Oracle Solutions on Top of VMware vSphere 4

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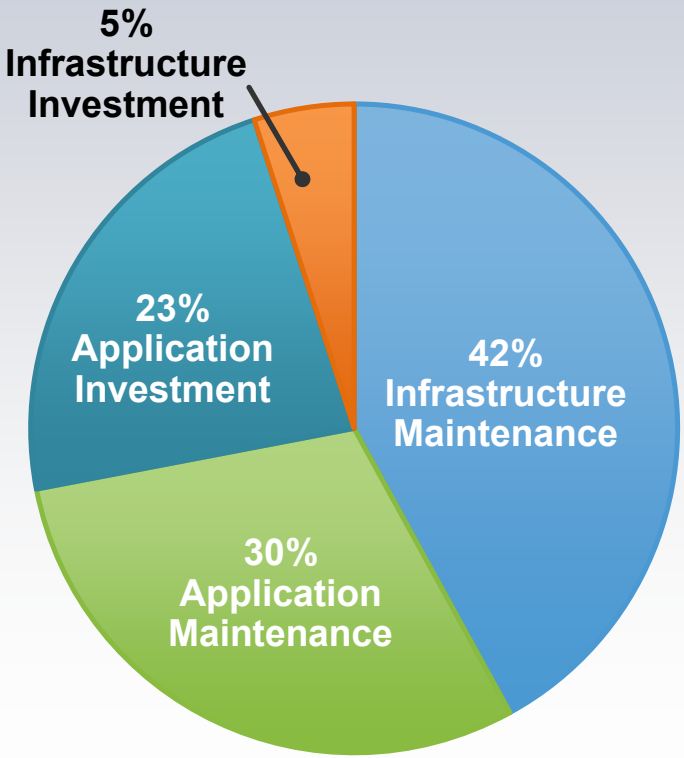
VMware Adriatic

The Problem

Where the IT Budget Goes



Your Business Can Change Only as Fast as Your IT Can

Overwhelming complexity

>70% of IT budgets just to keep the lights on

<30% of IT budgets goes to innovation and competitive advantage

Why Deploy Oracle Products on VMware?

Performance

Match Native Performance Even in Consolidation Scenarios

- 95%+ Oracle instances match native performance on VMware

Oracle Licensing

Virtualization-Friendly Licensing

- Increase utilization of Oracle licenses

Consolidation

Reduce HW and SW costs by >50%

- Consolidate servers by 4X – 20X, consolidate licenses

App Delivery

Accelerate Application Delivery

- Provision On-Demand (production and test / dev)

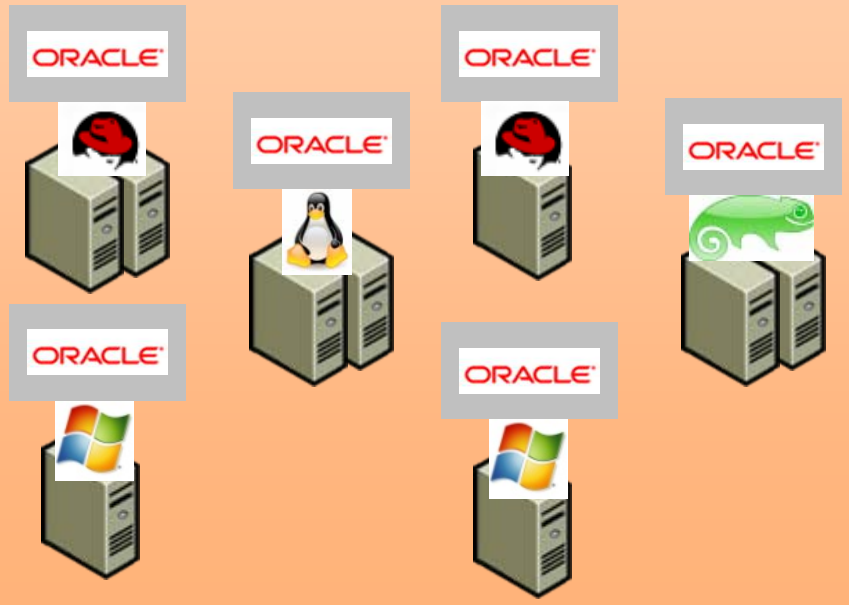
App QoS

Increase Application QoS

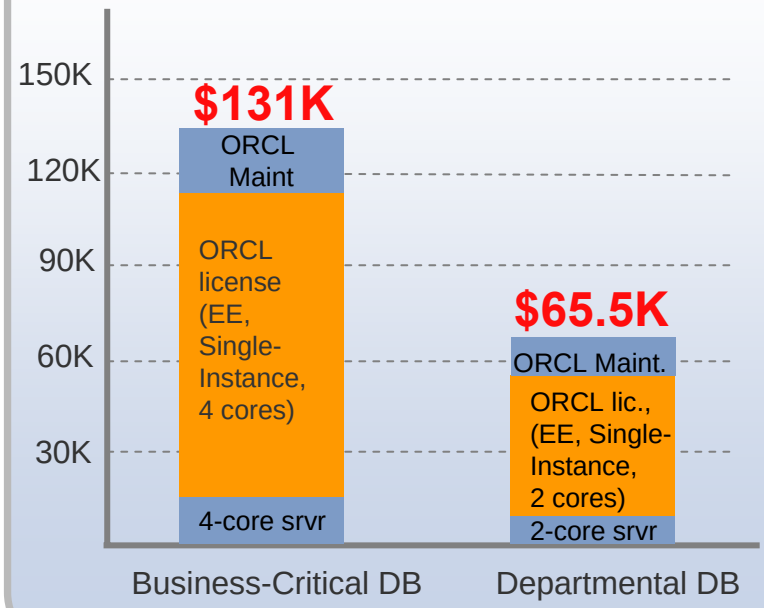
- Scale dynamically
- Built-in High Availability and simple Disaster Recovery

The Challenge: Database Sprawl and Costs

Too many small to mid-sized Oracle…
~ 4% of x86 servers



… And very high cost per instance (SW and HW)

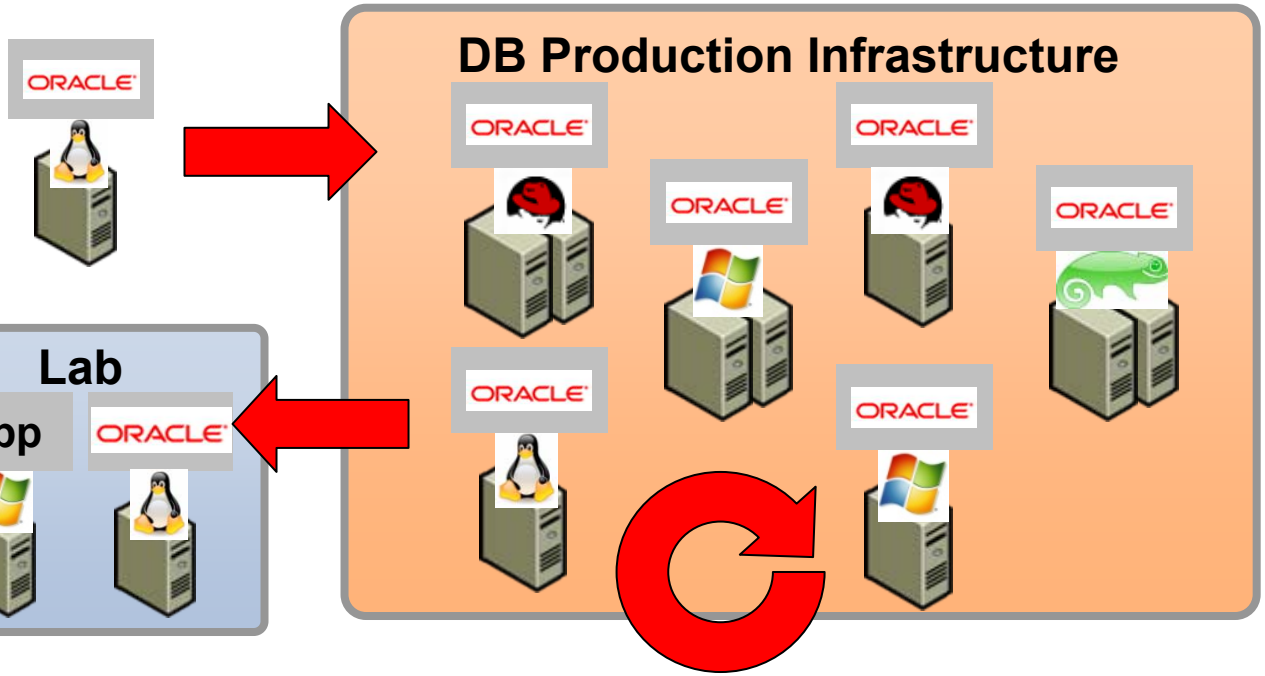


Low utilization of HW and SW 5%-15% range (average ~6%)[1]
Intense over-provisioning due to extremely-conservative sizing

[1] *VMware Capacity Planner*, 700K+ servers surveyed through 3/2009

Database Operational Challenges

Slow provisioning
- Weeks or months lead time for new DB

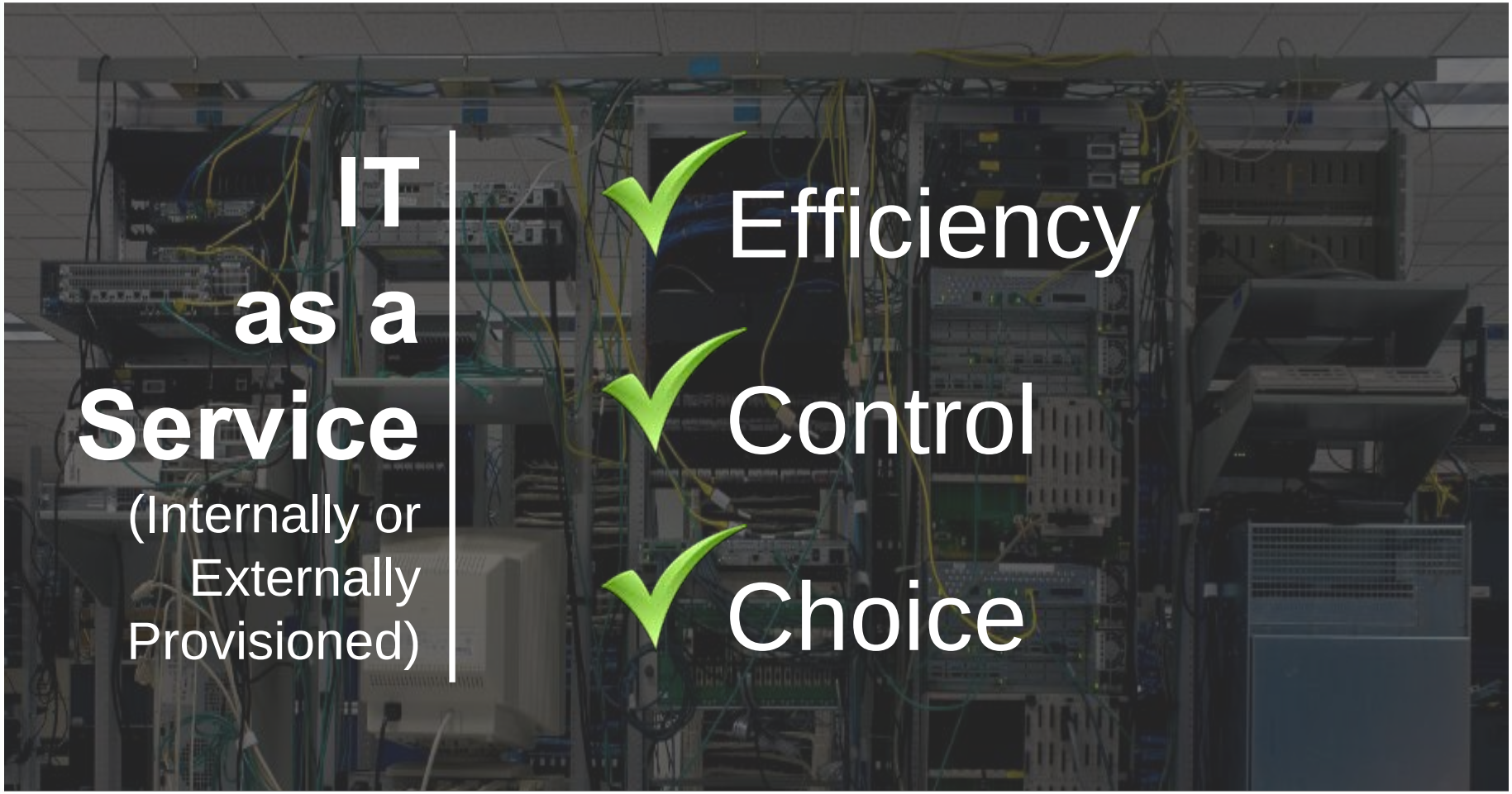


Inefficient testing
- Overhead and time to clone from production to lab

High Availability not offered for all DBs
- HA / DR complex and expensive
- Many unprotected DB instances

Difficult to size and scale
- Re-sizing DB highly disruptive
- Over-provisioning to compensate for future requirements

The Goal


IT as a Service
(Internally or Externally Provisioned)
Efficiency
Control
Choice

VMware ESX: Even More Reliable than a Mainframe!

Redmondmag.com

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Feature

The 2008 Editors' Choice Awards

Here are our selections for the products we believe you just can't live without.

by Lafe Low
January 2008

Cra
The
refl
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ou
pro
that's delivered on time
streamline operations,
opportunities.

For this Editors' Choice
feature or function. Ther
management tool. Inste
mean to our expert edit

Let us know how our ex
you use in your everyda

Most Reliable

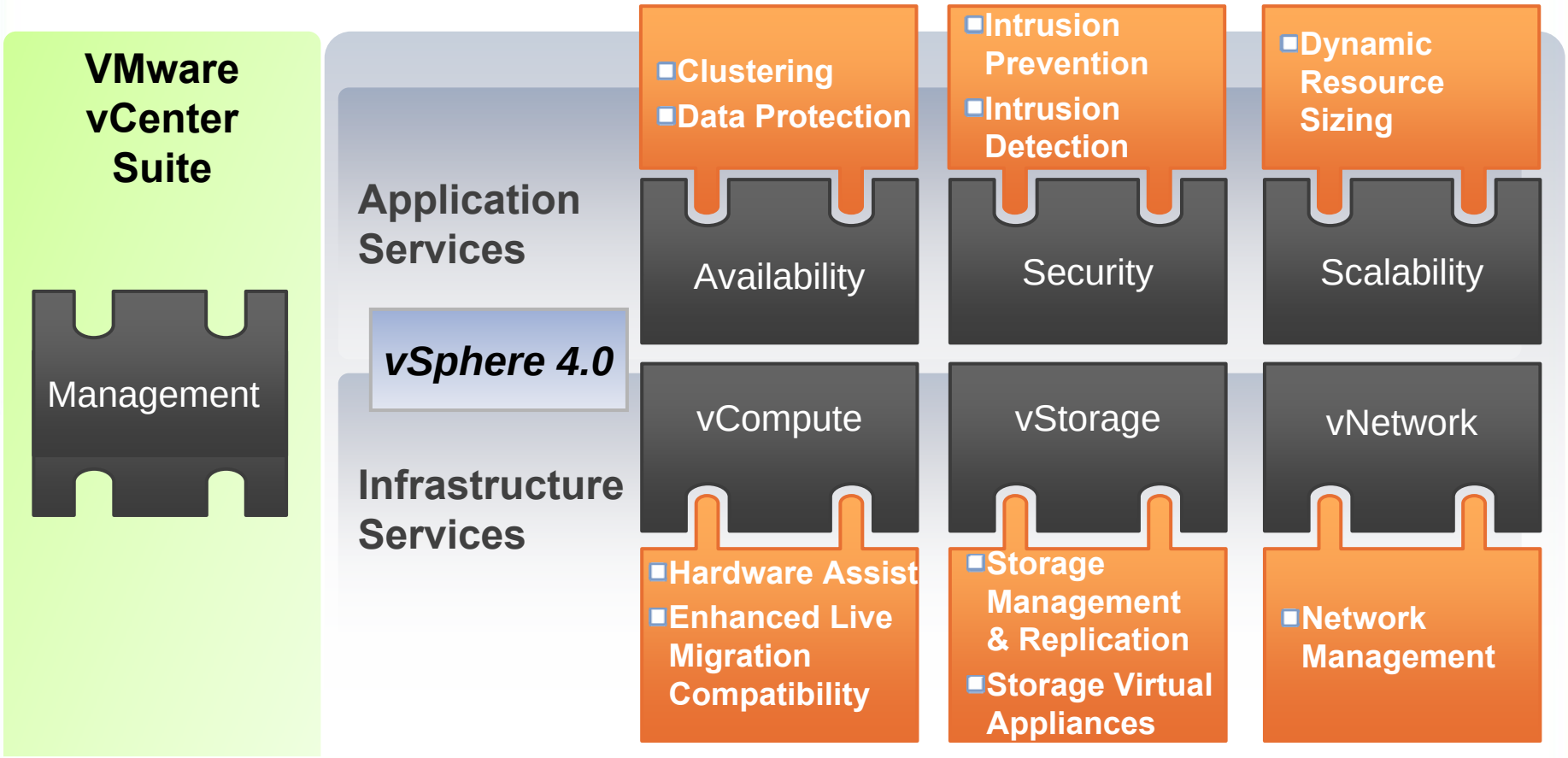
This is the "accidentally built a wall around it and forgot it was there" kind of reliable:

1. VMware ESX: The least stable part of ESX is usually the administrator. The code is virtually bomb-proof.

2. IBM mainframes: They've been running for more than 50 years, and probably will for another 50.

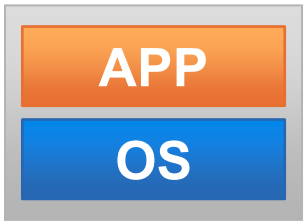
3. DOS 6.2: One company had a DOS machine with a terminal emulator connected to a remote customer. It downloaded thousands of invoices per month and delivered them to a file share. The box was never rebooted and was found behind a filing cabinet when the company moved.

VMware vSphere™ – The Industry's First Cloud Operating System

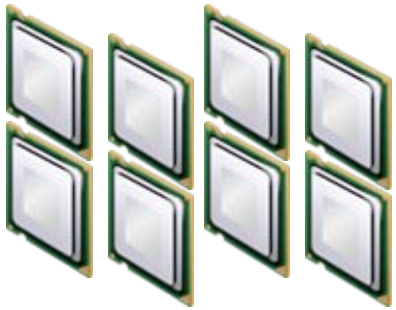


Scalability Improvements in VMware vSphere 4

VMware vSphere 4 Dramatically Improves VM Scalability



255 GB



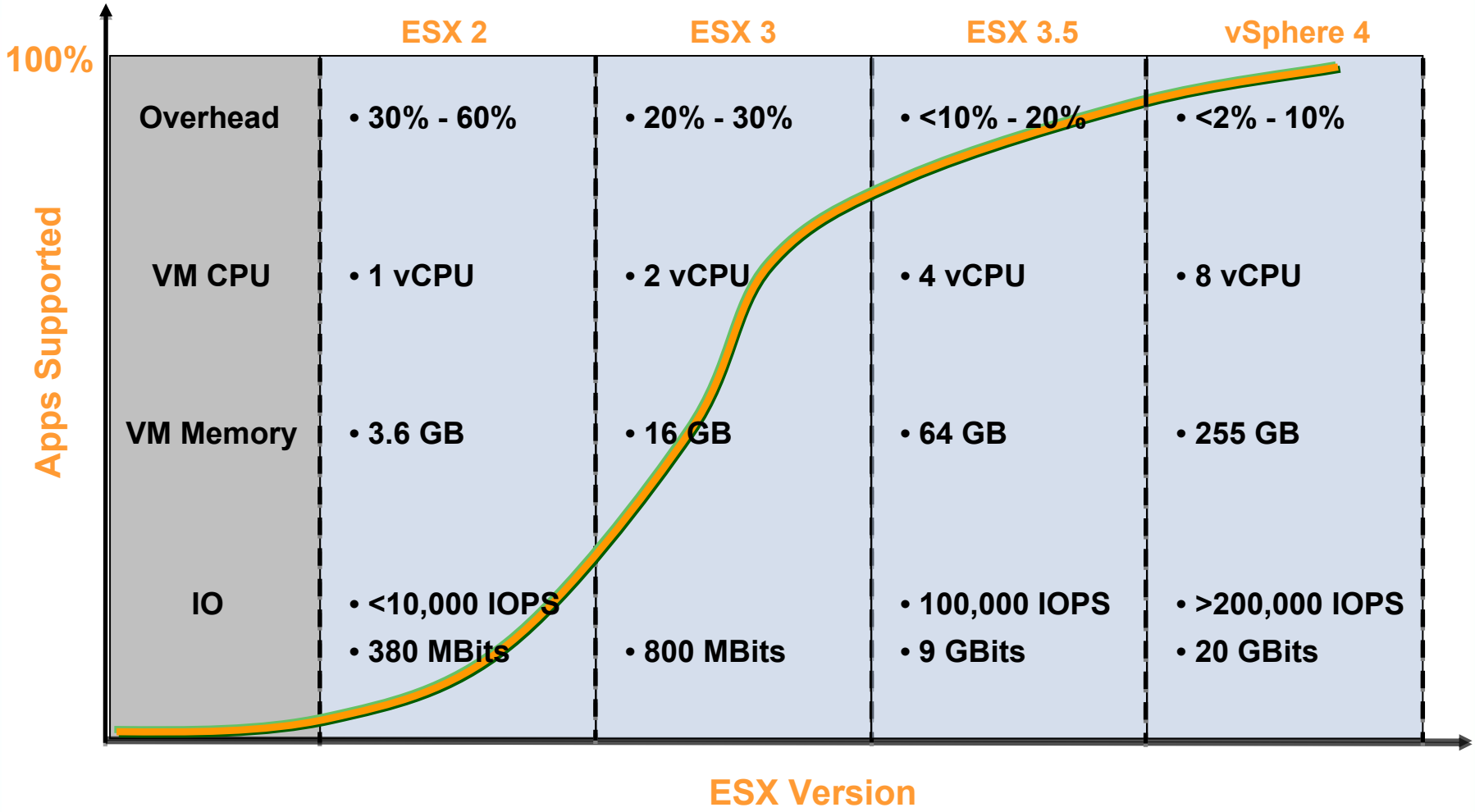
8 vCPUs

- Scalable virtual machines
- Hot add of
  - CPU
  - Memory
- Hot add and remove
  - Storage devices
  - Network devices
- Hot Extend virtual disks
- Zero downtime scale out of virtual machines

DRS Ensures Capacity on Demand

- Shrink and grow of applications based on demand and priority
- Dynamic and responsive load balancing

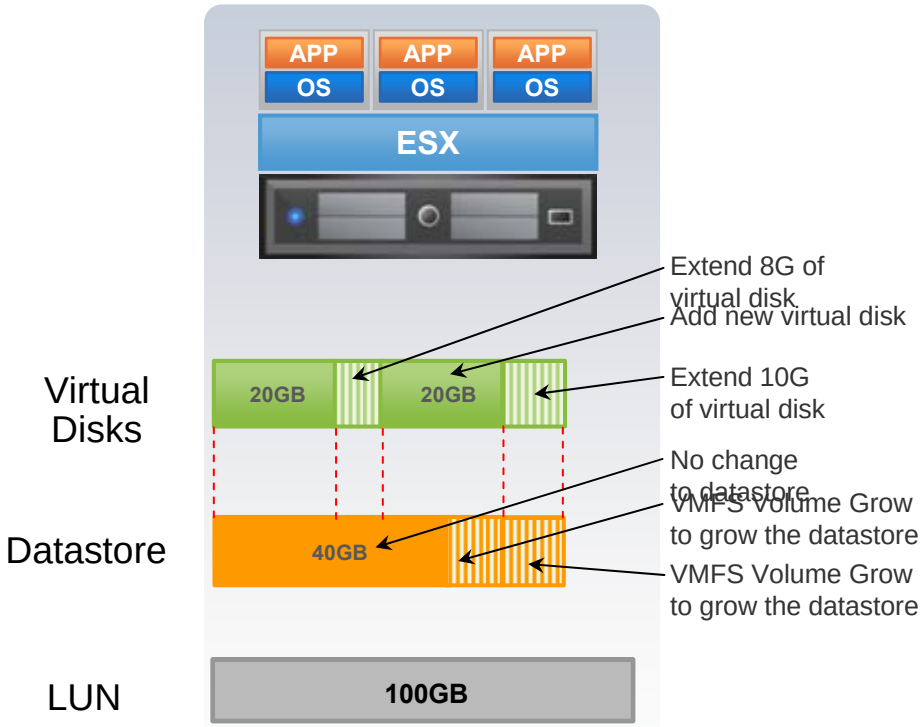
>95% of Applications Match or Exceed Native Performance on VMware Infrastructure



Source: VMware Capacity Planner analysis of > 700,000 servers in customer production environments

Enhanced Storage Capabilities

Efficient Storage Abstraction with VMFS



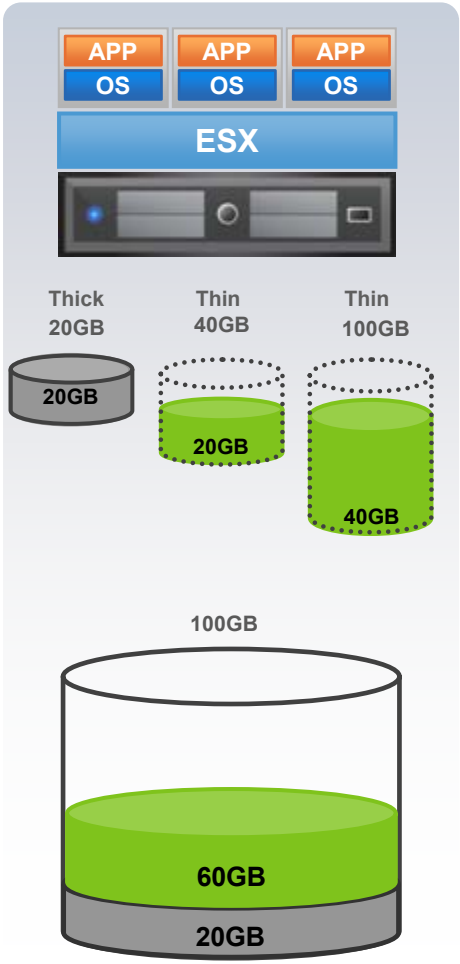
Hot Virtual Disk Extend

- Expand virtual disks online
- Respond quickly to growing requirements without downtime

VMFS Volume Grow

- Expand VMFS Volume on the same LUN it was created
- Facilitate adding more virtual machines to an existing volume
- Facilitate data growth for the virtual machines
- Increase flexibility to simplify capacity planning

vStorage Thin Provisioning

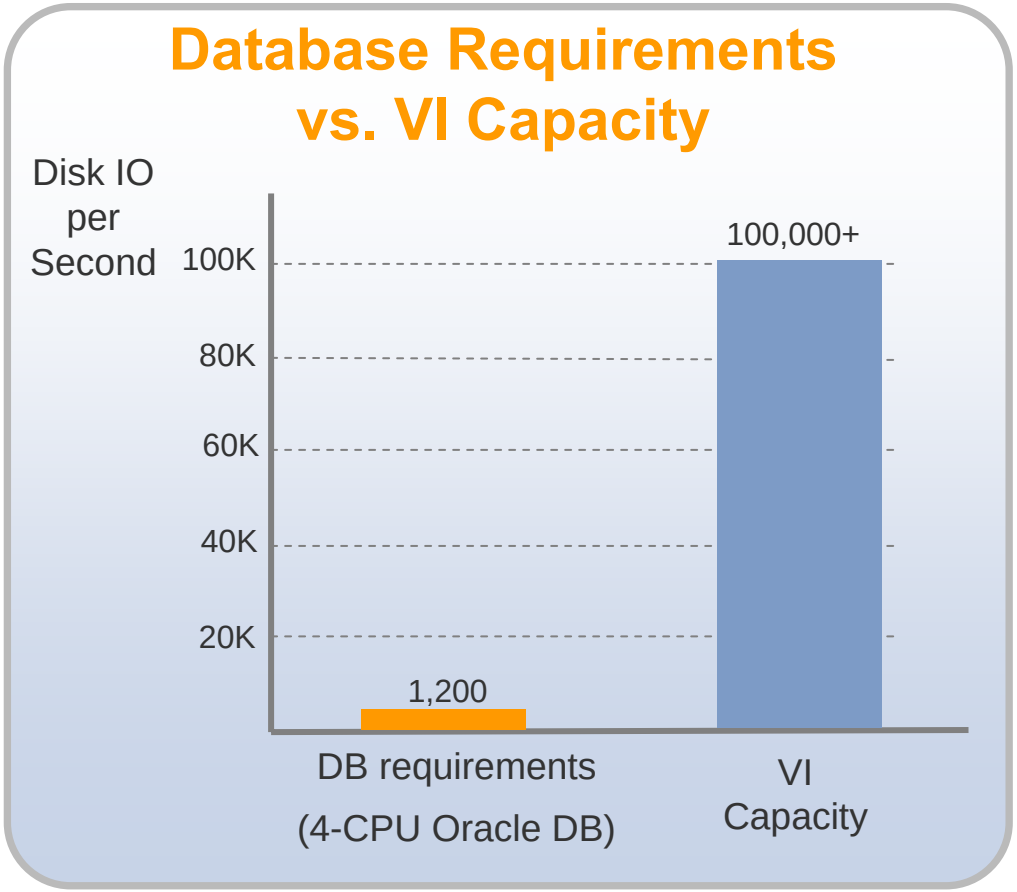


- Virtual machine disks consume only the amount of physical space in use
  - Virtual machine sees full logical disk size at all times
  - Full reporting and alerting on allocation and consumption
- Significantly improve storage utilization
- Eliminate need to over-provision virtual disks
- Reduce storage costs by up to 50%

vStorage API Categories

vStorage API	Toolkit name	Details
Management	**vSphere SDK**	• For storage management vendors • Provide end-to-end mapping from VM to disk drive for troubleshooting, trending, utilization, monitoring
Data Protection	**Virtual Disk Dev Kit (VDDK), vSphere SDK**	• Targeted at backup software vendors • Enable scalable LAN-free backups
Site Recovery Manager	**SRM Adapter**	• Leverage array-based replication in automated DR solution • Detect which VMs are getting replicated, automated LUN promotion
Multipathing	**PSA Kernel Module Dev Kit (PSA KMDK)**	• For array vendors • Enable array compatibility, multipath i/o optimization
Array Integration	**vStorage APIs for Array Integration (VAAI)**	• Speed up common vStorage operations by leveraging array-based copy & clone operations • Improve storage management experience for thin-provisioned LUNs

I/O Usage of Oracle DBs



VMware can drive far more IO than average Oracle DB

It would take 80 average Oracle servers to fully load ESX

Source: VMware Capacity Planner analysis of > 700,000 servers in customer production environments

Oracle Workload: Results @ Peak

- The VM throughput was 85% of native throughput
- Impressive in light of the heavy kernel mode content of the benchmark
- Results summary for the 8-vcpu VM:

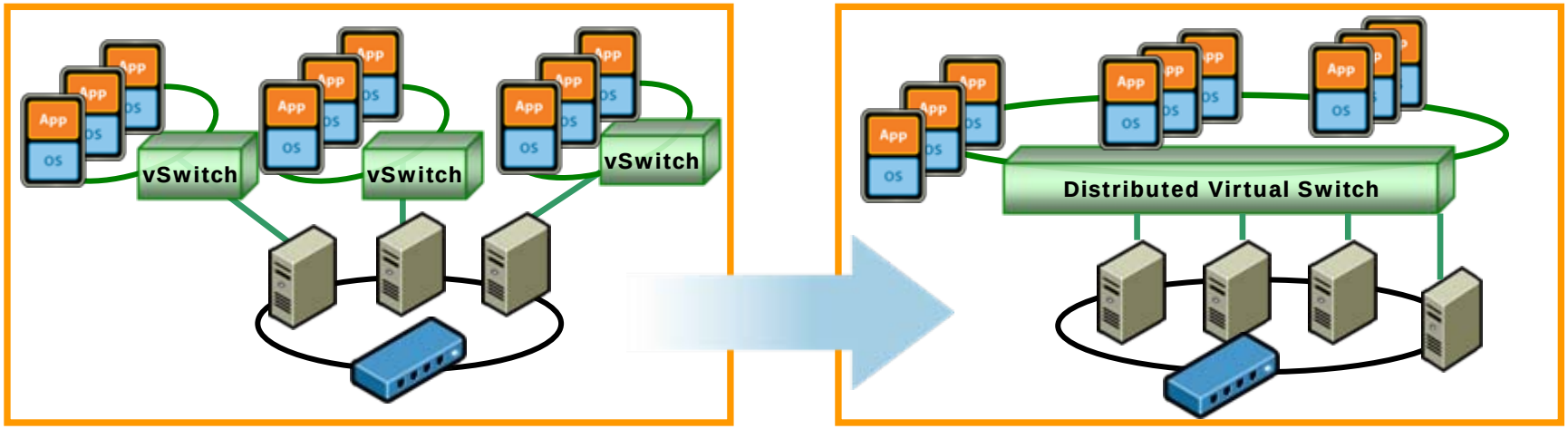
Configuration	Native	VM
Throughput in business transactions per minute	**293K**	**250K**
Disk IOPS	**71K**	**60K**
Disk Megabytes/second	**305 MB/s**	**258 MB/s**
Network packets/second	**12K/s send/ 19K /s receive**	**10K/s send/ 17K /s receive**
Network bandwidth/second	**2.5MB/s send 6.6MB/s receive**	**2.1MB/s send 5.6MB/s receive**

VMware vSphere 4 Networking Improvements

vNetwork Distributed Switch Benefits

VI3 Networking

vSphere 4 Networking



- Dramatically simplifies datacenter administration
- Enables networking statistics and policies to migrate with virtual machines (Network VMotion)
- Provides for customization and third-party development

Third-Party Distributed Switches

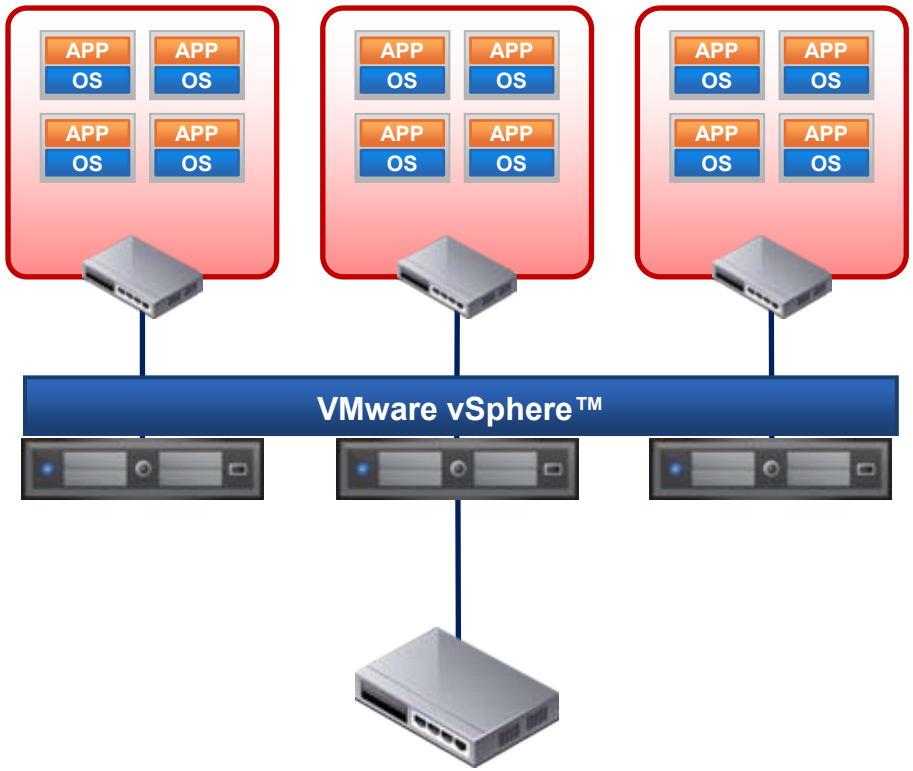
- Aggregated datacenter level virtual networking
- Simplified setup and change
- Easy troubleshooting, monitoring and debugging
- Enables transparent third party management of virtual environments

CISCO

vNetwork Appliance APIs allow third-party developers to create distributed switch solutions.

Security with vSphere 4

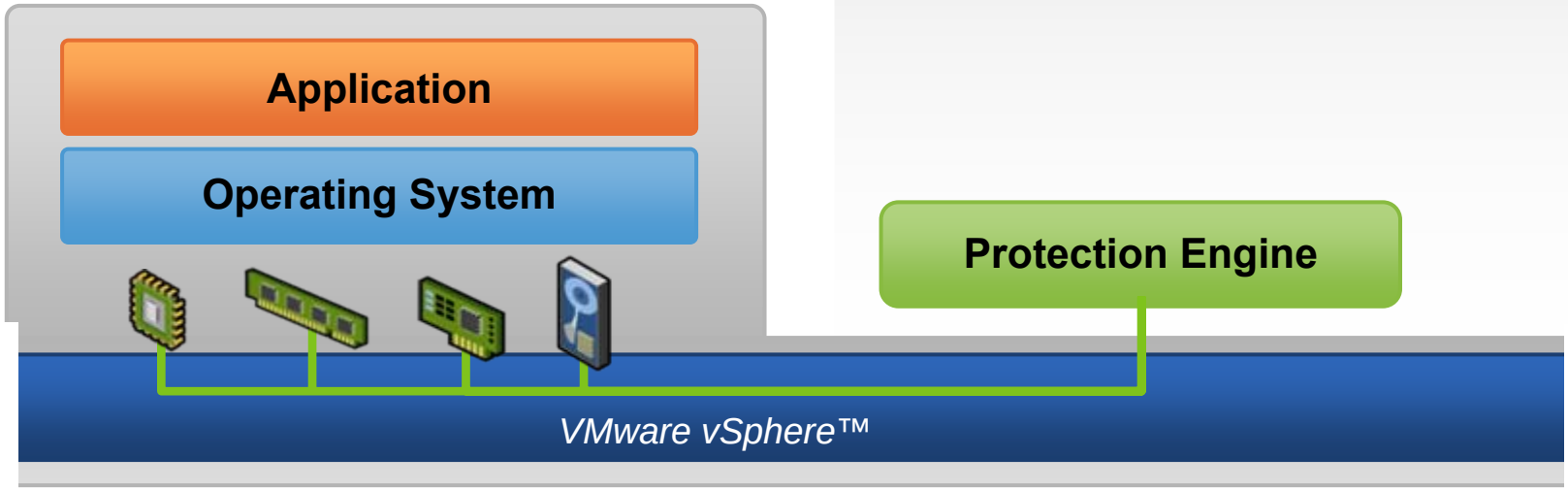
VMware vShield Zones



- Self-learning, self-configuring firewall Service
- VMotion and network-configuration aware trust zones
- Dynamic firewall policy using application protocol awareness
- Dynamic security capacity using infrastructure vServices
- Security policies auto-adapt to network reconfiguration or upgrades

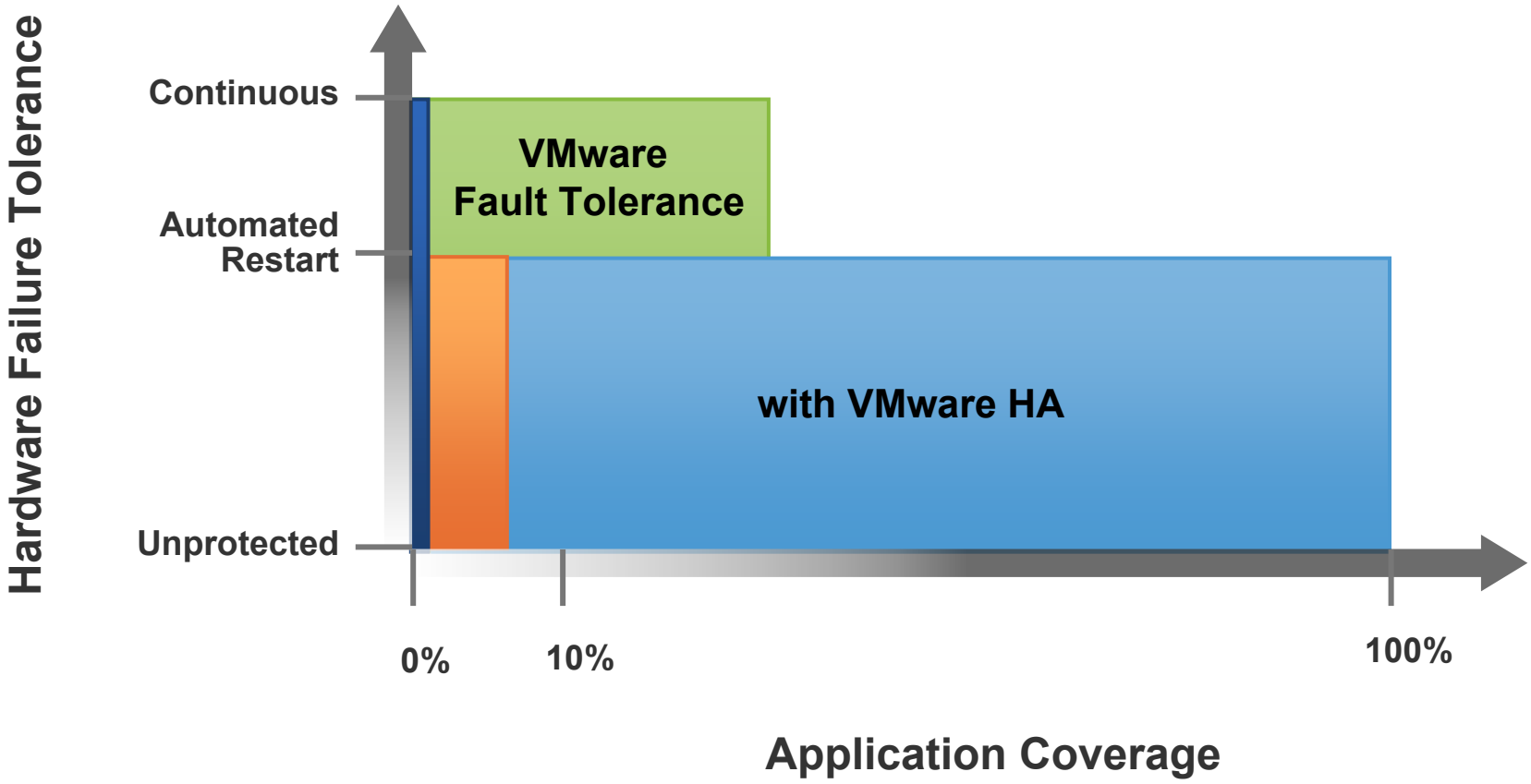
VMware VMsafe

- API that enables protection of VMs by inspection of virtual components in conjunction with hypervisor
- Isolation of protection engine from malware
- Broad ranging coverage of virtual machine CPU, memory, storage and network

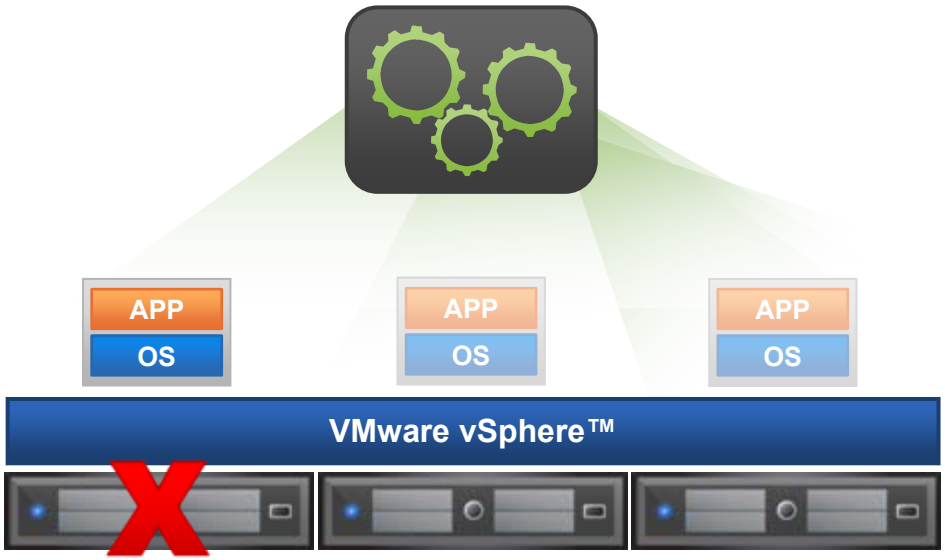


VMware vSphere 4
High Availability

Next Generation High Availability Service Levels



VMware Fault Tolerance

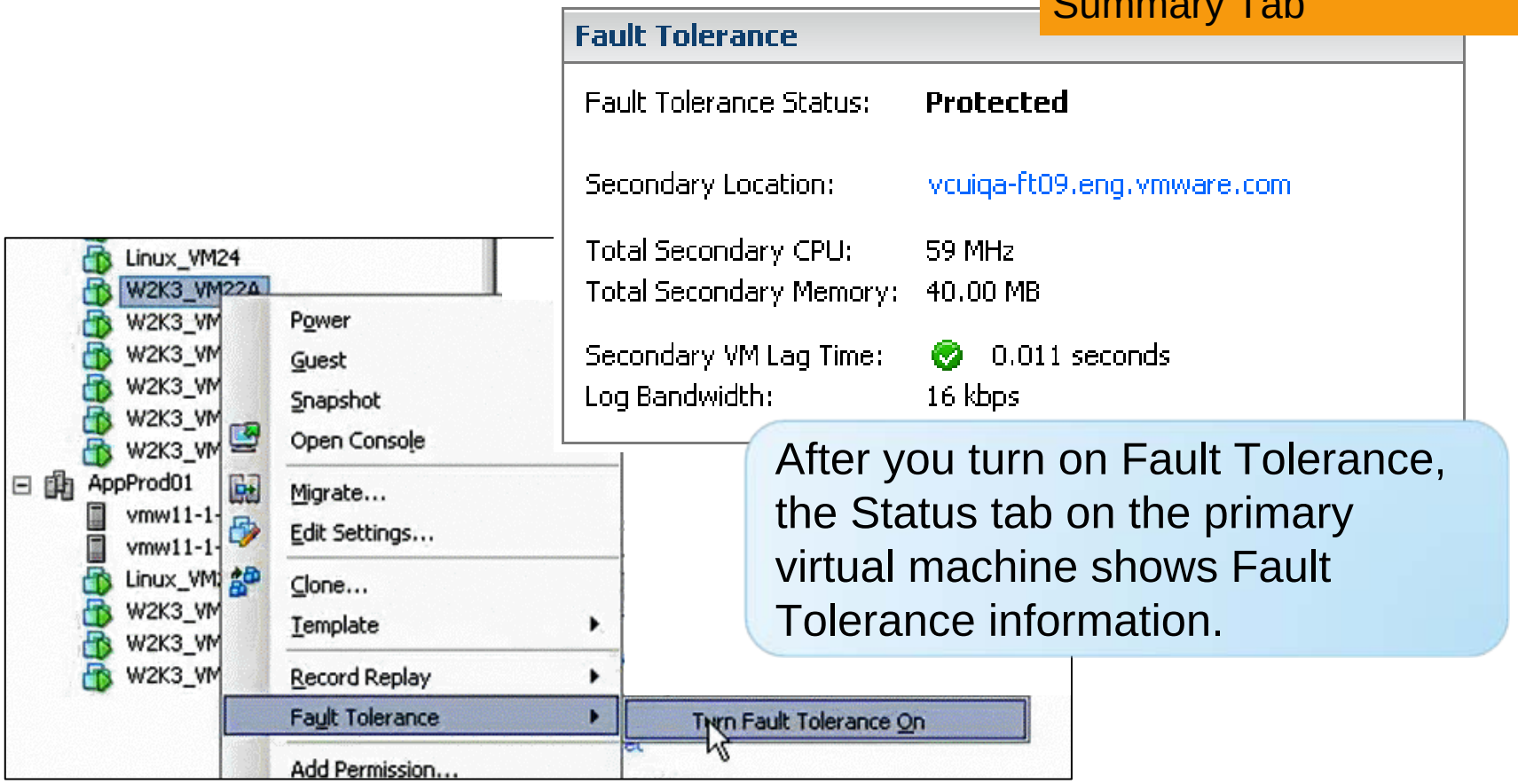


- Single identical VMs running in lockstep on separate hosts
- Zero downtime, zero data loss failover for all virtual machines in case of hardware failures
- Zero downtime, zero data loss
- No complex clustering or specialized hardware required
- Single common mechanism for all applications and OS-es

VMware FT provides zero downtime, zero data loss protection to designated virtual machines in an HA cluster.

Turning On Fault Tolerance

Primary Virtual Machine > Summary Tab



After you turn on Fault Tolerance, the Status tab on the primary virtual machine shows Fault Tolerance information.

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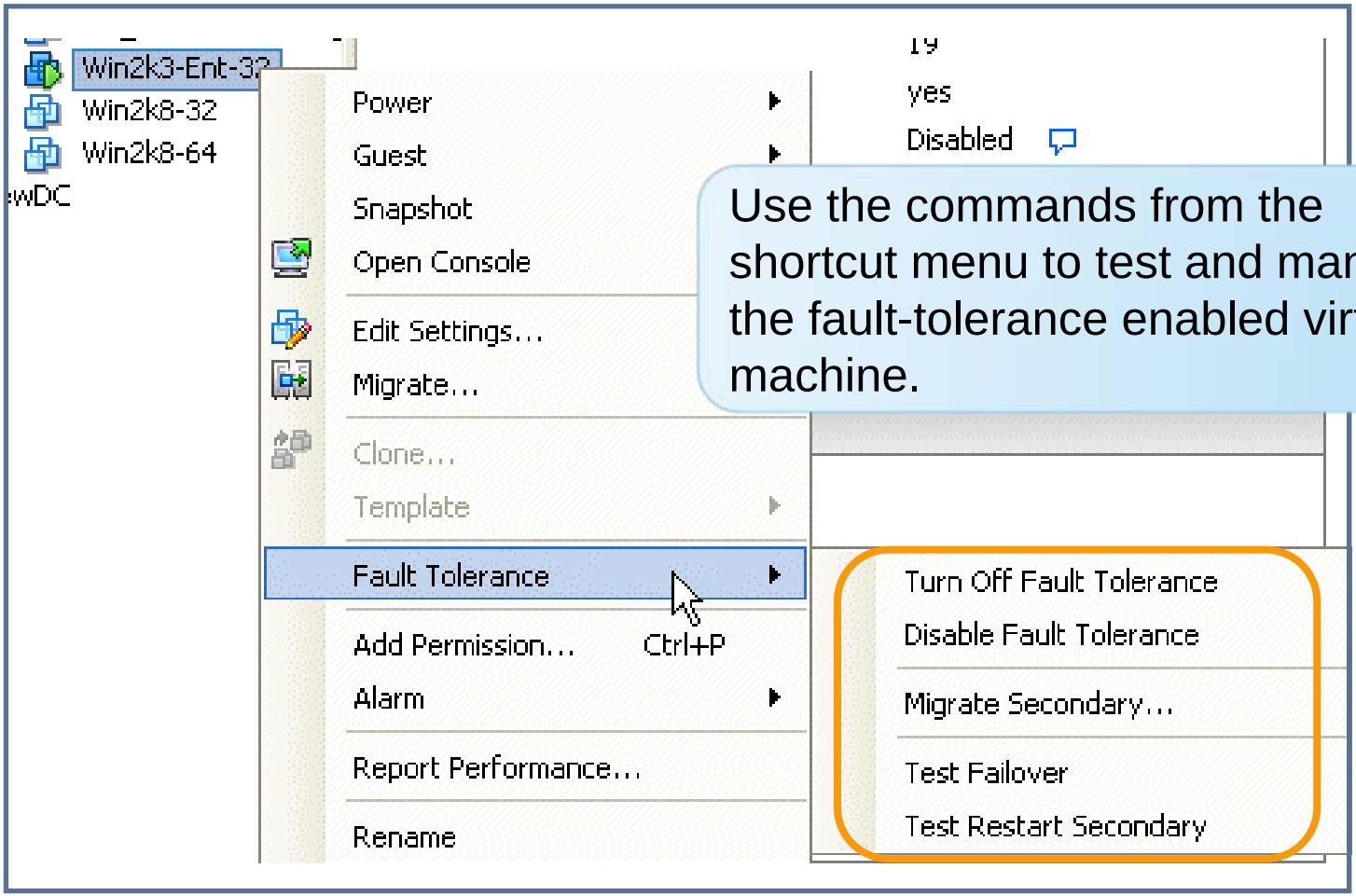
Managing FT-Enabled Virtual Machines



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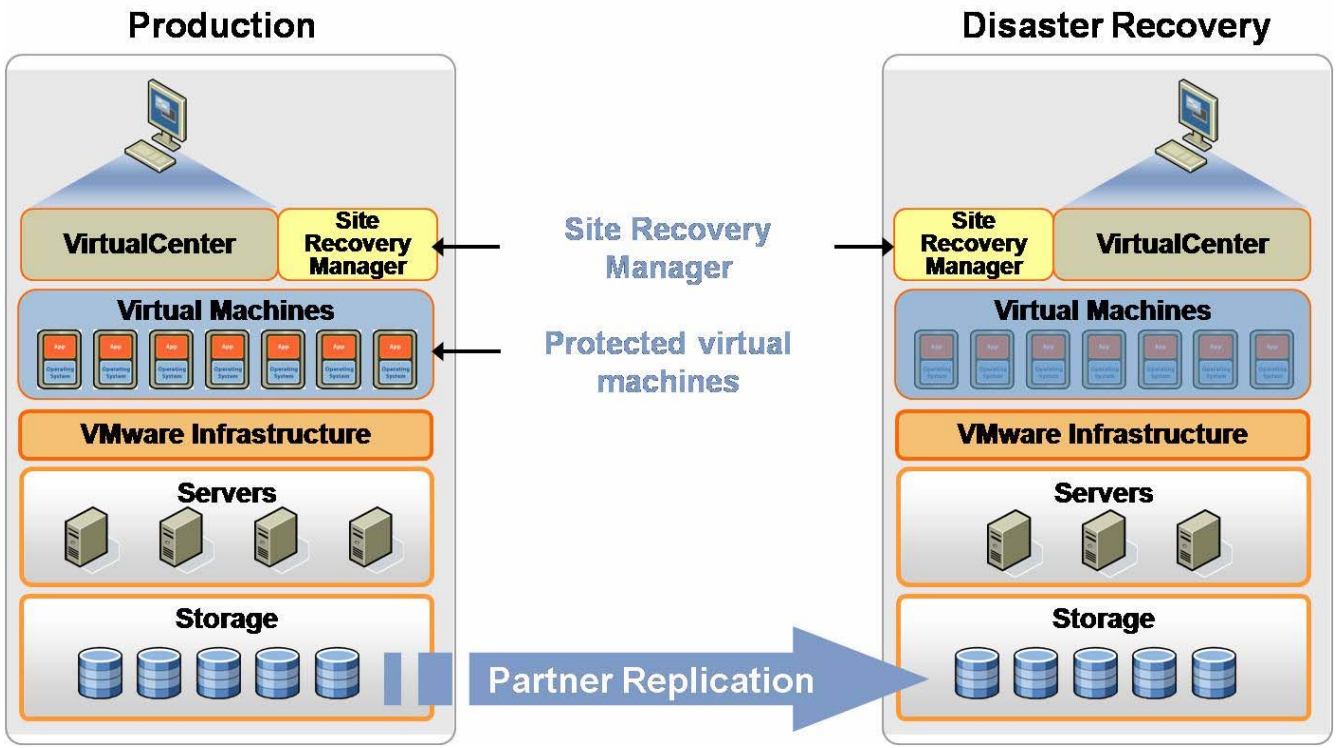
Automate DR for all Apps with Site Recovery Manager

- Automate failover of entire datacenters
- Eliminate need for dedicated failover servers
- Conduct frequent DR tests

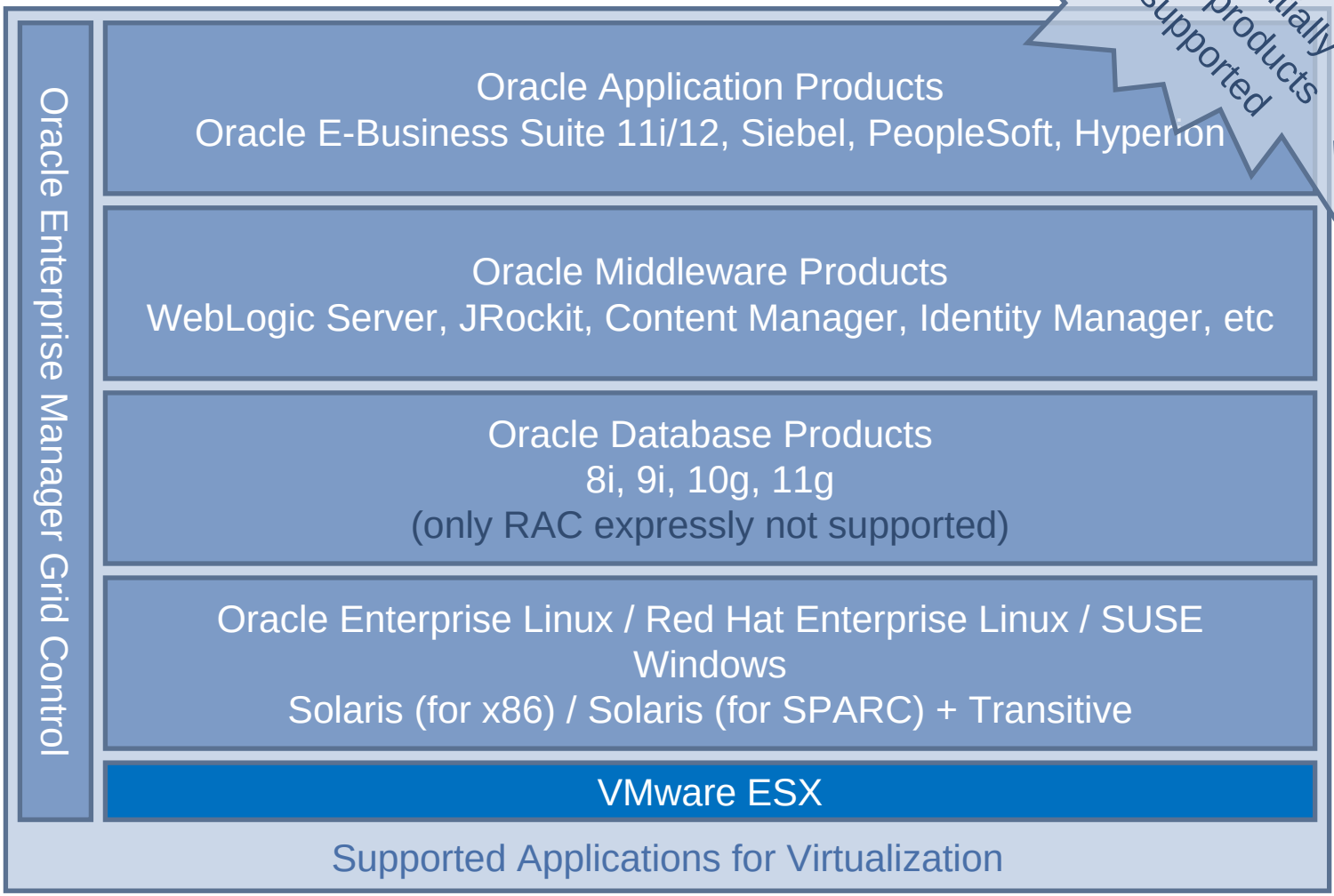


Oracle Support for VMware

Yes! Oracle has a support statement for VMware

- Oracle **Metalink (MyOracleSupport) 249212.1** defines Oracle's VMware support policy
- Oracle Support Policy is not the same as Oracle Sales/Marketing
  - Some Oracle & 3rd-party marketing documents incorrectly imply that Oracle does not support VMware
  - What matters: What the Support organization will do when you call
- Support facts:
  - Oracle RAC "expressly not supported"
  - Oracle will accepts SRs on VMware for bugs already known to Oracle
  - Oracle may accept SRs on VMware for bugs that are not seen by Oracle as being caused by virtualization
  - Oracle maintains (as most ISVs do) right to require physical reproduction if they suspect VMware is "at fault"

Oracle Support for VMware



Essentially ALL products supported

Summary – The Best Consolidation Platform for Oracle

Run Oracle on VMware with confidence

- Great performance even for large databases
- Virtualization-friendly licensing, particularly in pre-production environments
- Oracle support exists for VMware – test for yourself

Reduce Hardware and Software costs by 50% or more

- Consolidate by 4X, 8X, even 20X
- Preserve isolation and database control

Accelerate application delivery

- On-Demand database provisioning
- Rapid deployment of standard application templates
- Streamlined testing, staging and troubleshooting of Oracle stacks

Deliver high-quality, low-cost Customer Quality of Service

- Implement High Availability and Disaster Recovery without cost or complexity of clustering or mirroring
- Provide continuous uptime using commodity x86 infrastructure

Resources

- Visit us on the web to learn more regarding our Oracle solutions:
  http://vmware.com/oracle
  - Best Practices
  - Reference Architectures
  - Case Studies

- Contact your VMware rep for more information on Oracle opportunities, access to experts, and details on services

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Hvala!