Oracle on Vmware / EMC

How to optimize service levels?
How to reduce cost?

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vmware

EMC² where information lives

Why EMC is the best platform for Oracle

Availability	99,999% proven uptime. Keeps running at high performance and protection, even if components fail
Reliability	Product quality, Interoperability testing, extreme redundancy
Data Integrity	Avoids block corruptions (this is unknown but important to DBA's) due to additional checksumming, scrubbing, power fail destage
Predictable High Performance	High performance is no good if you can only get this during POCs, with small datasets and no use of advanced features like replication. And only EMC EFDs drive real high performance whilst maintaining high reliability
Scalability	Small to large, seamless migrations using storage virtualization
Freedom of choice	Connectivity, RAID level, Disk type (including EFD)
Control	Instead of one-size-fits-all, customer decides data placement (policy based these days, using FAST)
Support	Joint Escalation Center (JEC aka JSC), Oracle and EMC working together to resolve issues, Avoid fingerpointing

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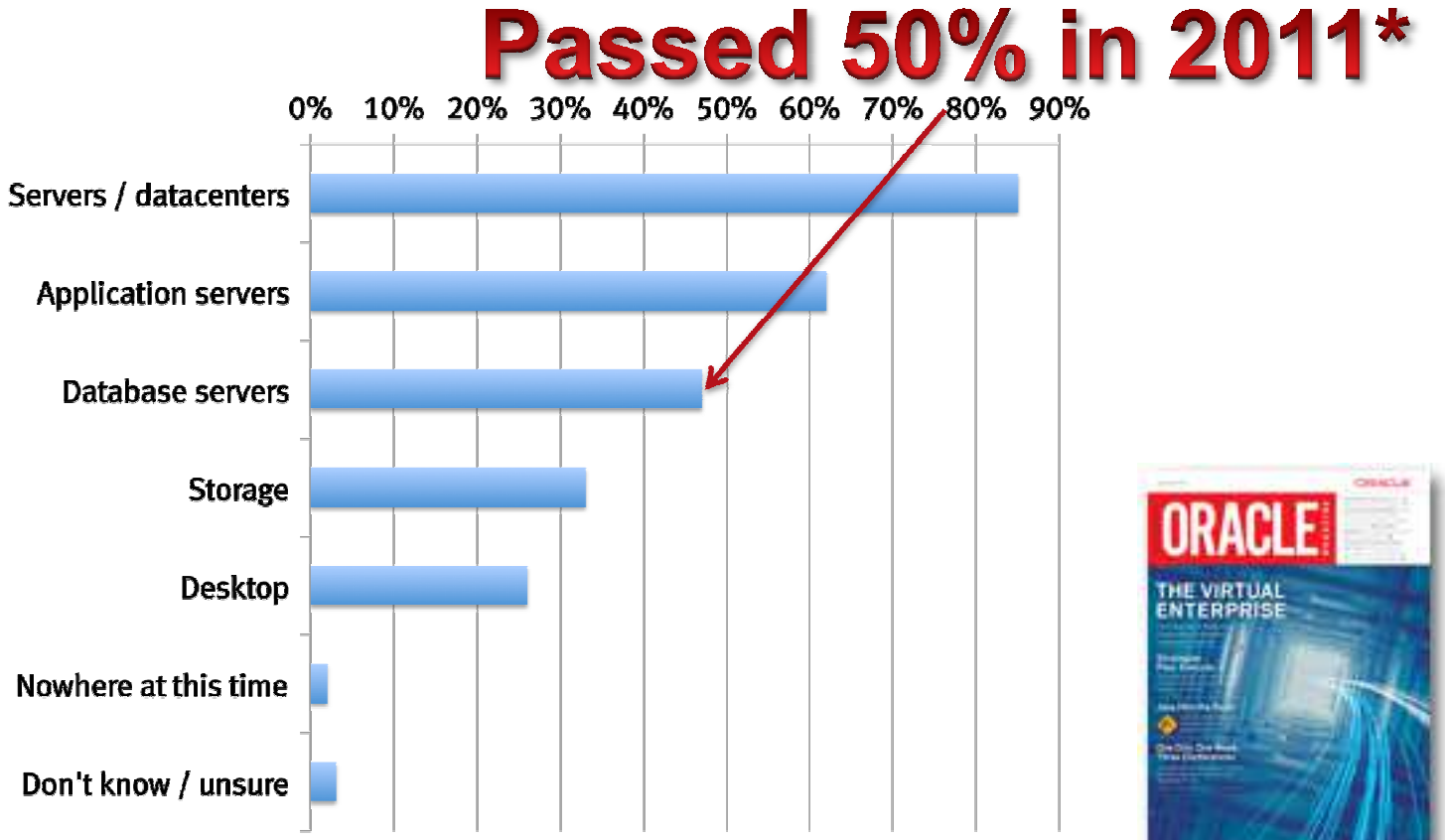
Virtualization is gaining momentum



Oracle Magazine
July / August 2010

Source: 2010 IOUG Enterprise Platform Decision Survey: Toward a Smarter Information Foundation

*Source: Paul Mauritz keynote, VMware vSphere 5 launch

Call to action

Follow the money!

Question:
Where do organizations spend most money in the Business Application stack?

Storage? Servers? Networks? Management tooling?

Call to action

Follow the money!

Application licenses: 20-40% ?

Database licenses: 20-40% ?

Infrastructure: ‹ 10% !
-Servers
-OS license
-Storage
-Networking
-Backup
-Tooling
-Etc.

If we can save 10% on db/application licenses…
We easily justified 50% more expensive infrastructure

Oracle database technology pricing

(List price, US$, as an example, street prices are lower)

	Named User Plus	Software Update License & Support	Processor License		Software Update License & Support
Database Products					
Oracle Database					
Standard Edition One	180	39.60	5,800		1,276.00
Standard Edition	350	77.00	17,500	PER CPU	3,850.00
Enterprise Edition	950	209.00	47,500		10,450.00
Personal Edition	460	101.20	-		-
Lite Mobile Server	-	-	23,000		5,060.00
Enterprise Edition Options:					
Real Application Clusters	460	101.20	23,000		5,060.00
Real Application Clusters One Node	200	44.00	10,000	PER CPU	2,200.00
Active Data Guard	200	44.00	10,000		2,200.00
Partitioning	230	50.60	11,500	PER CPU	2,530.00
Real Application Testing	230	50.60	11,500		2,530.00
Advanced Compression	230	50.60	11,500	PER CPU	2,530.00
Total Recall	120	26.40	5,800		1,276.00
Advanced Security	230	50.60	11,500		2,530.00
Label Security	230	50.60	11,500		2,530.00
Database Vault	460	101.20	23,000		5,060.00
OLAP	460	101.20	23,000		5,060.00
Data Mining	460	101.20	23,000		5,060.00
Spatial	350	77.00	17,500		3,850.00
In-Memory Database Cache	460	101.20	23,000		5,060.00
Retail Data Model	800	176.00	40,000		8,800.00
Communications Data Model	800	176.00	40,000		8,800.00
Database Enterprise Management					
Diagnostics Pack	100	22.00	5,000		1,100.00
Tuning Pack	100	22.00	5,000		1,100.00
Change Management Pack	70	15.40	3,500		770.00
Configuration Management Pack for Oracle Database	100	22.00	5,000		1,100.00
Provisioning and Patch Automation Pack for Database	70	15.40	3,500		770.00
Data Masking Pack	230	50.60	11,500		2,530.00

Licence for 1 cpu (core)

*You need one of these *per CPU core**

No options available for Standard Edition
So you need Enterprise Edition if you want to use options

Licence uplift for each option
you need another license *per CPU core*

Most customers have at least 5 options

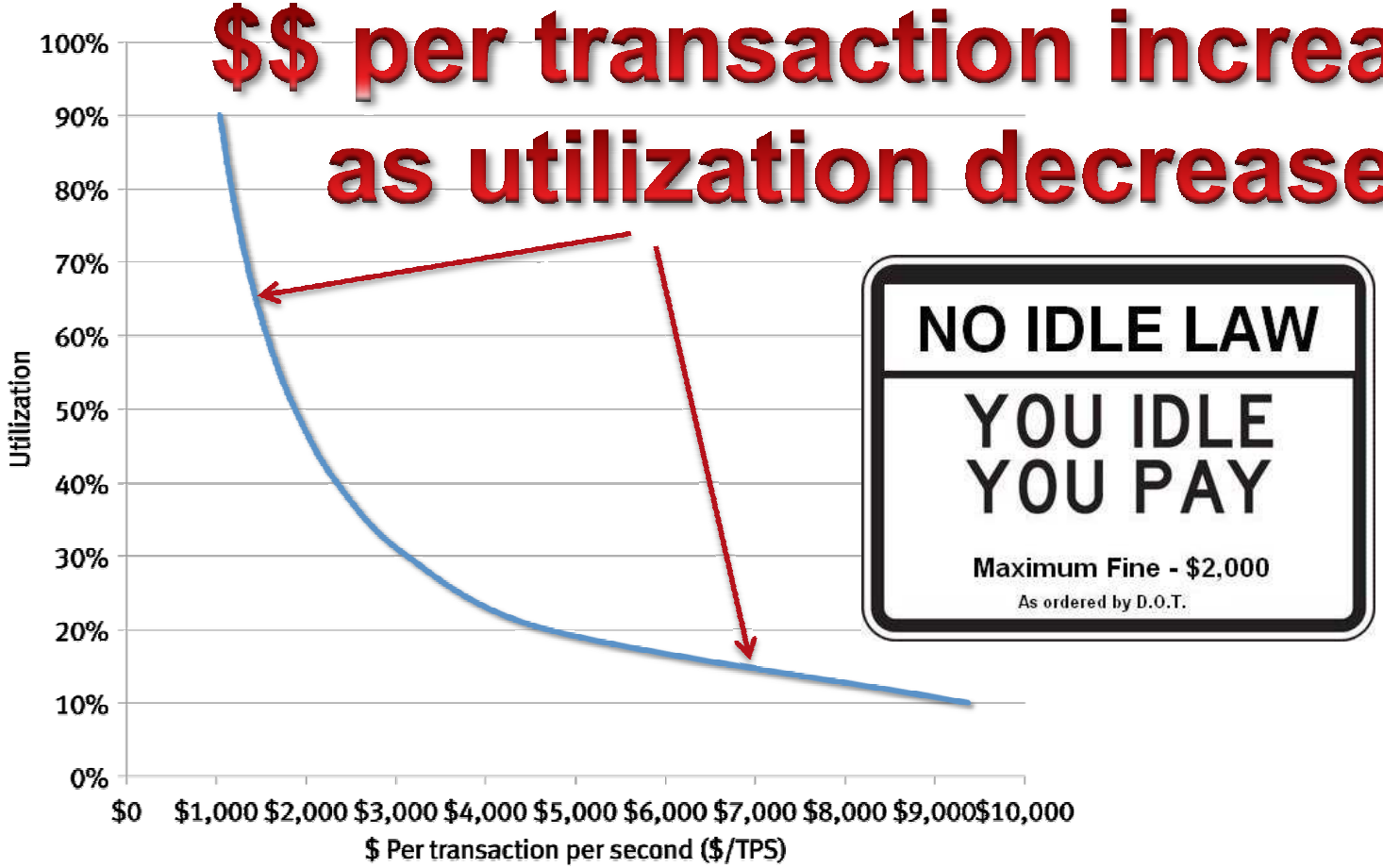
Licence costs

Questions:

- What's the cost of my server hardware?
- What's the cost of the DB CPU licences?
  (including DB options, maintenance, support)
- So what's the cost of a CPU cycle?
  (assuming 100% utilization)
- How much cycles are spent idling?
- How much cycles are spent on other tasks?

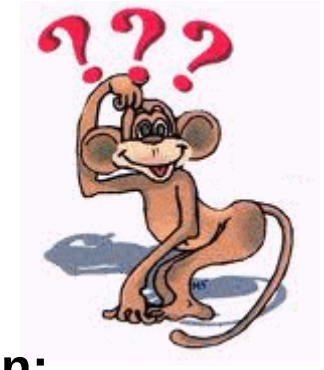
- So, what's my CPU ***licence*** utilization?

Transaction cost vs. utilization



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

DB server CPU creep



Easy question:

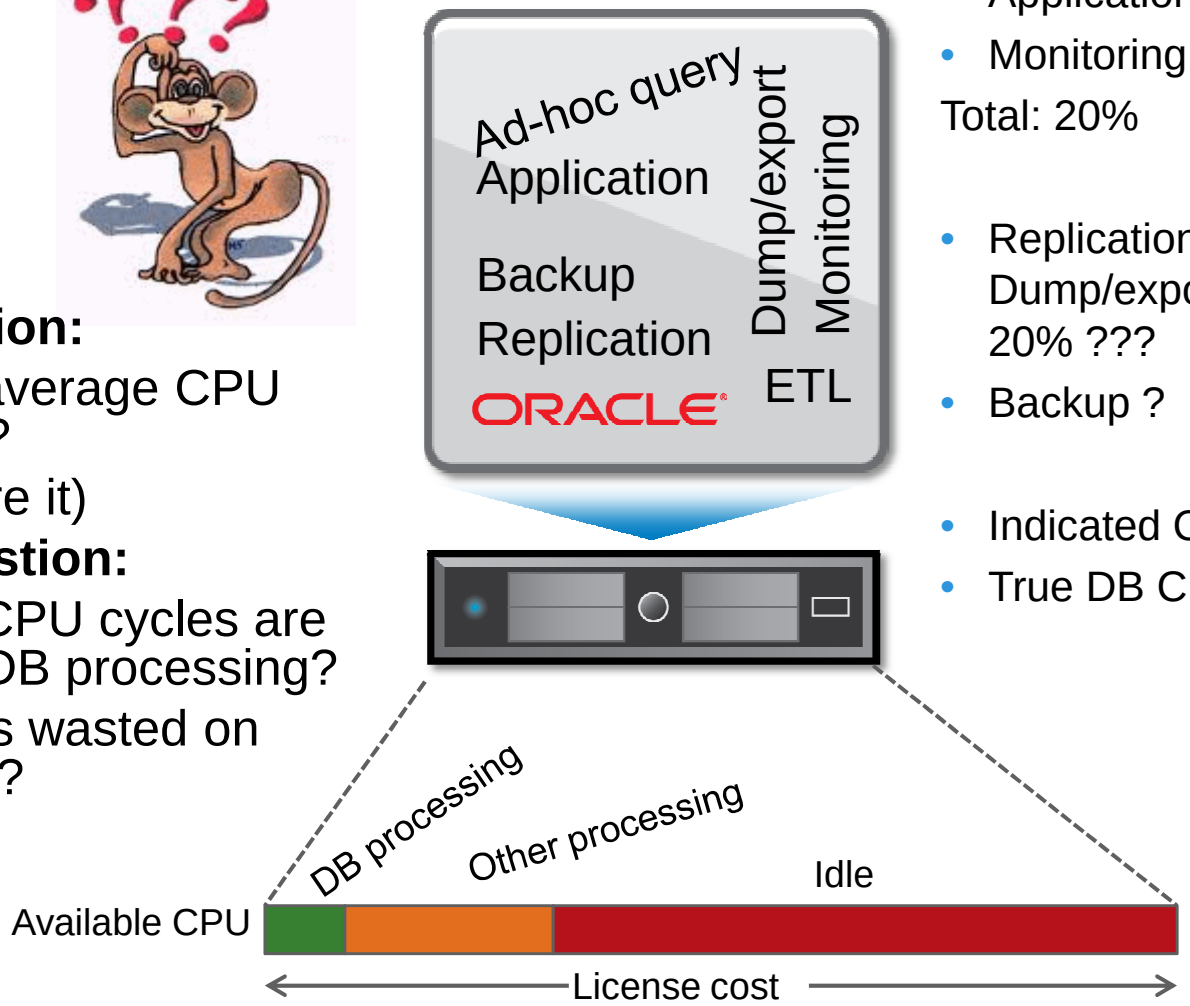
What's the average CPU utilization?

(just measure it)

Harder question:

How much CPU cycles are spent on DB processing?

How much is wasted on other stuff?



Example:

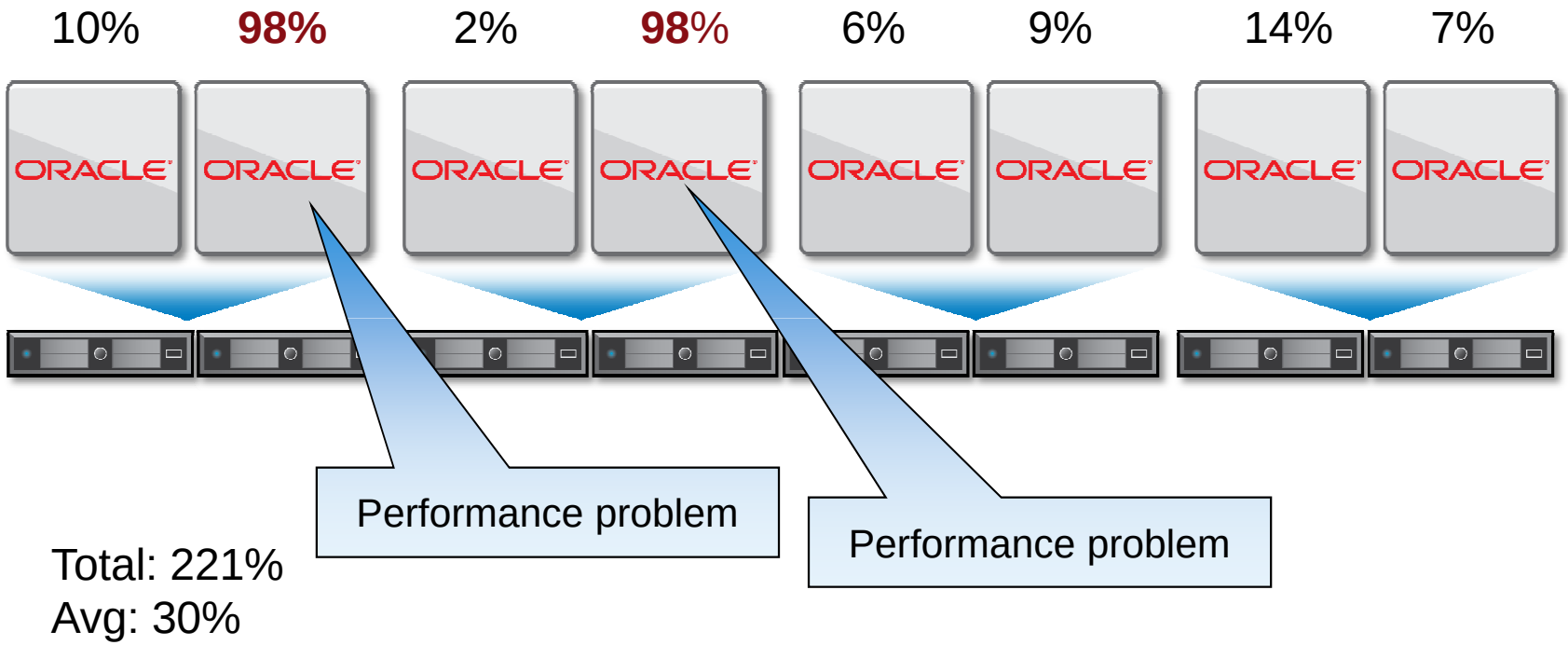
- Oracle DB processing: 10%
- Application: 8%
- Monitoring: 2%

Total: 20%

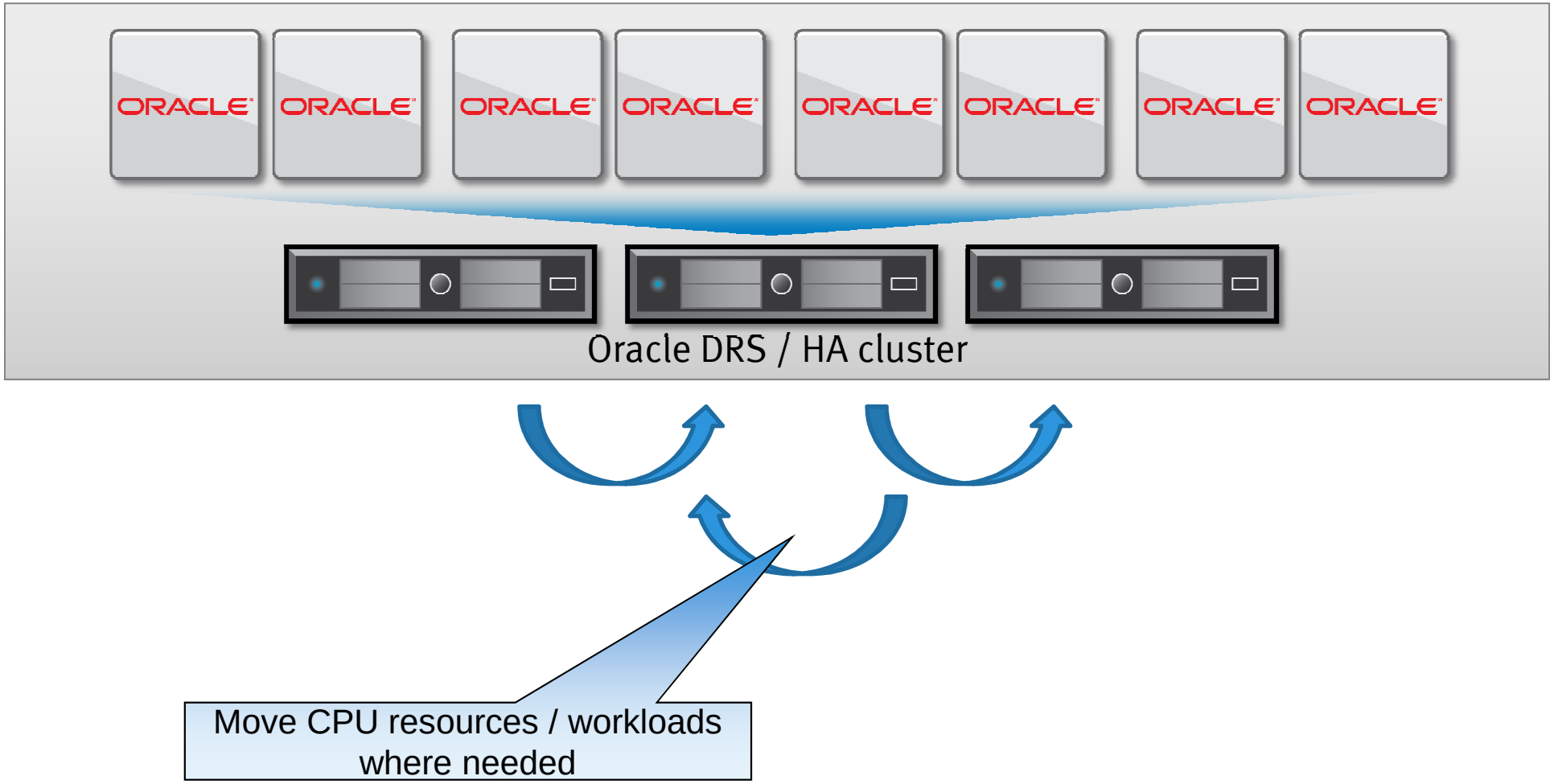
- Replication + ETL + Dump/export + Ad-hoc query: 20% ???
- Backup ?

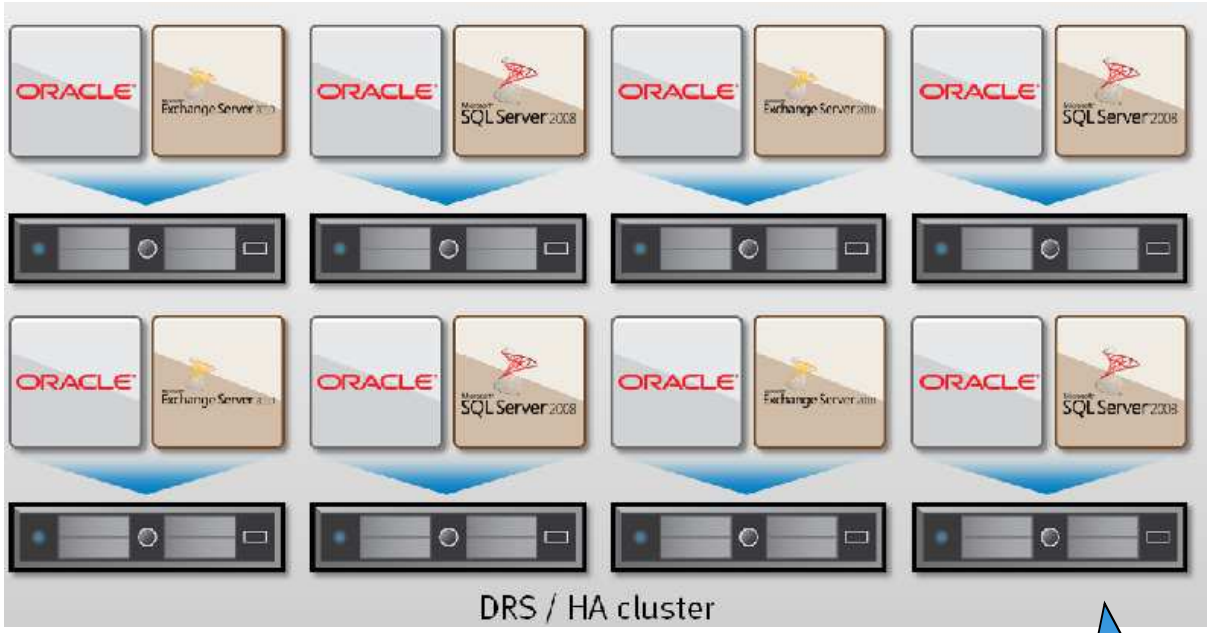
- Indicated CPU util: 40%
- True DB CPU util: 10%

Classic problem of resource management (applied to DB processing power)

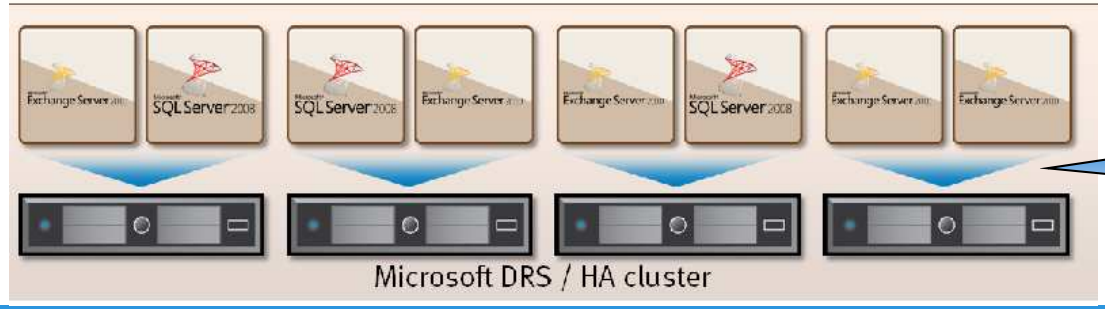


Resource Management (Vmware style)





Poorly managed licensing (Expensive)



Well managed licensing (Savings)

VIDEO

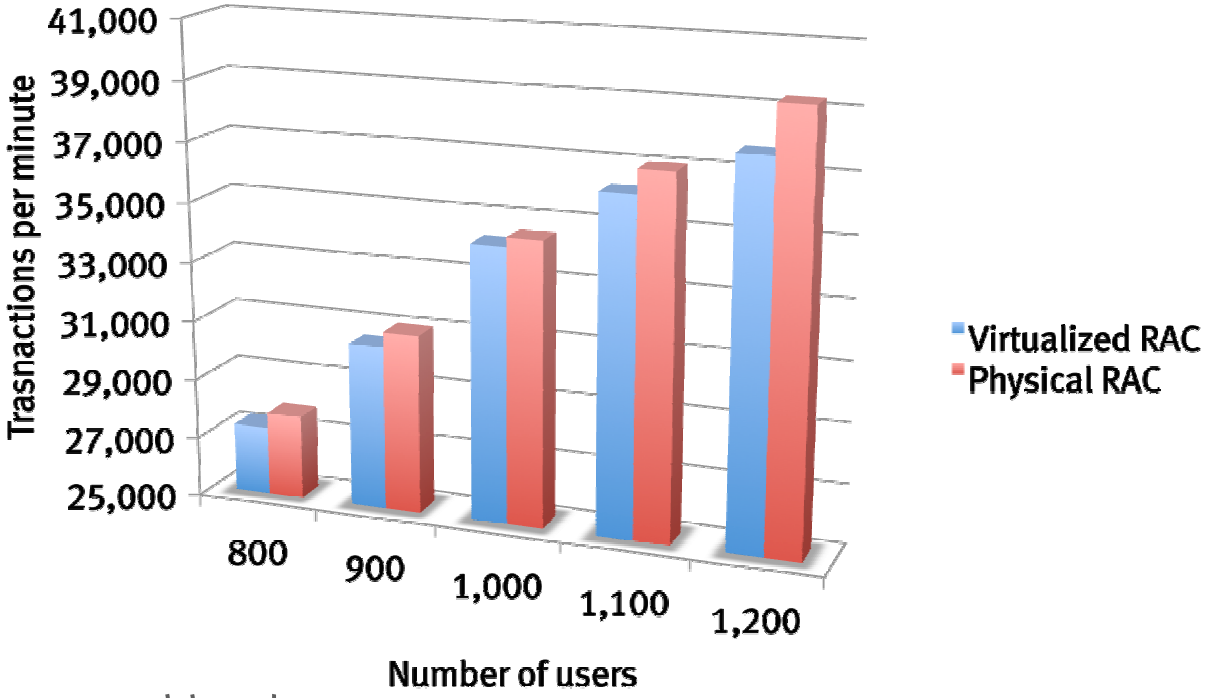
Virtualizing Oracle: Caging the Licensing Dragon
http://www.youtube.com/watch?v=FuXBMS2UwyE

Oracle's Richard Garsthagen on Oracle licensing with Vmware
http://www.licenseconsulting.nl/vmworld-richard-garsthagen-oracle-over-licenties-in-gevirtualiseerde-omgevingen/

Helping our customers save $$$

- Database servers are sized for peak loads
  - CPU Utilization typically less than 50% avg (or much lower)
  - **This is a complete waste of money!**
- Customers run other stuff on the same DB servers
  - App servers, replication, load / ETL processes, middleware,
  - Management agents, backup, ad-hoc queries, etc
- DB servers do not all peak at the same time
  - Dev vs Acceptance vs Prod
  - Batch vs OLTP vs load /ETL
- What if we could share CPU resources?
  - And dynamically move horsepower to production servers that require it
- Isn't this what virtualization is all about?
- Virtualize Oracle databases and save $$$$!!
  - Mostly on license cost
  - But: hard to measure/justify

Physical & virtual Oracle RAC comparison



- OLTP database workload
- SAN / RDM (storage config 1)
- Virtual environment delivered performance consistently within 4% of physical environment
  - NFS / dNFS difference is higher (see previous slide)

Oracle Performance on VMware– an issue?

From: De Witte, Eric Sent: Tue 1/31/2012 2:03
To: Sjerps, Bart
Cc:
Subject: Oracle on Vblock

Bart,

FYI, we have sold 2 Vblocks 300 GX in Luxemburg. Part of the acceptance criteria during the POC was Oracle performance.

They were running Oracle natively on Linux on Dell Egenera blades connected to DMX 4.

For the test they recorded user activity on Oracle instances for 4-8 hours, then exported the DB/app to VMs on the Vblock and replayed the activity again to compare performance.

The Virtual instances performed between 30 and 50 % faster than the native instances. ;)

Best regards,

De Witte Eric
vSpecialist Technical Lead, EMEA-North

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. No limitation on use or distribution.

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

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VMWare extended support onOracle

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

STOP IDLING
START SAVING

EMC: #1 IN DATABASE
VIRTUALIZATION
EMC²
where information lives®

Case study

Oracle 11*i* eBusiness Suite: Replatform

- One of the largest single global instances of Oracle 11*i*
- Core mission-critical applications
- 75+ application tiers – VMware/RHEL
- Oracle Database 10*g* R2
- 8 TB database; 8.8 billion rows of data
- 52 million transactions per day
- 79K IOPS
- 40K blocks per second interconnect traffic
- 40,000+ named users
- 4,000+ peak concurrent users

EMC²
where information lives

EMC IT: Replatform

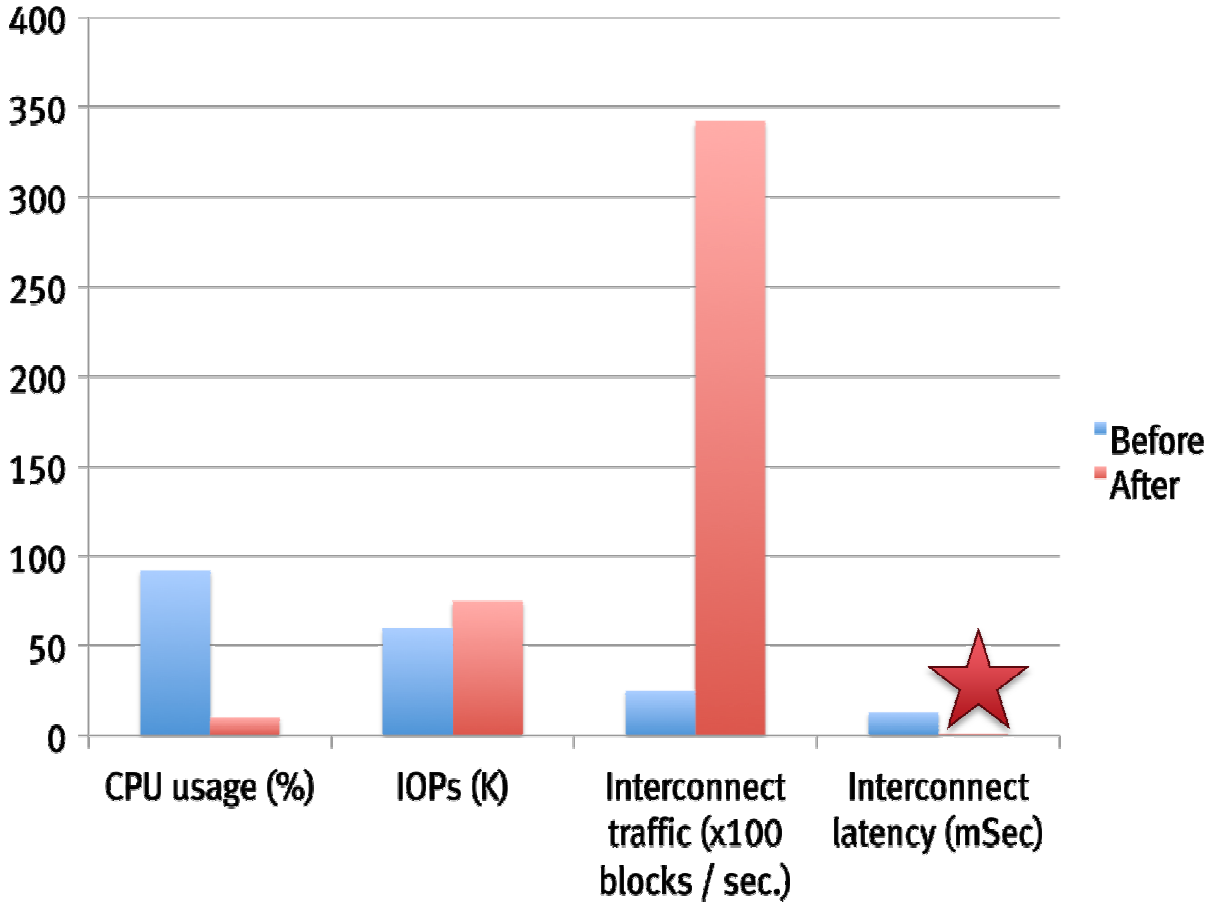
Sun Fire Server

- Sun Fire E25K
- UltraSPARC IV processor
- CPU – 224 Cores
- CPU utilization 80%
- OS – Solaris 10
- Storage – Symmetrix DMX-3

Unified Computing System

- Cisco UCS B440
- Intel Nehalem EX processor
- CPU – 128 Cores
- CPU utilization 10%
- OS – Red Hat Linux / vSphere
- Storage – Symmetrix VMAX

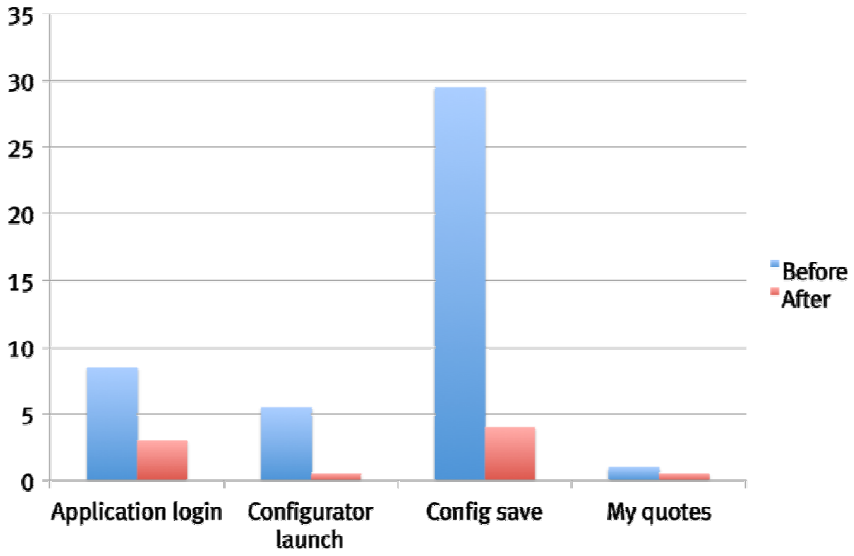
EMC IT:
11*i* system performance statistics



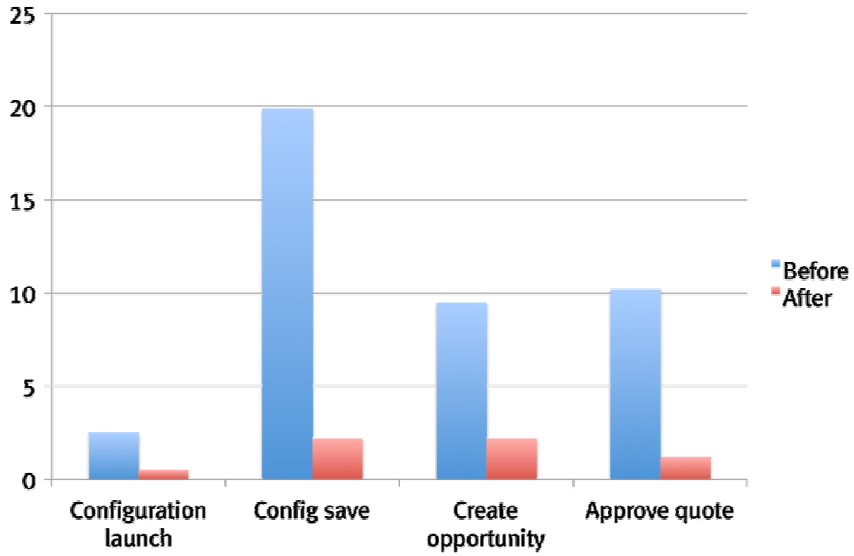
50%-90% reduction in times for online transactions (i.e. 2-10 times faster)

EMC IT:
11*i* performance improvements - online

CXP transaction times (sec)



DXP transaction times (sec)



EMC IT updates: Underway today

CISCO Unified Computing System

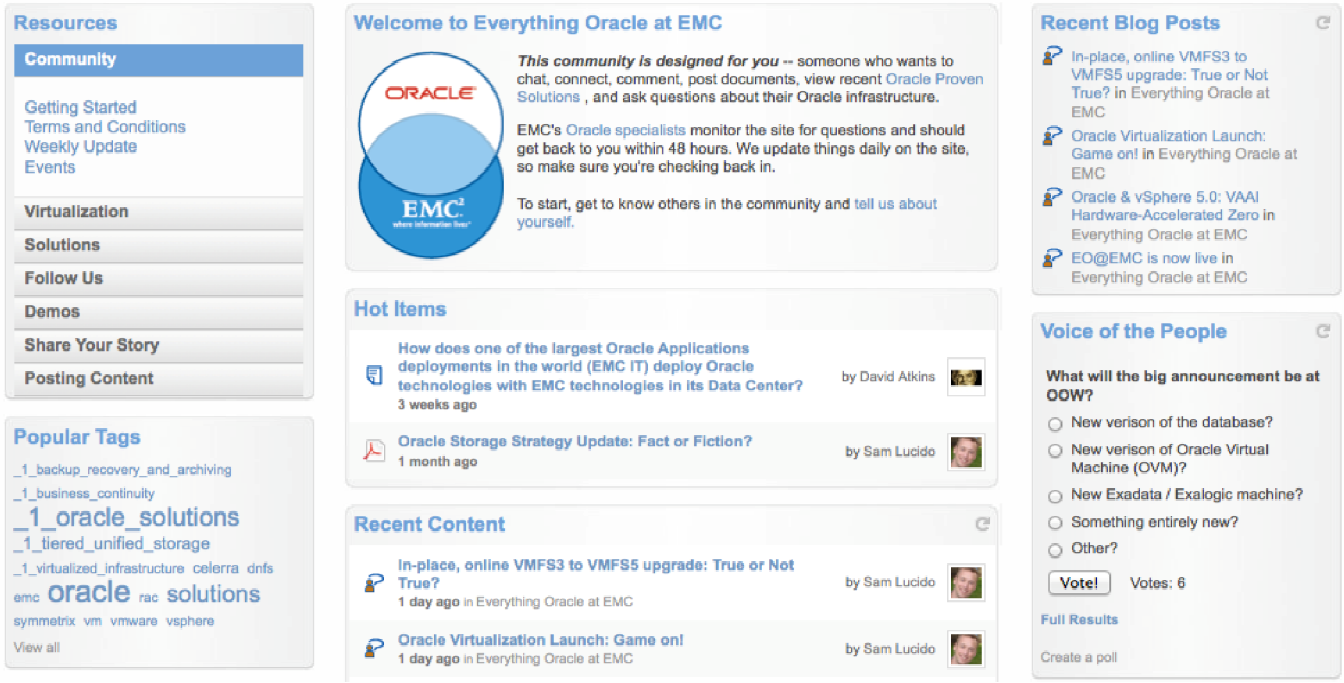
- Cisco UCS B440
- Intel Nehalem EX processor
- CPU – 192 cores
- CPU utilization 10%
- OS – Red Hat Linux / vSphere*
- Storage – Symmetrix VMAX

vSphere 5.0:
32 cores per VM

Moved to 128 cores
4 x B440 blades

EMC² where information lives

New EMC Community Network
Everything Oracle at EMC (EO@EMC) site



- Provides a focal point for all of EMC's Oracle-related activities
- EMC's Oracle-related Proven Solutions content now publicly available and searchable on Google
- Go to:http://community.emc.com/community/connect/everything_oracle

References

Blog
http://bartsjerps.wordpress.com

Blog post on Oracle/Vmware licencing (and how to save money):
http://bartsjerps.wordpress.com/2011/11/09/oracle-vmware-licensing-cost-savings/

Everything Oracle @ EMC (community):
https://community.emc.com/community/connect/everything_oracle

EMC Resource library (whitepapers):
http://www.emc.com/resource-library/resource-library.esp
(search “oracle” and check “whitepapers”)

Thank You