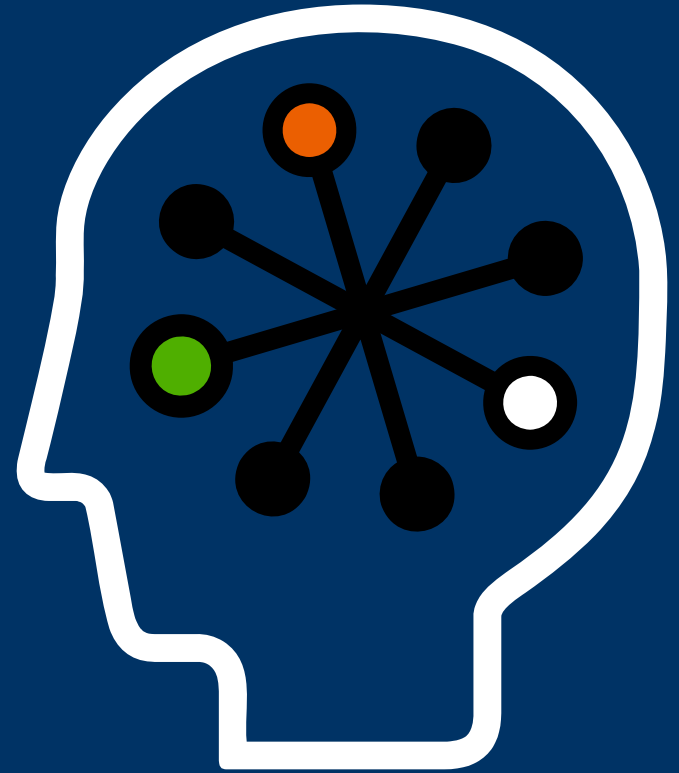


# HP-UX 11i v3 Knowledge-on- Demand

HP technical Webcast series:  
deployment optimization



# HP-UX 11i v3 Knowledge-on-Demand

- Objective: Support developers, deployment personnel and customers in achieving better business outcomes with HP-UX 11i
- What HP is providing: A series of technical on-demand training Webcasts
  - Focused on helping people who deploy HP-UX Integrity solutions increase performance through optimizing their installations for HP-UX 11i v3 on HP Integrity servers
  - Available at [www.hp.com/go/kod](http://www.hp.com/go/kod)

# HP-UX 11i v3 Knowledge-on-Demand webcasts – planned topics

- HP-UX 11i v3 operating system optimization
  - Dynamic nPartitions
  - HP-UX 11i v3 tunables
  - I/O optimization
  - System Management Homepage
  - Software Assistant
  - GlancePlus
  - Performance trouble-shooting on v3
- Optimizing high availability configurations
  - Serviceguard configuration and manageability
  - Configuring Serviceguard with Oracle RAC
  - Serviceguard delta training
- Optimizing virtualized configurations
  - Capacity advisor
  - Workload monitoring and management
  - System sizing with HP VM

Additional  
Webcasts to be  
published going  
forward!

Topics subject to change without notice.

# Related HP-UX 11i v3 resources

- All deployment resources
  - HP-UX 11i developers content  
[www.hp.com/go/hpuxdev](http://www.hp.com/go/hpuxdev)
  - HP-UX 11i v3 news, functionality, product download, and services resources  
[www.hp.com/go/hpux11i](http://www.hp.com/go/hpux11i)
  - HP Integrity server product information  
[www.hp.com/go/integrity](http://www.hp.com/go/integrity)

# We hope you enjoy this Knowledge-on-Demand topic!

Thank you for taking time to learn about HP-UX 11i v3 and related technologies.

Please provide feedback on today's topic and/or future topics by using our online HP-UX 11i Knowledge-on-Demand Feedback form:

[www.hp.com/go/kodfeedback](http://www.hp.com/go/kodfeedback)



# Serviceguard configuration and manageability

HP technical Webcast series: deployment optimization



Technology for better business outcomes

# Introducing today's speaker

- Jonathan Patrizio is a Senior Solutions Architect in the Highly Availability Advanced Technology Center (HA ATC) and is an expert on Serviceguard manageability.
- He architects mission-critical, highly available and disaster tolerance solutions on HP-UX and Linux and has been with HP for 19 years.
- His key responsibilities include bringing requirements from customers back to the R&D lab, driving product roadmaps and generating collateral that conveys how to effectively use the Serviceguard product portfolio.



# Agenda

- Manageability & HA
- Serviceguard Manageability
  - HP System Management Homepage
  - Serviceguard Manager
- Demonstration – configure a cluster
- Distributed Systems Administration Utilities (DSAUI)
- Summary

# Manageability and High Availability



# Terminology – for your reference

CFS	Cluster File System – a feature of SG SMS
DSAU	Distributed Systems Administration Utilities
DMI	Desktop Management Interface
SIM Collection	Systems Insight Manager Predefined group of systems, partitions, etc.
pdsh	Parallel Distributed Shell – part of DSAU
SG SMS	Serviceguard Storage Management Suite
SMH	System Management Homepage
SNMP	Simple Network Management Protocol
SSL	Secure Socket Layer
VSE	Virtual Server Environment
WBEM	Web based Enterprise Management

# Achieving Availability

- Combination of 3 major pillars of availability
  - Technology
    - Reliable architectural components (servers, disks, network, etc.)
    - Clustering software
    - Middleware
    - Data replication
    - Management software and tools
  - People and Processes
    - Training
    - Documentation
    - Change control
  - Support Services
    - Rapid response time
    - Rapid diagnosis and repair
    - Availability of parts

# The Mission-critical environment

## Why is manageability so important?

- Down-time → \$\$\$\$
- Many components must work together to eliminate SPOF
  - A variety of different manageability interfaces to master
  - # instances of like components
  - Visualizing how components are connected together
  - Rapid identification of problems
- **Human-error** – one of the most common causes of down-time
  - Remembering the commands
  - After real failures, administering a recovery accurately
- When disaster strikes...
  - People panic – but it's crucial to manage the business for continuity

# Manageability

## Bringing order from chaos

<b>Configuration</b>	<b>Creation</b> <ul style="list-style-type: none"><li>• Configuring a new system</li><li>• Setting attributes affecting the startup &amp; run-time behavior</li><li>• Iteratively adding, deleting or modifying components of the system</li></ul>
<b>Administration</b>	<b>Control</b> <ul style="list-style-type: none"><li>• Operator invoked changes to the system</li><li>• Control of access, who gets to do what</li><li>• Changing run-time behavior by modifying control attributes</li></ul>
<b>Discovery &amp; Monitoring</b>	<b>Observance</b> <ul style="list-style-type: none"><li>• Finding what objects exist, how they are connected</li><li>• Finding the detailed attributes of the components</li><li>• Tracking how their attributes change over time</li></ul> <b>Troubleshooting</b> <ul style="list-style-type: none"><li>• Making status issues stand-out</li><li>• Providing tools to assist with fixing problems</li></ul> <b>Comprehension, Training &amp; Reporting</b> <ul style="list-style-type: none"><li>• Understanding how the system works</li><li>• Recording a configuration</li></ul>
<b>Miscellaneous</b>	<b>Simulation, auditing, compliance</b>

# Serviceguard Manageability



# Serviceguard Portfolio

Delivering over a decade of quality service



- Serviceguard HP-UX
- Serviceguard Linux

- Extended Clusters
- Metrocluster
- Continentalclusters
- DT solutions for LINUX



- Serviceguard Extension for RAC (HP-UX)
- Serviceguard Extension for SAP (HP-UX and LINUX)
- Serviceguard Storage Management Suite (HP-UX)
- Serviceguard Manager (HP-UX and LINUX)
- Serviceguard Extension for Faster Failover (HP-UX)
- Serviceguard HA Toolkits (HP-UX and LINUX)

# Serviceguard Manager Versions

- Standalone version – A.05.01
  - Manages SG A.11.17 or earlier
  - Transitioned to Serviceguard Manager in HP SMH...
- Serviceguard Manager for HP SMH
  - [Web-based](#)
  - Manages a particular version of Serviceguard
  - Is included with each Serviceguard release
- Version summary:
  - A.05.01 – SG A.11.17 or earlier
  - [B.01.00](#) – SG A.11.17.01 (11i v3 only)
  - [B.01.01](#) – SG A.11.18 (11i v2 & v3, Linux RH4, RH5 & SLES10)

# Goals of Serviceguard Manager

- Monitor
  - Rapid assessment of topology, status
- Administer
  - No need to remember command line options
- Configure
  - Cluster and package configuration
  - See all options quickly & easily
  - Automated distribution of configuration files
  - Discovery of cluster resources
- Troubleshooting
  - Status badges & colors
  - Consolidated log viewing

HP System  
Management  
Homepage and  
Serviceguard  
Manager



# System Management Homepage

The launch pad for Serviceguard Manager – browser-based!

Device Home Page - Microsoft Internet Explorer provided by Hewlett-Packard

File Edit View Favorites Tools Help

hp System Management Homepage ( kilt ) User: root Home | Sign Out

Home Settings Tasks Tools Logs Help

Home

System Model  
9000/800/A500-7X

Integrated Agents  
none

Other Agents  
none

Management Processor  
none

Others Links  
Support  
Forums

Legend

- Critical Normal
- Major Disabled
- Minor Unknown
- Warning Informational

Saturday, April 21, 2007 2:13:14 PM  
refresh: manual

**System Status Summary**

- Home -> System -> System Summary
- Home -> Serviceguard -> Cluster scotsman

**System**

- System Summary
- Cooling
- Physical Memory
- Power
- Processors
- ... 2 items not shown

**Operating System**

- Memory Utilization
- Network Information
- Process Information

**Serviceguard**

- Cluster scotsman

**Software**

- Software Bundles
- Software Products

**System Configuration**

- Accounts for Users and Groups
- Disks and File Systems
- Kernel Configuration
- Peripheral Devices

Serviceguard status box

HP System Management Homepage v2.2.4 ©2003-2006 Hewlett-Packard Development Company, L.P.

# SG Manager B.01.01 for SG 11.18

- Standard SMH features
  - SMH/UX integration
    - Single sign-on
    - Secure communication via SSL
    - Setup & view consolidated logs
    - Other SMH tools, e.g. File Systems
  - HP SIM integration
  - Online context sensitive help
  - Consistent look & feel with other tools
- Local SG cluster management
  - Monitoring (+consolidated logs)
  - Administration (full SG CLI support)
  - Configuration (including MNPs)
  - Role based access
  - Ripples SG membership/status up to the SMH Homepage, SIM
  - Identifies Metrocluster
  - Localization in 8 languages

Device Home Page - Microsoft Internet Explorer provided by Hewlett-Packard

System Management Homepage ( kilt )

User: root  
Home | Sign Out

Home Settings Tasks Tools Logs Help

Home -> Serviceguard -> Cluster scotsman

HP Serviceguard Manager: Cluster scotsman

Summary Refresh Data Auto Refresh

View Administration Configuration Alerts & Logs System Tools

Main Parameters Packages Dependencies Network Cluster Lock Volume Groups Roles Extensions Oracle RAC

Cluster Status: ● up Alert Summary: ✘

Nodes: 2 / 2 active

Node	Node Status	OS Version	Serviceguard Version	Packages (Running/Configured)
haggis	up	HPUX B.11.23	A.11.18.00	4 / 9
kilt	up	HPUX B.11.23	A.11.18.00	6 / 10

Packages: 9 / 10 running

Package	Package Status	Alert Summary	Running On	Primary Node	Auto Run	Node Switching (Enabled/Configured)	Dependencies
clog	up		kilt (adoptive)	haggis	enabled	2 / 2	no
new_package1	up		kilt	kilt	enabled	2 / 2	yes
new_package2 (MNP)	up		2 / 2		enabled	2 / 2	yes
new_package3	up	ⓘ	kilt	kilt	enabled	1 / 1	no
new_package4	up		kilt	kilt	enabled	2 / 2	no
new_package5	down	✘		kilt	disabled	0 / 2	no
new_package6	up		haggis (adoptive)	kilt	enabled	2 / 2	no
new_package7	up	⚠	haggis (adoptive)	kilt	disabled	2 / 2	no
new_package_kilg	up		kilt	kilt	enabled	2 / 2	no
pkg_upcc	up		haggis	haggis	enabled	2 / 2	no

# Serviceguard Manager via a browser

## A web application

Device Home Page - Microsoft Internet Explorer provided by Hewlett-Packard

File Edit View Favorites Tools Help

hp System Management Homepage ( kilt ) User: root Home | Sign Out

Home Settings Tasks Tools Logs Help

Home -> Serviceguard -> Cluster scotsman

### HP Serviceguard Manager: Cluster scotsman

Refresh Data  Auto Refresh

View Administration Configuration Alerts & Logs System Tools

Main Parameters Packages Dependencies Network Cluster Lock Volume Groups Roles Extensions Oracle RAC

Cluster Status: ● up Alert Summary: ✘ ← Summary Status

Nodes: 2 / 2 active

<input type="checkbox"/>	Node	Node Status	OS Version	Serviceguard Version	Packages (Running/Configured)
<input type="checkbox"/>	<a href="#">haggis</a>	<span style="color: green;">●</span> up	HPUX B.11.23	A.11.18.00	4 / 9
<input type="checkbox"/>	<a href="#">kilt</a>	<span style="color: green;">●</span> up	HPUX B.11.23	A.11.18.00	6 / 10

Packages: 9 / 10 running

<input type="checkbox"/>	Package	Package Status	Alert Summary	Running On	Primary Node	Auto Run	Node Switching (Enabled/Configured)	Dependencies
<input type="checkbox"/>	<a href="#">clog</a>	<span style="color: green;">●</span> up		kilt (adoptive)	haggis	enabled	2 / 2	no
<input type="checkbox"/>	<a href="#">new_package1</a>	<span style="color: green;">●</span> up		kilt	kilt	enabled	2 / 2	yes
<input type="checkbox"/>	<a href="#">new_package2 (MNP)</a>	<span style="color: green;">●</span> up		2 / 2		enabled	2 / 2	yes
<input type="checkbox"/>	<a href="#">new_package3</a>	<span style="color: green;">●</span> up	<span style="color: blue;">i</span>	kilt	kilt	enabled	1 / 1	no
<input type="checkbox"/>	<a href="#">new_package4</a>	<span style="color: green;">●</span> up		kilt	kilt	enabled	2 / 2	no
<input type="checkbox"/>	<a href="#">new_package5</a>	<span style="color: red;">●</span> down	<span style="color: red;">✘</span>		kilt	disabled	0 / 2	no
<input type="checkbox"/>	<a href="#">new_package6</a>	<span style="color: green;">●</span> up		haggis (adoptive)	kilt	enabled	2 / 2	no
<input type="checkbox"/>	<a href="#">new_package7</a>	<span style="color: green;">●</span> up	<span style="color: orange;">⚠</span>	haggis (adoptive)	kilt	disabled	2 / 2	no
<input type="checkbox"/>	<a href="#">new_package_kilg</a>	<span style="color: green;">●</span> up		kilt	kilt	enabled	2 / 2	no
<input type="checkbox"/>	<a href="#">pkg_upcc</a>	<span style="color: green;">●</span> up		haggis	haggis	enabled	2 / 2	no

# Kernel Configuration – HP SMH

Device Home Page - Microsoft Internet Explorer provided by Hewlett-Packard

System Management Homepage ( hasupt19 )

User: root  
Home | Sign Out

Home Settings Tasks Tools Logs Help

Home -> System Configuration -> Kernel Configuration

### Modify Kernel Tunable : maxdsiz\_64bit

Tunable Name	maxdsiz_64bit
Description	Maximum size of the data segment of a 64-bit process (bytes)
Module	vm
Default	4294967296
Range	262144..4396972765184
Current	1073741824
Tuning Capability	Dynamic
Usage	0%
Constraints	maxdsiz_64bit >= 262144 maxdsiz_64bit <= 4396972765184

("Enter your changes below and click on the Modify button. For more information on kctune, refer to [kctune manpage](#). Click on [maxdsiz\\_64bit manpage](#) for more information about the tunable.  
**NOTE:** If you set the value of the Tunable to default, a default optimum value as recommended by HP will be assigned to the tunable.

**New setting (evaluated)::**

**Next Boot Value::**

**Mode of Change::**  change immediately  change at next boot

**Backup::**  back up the current configuration before applying change

**Reason for Change::**

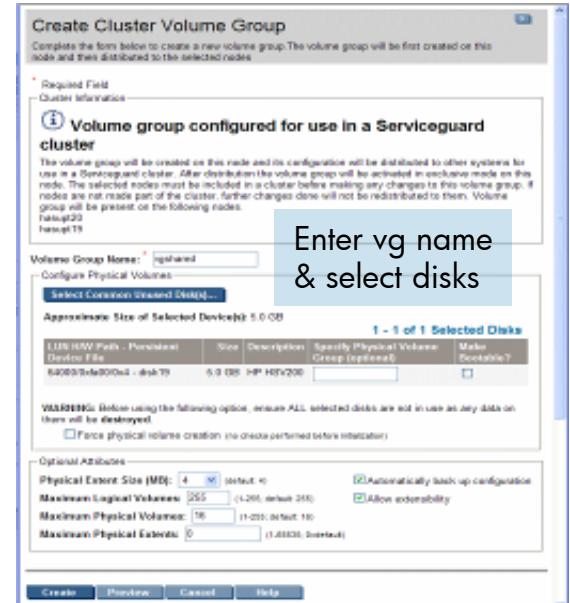
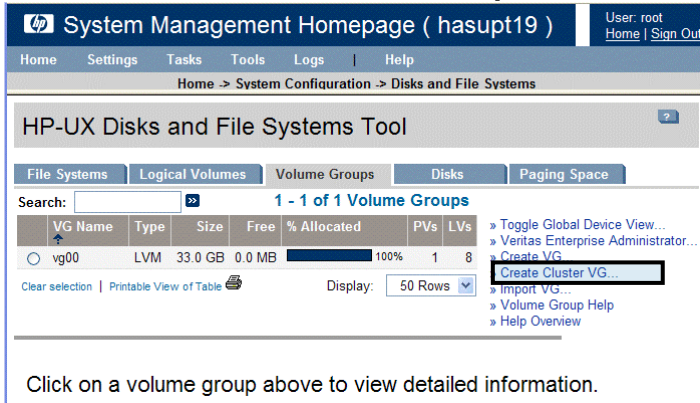
**Command Preview:**

To see the command(s) that will be run, input the required information and press the [Preview] button.

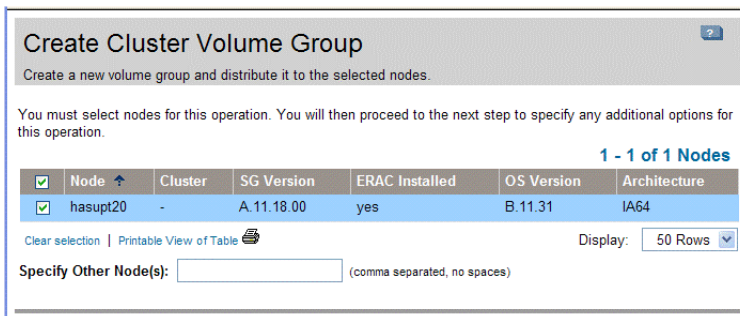
# Creating a cluster volume group

## Integration with Serviceguard

HP SMH: Disks & File Systems functional area



Wizard is launched



Command Preview:

```
[Create]: /usr/sbin/pvcreate /dev/rdisk/disk19 && \
/usr/bin/mkdir -p -m u=rwx,g=r,x,o=r /dev/vgshared && \
/sbin/mknode /dev/vgshared/group c 64 0x010000 && \
/usr/bin/chmod u=rw-,g=r,o=--- /dev/vgshared/group && \
/usr/sbin/vgcreate -A y -x y -l 255 -p 16 -s 4 /dev/vgshared /dev/disk/disk19 && \
/usr/sbin/vgchange -a n /dev/vgshared && \
/usr/sbin/vgchange -c y -S n /dev/vgshared && \
/usr/sbin/vgexport -s -p -v -m /var/tmp/fgweb.hasupt19.vgshared.map /dev/vgshared && \
/usr/bin/cmp /var/tmp/fgweb.hasupt19.vgshared.map hasupt20:/var/tmp/fgweb.hasupt19.vgshared.map && \
/usr/sbin/cmexec hasupt20 /usr/bin/mkdir -p -m u=rwx,g=r,x,o=r /dev/vgshared && \
/usr/sbin/cmexec hasupt20 /sbin/mknode /dev/vgshared/group c 64 0x010000 && \
/usr/sbin/cmexec hasupt20 /usr/bin/chmod u=rw-,g=r,o=--- /dev/vgshared/group && \
/usr/sbin/cmexec hasupt20 /usr/sbin/vgimport -m /var/tmp/fgweb.hasupt19.vgshared.map vgshared /dev/disk/disk19 && \
/usr/sbin/cmexec hasupt20 /usr/bin/zm /var/tmp/fgweb.hasupt19.vgshared.map && \
/usr/bin/zm /var/tmp/fgweb.hasupt19.vgshared.map && \
/usr/sbin/vgchange -a e /dev/vgshared
```

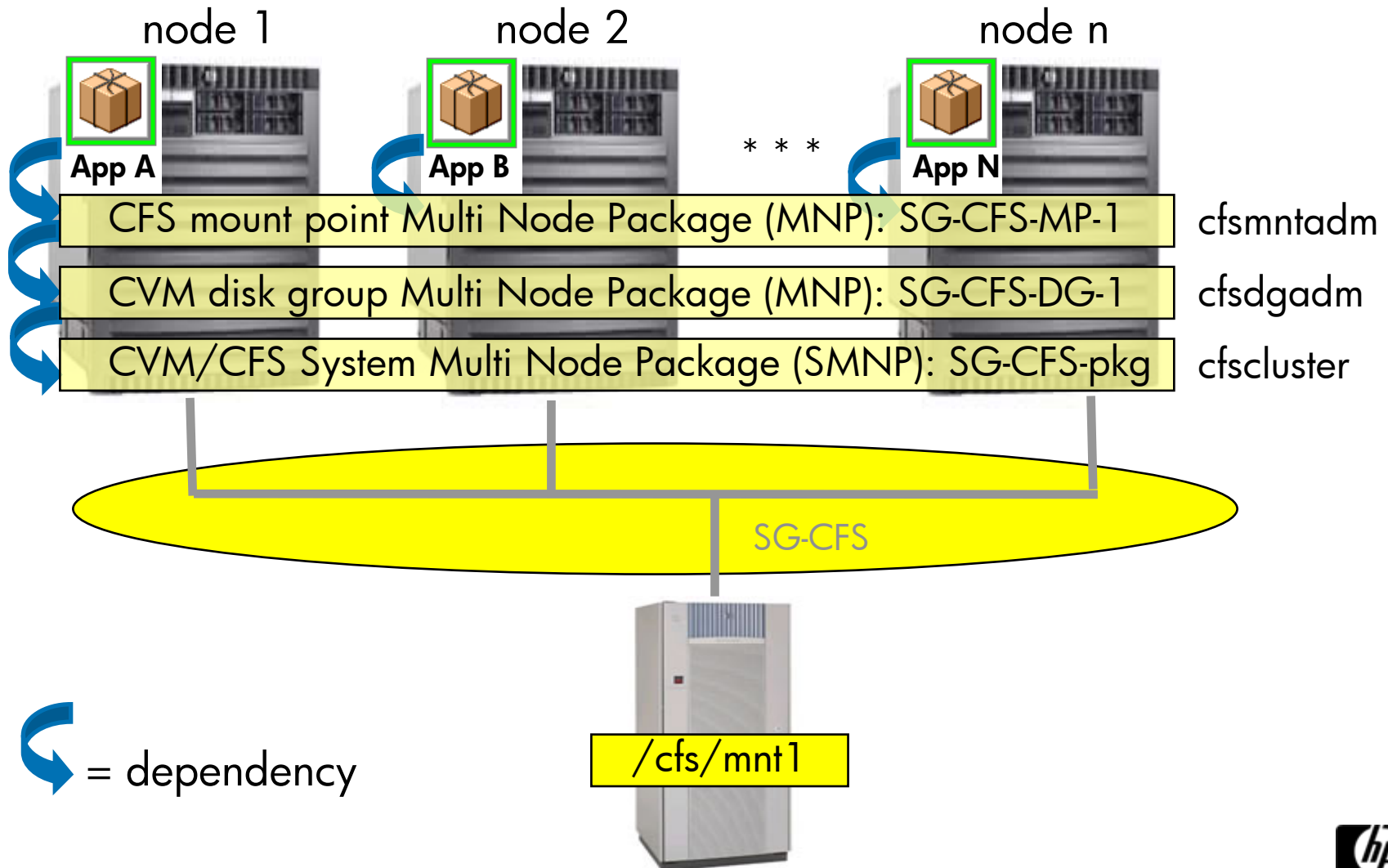
Other cluster node names are presented

Preview of commands

# Configuring a CFS Cluster



# Multi-Node packages and package dependencies in a Serviceguard CFS Cluster



# HP SIM showing our pre-defined collection

The screenshot displays the HP Systems Insight Manager (SIM) interface. The top navigation bar includes the HP logo, the title 'HP Systems Insight Manager', and user information 'User: root' with links for 'Home' and 'Sign Out'. Below the navigation bar, there are several tabs: 'Tools', 'Deploy', 'Configure', 'Diagnose', 'Optimize', 'Reports', and 'Tasks & Logs'. The main content area is titled 'Demo systems' and shows a table of systems. The table has columns for 'System Name', 'System Type', 'System Address', 'Product Name', and 'OS Name'. Two systems are listed: 'hasupt19' and 'hasupt20', both of which are 'Server' type and have 'HP-UX' OS. The interface also shows a 'System Status' panel on the left with a legend and event counts, and a 'System and Event Collections' panel with a tree view showing the hierarchy of collections.

System Status  
Legend... Customize...  
Updated: Wed, 4/11/2007, 3:30 PM PDT  
4 0 0 9 Uncleared Event Status

Search  
Advanced Search...

System and Event Collections  
System Overview  
All Systems  
All Events  
Systems  
Private  
HPTF Manageability Demo S  
Demo systems  
hasupt19  
hasupt20  
Shared

Tools Deploy Configure Diagnose Optimize Reports Tasks & Logs  
Options Help

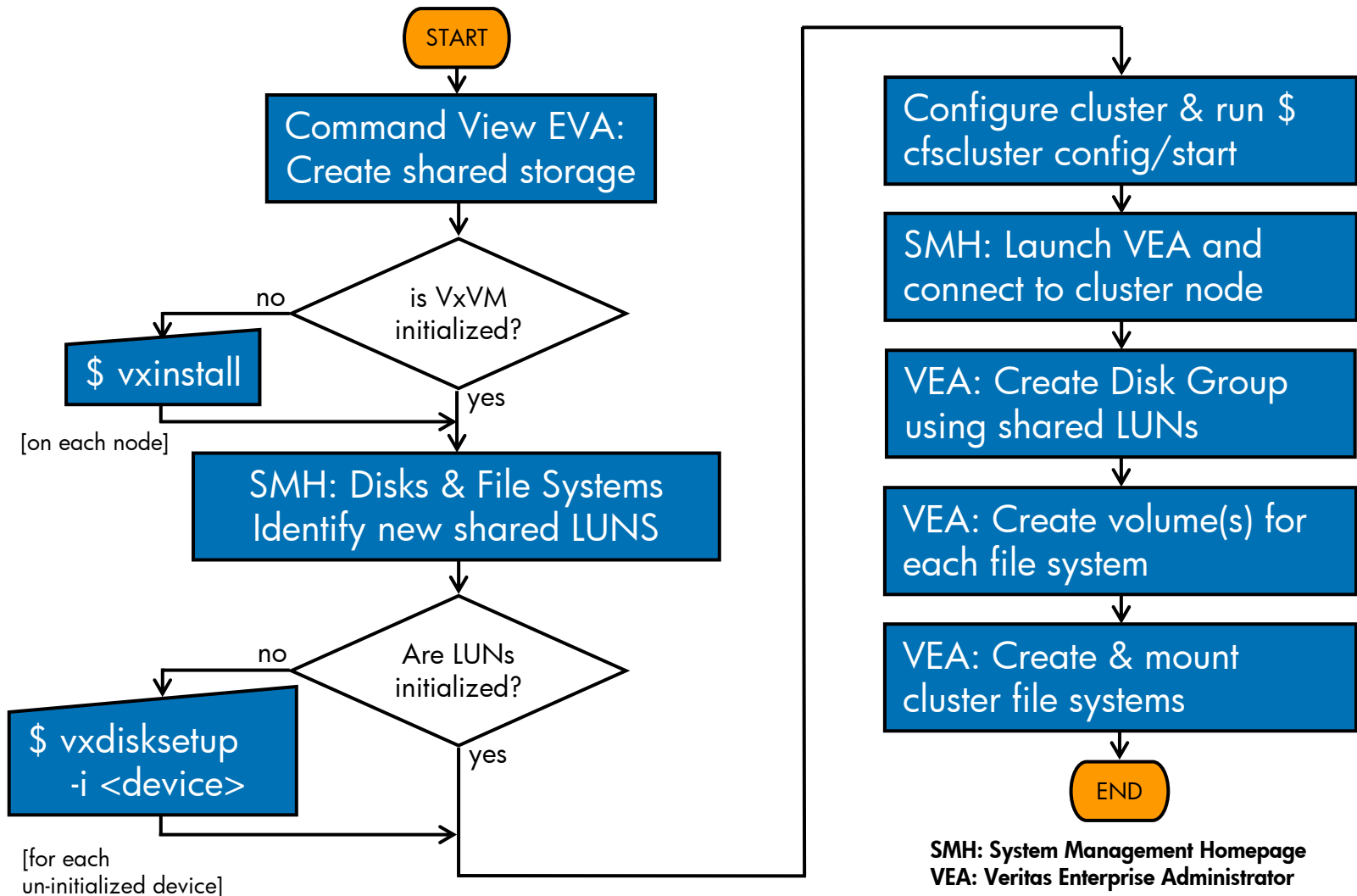
Demo systems  
System(s) Events  
View as: table  
 Select "Demo systems" itself  
Summary: 0 Critical 0 Major 0 Minor 2 Normal 0 Disabled 0 Unknown Total: 2

	HS	MP	SW	ES	System Name	System Type	System Address	Product Name	OS Name
<input type="checkbox"/>	✓	ⓘ		✓	hasupt19	Server	16.89.143.52	ia64	HP-UX
<input type="checkbox"/>	✓	ⓘ		✓	hasupt20	Server	16.89.143.53	ia64	HP-UX

Save AS Collection... Delete Print

- HP SIM collection named "Demo systems" created via the **Customize...** menu
- Two servers (hasupt19 & 20) to be used to create a 2-node cluster with CFS

# Creating the CFS file systems



# Configure a cluster & setup CVM

- Use Serviceguard Manager to create cluster hptf
  - Use HA Quorum Service as cluster lock tie-breaker, 16.89.121.72
- Setup CVM (in preparation for CFS)
  - Initialize VxVM if needed on each node (using \$ vxinstall command)
  - \$ cfscluster config
  - \$ cfscluster start
- Serviceguard Mgr shows new System Multi-node Package, SG-CFS-pkg
- Rediscovery on HP SIM shows the new cluster, hptf



Tools ▾ Deploy ▾ Configure ▾ Diagnose ▾ Optimize ▾ Reports ▾ Tasks & Logs ▾ Options ▾ Help ▾

## Demo cluster

System(s) Events

View as: table ▾

Select "Demo cluster" itself

Summary: ✖ 0 Critical ▼ 0 Major ⚠ 0 Minor ✔ 2 Normal  0 Disabled ? 0 Unknown Total: 2

<input type="checkbox"/>	HS	MP	SW	ES	System Name	System Type	System Address	Product Name	OS Name
<input type="checkbox"/>	✔	ⓘ		ⓘ	hasupt19 in Cluster hptf_1164670251	Server	16.89.143.52	ia64 hp server rx2600	HP-UX
<input type="checkbox"/>	✔	ⓘ		ⓘ	hasupt20 in Cluster hptf_1164670251	Server	16.89.143.53	ia64 hp server rx2600	HP-UX

Save As Collection... Delete Print

# SGManagerPI – CFS Package Stack

The screenshot displays the HP Serviceguard Manager web interface for cluster hptf. The main navigation bar includes Home, Settings, Tasks, Tools, Logs, and Help. The current view is 'Tools -> Serviceguard -> Serviceguard Manager'. The page title is 'HP Serviceguard Manager: Cluster hptf'. Below the title, there are tabs for View, Administration, Configuration, Alerts & Logs, and System Tools. The 'Packages' tab is selected, showing a table of package status on nodes.

Package	Node	Package Status On Node	
		hasupt19	hasupt20
SG-CFS-DG-1 (MNP)		up	up
SG-CFS-MP-1 (MNP)		up	up
SG-CFS-MP-2 (MNP)		up	up
SG-CFS-MP-3 (MNP)		up	up
SG-CFS-pkg (SMNP)		up	up

This screen shot shows an example of MNP and SMNP packages for:

- 1 disk group created & controlled by SG-CFS-DG-1
- 3 cluster file systems (/cfs/mnt1 - /cfs/mnt3) controlled by SG-CFS-MP-n



DSAU  
Distributed System  
Administration  
Utilities



# DSAU

## Manage a SG cluster or group of systems

Integrated with Serviceguard & Serviceguard Manager (B.01.00 & later)

Based on Open Source tools: syslog-ng, cfengine, pdsh

- **Consolidated Logging**
  - Centralize logs
  - Extended to support TCP
  - Integrated with SG – for syslog.log and package logs
- **Configuration Synchronization**
  - Client/server tool, central configuration master – golden image
  - Configuration description file for managed clients
  - Check file permissions, track checksum changes
  - Perform edits to files, run shell commands, check/signal processes
- **Command Fan-out**
  - Use rsh or ssh to execute shell commands in parallel
  - Use csshsetup tool to easily distribute ssh keys
- User Manual: <http://docs.hp.com/en/T2786-90090/T2786-90090.pdf>

# Leverage from Open Source Tools

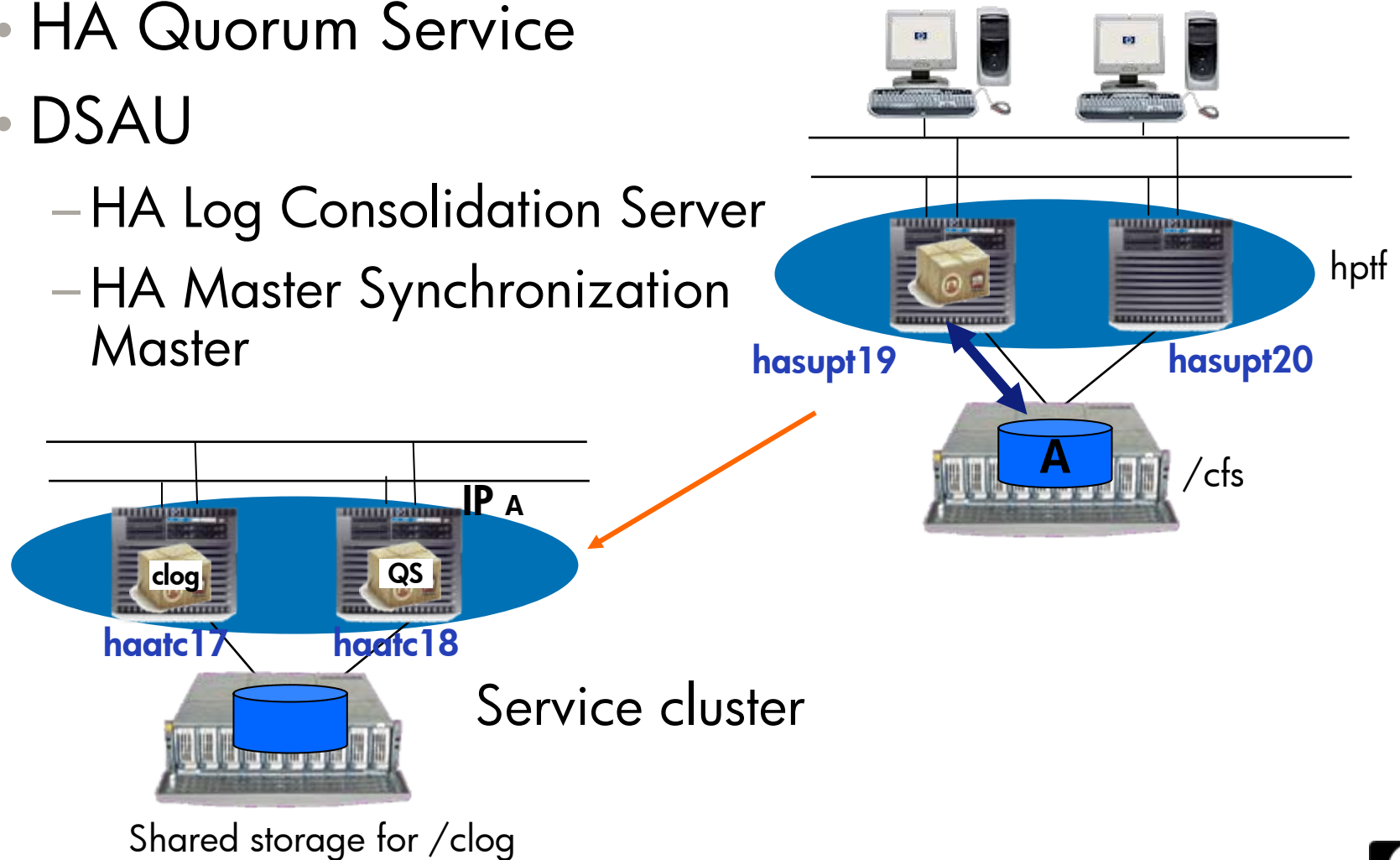
## Reference Material

- **Configuration synchronization**
  - cfengine – “Configuration Engine”
  - [www.cfengine.org](http://www.cfengine.org)
  - Goal-based/“desired state” management tool
- **Consolidated logging**
  - Syslog-NG – Syslog Next Generation
  - <http://www.balabit.com/products/syslog-ng/>
  - Syslog replacement
    - Offers standard UDP and additional TCP transports
    - Significantly more powerful filtering, log rotation, etc.
    - Allows consolidation of arbitrary text based log files.
- **Command fan-out**
  - Parallel Distributed Shell (pdsh)
  - <http://www.llnl.gov/linux/pdsh/pdsh.html>
  - <http://sourceforge.net/projects/pdsh>
  - Ssh or rsh based command fan-out with intelligent output filters
    - Includes a parallel distributed copy (pdcop) command as well

All of the above productized/supported by HP

# “Service Cluster” – A best practice

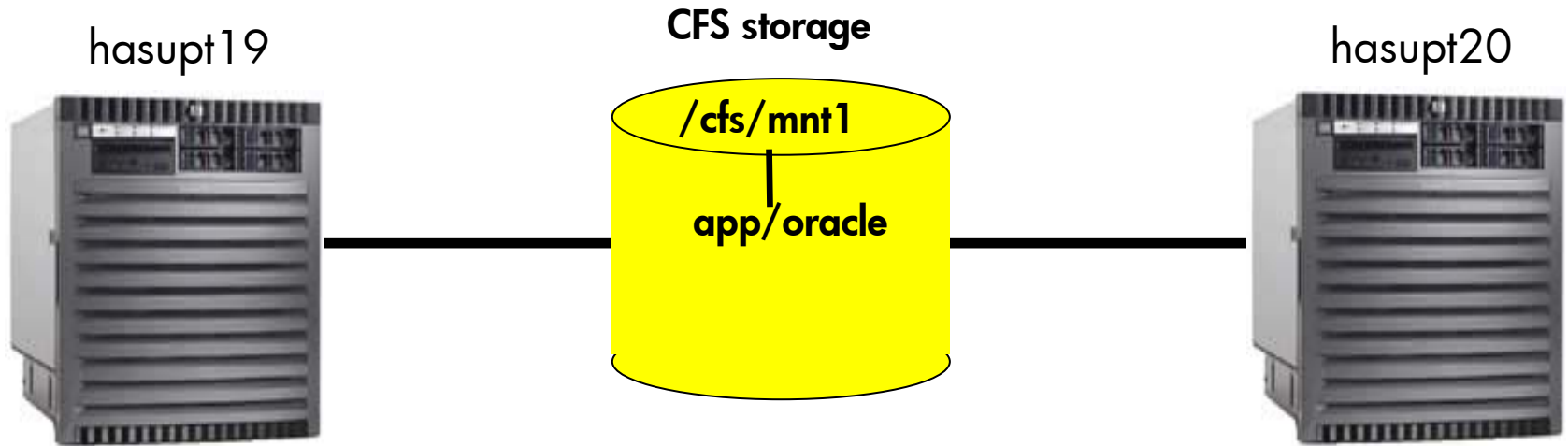
- HA Quorum Service
- DSAU
  - HA Log Consolidation Server
  - HA Master Synchronization Master



Use DSAU tools to  
assist in configuring  
a highly available  
Oracle Database



# Easing application deployment



- Kernel parameters – use HP SMH Kernel Configuration
- Set up pdsh – parallel distributed shell to ease preparation steps
- Set up oracle users, home directories
- Install Oracle binaries on /cfs/mnt1; data files on /cfs/mnt2
- ECM Toolkit for Oracle [ included in the SG SMS bundle ]

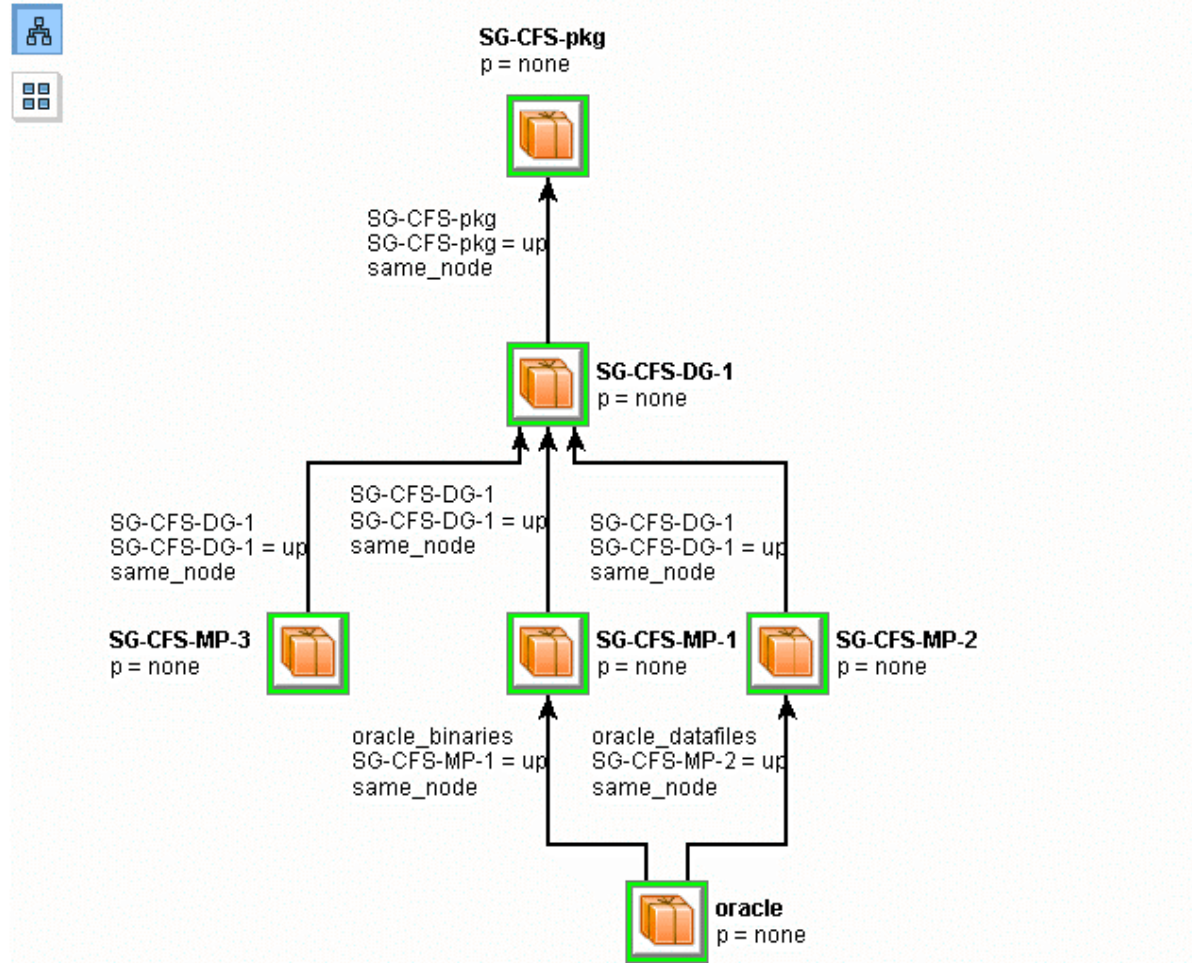
# Oracle Database – Integration with SG

- Oracle RAC – HP Supported framework **Reference Material**
  - <http://software.hp.com> → High availability → Serviceguard Extension for RAC Toolkit
  - Delivered with SGeRAC version A.11.18
  - White Paper: <http://docs.hp.com/en/8987/sgeractoolkit-wp.pdf>
- Single-instance Oracle
  - ECM Toolkit, revision B.04.01
  - Supports SG A.11.16 – A.11.18, Oracle 9i, 10gR2

README	Integration instructions
haoracle.conf	Oracle instance / user configuration file
toolkit.sh	Wrapper used from run script to invoke Oracle toolkit
haoracle.sh	Main shell script – for starting, stopping oracle
haoracle_sql.sh	SQL scripts for sqlplus to start/stop Oracle
haoracle.mon	Called by haoracle.sh to monitor Oracle processes
halistener.mon	Called by haoracle.sh to monitor a configured listener

# Package Oracle's dependency graph

This graph shows all package dependencies configured in the cluster. (Note: p means priority)



# Wrap-up



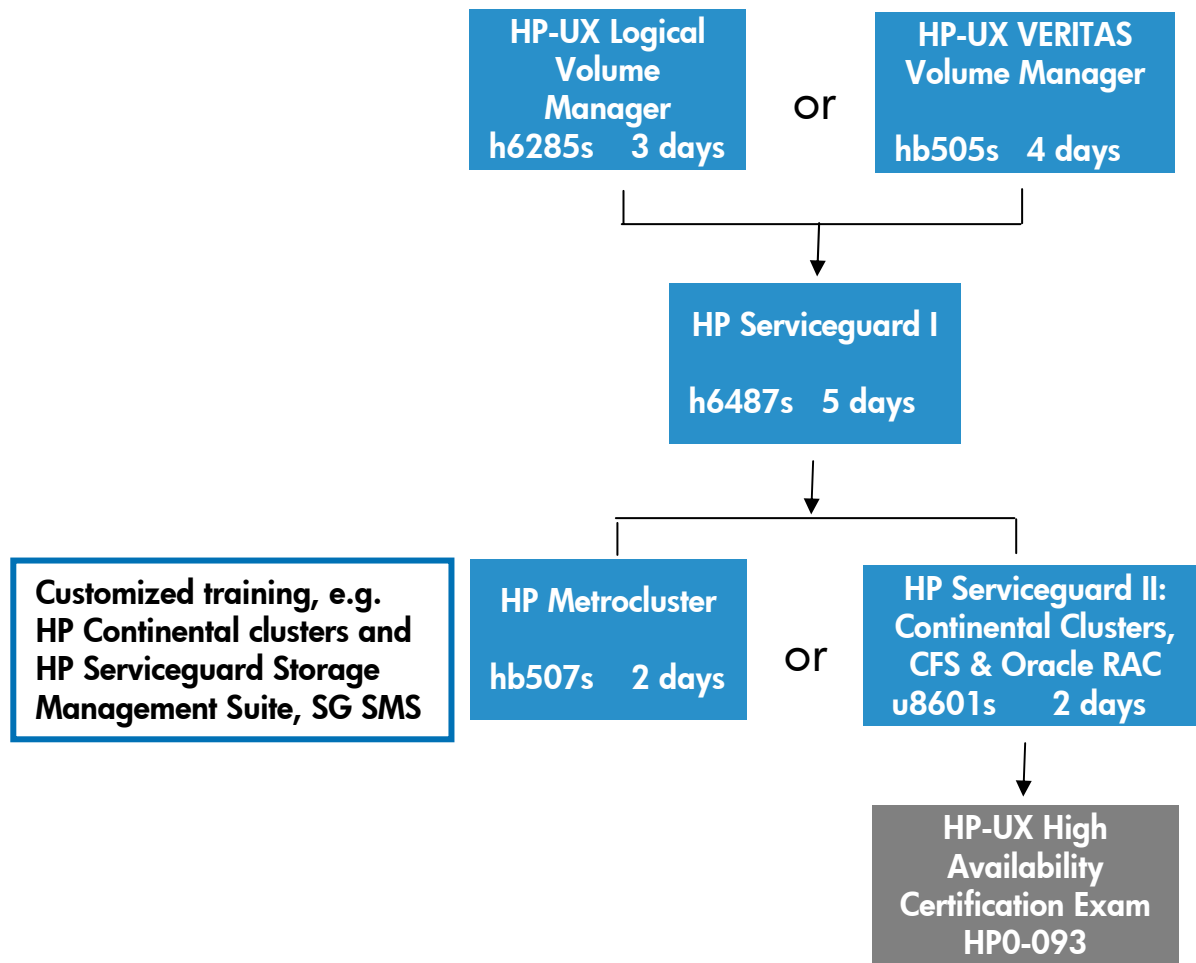
# Summary

- There exists a powerful set of management tools, that when combined can significantly improve the manageability of a SG environment
  - SMH, SIM, Serviceguard Manager
  - DSAU
    - Consolidated logging
    - Cluster-wide command execution
    - File synchronization
- Serviceguard Manager
  - Quick assessment of your cluster
  - Simpler administration and configuration – options all presented
  - Online help assists with training
- Create a service cluster; use it to service application clusters
- CFS can ease configuration, administration & maintenance

# For more information on HP's High Availability offerings ...

- Web sites:
  - <http://www.hp.com/go/serviceguard>
  - <http://www.hp.com/go/ha>
  - <http://docs.hp.com/hpux/ha>
- Watch our HA/DT demos at:
  - [www.hp.com/centers/demos](http://www.hp.com/centers/demos)  
Click on: Adaptive Infrastructure → Optimize → Continuity and Availability
    - Apache Web Server Farm Utilizing Serviceguard CFS
    - Avoiding Outages Due to Hardware Failure
    - High Availability Solutions
    - Lowering the Cost of High Availability
    - Serviceguard CFS for RAC integrated with VSE
    - The Virtual Server Environment Made Real (incl. Metrocluster)
    - And more...

# HP High Availability Training Curriculum



- For more information, visit [www.hp.com/learn/unix](http://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](http://www.hp.com/learn/vse)

Thank you!



