Virtualisierung 2.0
mit Oracle VM in der Praxis
Virtualisierung 2.0

mit Oracle VM in der Praxis

Christian Rothe
Linux and Virtualization Business Development
ORACLE Deutschland GmbH

Björn Bröhl
Direktor Strategie & Innovation
OPITZ CONSULTING GmbH

Oracle ACE Director

DOAG Konferenz 2009
The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described for Oracle’s products remains at the sole discretion of Oracle.
Agenda

• **Next-Generation Datacenter**
  • Grid-basierte Virtualisierung mit Oracle VM
    • Einsatzbereiche Oracle VM
    • Update Oracle VM 2.2
    • Ausblick Oracle VM Roadmap
  • Beispiele für die Umsetzung von RZ-Anforderungen
    • Get started: Memory-Stick, Upgrade auf 2.2
    • Hardwareauswahl und Sizing
    • RAC auf Oracle VM
    • Integriertes Management mit Oracle Enterprise Manager Grid Control
  • Fazit und Zusammenfassung

• **Fragen und Antworten**
1 Datacenter der Next-Generation
Beispiele für den Betrieb bisher…

- Management / Überwachung
- Betrieb
- Software (OS, RDBMS, Middleware, etc.)
- Compliance
- Hardware (Server, Storage, Netzwerk, etc.)
- Sicherheit

Frage: viele einzelne Schritte hoher Zeitbedarf großes Risiko und die Flexibilität?
...und im NG Datacenter

- Management / Überwachung
- Betrieb
- GRID / CLOUD
- Sicherheit
  - Hardware (Server, Storage, Netzwerk)
  - Software (OS, RDBMS, Middleware)
- Compliance

- EIN einzelner Schritt
- GERINGER Zeitbedarf
- GERINGES Risiko
- HOHE Flexibilität
Grid-basierte Virtualisierung mit Oracle VM
Where It’s Used: Core Production
Not virtualization for virtualization sake…

Proprietary Unix Hardware (Virtualized / Partitioned)

Oracle VM
• Migration to x86_64
• Migration to Linux (some Windows)

Green-field production deployments

…Oracle VM is part of the application architecture
Implications for Oracle’s Virtualization Direction
What it Means to Be Application Oriented

• Develop products that make enterprise software...
  • Easier to *deploy*
  • Easier to *manage*
  • Easier to *support*
• Provide exceptional performance and scalability under load
• Provide deterministic high-availability
• Support for large-scale storage infrastructure
• Economics to permit ubiquity, i.e. virtualization-by-default architectures
# Oracle VM 2.2

## In a Word… Performance

<table>
<thead>
<tr>
<th>Feature</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Update to Xen 3.4 hypervisor with support for hardware assisted paging (Intel EPT / AMD RVI), etc.</td>
<td>Performance: Significant performance improvements for hardware virtualized guests such as Microsoft Windows</td>
</tr>
<tr>
<td>Update to dom0 kernel: EL 5.3 base</td>
<td>Performance: Updated driver support for the latest hardware</td>
</tr>
<tr>
<td>Support for the Intel® Xeon 5500 Series CPU (code named Nehalem) and AMD Opteron “Istanbul” features.</td>
<td>Performance: Significant advances in virtualization support for hardware virtualized guests</td>
</tr>
<tr>
<td>OCFS2 filesystem 1.4 support</td>
<td>VM creation speed: Permits sparse file creation, deployment, and cloning of VMs</td>
</tr>
<tr>
<td>Server Pool Master auto fail over / HA</td>
<td>Availability: no single point of management failure</td>
</tr>
<tr>
<td>Shared storage and cluster configuration scripts</td>
<td>Ease-of-installation: reduce set up complexity</td>
</tr>
</tbody>
</table>
### Oracle VM 2.2

#### In a Word… Performance

<table>
<thead>
<tr>
<th>Feature</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>vCPU scheduling priorities and caps per VM.</td>
<td>Resource Management: Control access to CPU between multiple VMs to align with IT/business priorities</td>
</tr>
<tr>
<td>Import VHD format VMs</td>
<td>Ease-of-Use: Import VHD-based VMs, e.g Virtual Iron</td>
</tr>
<tr>
<td>Import Multipath Devices as Shared Virtual Disks</td>
<td>Ease-of Use: Important for Oracle Real Application Clusters</td>
</tr>
<tr>
<td>Server Maintenance Mode</td>
<td>Ease-of-Use: Prevent server from actively hosting VMs during maintenance</td>
</tr>
<tr>
<td>GUI: Virtual Machine “Tree” Views</td>
<td>Ease-of-Use: At-a-glance hierarchy view of Pools, Servers, and VMs</td>
</tr>
<tr>
<td>Enhanced user group management</td>
<td>Ease-of-Use: Easily reassign users to VMs or vice versa</td>
</tr>
<tr>
<td>Enhanced Management Logging</td>
<td>Supportability: Easier, faster troubleshooting</td>
</tr>
</tbody>
</table>
### Next Generation: Oracle VM 3.0

**Oracle VM + Virtual Iron**

<table>
<thead>
<tr>
<th>Comprehensive and Dynamic Capabilities: The Power is in the Combination...</th>
<th>Oracle VM Today</th>
<th>Virtual Iron Adds</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Server Virtualization</strong></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>– Server consolidation</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>– High availability</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>– Virtual machine live migration</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Dynamic resource management and automation</strong></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>– Capacity management</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>– Power management</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>– Integration: Open, comprehensive, and scriptable API</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Full stack management and control</strong></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>– Deep insight &amp; management of the full software stack</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>– Management of virtual and physical environments</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Forward looking information is subject to change without notice at Oracle's sole discretion.
The New, Combined Oracle VM
Oracle VM 3.0

<table>
<thead>
<tr>
<th>Dynamic Management and Automation</th>
<th>• Dynamic management and automation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Capacity and power management</td>
</tr>
<tr>
<td></td>
<td>• Open, comprehensive and scriptable API</td>
</tr>
<tr>
<td>Improved network and storage configuration</td>
<td>• Improved ease of use</td>
</tr>
<tr>
<td>Top-down full stack management</td>
<td>• Richer, dynamic html UI</td>
</tr>
<tr>
<td></td>
<td>• Comprehensive job and event tracking</td>
</tr>
<tr>
<td></td>
<td>• Centralized, automated network and storage configuration</td>
</tr>
<tr>
<td></td>
<td>• Pool-level bridging, bonding, multi-pathing</td>
</tr>
<tr>
<td></td>
<td>• Storage Connect plug-ins for GUI access to advanced 3rd party functionality</td>
</tr>
<tr>
<td></td>
<td>• Snapshots, thin provisioning / cloning</td>
</tr>
<tr>
<td></td>
<td>• Enhancements to Oracle VM Templates to easily deploy multi-tier Oracle and non-Oracle software</td>
</tr>
</tbody>
</table>

Forward looking information is subject to change without notice at Oracle's sole discretion.
Manager 3.0: Significant GUI Enhancements

- Dynamic html
- Advanced storage management
- Advanced network management
- Fine-grained configuration data
- OVF-based Oracle VM Templates

Forward looking information is subject to change without notice at Oracle's sole discretion.
Oracle VM Template Builder: Today

Whitepaper: Oracle VM Template Developer's Guide: Creating Pre-Built VMs for Rapid Software Deployment
Oracle Assembly Builder
Full N-Tier Deployment and Management of Complex Applications

Oracle SOA Suite
Oracle BPM Suite
Oracle WebCenter
Oracle Identity Mgt
Oracle WebLogic Suite-based Application Grid
Oracle Database

Oracle VM Server
Application A
Application B

Virtualized Software Appliances

Forward looking information is subject to change without notice at Oracle's sole discretion.
Storage Management: Enabling Better Choices
Oracle VM Storage Connect Architecture

- Manage all types of storage from Manager (NFS, OCFS2, iSCSI, FC/SAN)
- Use advanced storage features of OCFS2 or directly leverage 3rd party storage system capabilities
- Allows use of advanced “intelligent” devices or more basic, lower-cost devices with OCFS2
- Storage management updates independent of Oracle VM release schedule

Oracle VM Manager 3.0
Oracle VM Storage Connect Framework

- Snapshots
- Thin provisioning
- Sparse files...

Inexpensive Disks...
...High-end Storage systems

Forward looking information is subject to change without notice at Oracle's sole discretion.
Beispiele für die Umsetzung von RZ-Anforderungen
Auswahl von Hardware und Sizing  1/2

IT Fachabteilung

Anforderungen

ORACLE

+ min. Anforderungen

=
Auswahl von Hardware und Sizing  2/2

- **Oracle Validated Configurations**

  Validated Configurations

### Published Validated Configurations

<table>
<thead>
<tr>
<th>Published Date</th>
<th>Server Model</th>
<th>Operating System</th>
<th>Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>09-OCT-09</td>
<td>Sun Fire X4275</td>
<td>OEL 5 Update 3 x86_64</td>
<td>Sun Storage 700i</td>
</tr>
<tr>
<td>09-OCT-09</td>
<td>Sun Fire X4170</td>
<td>Oracle VM Server 2.1.5 x86 and x86_64</td>
<td>Sun Storage 700i</td>
</tr>
<tr>
<td>12-DEC-06</td>
<td>Sun Blade x8400 Server</td>
<td>RHEL 4 AS/ES Update 3 x86-64</td>
<td>Sun StorageTek 6</td>
</tr>
</tbody>
</table>

- **OC Methode: Sizing von Systemen**

- **Erfahrungswerte**
Getting Started.. With a Memory Stick

• 1. Select the external USB drive for installation.
Getting Started.. With a Memory Stick

• 2. Make one big partition on the USB drive, mount it to /, and format as ext3.
Getting Started.. With a Memory Stick

3. Use the "Change drive order" screen to make /dev/sdb available for the GRUB boot loader.
Getting Started.. With a Memory Stick

- Done. Installs to the external USB drive and boots straight to it.

Oracle VM 2.2 Installation: http://www.youtube.com/watch?v=R0vKJeXhXuo
How do I upgrade my Oracle VM environment from v2.1.5 to v2.2?

- If you are using Oracle VM Manager to manage your environment, you should upgrade the components of your environment in the following order:
  1. Upgrade the Oracle VM Manager software from v2.1.5 to v2.2 from the Oracle VM 2.2.0 Installation Media
  2. Upgrade all of the Oracle VM servers except the Master (see the procedure below).
  3. Finally, upgrade the Oracle VM server that is the Master server (see the procedure below).

- To upgrade each Oracle VM 2.1.5 Server to Oracle VM Server 2.2 follow these steps:
  1. Install ovm22upgrade package
     # up2date ovm22upgrade
  2. Run python script as suggested by the rpm install process
     # /usr/local/sbin/ovm22upgrade.py
  3. Upgrade package using following command and reboot the system
     # up2date -fu
3 RAC auf Oracle VM
Benefits of RAC on Oracle VM

• Improved server consolidation
  • RAC databases with underutilized CPU resources or peaky CPU utilization can be consolidated with other similar workloads

• Rapid provisioning of RAC servers and resources
  • RAC nodes can be quickly deployed
  • fully patched and configured system images

• Sub-capacity licensing
  • Oracle VM can be configured using hard partitioning
  • Hard partitioning allows you to license only CPUs used by the partition instead of all CPUs on a physical server

• Virtual Cluster
  • Create RAC environment on a single physical server
  • Perfect environment for test, Q/A, or demo clusters
Oracle VM – RAC Database Support

• Configuration
  • Oracle RAC Database 10.2.0.4, 11gR1 & 11gR2
    • 32bit and 64bit
    • Static mode only
  • Oracle VM 2.1.5 or higher
  • Para-Virtualized mode guests
    • Oracle Enterprise Linux 5.1 or higher
  • 11gR1 RAC-OVM Template

• Pending Validation
  • 11gR2 RAC-OVM Template
  • Support for Dynamic resources changes
    • CPU and Memory
  • Live Migration support
Server Virtualization Certification

• Why RAC on OVM Certification is needed
  • CRS-RAC is time and scheduling sensitive (CPU, IO, network, and clock drift sensitive)

• Validation/Certification - Areas of focus:
  • Clock drift
  • Scheduling
  • Timeout sensitivity
  • Dynamic changes
  • Image migration
  • Shared I/O service times
  • OS profile and statistics
  • Integration with new APIs
  • CPU, Memory affinity
  • …
RAC on OVM – Deployment Configuration

- Two types of deployments
  - Test OVM RAC Configurations
  - Production OVM RAC [Supported] Configurations
    - Each RAC node must be deployed on a separate physical server for production environments

Whitepaper: Oracle Real Application Clusters in Oracle VM Environments
Oracle RAC on Oracle VM
Non-Production deployment
Oracle RAC on Oracle VM
Production Deployment
RAC on OVM – ASM Disk Configuration

Oracle VM

Guest 1
ASM Instance + ASM 1
/dev/xvda
VBD Driver

Guest 2
ASM Instance + ASM 2
/dev/xvda
VBD Driver

Domain-0

/LUN-1

SAN Storage

Processor 0

SAN Switch 1

Multipathing Driver

SAN Host Bus Adapter

/port-0
/port-1

/dev/sda
Integriertes Management mit Oracle Grid Control
Enterprise Manager
Integrated management for physical and virtual environments

Oracle Enterprise Manager

Monitor
Administer
Provision
Live Migrate
Patch
Track configuration

Linux / OEL

Oracle VM

Hypervisor

Software stack

Monitor
ADMINISTER
Provision
Live Migrate
Patch
Track configuration

Application

Middleware Cluster

Database Cluster

Guest OS

Hardware

Oracle Enterprise Manager

Integrated management for physical and virtual environments

Application

Middleware Cluster

Database Cluster

Guest OS

Hardware

Oracle

Enterprise Manager

Integrated management for physical and virtual environments
Manage Server Performance in Context of Application Workloads

Sample customer Scenario

- Sysadmin needs to monitor Oracle DB process for resource contention
- Properly configure swap space for Oracle DB processes

Sys Admin views database targets running on the host and navigates to Oracle DB homepage to monitor Oracle processes
5 Fazit und Zusammenfassung
...ganze einfach, mit dem vollständigen Stack

Management / Überwachung

Betrieb

GRID / CLOUD

Sicherheit

Hardware (Server, Storage, Netzwerk)

Software (OS, RDBMS, Middleware)

Compliance
Fragen und Antworten
Kontaktdaten

Christian Rothe
Oracle Deutschland GmbH
Email: christian.rothe@oracle.com
Telefon: +49 911 98182456

http://blogs.oracle.com/virtualization/

Björn Bröhl
OPITZ CONSULTING GmbH
Email: bjoern.broehl@opitz-consulting.com
Blog: http://blog.bbroehl.eu
Telefon: +49 2261 – 6001 – 0

http://blog.bbroehl.eu