Licensing Oracle and SQL Server on vSphere
Disclaimer

• This presentation may contain product features that are currently under development.
• This overview of new technology represents no commitment from VMware to deliver these features in any generally available product.
• Features are subject to change, and must not be included in contracts, purchase orders, or sales agreements of any kind.
• Technical feasibility and market demand will affect final delivery.
• Pricing and packaging for any new technologies or features discussed or presented have not been determined.
Scott Salyer

- Director Global Systems Engineering Enablement, VMware
- 10 years with VMware (May 2007)
  - 10-time consecutive speaker at VMworld
- 20 years Enterprise Architecture and Microsoft Application experience, including SQL Server, Directory Services (including AD), Automation/Scripting, Identity/Access Management, and Exchange
- Author/co-author of following whitepapers: (https://vault.vmware.com/group/vault-main-library/id-30181269)
  - SQL Server on VMware Best Practices Guide, Availability and Recovery Options
  - Exchange on VMware Best Practices Guide, Availability and Recovery Options, Design and Sizing Examples
  - SharePoint on VMware Best Practices Guide, Availability and Recovery Options
Dave Welch – CTO, Chief Evangelist – House of Brick

• Founding partner
• Oracle license practice lead
  – License assessment
  – Audit defense
• Prominent Oracle VBCA industry voice
• System architect
  – Performance, scalability, business continuity
  – Infrastructure assessment
• 1994 DBA
  – Business-critical workloads
  – Oracle Parallel Server / RAC

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@ORAvbca
House of Brick

- Established in 1998
- Industry leader in Oracle virtualization
- Virtual Business Critical Application performance transparency

Key services
- Oracle and SQL Server specialties
- Managed License Services
- Oracle license review & audit defense
- Managed Consulting Services
- Cloud architectures
- Rapid RISC replatforming to vSphere
Virtualizing Applications Track
Sessions and Offerings

- 30 Breakout Sessions with 2 Panels & 3 Quick Talks
- 10 BCA Meet-The-Experts sessions (15min 1-on-1 appts)
- 2 Birds-of-a-Feather special invitation receptions (Oracle & SAP)
- 5 Group Discussions
- 3 Saturday - Full Day Applications Bootcamps

- Sign up for the Independent Oracle User Group (IOUG) VMware Special Interest Group (SIG)
  
  www.ioug.org/vmware
The Percentage of Applications in Virtualized Infrastructure Has Increased Dramatically Over the Last Few Years

(VMware Core Metrics Survey 2016)

% Respondents Running the Application in Virtualized Infrastructure

<table>
<thead>
<tr>
<th>Region</th>
<th>Company Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA</td>
<td>SMB</td>
</tr>
<tr>
<td>EU</td>
<td>COMM</td>
</tr>
<tr>
<td>dAP</td>
<td>ENT</td>
</tr>
<tr>
<td>BRIC</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Application Type</th>
<th>Region</th>
<th>Company Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microsoft SQL</td>
<td>81%</td>
<td>80% 81% 73% 75%</td>
</tr>
<tr>
<td>Custom/Industry-Specific Business Critical Application</td>
<td>65%</td>
<td>57% 70% 66% 71%</td>
</tr>
<tr>
<td>Microsoft Exchange</td>
<td>53%</td>
<td>52% 55% 49% 58%</td>
</tr>
<tr>
<td>Microsoft SharePoint</td>
<td>52%</td>
<td>51% 55% 48% 58%</td>
</tr>
<tr>
<td>SAP</td>
<td>46%</td>
<td>61% 44% 43% 51%</td>
</tr>
<tr>
<td>Oracle Databases</td>
<td>33%</td>
<td>36% 51% 48% 55%</td>
</tr>
<tr>
<td>IBM Middleware</td>
<td>30%</td>
<td>38% 22% 24% 31%</td>
</tr>
<tr>
<td>Oracle Applications</td>
<td>29%</td>
<td>26% 28% 30% 36%</td>
</tr>
<tr>
<td>High Performance Computing</td>
<td>29%</td>
<td>18% 29% 41% 40%</td>
</tr>
<tr>
<td>Oracle Middleware</td>
<td>22%</td>
<td>19% 20% 26% 29%</td>
</tr>
</tbody>
</table>

N = 1024

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Where Can I Learn More?

- Business Critical Applications VMware.com Homepage Page

- VMware – DellEMC Collaborative Collateral and DBTA Surveys
  - http://www.dbta.com/emc

- Blogs
  - vSphere Blog
    - https://blogs.vmware.com/vsphere/
  - One Stop Shop - All Oracle on VMware SDDC
  - VMware IOUG Special Interest Group
    - http://vmsig.org/
General Principles of Licensing Relational Database Management Systems with VMware

- All software vendors deserve the total licensing fees that the individual contracts that the customers of those vendors have signed require.
- VMware recommends to all VMware customers that they adhere to the specifics and fulfill the responsibilities of all their 3rd party contracts.
- VMware has a number of partnerships with companies who have recognized expertise in the areas of database licensing on vSphere and we often recommend to VMware customers that they consult with those partners.
- VMware vSphere is a platform of virtualized hardware that creates a total abstraction layer between the OS and the Hardware.
- ESXi, is a non-paravirtualized, Type1 hypervisor and therefore makes no changes to the kernel of the guest operating system.
Licensing Microsoft SQL Server on VMware vSphere
SQL Server Licensing Overview

- Always refer to official Microsoft documentation
  - Microsoft SQL Server 2016 Licensing Guide
  - Microsoft SQL Server 2016 Virtualization Guide
  - Product Licensing Page (including Product Terms document)

- Production Licensing models
  - Server/CAL (only for Standard Edition)
    - Requires a client access license (CAL) for every user or device connected
  - Per-core (All Editions)
    - 1 VM per core limit without Software Assurance
    - Unlimited VMs with Software Assurance (limited by resource requirements)

- When virtual machines move, licenses don’t necessarily move with them
  - Without Software Assurance, a license can only be transferred to another server once every 90 days (waived for permanent hardware failure)
  - Eliminate vMotion accounting with purchase of software assurance (SA)
  - Without SA, vMotion is possible, but target host needs to have available license to accommodate the vMotion addition (no more than 1 VM per core). With physical host licensing, licenses don’t actually move

Previous Versions
- Microsoft SQL Server 2014 Licensing Guide
- Microsoft SQL Server 2014 Virtualization Licensing Guide
Server / CAL Licensing

• Only available in Standard Edition
  – Upgrades from previous Enterprise versions with SA will allow utilization of existing CALs but NO NEW ONES!

• A CAL entitles each user or device to access an unlimited number of SQL Servers
  – Great for environments with few users and many SQL Servers
  – CAL licenses need to be purchased separately

• **VM-based licensing only** in virtualized environments (cannot license the host); 1 Server license per VM

• Software Assurance is required for License Mobility within a server farm

• Existing investment in CALs will influence licensing model chosen
Per-Core License by Virtual Machine

- Requires a core license for each virtual core
  - Minimum 4 core licenses per virtual machine with 2-core increments
- Advantages:
  - VMs can move freely within a server farm or to a cloud services provider with purchase of Software Assurance
  - Easier license accounting
  - Ideal for mixed workload clusters
- Disadvantage:
  - Low utilization of the VM may result in unused license capacity ($$)
- NOTE: Licenses are applied to virtual cores whether backed by a physical core OR hyperthread
Per-VM Licensing Example

Scenario:

- Rainpole Bank has 50 VMs; 5 VMs running SQL Server
- 4 of the SQL Server VMs are in Basic Availability Groups; 1 standalone
- Each SQL Server VM is configured with 4 vCPUs
  - Monitoring shows a healthy 70% utilization in each VM during peak hours
- Each ESX Host has 32 physical cores; not enough SQL Server VMs to fill a single host

Best Solution:

- License by VM
- Spread VMs across multiple ESX Hosts for maximum availability
- Purchase SA to allow for license mobility
“High-Density Virtualization” Enterprise Per-Core Licensing

- All cores on the ESX Server host are licensed.

- Without SA:
  - Rights allow 1 OSE (i.e. VM) per core for a total of 8 VMs per host.
  - VMs can have any number of vCPUs (1 vCPU per VM shown for simplicity).
  - Virtual machine can move freely as long as the target server has valid licenses.

- With SA:
  - Rights allow unlimited OSEs.
  - Unlimited OSE right allows free movement of VMs among licensed hosts (license doesn’t actually move).

8 cores per host (2x4)

Each VM is 1 vCPU

vSphere Cluster 1 – HA-enabled

Initial 4 CPU Licenses

Incremental 2 CPU Licenses

Maintenance Mode

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Per-Host Licensing Example

Scenario:
• Rainpole Bank has 500 VMs; 50 VMs running SQL Server
• 16 of the SQL Server VMs are in Always-On Availability Groups; 34 standalone
• SQL Server VM is configured with between 4 and 16 vCPUs
  – Monitoring shows an average 30% VM utilization during peak hours (high variation in utilization)
• Each ESX Host has 32 physical cores with hyperthreading enabled

Best Solution:
• License all physical cores on all ESX hosts that will run SQL Server VMs (Enterprise Per-Core)
  – Can be a vSphere cluster dedicated to SQL Server or use Host Affinity
• Spread AAG VMs across multiple ESX Hosts for maximum availability
• Purchase SA to allow unlimited VMs per host
  – This effectively grants VM mobility to any SQL Server-licensed host in the cluster
**SQL Server Licensing Consolidation Example**

- **Config:** 2x8 – 16 cores per server
- **Total of 160 cores**
- **Avg. Utilization:** 15%

- **Costs:**
  - $1200K
  - $1000K
  - $800K
  - $600K
  - $400K
  - $200K

- **SA:** 160 cores worth of Enterprise Edition licenses
- **10 Servers**


- **~$1.3M**

---

- **Config:** 2x8 – 16 cores per server
- **Total of 32 cores**
- **Avg. Host Utilization:** 75%

- **Costs:**
  - $1200K
  - $1000K
  - $800K
  - $600K
  - $400K
  - $200K

- **SA:** 32 EE Licenses
- **10 Servers**


- **~$400K**

---

*Costs are for illustration only and do not reflect current pricing*
Licensing for Availability and Recovery

• For each licensed SQL Server covered by active SA, customers can run up to the same number of passive failover instances hosted on premises (no additional licenses)
  – Rights allow for 1 “free” passive secondary server; additional passive servers must be licensed
  – If you have primary SQL Servers on premises and the passive secondaries in the cloud, the secondaries must be licensed

• If licensing the VM, SA allows for license mobility, which allows VMware HA, vMotion, and DRS

<table>
<thead>
<tr>
<th>VMware Feature</th>
<th>SQL Server License Required at Primary Host</th>
<th>SQL Server License Required at Secondary Host</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMware HA</td>
<td>Yes</td>
<td>No(^1)</td>
</tr>
<tr>
<td>vMotion</td>
<td>Yes</td>
<td>Yes(^2)</td>
</tr>
<tr>
<td>VMware Fault Tolerance (FT)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Site Recovery Manager</td>
<td>Yes</td>
<td>No(^1)</td>
</tr>
</tbody>
</table>

1. Software Assurance required for failback within 90 days
2. Sufficient licenses required on target host
Key Takeaways

- Analyze your environment and **pick the licensing model that’s right for your business**
- If licensing by VM (minimum 4 virtual cores), **make sure the VM is fully loaded to avoid wasting licenses**
  - Software Assurance required for unlimited mobility
- If Basic Availability Groups or Always-On Availability Groups are used, **separate nodes on separate ESX hosts to maximize availability**
- If you have enough VMs to fill one or more ESX hosts, **consider licensing the hosts instead of the VMs**
  - With SA, you can have unlimited VMs per host allowing for maximum consolidation and unlimited VM mobility to any other licensed host
  - You can license every host in the cluster or use host affinity
- **VERIFY EVERYTHING with your Microsoft rep**
Licensing Oracle Databases on VMware vSphere
Mars v. Oracle Lawsuit

“Oracle programs are installed on any processors where the programs are available for use. Third-party VMware technology specifically is designed for the purpose of allowing live migration of programs to all processors across the entire environment.”

Chad Russell, Oracle Corporate Counsel 25 Sep 2015 to Khaled Rabbani, Mars General Counsel (Declaration of Eloise Backer, exhibit 11)
Oracle Contract’s Licensing Level

- Enterprise?
- vCenter?
- Cluster?
- Sub-Cluster?

“Processor: shall be defined as all processors where the Oracle programs are installed and/or running.”
Mars’ Motion to Dismiss with Prejudice
Oracle Corp-Filed Lawsuits Re: VMware “Installed”

Case law search results:
Time Since Mars
Capability = License Event?
License Every DC On the Street?

Sudhir Balasubramanian
4 January 2017 Post

If (Oracle’s VMware prospective licensing assertion) were true, it would require you to license EVERY existing vSphere host in EVERY datacenter and cloud, be that yours or a company down the street as vCenter’s and SSO domains are not an obstacle to vMotion. And so by this faulty logic you would need to license every host in the galaxy.

# Oracle’s Licensing Policy Docs

<table>
<thead>
<tr>
<th>Document</th>
<th>Contractual?</th>
<th>Accurate?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical Support Policy</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Processor Core Factor Table</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Application Licensing Table</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Partitioning Policy</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Software Investment Guide</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Licensing Data Recovery Environments</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Oracle Technology Hosting Guide</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Licensing Software in the Cloud Computing Environment</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Fulmer Ware Blog Post (2)

• Would a California Court construe a possible future event a royalty obligation
• Unaware of any filing on issue by Oracle
• Unaware of OLSA language supporting Oracle’s position
• A California court could find Oracle’s use of audit rights to obtain unrelated server information as a breach of the audit clause
• Contract interpretation governed by contract’s clear, explicit language that involves no absurdity
Oracle did not specifically draft its “installed” interpretation
California law requires ambiguities be interpreted against the contract drafter
Contract interpreted per parties’ mutual intention upon contracting
Oracle on VMware not widespread as of Mars 2009 agreement
  - Oracle’s “installed” interpretation not mutually intended by the parties
Being audited? Get experienced legal advice
Audit Defense Customers

LMS Claims
$XX,XXX,XXX
$XX,XXX,XXX
$X,XXX,XXX

Contractual Merit
$XXX,XXX
$XXX,XXX
$X,XXX
Proactive Approach

• **Oracle License Review**
  – Baseline compliance
  – Optimization analysis—license, architecture
  – Support spend reduction
  – Unlimited License Amendment exit analysis

• **Managed License Support Services**
  – On-Going Monitoring
  – Unlimited Audit Support
Unlimited License Amendments

C.1.d: Following the end of the Unlimited Deployment Period, and regardless of the quantity of program licenses in your Certified Deployment, your annual technical support fee for the programs licensed under this ordering document shall in no event be less than the annual technical support fee you paid for such program licenses at the support renewal immediately prior to the end of the Unlimited Deployment Period.

https://www.pinellascounty.org/bcc-agenda/2010_01_05/2010_01_05/32b-ULA.pdf
Oracle on VMware Licensing Resources

“VMware Virtualization and the Oracle Audit: What Every Oracle Customer Needs to Know About the ”Installed and/or Running” Language of the Processor Definition” – 6 July 2017

“Mars vs. Oracle” – 17 January 2016 blog
http://houseofbrick.com/mars-vs-oracle/

“Licensing Databases on EMC and VMware Technology” – Whitepaper
http://houseofbrick.com/whitepaper-database-licensing/

Oracle Gives Itself a 100+% Raise in Authorized Cloud Compute Environments

Licensing Demystified: Virtualization and Cloud Licensing – NoCOUG Journal, August 2017

Oracle on vSphere Licensing Collection
http://blogs.vmware.com/vsphere/?p=17066
“Don’t Miss” Sessions

Snapshots and SQL Server- Technical Deep Dive & Detailed Lab Findings [PBO3350BUS]
Wed. Aug. 30, 10:00 am – 11:00 am | Islander B, Lower Level

Running Oracle on VMware? Heard About Mars vs. Oracle? Learn About Oracle Audits from the Experts [VIRT1253BU]
Wed. Aug. 30, 1:00 pm – 2:00 pm | Mandalay Bay Ballroom K, Level 2

Deep Dive on Physical and Virtual NUMA: Save your SQL Virtual Machines from Certain Doom-A!
[VIRT1773BU]
Wed. Aug. 30, 2:30 pm – 3:30 pm | Oceanside B, Level 2
“Don’t Miss” Session Replays

2013 Oracle on VMware Customer Experience Panel
https://www.youtube.com/watch?v=KreFutmwGZs

2014 Oracle on VMware Customer Experience Panel
https://www.youtube.com/watch?v=B7QPvTjnNgo

The VMworld 2014 U.S. Global Support Services Panel Discussion

See my blog post here. Search for the heading “VAPP2980 VMware Global Support Services Panel – What Goes Wrong and How We Fix It – 4:00 PM”. Here is the link to the session replay.
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Please fill out your survey.

Take a survey and enter a drawing for a VMware company store gift card.