CockpitMgr for OpenVMS

Johan Michiels
Product Manager
HP Belgium

Today’s speaker:
Gerrit Woertman
VSI – VMS Ambassador
CTO OpenVMS
Business Generating Software (BGS)
gerrit@bgsoftware.nl
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 VMS clusters
  - 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 OPA0 messages to Terminal Server

Store console output on disk
Search console output for specific text strings

Console Connect
Cockpit
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 SNMP gets 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 VMScluster
- 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
<table>
<thead>
<tr>
<th>System</th>
<th>Date &amp; Time</th>
<th>Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>TETHY3</td>
<td>11-APR-2015 22:32:10.50</td>
<td>Disk $1$DGA203: (DISK$ORACLE_1) has 7.32% free blocks (663E460 blocks)</td>
</tr>
<tr>
<td>BRSADV</td>
<td>11-APR-2015 23:00:03.06</td>
<td>Disk $2$DGA5: is not mounted</td>
</tr>
<tr>
<td>FCS3</td>
<td>11-APR-2015 23:44:16.36</td>
<td>The physical state of port 4 has changed from InSync to notLight</td>
</tr>
<tr>
<td>NEPTUN</td>
<td>12-APR-2015 03:01:11.25</td>
<td>Please mount device _$2$DKE320 (NEPTUN)</td>
</tr>
<tr>
<td>HUB001</td>
<td>12-APR-2015 00:00:00.03</td>
<td>A module has been removed.</td>
</tr>
<tr>
<td>HUB001</td>
<td>12-APR-2015 00:00:00.04</td>
<td>A backplane connection change has occurred.</td>
</tr>
<tr>
<td>LUX</td>
<td>12-APR-2015 14:16:19.25</td>
<td>Disk $1$DGA30 is copy target in shadow set DSA3:</td>
</tr>
<tr>
<td>BRSADV</td>
<td>12-APR-2015 14:17:16.35</td>
<td>Only 320 global page table entries free</td>
</tr>
<tr>
<td>BRSADV</td>
<td>12-APR-2015 14:19:54.39</td>
<td>Process DQ server is missing</td>
</tr>
<tr>
<td>BRSVMS</td>
<td>12-APR-2015 14:19:58.02</td>
<td>Process UPDATER (PID: 20400129) seems to be looping</td>
</tr>
<tr>
<td>PLUS1</td>
<td>12-APR-2015 15:59:11.47</td>
<td>%SYSTEM-W-PAGEFRAG, page file filling up; please create more space</td>
</tr>
<tr>
<td>BRSAPX</td>
<td>12-APR-2015 16:12:33.24</td>
<td>– SYSTEM-F-NOSLOT, no PCD available</td>
</tr>
<tr>
<td>LUX</td>
<td>12-APR-2015 18:00:04.25</td>
<td>Disk $1$DGA20: is missing as member of shadow set DSA5:</td>
</tr>
<tr>
<td>BRSOP1</td>
<td>12-APR-2015 18:16:08.83</td>
<td>User OPERATOR modified SYSUAF record SMITH: PGFLQUOTA,BYTLIM</td>
</tr>
<tr>
<td>BROBAT</td>
<td>12-APR-2015 18:19:12.04</td>
<td>Scheduler job FIABAS_EOD (PID: 202001D3) for user ACCOUNTING1 has started</td>
</tr>
<tr>
<td>BROBAT</td>
<td>12-APR-2015 18:19:16.07</td>
<td>Scheduler job FIABAS_FULL (PID: 202001D9) for user ACCOUNTING1 has started</td>
</tr>
<tr>
<td>GFDVMS</td>
<td>12-APR-2015 21:04:25.91</td>
<td>The STP state of port 3-1 in VLAN 99 (GFDVMS) has changed from “forwarding” to “broken”</td>
</tr>
<tr>
<td>BRSVMS</td>
<td>12-APR-2015 22:46:12.51</td>
<td>%SYSTEM-W-POOLEXPT, Pool expansion failure</td>
</tr>
<tr>
<td>PLUS1</td>
<td>12-APR-2015 22:53:26.32</td>
<td>%LICENSE-W-NOLOAD, license was not loaded for VMSCluster</td>
</tr>
<tr>
<td>LUZ</td>
<td>12-APR-2015 22:55:42.13</td>
<td>%QMRO-W-CREPRCSTP, failed to create a batch process, queue TCPPOLYSRV_LUZ will be stopped</td>
</tr>
<tr>
<td>TETHY3</td>
<td>12-APR-2015 22:55:42.16</td>
<td>Disk $1$DGA201: (DISK$WORKFILES) has 9.86% free blocks (2002672 blocks)</td>
</tr>
<tr>
<td>CISCO_001</td>
<td>13-APR-2015 00:02:08.22</td>
<td>Link down (2)</td>
</tr>
<tr>
<td>SANMUI</td>
<td>13-APR-2015 00:00:18.26</td>
<td>An HSV controller’s battery assembly has malfunctioned</td>
</tr>
</tbody>
</table>
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
More information?