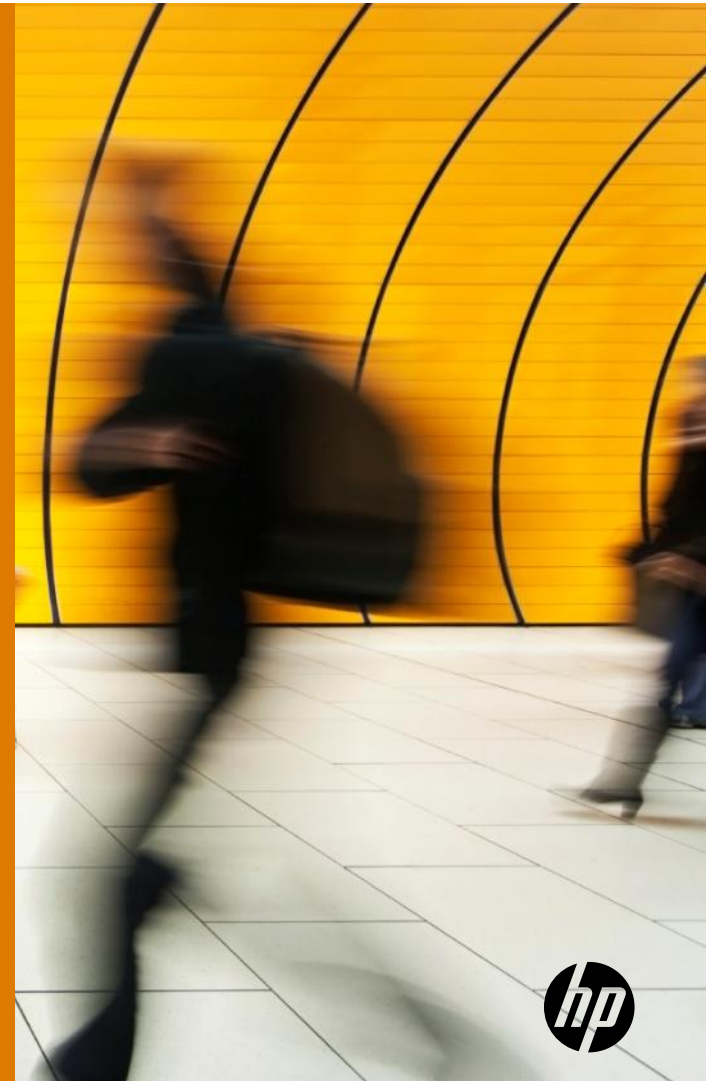


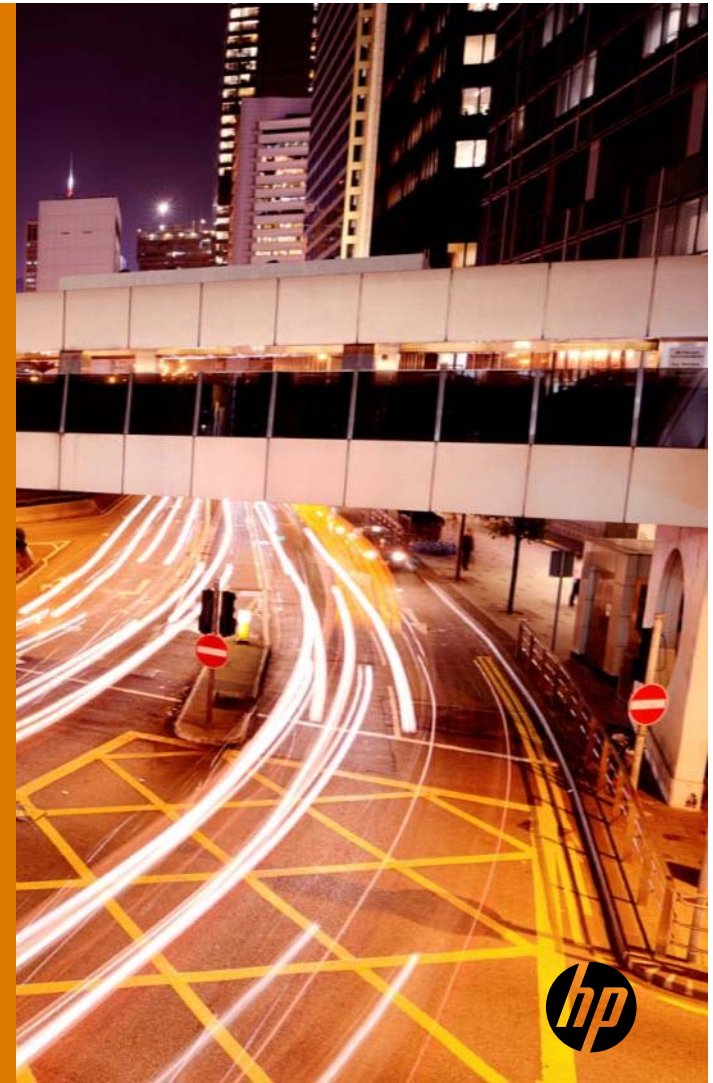
CockpitMgr for OpenVMS

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*Some history.
Why CockpitMgr?*



1993: Digital announces Polycenter

- A marketing name for many point solutions
 - Problem management, performance management, storage management, automation, network management, and security management
- Existing management products got new names
- “Assists network and system managers in planning and managing an open and integrated distributed environment”

What can we say?

- Great point solutions
- Perfect for managing VMS environments in the early nineties
 - Standalone systems, and CI or DSSI clusters located in 1 datacenter
 - Locally attached storage or storage behind HSC/HSJ/HSD controllers
- The marketing umbrella did not trigger any product integration
 - Each product comes with its own configuration utility, notification mechanisms...etc.

Technology & customer demands evolve...

- Multi-site disaster-tolerant VMScusters
 - Network is now part of the cluster
- SAN
 - Storage is drifting away from the systems
- Increased security demands
 - SSH
- Internet technologies
 - Web browser for event notification and reporting
 - XML to store information, XSLT for reporting
- Cell phones
 - SMS ideal for important/urgent event notification

Our motivation to develop CockpitMgr

- When Computer Associates acquired Polycenter products in 1996, we quickly realized there was no future, as the functionality of all products was frozen.
- We decided to re-engineer everything, in a fully integrated way, and deploying the latest technologies.
- Today CockpitMgr evolved to the most complete toolset in the industry, supporting VMS system managers in the daily operations.

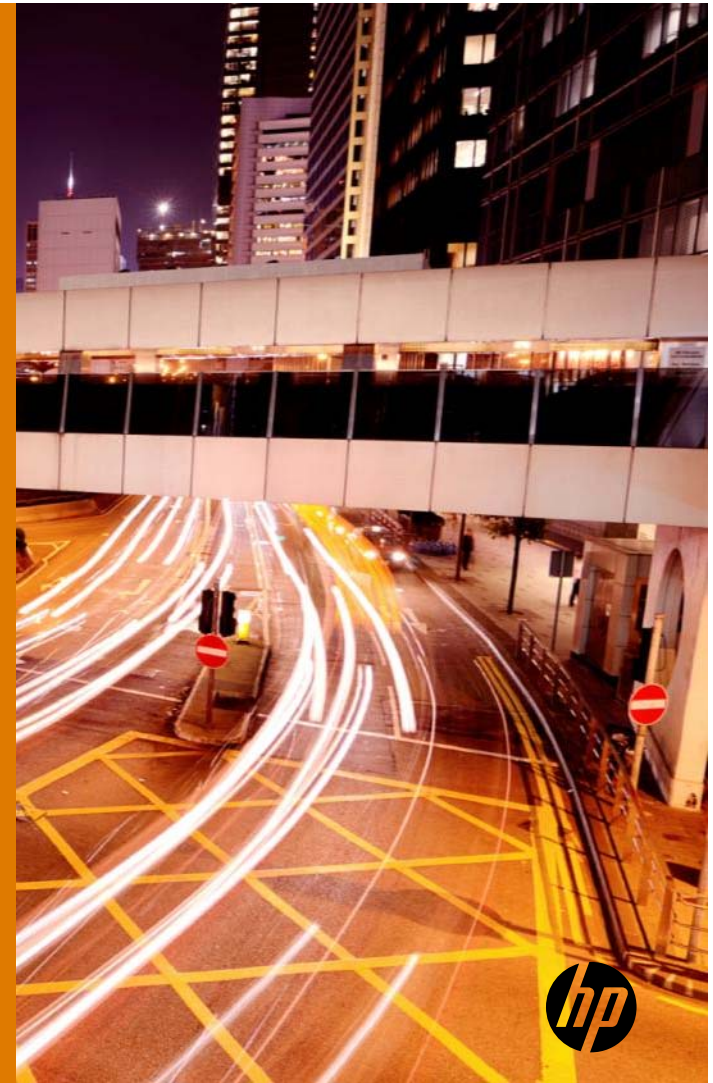
Our starting points

- What information does a system manager of mission-critical VMS systems and clusters need to manage efficiently the entire VMS environment?
- Where can this information be found?
- How can all the available information be centralised, processed, and presented in an uniform way?
- Which modern technologies are the most appropriate to use and are demanded by our customers?

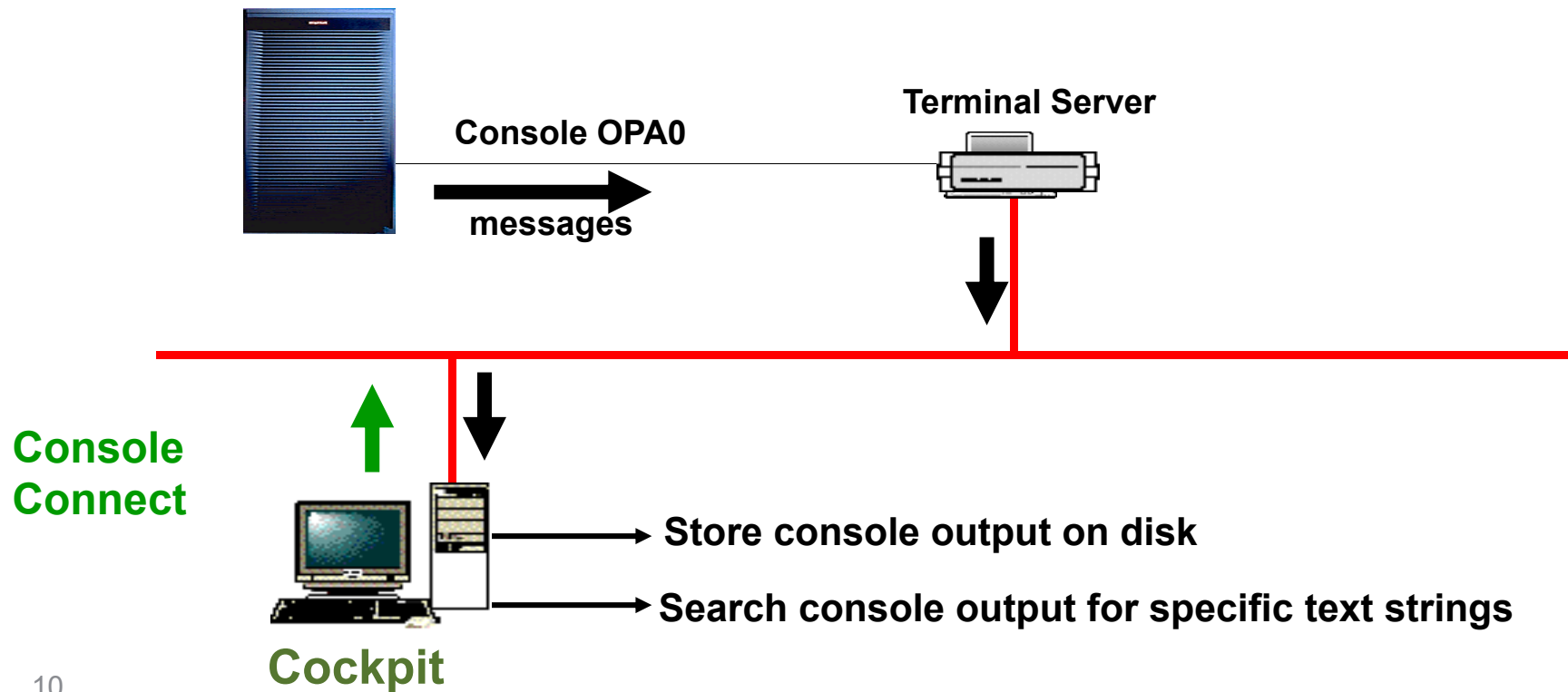
The cockpit concept

- The cockpit is a dedicated system that monitors the entire OpenVMS production environment
 - Consoles, systems, network, storage, security, log files, performance, configuration changes...etc.
- All information is consolidated on the cockpit and brought to the system manager in various ways
 - Event console, GUI, cell phone, web browser...etc.
- Runs on OpenVMS (Alpha or Integrity)
 - A VMS system manager works best on a VMS system

Console Manager



Console Management



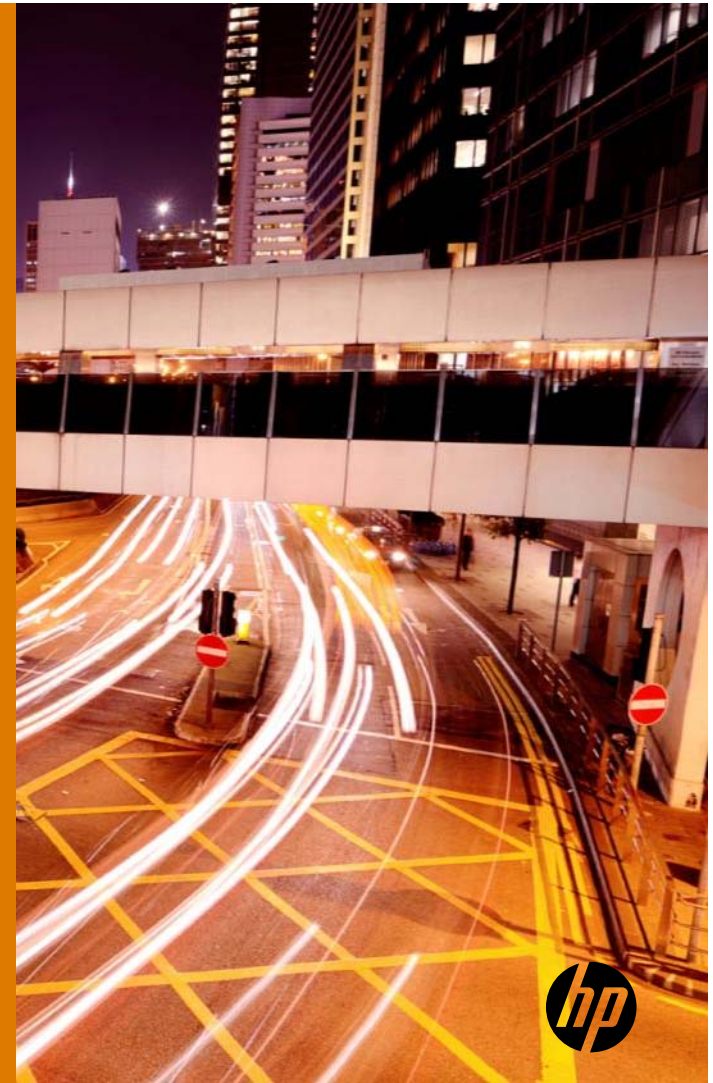
Console Management

- CockpitMgr provides complete console management:
 - Connect to remote system console
 - Log console output for further reference
 - Search console output for specific text strings
- Many up-to-date scan profiles included:
 - OpenVMS, VMScluster, shadowing, LAN failover messages....
 - Layered products such as SLS, ABS, MDMS, RDB, DCPS ...
 - VAX, AlphaServer and Integrity messages

Console Management (cont.)

- Terminal server support:
 - Classic DEC servers/LANtronix
 - Cisco Access Server
 - Digi CM server
 - Marvel NAT box
- Direct connection to Integrity MP
- Connection to TCP/IP port for emulated hardware
- Communication protocols: LAT, Telnet, SSH

System Monitoring



System Monitor

- System Monitor on the cockpit communicates with an Agent running on each VMS production system
- What needs to be monitored is defined centrally on the cockpit
- Connection is made at regular time intervals
- Connection is only accepted from a “trusted” cockpit
- Implemented with non-transparent DECnet task-to-task and TCP/IP socket programming

What is monitored?

- System reachability
- Changes in the hardware error counts of CPU, memory, devices, buses, controllers...
- The system time difference between cockpit and managed system

What is monitored? (cont.)

- Processes
 - Does a process exist on one system or cluster-wide?
 - If process name contains wildcards, the minimum number of occurrences can be specified
 - Specification of a UIC is optional
- Disks
 - Disk free space
 - Disk states (e.g. mount verification, not mounted, write-locked,...etc.)

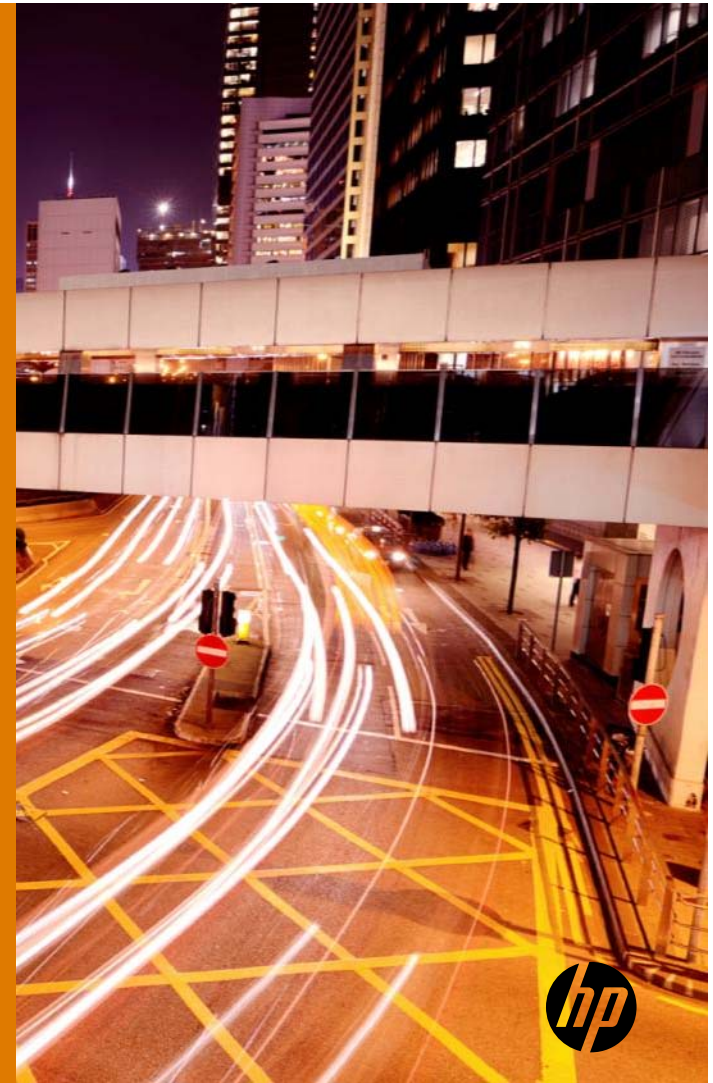
What is monitored? (cont.)

- Shadow sets
 - Is there a disk missing as shadow set member?
 - Are the shadow set members doing copy and merge operations?
 - Is a disk unexpected member of a shadow set?
- Status of batch and print queues, number of pending jobs.
- Checks whether a batch job has been submitted on a queue by a certain user
 - Supports generic queues

System Monitor key features

- Monitoring of every item can be restricted to certain periods of the week
- Items can be monitored per node or per cluster
- Wildcards can be used
- Fast configuration utility available
- Automatic repair actions can be defined
- The System Agent can easily be extended with your own specialized monitoring modules

Storage Monitoring



Storage today

- Storage is located in a SAN
- Local storage is configured behind a RAID controller
- Redundant storage configurations are built, and VMS operations continue after a single failure

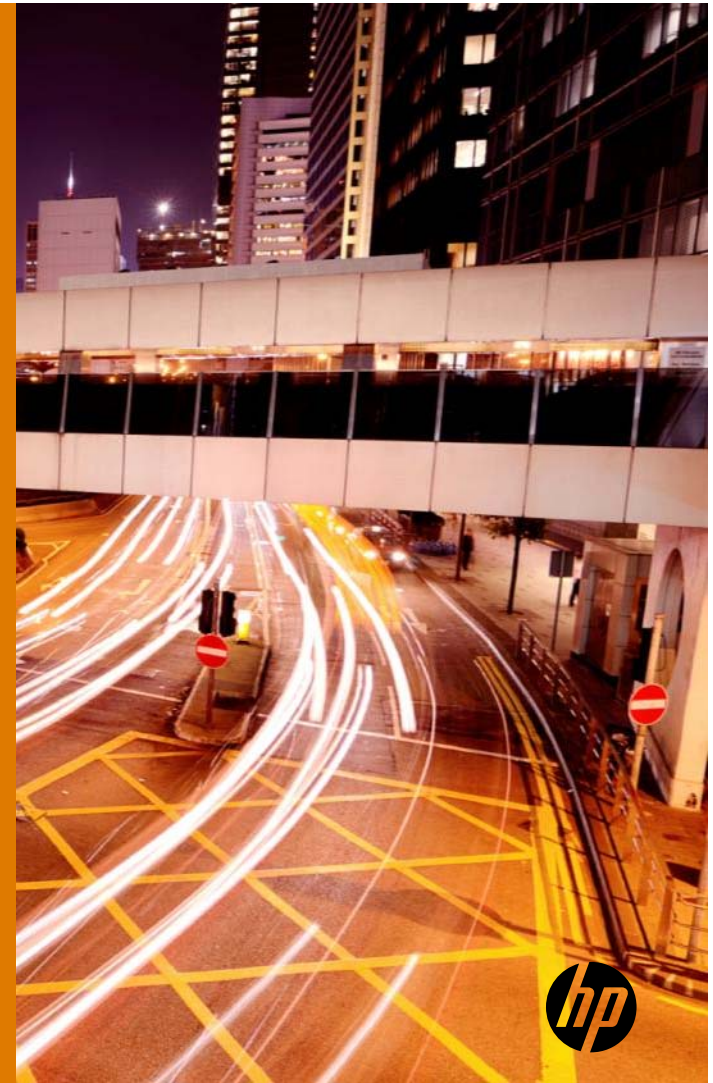
Storage monitoring

- Configure the SAN Management Appliance (EVA, 3PAR...) to send SNMPtraps to the cockpit
 - An SNMPtrap Listener receives the SNMPtraps, analyses and interprets them
- Configure HSJ, HSZ and HSG controllers in Console Manager
 - Message instance codes are detected and interpreted
- New in V7.8: Monitoring of MSA and P2000 (controller status, cache and batteries, disks, RAID sets, copy operations...etc)

Storage Monitoring (cont.)

- Use SNMPgets to query MIB agents
 - Brocade Fibre Channel Switches, McData Enterprise Director, Cisco MDS, Network Storage Routers, Solid state disks, Wave Division Multiplexers, RAID controllers...etc.
 - Monitoring of the port states, error counters and device-specific diagnostic information
 - Performance data collection

Network Monitoring



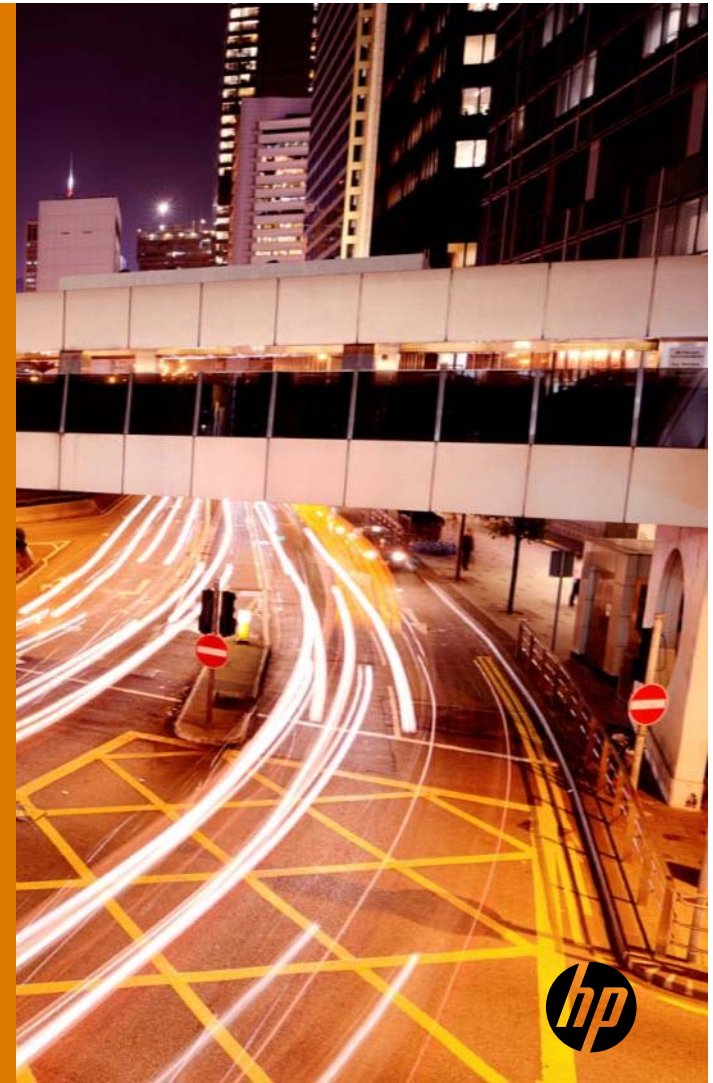
Network Monitoring

- Network is used as cluster interconnect
- Any network issue may have immediate impact on the VMSccluster
- Good working systems are useless in case of network problems

Network Monitoring

- Monitoring of selected network devices (SNMPgets):
 - Strong focus on Cisco Catalyst (includes support for monitoring of trunks, VLANs and etherchannels)
- Includes checking for the availability of each device, changes in the port states, and changes in the port error counters
- Listens for and interprets SNMPtraps sent by network devices
- Performance monitoring
 - graphs on throughput of Catalyst ports

Performance Monitoring



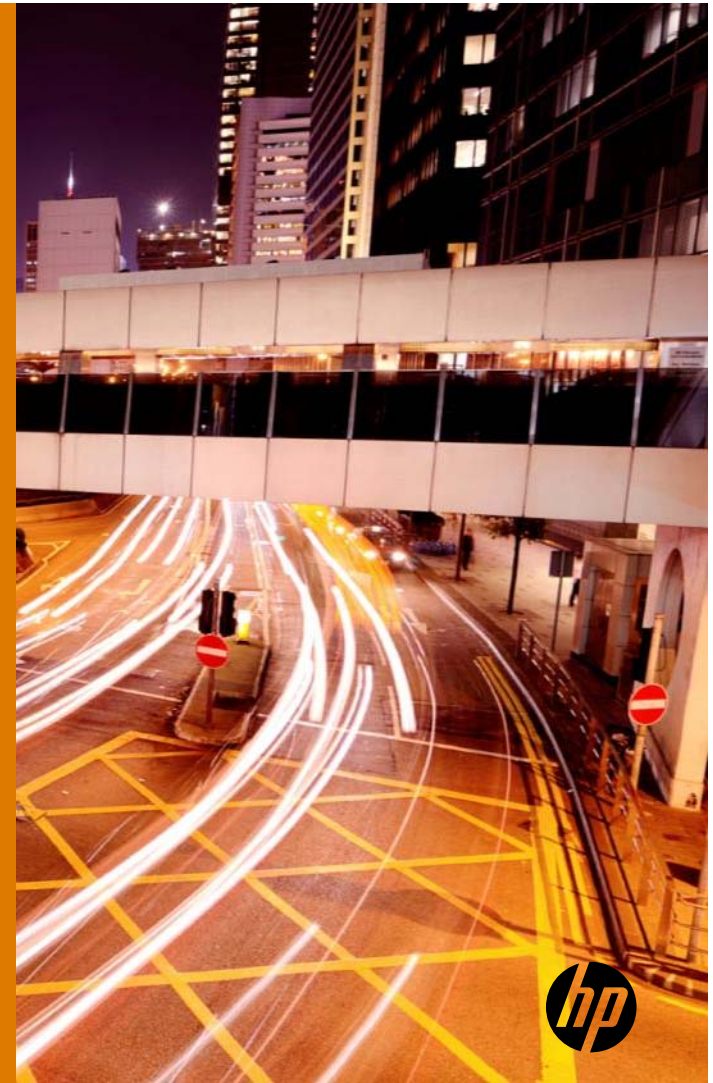
Performance Monitor

- The Performance Monitor looks for possible indications of system performance slowdowns
 - CPU utilisation (also per mode)
 - Memory utilisation
 - Page and swap file utilisation
 - Looping processes
 - Idle processes
 - Pool utilisation
 - Processes in special wait state (RWAST, RWMBX...)
 - Process quota utilization

Performance Monitoring

- CockpitMgr collects some performance metrics, and makes the information available in graphs
 - PNG files to display in web browser

More features



More features

- SNMP based monitoring of many devices
 - Printers, UPS, temperature & humidity sensors, ...etc
- Real-time security event monitoring
- Log File browser: searches batch and application log files for errors
- Job scheduler (OpenVMS V7.2 or above)
- NETDCL
 - Execute one or more DCL commands on a remote system with output to the cockpit
 - Facilitates remote system management

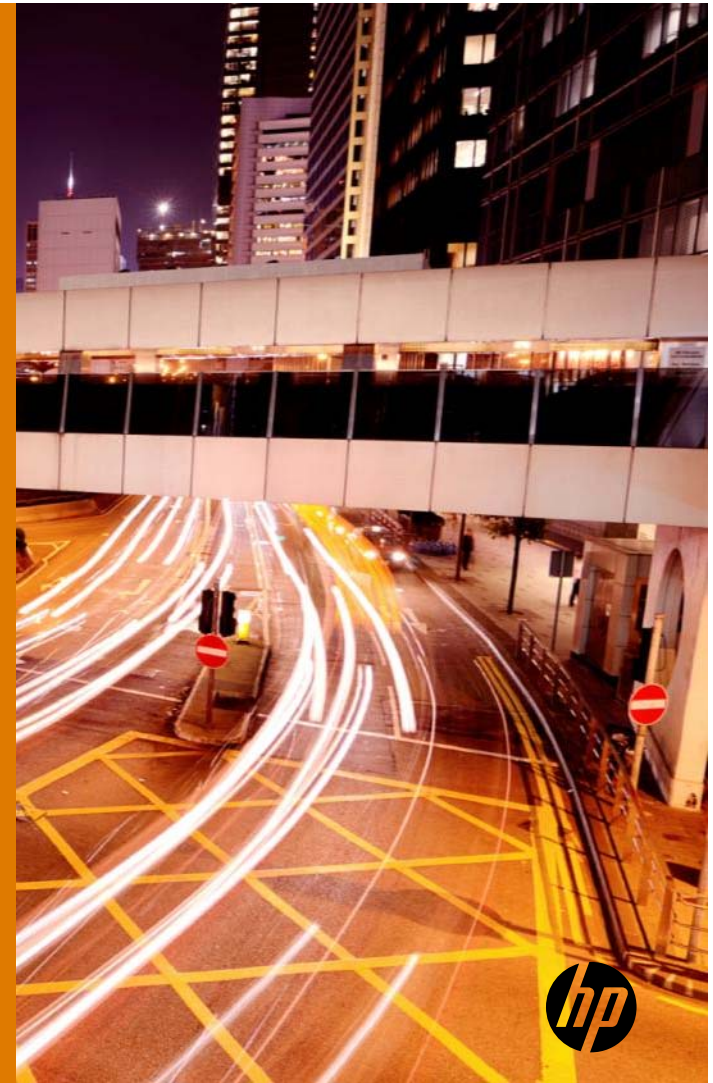
Non-VMS systems

- Monitoring of Unix systems
 - Unix agent available for processes and file system space
 - Easy integration of existing monitoring procedures
 - Syslog messages can be sent to cockpit
- Monitoring of Windows systems
 - SNMP-based checking of processes, services, disk space, high CPU and memory utilization
 - Event log can be sent to cockpit Syslog server

Standby cockpit

- In a disaster-tolerant environment, you can not depend on anything that is only at either site
- Your cockpit is key in the operations. After loss of the cockpit, you need to be able to activate the cockpit in the other site
- Standby cockpit will automatically become active
 - if primary fails
 - network connection between the 2 sites is broken
- Manual switch between the active and standby cockpit is possible
- Events detected by primary cockpit are sent to standby cockpit to have all historical information available in both sites.

Event Notification



Several notification utilities

- Event console
- GUI
- SMS to cell phone
- Web browser
- Integration with enterprise manager

CockpitMgr Event Console -- Cockpit PLUIS -- User SYSTEM

Control Customize

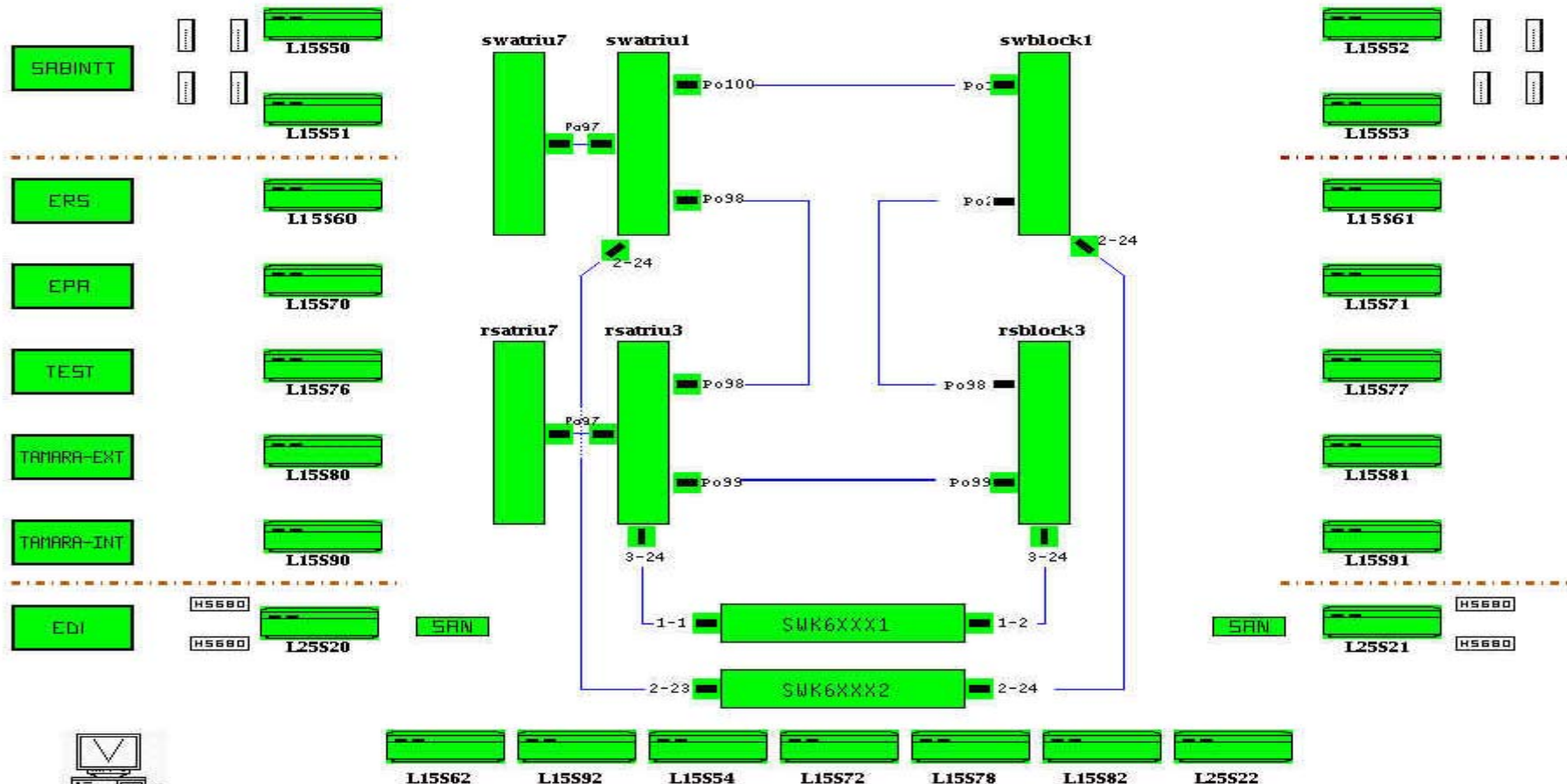
System	Date&Time	Text	Solution
TETHYS	11-APR-2015 22:32:18.58	Disk \$1\$DGA203: (DISK\$ORACLE_1) has 7.32% free blocks (663E480 blocks)	
BRISADV	11-APR-2015 23:00:03.06	Disk \$2\$DGA5: is not mounted	
FCS3	11-APR-2015 23:44:18.18	The physical state of port 4 has changed from inSync to noLight	
NEPTUN	12-APR-2015 03:01:11.25	Please mount device _\$2\$DKB300: (NEPTUN)	
BRISOP	12-APR-2015 13:57:29.85	%SECURITY_BREAKIN, BRIS001::VISITOR attempts breakin with user SMITH	
HUB001	12-APR-2015 00:00:00.03	A module has been removed.	
HUB001	12-APR-2015 00:00:04.04	A backplane connection change has occurred.	
LUX	12-APR-2015 14:16:19.25	Disk _\$1\$DGA300 is copy target in shadow set DSA3:	Copy operation terminated
BRISADV	12-APR-2015 14:17:18.35	Only 320 global page table entries free	
BRISADV	12-APR-2015 14:19:54.99	Process DB_server is missing	Process available
BRISVMS	12-APR-2015 14:19:58.02	Process UPDATER (PID: 20400129) seems to be looping	Process deleted
PLUIS	12-APR-2015 15:59:11.47	%SYSTEM-W-PAGEFRAG, page file filling up; please create more space	
BRISAXP	12-APR-2015 16:12:33.24	-SYSTEM-F-NOSLOT, no PCB available	
LUX	12-APR-2015 18:00:04.25	Disk \$1\$DGA420: is missing as member of shadow set DSA5:	
BRISOP	12-APR-2015 18:16:08.83	User OPERATOR modified SYSUAF record SMITH: PGFLQUOTA, BYTLM	
BROBAT	12-APR-2015 18:19:12.04	Scheduler job FIBAS_EOD (PID: 202001D3) for user ACCOUNTING1 has started	Job completed OK
BROBAT	12-APR-2015 18:19:16.07	Scheduler job FIBAS_FULL (PID: 202001D9) for user ACCOUNTING1 has started	
GFD0002	12-APR-2015 21:04:25.91	The STP state of port 3-1 in VLAN 99 (GFD0004) has changed from "forwarding" to "broken"	
BRISVMS	12-APR-2015 22:48:12.51	%SYSTEM-W-POOLEXP, Pool expansion failure	
PLUIS	12-APR-2015 22:53:26.32	%LICENSE-W-NOLOAD, license was not loaded for VMSCUSTER	
LU2	12-APR-2015 22:59:42.13	%QMAN-E-CREPRCSTOP, failed to create a batch process, queue TCPOLYSRV_LU2 will be stopped	
TETHYS	12-APR-2015 22:59:42.16	Disk \$1\$DGA201: (DISK\$WORKFILES) has 9.88% free blocks (2002762 blocks)	Threshold not exceeded
CISCO_001	13-APR-2015 00:02:08.22	Link down (2)	
SANM01	13-APR-2015 00:08:18.28	An HSV controller's battery assembly has malfunctioned	

Console System Monitor Operations Performance Storage/Backup Security SNMP Other

Load All Delete Cleared Delete Shown Show Marked AutoScroll Quit

Atrium

K-2



Active Cockpit: L15S36

Atrium

K-2

SABINTT

ERS

EPA

TEST

TAMARA-EXT

TAMARA-INT

EDI



Active Cockpit: L15S36

...

...

L15S50

swatriu7

swatriu1

swblock1

swatriu7

File Options Help

Hostname: swatriu7

TCP/IP address: 10.252.249

Location: ATRIUM CR3

Device type: Catalyst 6509

1

5

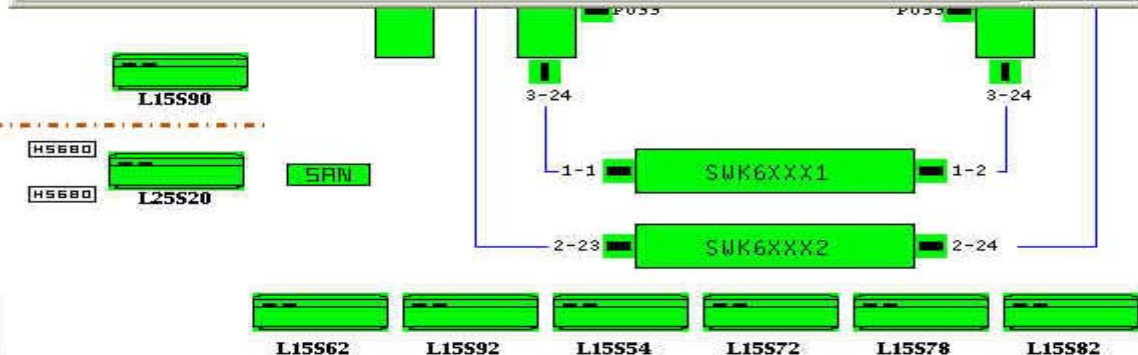
8

9

15

Port 9-33 S69DB

0209/0197



L15S52

L15S53

L15S61

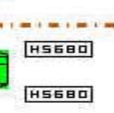
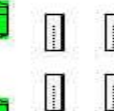
L15S71

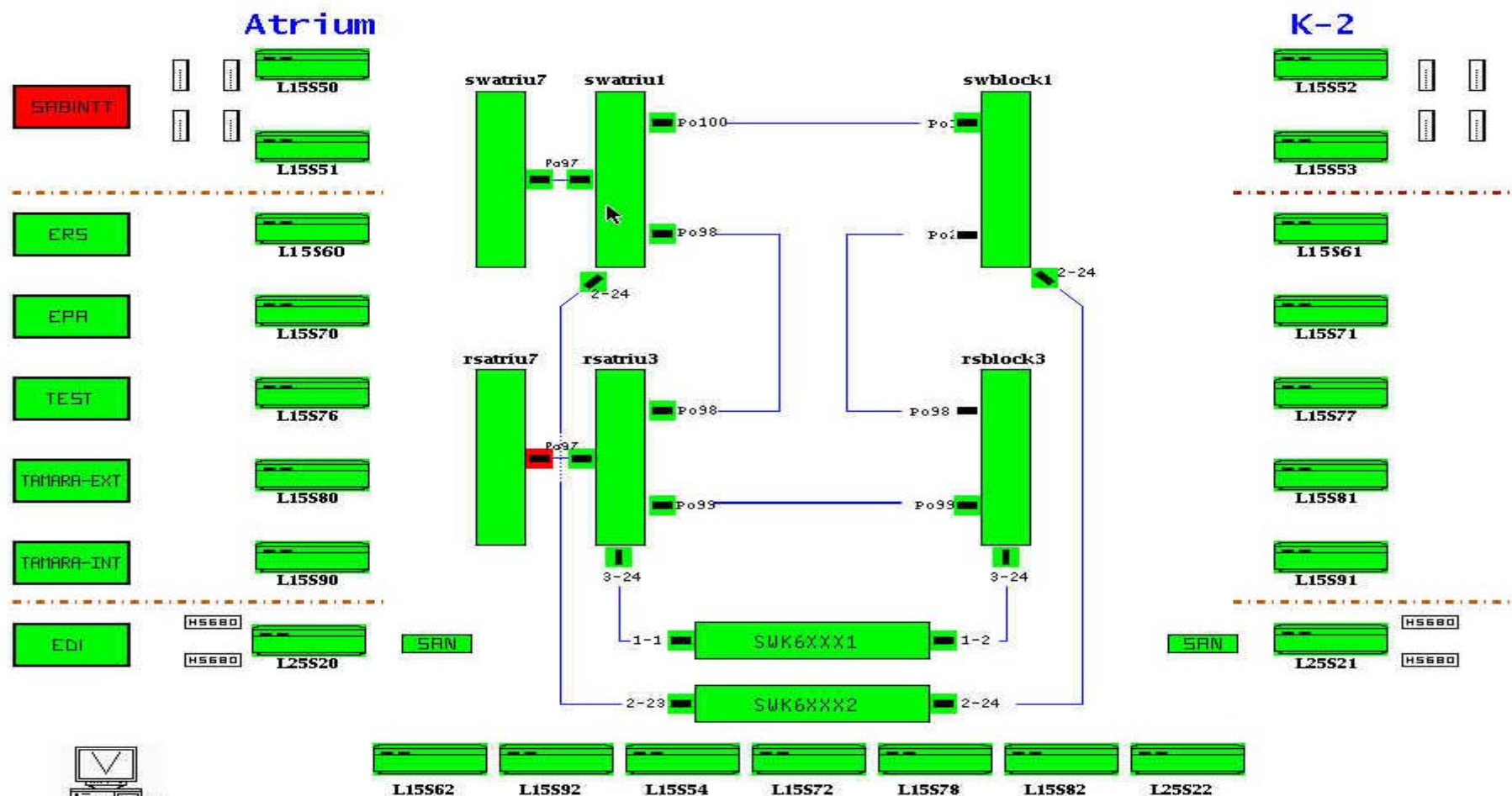
L15S77

L15S81

L15S91

L25S21





Atrium

K-2

SABINTT

File Options Help

Processes BatchJobs

Disks BatchQueues

ShadowSets PrintQueues

Definition File saved!

EPA

TEST

TAMARA-EXT

TAMARA-INT

EDI

HS680

HS680

L15S70

L15S76

L15S80

L15S90

L25S20

SAN

swatriu7

swatriu1

swblock1

rsatriu7

rsatriu3

rsblock3

SWK6XXX1

SWK6XXX2

L15S52

L15S53

L15S61

L15S71

L15S77

L15S81

L15S91

L25S21

HS680

HS680

SAN

L15S62

L15S92

L15S54

L15S72

L15S78

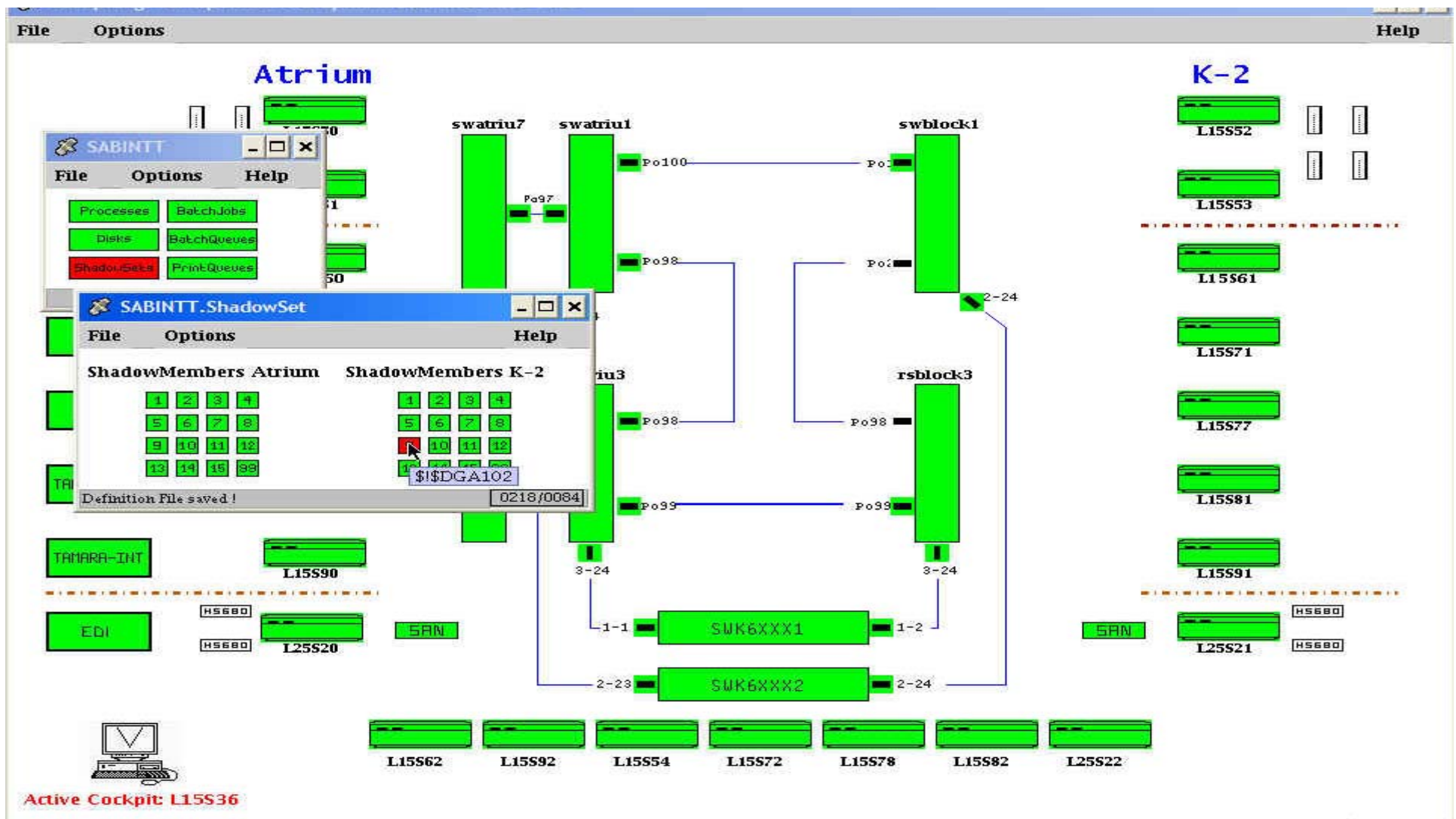
L15S82

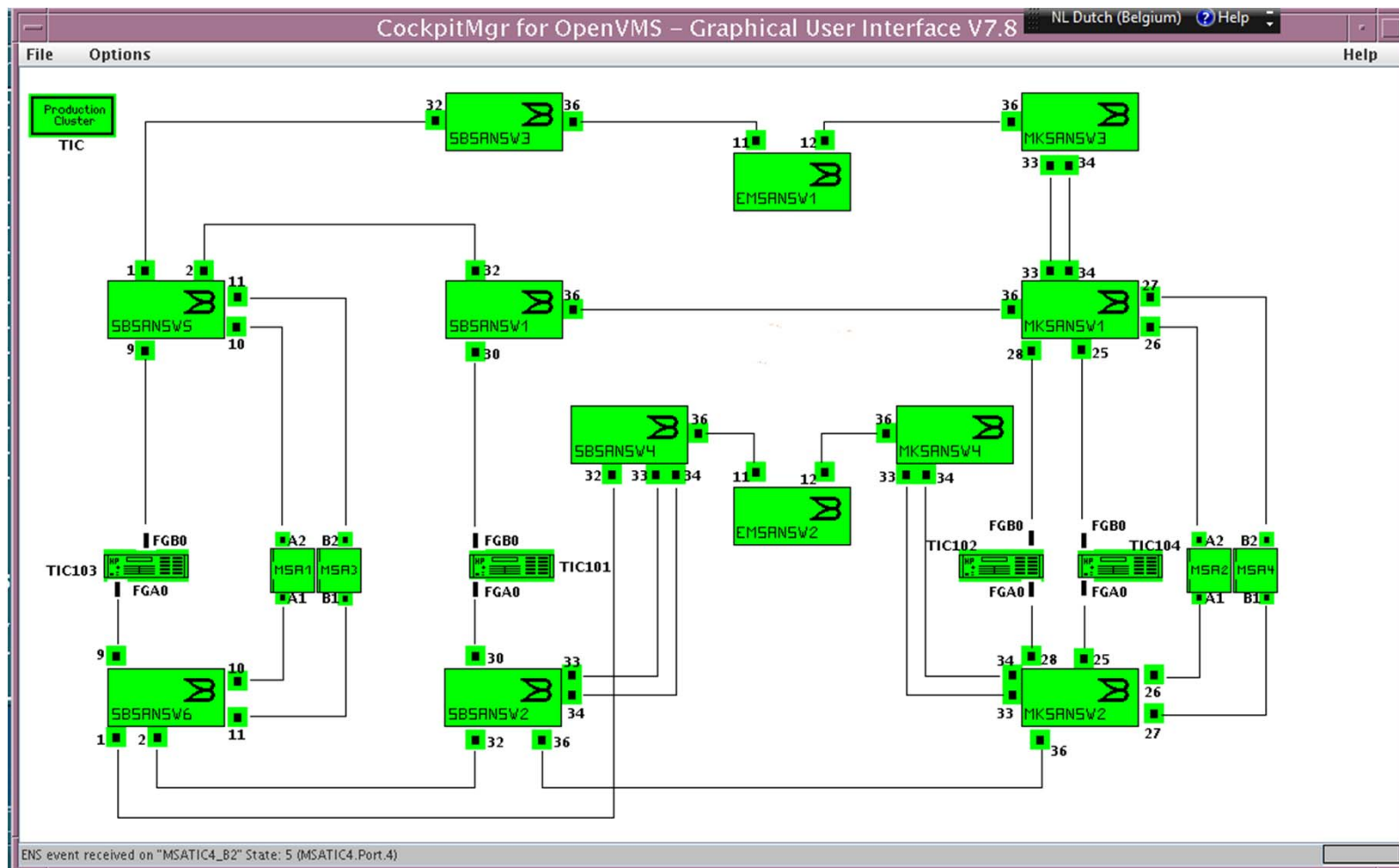
L25S22



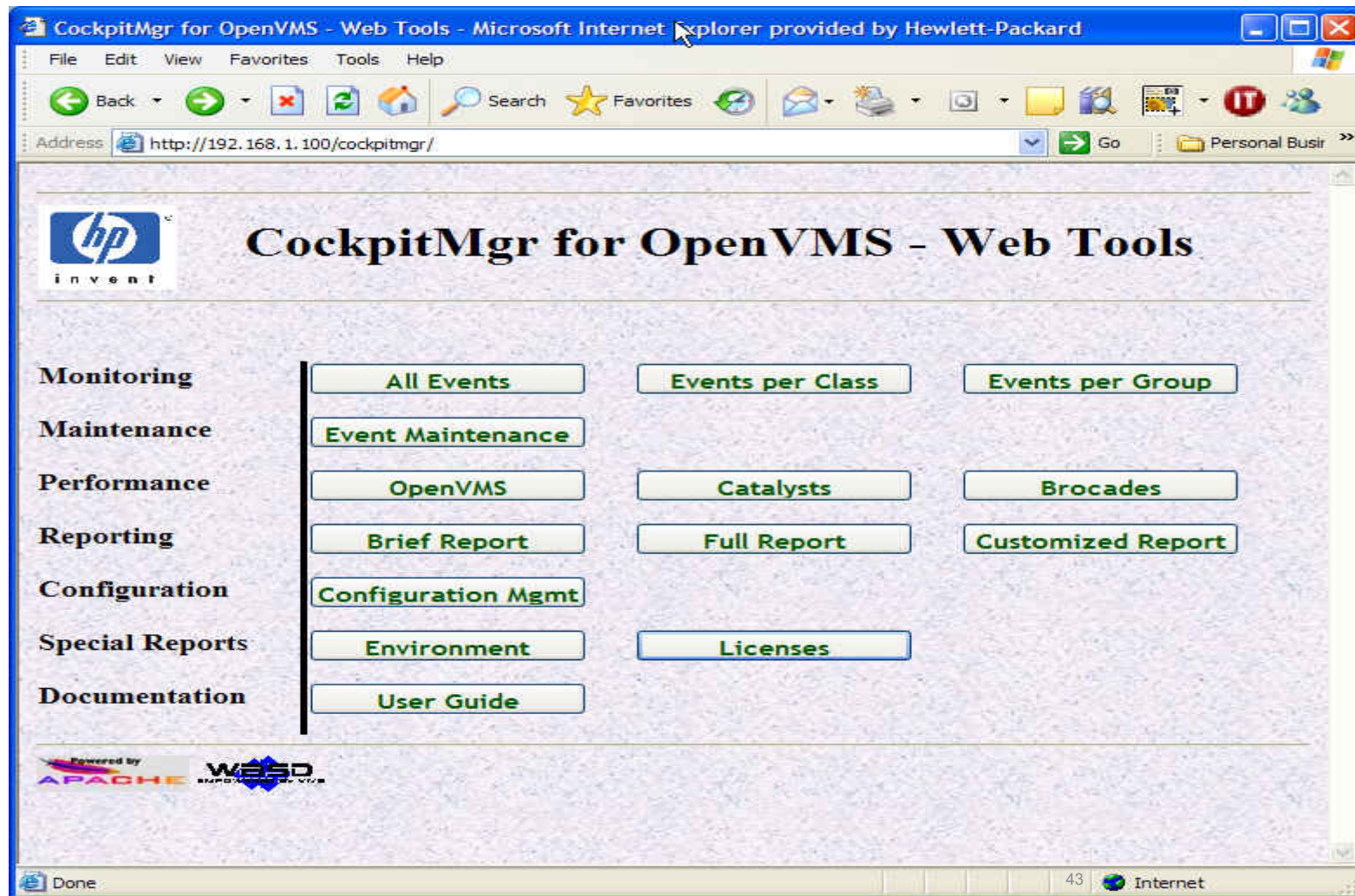
Active Cockpit: L15S36

[0255/0210]







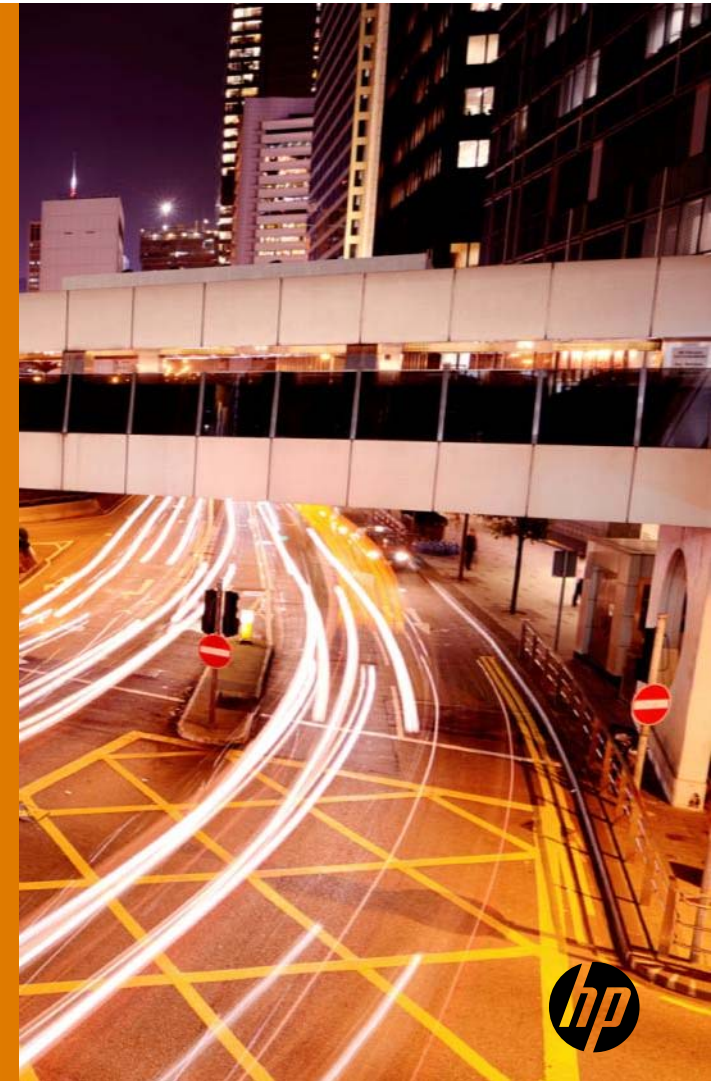


Notification to cell phone

- Requires cellular engine, antenna, power cable, cable to connect to COM port and SIM card
- CockpitMgr makes it easy to define which messages should be sent to who and when.

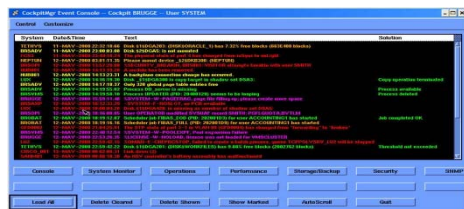
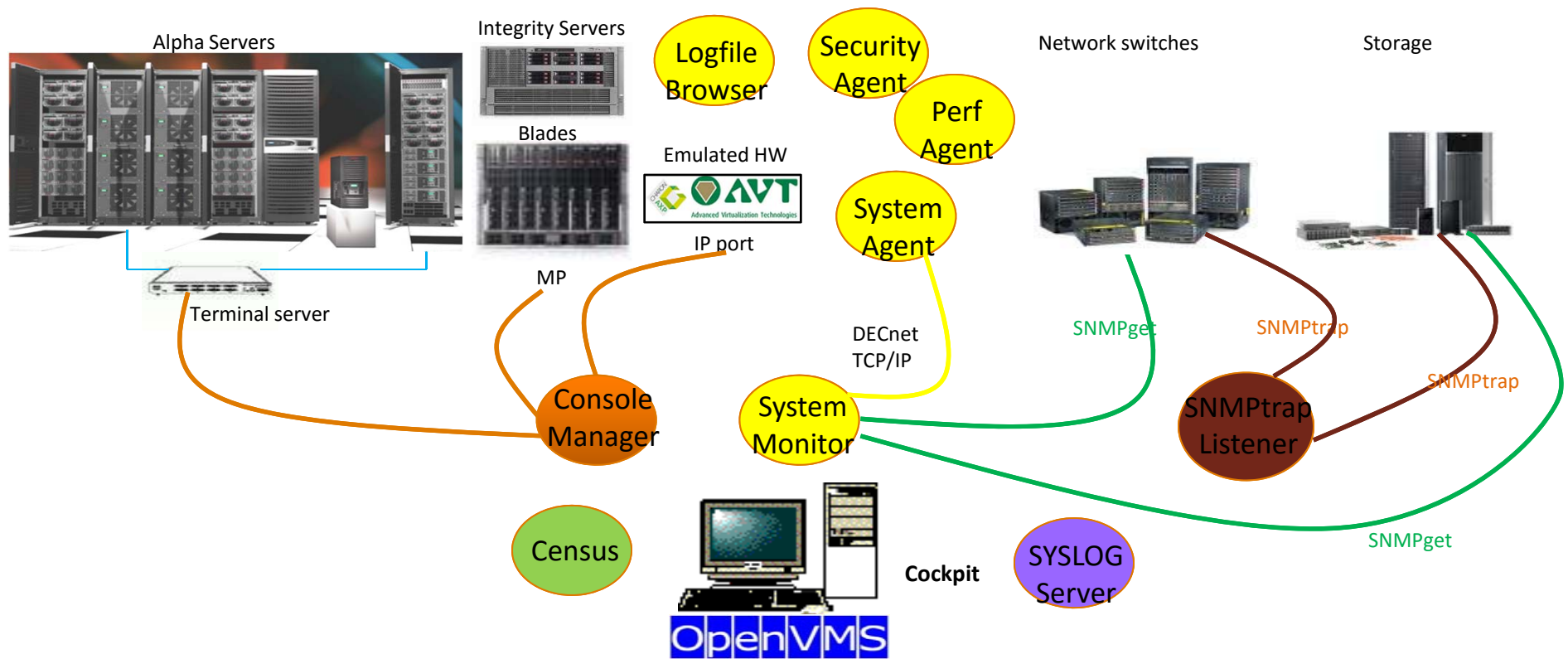


Configuration & Change Management

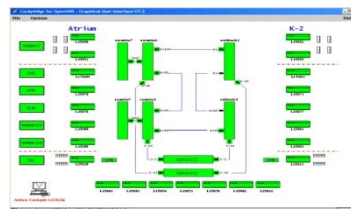


Census: Configuration & Change management

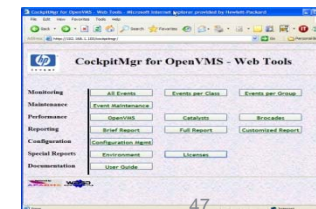
- Configuration details are collected:
 - OpenVMS systems
 - Brocade Fibre Channel switches and routers
 - Cisco Catalyst switches
 - EVA storage
 - Blade enclosures
- Different information sources are correlated
 - Link a HBA to a FC switch/port
 - Link a NIC to a catalyst/port
- Data is stored in XML format
 - Allows comparison of current with older configurations
 - Data is displayed in web browser using XSL



Event Console



GUI

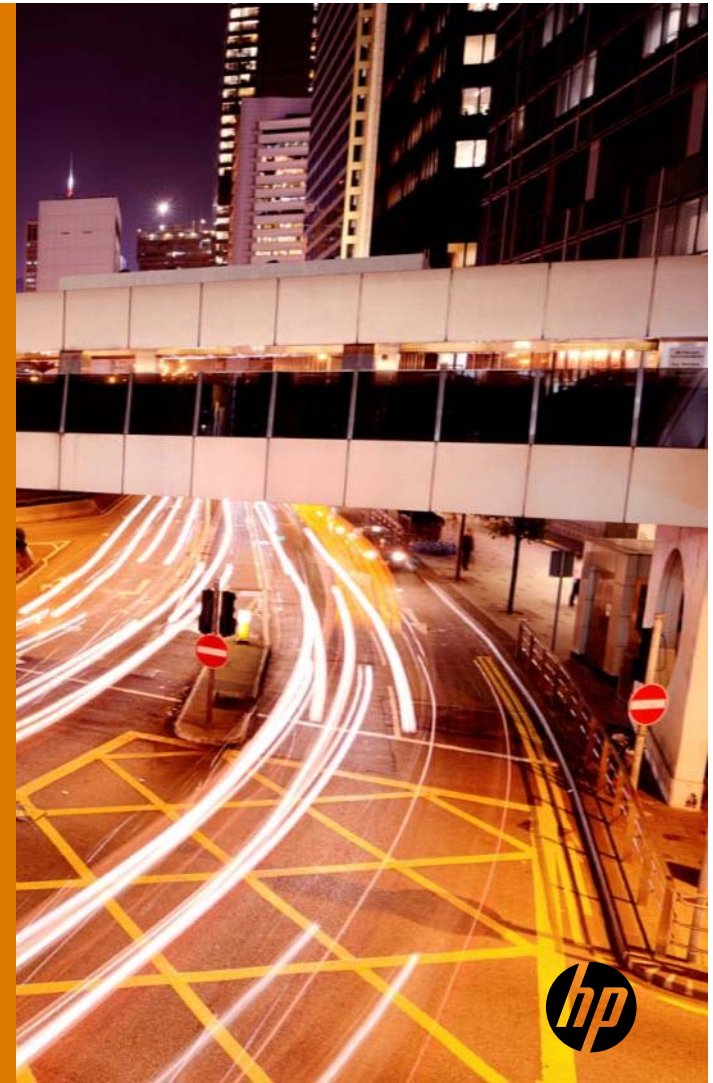


Web browser



Cell Phone

More information?



OpenVMS Technical Journal

<http://h71000.www7.hp.com/openvms/journal/v1/index.html>

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