Oracle for administrative, technical and Tier-0 mass storage services

openlab Major Review Meeting

29 September 2009

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Main areas of activity

- Security
- Oracle Database Virtualization
- Joint Software Testing Program (mostly 11.2 database for the past 6 months)
- Monitoring
  - Web applications monitoring using EM / beacons
  - Database policies
• **CERN ELFms** (Extremely Large Fabric management system)
• **Quattor** (System installation and configuration toolsuite)
• **Syscontrol** (Management and Inventory)
Use OS firewall (iptables) to protect our data. Another security layer.

Need to build rules for RACs which run complex environments and are very sensitive, using several network interfaces → Extensive testing

Need to change Quattor ncm-iptables component

Also provides a log of “inappropriate” accesses
Firewall configuration for:
- Application servers
- Database servers
...

Code Generation → Quattor

Templates
PAN Language

CDBServers

ncm-iptables
- Installation
- Reboot
- Manually

Note: Not auto propagated with every change
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OracleVM at CERN

- Need to integrate OracleVM within CERN ELFms
- Central Linux installation (PXE) + Quattor

- Manual installation: OVM + packages ≈ 1-3 h
- Whole automatic installation ≈ 20 min
Integration of OracleVM as host already done.
Integrate the installation of the guest hosts using CERN ELFms
Installation of the Oracle Database on guest hosts using Quattor

Special thanks to OracleVM experts from Oracle:
- Chris Barclay
- Adam Hawley
- Madhup Gulati
for their help
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What is Data Guard?

It’s a technology that establishes and maintains secondary "standby databases" as alternative/supplementary repositories to production "primary databases".

Physical standby (Redo Apply)

• Replicates the exact contents of its primary database across the Oracle Net network layer.

Logical standby (SQL Apply)

• Convert the redo generated at the Primary database into data and SQL and then re-apply those SQL transactions on the Logical standby.
Data Guard in a nutshell

Production / Primary

Broker

Physical Standby

Delay?

Redo

Apply

Exact copy up to date. Mount (10g) 11g Active DG Read Only

Continuous open

Logical Standby

Delay?

Redo to SQL

SQL Apply

Redo

Apply
Data Guard – 11g

- **High Interest on this technology**
  - Disaster recovery solution
  - Offload primary database:
    - Backups can be done on the physical standby
    - Physical Standby can be used for read-only queries (11g only) i.e. reporting, data warehouse apps, lengthy queries,…
    - Several use cases already identified for the “active dataguard” including CASTOR name server,…
  - Hardware migration solution
DataGuard: automatic block recovery 11gR2

User completes its query. It doesn’t get: ORA-01578: ORACLE data block corrupted
Access to binaries via Oracle Joint Software testing program

High interest on new features
- Already 2 applications designed based on 11g new features

Features (full report provided to Oracle)
- Active duplication 😊
- Automatic block recovery
  - Primary ↔ Standby 😊
  - Primary ➔ Standby 🌚 in progress
- DUPLICATE Without Connection to Target Database 😊
- Configurable Real-Time Query Apply Lag Limit 😊
- Direct NFS better performance vs Kernel mounts 😊
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OEM – Service tests and beacons

- OEM has been **migrated** to version **10.2.0.5** following the intensive pre-release testing and feedback (with some highlight on the benefits)

- The **virtualization console** has been intensively tested in the pre-release. This work was mentioned in the **Oracle press release**.

- **Enable** the use of **web transactions monitoring**.
**OEM – Service tests and beacons**

- **AIM**: We need to extend the monitoring provided by Lemon in aspects like the web transactions.
- Decided to take profit of OEM Services
- Provided feedback in the CAB (Customer Advisory Board)
- Our requirements were included in the last release of OEM (10.2.0.5)
- Satisfied with the tests we plan to deploy them widely.
Steps to follow to create an “EM service”:

- Creation of an “OEM service beacon” (remote piece of software that plays back recorded Web transactions or service tests for various protocols)
- Creation of an “OEM system” for each CERN service to be monitored
- Creation of an “OEM service” for each OEM system
- Creation of a set of “OEM service tests” for each CERN service
1st Step: Creation of an OEM beacon

**Beacon:** J2EEPS beacon

**General**
- Status: Up (Black Out)
- Availability (%): 100 (Last 24 Hours)
- Host: ithp08.cern.ch

**Properties**
- Proxy Host
- Proxy Port
- Do Not Proxy For Domain

**Alerts**
- No Alerts found.

**Host Alerts**
- No Alerts found.

**Related Links**
- Past Changes

**Home**
- Watch Lists
- Monitored Targets
2nd Step: Creation of an OEM system
3rd Step: Creation of an OEM service

OEM – Service tests and beacons
4th Step: Creation of OEM service tests to monitor a CERN service
Performed EM service tests – **Test types:**

- **Web Transactions:**
  - ✓ SSO: CERN authentication
  - ✓ Form authentication: AIS login
  - ✓ Realm: Tomcat Realm

- **JDBC SQL Timing**

- **LDAP**
Example of service test – Type Web Transaction

**Input Parameters**

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_CTL00$CONTENTPLACEHOLDER1</td>
<td>Im0renol</td>
</tr>
<tr>
<td>V_CTL00$CONTENTPLACEHOLDER1</td>
<td>★★★★★</td>
</tr>
</tbody>
</table>

Example: Name = USR, Value = jsmith. During playback, “[USR]” in the URL or POST Data fields will be substituted with “jsmith”.

**Request**

- **URL:** https://j2eepstest.cern.ch/jpptest/central
- **HTTP Method:** POST
- **POST Data:** Show
- **HTTP Headers:** Show

**Actions**

- **DHTML Script**
  - `newValue=[V_CTL00$CONTENTPLACEHOLDER1$TXTFORMSLOGIN]` name="ctl00SContentPlaceHolder1$btnFormsLogin"
  - `newValue=[V_CTL00$CONTENTPLACEHOLDER1$TXTFORMSPASSWORD]` name="ctl00SContentPlaceHolder1$btnFormsPassword"

This section is for information purposes only. They are only used in Browser Simulation Mode.
Example of service test – Type LDAP

Edit Service Test: central database cluster

- Test Type: JDBC SQL Timing
- Name: central database cluster
- Collection Frequency (minutes): 10

Test Parameters

- Database Connection
  - Connection String: jdbc:oracle:thin:@(DESCRIPTION=)
  - Class String: oracle.jdbc.driver.OracleDriver

- Credentials
  - Username: jpsmanager
  - Password: ********

- Query
  - Statement: select sysdate from dual
Example of service test – Type JDBC SQL Timing

**Edit Service Test: ldap connection to CERNs Active Directory**

<table>
<thead>
<tr>
<th>Test Type</th>
<th>LDAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>ldap connection to CERNs Active Directory</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test Parameters</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collection Frequency</td>
<td>5 minutes</td>
</tr>
<tr>
<td>LDAP Host Address</td>
<td>cerndc.cern.ch</td>
</tr>
<tr>
<td>LDAP Port</td>
<td>389</td>
</tr>
<tr>
<td>LDAP User Name</td>
<td><a href="mailto:jpsadbnw@cern.ch">jpsadbnw@cern.ch</a></td>
</tr>
<tr>
<td>LDAP Password</td>
<td>***************</td>
</tr>
<tr>
<td>Total Number of Retries</td>
<td>6</td>
</tr>
<tr>
<td>Retry Interval (minutes)</td>
<td>5</td>
</tr>
<tr>
<td>LDAP Search Filter</td>
<td>CN=jpsadbnw</td>
</tr>
<tr>
<td>LDAP Search Base</td>
<td>CN=jpsadbnw,OU=Users,OU=Organ</td>
</tr>
<tr>
<td>LDAP Compare Attribute Name</td>
<td>cn</td>
</tr>
<tr>
<td>LDAP Compare Attribute Value</td>
<td>jpsadbnw</td>
</tr>
<tr>
<td>LDAP Timeout (seconds)</td>
<td>60</td>
</tr>
<tr>
<td>Request Type</td>
<td>Unsecured</td>
</tr>
<tr>
<td>Authentication Mode</td>
<td>None</td>
</tr>
</tbody>
</table>
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Increasing productivity at CERN with Enterprise Manager Grid Control

Manuel Guijarro
Lucia Moreno
Chris Lambert
CERN

Oracle OpenWorld – October 2009

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Snapshots of OOW presentation
Our Challenge

- Minimize cost of monitoring growing architecture
- Provide timely, standardized access to meaningful information
- Enable pro-active management & problem avoidance
- Identify and remove configuration exceptions
Conclusion: Increased productivity

Furthermore… Grid control reduces manpower needs by:

- Providing centralized access to meaningful information
- Enforcing compliance with our standards
- Decreasing time consumed by daily operations
- Reducing downtime by pro-active monitoring
- Assisting DBAs in their tuning and performance improvement tasks
- …and all with little additional effort even for a constantly expanding IT infrastructure
- Beta project around Oracle Weblogic
- Database virtualisation deployment
- 11.2 database deployment start
Outreach

- 11.2 testing result
- OOW conference
- UKOUG conference
- Phone conferences on OracleVM and EM
- Swiss Oracle User Group on Oracle 11
- CERN Computer Newsletter article
- Oracle Press release about OEM management to OVM server

Supporting Quotes

- “Two of the main roadblocks of customer adoption of virtualization technologies has been the high cost and complexity of managing virtual environments and a lack of tools to provide an application perspective,” said Richard Samel, Oracle senior vice president Product Development. “With added management capabilities for Oracle VM, Oracle Enterprise Manager has taken a major step forward in helping our customers drive down the cost of managing applications in virtual environments.”

- “CERN has been searching for a comprehensive virtualization management solution for some time. We recently evaluated Oracle Enterprise Manager Oracle VM Management Pack and we were impressed with its virtualization dashboard. It simplifies administrators’ jobs by providing an integrated solution for monitoring and administration of virtual servers as well as backup configuration relationships. We especially like the ability to provision servers within minutes using templates and live-migrate VMs. These management capabilities can greatly simplify virtual infrastructure management, reduce IT operations overhead, provide cost savings, and reduce risk,” said Uwe Winkler, CERN

- “With the latest additions for Oracle VM deployment and management, Oracle Enterprise Manager will enable us to manage both our existing physical environments and new virtualized infrastructure from a single console. The virtualized Oracle grid infrastructure will allow us to maximize the use of server resources while maintaining high levels of system availability and performance,” said April Simms, Database Administrator, Southern Utah University.