

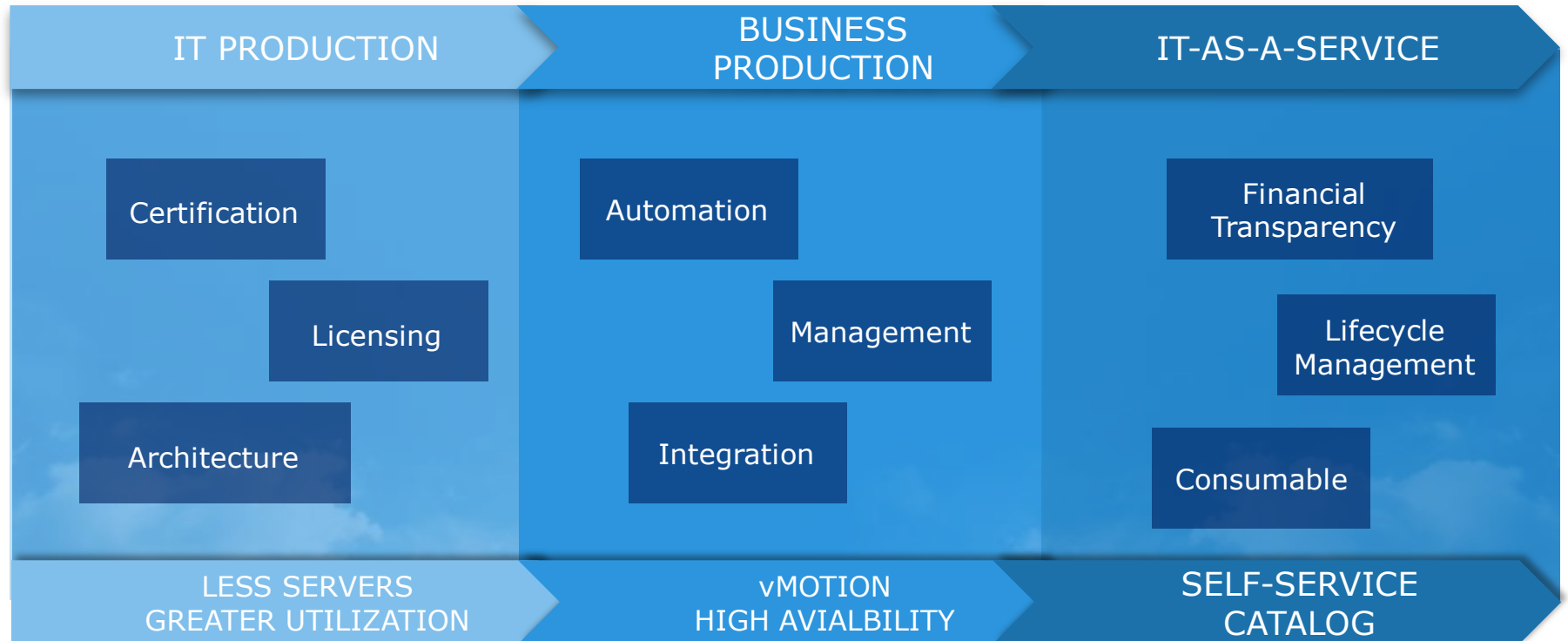


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OPTIMIZING ORACLE ENVIRONMENTS & ACCELERATING TIME TO MARKET

REPLATFORMING, COST REDUCTION & PERFORMANCE BENEFITS

Virtualization Conversation



Database re-platforming: Goals

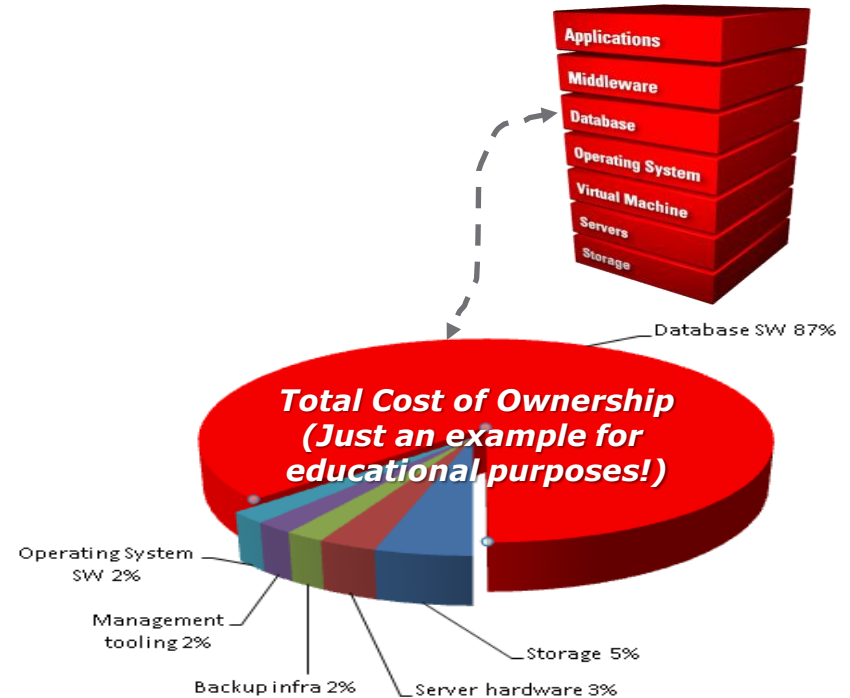


1. *Maximize use of license investment*
2. Maintain or (better even) improve performance
3. Reduce downtime / increase SLAs
4. Avoid Vendor lock-in
5. Simplify server & storage refresh cycles
6. Speed up provisioning of new databases
7. Improve security, compliance and auditing
8. Simplify management



Why look at licensing?

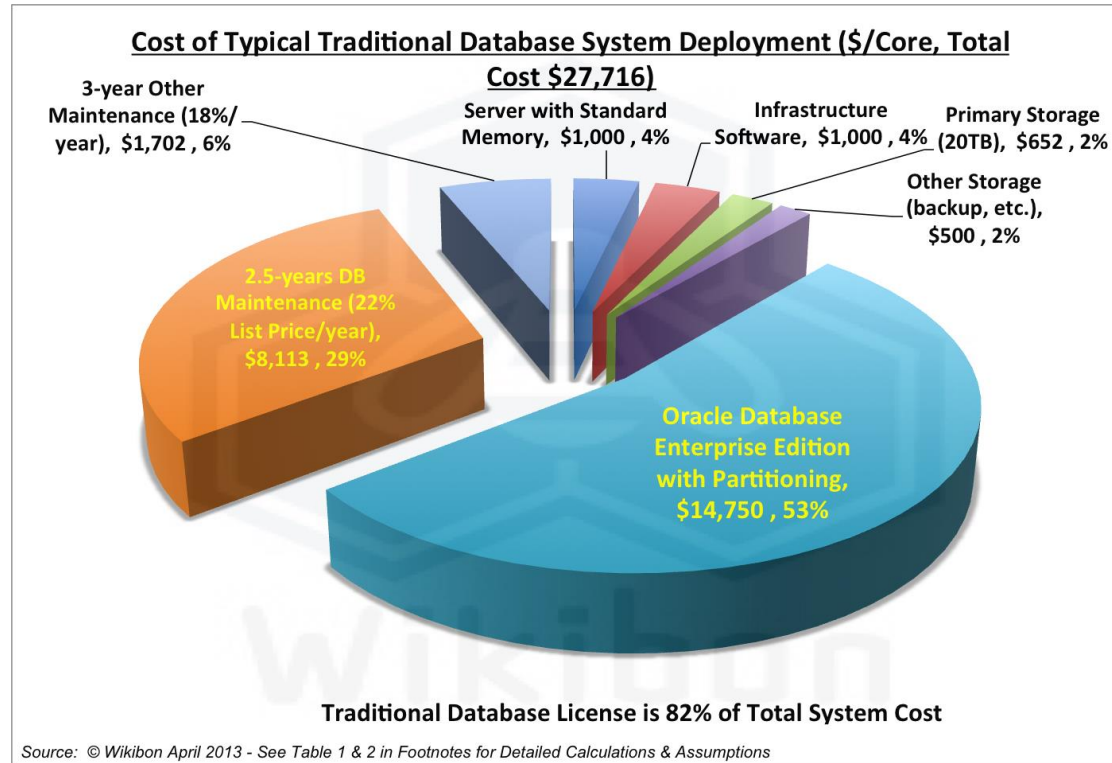
- Oracle DB licensing is expensive
 - Midsize server (24 cores):
HW ~ \$ 50,000
SW ~ \$ 483,000 @ 50% discount
5Y maintenance ~ \$531,000
(Enterprise Edition + basic options)
- What if we add RAC? Active DG?
Pluggable DB?
- Large part of the TCO of a database infrastructure stack



If we can save 10% on db licenses...

We easily justified 50% more expensive infrastructure

Validation: Wikibon Research



Wikibon Article: [Virtualization of Oracle Evolves to Best Practice for Production Systems](#)

Before we forget



- Oracle is FULLY supported on VMware
 - Including Oracle RAC
 - Any other claim is FALSE
 - Platform certification is NOT required
 - Escalation paths exist from Oracle/EMC and VMware to avoid fingerpointing
 - Need to reproduce on physical is RARE but easy with EMC
- All potential licensing problems can be avoided
 - Including recent Oracle claims about Vsphere 5.5 and Vsphere 6
- Performance scaling & overhead is no issue
 - 1 VM: 128 vCPU, 4TB memory, 1M+ IOPS

Before we start...

Beware of the license demon

100% SURE YOU
ARE COMPLIANT?



ORACLE®
LICENSE MANAGEMENT
SERVICES



If needed...
Bring in the superheroes
They help you with licensing
& legal issues



Licenseconsulting.eu



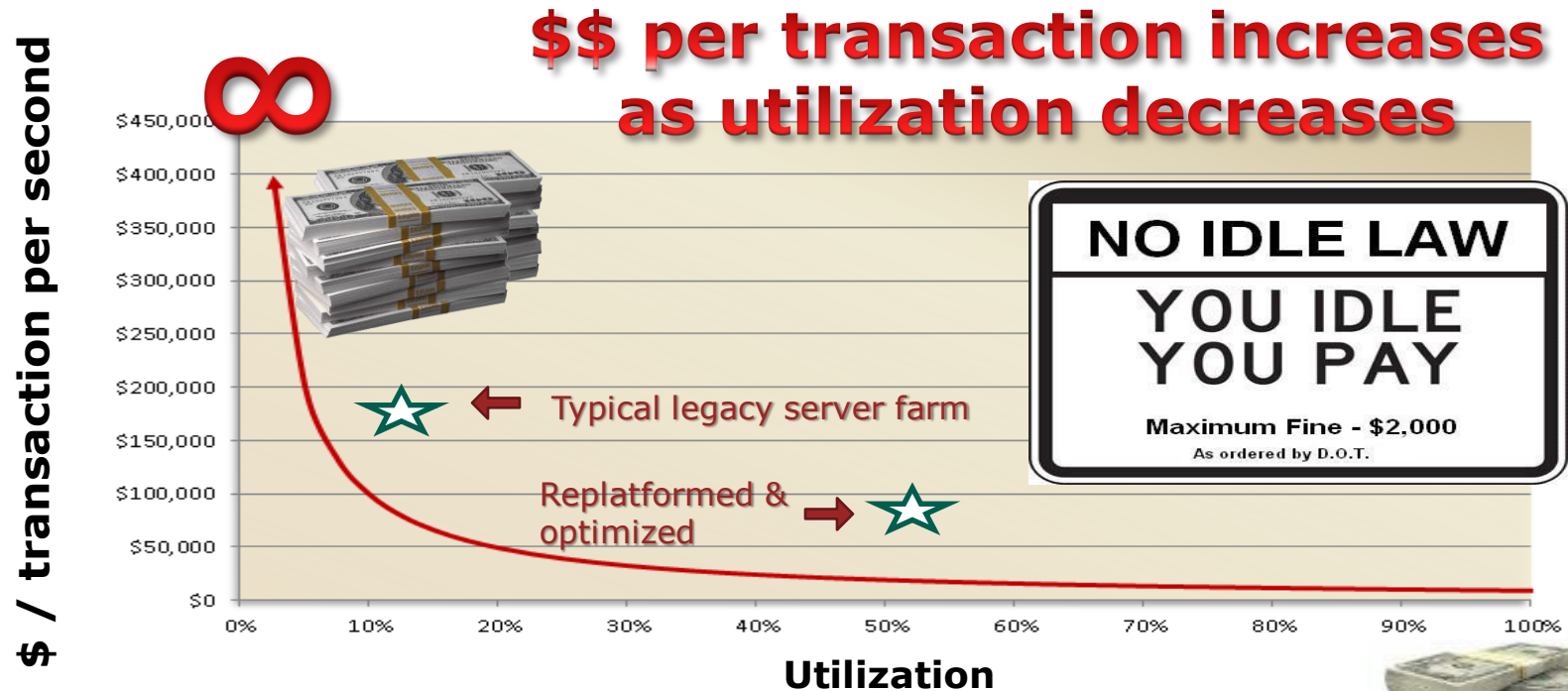
House of Brick Technologies



Madora Consulting UK

EMC³

Transaction cost vs. utilization

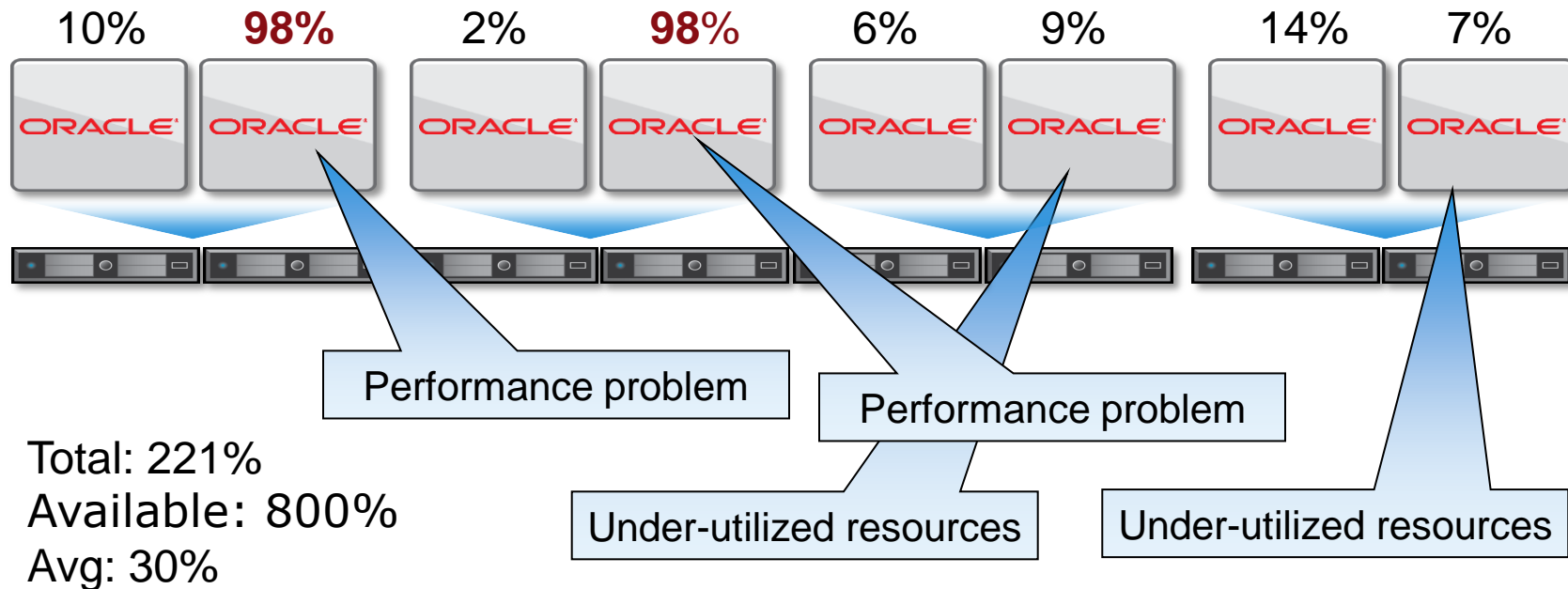


Cost per TPS for a four-node Oracle RAC 11g cluster running EE
Software license cost: around \$2,200,000
TPS: Around 4,000 at peak utilization



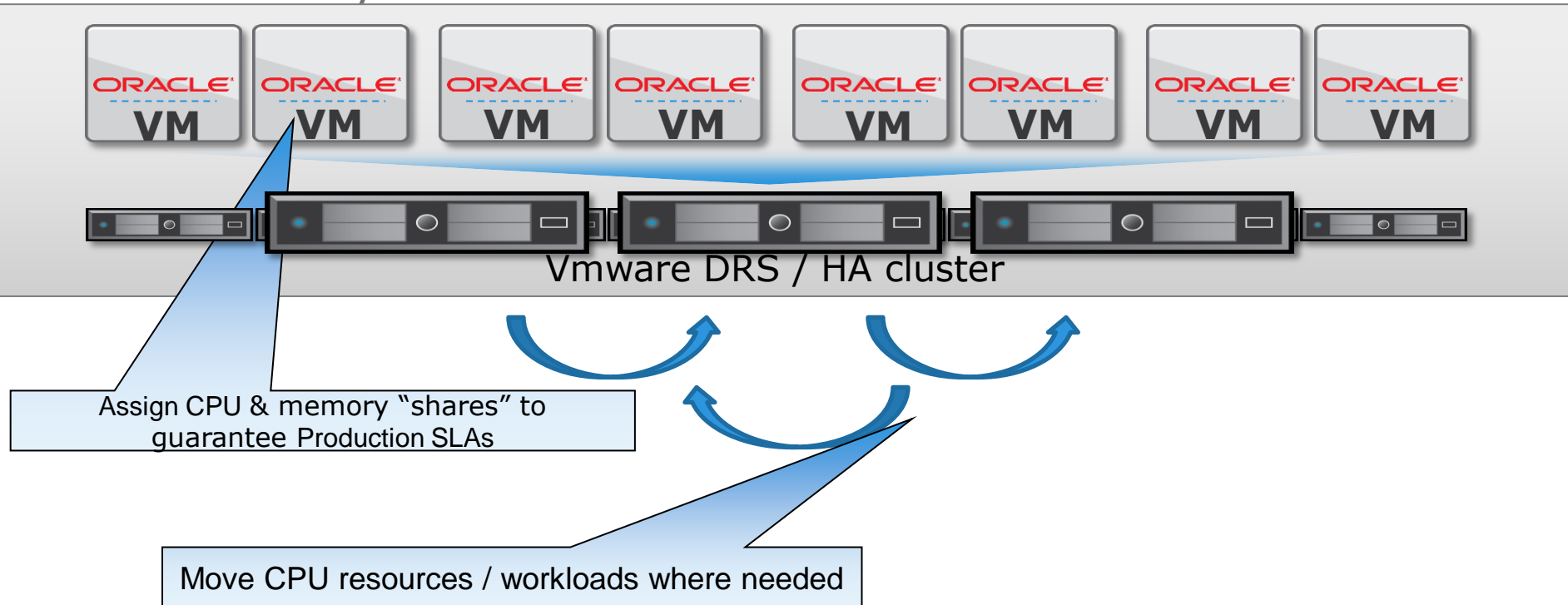
Classic problem of resource management

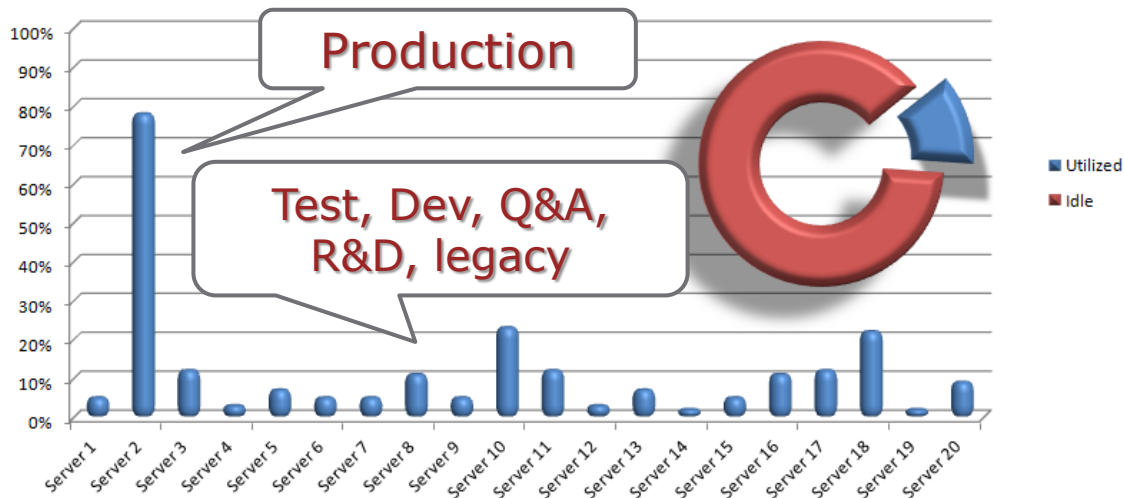
(applied to DB processing power)



Resource Management

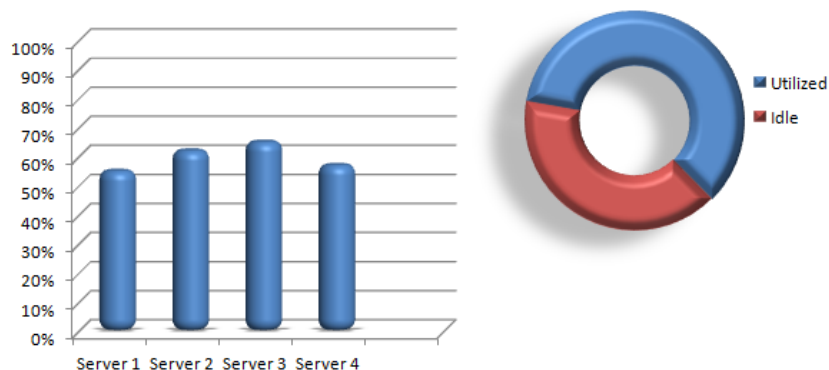
"Mainframe style"





Typical legacy database server farm:

- Physically deployed
- Oversized
- Outdated platforms
- Very poor CPU utilization
- IO & CPU bottlenecks
- Servers running mix of:
 - Apps, middleware & DB
 - Tooling
 - Replication & Backup





Optimized database server farm:

- Virtualized
- Significantly less CPUs on Modern HW
- High average CPU utilization
- No I/O bottlenecks
- Sized correctly
- Servers running ONLY Oracle
- Minimal required licenses & options

5 steps to TCO reduction

Getting the best Return on Investment

1. Replatform for lowest \$ / transaction
 - And eliminate I/O problems, backup, etc → 
2. Virtualize servers to drive up CPU utilization
3. Remove unnecessary licensed options
 - Or go to different license model (i.e. Standard Edition)
4. Only run DB transactions on licensed CPU
5. Re-negotiate license contracts → 
 - Suspend maintenance, etc
 - Avoid non-compliance, audits, support issues, ...



ROAD BLOCK #1: SUPPORT

ORACLE NOT SUPPORTED ON VMWARE?

My Oracle Support note 249212.1

Purpose

Explain to customers how Oracle supports our products when running on VMware

Scope & Application

For Customers running Oracle products on VMware virtualized environments

Support Status for VMware Virtualized Environments

Oracle has not certified any of its products on VMware virtualized environments. Oracle Support will assist customers running Oracle products on VMware in the following manner: **Oracle will only provide support for issues that either are known to occur on the native OS, or can be demonstrated not to be as a result of running on VMware.**

If a problem is a known Oracle issue, Oracle support will recommend the appropriate solution on the native OS. If that solution does not work in the VMware virtualized environment, the customer will be referred to VMware for support. **When the customer can demonstrate that the Oracle solution does not work when running on the native OS, Oracle will resume support, including logging a bug with Oracle Development for investigation if required.**

If the problem is determined not to be a known Oracle issue, we will refer the customer to VMware for support. When the customer can demonstrate that the issue occurs when running on the native OS, Oracle will resume support, including logging a bug with Oracle Development for investigation if required.

NOTE: Oracle has not certified any of its products on VMware. For Oracle RAC, Oracle will only accept Service Requests as described in this note on Oracle RAC 11.2.0.2 and later releases.

Source: [My Oracle Support website](#), [VMware Oracle Support Statement](#)

Oracle Support will assist customers running Oracle products on VMware ... in the following manner...

Is Oracle certified to run on VMWare?

By Mike Dietrich-Oracle on Jan 17, 2011

This question in similar occurrences gets asked during **every Upgrade Workshop** at least once. People would like to know if they can run an **Oracle Database** or **Oracle Real Application Clusters** or **Oracle Grid Control** or **Oracle Fusion Middleware** or ... in an VM environment with **VMWare's virtualisation products**.



And the answer is: **Yes, you can!!**

But ... there's a **fine print** you should take care on before setting up virtual environments with a different solution than XEN based **Oracle VM**.

Please read **Note:942852.1 - VMWare Certification for Oracle Products** and **Note:249212.1 - Support Position for Oracle Products Running on VMWare**

Virtualized Environments for further details:

[Oracle blog:](#)
[Is Oracle certified to run on VMware?](#)

Comments:

Considering the fact that Oracle is probably the most expensive database available in the market these days, I would think that they would be a little more mature to try and support VMware.

Posted by **Charl** on January 18, 2011 at 11:56 PM CET #

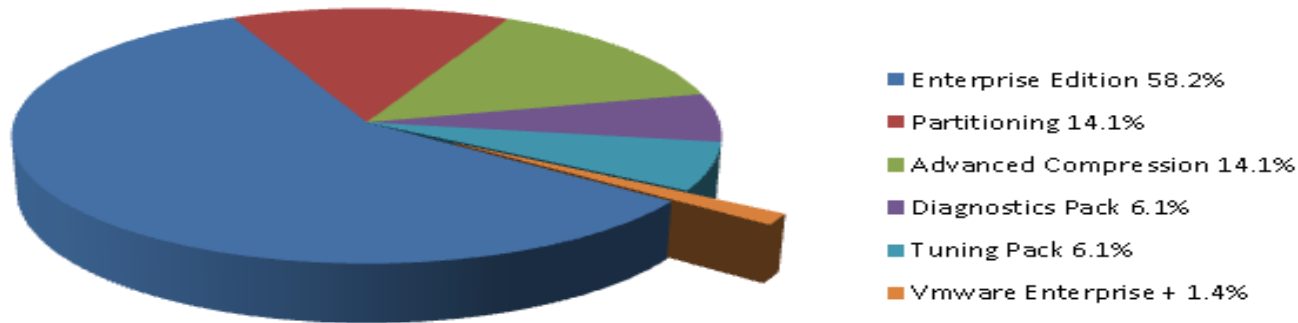
Charl, thanks for your comment - and I believe there's a misunderstanding because of the wording sequence of the support note. We DO SUPPORT Oracle on VMware environments. You just have to take into consideration in case of a failure that it could happen that you'll have to be able to reproduce misbehaviour of an Oracle product



ROAD BLOCK #2: LICENSE COST

LICENSE COST HIGHER ON VMWARE VS
PHYSICAL OR OTHER HYPERVISORS?

VMware - Expensive?



- VMware licenses make up less than 2% of total SW licensing
- Will even be lower if you go to 8 cores/socket (common)
- Or modern server with 2 sockets/18 core per socket/36 cores (<5%)
- Or if you use Oracle RAC or other additional options

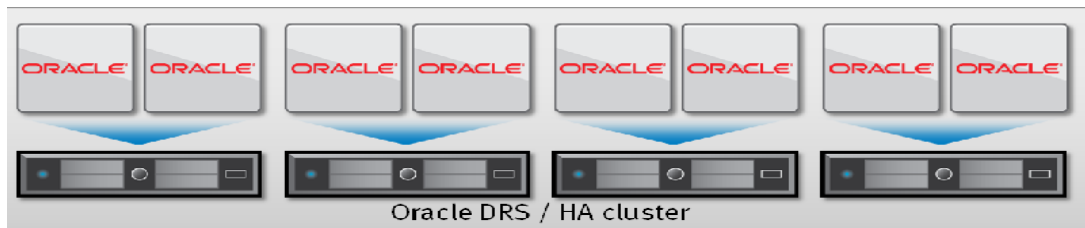
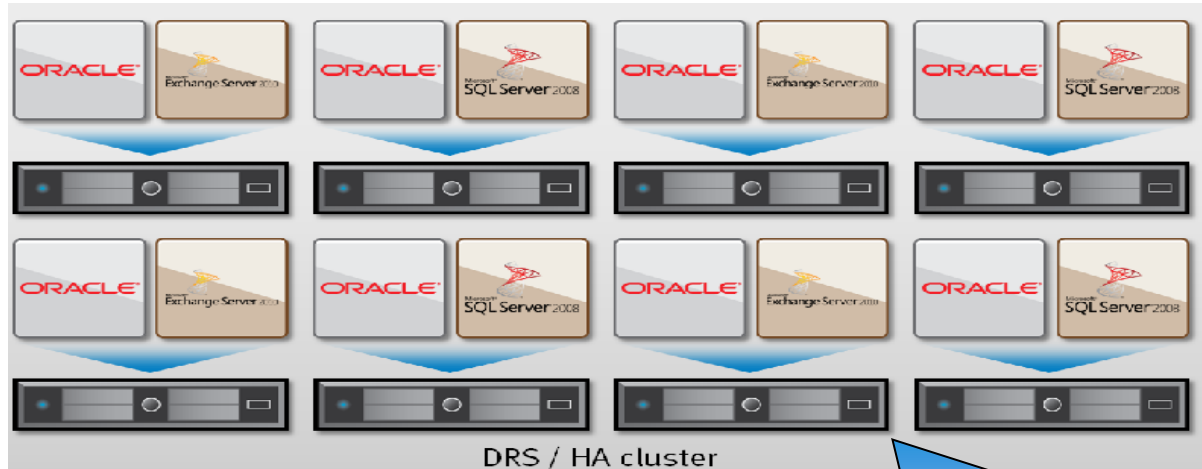
Server: Dual-Socket, 12 core X64

DB licenses: Oracle EE + Partitioning + Advanced Compression + Diagnostics & Tuning pack

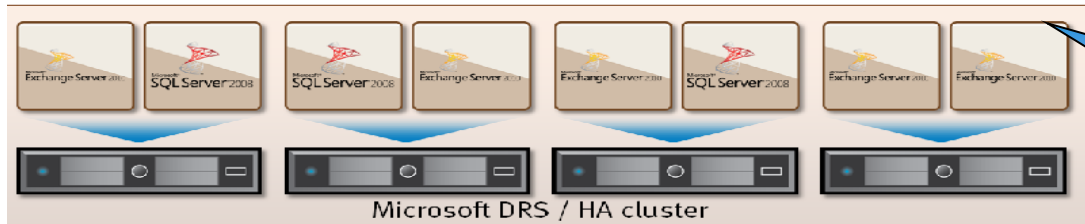
VMware licenses: Enterprise Plus (most expensive type)

Based on publicly available list pricing - All other costs (HW&SW) ignored for simplicity

ORACLE LICENSES

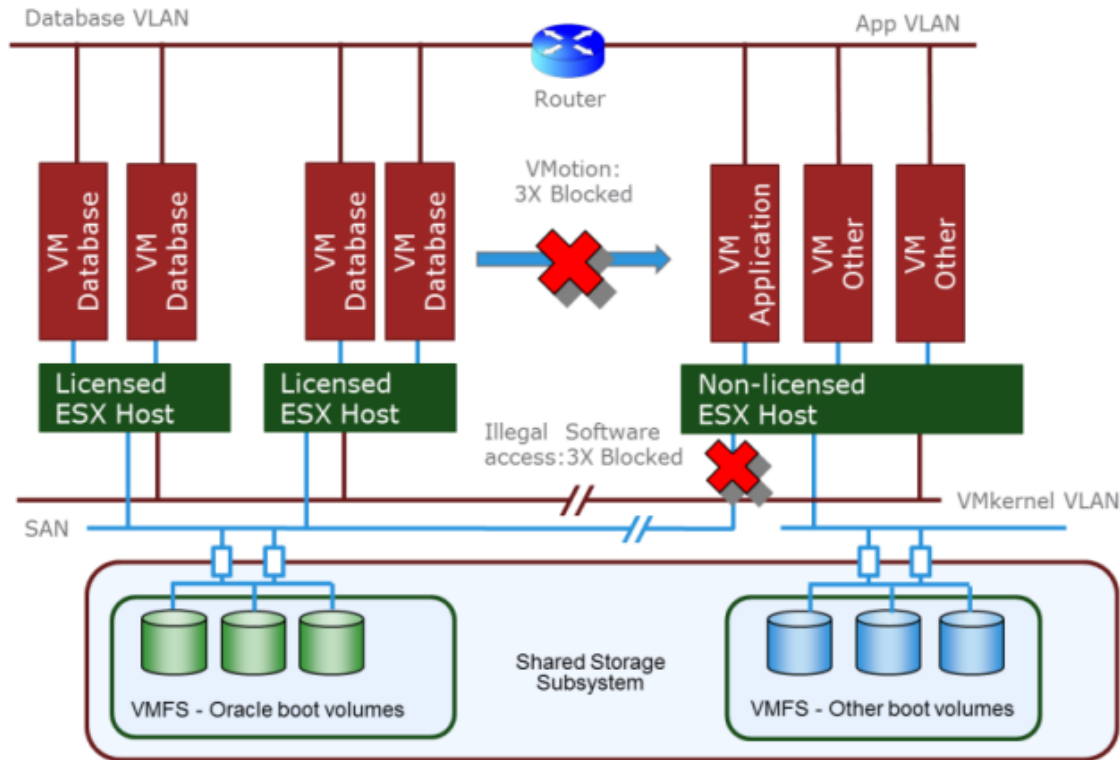


Poorly managed licensing
(Expensive – requires 8 servers fully licensed)



Well managed licensing
(Savings – only requires 4 servers fully licensed)

Avoiding the Vmotion Trap



Oracle on VMware: Caging the license dragon

Do's

- Prevent "illegal" Vmotion moves by creating multiple barriers
- Keep Vmotion audit trails
- Watch the [IOUG "straight talk" video](#) on my blog
- **Hire external licensing expertise**

Don'ts

- Believe Oracle sales reps
- Give LMS all info they ask for
- Run hypervisors that don't achieve TCO reduction

Know

- You only have to license Oracle where it IS running (not where it might run in the future)
- Oracle FUD/Scare tactics

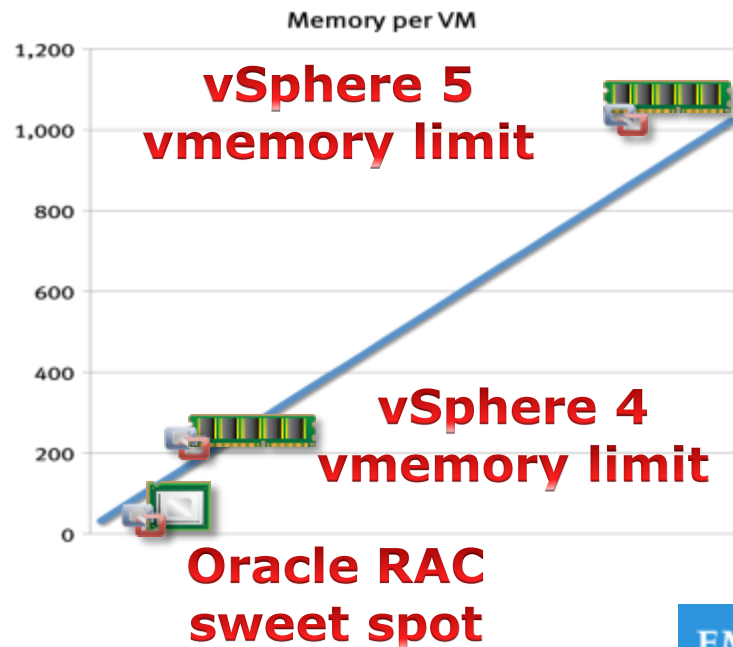
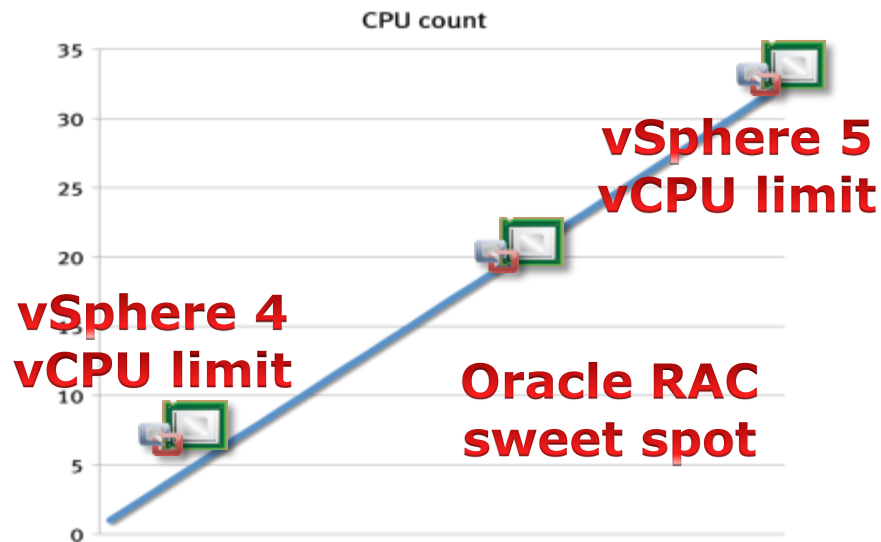


ROAD BLOCK #3: SCALABILITY

MAXIMUM WORKLOAD ON A SINGLE VM

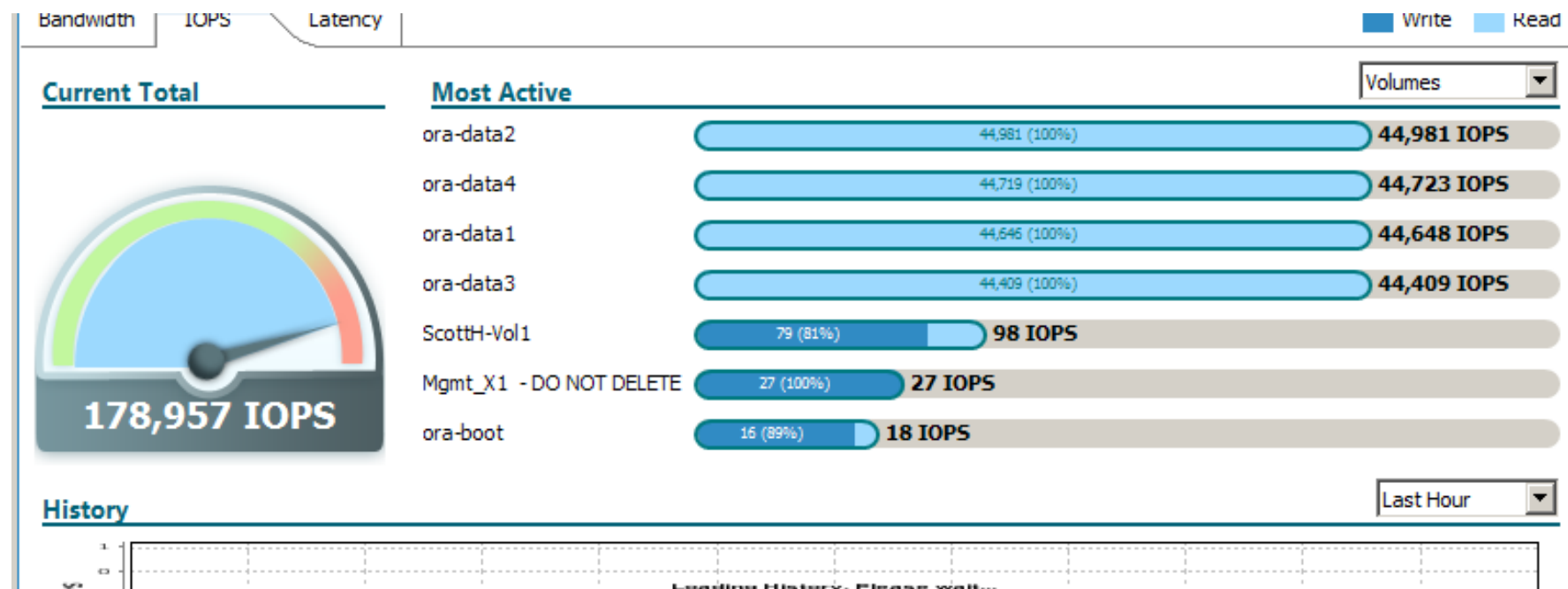
vSphere 5 - limits on vCPUs and memory

vSphere 6: 128 vCPU / 4 TiB memory per VM



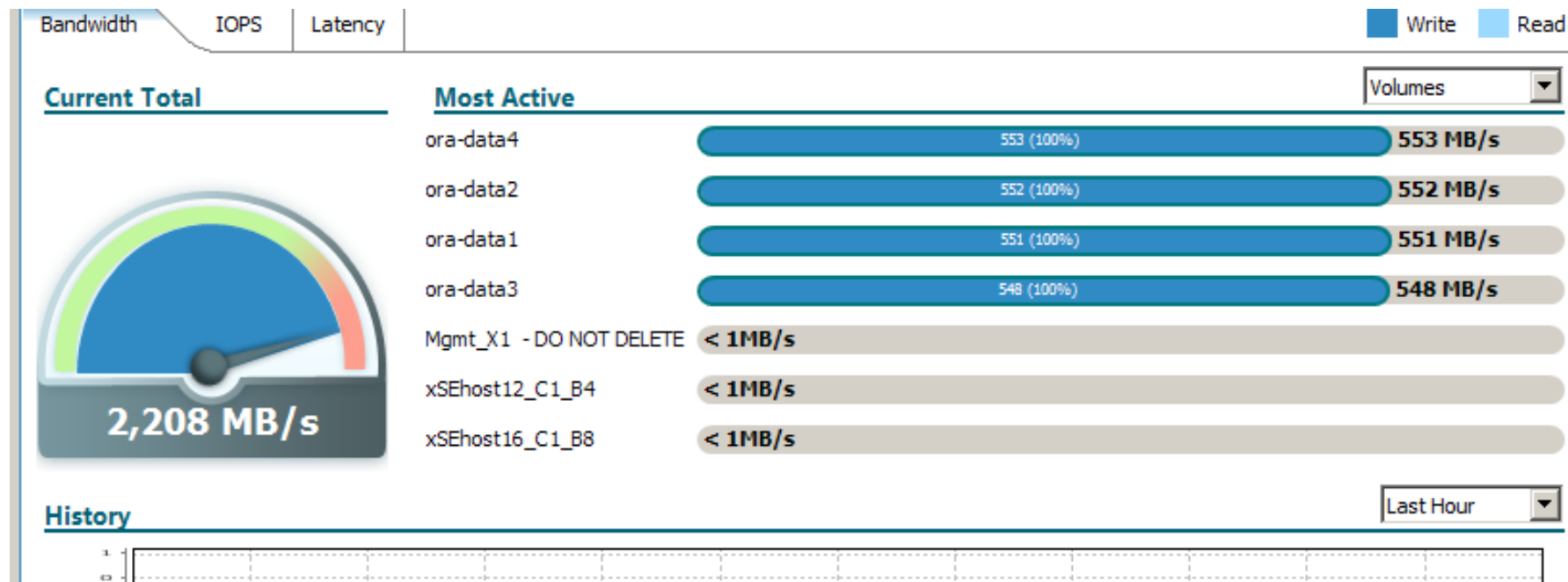
Performance example with SLOB

Lab test: 1 v2.4 X-Brick, 3 VM's Oracle 11.2.0.4.0, VMDKs



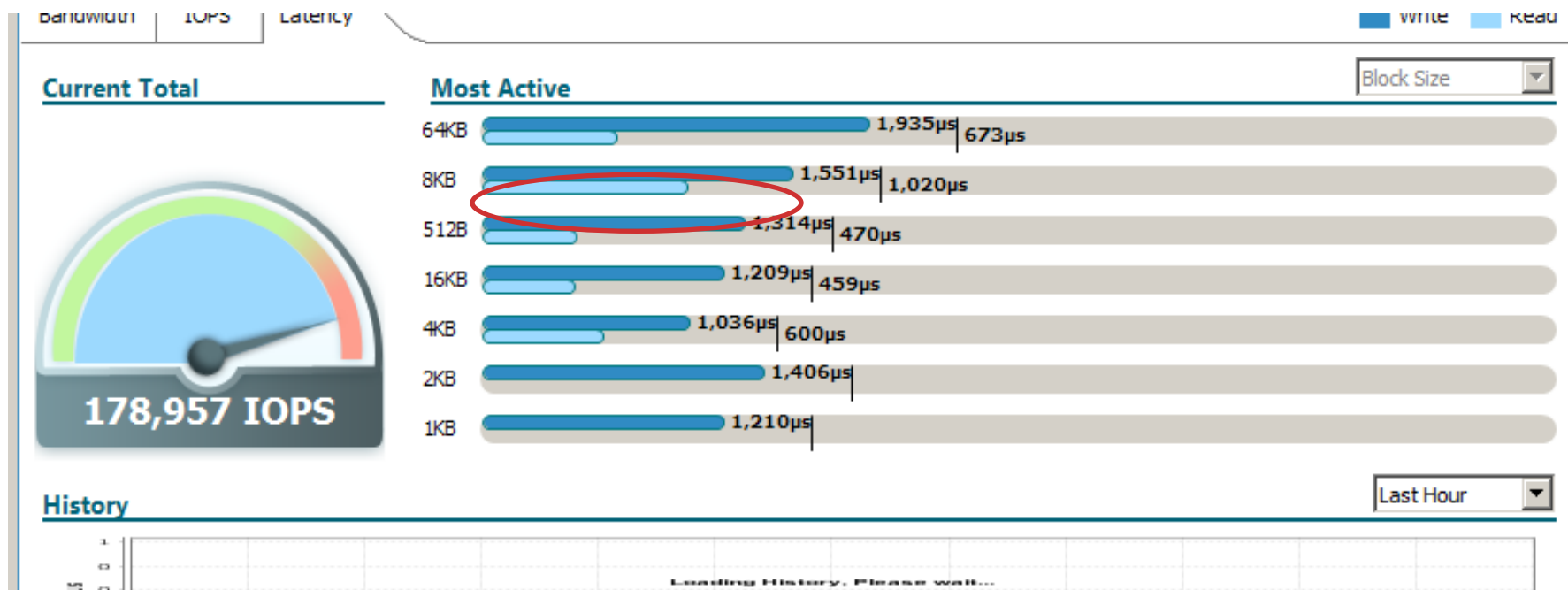
Performance example with SLOB

Bandwidth



Performance example with SLOB

Latency (nearly all I/O is 8K random)



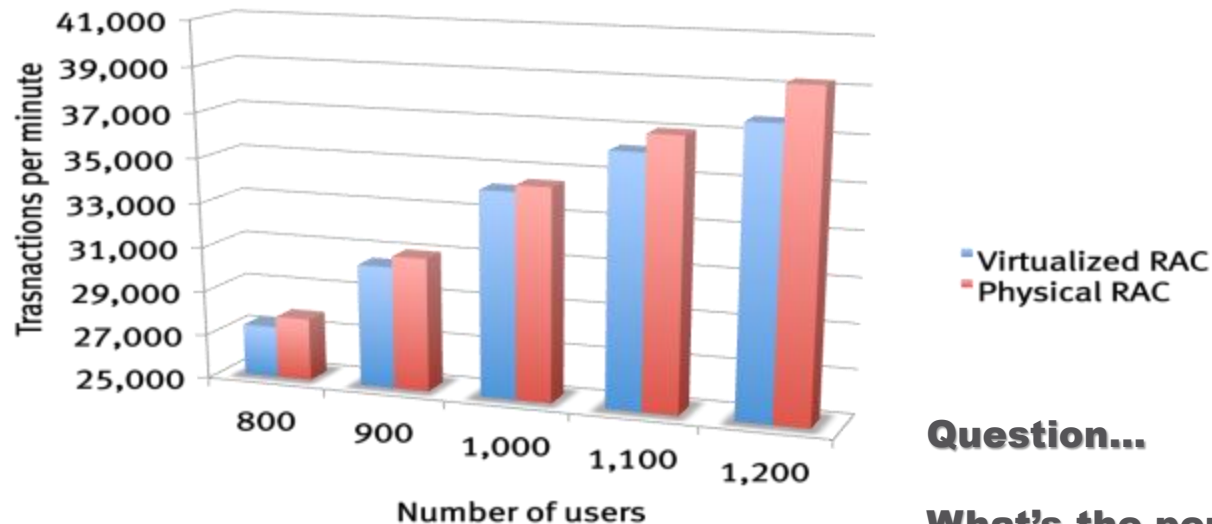


ROAD BLOCK #4: OVERHEAD

PERFORMANCE IMPACT OF VIRTUALIZATION

Performance overhead physical vs. virtual

EMC IT analysis: ~ 4% (vSphere 5.1!)



Question...

What's the performance overhead of:

- **Oracle RAC ?**
- **Host replication ?**
- **Advanced Compression ?**
- **Transparent table encryption ?**



ROAD BLOCK #5: PLATINUM SUPPORT

ONE STOP SHOPPING FOR SUPPORT?

VMware extended support for oracle

Total Ownership

VMware Support will accept accountability for any Oracle-related issue reported by a customer. By being accountable, VMware Support will drive the issue to resolution regardless of which vendor (VMware, Oracle, or others) is responsible for the resolution. In most cases, reported issues can be resolved via configuration changes, bug fixes, or feature enhancements by one of the involved vendors.

In the rare situation that another vendor is unable or unwilling to provide a satisfactory technical resolution, VMware Support will immediately notify the customer, assist in escalation and explore other potential technical workarounds with the customer.

VMware will also assist its customers with technical issues for other Oracle software products, besides the Oracle Database and provide similar [escalation assistance](#) if needed.

Besides technical assistance, VMware Support will advocate on the customer's behalf to:

- Provide any relevant evidence that virtualization does not play a part in the Oracle product technical problem
- Engage Oracle Support in resolving the customer's technical issue, escalating management attention as appropriate

<http://www.vmware.com/support/policies/oracle-support.html>

EMC support for Oracle on VMware



EMC E-Lab and VMware have tightly collaborated on support for use of Oracle Database 11g in VMware environments. This includes extensive testing and qualification of VMware virtualization software with EMC and Oracle technologies, combined with EMC and VMware joint support.

In addition, EMC and VMware have documented a series of Proven Solutions which outlines how to design, deploy, and manage VMware virtualization software in EMC and Oracle environments. Through seamlessly integrating VMware into EMC and Oracle environments, IT organizations can dramatically increase hardware utilization, consolidate servers, and improve efficiency.

<http://www.emc.com/solutions/application-environment/oracle/oracle-virtualization-vmware.htm>

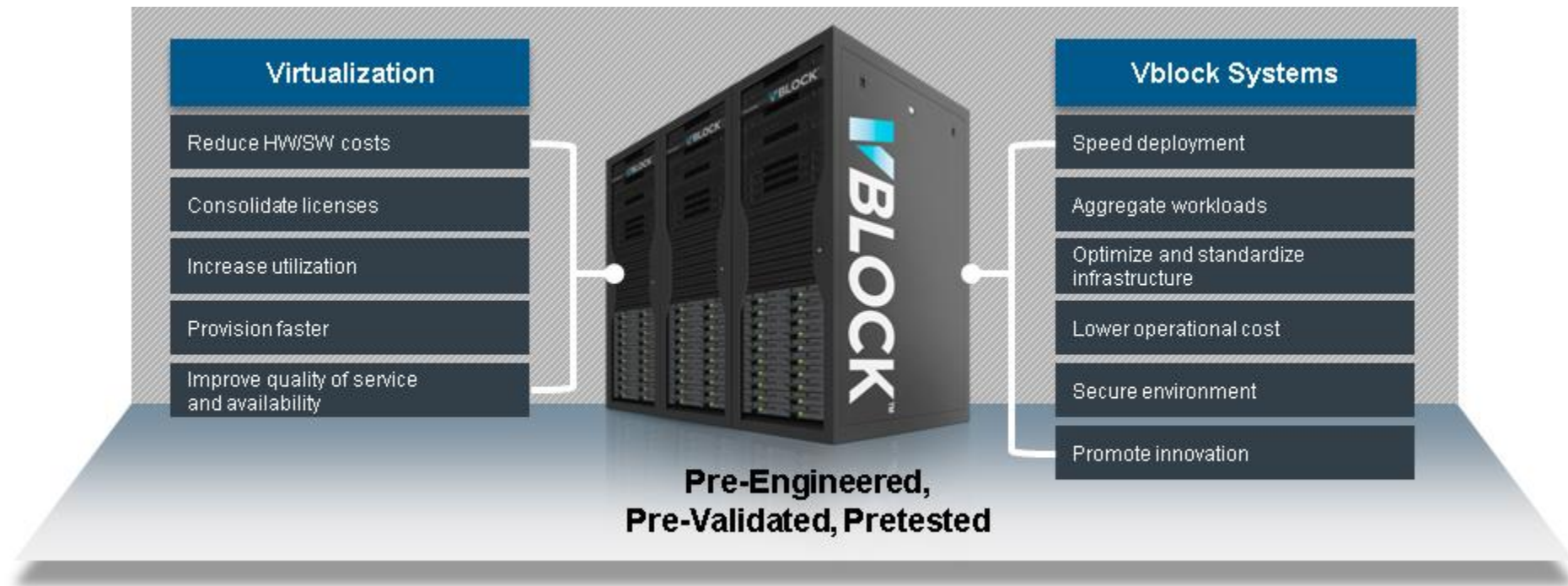


ROAD BLOCK #6: NO INTEGRATED STACK

OPTIMIZED SYSTEM FOR DATABASE WORKLOADS?

EMC/VCE VBLOCK OPTIMIZED SYSTEM

Single SKU – All-Flash - optimized for database workloads



Oracle on VMware

Best practices and guidelines



Avoid compliancy issues

Make sure you are ALWAYS compliant with licensing

- Prohibit illegal live migrations
 - IO fencing, rules, network isolation
- Audit movements
 - Insurance policy against the license police
- Be careful with management tools
 - Vcenter 6.x & cross-cluster migrations? (!)
- Know the rules
 - 10-day rule? Sub-server partitioning? SE vs EE? CPU based vs NUP? Etc etc.
 - Don't hesitate to hire external license consulting (LMS audits can be much more expensive)
- CxO / IT management: Make your DBA team responsible for being compliant
 - Let them report every 6 months

Capitalize on better infrastructure

Replace or enhance expensive licensed options where possible

- Advanced Compression -> Storage compression
 - Works for ALL data
 - No additional license
- RAC -> VMware HA
 - Reduces complexity, improves performance and eliminates \$\$\$ license
 - No free lunch: HA is active/passive (failover = few minutes, crash restart)
- Active Data Guard -> SAN replication
 - Replicate an ENTIRE Business Landscape AT ONCE (1 point of control)
 - RELIABLE (zero dataloss or async – but always consistent), independent from DB, OS, Server, etc
 - Improves failover/failback scenarios (no standby rebuild)
 - No Force Logging or even archive logging required

Choose the best CPU available

Based on \$/transaction (TPC-C per core)

CPU power

- The more powerful the CPU is per core, the more workload you can run with the same footprint (Without adding licenses!)

Memory size

- Oracle runs better with lots of RAM (SGA)
- More RAM allows more VM's per host

TPC-C benchmark for OLTP

- The industry standard – but not all servers listed (Oracle “Engineered” systems are missing...)
- If you're creative you can find similar CPUs and their TPC ratings – or look at SPEC ratings to compare CPU power

Powerful CPU cores are more efficient

- High TPC-C and/or SPEC ratings will allow you to drive higher consolidation ratios - And provide better performance

Minimize overhead where possible

- VMware: 4% (verified by EMC) – vSphere 5.1 (!)
- Oracle RAC – 10%? (conservative estimate)

Note: Intel E5-2697v2 ~ 115,000 TpmC/Core (estimate)

Intel E5-v3 ~ 125,000 TpmC/core (estimate)

SPARC T5 ~ 66,800 TpmC/Core (used in SPARC Supercluster T5)

IBM POWER 7+ ~ 150,000, POWER 8 200,000+ (but beware of core factor)



Processor types and TPC ratings	TpmC/Core
Intel X5690	87758
Intel E7-8870	63199
Intel E5-2690	100574
Intel E5-2643	100574

EMC³

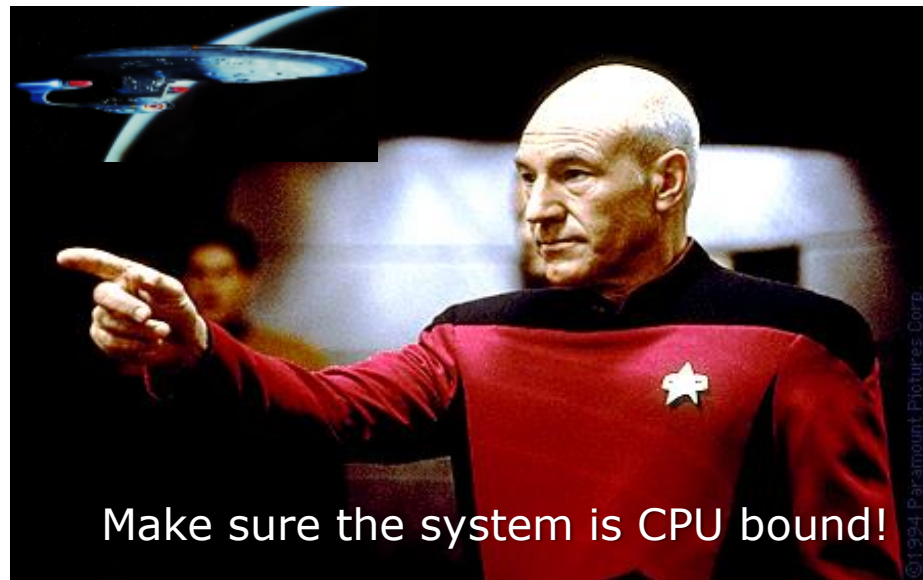
Eliminate I/O bottlenecks

- Driving up CPU utilization only possible if we can feed data quickly enough to/from the CPU
 - Some apps need high bandwidth (measured in Mbyte/s)
 - Some apps need many IOPS (I/Os per second) at low latency
- Traditional “spinning disk” storage is limited
 - Disk Capacity is high, bandwidth and latency is poor
- Solution: Flash based storage
 - Either Hybrid Disk + Flash or All-flash
- Typical All-flash Array metrics:
 - 100,000’s of IOPS @ sub-millisecond latency
 - Many Gigabytes/s bandwidth
 - Not sensitive to mixed workloads
 - Some beneficial side effects (inline compression, de-duplication, zero-overhead snapshots, ...)



Databases shouldn't have high I/O wait

- Adding CPU does not speed up I/O bottlenecks
 - Memory does somewhat
- IOPS are relatively (!) cheap
- CPU cycles are expensive
 - Because of licenses
- Consolidation leads to
 - Higher IO requirements
 - I/O bottlenecks
 - Bandwidth issues
- Flash storage can solve these limitations



STORAGE IS NO LONGER THE BOTTLENECK

EMC³

Other Best Practices for virtualizing Oracle

- Enable hugepages
- Tune NUMA settings
- Honour storage best practices
 - Data layout
 - Disk alignment
 - Multipath/IO balancing
- No parasite workloads
 - Middleware / apps
 - Monitoring agents
 - Replication/mirroring etc
 - ETL
- Run standardized benchmarks
 - Not (only) your own app
 - SLOB for I/O
 - Swingbench for CPU
- Run failure tests
 - Kill a physical server
 - Pull an FC cable
 - ... etc
- Use Virtualization-aware management tools

Enjoy freedom of choice

Break dependency from the lock-in dragon

- What's a Virtual Machine anyway?
 - Configuration files + Data set
 - Standardized, HW independent X86 platform
- Could be moved easily to other platforms
 - Different hypervisors
 - Different servers
 - Different storage

(But... Keep running on EMC ;-)

"Oracle as a Service"

Next Steps into the Cloud- "Database as a Service"



EMC & VMware Deep Integration

Enabling A Superior Private Cloud Environment



AUTOMATED PROVISIONING

Integrations between EMC VMAX, VNX, Avamar & Data Domain and VMware vRealize

Integrations between EMC VMAX, VNX & Virtual Storage Integrator (VSI) and VMware vCenter



SELF-SERVICE

VMware vRealize Self-service Portal



MONITORING

Integrations between EMC Storage Analytics and VMware vCenter Operations Manager & Log Insight



METERING & CHARGEBACK

VMware vRealize Automation Center & vCenter Chargeback and IT Business Management Suite



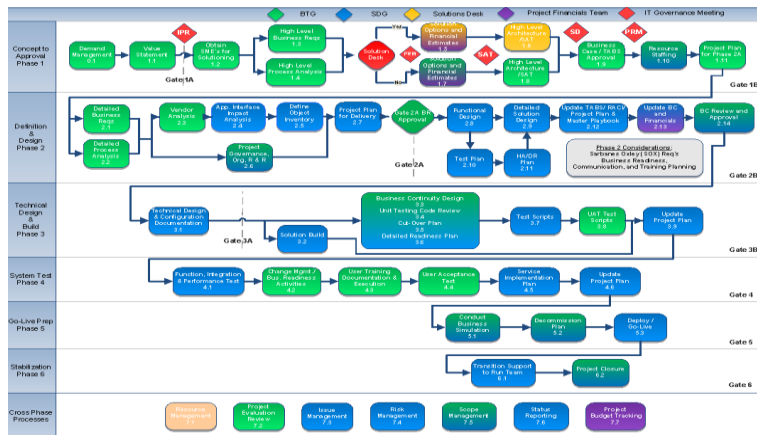
SECURE MULTI-TENANCY

VMware vRealize Automation Center

EMC IT: Past vs. Present

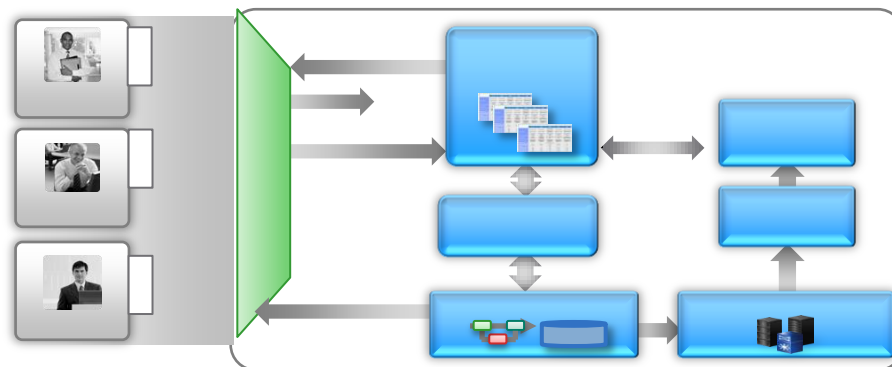


Previous Timeline: ~4 Months



Custom Configurable
Manual Solution

New Timeline: < 1 Hour



Standard Automated
Delivered

Order and Build On Demand

EMC³

Enabling and Provisioning Oracle DBaaS

vRealize Automation Service Catalog

The screenshot displays the vRealize Automation Service Catalog interface. At the top is a navigation bar with tabs: Home, Catalog (selected), Items, Requests, Inbox, Advanced Services, Administration, and Infrastructure. Below the navigation bar, the page title is "Service Catalog" with the instruction "Browse the catalog for services you need." On the left is a sidebar with a filter menu. The filter menu has a "All Services" section with a blue cube icon, followed by "ITaaS" with a plus icon, and two sections with Oracle logos: "Oracle" and "Red Hat". The main content area is titled "All Services (3)" and displays three service cards. Each card features the Oracle logo, a title, a description, and a "Request" button. The first card is "Oracle DBaaS" with the description "Provisions an 11g or 12c Oracle Database". The second card is "Oracle DBaaS (Backup)" with the description "Oracle DBaaS Service with an Avamar scheduled full RMAN backup to Data ...". The third card is "Oracle DBaaS with OE..." with the description "Installs an Oracle Database, 11g or 12c, including an OBM 12c Agent for central ...".

Service Catalog

Browse the catalog for services you need.

All Services

ITaaS

Oracle

Red Hat

All Services (3)

Oracle DBaaS
Provisions an 11g or 12c Oracle Database
Request

Oracle DBaaS (Backup)
Oracle DBaaS Service with an Avamar scheduled full RMAN backup to Data ...
Request


Oracle DBaaS with OE...
Installs an Oracle Database, 11g or 12c, including an OBM 12c Agent for central ...
Request

Enabling and Provisioning Oracle DBaaS

Provisioning an Oracle database – Day 1

Home Catalog Items Requests Inbox Advanced Services Administration Infrastructure

New Request



Oracle DBaaS
Install 11g or 12c Oracle Database Software and creates a database (general) with optional monitoring.

Request Information Node Properties Service Properties

Ora_DB_v1.0.0

- * selected_language: English
- * install_edition: Enterprise Edition
- * email_address: Standard Edition
Enterprise Edition
- * domainname: us.oracle.com
- * sid: orclpdb
- * systempassword:
- * syspassword:
- * enable_archive_log_mode: true
- * characteraset: AL32UTF8
- * national_characteraset: AL16UTF16
- * oracle_version: 12c
- * local_management: true

Oracle DBaaS Enabling and Provisioning

vRealize Automation Application Services – *Application Blueprint*

Oracle DBaaS (OEM) v1.0.0 - Blueprint

Logical Templates

- Database Servers
 - CentOS 32bit with MySQL v1.0.0
 - Ubuntu 64bit with GemFire v1.0.0
 - W2K8 R2 Enterprise SP1 with SQL S...
- OS Templates
 - CentOS 32bit with MySQL v1.0.0
 - CentOS63 32bit v1.0.0
 - CentOS63 64bit v1.0.0
 - CentOS64 32bit v1.0.0
 - CentOS64 64bit v1.0.0
 - RHEL61 32bit v1.0.0
 - RHEL61 64bit v1.0.0
 - RHEL-64 v1.0.0
 - RHEL64 32bit v1.0.0
 - RHEL64 64bit v1.0.0
 - RHEL-64bit v1.0.0
 - RHEL 6.5 64 Bit v1.0.0
 - RHEL 6.6 64 bit v1.0.0
 - RHEL 7.0 64 Bit v1.0.0
 - SLES11 SP2 32bit v1.0.0
 - SLES11 SP2 64bit v1.0.0
 - Ubuntu12042 32bit v1.0.0
 - Ubuntu12042 64bit v1.0.0
 - Ubuntu 64bit with GemFire v1.0.0
 - W2K8 R2 Enterprise SP1 v1.0.0
 - W2K8 R2 Enterprise SP1 with SQL S...

Service External Service Application Component

RHEL-64bit_v1.0

- Mnt_Ora_Artifact...
- Ora_DB_v1.0.0
- Oracle_Auto_Star...
- Oracle_EM_12c...
- Unmnt_Ora_Artif...
- RHEL64 v6.5

Application Components

External Services

Services

Oracle

- Application Servers
 - Orade Auto Startup Service v1.0.0
 - Orade EM 12c Agent v1.0.0
- Database Servers
 - Orade11g v1.0.0
 - Orade12c v1.0.0
 - Orade Auto Startup Service v1.0.0
 - Orade Backup Service v1.0.0
 - Orade Database Service v1.0.0
 - Orade EM 12c Agent v1.0.0
- Other
 - Mount Orade Artifacts v1.0.0
 - Unmount Orade Artifacts v1.0.0
- Performance Management
 - Orade EM 12c Agent v1.0.0

DETAILS NICS DISKS

Name	Mount Path	File ...	Size ...	Tags	Description
Disk1	/u01/app/oracle/binary	Auto	15	Binary	Binaries disk
Disk0	/u03/app/oracle/data	Auto	15	Data	Data disk
Disk3	/u02/app/oracle/log	Auto	15	Log	Log disk
Disk2	/u04/app/oracle/archive	Auto	15	Archive	Archive disk

Oracle DBaaS Enabling and Provisioning

vRealize Automation Application Services – *Application Blueprint*

The screenshot displays the vRealize Automation Application Services console for the 'Oracle DBaaS (OEM/Backup) v1.0.0 - Blue...' blueprint. The interface is divided into three main sections:

- Left Sidebar (Logical Templates):** Lists various templates categorized under 'Database Servers' and 'OS Templates'. The 'OS Templates' section includes RHEL64 32bit and 64bit versions, SLES11 SP2 32bit and 64bit versions, and Ubuntu12042 32bit and 64bit versions.
- Central Canvas:** Shows a service stack diagram for the 'RHEL-64bit_v1.0' template. The stack includes components like 'Mnt_Ora_Artifact...', 'Ora_DB_v1.0.0', 'Oracle_Auto_Star...', 'Oracle_EM_12c_...', 'Oracle_Backup_...', and 'Unmnt_Ora_Artif...'. A red arrow points from the 'Oracle_Backup_...' component in the right sidebar to its corresponding box in the central stack diagram.
- Right Sidebar (Application Components):** Lists various components categorized under 'Application Servers', 'Database Servers', 'Other', and 'Performance Management'. The 'Database Servers' section includes Oracle11g v1.0.0, Oracle12c v1.0.0, Oracle Auto Startup Service v1.0.0, Oracle Backup Service v1.0.0, Oracle Database Service v1.0.0, and Oracle EM 12c Agent v1.0.0.

The bottom section of the console displays the details for the 'Oracle Backup Service' component, including its version (1.0), service version business group (Oracle2-BG), and a description: 'Calls a vCO workflow to register the client in Avamar. This Service assumes that the Avamar client binaries have already been installed as part of Oracle DB installation prereqs.' The 'Pre-installed in a Template' checkbox is currently unchecked.

Oracle DBaaS - Day 2 Operations

Home Catalog **Items** Requests Inbox Advanced Services Administration Infrastructure

You are here: Items > Machines

Machines

Select an item type from the menu on the left to view your provisioned items. Use the Actions menu to manage your items.

View Details View Components Actions

Name	Description	Cost to Date	Status
FEHC3-Ora30068	vcac://6c3b68	\$0.00	On

- Add Memory *
- Add OEM 12c Agent *
- Add vCPU *
- Backup Database *
- Change Lease
- Configure Database Backup *
- Connect by Using RDP
- Destroy
- Expire
- Get Job Status
- Install Tools
- Power Cycle
- Power Off
- Reboot
- Reconfigure
- Remove Backup Service *
- Remove OEM 12c Agent *

Page 1 of 1

Monitoring Oracle DBaaS

Oracle Enterprise Manager Cloud Control 12c monitoring

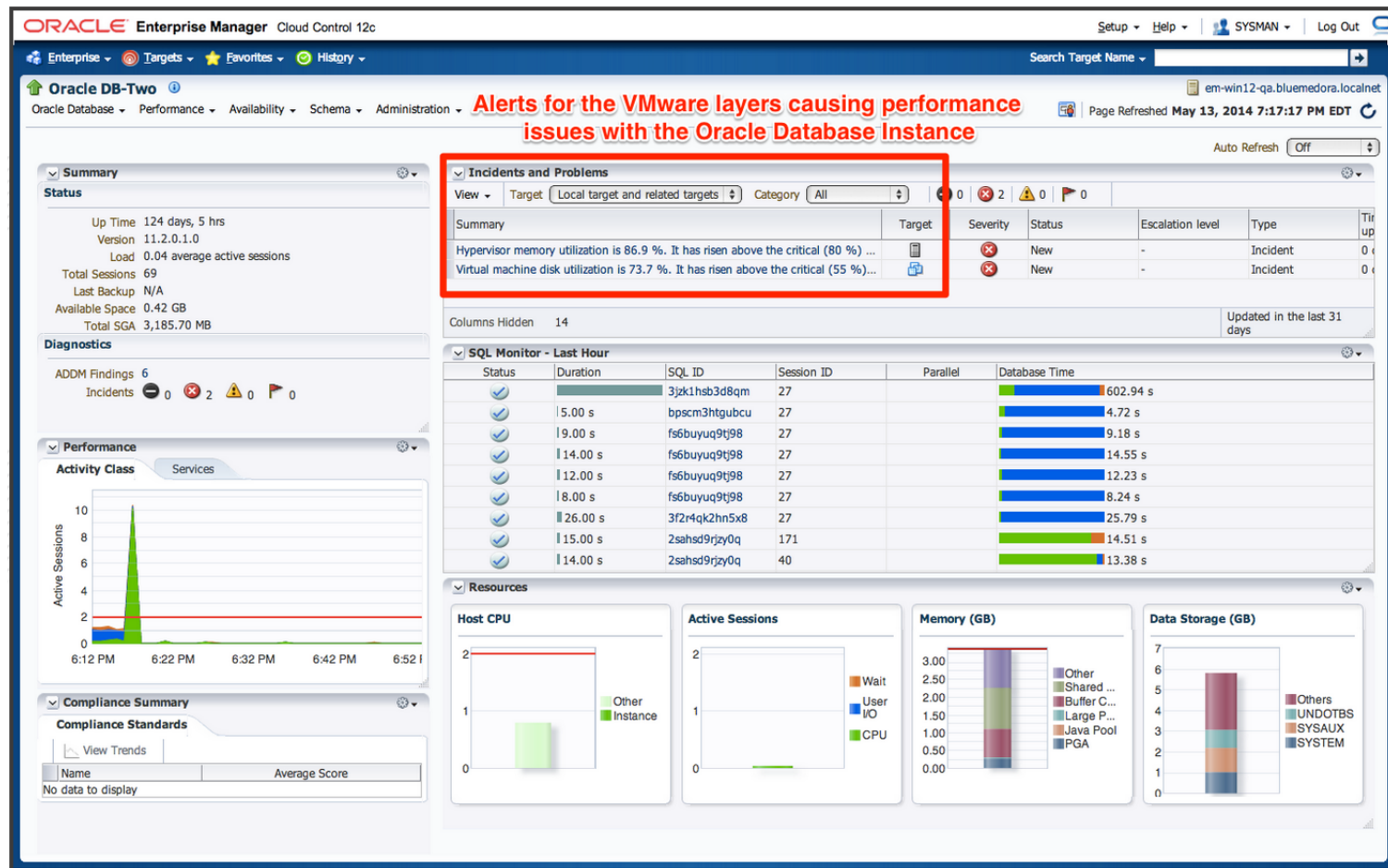
The screenshot displays the Oracle Enterprise Manager Cloud Control 12c interface. The main window shows the 'Summary' tab for the target 'Ora12c-YCLWIHT3.epc.ssev.local'. The 'Status' section indicates the target is 'UP'. The 'Diagnostics' section shows 'Incidents', 'Configuration Changes', and 'Critical Patch Advisories'. The 'Configuration' section provides details about the host, including IP Address, Operating System, File System, Memory, Address, and Model. The 'Job Activity' section shows a summary of jobs executed within the last 7 days.

On the right, the 'Related Targets' section lists several targets with their installed locations and availability status:

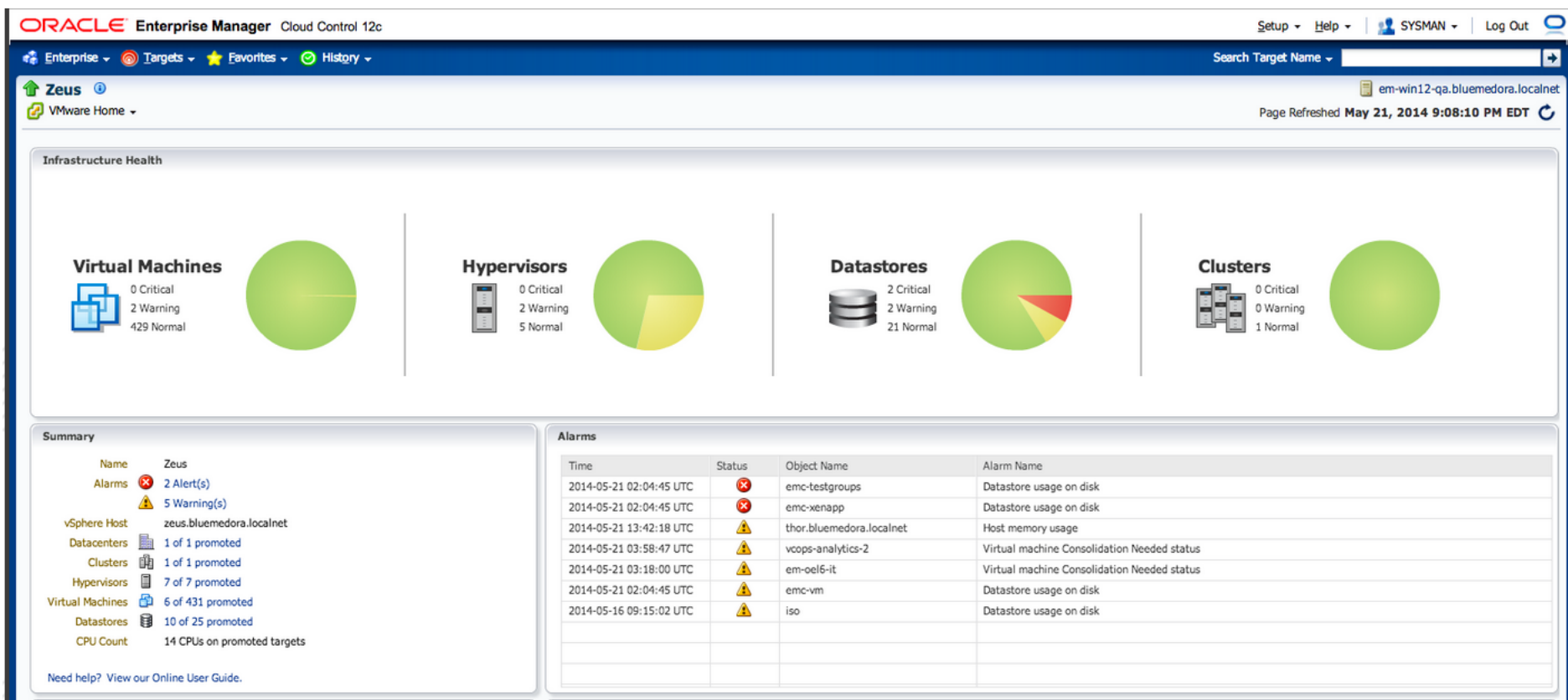
Select	Name	Installed location	Availability
<input type="checkbox"/>	Ora12c-YCLWIHT3.epc.ssev.local:3872	/home/oracle/agent/core/12.1.0.2.0	UP
<input type="checkbox"/>	orclpdb	/u01/app/oracle/product/12.1.0/db_1	UP
<input type="checkbox"/>	Ora12c-YCLWIHT3_LISTENER	/u01/app/oracle/product/12.1.0/db_1	UP
<input type="checkbox"/>	Oradb12Home1_1_Ora12c-YCLWIHT3	/u01/app/oracle/product/12.1.0/db_1	n/a
<input type="checkbox"/>	agent12c1_2_Ora12c-YCLWIHT3	/home/oracle/agent/core/12.1.0.2.0	n/a

The bottom of the screenshot shows the 'ORACLE Enterprise Manager Database Express 12c' logo and a login dialog box with fields for 'User Name', 'Password', and 'Log On'.

Extends Oracle Cloud to VMware – Performance View



Extends Oracle Cloud to VMware – VMware Status



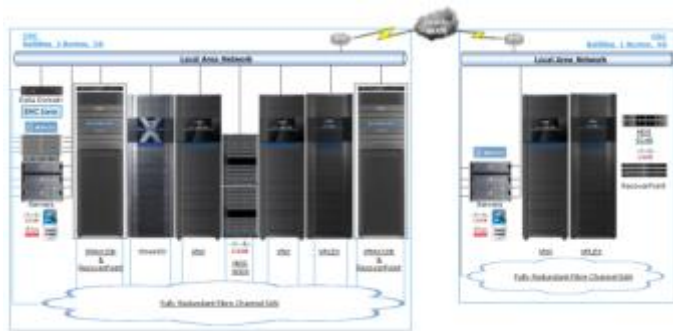
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References

My Blog "Dirty Cache"

<http://bartsjerps.wordpress.com>

Everything Oracle @ EMC (community):

<http://emc.com/everythingoracle>


XtremIO

<http://xtremio.com/>



Dirty Cache


A storage infrastructure perspective on optimizing business applications


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[← Thank you, Larry Ellison](#)

Stop Idling – Start Saving


 OCTOBER 23, 2012 [LEAVE A COMMENT](#)



One of my missions is to help customers saving money (Dirty Cache Cash). So considering the average enterprise application environment, I frequently ask them where they spend most of their IT budget on. Is it servers? Networks? Middleware? Applications?

Turns out that if you look at the operating cost of an Oracle database application, a very big portion of the TCO is in database licenses. Note that I focus on Oracle (that's my job) but for other databases the cost ratio might be similar. Or not. But it makes sense to look at Oracle as that is the most common platform for mission-critical applications. So let's look at a database environment and forget about the application for now.

Let's say that 50% of the operating cost of a database server is spent on Oracle licensing and maintenance



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