrade to QS A.04.00 prior to a Serviceguard A.11.19 upgrade

IP Monitor support



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IP Monitor

- IP Monitor brings another layer of failure detection for networks
 - In addition to monitoring network interfaces at the link level, Serviceguard can also monitor the IP level
- Errors detected:
 - IP packet corruption on the router or switch
 - Link failure between switches and a first-level router
 - Any error that prevents packets from being received but do not affect the link-level health of an interface
- Supported on both HPUX and Linux
- Supported with IPv4 and IPv6

Network Auto Failback support



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New cluster configuration parameter – NETWORK_AUTO_FAILBACK

- NETWORK_AUTO_FAILBACK attribute
 - For link-level failures that cause failover to a standby, this attribute controls whether Serviceguard automatically switches back to the primary
- Prior to Serviceguard A.11.19, when a device recovers from a link-level failure we fail back to the primary device from a standby

Online cluster and package configuration



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Online cluster and package configuration with SG A.11.19

New Online Cluster Configuration Capabilities

- Serviceguard A.11.19 introduces new online cluster-management capabilities. The new capabilities include:
 - Changing the Quorum Server configuration
 - Changing the lock disk configuration
 - Changing the lock LUN configuration
 - Changing an interface from IPv4 to IPv6, or vice versa
- For a summary of what can be changed online, and what operations can be done only when the cluster is halted.

New Online Package Configuration Capabilities

- Serviceguard A.11.19 allows you to perform most configuration changes to modular packages, and many changes to legacy packages, while the package is running
- In general, you have greater scope for online changes to a modular than to a legacy package. In some cases, though, the capability of legacy packages has been upgraded to match that of modular packages as far as possible.

New preview
capabilities



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Preview objectives

- Check if application is highly available
- Provide a big-picture analysis of resource utilization of the “system”
- Provide a “what-if” analysis if system is perturbed
 - without disturbing a running clustered environment

* **System** = A cluster of nodes running a set of interdependent applications

Serviceguard Preview

- Preview options
 - -t option
 - cmeval command
- SG commands enhanced for assessment reports:
 - cmhaltnode [-t] [-f] <node name>
 - cmrunnode [-t] <node name>
 - cmhaltpkg [-t] <package name>
 - cmrunpkg [-t] [-n node_name] <package name>
 - cmmodpkg { -e [-t] | -d } [-n <node_name>] <package name>
 - cmruncl -v [-t]

cmmodpkg -e -t pkg 1

- package:pkg3 | node:node2 | action:failing
- package:pkg2 | node:node2 | action:failing
- package:pkg2 | node:node1 | action:starting
- package:pkg3 | node:node1 | action:starting
- package:pkg1 | node:node1 | action:starting
- cmmodpkg: Command preview completed successfully

- pkg1, when enabled, will “drag” pkg2 and pkg3 to its primary node, node1
- It can do this because of its higher priority
- Running the preview confirms that all three packages will successfully start on node2

Partial-startup maintenance mode



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Partial-startup maintenance mode

About Partial-Startup Maintenance Mode

- Serviceguard provides a maintenance mode for modular, failover packages that allows you to start the package partially and perform maintenance on some package modules while the other modules are running
- Serviceguard ignores failures reported by package services, subnets, EMS resources, and file systems; these will not cause the package to fail
- This is called partial-startup maintenance mode, sometimes abbreviated to maintenance mode

IMPORTANT: The package must be down and disabled before you can place it in, or take it out, of partial-startup maintenance mode

Serviceguard HPVM update



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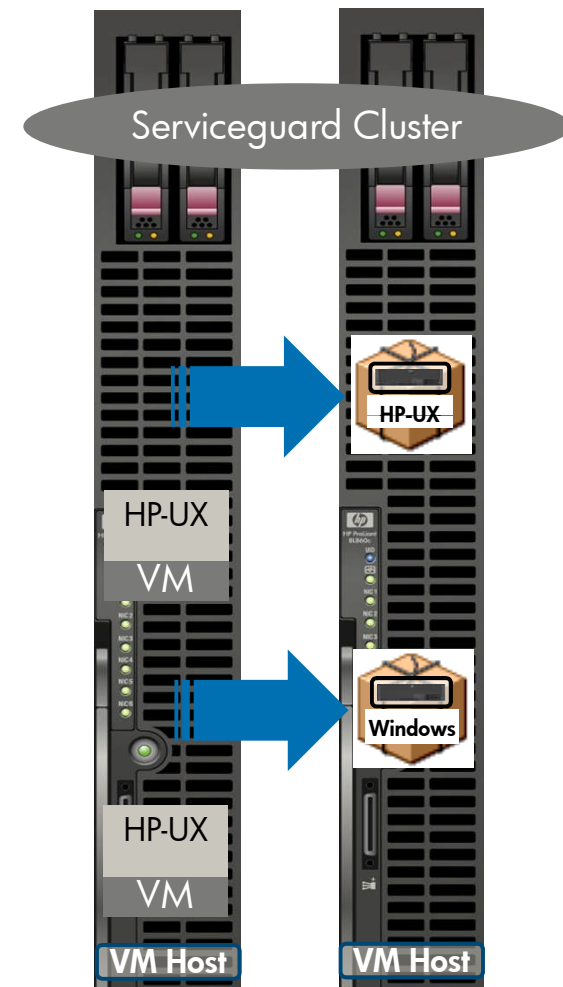
Serviceguard HPVM 4.0 Enhancements

- Online VM Migration is supported with HP-UX and Windows VM guests configured as Serviceguard packages using *hpvmmsg_move*
- VM Guest Application Monitoring
- Support for VMs as Packages and VMs as Nodes on the same VM Hosts

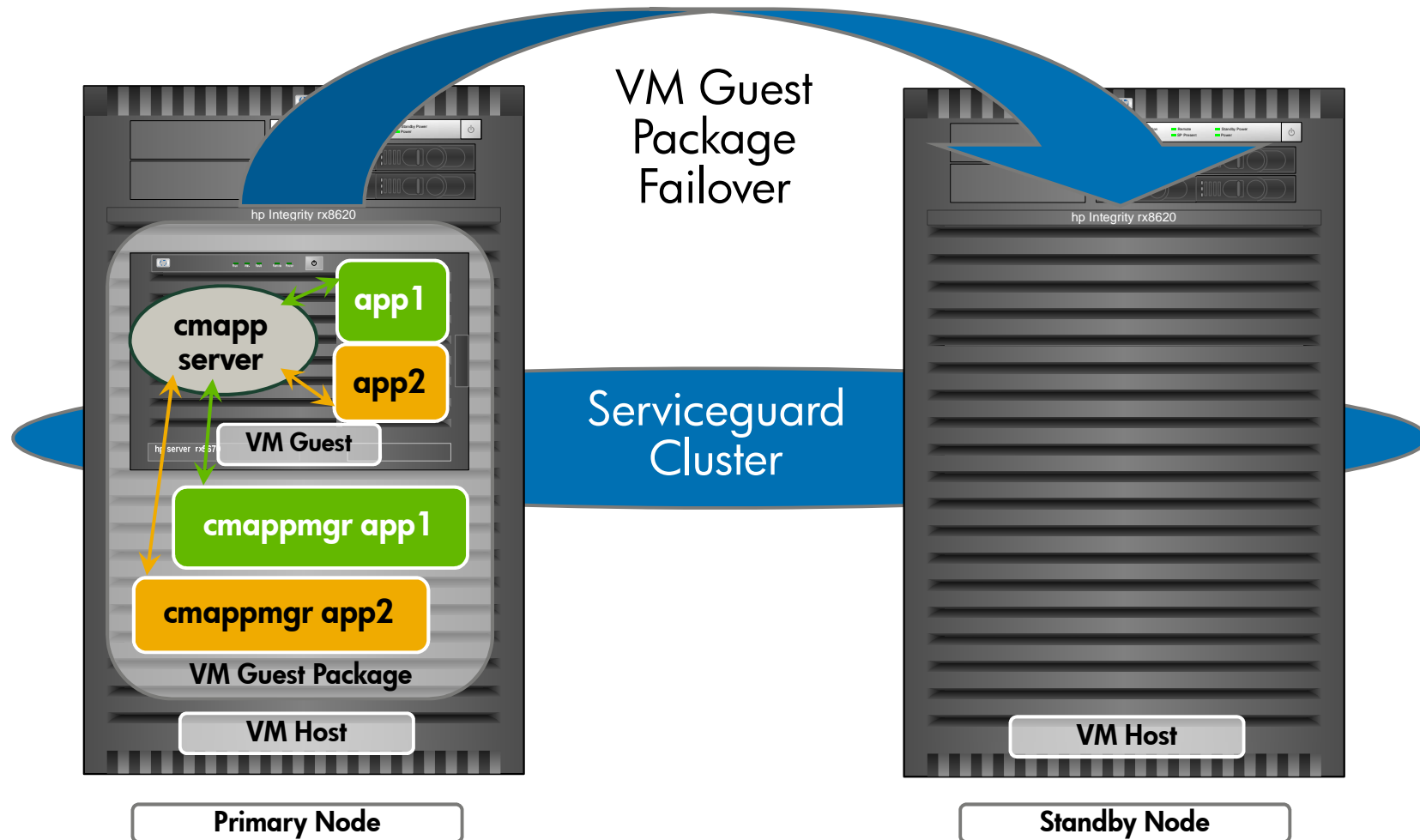


New! Integrity VM 4.1 Online VM Migration with Serviceguard A.11.19

- Online VM Migration is supported with HP-UX and Windows VM guests configured as Serviceguard packages using `hpvmmsg_move`
 - Allows a running VM, its guest OS and its applications to be moved to a different VM host within a Serviceguard cluster without service interruption
- Customer Benefits:
 - Minimal application downtime during planned maintenance periods
 - Protection for the VM guest against unplanned VM host hardware/software failures or failure of the VM guest itself
- Note: During the online migration process, Serviceguard is not protecting the VM guest



Integrity VM 4.1/Serviceguard A.11.19 VM Guest App Monitoring example



SGeRAC update



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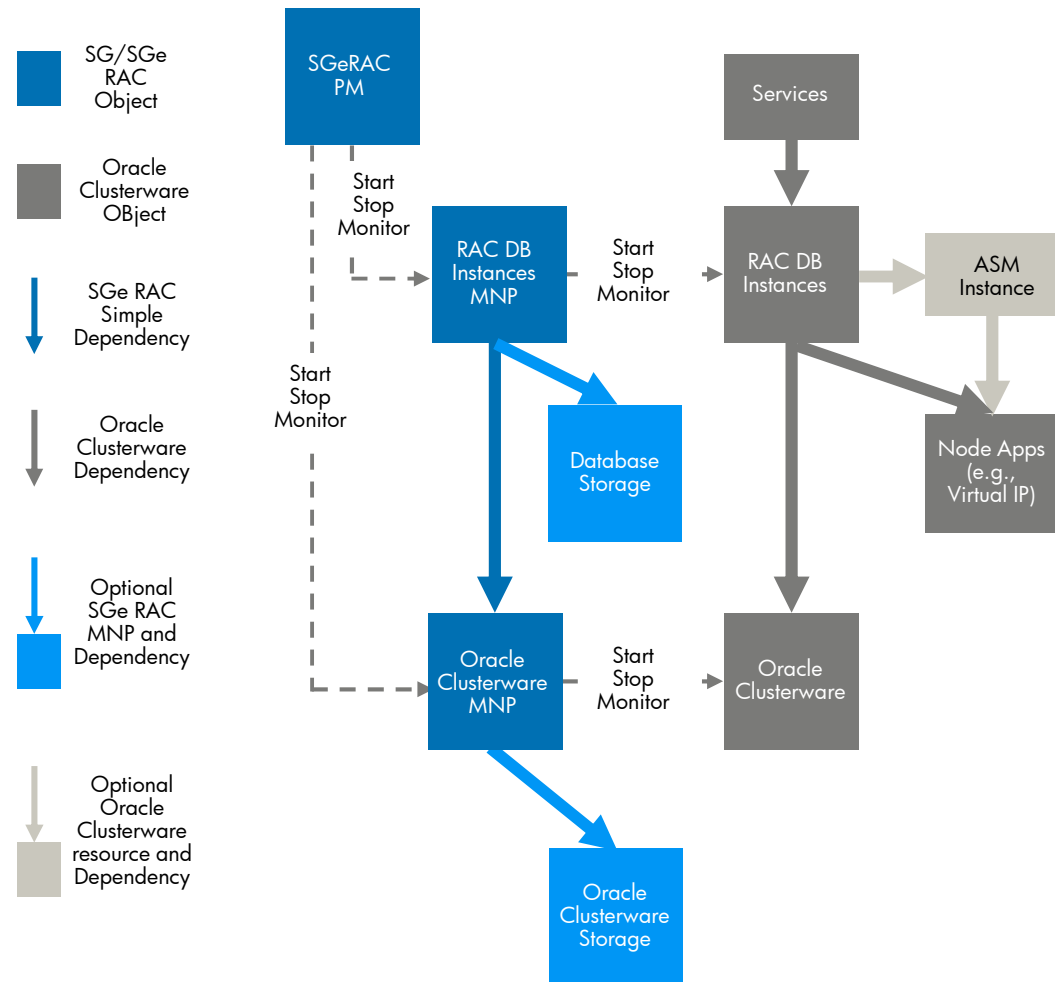


SGeRAC A.11.19 enhancements

- IPv6 support
 - Cluster Interconnect Monitoring
 - Oracle VIP network monitoring
- Support for Logical Volume Manager Version 2.0 (or later)
- Support for the SGeRAC Toolkit
 - Support for modular package format
 - Support for package maintenance mode

Co-ordination of SGeRAC with Oracle 10g/11g RAC – Integration Framework

- Based on Serviceguard A.11.17 SGeRAC Multi-Node Package and Simple Package Dependency features
- Provides smooth startup/shutdown of the combined stack for all supported SGeRAC storage options
- Availability:
 - For SGeRAC A.11.17/A.11.17.01
Download: <http://software.hp.com>
 - For SGeRAC A.11.18
Included in SGeRAC A.11.18
June 2008 patches:
 - PHSS_37927/11i v2 and
 - PHSS_37928/11i v3
 - For SGeRAC A.11.19
Included in SGeRAC A.11.19



SGeRAC Toolkit modular package enhancement

- Support both legacy and modular package format
- All toolkit parameters are defined in the package ascii file
- Toolkit configuration files are automatically generated
- Predefine the service parameters and script_timeout in the module ADF file
- Don't need to create the package working directory on all nodes and copy the package script file, toolkit config file to other nodes
- Support user modified toolkit script

Maintenance mode configuration

- New parameter for maintenance mode in both OC MNP and RAC MNP to enable this feature, default value is no
 - MAINTENANCE_FLAG [yes/no]
- The MAINTENANCE_FLAG must be the same in OC MNP and RAC MNP
- Debug file oc.debug and rac.debug in toolkit working directory as a switch between maintenance mode and normal checking mode
- If OC MNP is in maintenance mode, RAC MNP will be in maintenance mode regardless of the debug file for RAC MNP
 - New parameter OC_TKIT_DIR in RAC MNP config file, set manually for legacy package, modular package can get it from CDB
- Message in toolkit log file:
 - OC MNP:
 - “OC MNP pausing Oracle Clusterware checking and entering maintenance mode”
 - “Starting Oracle Clusterware checking after maintenance”
 - RAC MNP:
 - “RACP MNP pausing RAC instance checking and entering maintenance mode”
 - “Starting RAC instance checking after maintenance”

SGeRAC Support Matrices (as of April 9, 2009)



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SGeRAC A.11.19/11i v2

RAC support Matrix

Subject to change

| | | Oracle RAC 9iR2 | | Oracle RAC 10gR2 | | | Oracle RAC 11gR1 | |
|-----------------------------|-------|-----------------|------------------------------|------------------|---------------------|------------------------------|------------------|---------------------|
| | | SLVM | CVM/CFS 5.0 (SG SMS 2.01) | SLVM | ASM over SLVM | CVM/CFS 5.0 (SG SMS 2.01) | SLVM | ASM over SLVM |
| Cluster size | | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| Extended Cluster size | 10km | 2, 4** | 2,4,6,8,..., 16 | 2, 4** | | 2,4,6,8,...,16 | 2, 4** | 2,4,6,8,..., 16 |
| | 100km | | 2 | | No | 2 | No | 2 |

- (New) SGeRAC A.11.19 support starting with HP-UX AR0903
** 4-node support, requires SLVM v2 released with HP-UX AR0809 or later
- Integrity server only (HP 9000 servers not supported)



SGeRAC A.11.19/11i v3

RAC support Matrix

Subject to change

| | | 9iR2 RAC* | Oracle RAC 10gR2 | | Oracle RAC 11gR1 | | | |
|-----------------------|-------|-----------|------------------|--------------------------------|---------------------------|-------|--------------------------------|---------------------------|
| | | SLVM | SLVM | ASM over SLVM or raw disks/LUs | CVM/CFS 5.0 (SG SMS 2.01) | SLVM | ASM over SLVM or raw disks/LUs | CVM/CFS 5.0 (SG SMS 2.01) |
| Cluster size | | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| Extended Cluster size | 10km | 2,4** | 2,4** | | 2,4,6,8,..., 16 | 2,4** | | 2,4,6,8,..., 16 |
| | 100km | | | No | 2 | | No | 2 |

(New) SGeRAC A.11.19 support starting with HP-UX AR0903

** 4-node support, requires SLVM v2 released with HP-UX AR0809 or later

* 9iR2 RAC will not be supported with SMS 2.0 (CVM/CFS 5.0)

Disaster Tolerant Solutions update



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Disaster Tolerant Solutions AR0903 Enhancements

- Metrocluster AR0903 Enhancement (common to all 3 Metrocluster products):
 - Serviceguard A.11.19 support
 - Modular package support
 - Site Aware Disaster Tolerant Architecture (SADTA)
 - Metrocluster for RAC with Oracle 10gR2 and support added for 11gR1 RAC
 - Metrocluster for CFS (non-RAC) “Generic Complex Workload” support
 - HPVM 4.0 support
 - SONET/SDH support as heartbeat and CA links
- Metrocluster with Continuous Access XP A.09.00
 - Support Thin Provisioning (ThP) volumes for XP 20000/XP24000
- Metrocluster with Continuous Access EVA A.04.00
 - Support EVA 4400
 - Support IPv6 Configurations
 - Support for Enhanced Asynchronous Mode
- Metrocluster with EMC SRDF A.08.00
 - Includes only common enhancements listed above
- Continentalclusters A.07.01
 - Support Serviceguard A.11.19
 - Note: modular packages not supported (configure legacy packages only)



Metrocluster with
complex workloads
(RAC/CFS,
non-RAC/CFS)



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Metrocluster with complex workloads (RAC/CFS, non-RAC/CFS)

- Site Aware Disaster Tolerant Architecture (SADTA)
(SADTA enables deploying complex workloads in a Metrocluster)
 - Sept'08 (AR0809) Release:
 - Introduced support for “Metrocluster for RAC with Oracle 10gR2”
 - March'09 (AR0903) Release:
 - Added support for “Metrocluster for RAC with Oracle 11gR1”
 - Added support for “Generic Complex Workloads”, such as Metrocluster for CFS (non-RAC)
 - Can configure multiple “critical” packages
 - Site controller package failover policy can be configure “site_preferred”

Metrocluster SADTA and Metrocluster for RAC

- Site Aware Disaster Tolerant Architecture (SADTA) is an architecture to configure complex workloads in Metrocluster
 - Originally released for Oracle RAC (Metrocluster for RAC)
- Complex Workload
 - Any application configured using multiple multi-node or failover type packages with dependencies among them
 - Need to be started and stopped together during failovers across sites
 - Can be using CFS/CVM or SLVM
- Complex Workload examples
 - Oracle RAC database
 - SAP
- Metrocluster for Oracle RAC uses SADTA

Metrocluster for RAC

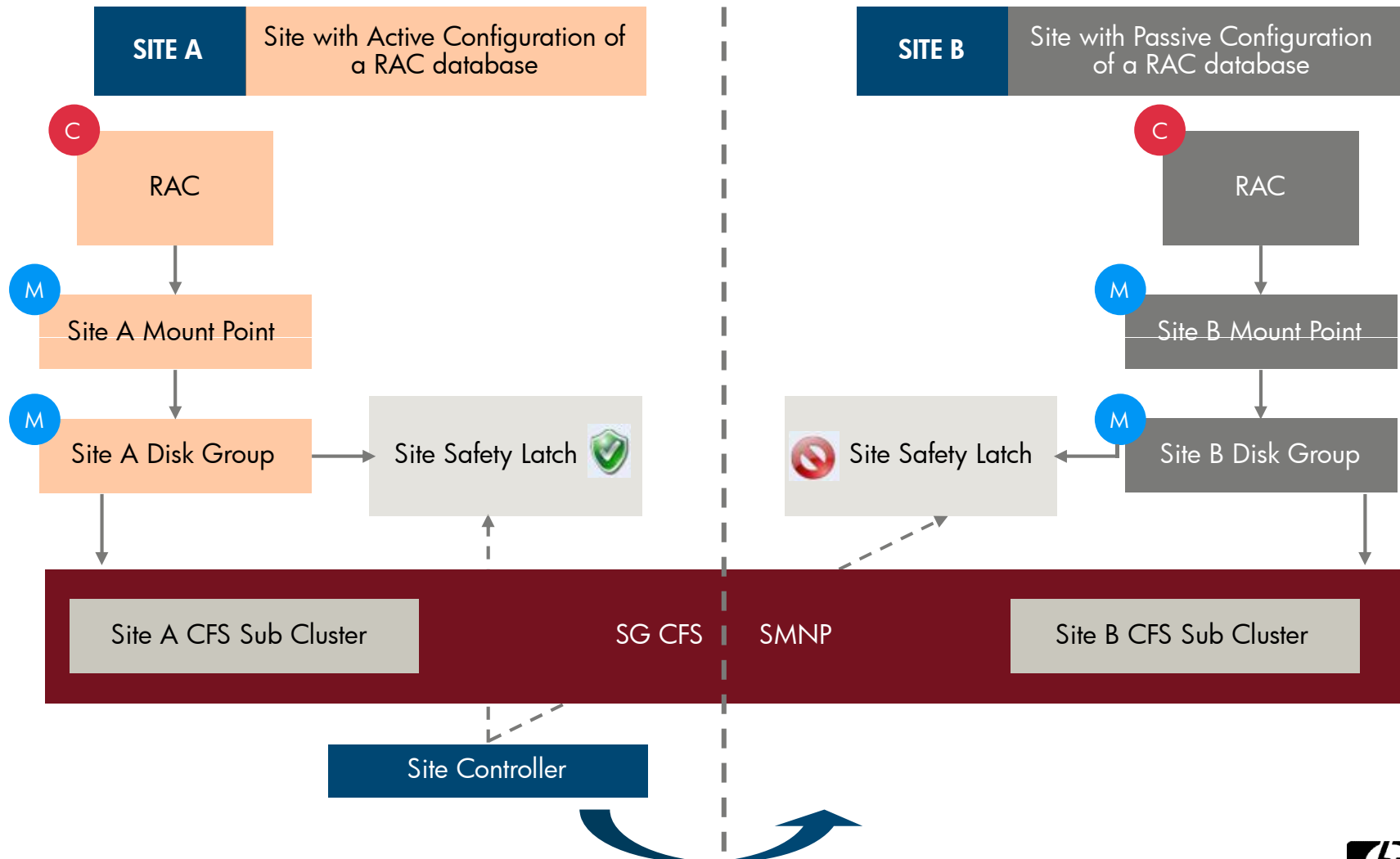


Diagram Legend

—————> Package dependency



Managed_package



Critical_package



Active MNP Package



Inactive MNP Package



SMNP Package



Site Controller Package



Failover Package

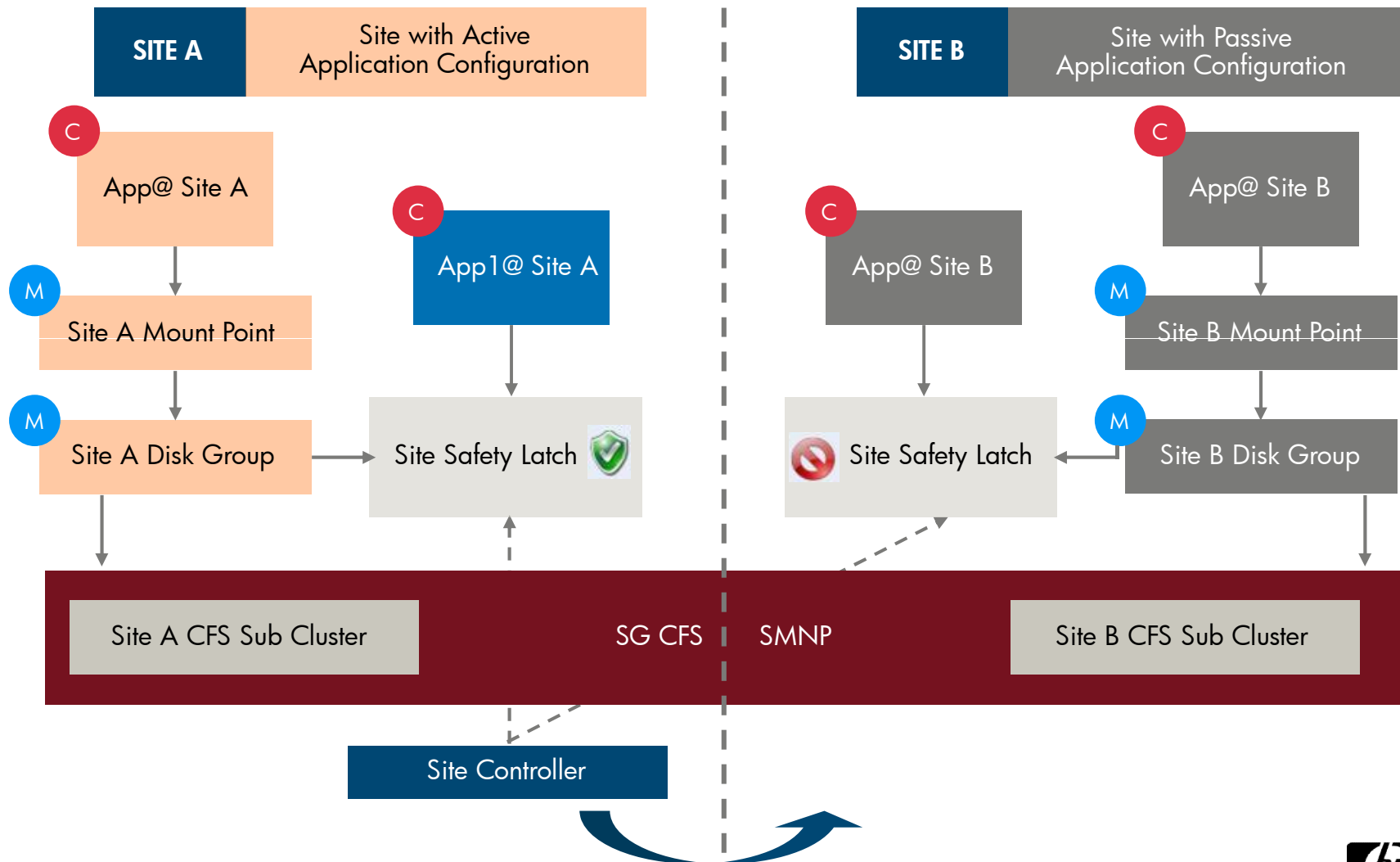
Metrocluster SADTA – CFS/SLVM support for complex workload

- In addition to Oracle RAC databases, SADTA will allow other applications over CFS/SLVM to be configured in Metrocluster (also known as a “Generic Complex Workload”)
 - Sites and Sub-clusters enabled even without SGeRAC installed
 - CFS Sub-clustering will be enabled when sites are declared in the cluster configuration file
 - Both Multi-Node and Failover type packages can be configured to be managed by Site Controller
 - Multiple packages can be specified as critical package
 - Supported with SG 11.18 and 11.19

* On Serviceguard 11.18 requires patch PHSS_38423 for HP-UX 11i v2 and PHSS_38424 for HP-UX 11i v3.



Metrocluster SADTA for RAC and other Workloads



References



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For more information

- HP High Availability & Disaster Tolerance Solutions
 - <http://www.hp.com/go/dt>
 - <http://www.hp.com/go/serviceguard>
- HP Serviceguard Solutions
 - <http://h71028.www7.hp.com/ERC/downloads/5982-5163EN.pdf>
- HP Metrocluster
 - <http://h71028.www7.hp.com/ERC/downloads/4AA2-1532ENW.pdf>
- HP Extended Cluster for RAC
 - <http://h71028.www7.hp.com/ERC/downloads/4AA2-2306EEW.pdf>
- Technical Documentation
 - <http://www.docs.hp.com/en/ha.html>
- HP Insight Recovery
 - <http://www.hp.com/go/insightrecovery>



HP High Availability & Disaster Tolerance Solutions demos

- Watch Serviceguard Manageability demos at:
 - <http://www.hp.com/go/HADemos>
Click on: Serviceguard Manageability

- Watch other HA/DT demos at:
 - <http://www.hp.com/go/HADemos>
Click on: Continuity & Availability
 - Apache Web Server Farm Utilizing Serviceguard CFS
 - High-Availability Solutions
 - HP Metrocluster Integrity Virtual Machines Demonstration
 - HP Mission Critical Services
 - Lowering the Cost of High Availability
 - Serviceguard CFS for RAC integrated with VSE
 - The Virtual Server Environment Made Real
 - And more...

Product features and compatibility matrices

Serviceguard, SGeRAC, Serviceguard Storage Management Suite, Quorum Server and ECMT.

- <http://docs.hp.com/en/5971/SG-SGeRAC-SMS-EMSSupport.pdf>
- <http://docs.hp.com/en/6202/QSSupportMatrix.pdf>
- <http://docs.hp.com/en/14297/ECMTandSGLXCompatibilityMatrix.pdf>

Disaster Tolerant Clusters Products:

- <http://docs.hp.com/en/6096/DT-matrix-cc.pdf>
- <http://docs.hp.com/en/6120/DT-matrix-mcxp.pdf>
- <http://docs.hp.com/en/6192/DT-matrix-mceva.pdf>
- <http://docs.hp.com/en/6095/DT-matrix-mcsrdf.pdf>

Partner portals

AP Partner Portal:

- <http://www.hp.com/partners/ap>
 - Access as follows: Products → HP Serviceguard high availability and disaster tolerant solutions for HP-UX 11i and Linux

EMEA Partner Portal:

- <http://www.hp.com/eur/smartportal>
 - Access as follows: Pre-Sales → Enterprise Storage and Servers → Integrity servers → Serviceguard

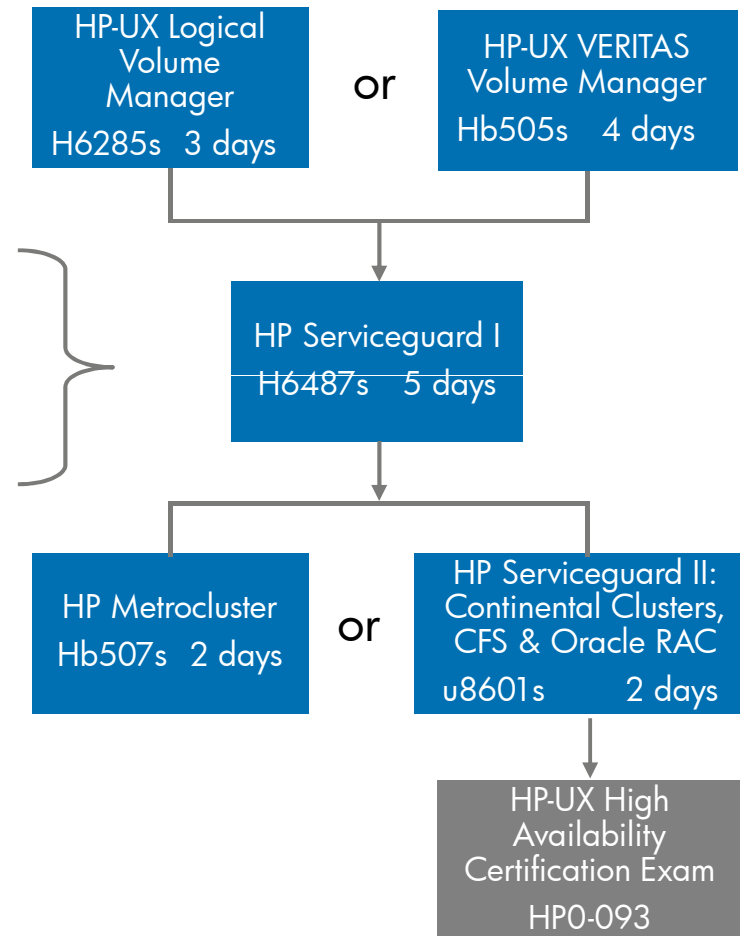
NA Partner Portal:

- <http://www.hp.com/partners/americas/bcs>
 - If you are unable to find the appropriate material, please contact ha.marketing@hp.com and they will assist you with your information request.

HP High Availability training curriculum

H6487S
Sept'08
Update!

Recently updated for Serviceguard 11.18, including content on legacy and modular packages, cross-subnet support, APA and lock LUN, DSAU and labs using SG MGR SMH plug-in covering many of the latest enhancements. Students can use VxVM or LVM for labs involving storage.



- For more information, visit www.hp.com/learn/unix
- Note that POSIX Shell Programming (h4322s) is recommended as a precursor to HP Serviceguard (h6487s)
- Check out our Virtual Server Environment curriculum at www.hp.com/learn/vse

Customized training (e.g. HP Serviceguard Storage Management Suite (SMS))

Thank you



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