Introduction to Virtualization

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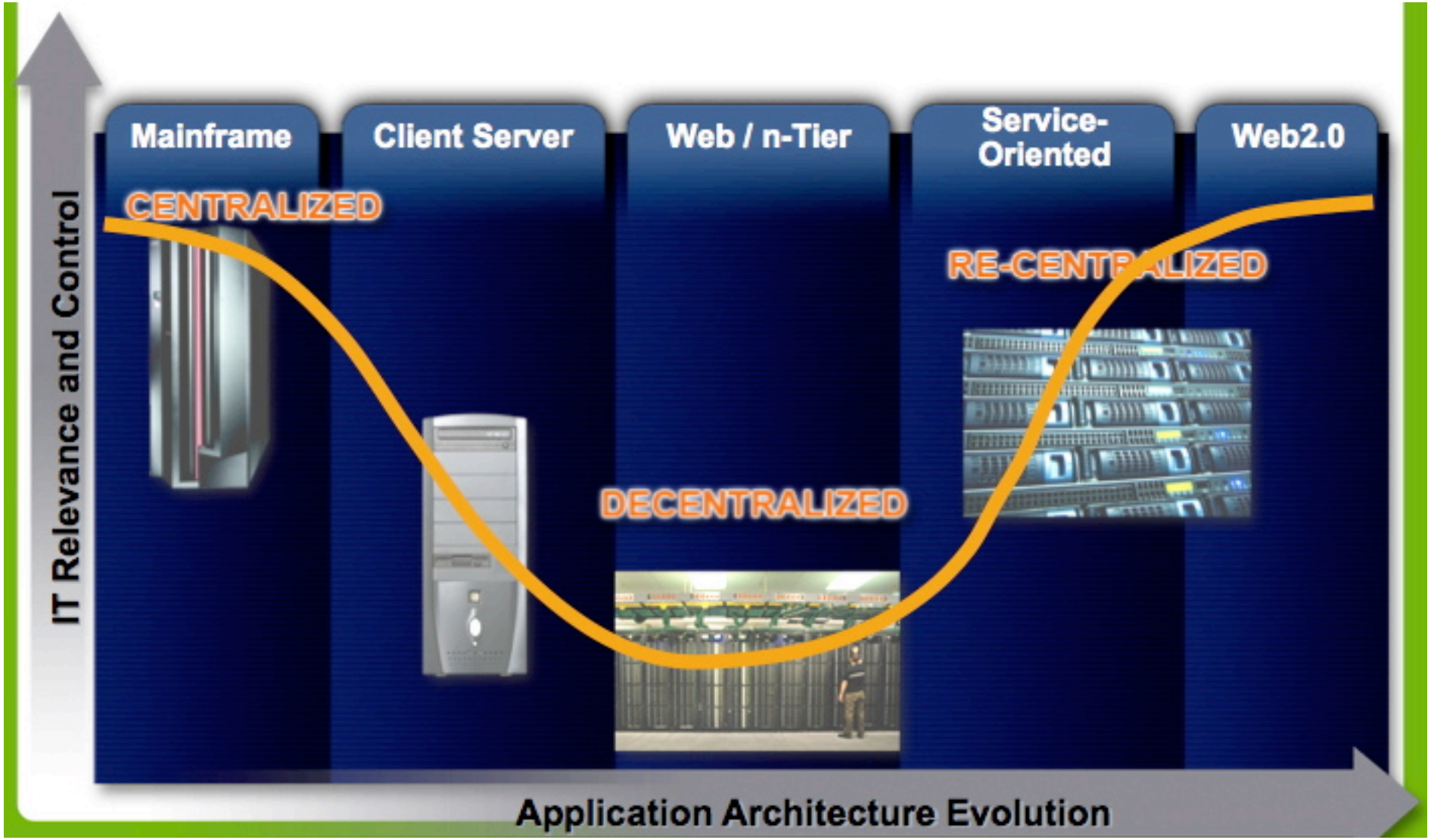
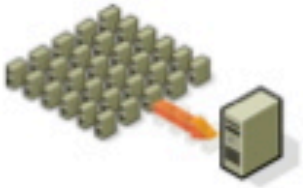
October 29, 2008, 7:20 to 10:00 PM

Data Center Transformation



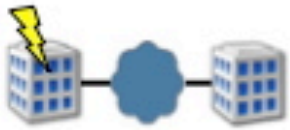
Scope of Virtualization Services

Server Consolidation



Reduce CapEx / OpEx

High Availability Disaster Recovery



Business Continuity Compliance

Infrastructure Optimization

Predictive Resource Planning

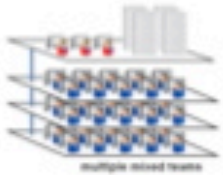
Infrastructure Automation

Service Catalogs & Compliance

Client Virtualization

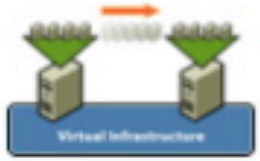
Mobility & Security

Software Lifecycle Mgt



Reduce Time to Market /

Intelligent Infrastructure



On-Demand Resources

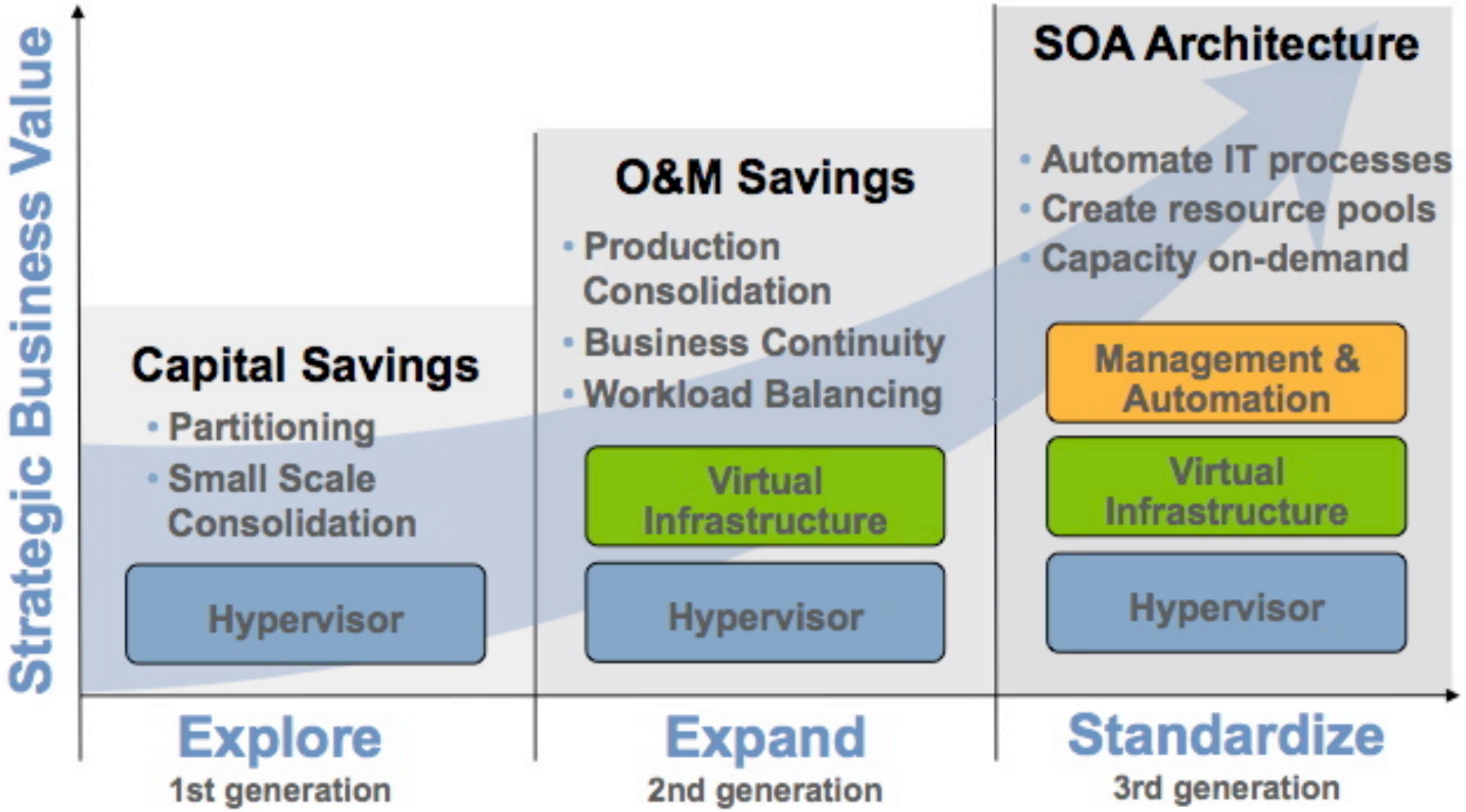
Secured Computing

Virtualization Security

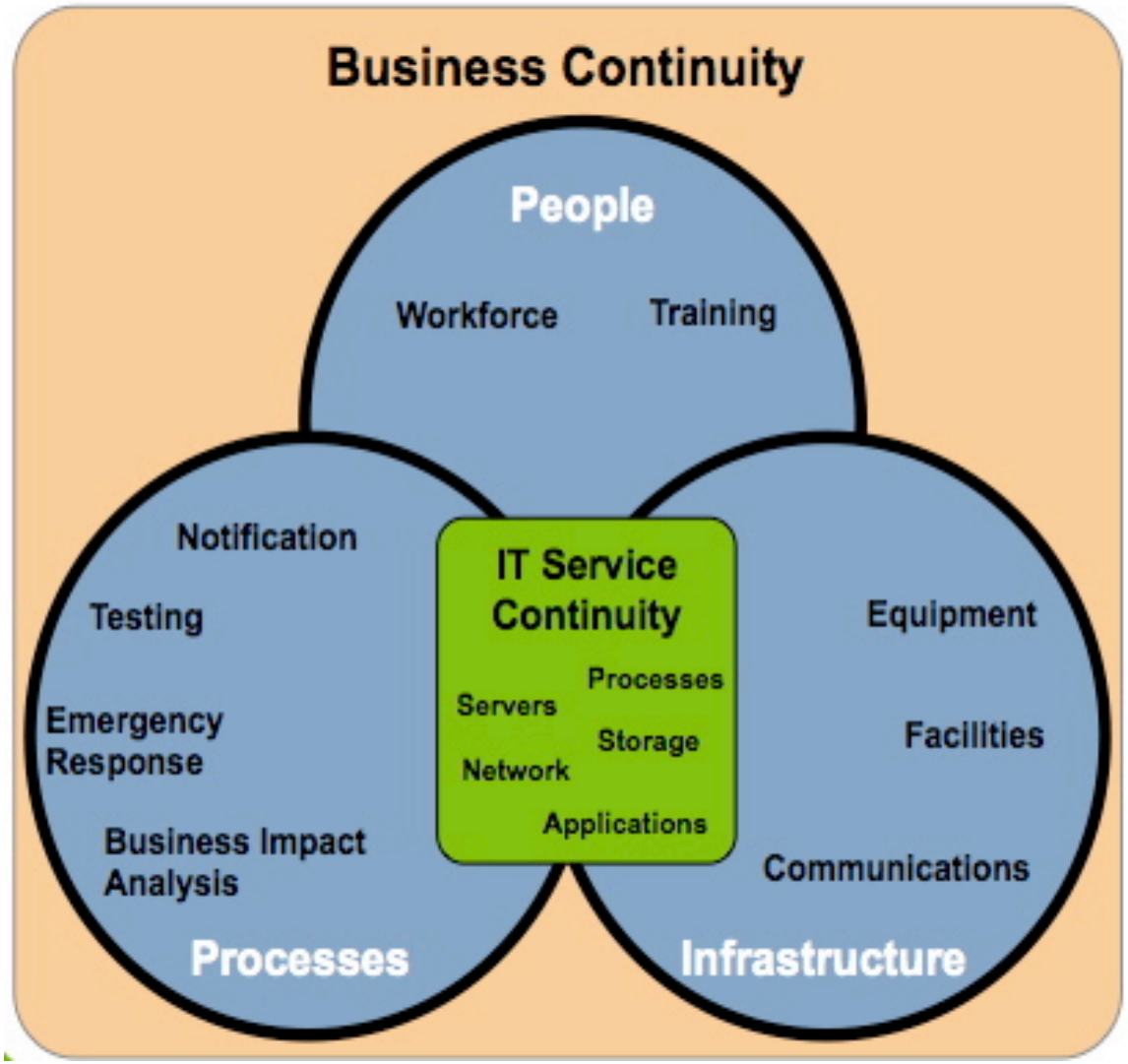
Applications

Ready to Run Applications

Virtualization Evolution



Business Continuity is the Objective



IT Service Continuity is a key element in the broader business continuity framework

IT Service Continuity = preventing and minimizing disruption from IT outages

- **Resiliency**
- **Reliability**
- **Manageability**

How to Understand the Virtualization Development

- Virtualization is an industry-changing movement that will touches all aspects of IT infrastructure and drive new levels of flexibility and dynamism in IT.
- Virtualization is addressing the process and operational issues around deploying and managing a large-scale virtual environment.

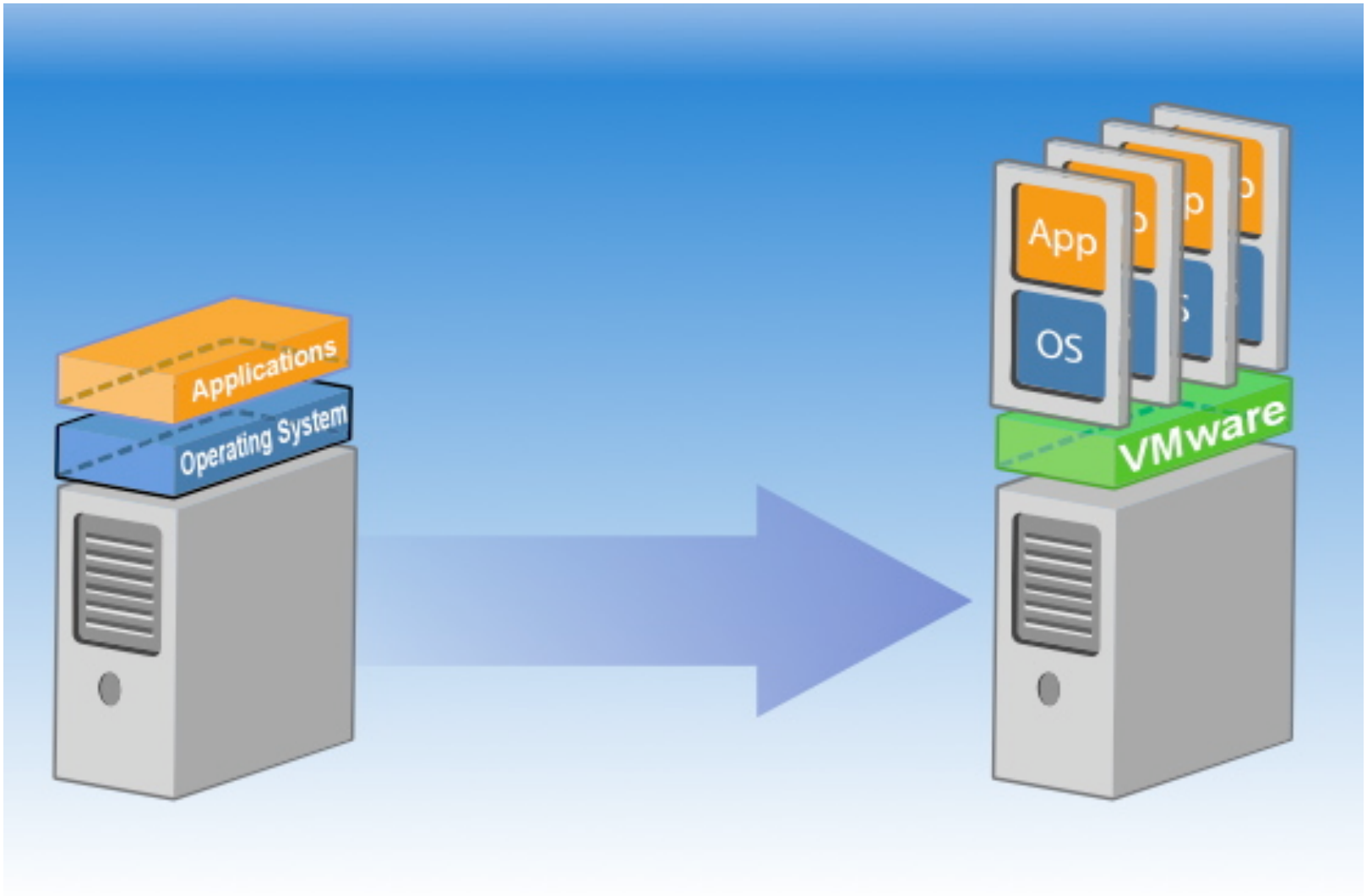
Part I

Virtualization Concepts

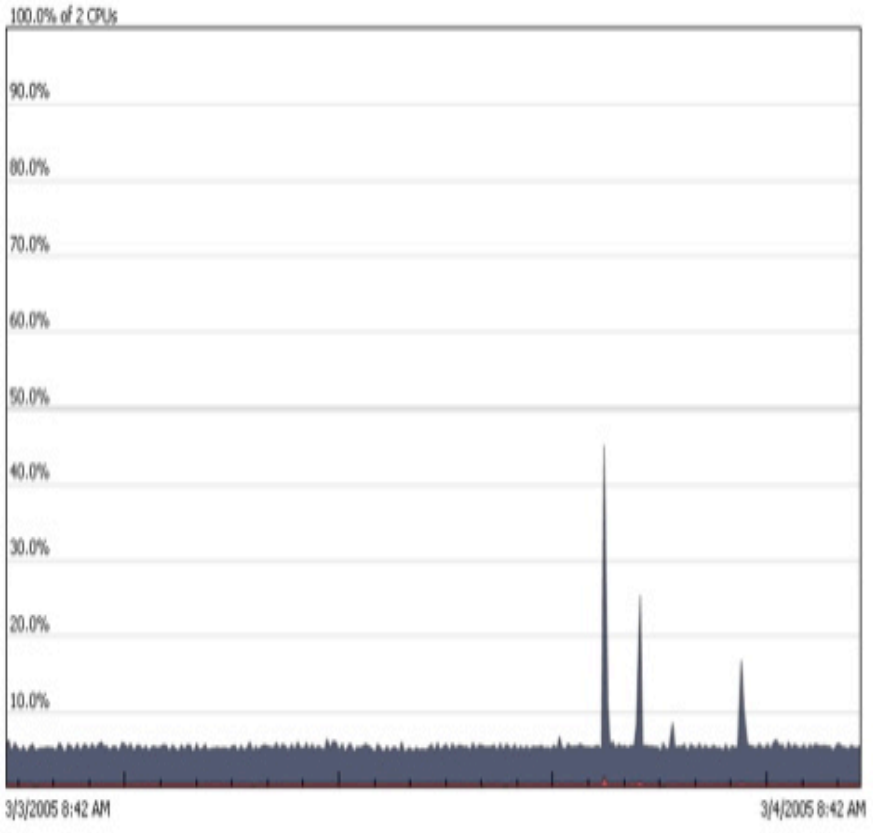
The Existing Role of the Operating System

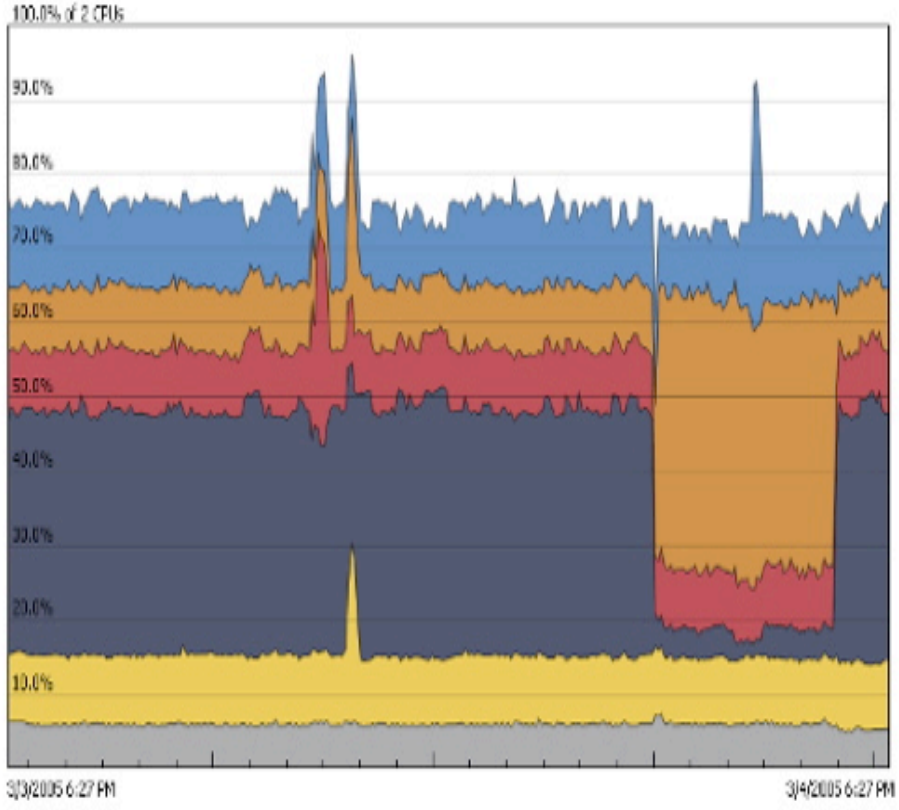
Virtualization is Based on Insertion of a Hypervisor on Top of Hardware

Virtualization Allows Transformation of a Server for Multiple Applications



Capacity Utilization: Stand-Alone vs. Virtualized Servers

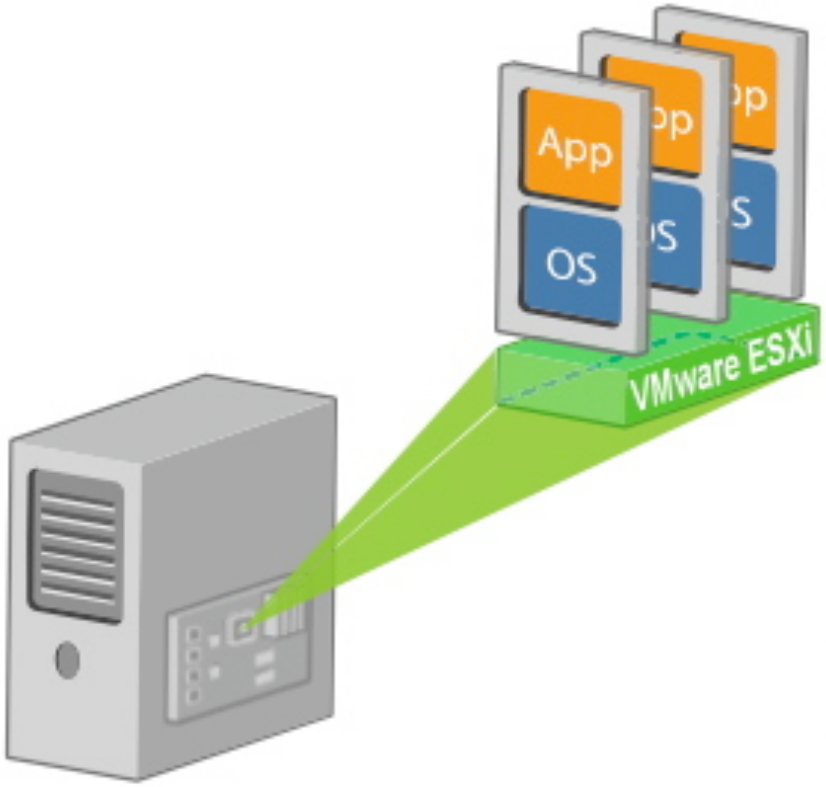




Dedicated Application

Virtualized Applications

Hypervisor Installs Immediately – Supports Desktops and Laptops



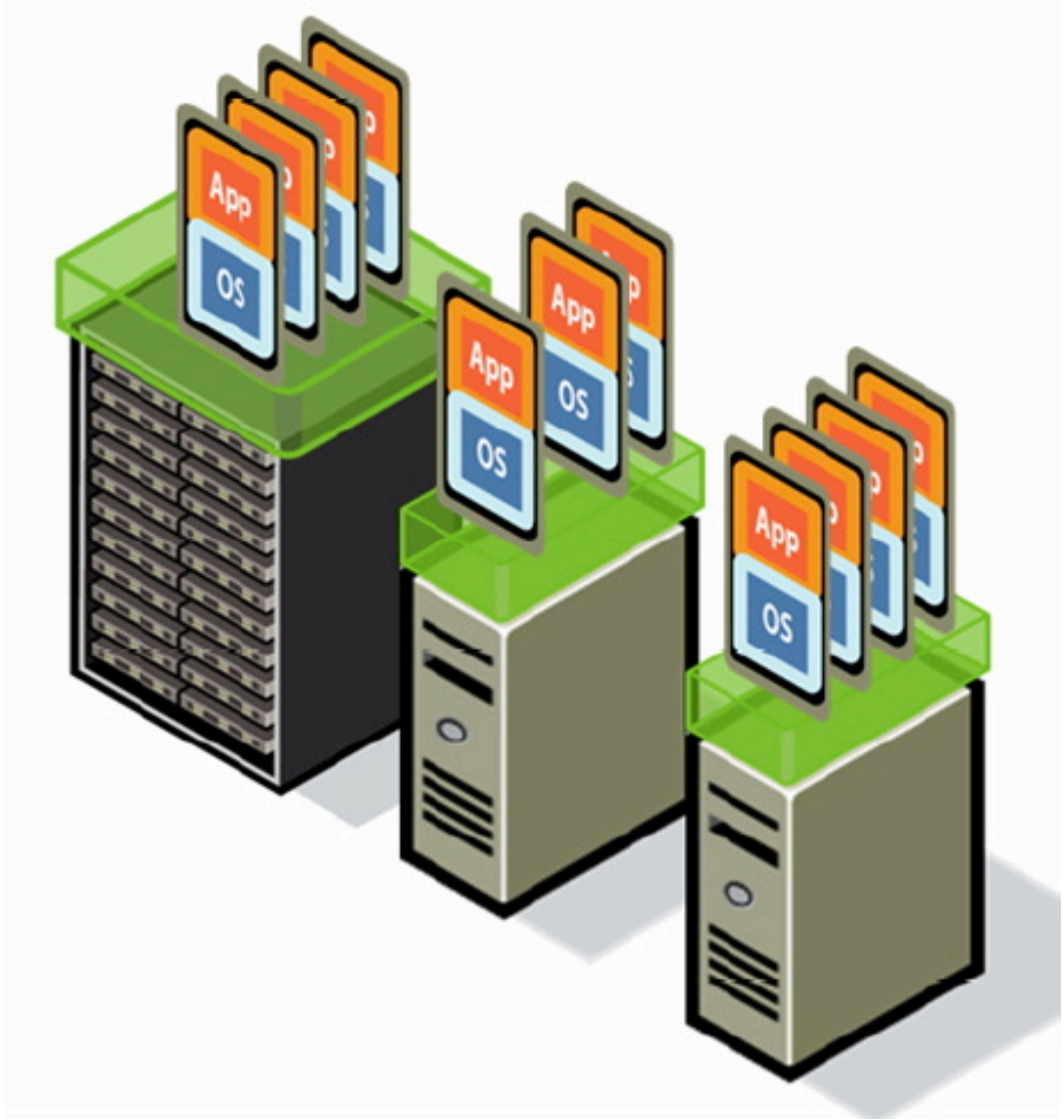
32MB footprint:
Increased security and reliability

No installation:
From server boot to running VMs in minutes

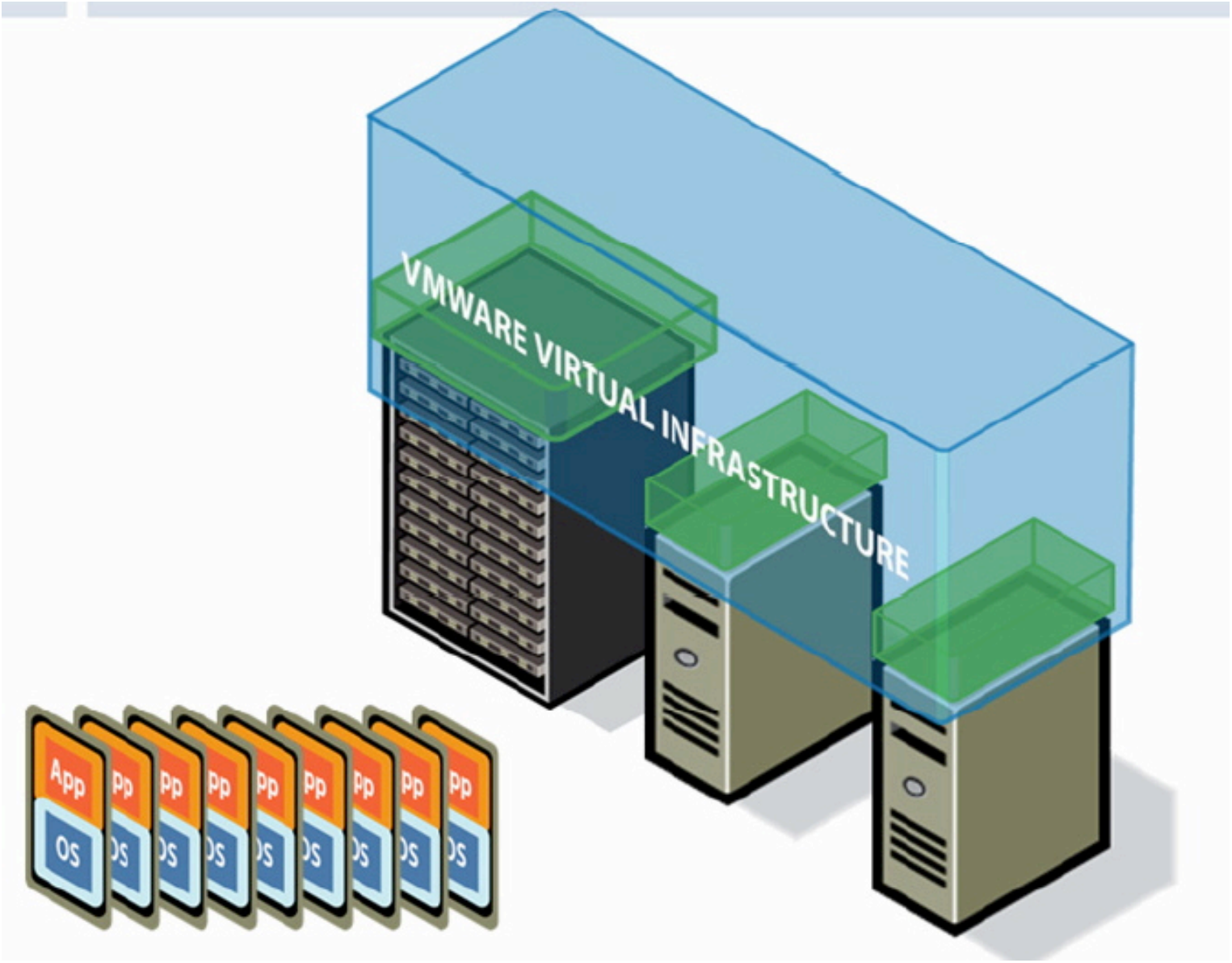
DELL NEC

hp invent IBM FUJITSU FUJITSU SIEMENS

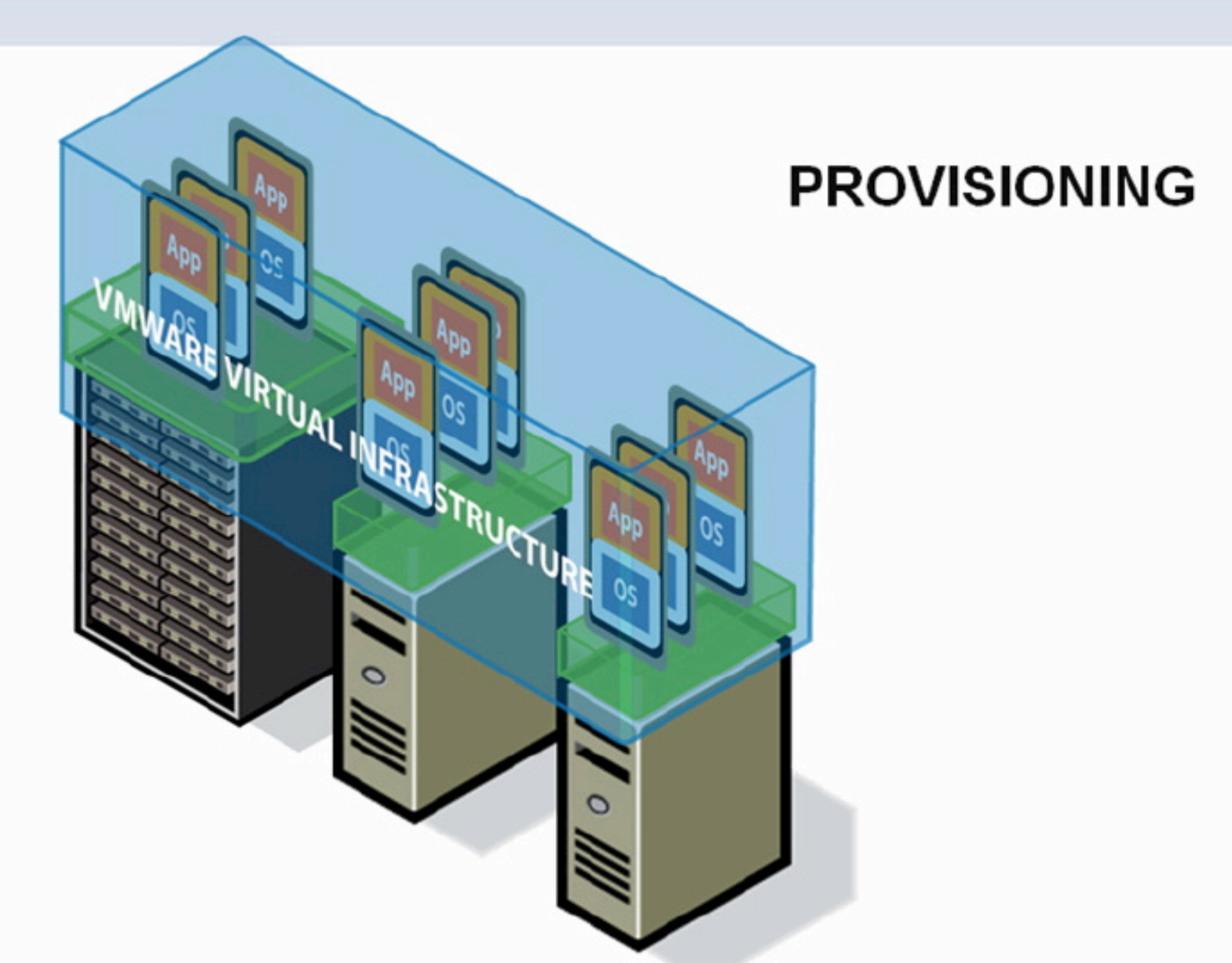
Virtual Machines Run on Any Hardware Configuration



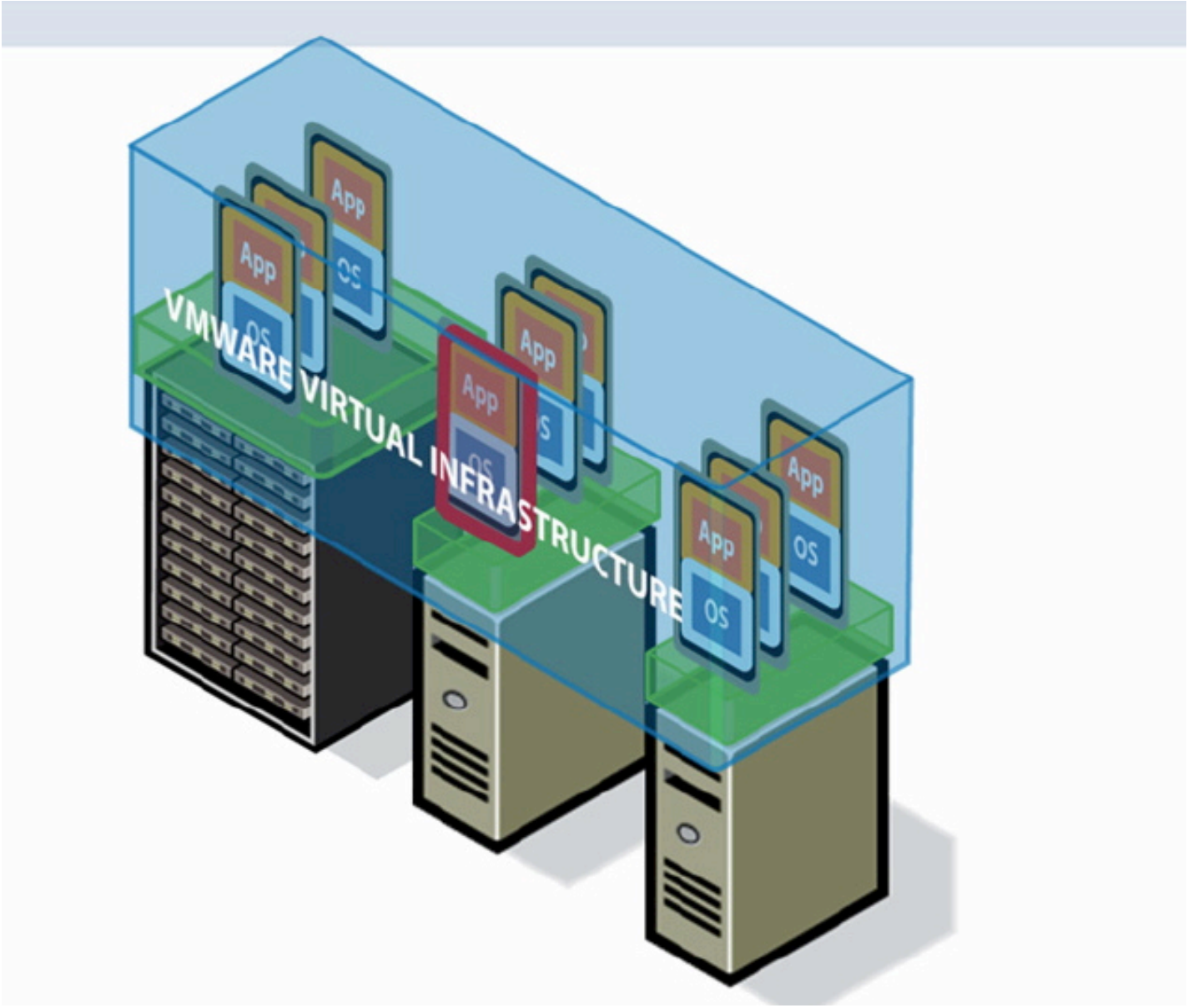
Virtual Machines Can Run on a Shared Infrastructure



A Single Software Can Span Different Hardware Components



Virtualization Allows Moving Applications Without Service Interruption

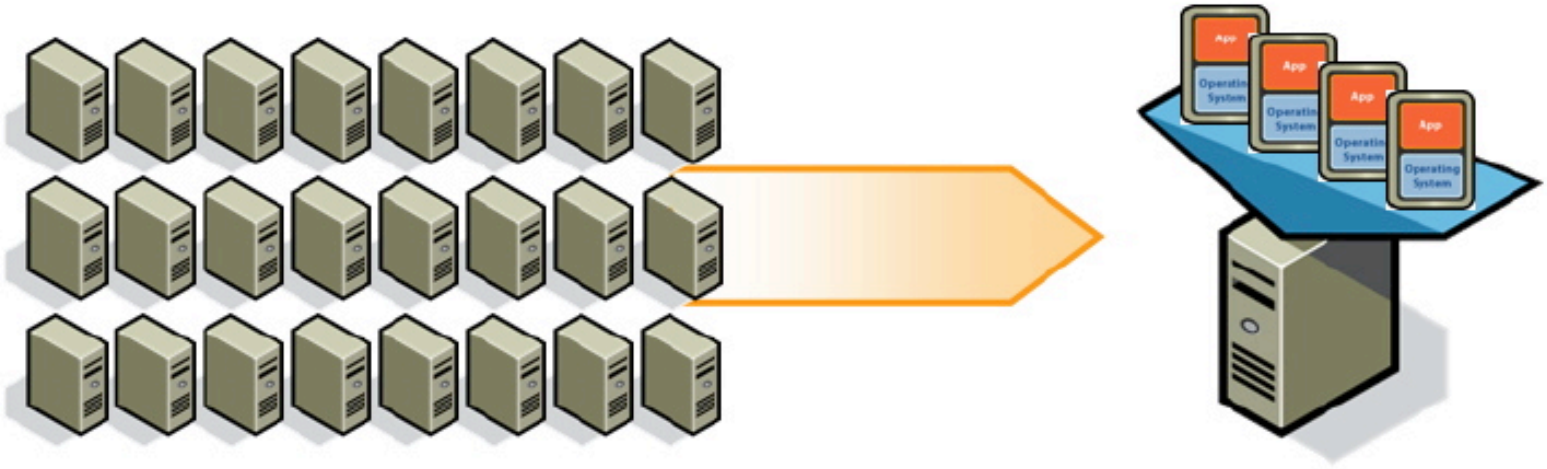


Advantages of Virtualization

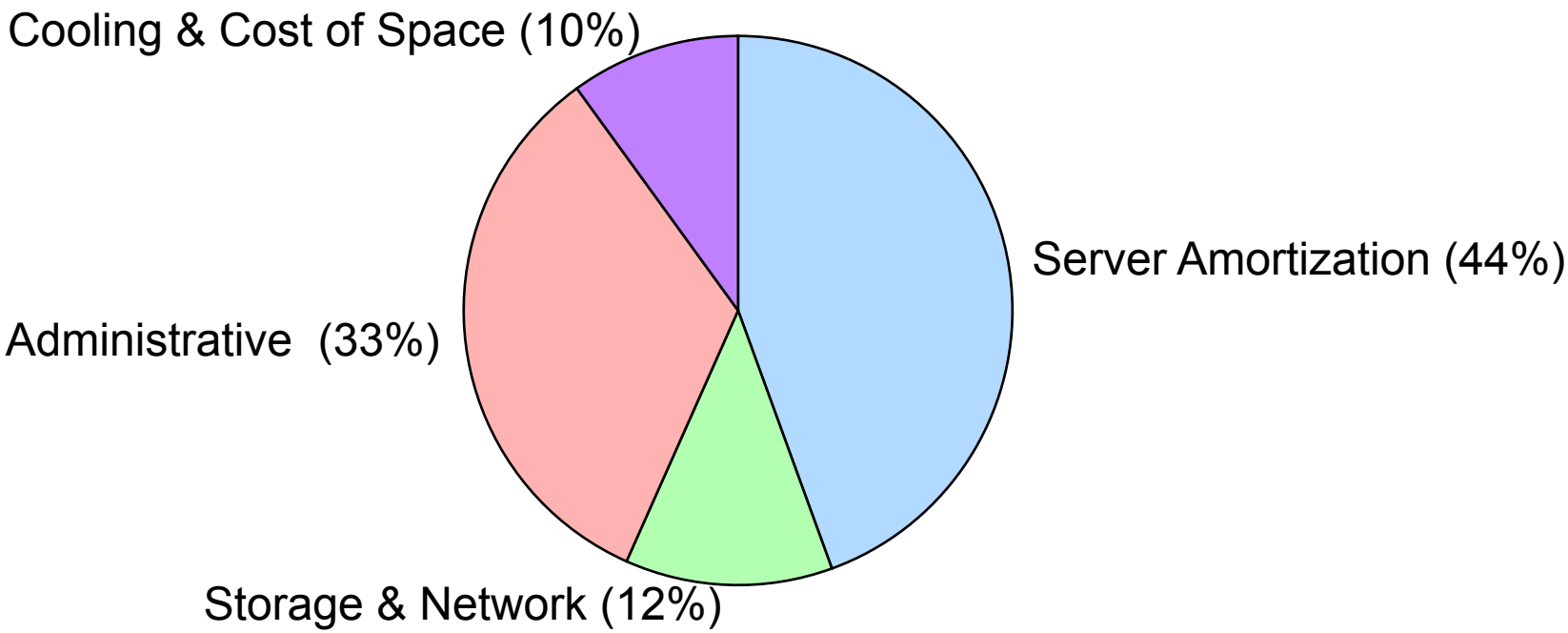
- Zero downtime maintenance
- Freedom from vendor-imposed upgrade cycles
- Instant provisioning
- Pooling hardware resource
- Virtual hardware supports legacy operating systems efficiently
- Dynamic resource sharing
- Security and fault isolation
- Business continuity, backups, and automated restoration

Example of the Impact of Virtualization

	Before	After
Servers	> 1,000	> 50
Storage	> Direct attach	> Tiered SAN and NAS
Network	> 3000 cables/ports	> 300 cables/ports
Facilities	> 200 racks	> 10 racks
	> 400 power whips	> 20 power whips



Labor Costs are 1/3 of the Costs of a Server



Operations Require One Staff per 200-400 Virtual Machines

Before

From 20–40 hrs to build a server and re-load application…

- Build and configure hardware
- Load operating system
- Load configuration tools (Backup, Resource Kit, Monitoring, etc…)
- Assign 2 IP addresses
- Build 3 network connections, copper or fiber
- Turn over to applications team to re-load and re-configure software
- Test applications
- Coordinate outage/data migration

After

…To 15–30 min to copy a virtual machine and restart

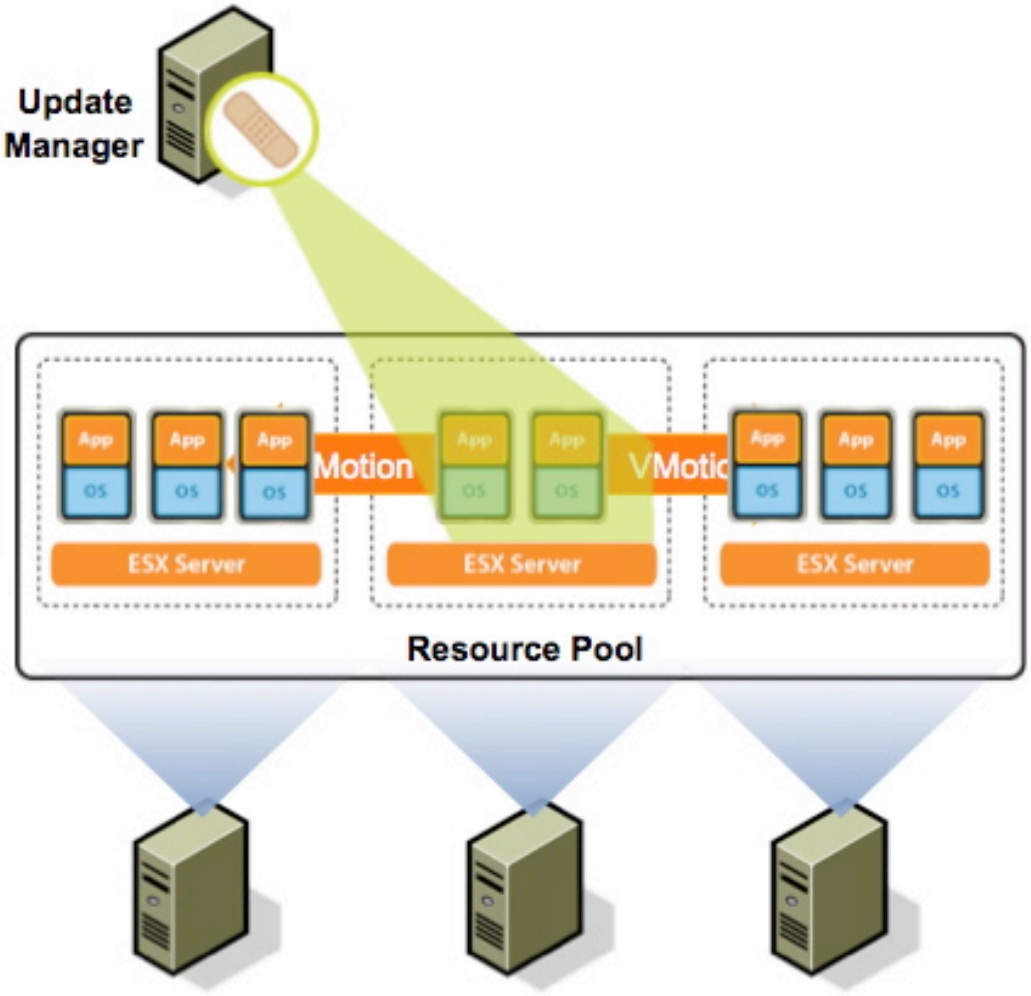
333 servers replaced per year = ~ 10,000 man/hrs saved

Note: Without virtualization one staff can handle up to 30 servers.

Examples of Productivity Using Virtualization

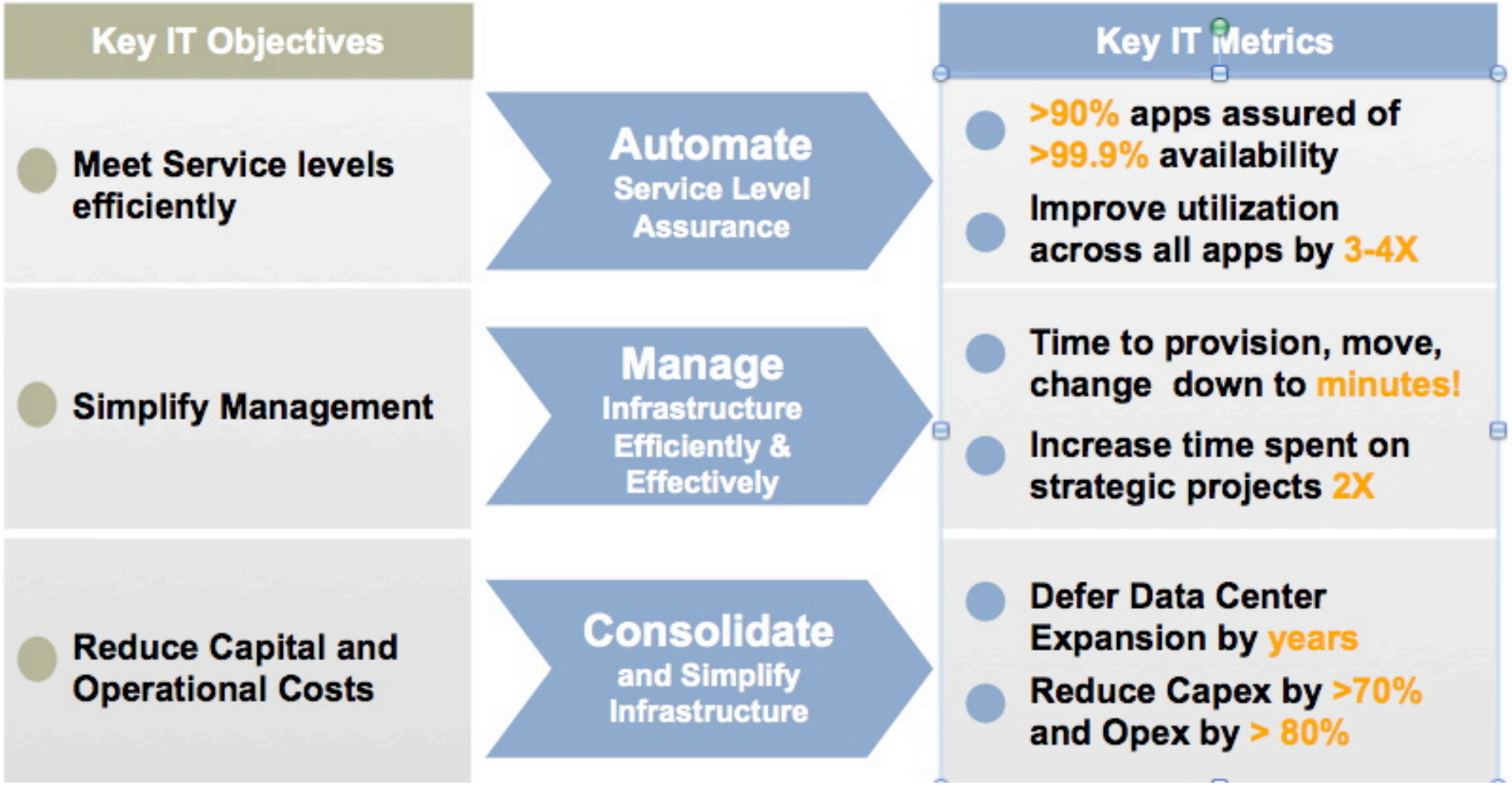
	BEFORE	AFTER
Instant Provisioning	> 4-6 weeks	> Fully automated to days
Live Migration	> Hardware maintenance window; app migration takes days/weeks	> No maintenance window or planned downtime; migrate app in seconds
Patch Management	> Patch each host manually with downtime	> Automated patching with no downtime
Disaster Recovery	> Weekend testing, uncertain restore	> Automated testing during day, quick/reliable restore
Service Delivery	> Slow, error-prone development / testing	> Automated self-service development / testing
	> Iterative, error-prone release management	> Push-button, precise release management

Non-Disruptive Automated Patch Management



- Automates patching of hosts and virtual machines with NO DOWNTIME
  - Scans and remedies online and offline virtual machines
  - Snapshots virtual machines prior to patching and allows rollback to snapshot
- Patches entire clusters
  - Each host enters maintenance mode, one at a time
  - Entirely automated – no intervention required

Transforming Costs, Efficiency and Availability



Impact of Virtualization

Hard cost savings

- 70-80% reduction in data center space, power infrastructure
- $8M cumulative savings since 2003

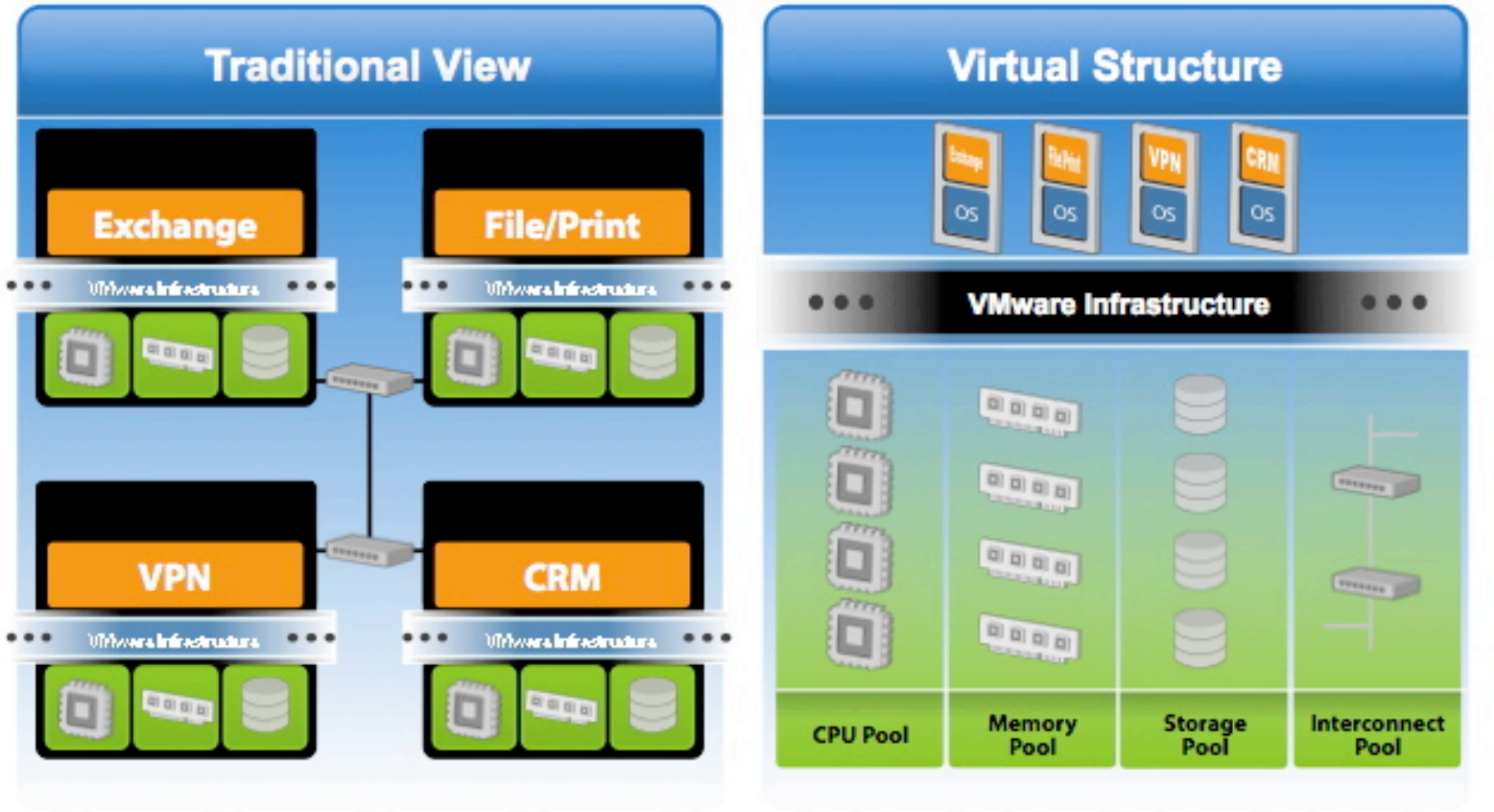
Operational efficiency

- Server rebuild and application load went from 20-40 hrs =>15-30 min
- 10,000 man hours saved per year

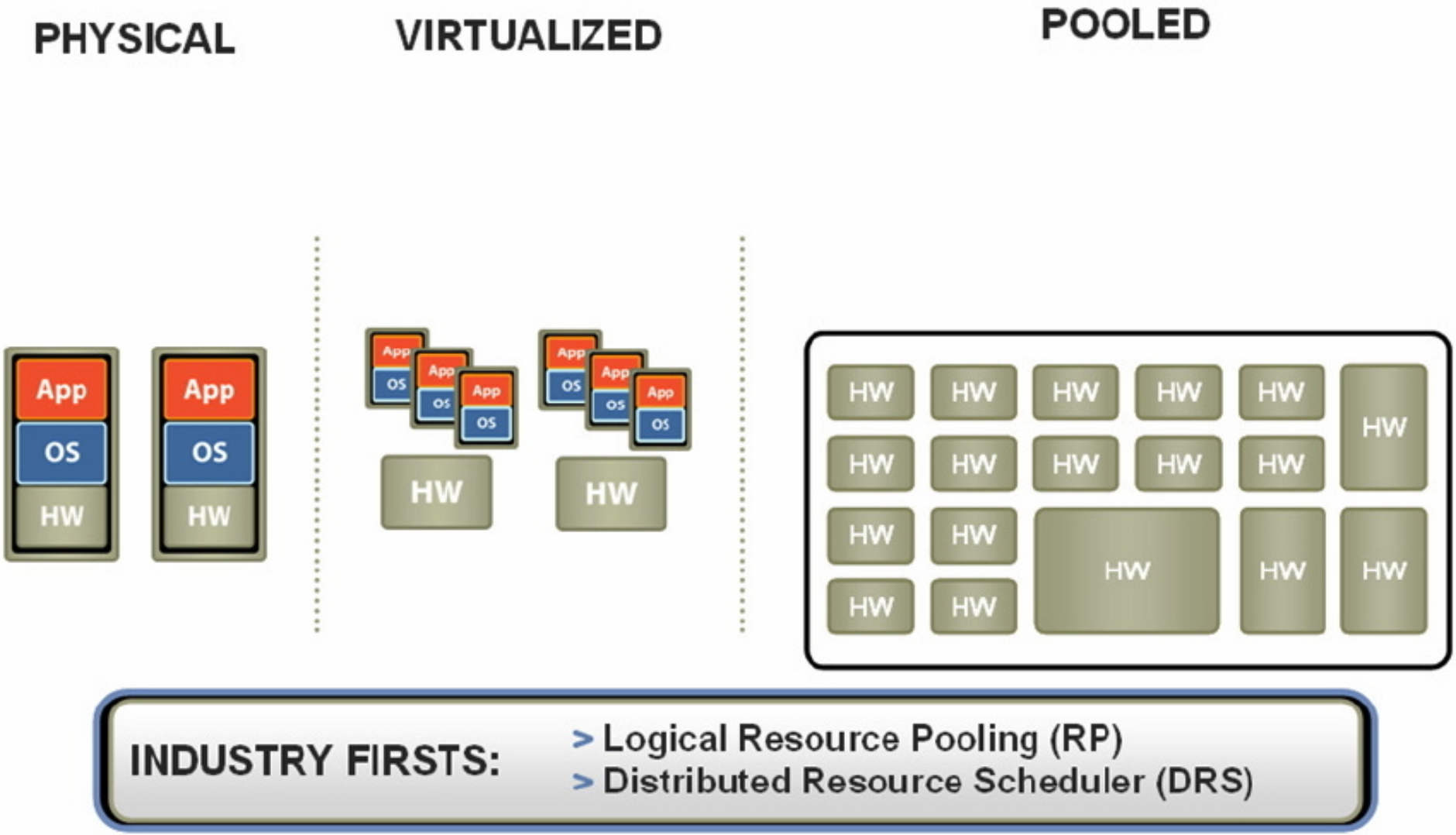
Part II

Deploying Virtualization

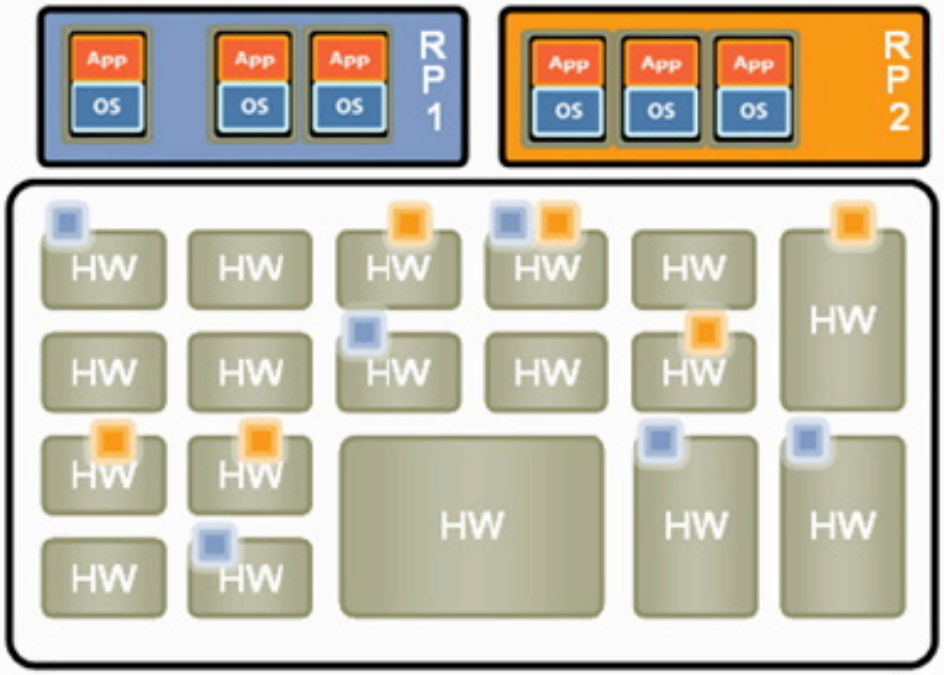
From Dedicated Processing to Pooled Processing



Pooling of Hardware for Shared Capacity Performance



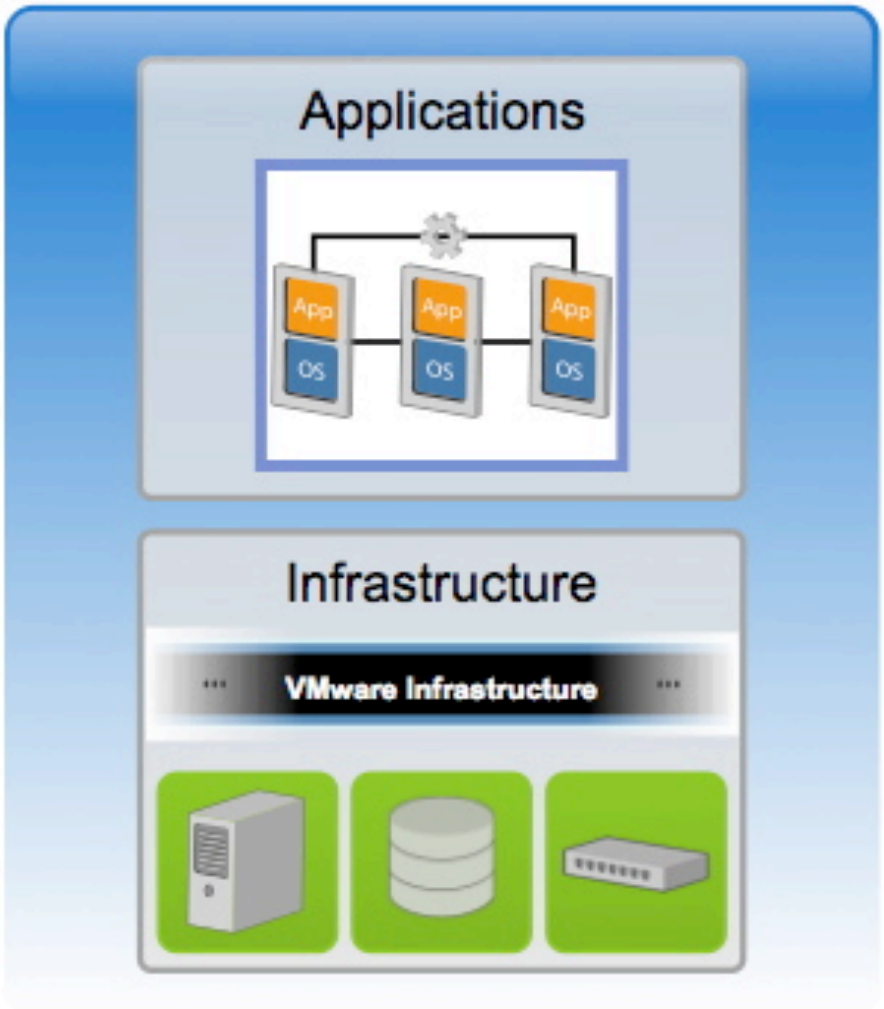
Logical Resource Pooling and Distributed Resource Scheduling



INDUSTRY FIRSTS:

> Logical Resource Pooling (RP)
> Distributed Resource Scheduler (DRS)

Where to Run Your Application?



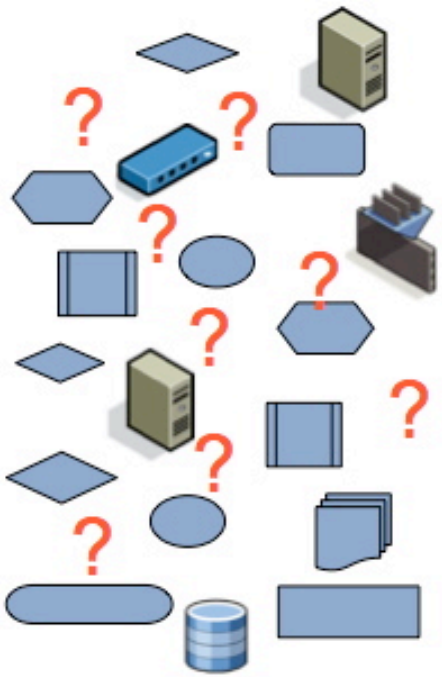
Best place to run your applications

- Guarantee application performance
- Fast recovery from hardware or software failure
- Security threats detected and eliminated
- Application delivery is automated

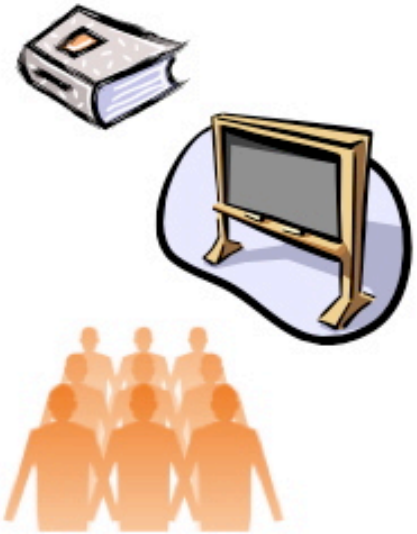
Business Continuity

Challenges of Traditional Disaster Recovery

Complex recovery processes and infrastructure



Dependent on perfect training, documentation, and execution



Failure to meet recovery requirements

- Recovery takes days to weeks
- Recovery tests often fail
- Significant IT time and resources consumed

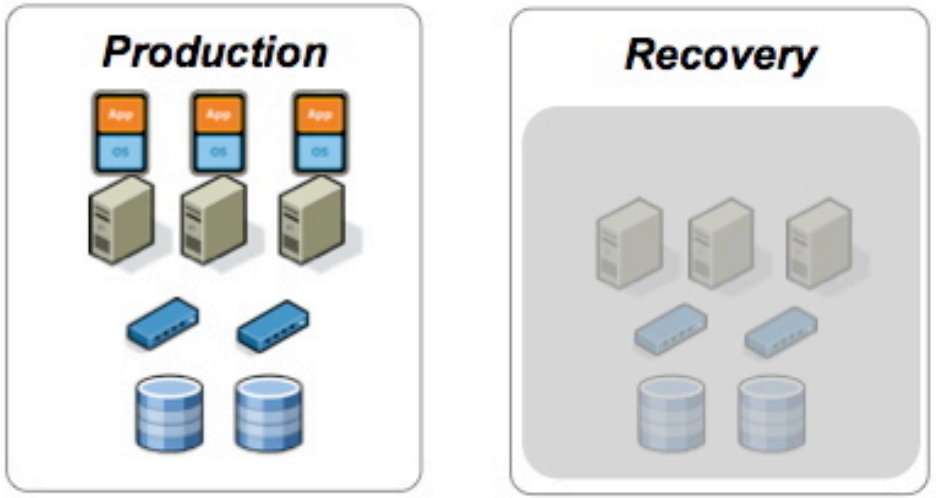
Infrastructure Challenges of Traditional Recovery

Fastest, most reliable recovery requires duplicating infrastructure

- Same servers, same network configuration, etc.
- Requires ongoing management

Idle infrastructure at recovery site

- Difficult to share
- Time-consuming to repurpose

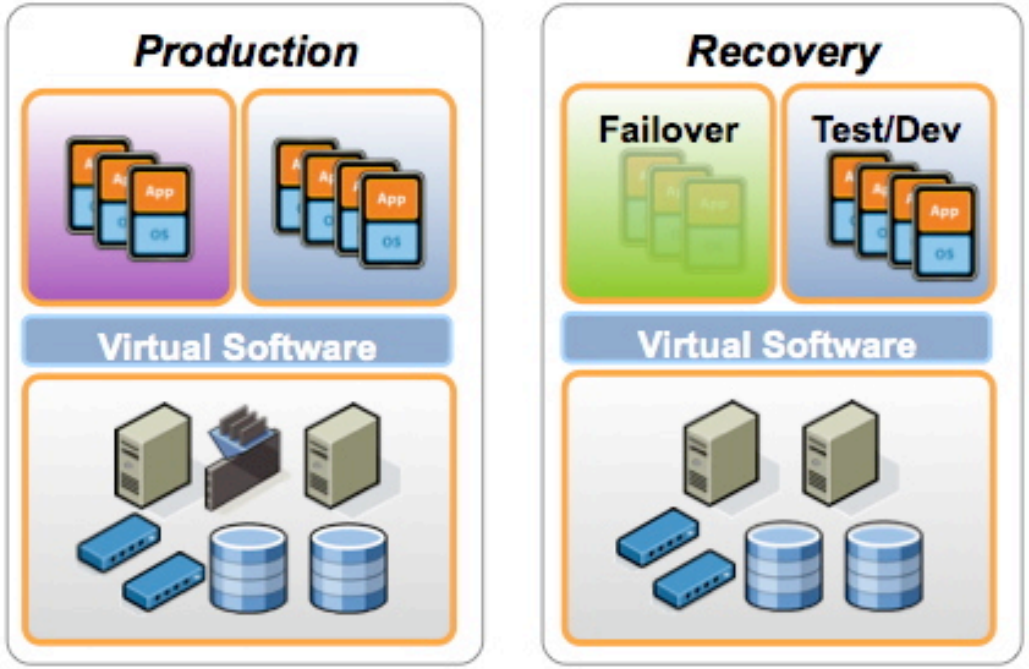


Organizations spend significant time and money on recovery infrastructure that is rarely used

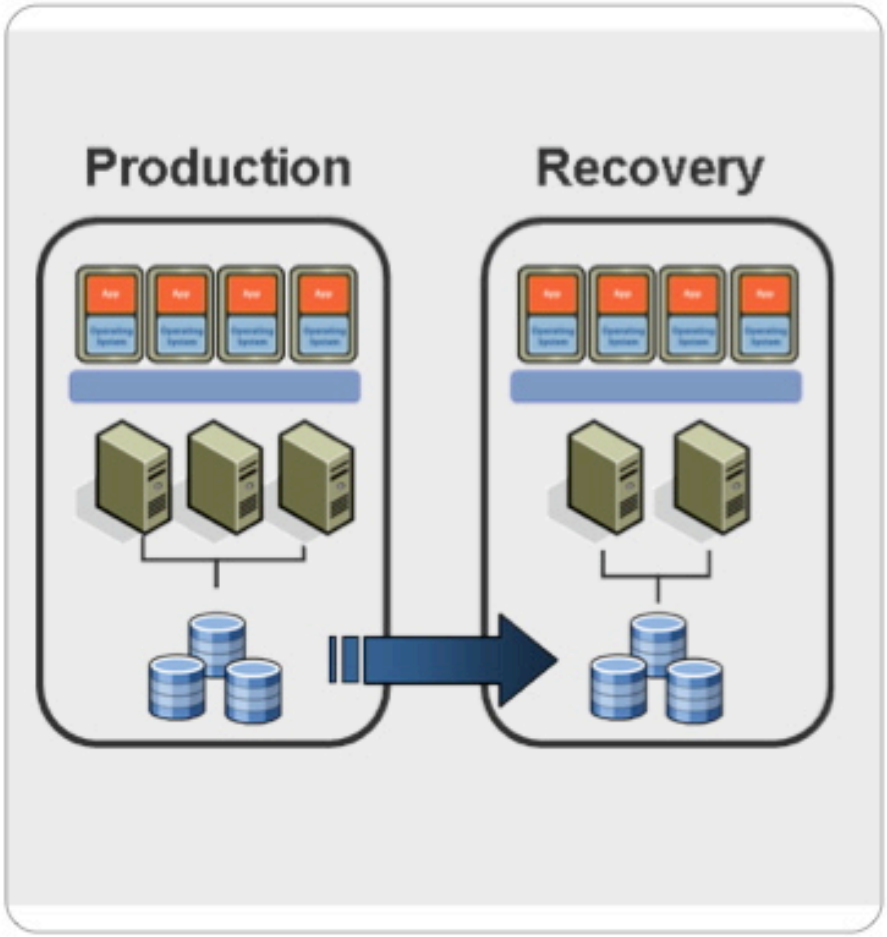
Making Better Use of Recovery Infrastructure

Turn recovery site into productive resource

- Leverage recovery site for other workloads
- Easy to leverage recovery infrastructure for testing
- Resource guarantees ensure predictable resource allocation



Virtual Site Recovery Management



- Simplifies and automates disaster recovery workflows:
  - Setup, testing, failover
- Turns manual recovery runbooks into automated recovery plans
- Provides central management of recovery plans from central control

A virtual Infrastructure makes disaster recovery rapid, reliable and manageable

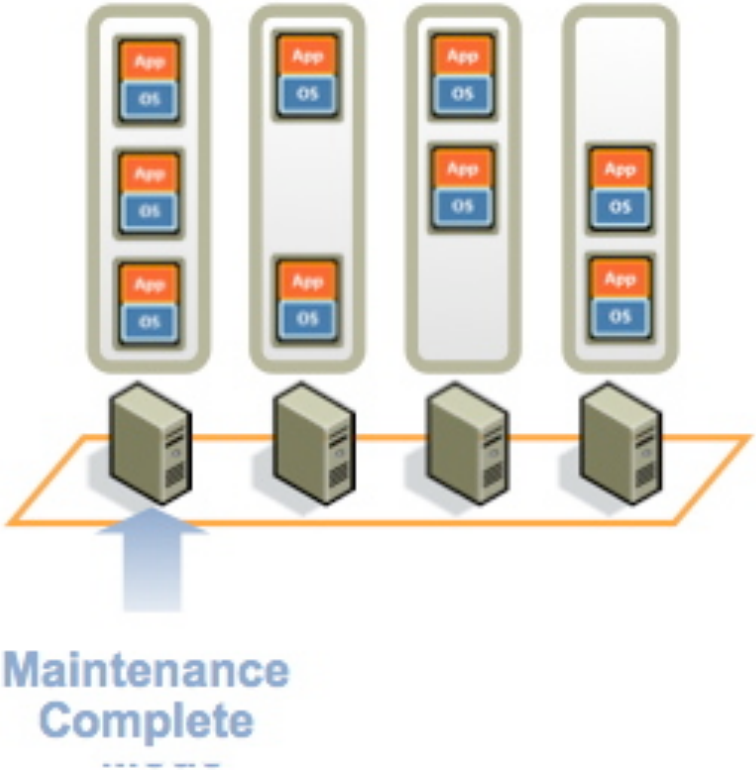
Eliminating Downtime for Hardware Maintenance

Hardware maintenance with Virtual Infrastructure

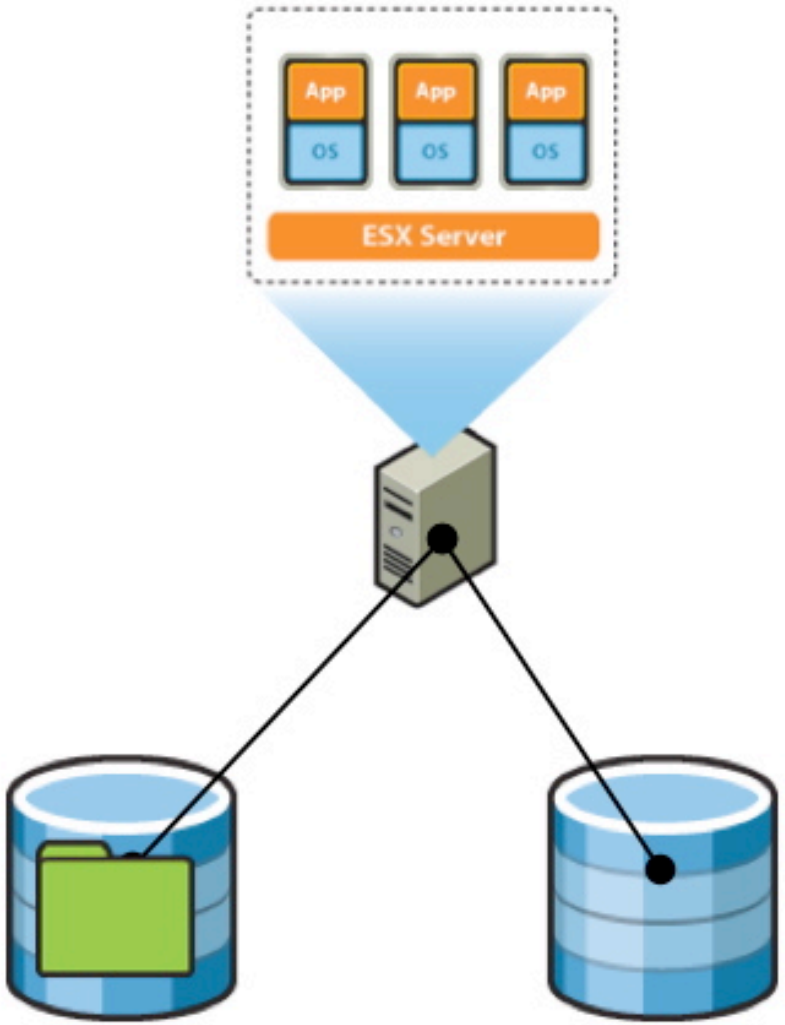
- Automated redistribution of workloads to other servers in pool
- Automatic redistribution when server maintenance complete

Impact

- Non-disruptive hardware maintenance:
  - *No* application downtime
  - *No* user impact
  - *No* downtime window



Eliminating Downtime for Storage Changes



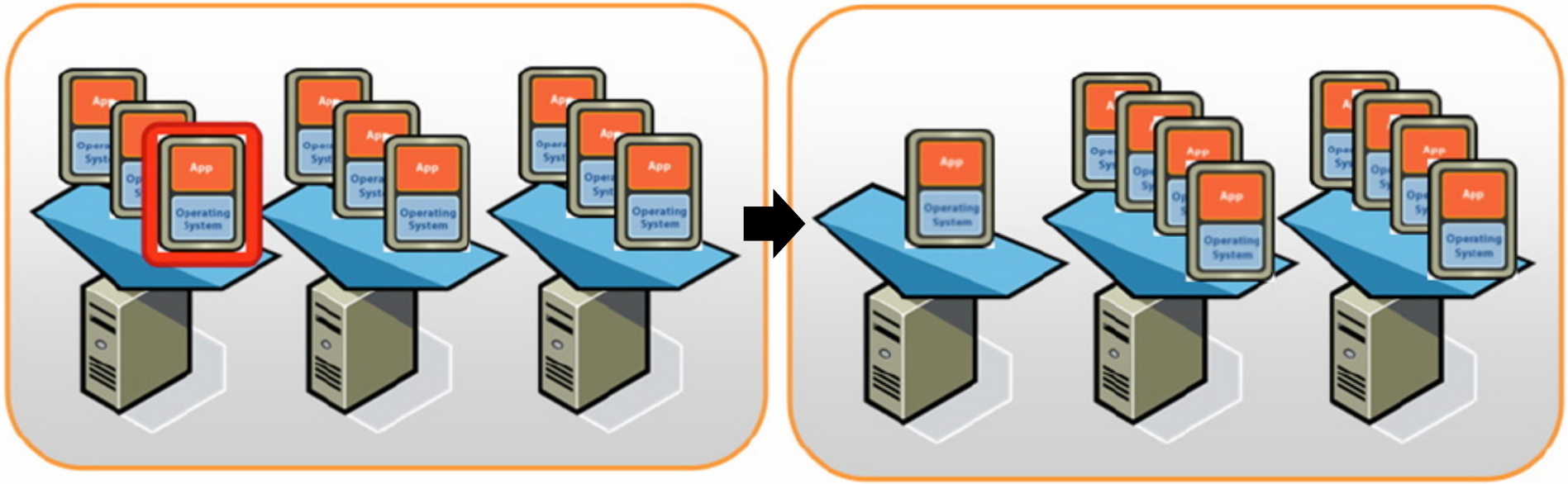
Examples

- Redistributing load
- Optimizing storage configuration
- Storage refresh

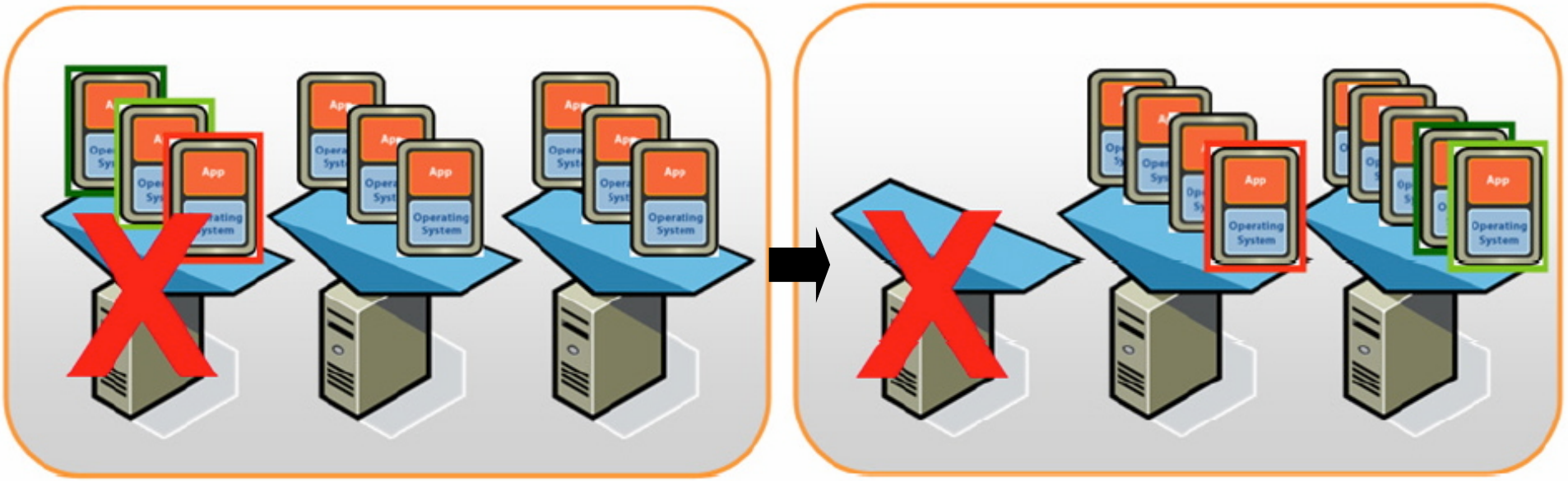
Storage Migration

- Online migration of virtual machine disks to new datastore
- Zero downtime for applications and users

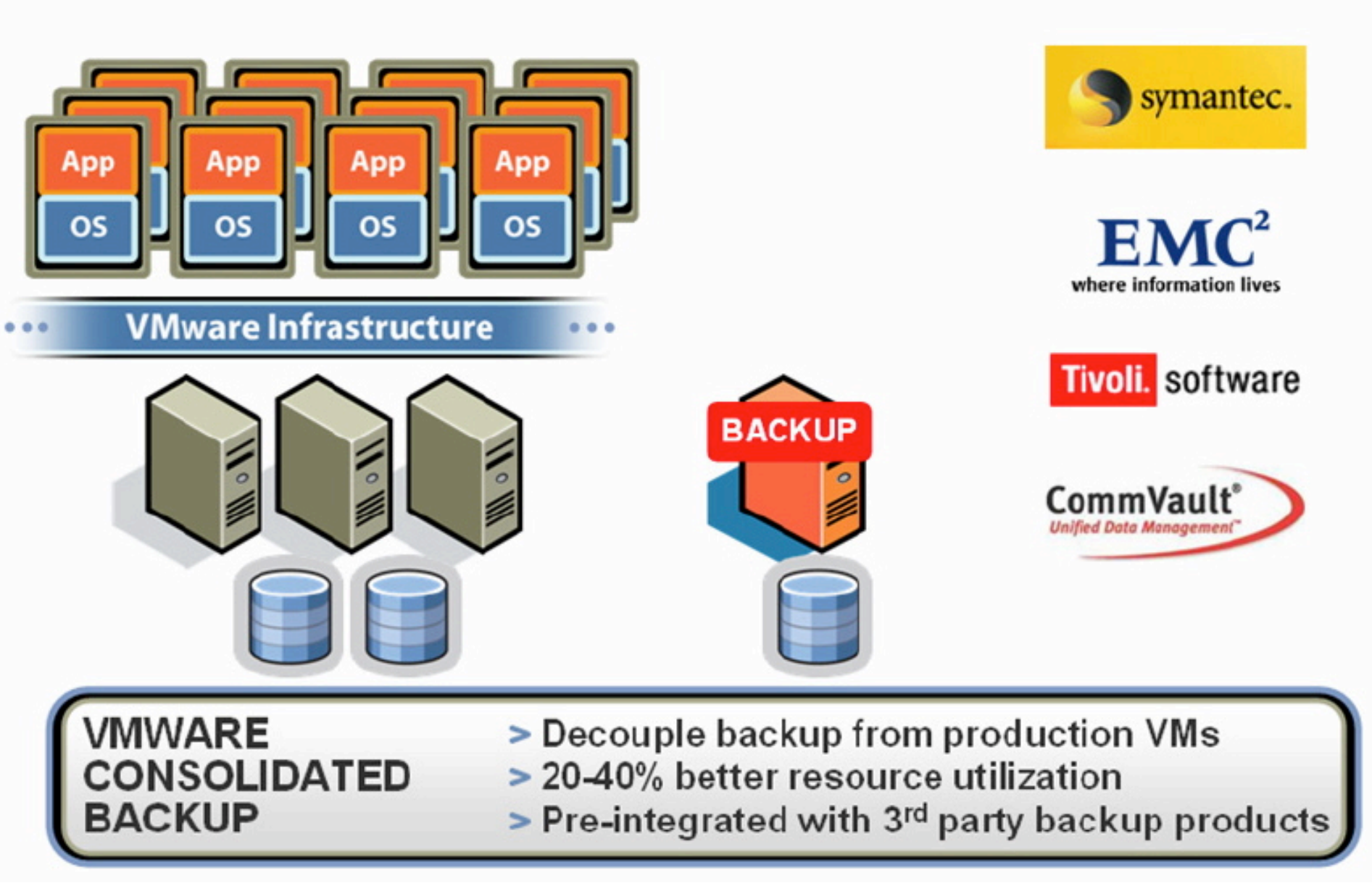
Redistribution of Workload to Handle Peak Processing Demands



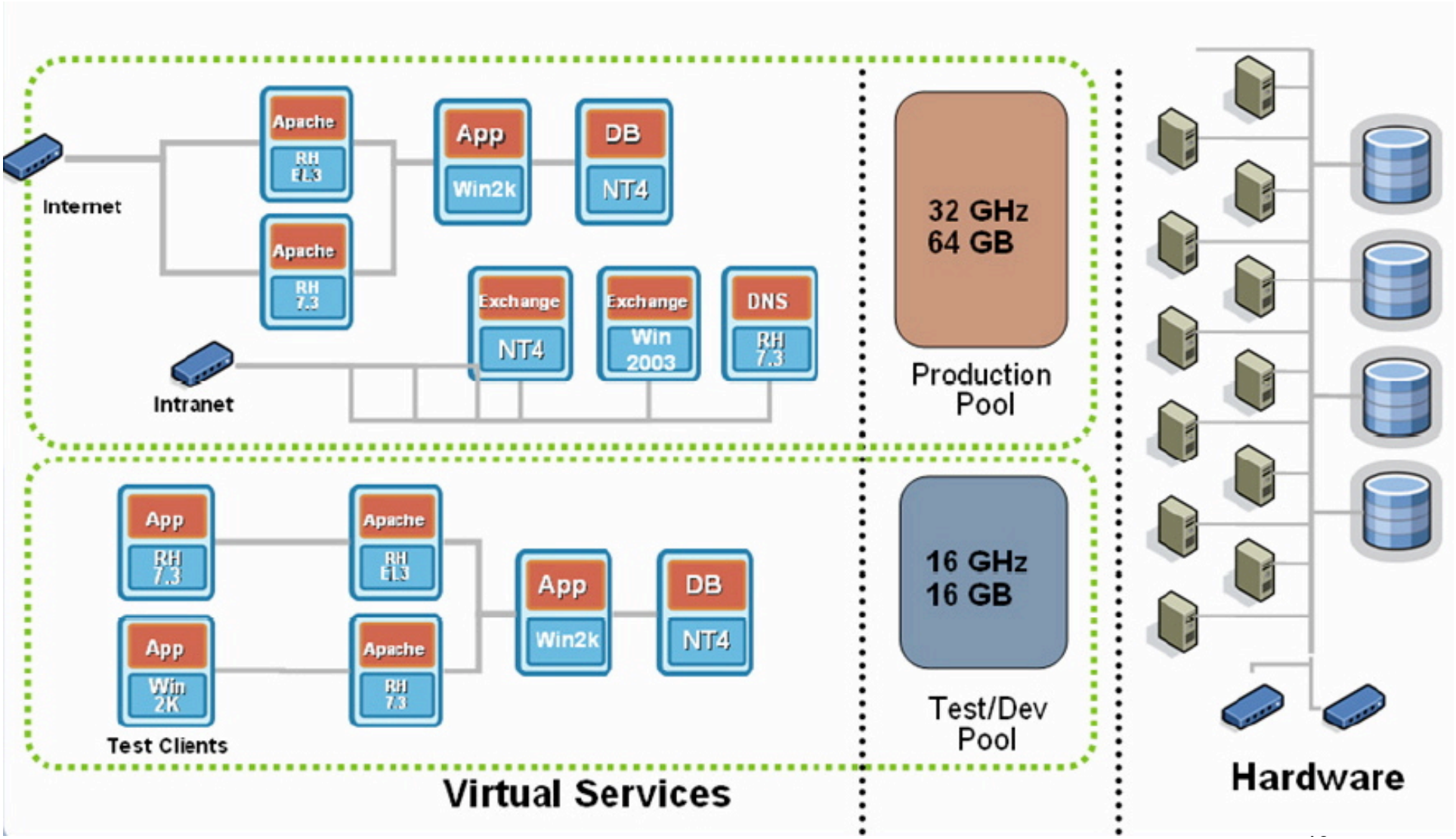
Automatic Restart of a Failed Server



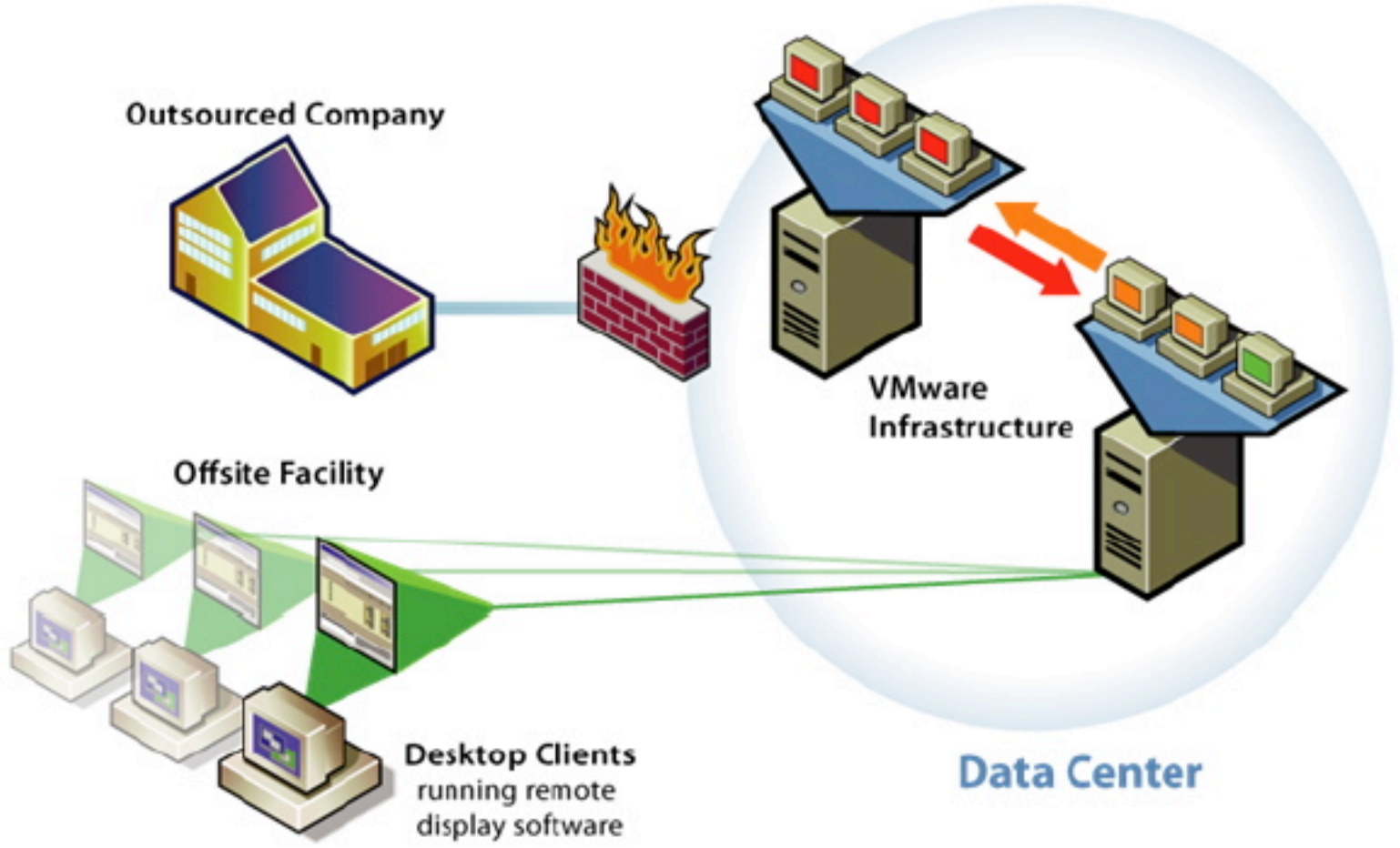
Backup Can Be Performed With Various Backup Products



How to Run a Virtualized Data Center that is Fault Tolerant



Extending the Virtual Infrastructure to End-User Clients



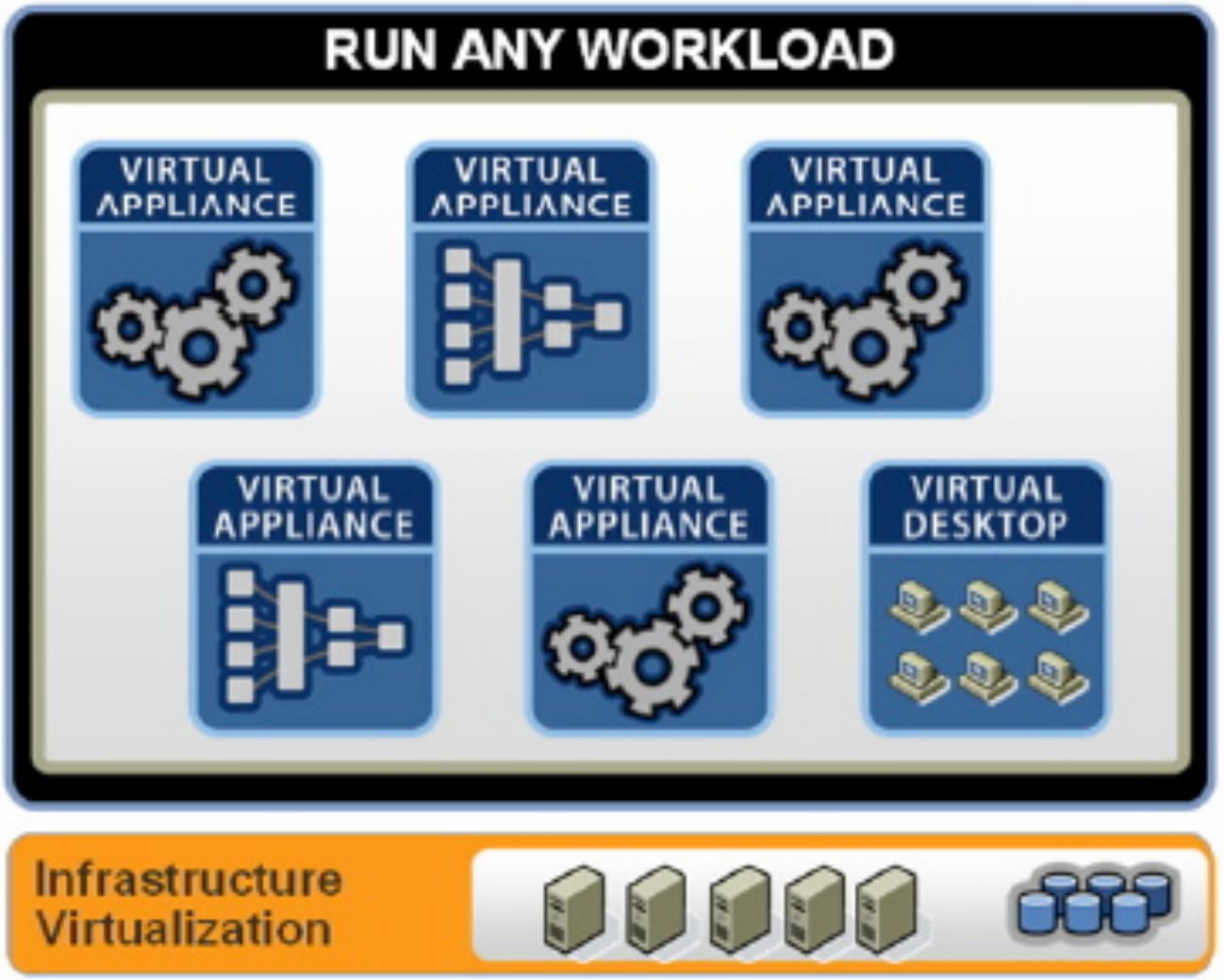
Part IV

Virtual Appliances

Traditional Approach: A Collection of Hardware and Cables

Virtualization is Based on Insertion of a Hypervisor on Top of Hardware

A Virtual Appliance Can Run a Range of Applications



There is an Extensive Catalogue of Diverse Virtual Appliances

Microsoft | Search | Advanced Search | Results 1 - 10 of 57

Microsoft Windows Server 2003 R2 Enterprise Edition Virtual ...
... **Microsoft** Windows Server 2003 R2 Enterprise Edition Virtual Appliance. **Microsoft** Windows Server 2003 R2 Enterprise Edition Virtual Appliance. Description. ...
http://www.vmware.com/appliances/directory/649

Microsoft SQL Server 2005 Enterprise Edition Virtual Appliance
... **Microsoft** SQL Server 2005 Enterprise Edition Virtual Appliance. **Microsoft** SQL Server 2005 Enterprise Edition Virtual Appliance. Description. ...
http://www.vmware.com/appliances/directory/651

Microsoft Exchange Server 2007 Virtual Appliance
... **Microsoft** Exchange Server 2007 Virtual Appliance. **Microsoft** Exchange Server 2007 Virtual Appliance. Description. A Pre-configured Virtual ...
http://www.vmware.com/appliances/directory/650

Alfresco Community Edition
... The Alfresco ECM platform delivers the same functionality available in commercial software packages such as **Microsoft** Sharepoint, Interwoven WorkSite ...
http://www.vmware.com/appliances/directory/325

Sieve Firewall
... Bandwidth control and prioritization by zone and port. A perfect example is **Microsoft** WSUS servers at a remote site on the site's only server. ...
http://www.vmware.com/appliances/directory/245

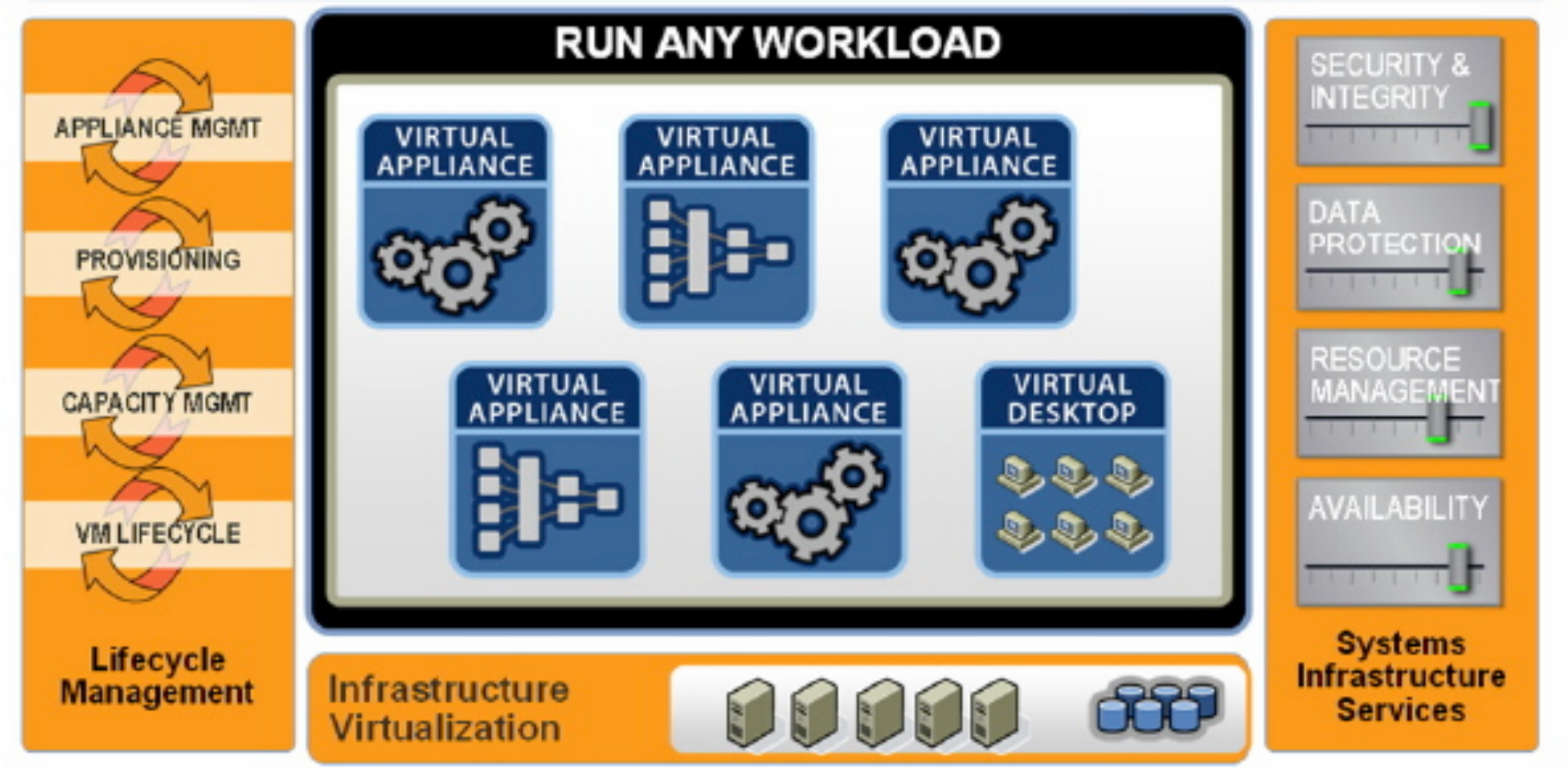
Virtual Appliance Marketplace - Certified Production Ready

Select Category....

Enter Appliance or Con

Title	Description	Certified	Buy	Size	Rating	Created	Modified
Check Point SOFTWARE TECHNOLOGIES LTD.	Proven Security for Virtual Environments	☑	☑	690 MB	☆☆☆☆☆	07/10/2008	08/19/2008
STONESOFT	High Availability Firewall and VPN virtual appliance for enterprise class security	☑	☑	34 MB	★★★★★	07/10/2008	07/30/2008
ABACA	The Abaca VPG is a groundbreaking email security solution that delivers unprecedented Spam blocking accuracy with zero tuning.	☑	☑	155 MB	☆☆☆☆☆	07/10/2008	08/11/2008
STONESOFT	StoneGate IPS is a powerful tool to protect your virtualized networks, securing the information flow in virtual datacenters.	☑	☑	28MB	★★★★★	07/10/2008	07/21/2008
ALTOR networks	VNSA provides granular, real time and historical visibility into the virtual switch traffic, with central management.	☑	☑	336MB	☆☆☆☆☆	06/13/2008	07/10/2008
KACE™ Systems Management. Done.	Easy-to-use, comprehensive and affordable appliances for full PC and Server Lifecycle Management	☑	☑	981 MB	★★★☆☆	06/13/2008	06/23/2008

Future Directions: Virtualized Environment + Tools to Support SOA



Part V

Virtual Desktop

Driving Change

Challenges

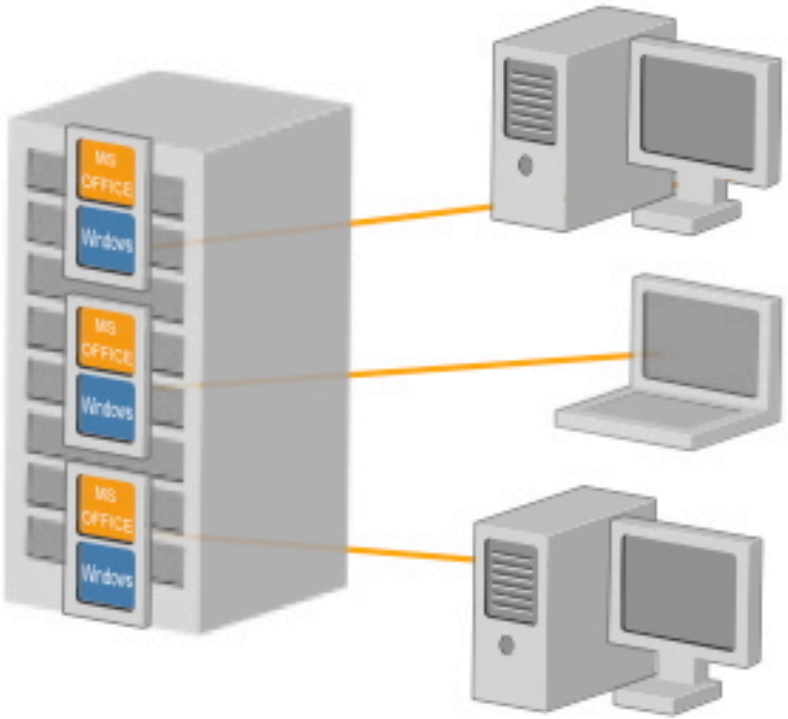
- PC Management is time consuming & inefficient
- Desktop Operating Costs are High
- Low End User Service Level Agreement (SLA) levels
- Security and Compliance Risks

Apply Virtualization to the Desktop

Transform the desktop

- OS and apps are decoupled from the physical device
- Desktops run as virtual machines in secure data center
- Transform static desktop to a stateless virtual desktop
- Connect to virtual desktop from thick or thin clients

The Virtual Desktop Runs in a Secure Data Center



Transform the Desktop

OS and apps are decoupled from the physical device

Desktops run as virtual machines in secure data center

Transform static desktop to a stateless virtual desktop

Connect to virtual desktop from thick or thin clients

Virtual Desktop Infrastructure: Client Access

Native Windows Client

- Provides extended capabilities to access local printers and storage etc.

Thin-Client Support

- Thin clients based on Linux and XPe
- WYSE ThinOS models

Browser Access

- Windows, Linux & Mac

Hospital Case Study: Desktop Replacement & Centralization

Business challenges

- Mobile roaming solution for doctors & nurses
- Bedside access to patient records & data
- Ensuring HIPAA compliance

Technical solution

- Virtual Desktop Infrastructure deployment using Wyse thin clients to access virtual desktops

Why Virtual Desktop Infrastructure

- Easier administration of desktops from a central location
- Reduced time to add new PC to <10 minutes
- Operational & hardware savings

Insurance Case Study: Business Continuity

Business challenges

- Need to reduce desktop operational costs
- Required High Availability of desktops
- Simplify desktop management

Technical solution

- Virtual Desktop Infrastructure deployment using thin clients to access virtual desktops

Results

- 45% reduction in support costs
- Used HA features to provide robust desktop disaster recovery protection
- Servers running at 80% utilization
- Plan to deploy 10,000 desktops by next year

Thin-Client Support

Virtual Desktop Infrastructure supports Linux and XP clients. This includes the majority of thin clients.

Virtual Desktop Infrastructure has been tested specifically with the following thin clients:

Custom OS

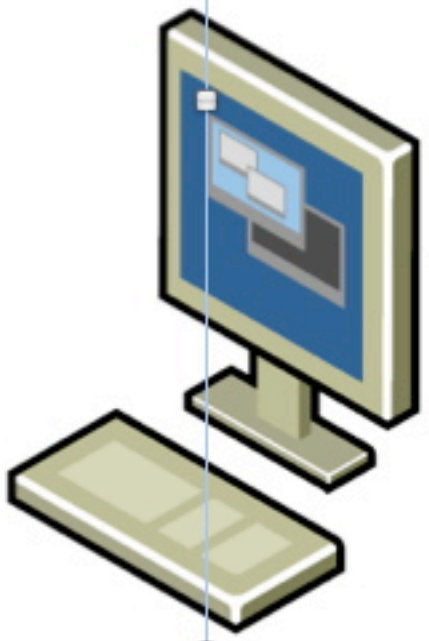
- WYSE S10 VDI Edition
- WYSE V10L

Linux Based

- WYSE S50, WYSE V50
- WYSE V50L

XP Based

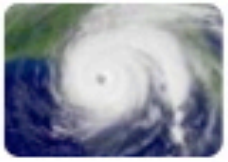
- WYSE V90
- WYSE V90L
- Neoware c50



The Uses of Virtual Desktops

Desktop PC Replacement

Replace traditional PCs with centralized virtual desktops for better control and efficient management. End users have flexibility



Disaster Recovery & Business Continuity

Provide continuous availability of desktops to end users by making high availability and disaster recovery solutions more cost-effective, simpler, and more reliable

Alternative Access

Centralize corporate data while enabling employees to work from home and branch offices. Enable partners/customers access to corporate desktops while protecting information

Summary

- Virtualization offers major savings in data center operations.
- Virtualization makes possible significant reductions in the costs of managing data centers, with simplification of systems management tasks.
- Virtualization offers back-up and increased redundancy for delivery of high performance and high availability services.
- Virtualization is a step in the direction of "cloud computing".