

The logo for HP World 2004 is centered at the top. It features a large, stylized, glowing yellow and white swoosh that loops around the text. The text "HP WORLD 2004" is in a large, white, serif font, and "Solutions and Technology Conference & Expo" is in a smaller, white, sans-serif font below it.

# HP WORLD 2004

Solutions and Technology Conference & Expo



## Improving availability with virtualization technology

**Renata Budko**

Solutions Marketing Manager

VMware, Inc

# Why focus on business continuity

- In the previous years backup & recovery was best effort
- Today the standards are different
  - More reliability is expected
  - Faster pace of business generates more critical change
  - Intense competitive environment requires high service levels
- There are many visible dangers
  - Terrorism
  - Natural disaster
  - Viruses and worms
  - Hackers and industrial espionage
  - Subcontractors going out of business
  - Human error

# Business at Risk

- One out of 500 Data Centers will have a severe disaster every year\*
- 81% of CEOs indicated their company plans would not be able to cope with a catastrophic event\*\*
- 43 percent of companies experiencing disasters never re-open, and 29 percent close within two years\*



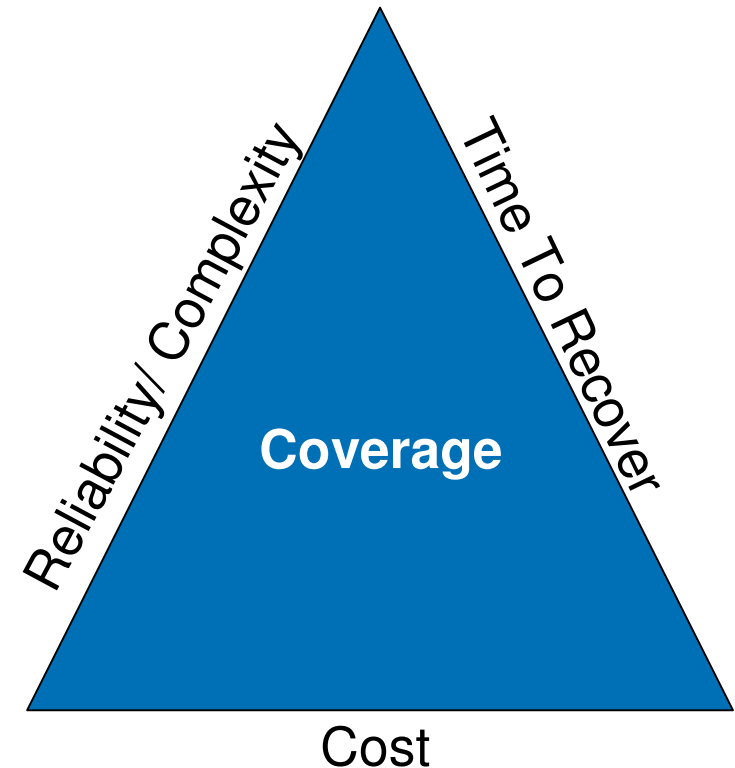
**Disaster Recovery is a focus of the executive management**

•\*McGladrey and Pullen

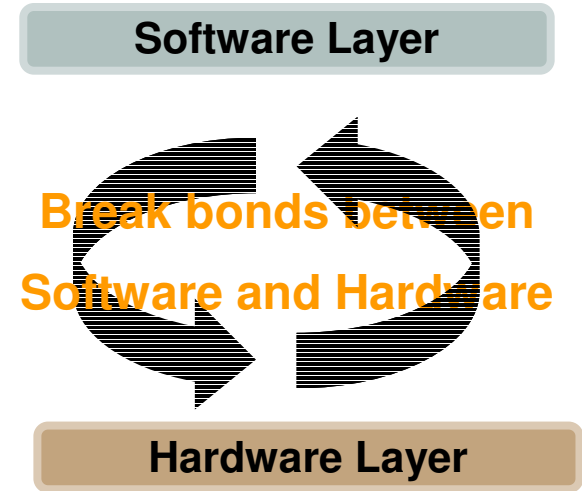
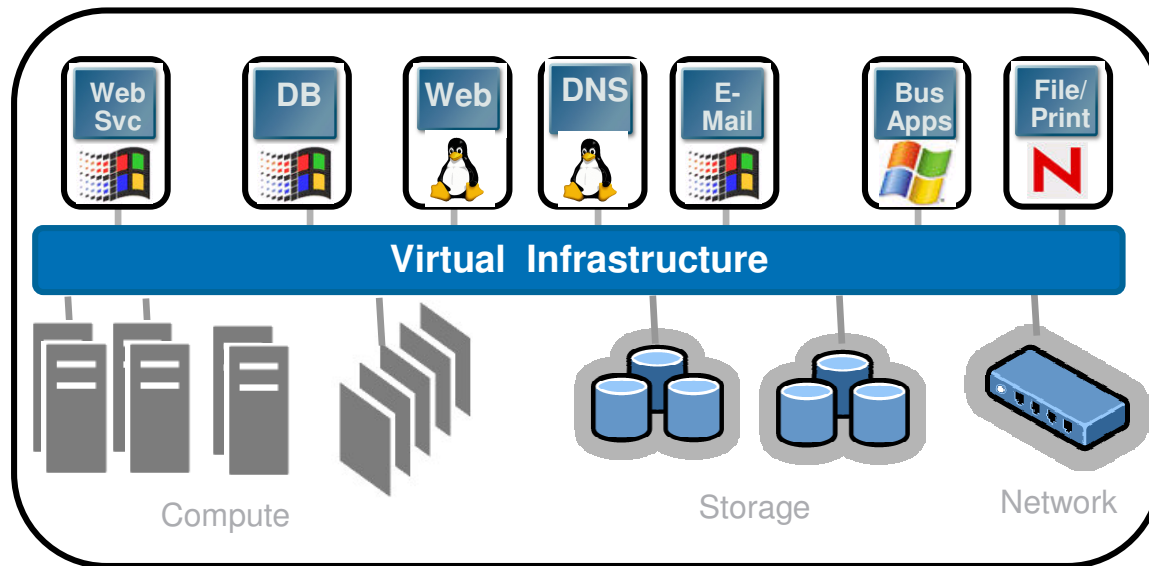
•\*\*INFOCON Magazine, October 2003

# Pain Point in Traditional DR

- Restoration to different platforms
  - Unreliable / manual
  - Takes a long time / does not meet TTR objectives
- Lock-step upgrades of primary and secondary data center result in short TTR but are too expensive
- Too many different tools and procedures
  - Systems, applications, and data DR involves different procedures
  - Systems, applications, and data reassembly is a manual, error/prone process
  - Backup / recovery testing is labor intensive
  - Live system backup is application specific => learning curve



# Virtual Infrastructure Transforms IT



## Virtual Infrastructure

- Separates hardware management from software management
- Simplifies IT so companies leverage their storage, network, and computing resources to control costs and respond faster
- Standard services across multiple generations of Windows, Linux, Netware
- Virtual hardware standardizes multiple generations of multi-vendor hardware

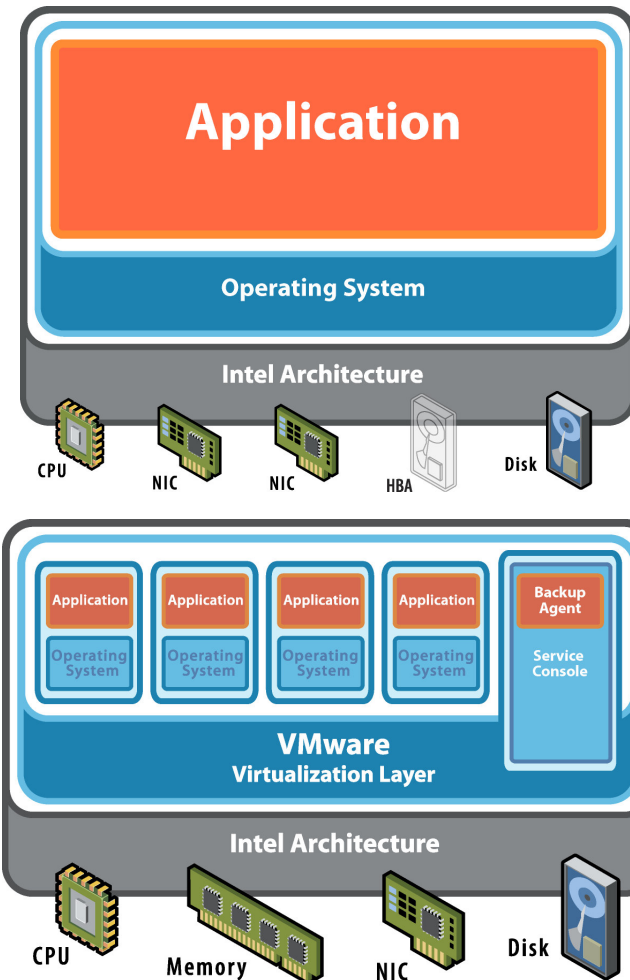
# Virtualization Overview

- **Traditional x86 Architecture**

- Each server runs single OS
- Typical “one server, one app” model
- Can contribute to low CPU utilization and server sprawl

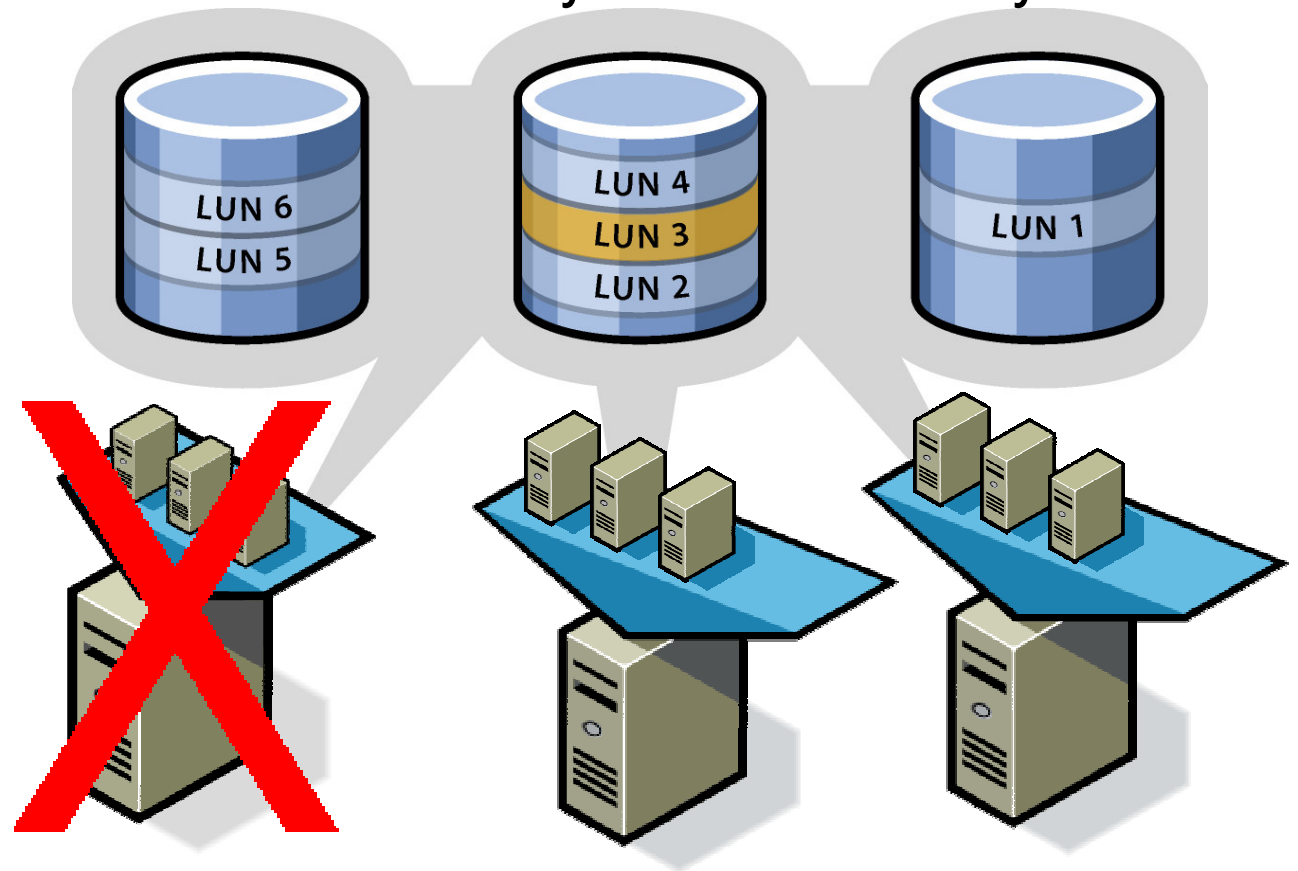
- **With Virtualization**

- Aimed at delivering
  - Higher CPU utilization
  - Reduction in server sprawl
  - Strong fault and security isolation, VM encapsulation
- Allows for up to 2-CPU VMs



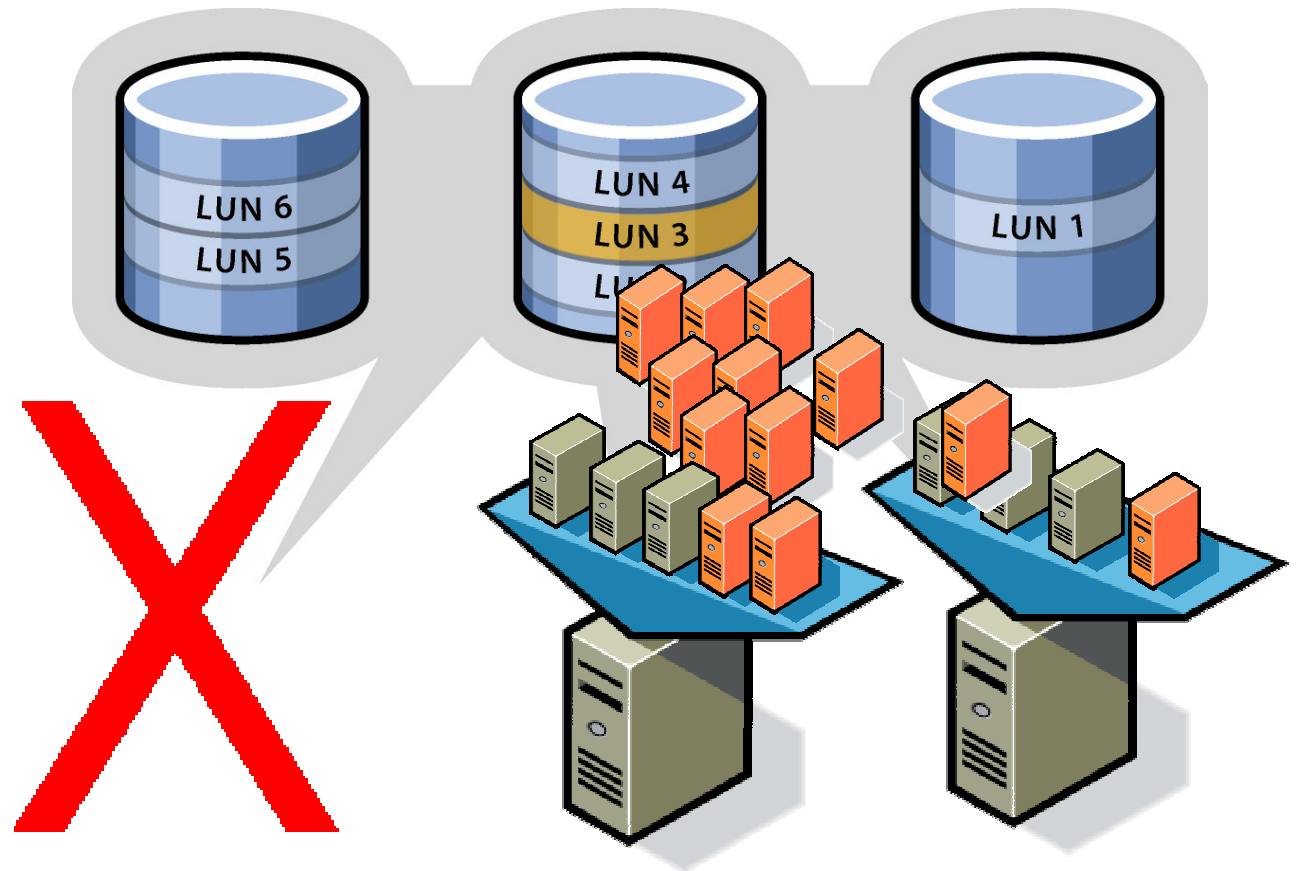
# Stand by VM on SAN

- Hosting VMs on SAN increases system availability
- If hardware hosting virtual machines fails, VMs can be restarted on a different platform.
- The only downtime is time required for VM booting



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# VMware Virtual Infrastructure Support

## Virtual Infrastructure Management Options



## Migration Tools



## Services



## Widest ISV Software Support



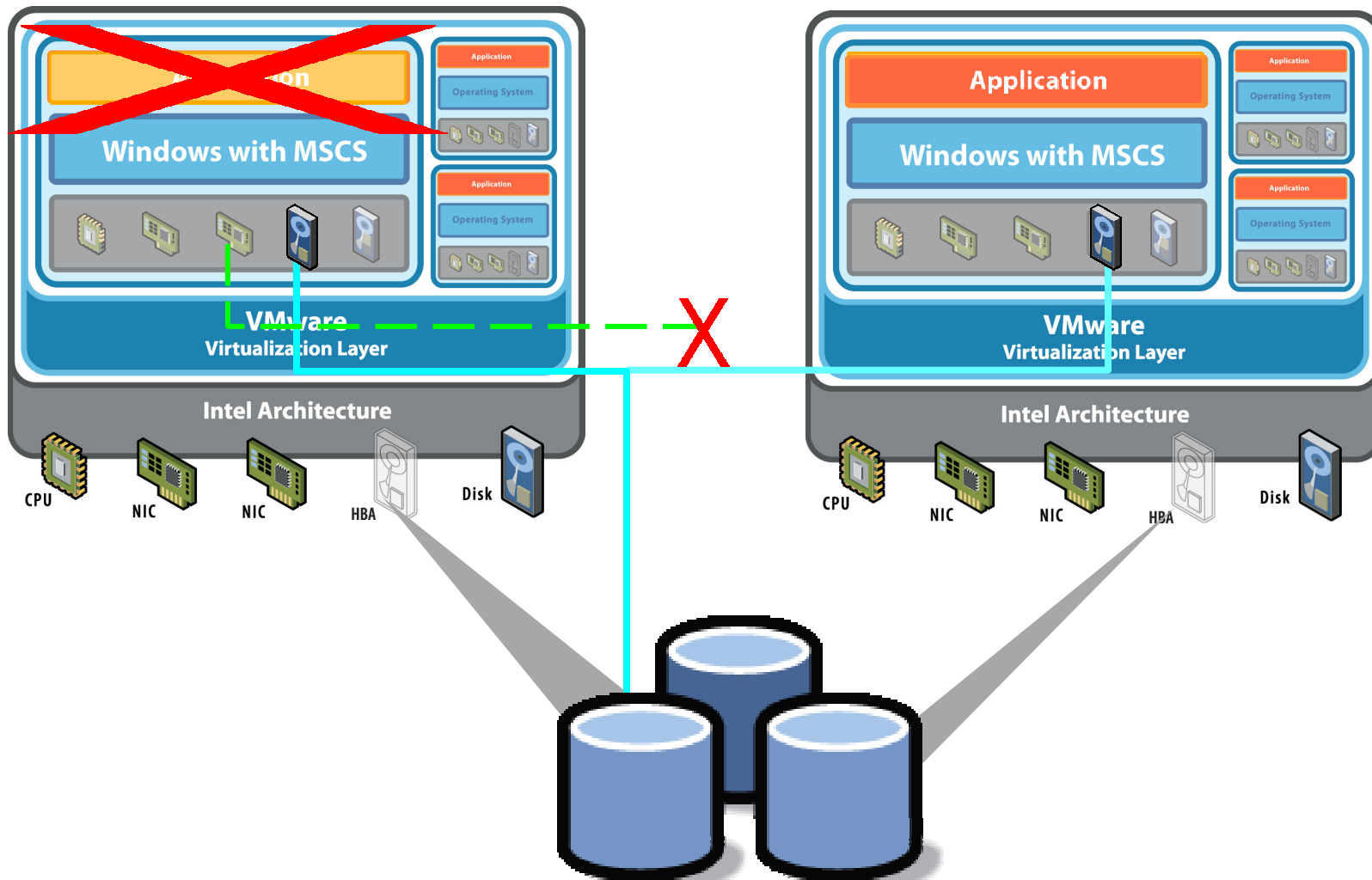
# Virtual Infrastructure improves all aspects of Business Continuity

- **Redundancy** - Supports clustering and HBA path failover
- **Disaster Recovery**
  - Eliminates hardware dependency for recovery
  - Multiplexes hardware
  - Improves time to recovery
  - Eliminates manual processes and Windows Registry updates
  - Conducive to automation
- **Monitoring** - Provides centralized monitoring and hot migration capabilities

# Hardware Redundancy

- Share redundant hardware elements across multiple workloads consolidated on top of virtual infrastructure
  - Share RAID drives
  - Share redundant power supplies
  - Share redundant network cards including advanced features
    - NIC teaming
    - HBA path failover
- Support **N+1 clustering**
  - Standard clustering software
  - Virtual to Virtual, Physical to Virtual and ESX to ESX clustering

# N+1 Clustering



# Disaster recovery at lower cost

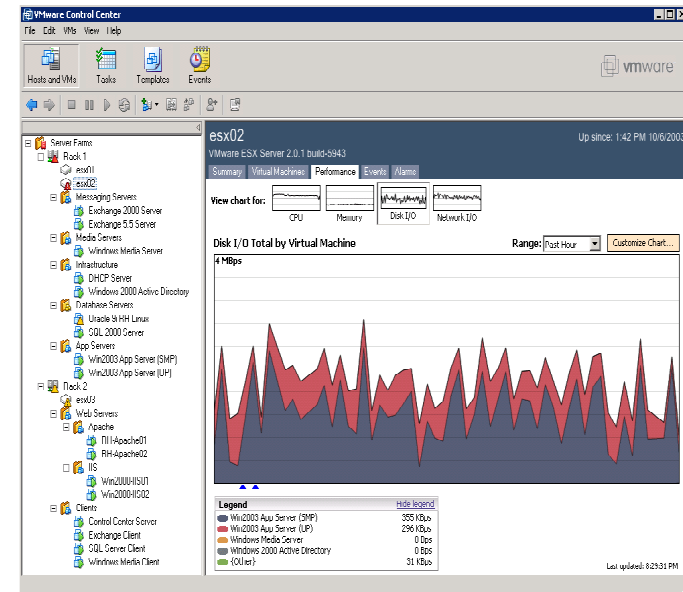
- Hardware / System/ Application independence
  - NO NEED to worry about THE EXACT hardware configuration
    - Flexibility to restore to any hardware
  - Application independent capture and recovery processes
- Less hardware required at “hot” failover site
- Single-step simplified capture and recovery
  - One step system and application recovery
  - No Windows registry issues
  - Easy-to-automate recovery
- Support for all capture / replication technologies
  - Tape / Media
  - Disk-based Back up
  - Synchronous or Asynchronous Data Replication

# Improving Time to Recovery

- Restore system and application data in one step
- Application / OS/ hardware independent (crash consistent) backup and recovery processes
- No need for 3<sup>rd</sup> party 'bare metal' restore tools
  - Reduce learning and ramp-up
  - Reduce software licensing expense
- Use the same methodology through application lifecycle
  - Staging
  - Deployment
  - DR
- Test once – recover anything
  - Application independent recovery => simplified testing

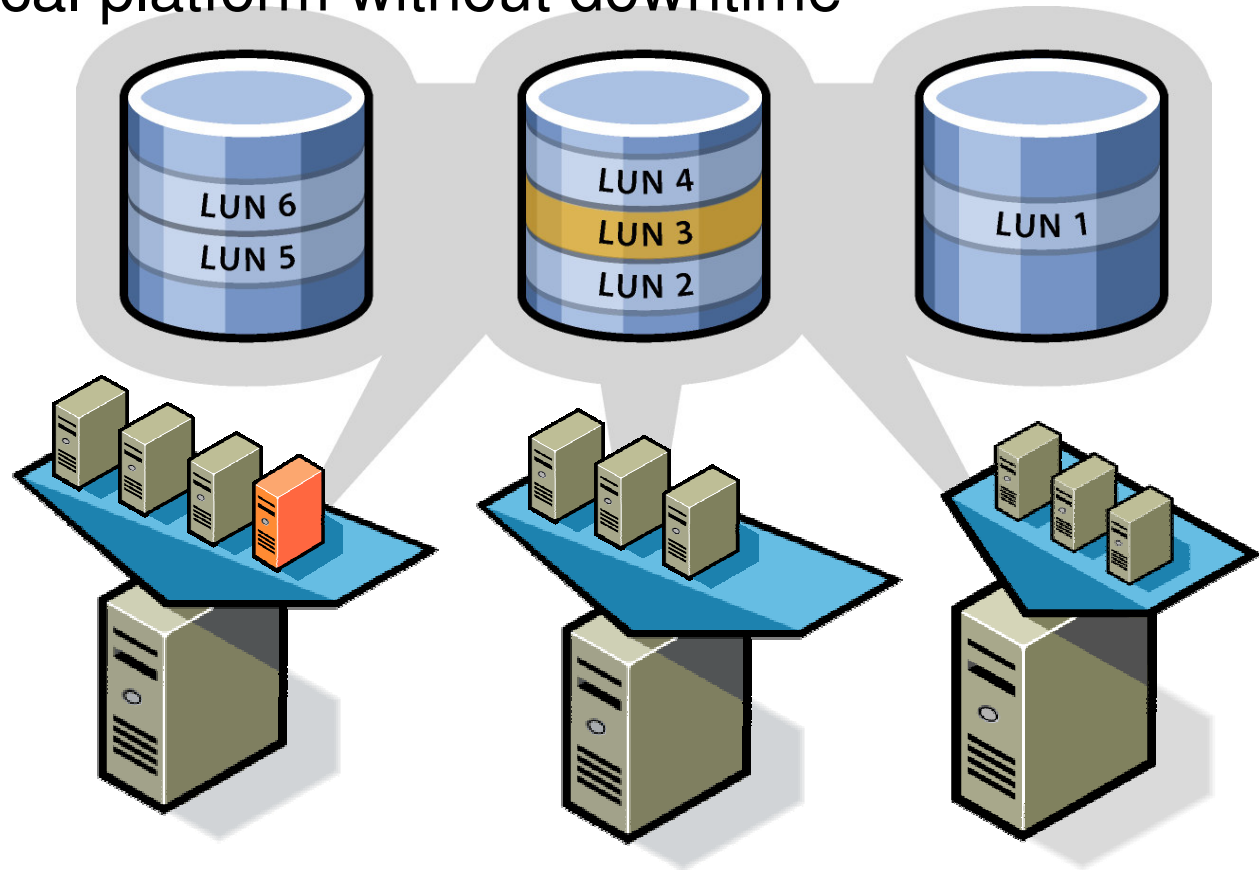
# Monitoring

- **Monitor** system availability and performance
  - **Automated** notifications and email alerting
  - SDK to **integrate** with existing management tools
  - **Secure** the environment with robust access control integrated with Windows Active Directory
- **Migrate** the workload to different platform in case of threat of disaster using VMotion



# VMotion on SAN

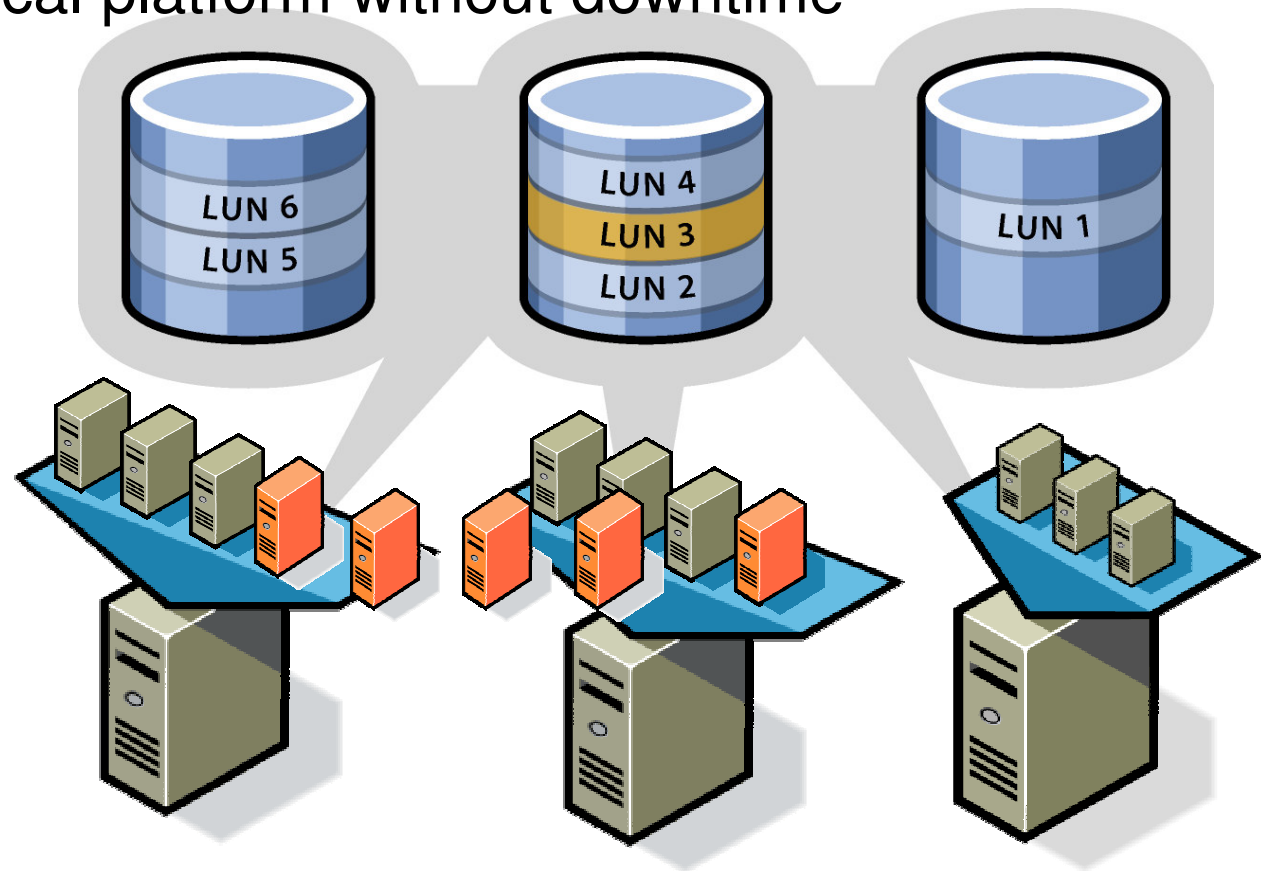
- VMotion let's you migrate active workload to a different physical platform without downtime
- Dynamically rebalance workloads to servers with more computing bandwidth
- Temporarily free servers for hardware maintenance





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# VirtualCenter Demo

- Demo VMotion
- Migrating a live virtual machine installed with MS SQL Database and exercised by Microsoft Database Hammer testing tool

# SDK enables automation

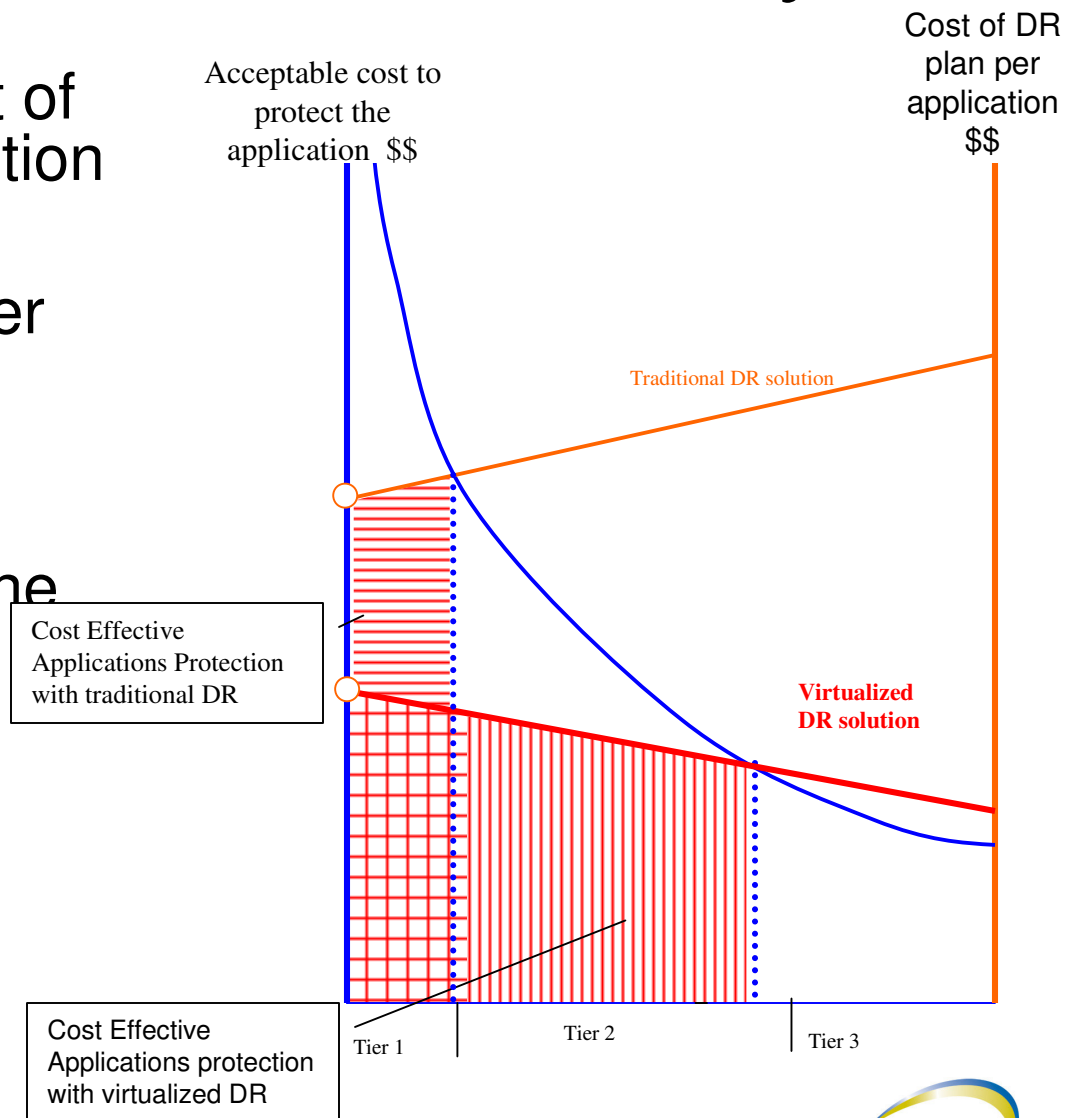
- Web Services interface that uses the SOAP and WSDL standards
- SDK Capabilities
  - Monitoring performance data for the virtual machine hosts
    - CPU, memory, disk I/O, and network utilization.
  - Operations with virtual machines including
    - Create, Delete and Copy
  - Configuring virtual machines
    - virtual CPU, memory, disk, network and hardware
  - Creation and definition virtual machine templates
  - Initiate VMotion™
- Partners who announced support
  - BMC Software, Computer Associates eTrust, Computer Associates Unicenter, Enigmatec Corporation, HP OpenView, IBM Director, IBM Tivoli Software, MetiLinx, PlateSpin, Platform Computing, Surgient and Altiris, Fujitsu-Siemens, Evident, Novadigm, NetIQ, nWorks, Citrix and Veritas

# Virtualization extends DR feasibility

- Threshold / fixed cost of disaster recovery solution is reduced
- Per application disaster recovery cost is minimized
- Procedures are standardized across the applications



Make Disaster Recovery Commercially Feasible for more applications and more Data Centers



# BB&K Background

- One hundred year old law firm recognized as one of the top 50 law firms in CA headquartered in Riverside, CA
- 150 lawyers and over 300 other employees
- 14 locations across the country
- Expects to grow 100% over the next 3 years

City of Fontana Wins Land Use Appeal  
*(July 2003)*

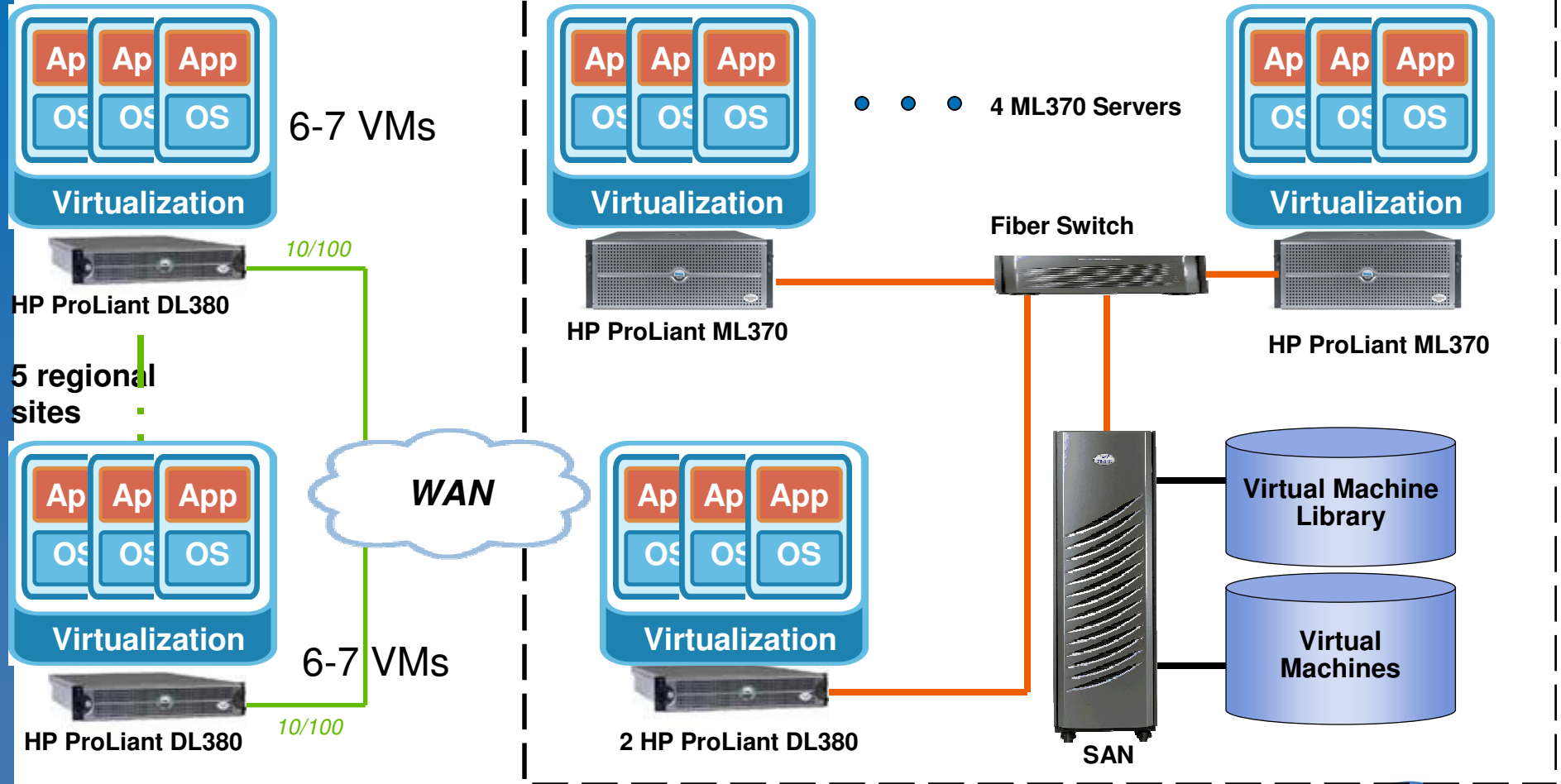
An Appellate Court Victory for All School Districts  
***Granowitz v. Redlands***



# Problem Statement

- Three years growth with no IT upgrades
- Double the number of users with no IT upgrades
- Independent operations in each remote office
  - Sustain WAN outage
  - Have autonomic systems
    - E-mail
    - file services,
    - PC DOCS databases
- Designed for easy administration
  - Backup, restore, and remote administration is easy to set up
- Fault tolerance for all critical services

# Server Consolidation and Fault Tolerance



# Deployed Architecture

- Physical Platforms
  - Headquarters
    - SAN with two HP ProLiant DL380s and four HP ProLiant ML370s;
  - Branch offices (5)
    - two HP ProLiant DL380s and direct-attached storage each
  - Network backbone
    - Cisco Catalyst 4500 in each location
- ESX Server 1.5.2
- Guest operating systems:
  - Windows 2000 Server, Windows Server 2003
- Applications you run in virtual machines:
  - **Altera**, Informative Graphics, PC DOCS, RES PowerFuse, specialty applications and utilities



# Deployment Experiences

- Familiar with VMware technology – workstation user
- Engaged VMware authorized partner for initial ESX Server installation
  - Installed 4 servers with 20 virtual machines in headquarters
  - Used P2V to image production environment into VMs
  - Conducted tests for 4 months using Winbench benchmarks / workloads
- Moved virtual machines into production
- Partner trained BB&K VMware administrator
- Deployed ESX Servers in regional offices
- During 20 month in operation, did not have any problems

# Fault Tolerance



“I believe the real benefit lies in how VMware software enables system capabilities that we never could have achieved without server virtualization, including fault tolerance. These capabilities are helping us build a more reliable IT infrastructure to support BB&K's business needs as the firm grows.”

John Weeks  
IT Director  
Best Best & Krieger

## The Challenge

The fast-growing California law firm needed to build a reliable IT infrastructure that would keep up with its rapid growth

## The VMware Solution

VMware server virtualization using ESX Server provided a cost-effective fault-tolerant business continuity infrastructure

- **Boosted infrastructure reliability dramatically by cutting server recovery period from hours to seconds**
- **Streamlined IT administration and increased employee productivity**
- **Eliminated risk of remote office downtime caused by WAN outage**
- **Reduced server provisioning time frame from days to minutes**

# BB&K Background

- One hundred year old law firm recognized as one of the top 50 law firms in CA headquartered in Riverside, CA
- 156 lawyers and over 150 other support staff
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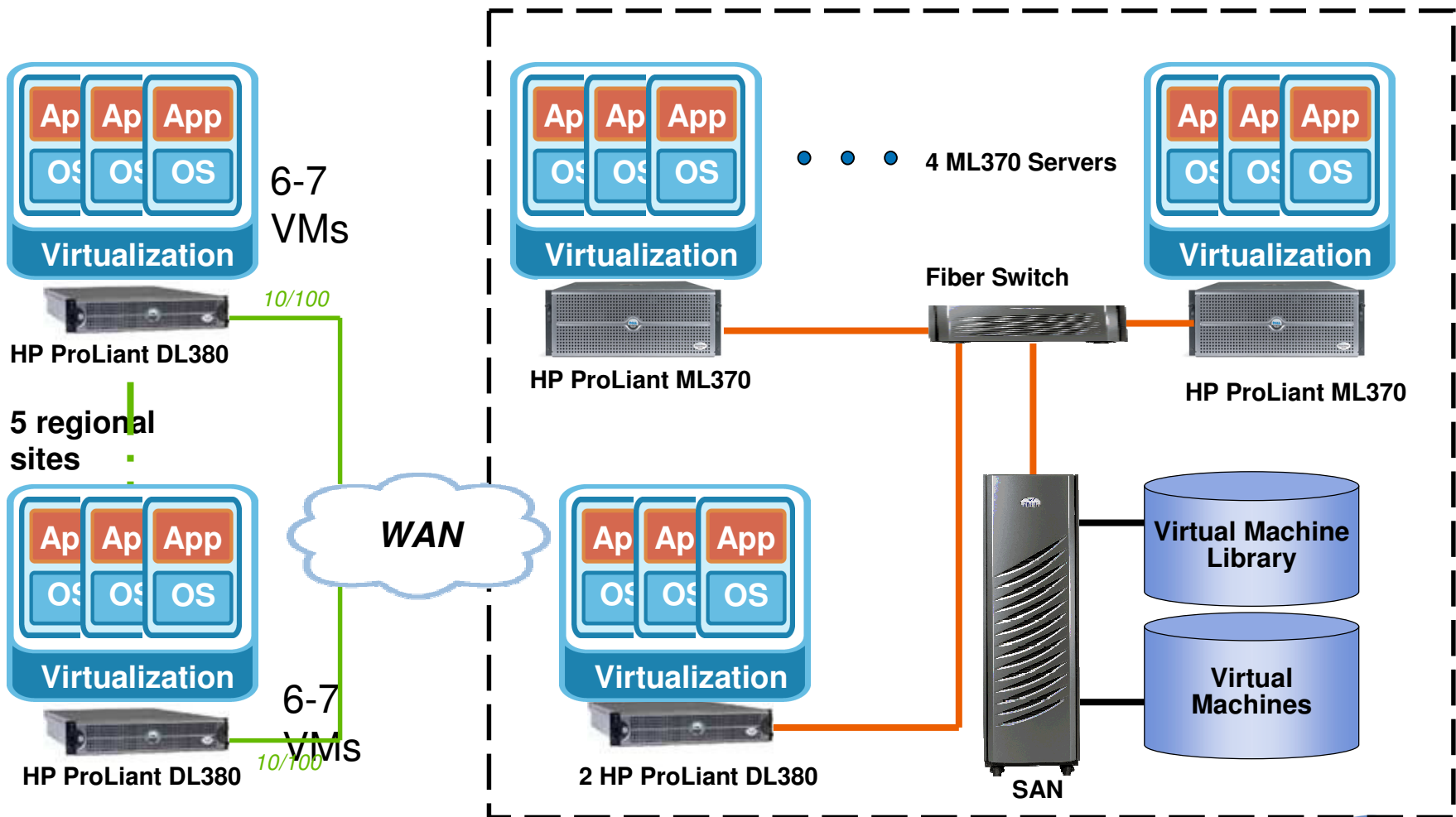


**BEST BEST & KRIEGER**  
ATTORNEYS AT LAW

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  - **Altiris** , SQL Server, PC DOCS, RES PowerFuse, specialty applications and utilities

# Deployment Experiences

- Familiar with VMware technology – workstation user
- Engaged VMware authorized partner for initial ESX Server installation
  - Installed 2 servers with 14 virtual machines in headquarters
  - Conducted compatibility testing for 2 months
  - Moved virtual machines into production
- Agile360 trained BB&K VMware administrator
- Deployed ESX Servers in regional offices
- During 9 months in operation, did not experience any problems

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