VMware's Dynamic Data Center

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Agenda

Core Technologies

- Server Consolidation & Capacity Planner
- Managing Your Virtual Environment

The Dynamic Data Center

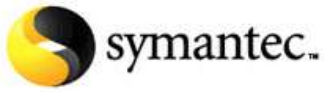
- Advanced Virtualization Features
  - **Distributed Resource Scheduling (DRS)**
  - **VMware HA**
  - **VMware Consolidated Backup (VCB)**
- High Availability / Disaster Recovery
- Enterprise Desktop with Virtual Desktop Infrastructure (VDI)

VMware at a Glance

Founded	1998
Total Employees	3000+
Number of Users	5+ Million/10,000 Ent Sites
Key Partnerships	IBM, HP, Dell, Sun, Intel, AMD
# Channel Partners	1,200+
Customer Profile	80% of the Fortune 500
Operating Structure	Independent EMC Subsidiary

Who Uses VMware?

95+% of the Fortune 100



The VMware Product Line

Secure Desktop Environment

Hosted Desktop Virtualization

Hosted Server Virtualization

Bare-Metal Server Virtualization

ACE

Workstation

VMware Server

VI3
ESX Server
Virtual Center

VMotion™

DRS & HA™

Virtual SMP™

VirtualCenter

P2V Assistant

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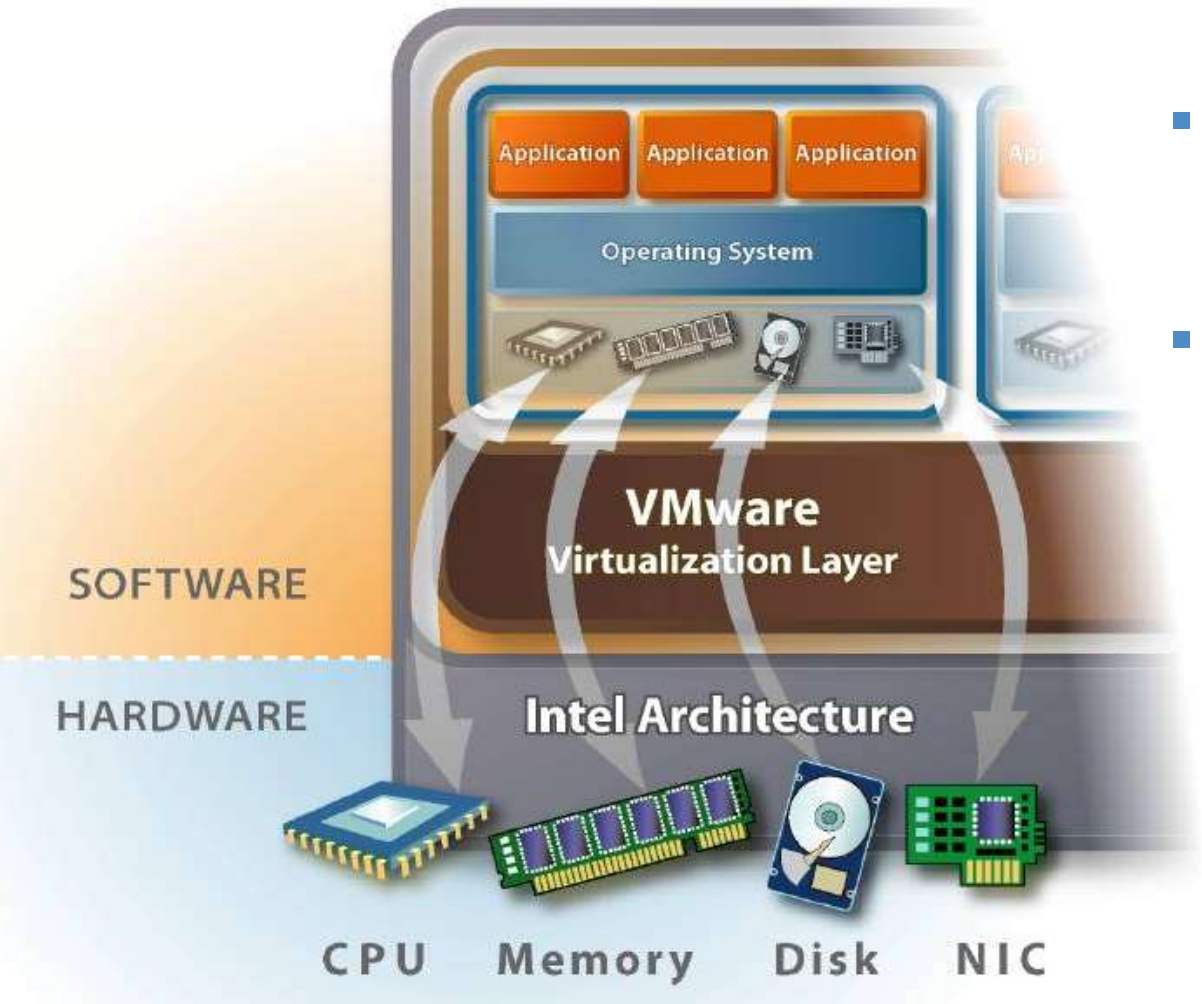
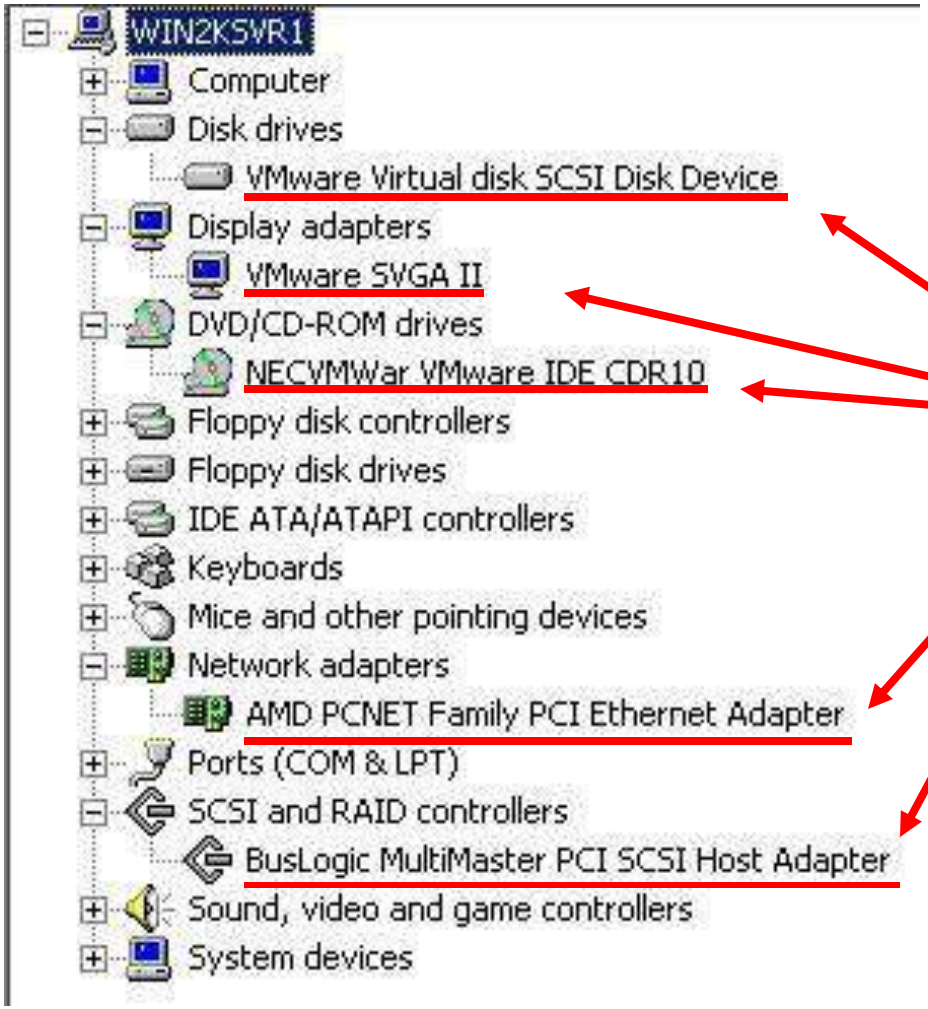
Gain Hardware Independence with the Virtual Machine Architecture



- Virtualization layer maps virtual hardware to real hardware.
- Can multiplex several virtual hardware to single real HW.

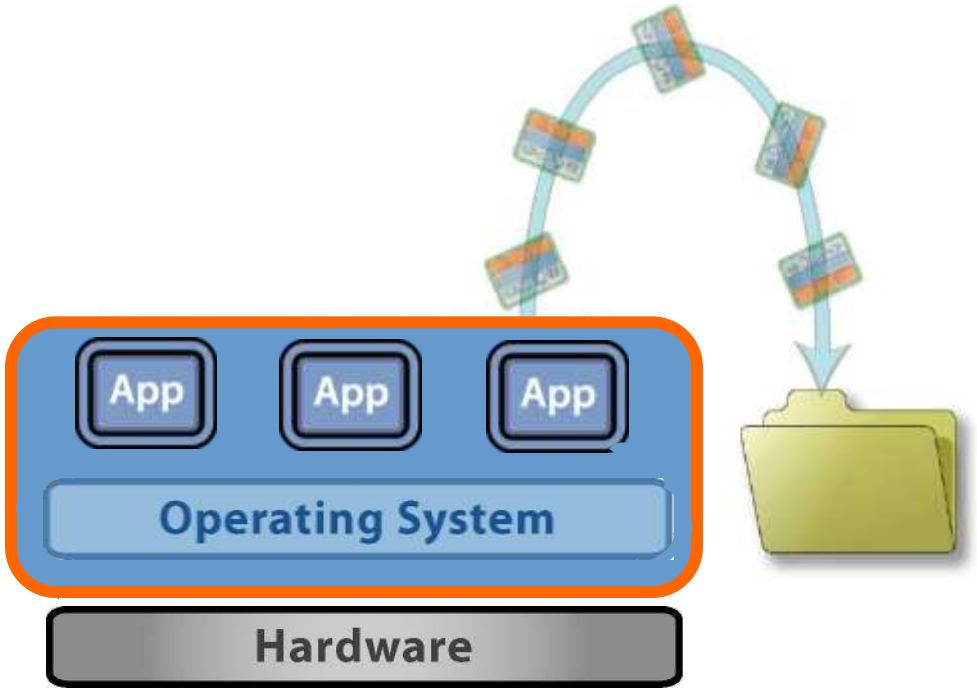
What's in a VM?



Virtualized Hardware, as seen by Windows Device Manager

Application + OS: Now A Data File

Entire server – OS, apps, data, devices, and state – is now simply a file.



- Server provisioning is similar to copying a file
- Server migration is now similar to data migration
- Data management techniques can be used for server management
  - Server cloning/copying
  - Versioning
  - Server archival
  - Remote mirroring

Fault and Performance Isolation

- Each virtual machine is isolated from others
- Totally separate OS, registry, applications and data files
- Immune to guest OS crashes, viruses or corruption
- Fault, performance, and security isolation
- CPU, RAM, Disk, and network resource controls*
- Guarantee service levels*

*** Available only on ESX Server**

More Robust Virtual Machines

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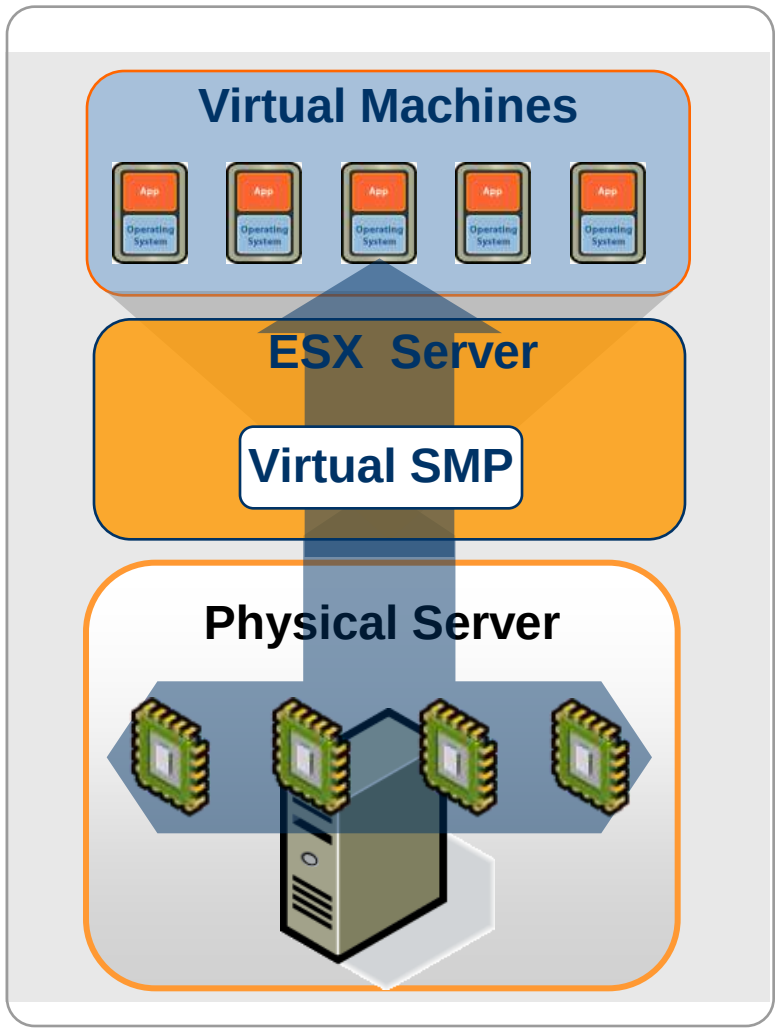
Enhanced CPU and Memory Virtualization

Run any workload in enterprise class virtual machines



ORACLE

DB2. Information Management Software

WebSphere. software

Apache HTTP SERVER PROJECT

CITRIX

- 4-way Virtual SMP allows single virtual machine to use up to four processors simultaneously
- Extended memory for virtual machines – *up to 16GB RAM per VM*
- Performance improvements across the board - up to 50% better for targeted workloads
- Physical server systems.
  - Up to 32 logical CPUs
  - Up to 64GB RAM.
  - Support for up to 128 powered-on virtual

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Heterogeneous Operating System Support

Freedom to choose the most appropriate OS for any application

	Windows Server 2003 Standard, Enterprise, Web Editions, and Small Business Server
	Windows 2000 Server and Advanced Server
	Windows NT : 4.0 Server
	Windows XP Professional
	Red Hat Linux 7.2, 7.3, 8.0, & 9.0 Red Hat Enterprise Linux 2.1 & 3
	Solaris 10 (on x86) NEW
	SUSE Linux 8.2, 9.0 and 9.1 SUSE Linux Enterprise Server 8
	Novell NetWare 5.1, 6.0 and 6.5
	FreeBSD 4.9

- Rigorously tested to run 28 versions of all major operating systems
- First level of 64-bit operating system support

Getting Virtualized

Consolidation Assessment with VMware Capacity Planner ™

P2V

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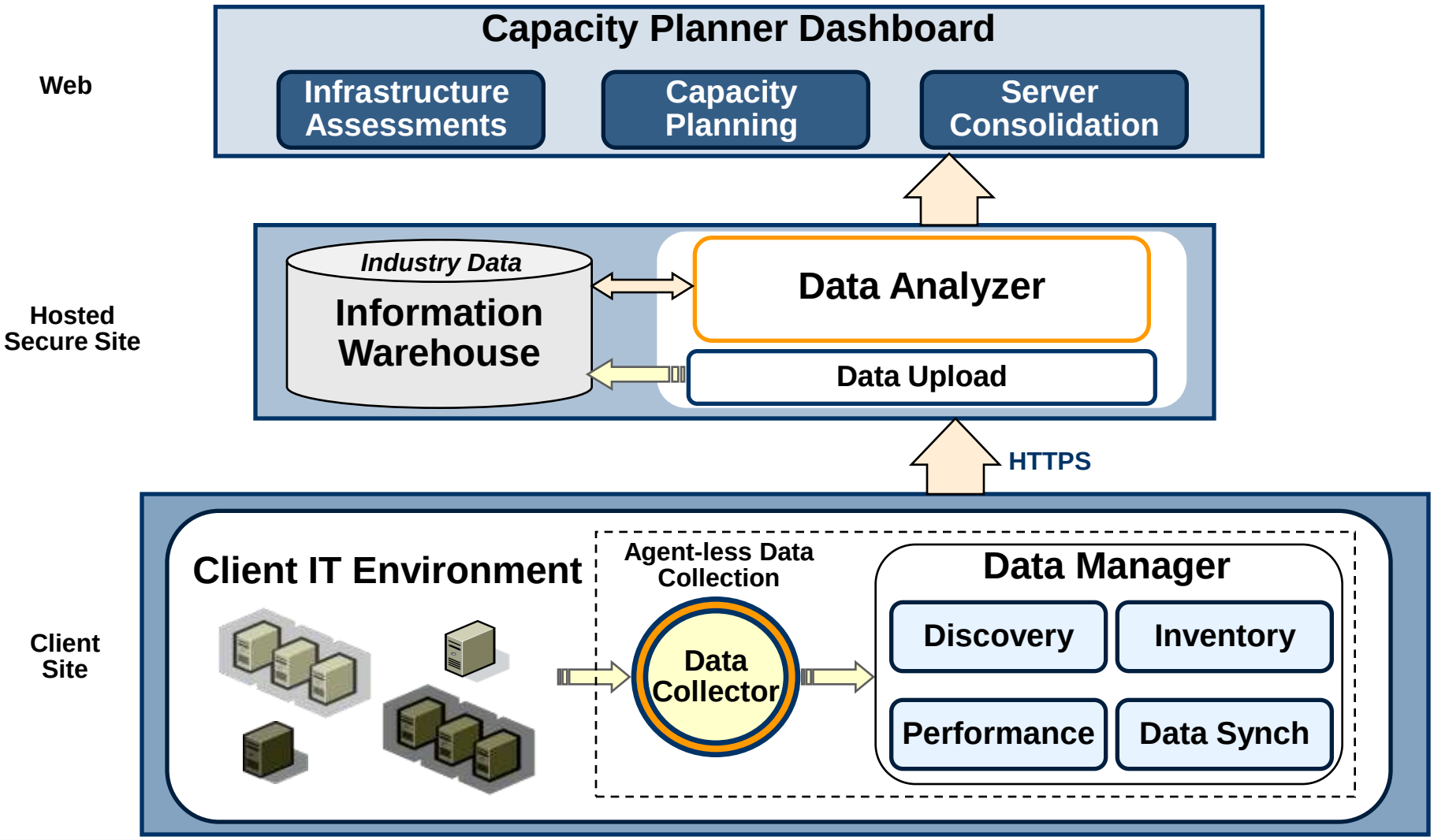
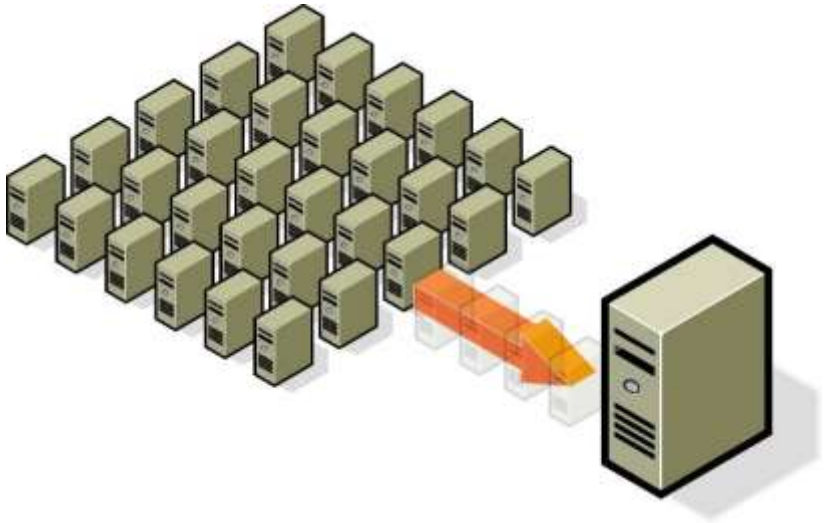
VMware Capacity Planner



VMware Customer Consolidation Ratios

- Conseco Finance 8:1
- State of Montana 8:1
- 7-Eleven 10:1
- Antares IT 10:1
- National Gypsum 10:1
- Applied Innovation 15:1
- AIG Technology 20:1
- Qualcomm 30:1

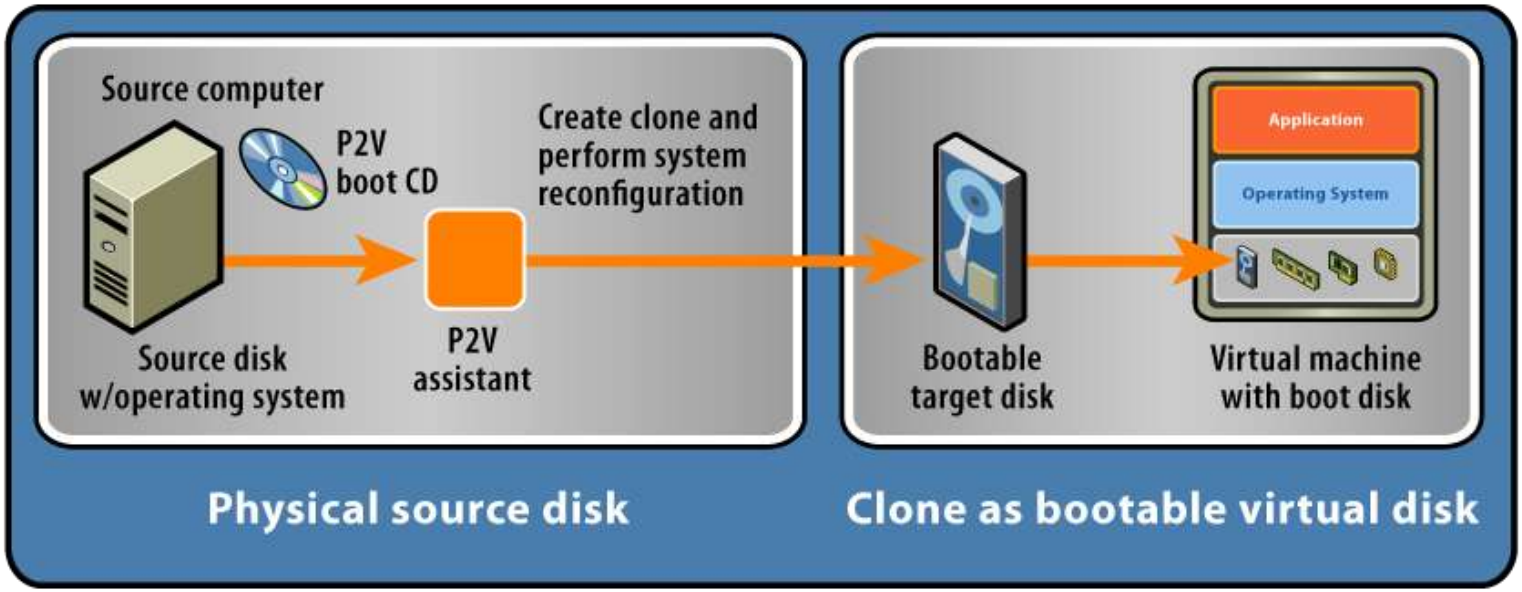


What does this mean???

Improved ROI…see example $$$

VMware Converter Automates Physical to Virtual Consolidation

P2V Assistant helps you migrate physical machines into VMs



1) P2V Assistant takes a snapshot of a physical system…

2) P2V Assistant performs all necessary substitutions…

… to transform a physical system into a production-ready virtual machine for Workstation, GSX Server & ESX Server

Managing Your Virtual Environment with Virtual Center 2

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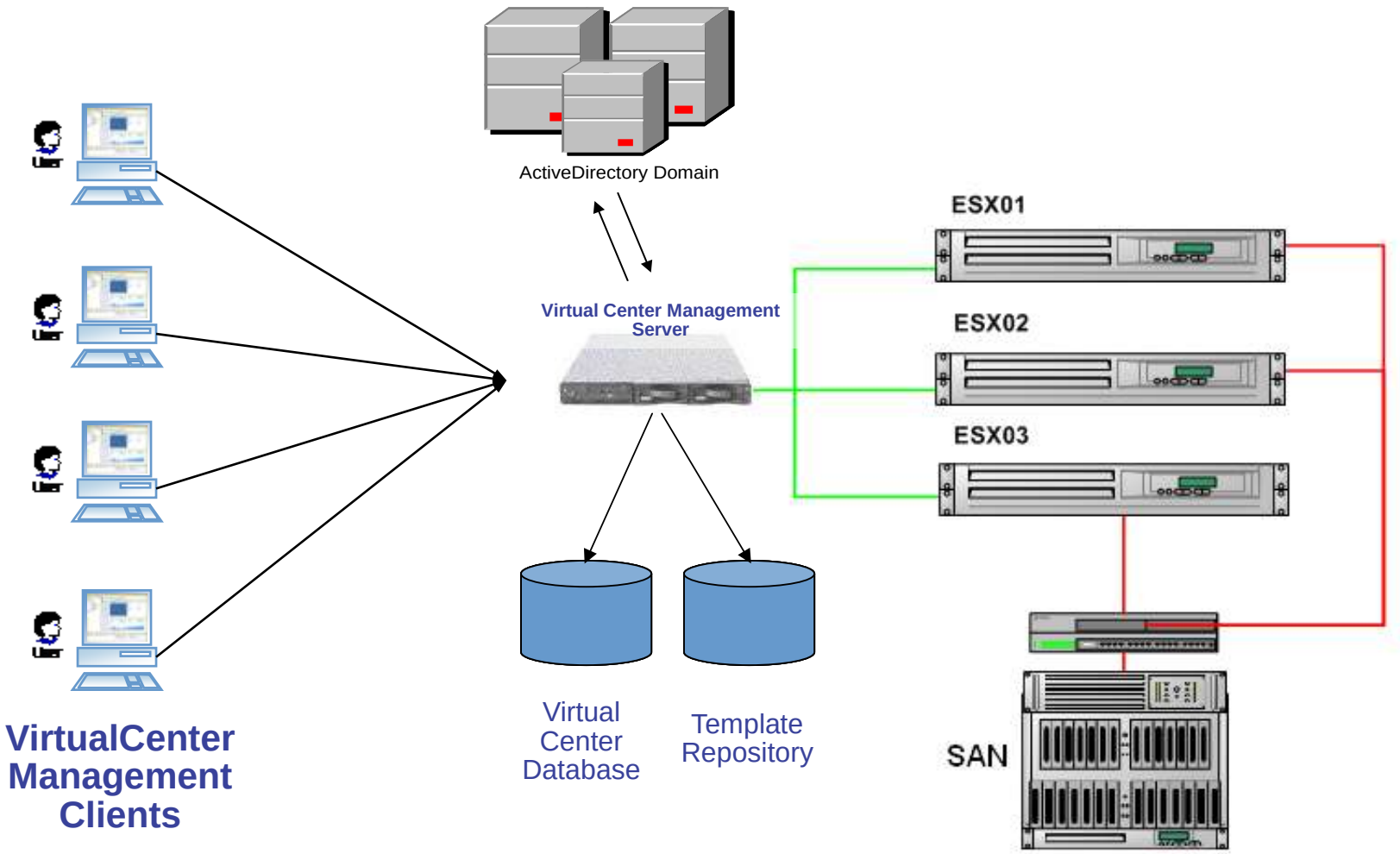
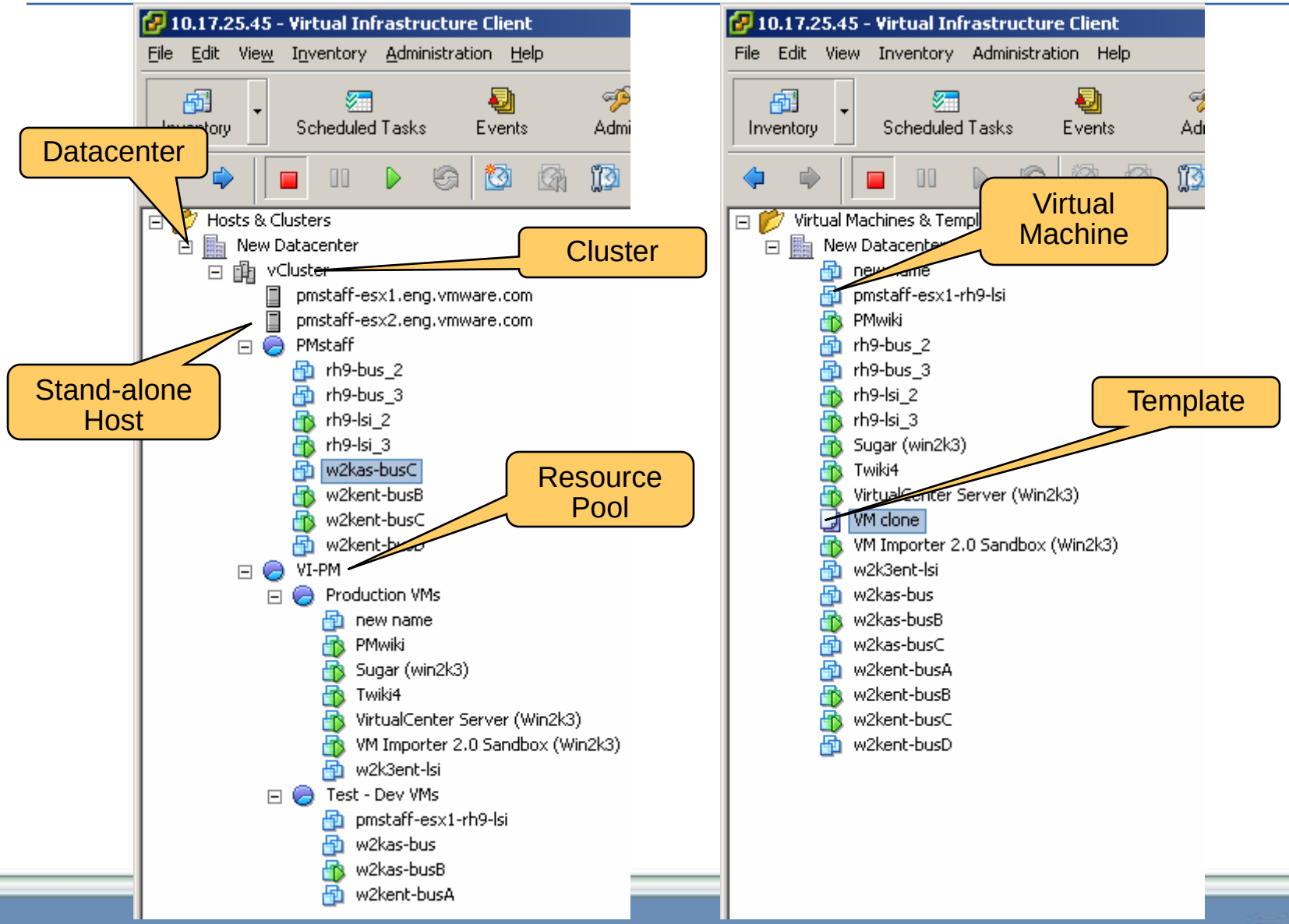
VirtualCenter Deployment Components



VirtualCenter 2.0 Inventory



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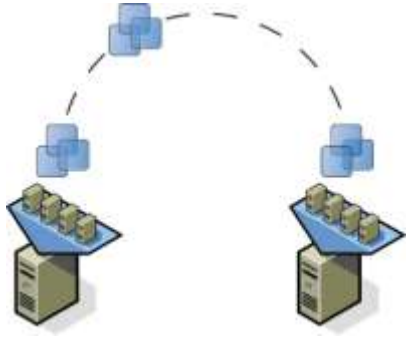
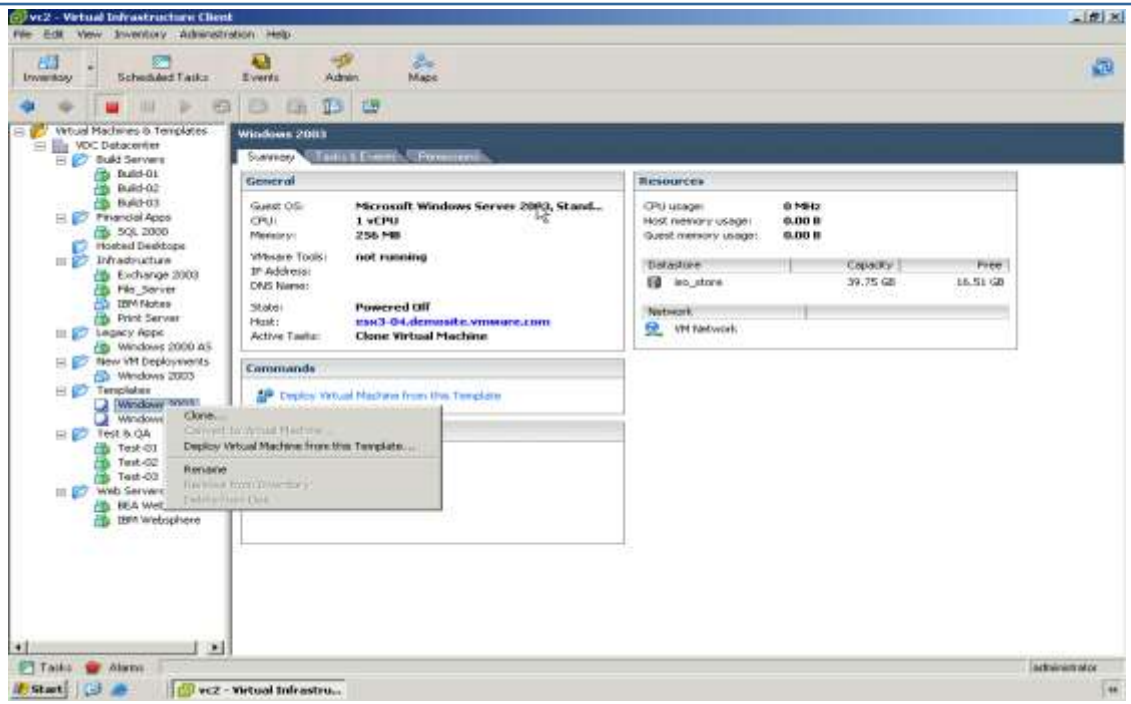
Rapid Server Provisioning





VirtualCenter Provisioning Process

1) Choose Server Template
2) Right click and choose deploy from template
3) Select Server location
4) Click Next, Next, Done

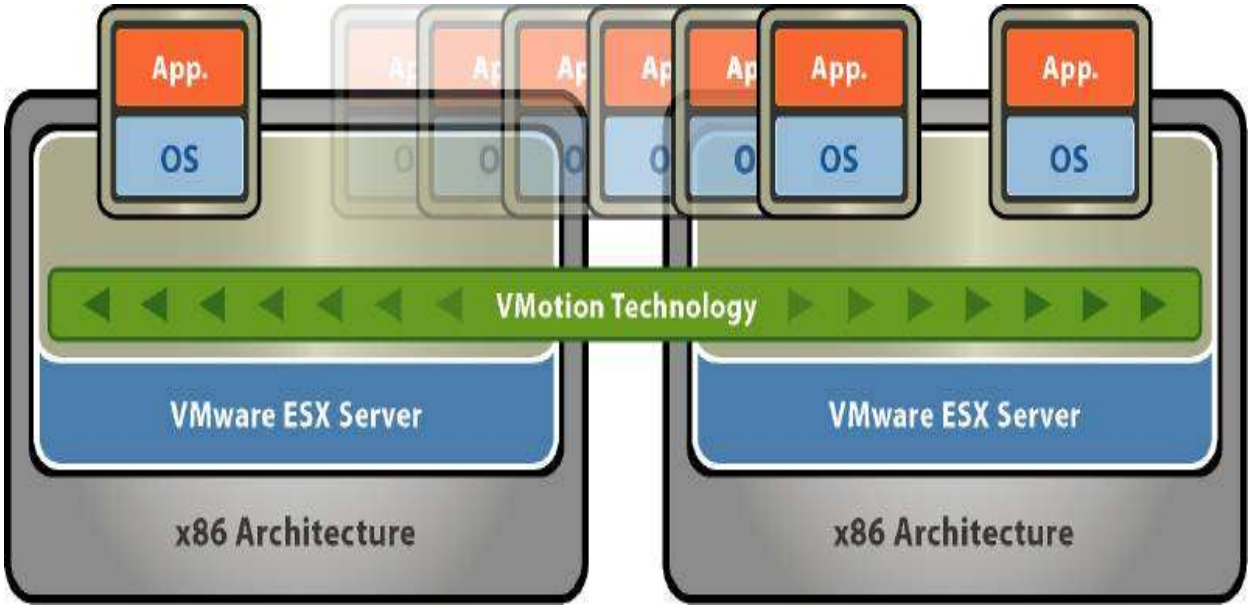
- Takes under 10 minutes
- Speed of a file copy
- Hardware-independent
- Template based
- Fully leverages the SAN
- Automatic and Standardized

Traditional Process vs. VirtualCenter

Key Task	Traditional Approach	VirtualCenter Approach
Provision a new server	• 3 - 10 **days** hardware procurement • 1 - 4 **hours** provisioning new server	• 5 - 10 **minutes** provisioning new VM
Moving an application to a new server; **Repurposing a server**	• 4 - 6 **hours** for migration • Service interrupted for duration of maintenance window • Requires days/weeks of change management preparation	• 2 - 5 **minutes** using VMotion™ (no service interruption) • 10 - 30 **minutes** without VMotion™
Hardware maintenance	• Requires 1 - 3 **hour** maintenance window • Requires days/weeks of change management preparation	• **Zero downtime** hardware upgrades with VMotion™

VirtualCenter

VMotion™ Technology Changes The Game



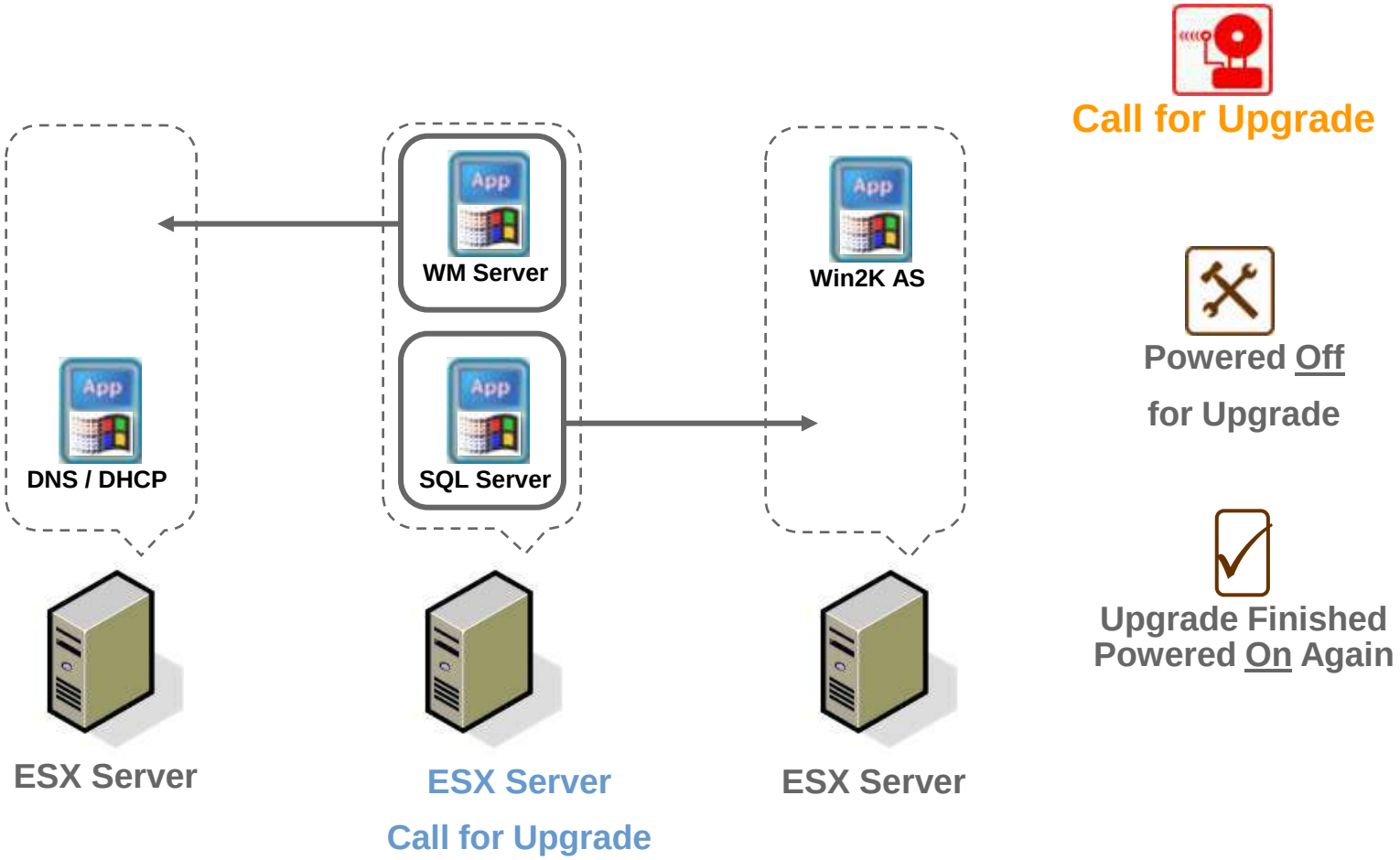
- Optimal Utilization
- 8 to 5 maintenance
- Zero Downtime
- Fast Reconfiguration

Move LIVE, STATEFUL applications across systems with minimal latency

VMotion technology lets you move live, running virtual machines from one host to another while maintaining continuous service availability.

VirtualCenter

Zero-Downtime Maintenance



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The Dynamic Data Center Leveraging VMware's New Technologies For the Dynamic Data Center

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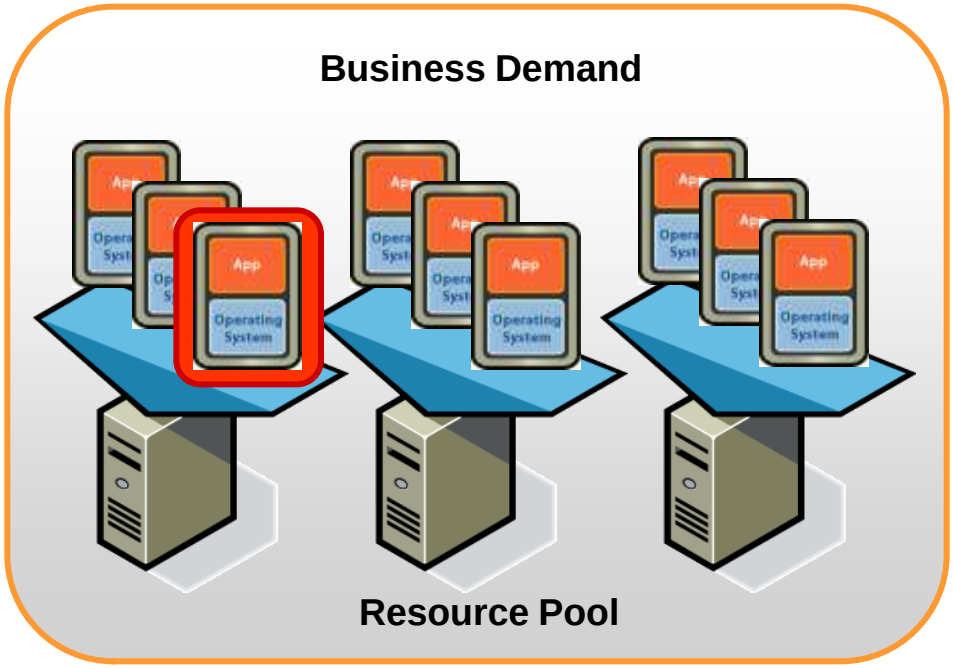
The Truly Dynamic Data Center
Major New Technologies

- Distributed resource scheduling
- VMware High Availability
- Resource Pools
- Disaster Recovery
- Fault Tolerance

NEW

Resource Optimization with VMware DRS

Dynamic and intelligent allocation of hardware resources to ensure optimal alignment between business and IT



- Intelligent allocation of resources based on pre-defined rules and policies
- Monitor utilization across resource pools
- Optimize data center resources
  - **Dynamically adjust supply based on changing demand for resources**
  - **Prioritize resources to the highest value applications**
  - **Conduct zero-downtime server maintenance**

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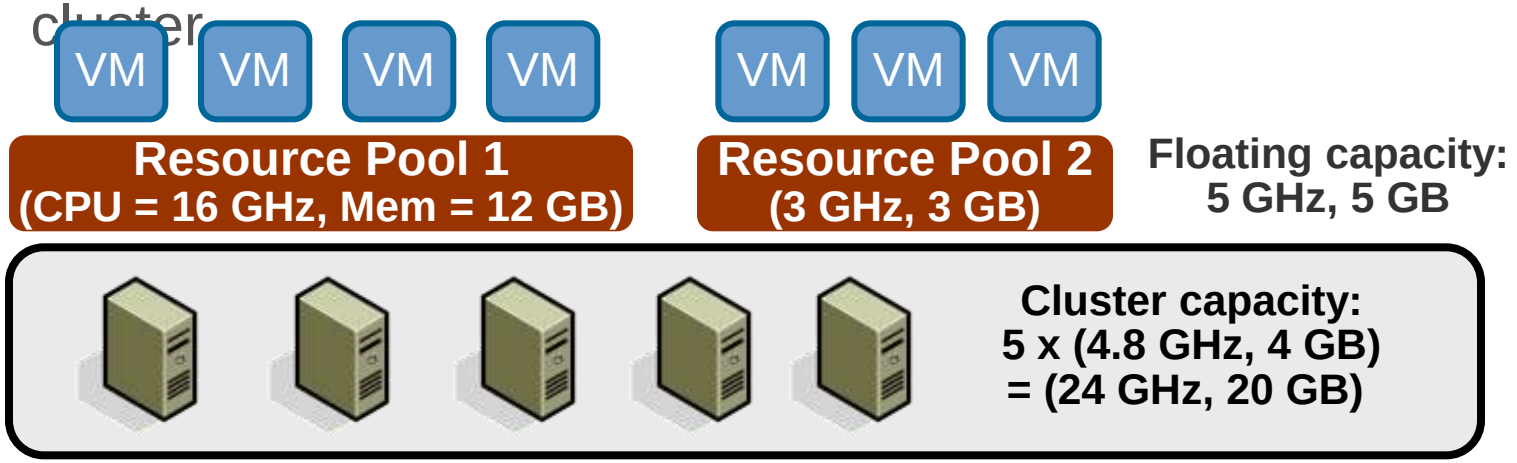
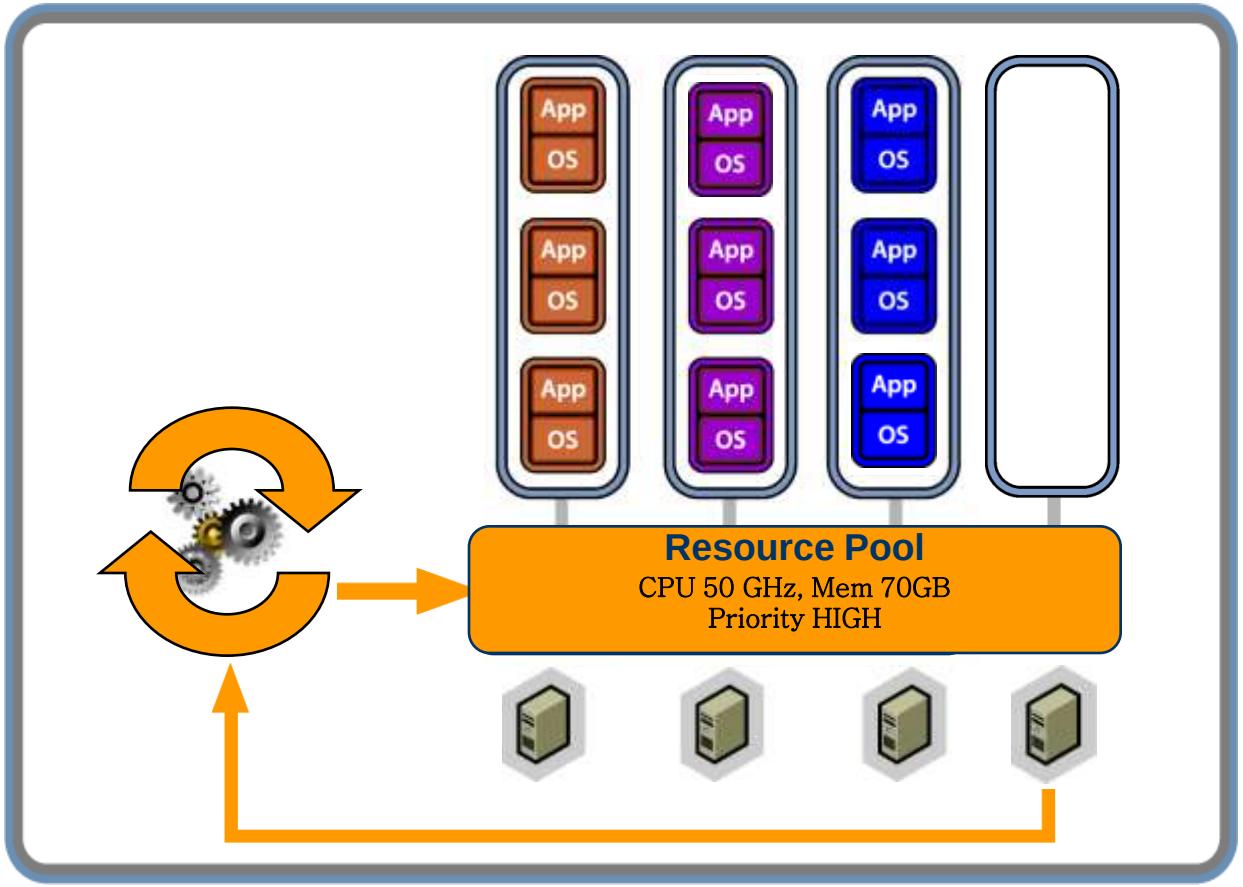
Resource Pools

- **Precise Resource Control**
- Virtual machines draw resources from their resource pools
- Resource allocations can be changed dynamically
- Resource pools can be nested
- Resource Pools can span computing resources in a cluster



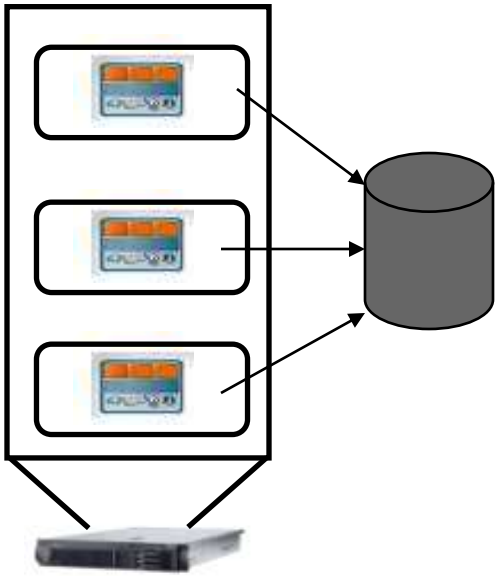
New - Capacity on Demand with VMware DRS

Add hardware dynamically



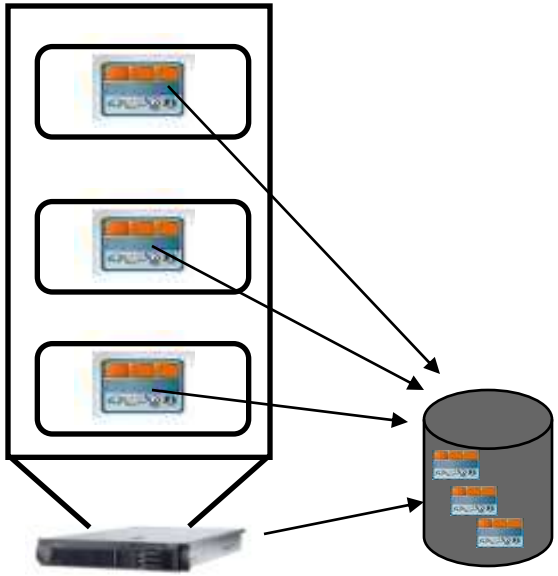
- Easily add more capacity
- Avoid over-provisioning to peak load

Backup Options with VMs



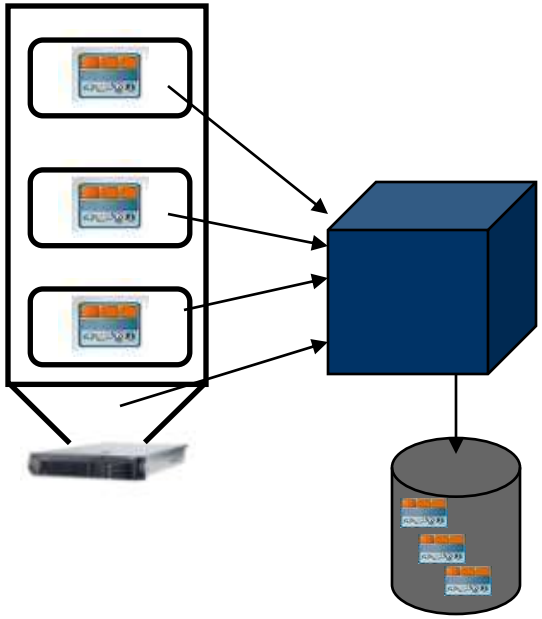
Backup Each VM

- Agent based inside each VM
- Just like physical servers



Whole Server Backup

- Use backup software with ESX Server Console OS
- Reduce backup licenses

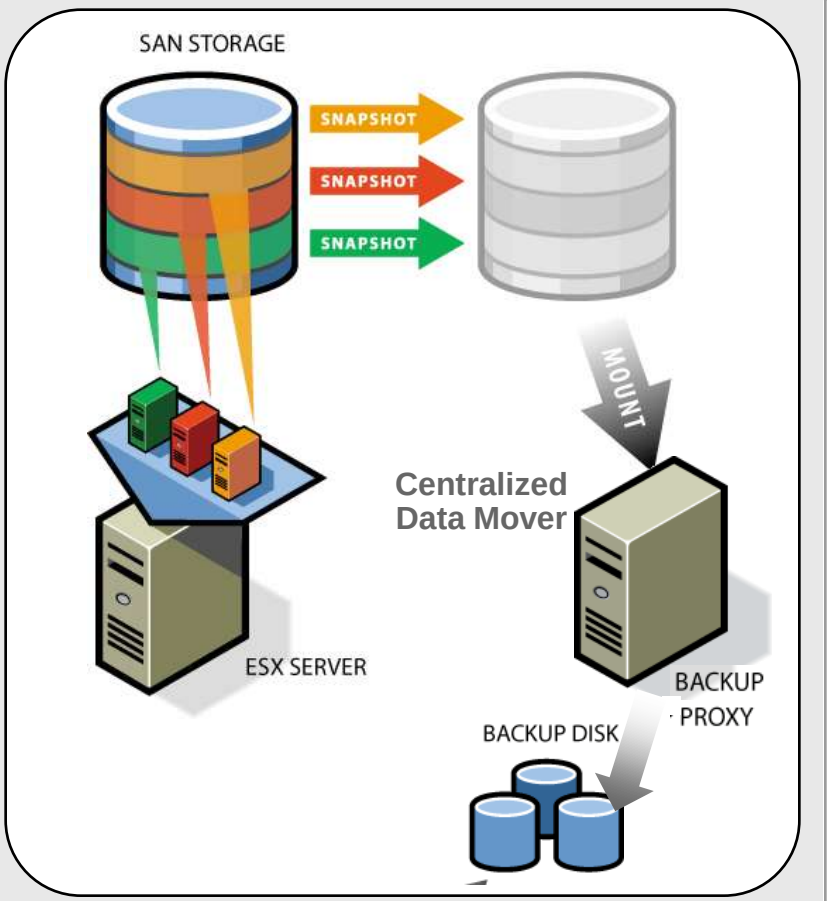


SAN Based

- Use SAN snapshot
- SAN handles checkpointing and tape archiving automatically

Protect data with VMware Consolidated Backup

Perform back up any time



- Centralized agentless backup for virtual machines
  - Move backup out of the VM
  - Eliminate backup traffic on the LAN
- Pre-integrated with major 3rd-party backup products

symantec.

EMC² where information lives

VERITAS

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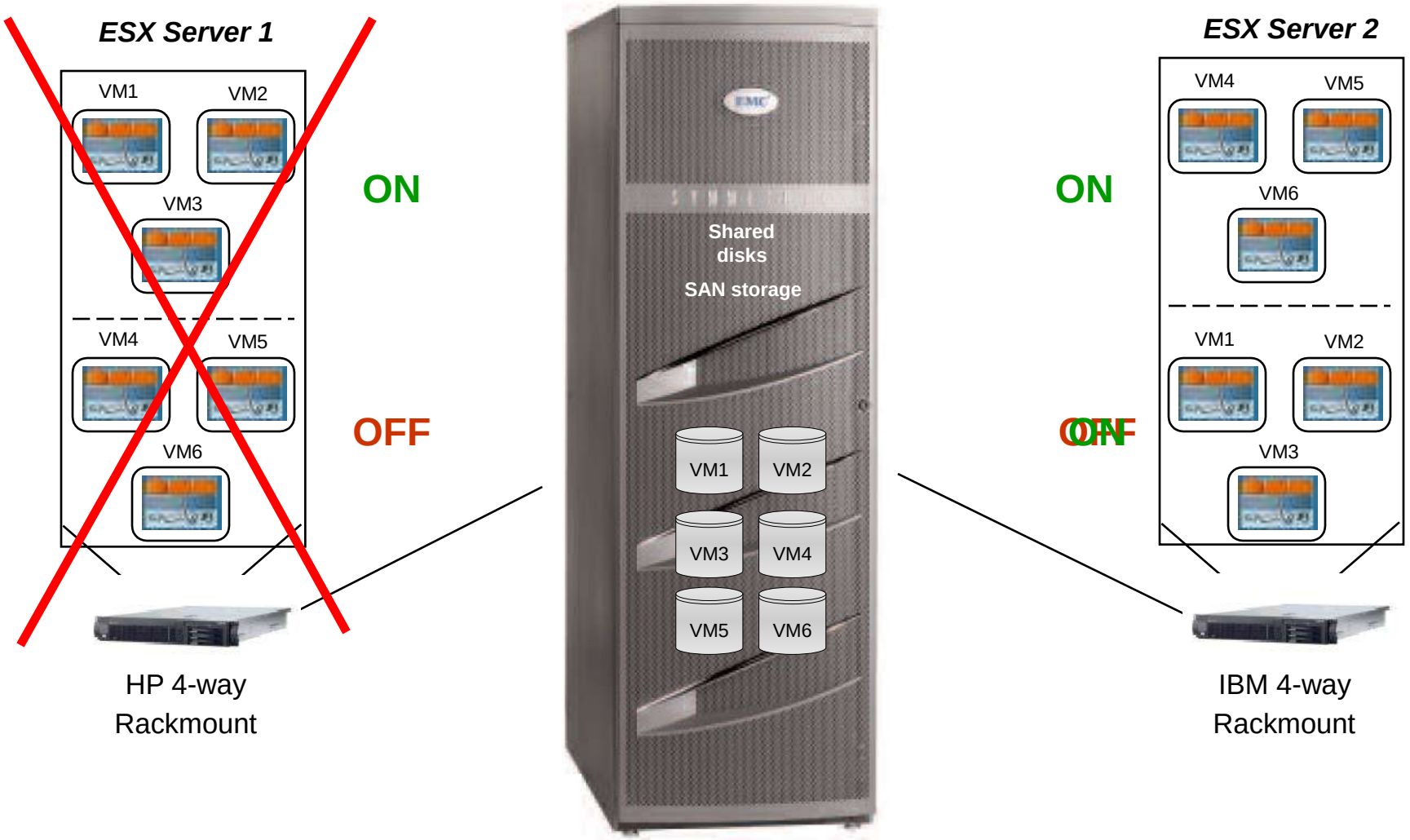
High availability via shared storage



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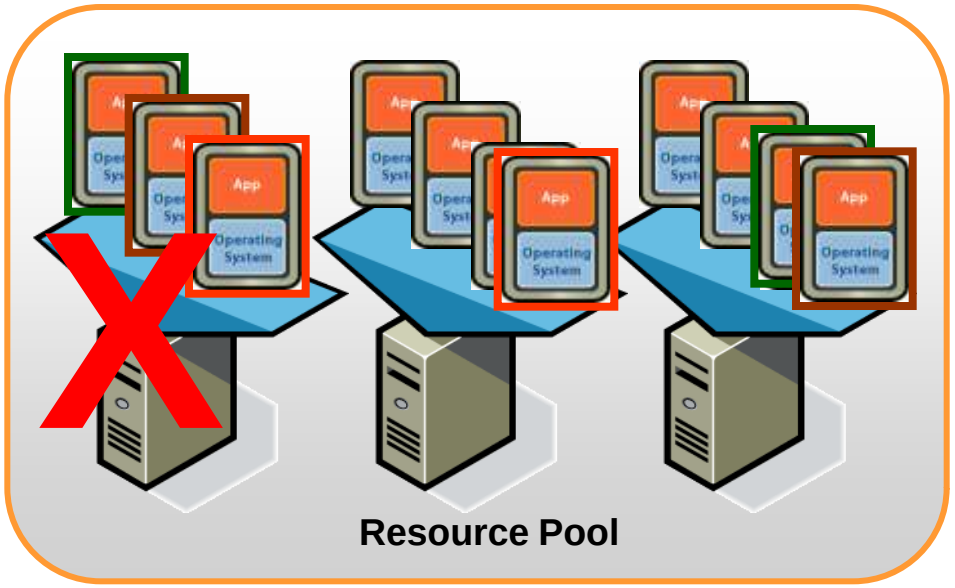
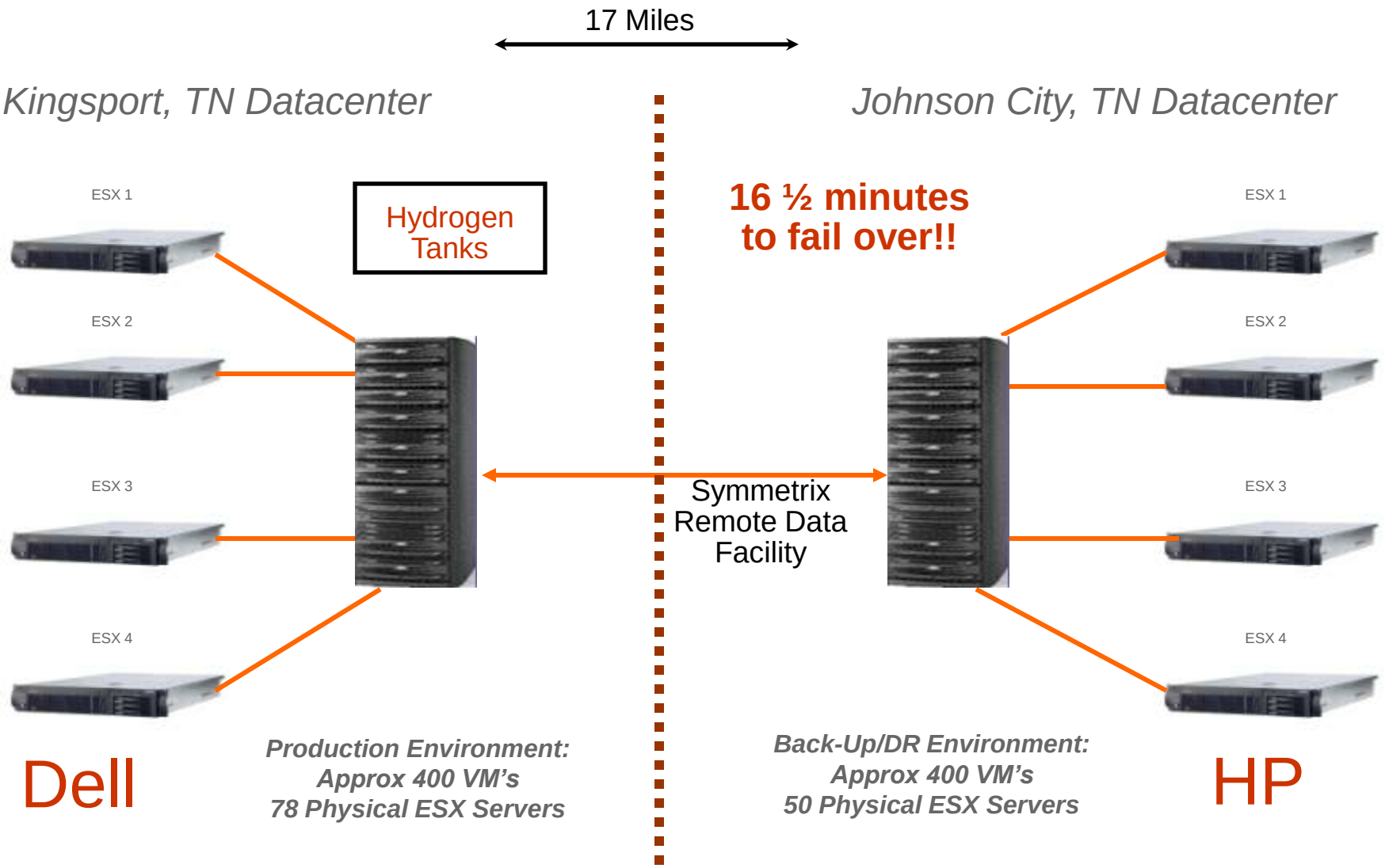
Ensure High Availability with VMware HA

VMware HA enables cost-effective high availability for all servers

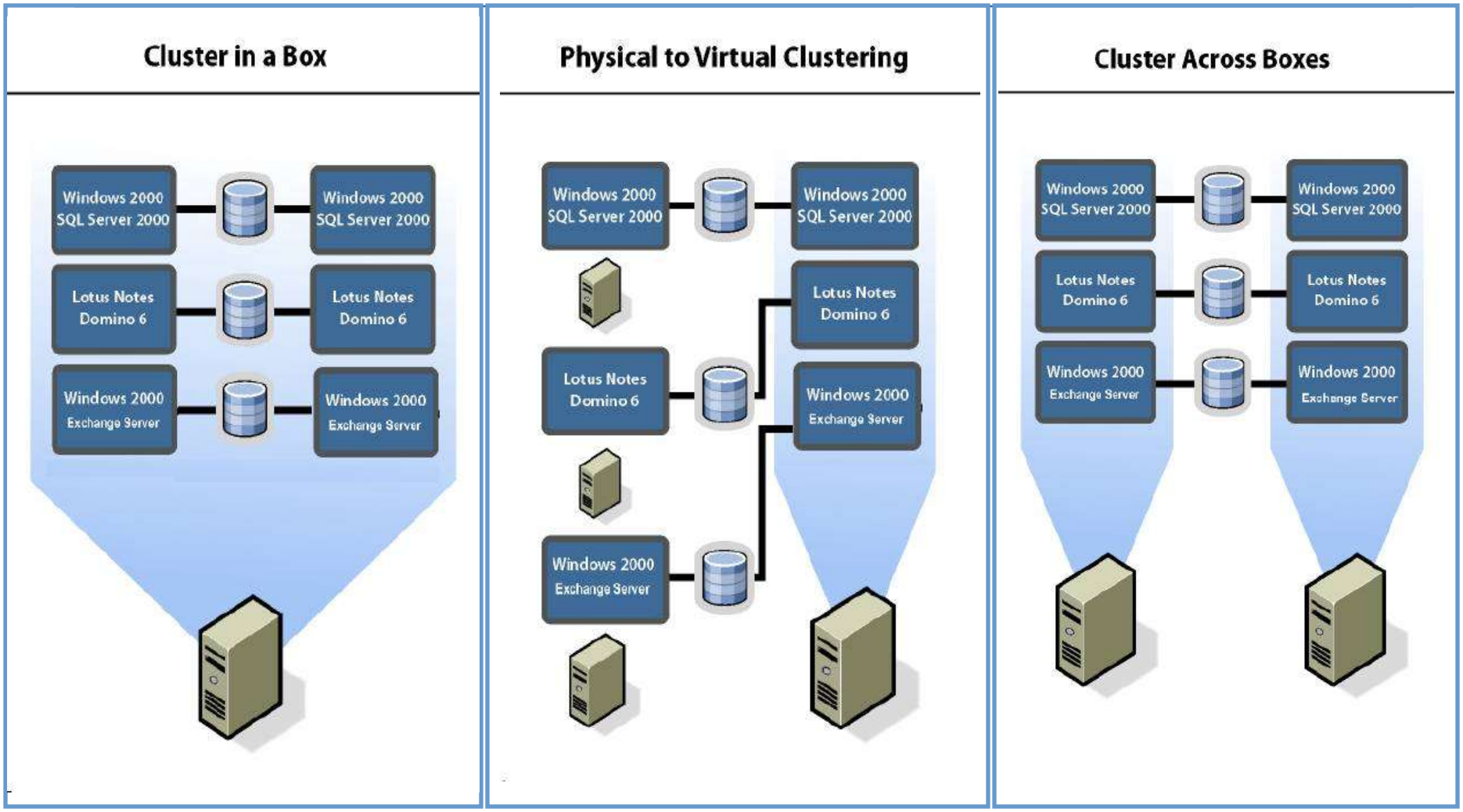


- Solves the “all my eggs in one basket (one ESX box)” problem
- Detects an ESX hardware failure
  - Automatically restarts virtual machines on remaining boxes
  - Intelligent placement using DRS
- No need for dedicated stand-by hardware
- None of the cost and complexity of clustering

Disaster Recovery



Tier One Applications that need Five 9s Clustering

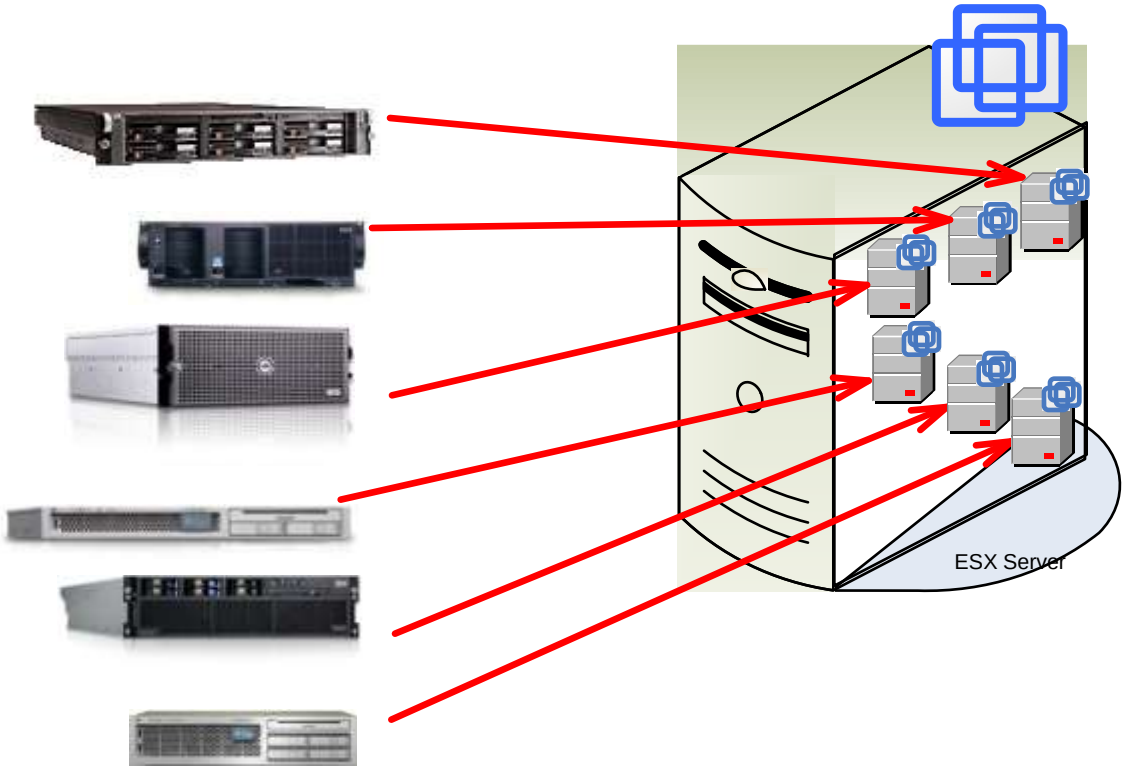


Physical to Virtual
Rapid Recovery - Using Byte Level Replication

LEGATO RepliStor

EMC² RepliStor

Double-Take



- Can be done with disparate hardware
- Capability provided by VMware's Hardware Independent virtual machines

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Enterprise Desktop
Virtual Desktop Infrastructure (VDI)

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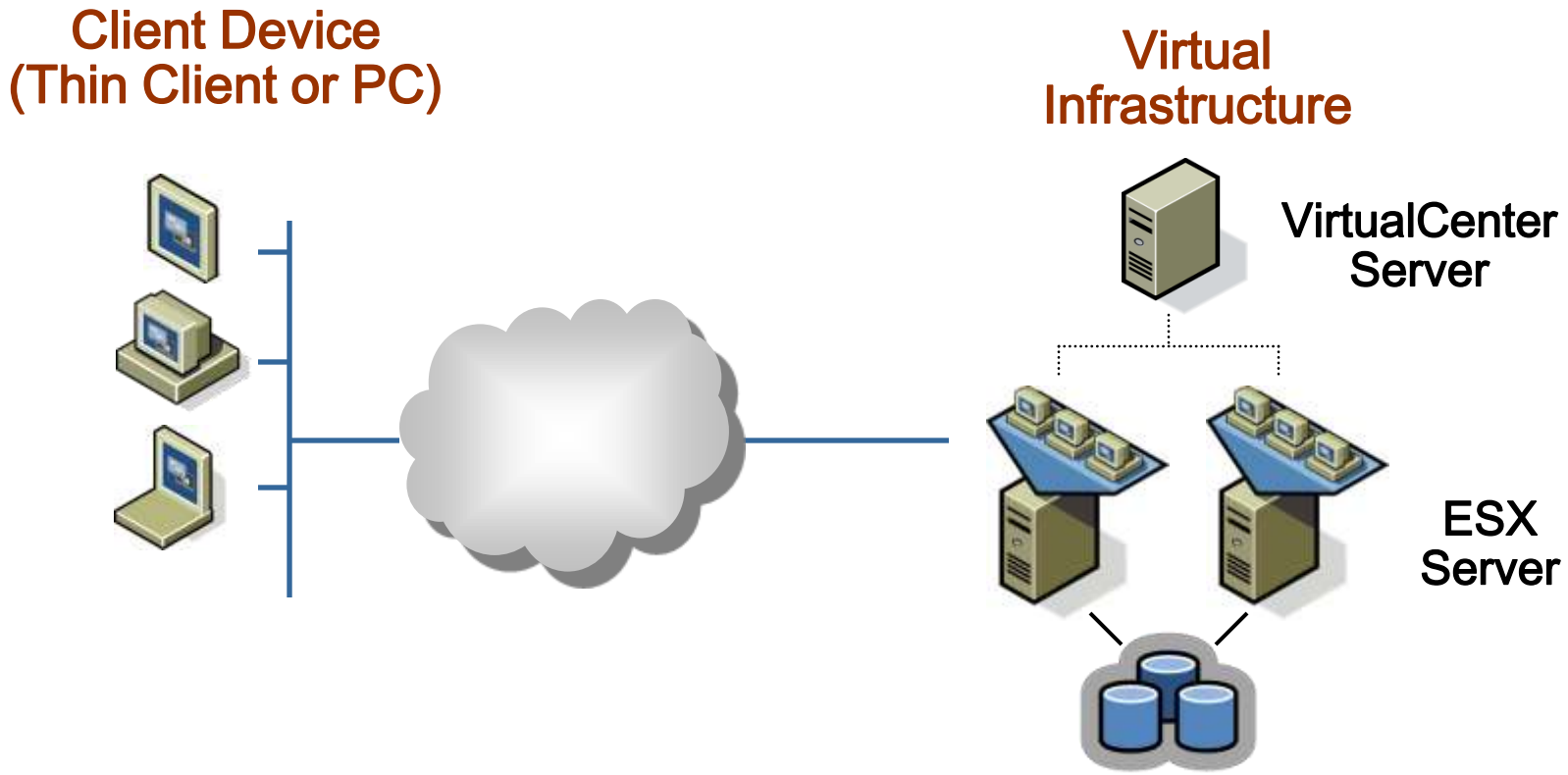
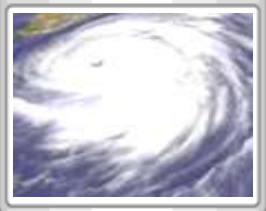
What is VDI?

VDI is a SOLUTION using current VMware products to improve management of enterprise desktops.



Need for New Capabilities

Disasters



Need to quickly recover, re-provision and reestablish user access to complete desktop environments to ensure business continuity

Need for Instant Desktop Recovery & Provisioning

Alt. Workspace

Need to be able to support a virtual work environment where users have alternative access to *complete desktop resources* while working remotely

Need for Alternative Workspace Access

Outsourcing

Need to secure data and resources within the corporate data center and provide secure access to outsourcing / offshore developers or transaction workers

Need for Secure, Controlled Access by Outsourcing Entities

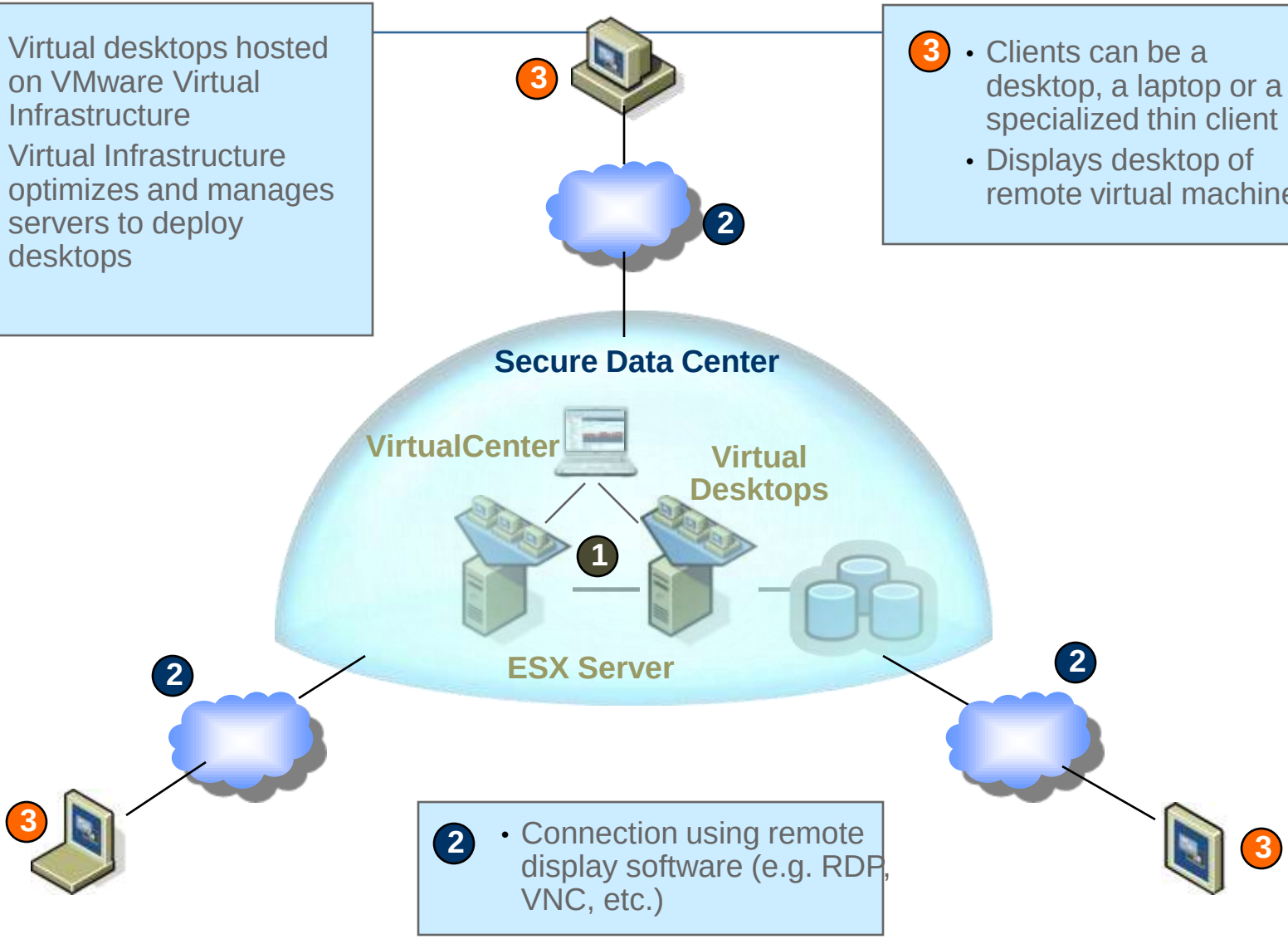
Compliance

Need to contain desktop proliferation and build a standardized, centrally managed desktop environment that adheres to internal and external compliance guidelines

Need for Desktop Consolidation & Standardization

VDI- How Does it work?

1. Virtual desktops hosted on VMware Virtual Infrastructure
   - Virtual Infrastructure optimizes and manages servers to deploy desktops



3. Clients can be a desktop, a laptop or a specialized thin client
   - Displays desktop of remote virtual machine

2. Connection using remote display software (e.g. RDP, VNC, etc.)

Solution Comparison

Requirements	Blade PC	Shared Services	VDI
Application Compatibility			
Rich Multi-Media			
User Isolation			
Scalability			
Resource Management			

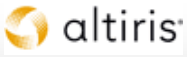
The VDI Ecosystem

The VMware Virtual Desktop Infrastructure Alliance

System Integration

Thin Clients

Management



Virtualization


VMware ESX Server

Server Hardware

VMware Lab Manager Overview

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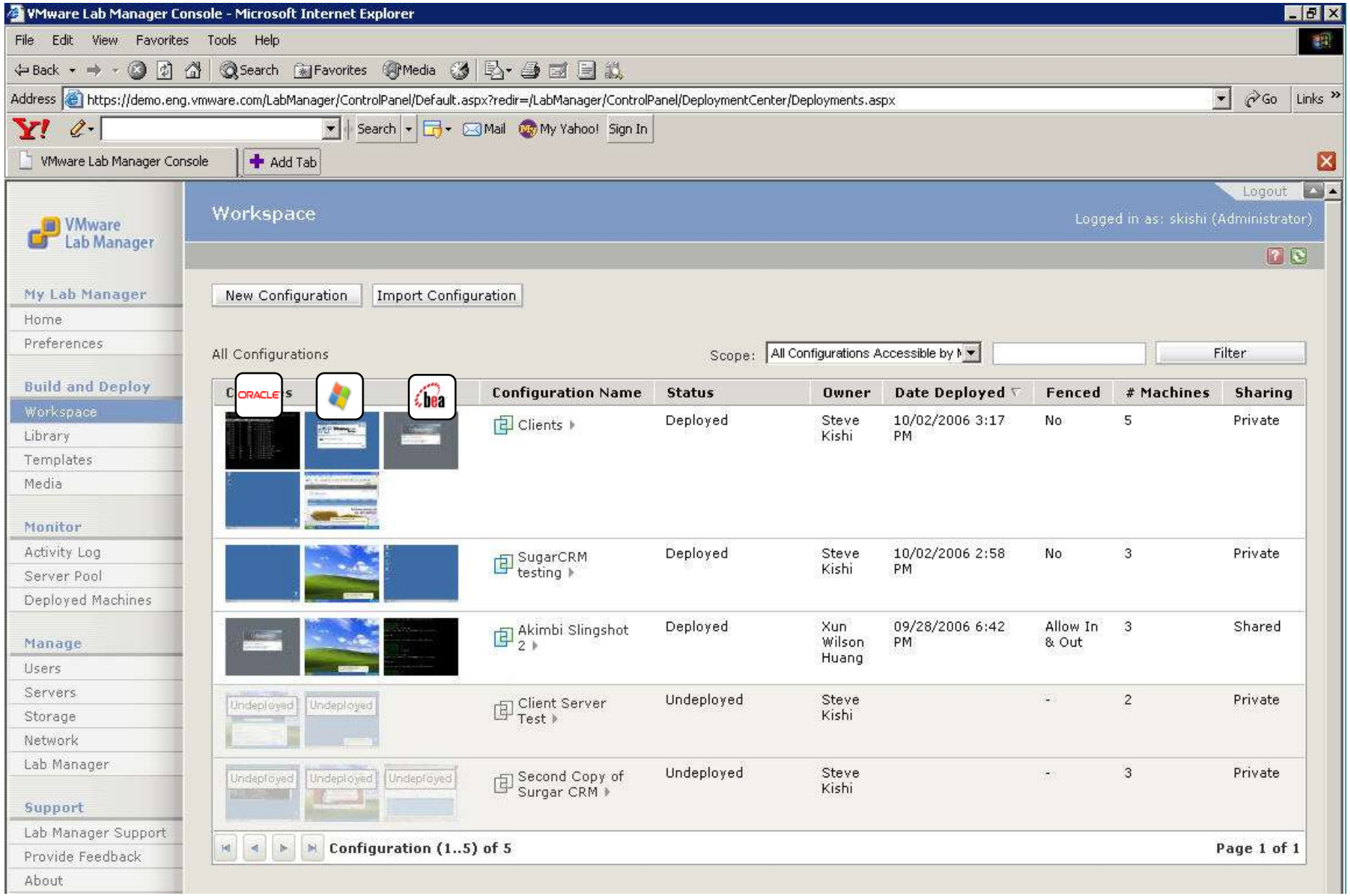
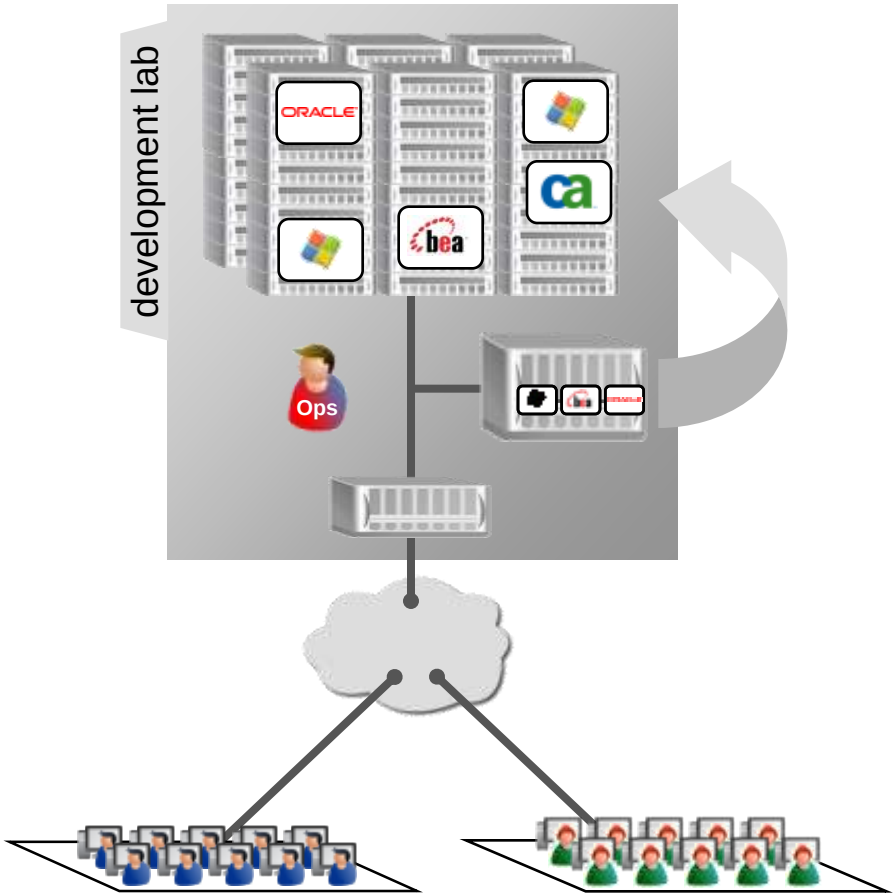
Introducing VMware Lab Manager

- VMware Lab Manager is a prepackaged VI3 application that provides:
  - Self-service provisioning of groups of machines (multi-machine configurations) across software development, test and QA teams, under IT oversight and control
  - Access to a library of configurations that can be setup in seconds with associated disk resource savings
  - Configurations can be deployed concurrently with other copies
  - Library configurations can save CPU and memory state saving provisioning time and allowing bug capture
  - Collaboration through sharing machines and copies of machines
  - Increased server utilization due to sharing of a pool of resources and immediate repurposing of the same hardware
  - Works across sites and geographies



Checking out a configuration from the VLM library

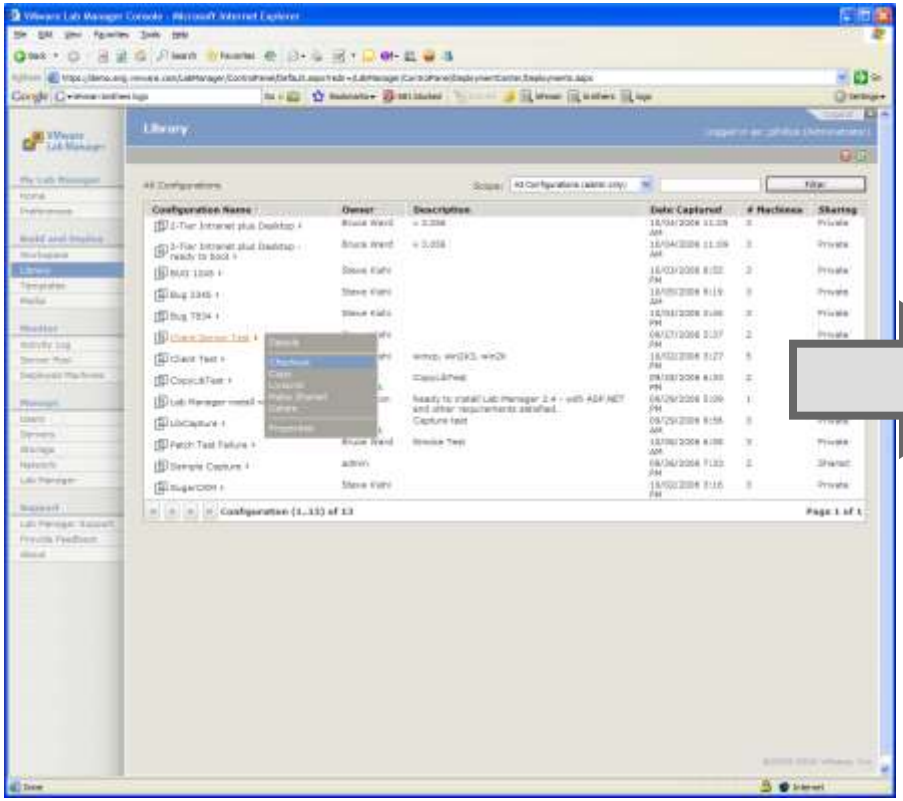


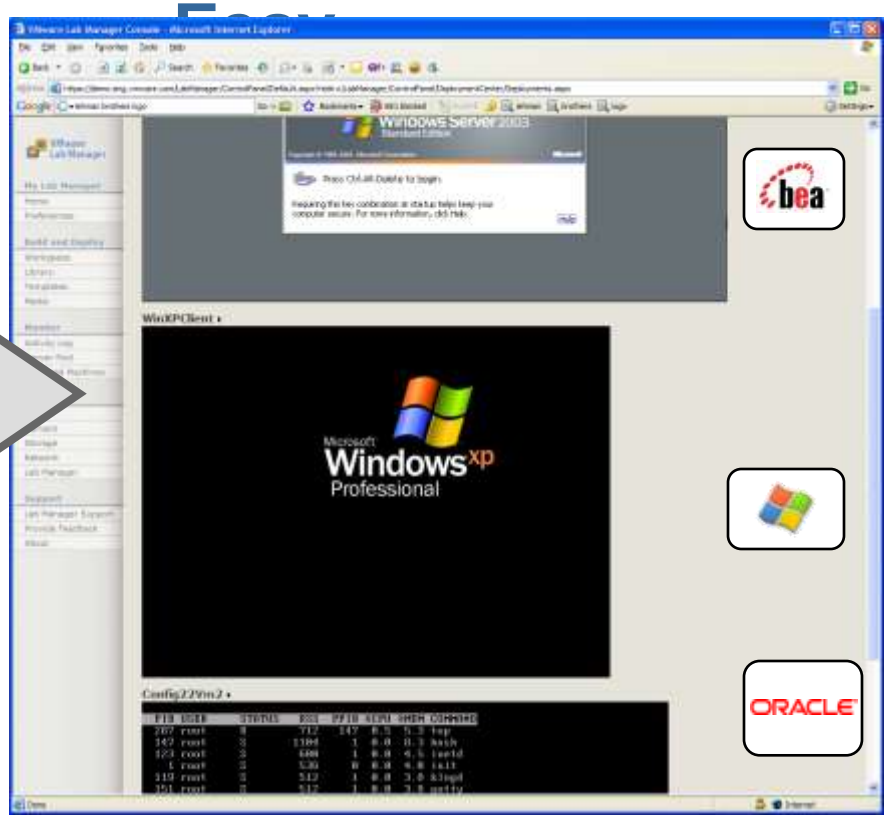
Developer in New Jersey needs Debt Analytics production configuration

Developer Logs in to Lab Manager via browser, browses library and selects *Debt Analytics* configuration

Lab Manager (1) enforces access control and quota policies (2) selects “best” hosts for each VM (3) provides console access for each VM

VMware Lab Manager – Fast and Easy





Self Service Provisioning
Multi-Tier Complete Application Environment (multi-VM)
Easy for non-IT users – Point and click library entry
IT in Control of Policy and Quotas

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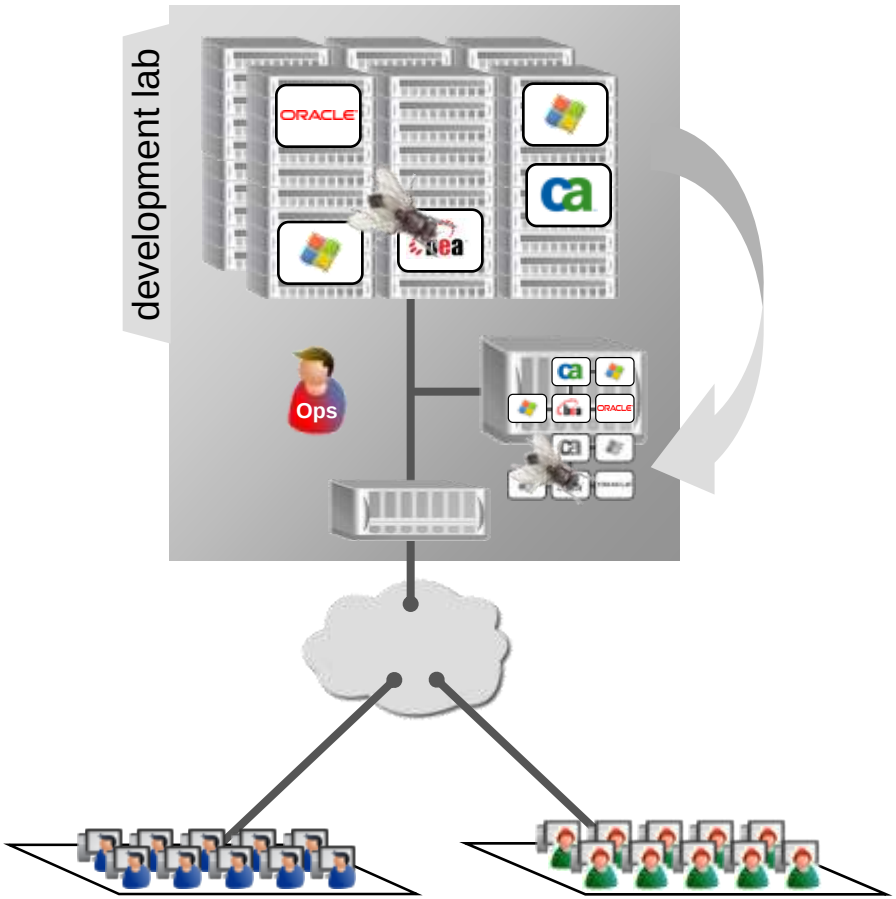
Capturing a configuration to the VLM library



QA Professional in Singapore has discovered a bug.

QA user selects “Capture to Library” on current configuration

Lab Manager (1) enforces access control and quota policies (2) suspends all VMs (3) Captures “net new” library entry and generates LiveLink URL.

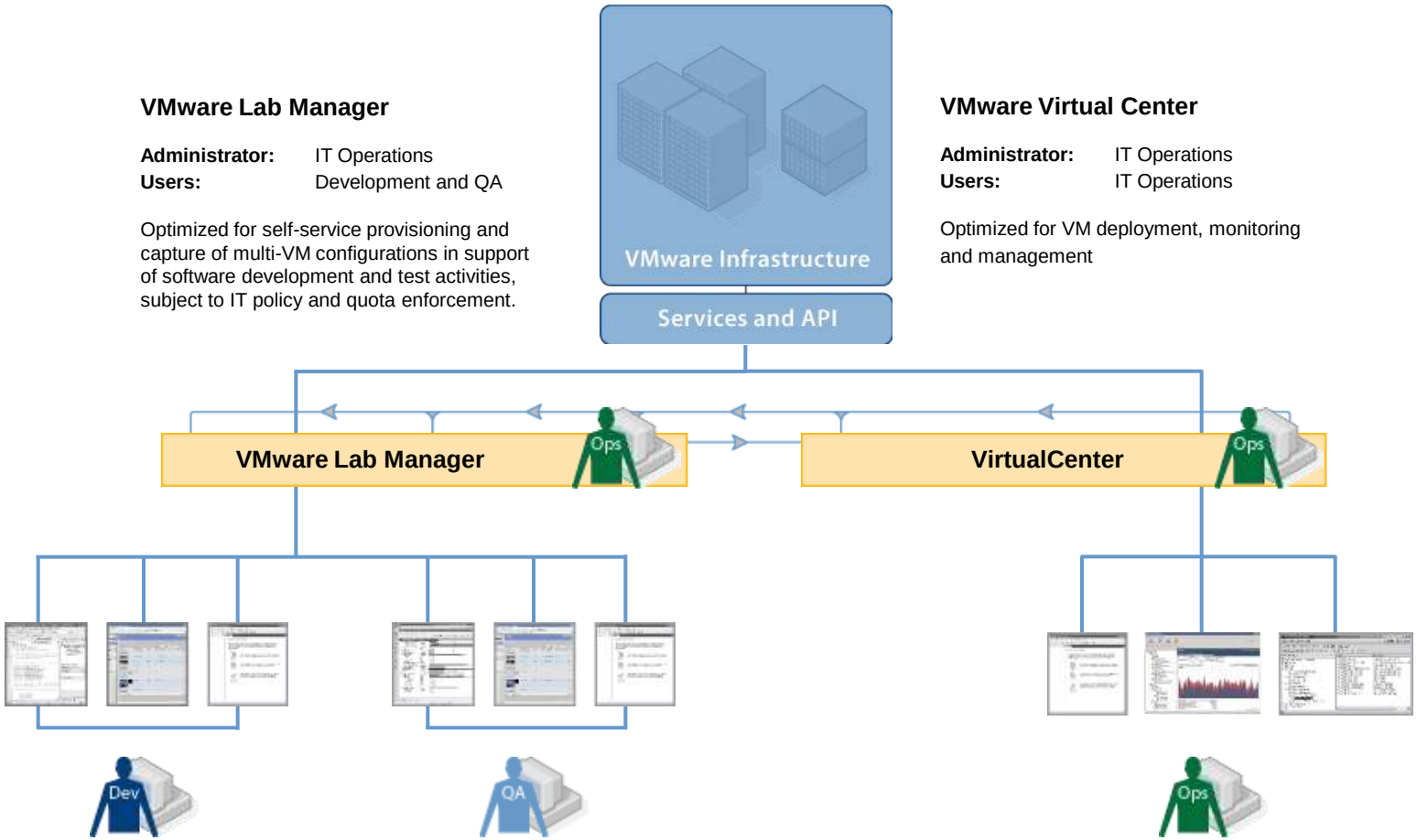
QA professional pastes LiveLink URL in bug report and resumes testing. Developer can then reproduce environment (and bug) on demand by clicking URL in bug report.

How VMware Lab Manager Fits

VMware Lab Manager

Administrator: IT Operations
Users: Development and QA

Optimized for self-service provisioning and capture of multi-VM configurations in support of software development and test activities, subject to IT policy and quota enforcement.



VMware Virtual Center

Administrator: IT Operations
Users: IT Operations

Optimized for VM deployment, monitoring and management

(Operations, Support and Optimization)

The Virtualized Datacenter of the Future

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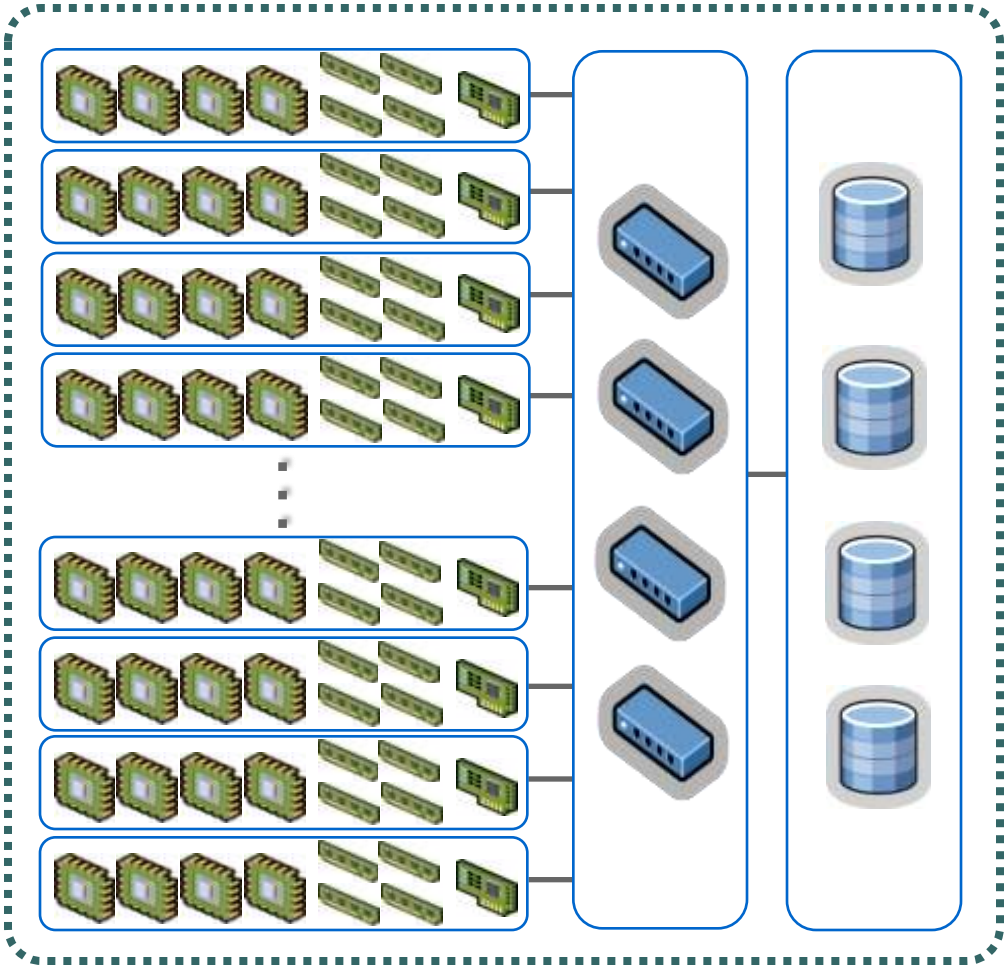
Future Datacenter Virtualization



- Anonymous pool of hardware
- Many virtualization-friendly CPU cores
- Large memories
- Shared, high-bandwidth interconnects
- 10GbE or equivalent network
- Power hungry