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Knowledge  
Is Power.

Learn. Share. Collaborate.



# Presented by Sean Comrie



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# Agenda

- What is Cloud Computing?
- Why Private Clouds?
- Managing the Journey to Private Clouds
- The Cisco Private Cloud Architecture and Portfolio

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# What is Cloud Computing?

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## WHAT IS CLOUD COMPUTING?

IT resources and services that are abstracted from the underlying infrastructure and provided “On-Demand” and “At Scale” in a multi-tenant environment



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# Today's IT – Many Cloud Options

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**The Network Makes Cloud Computing Possible**



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# Customer-Centric Drivers for Adoption

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## Why Customers are making the Journey to the Cloud

**1** Reduce overall IT costs through greater efficiency of assets

**2** Simplify IT operations through consolidation, unification and automation of IT infrastructure

**3** Improved pace and consistency of Business Application roll-outs

**4** Better aligning IT resources to business needs for flexibility and innovation.

**5** Adoption of IT models that reflect today's public and private usage demands



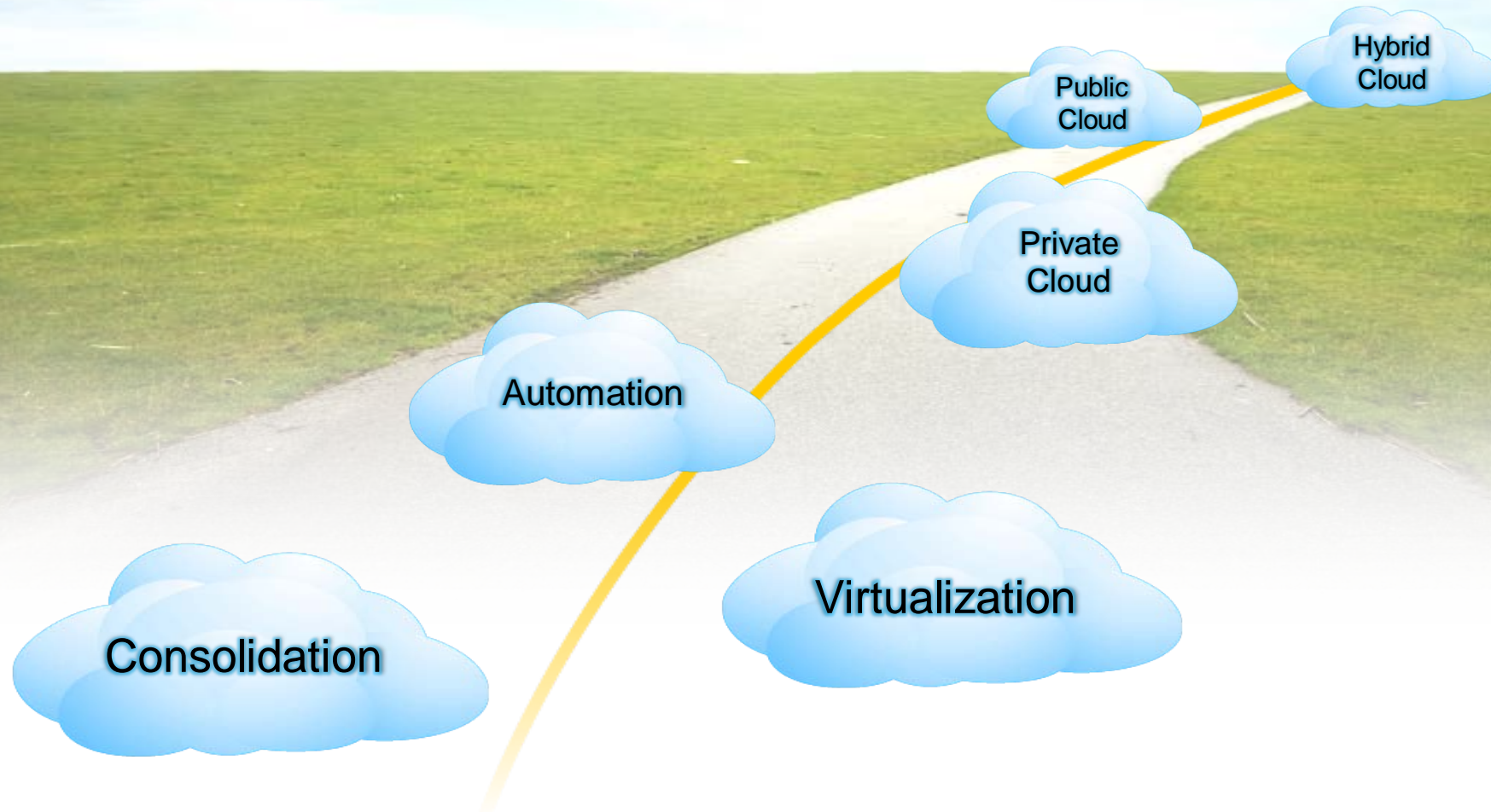
**Cloud Services will Change the Economics and Operations of IT**



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# Where is your Business on the Journey?

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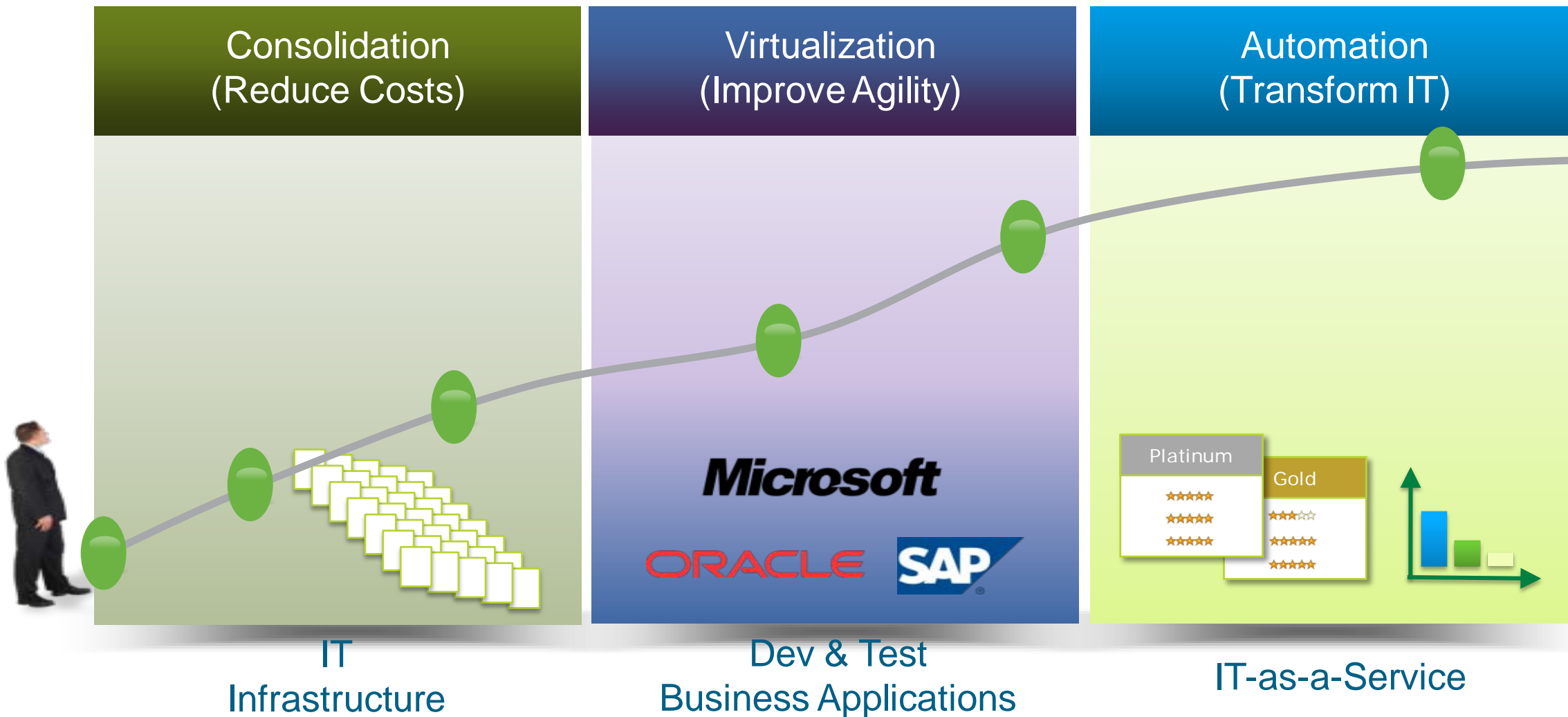


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# The Journey to Private Cloud

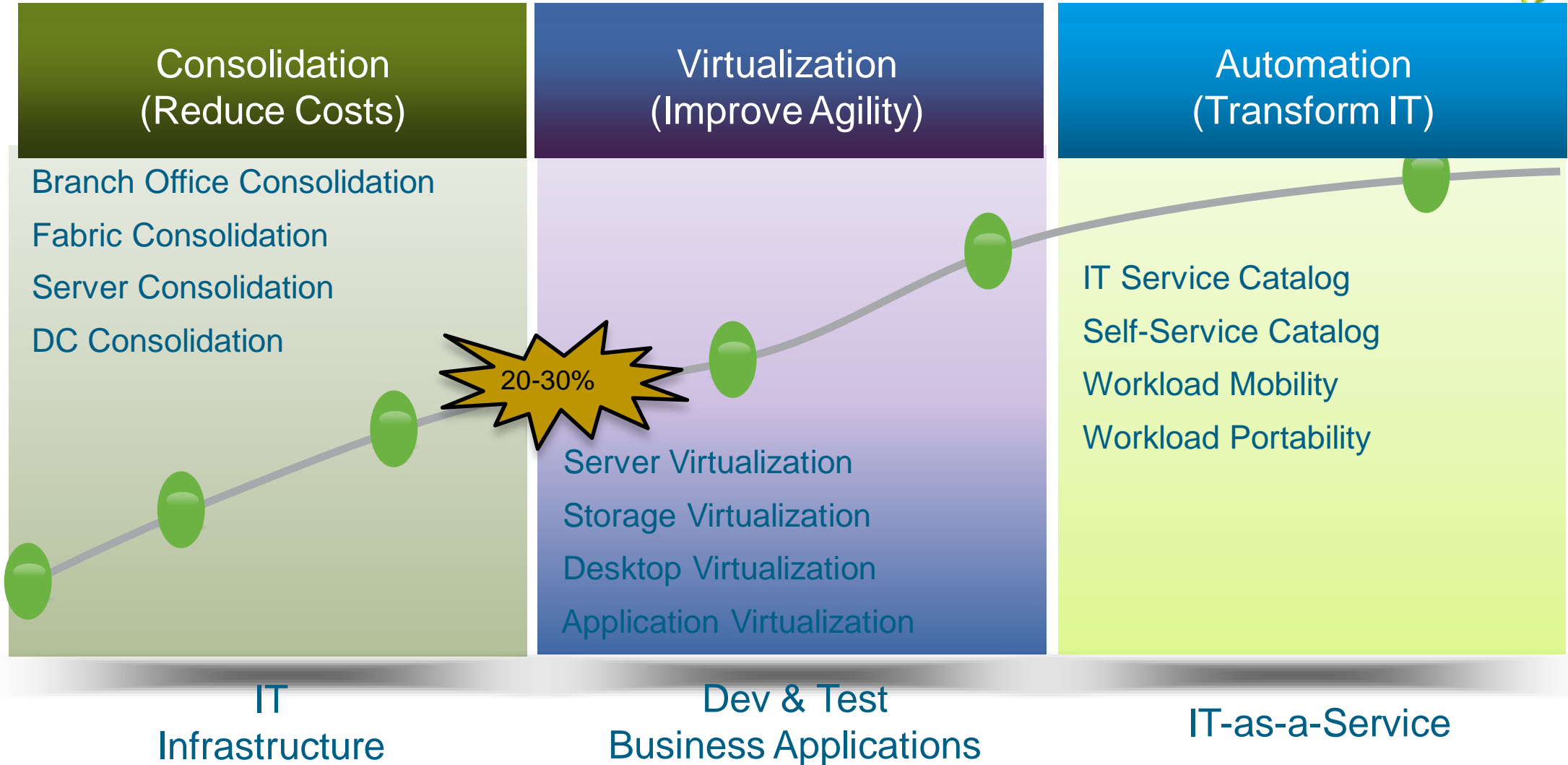
## Evolution of IT + Business Agility

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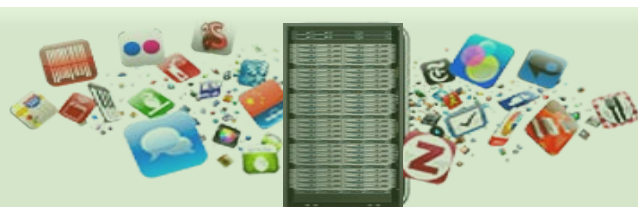
# Transitions to Private Cloud





# Consolidation

## Standardize the Infrastructure, Prepare for Growth



### Consolidation

- Standardize LAN / SAN infrastructure
- Reduce # of Network Operating Systems
- Reduce cabling
- Increase application bandwidth 10x
- Enable dynamic QoS



### Virtualization

- Increase VM density
- Increase VM performance
- Enable VM mobility (intra/inter-site)
- Enable VM-aware security



### Automation

- Reduce points of management
- Enable Stateless Computing
- Enable Policy-Based provisioning
- Simplify overall IT operations

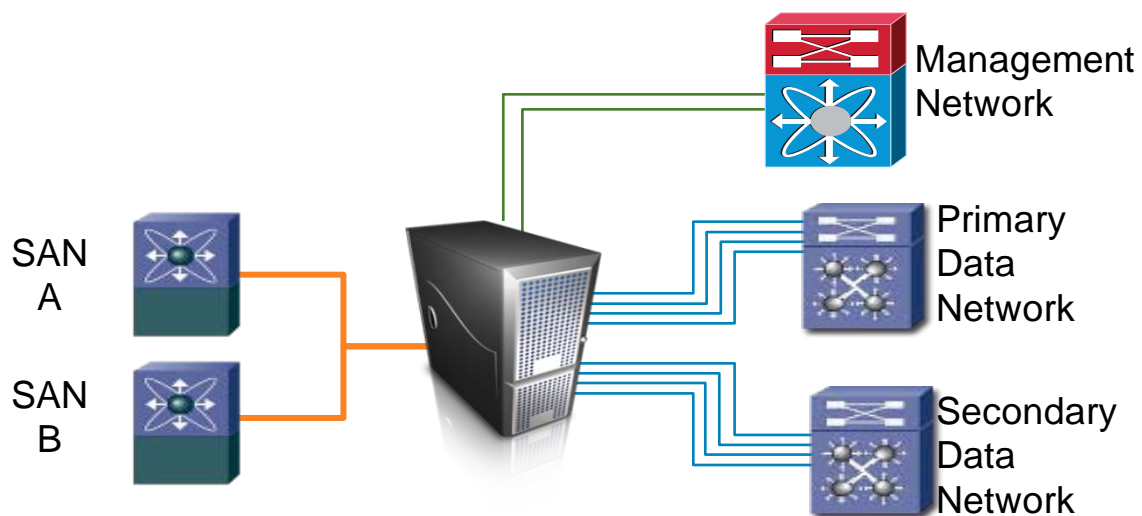


# Consolidate the Platform



## Existing Architecture

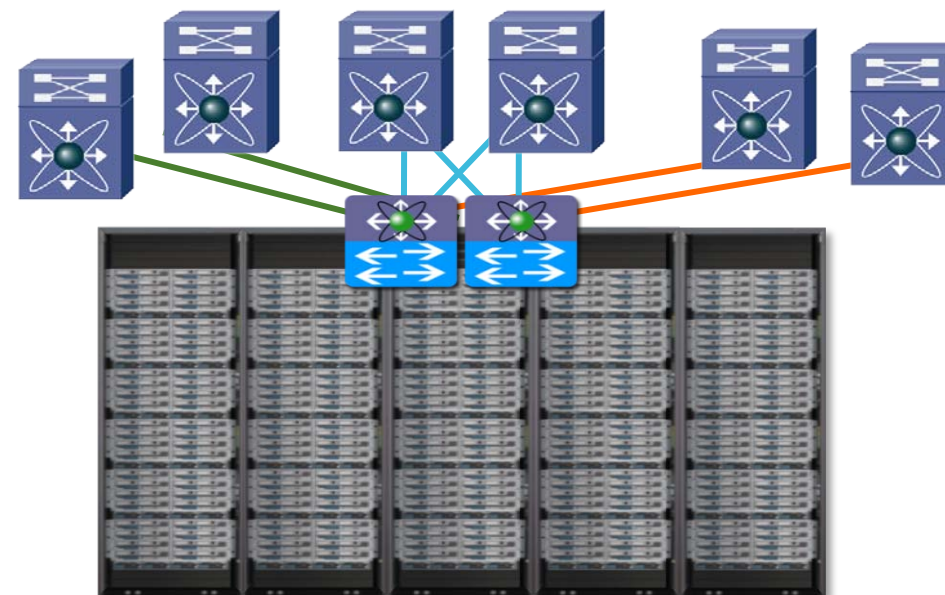
- Operating Systems = Multiple
- Poor system utilization
- Operations tasks tied to hardware
- Inefficient power and cooling



Isolated, Unshared Resources

## Private Cloud Architecture

- Operating Systems = Unified
- High utilization
- Dynamic management
- Reduced footprint



Efficient and Simplified

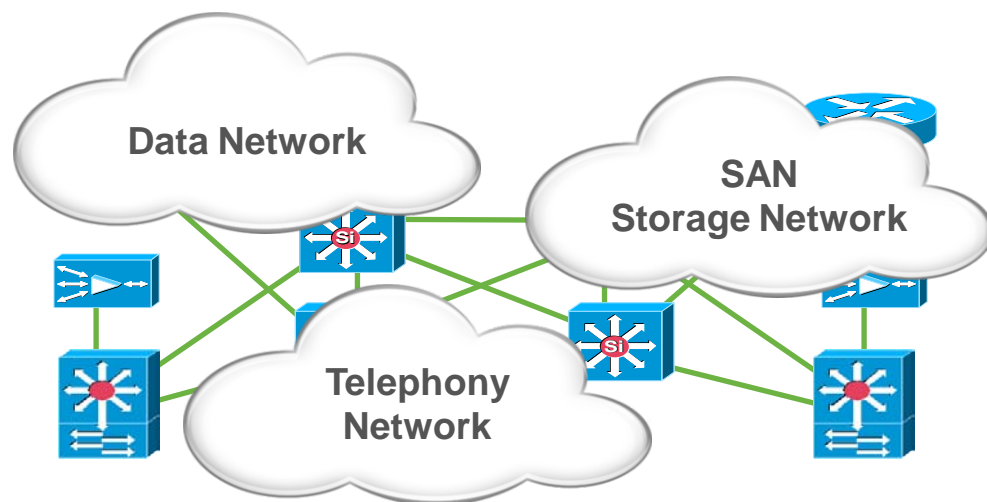


# Consolidate the Networks



## Legacy Architecture

- Networks defined by usage
- Disparate management teams
- Isolated ports required per system



Isolated, Unshared Resources

## Private Cloud Architecture

- Shared network services
- Cross-functional staff model
- Unified port capabilities
- Future-proof for new applications



Efficient and Simple



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# Consolidation

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# 9000

Helped law enforcement agencies increase operational excellence and administrative efficiency and Saved **\$900,000** in up-front capital costs and \$37,000 in annual energy costs

“The economics of the Cisco platform is superior and will become even more so as our service grows. And Cisco is a trusted name to potential customers.”

— Jas Dhillon, Chief Strategy Officer of **TASER International**



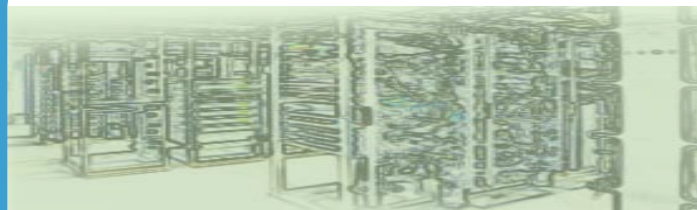
# Virtualization

## Efficiency, Mobility, Security and Visibility



### Consolidation

- Standardize LAN / SAN infrastructure
- Reduce # of Operating Systems
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### Virtualization

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# Moving from Physical to Virtual

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Physical Domain



Virtual Domain

- Better IT asset utilization
- Lower Costs of Data Center Facilities
- Increased Security & Visibility
- Faster deployment of Business Applications
- Improved Application Performance & Availability
- Automated Provisioning



# Multiple Aspects of Virtualization



## Cisco Unified Infrastructure

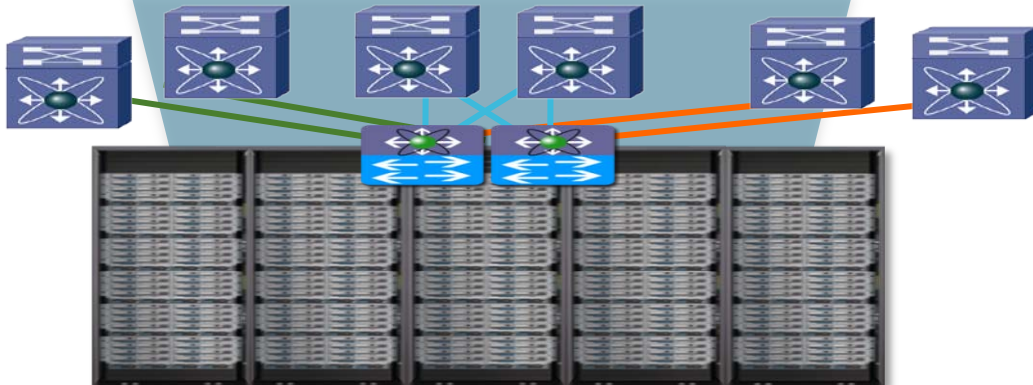
VM Security & Policy

VM Mobility

VM Performance

VM Efficiency

Network Virtualization



- Network Virtualization

- Network Switching & Security Visibility across VMs
- Multi-Tenancy
- Tiered services for Shared infrastructure
- Nexus 1000v

- VM Efficiency

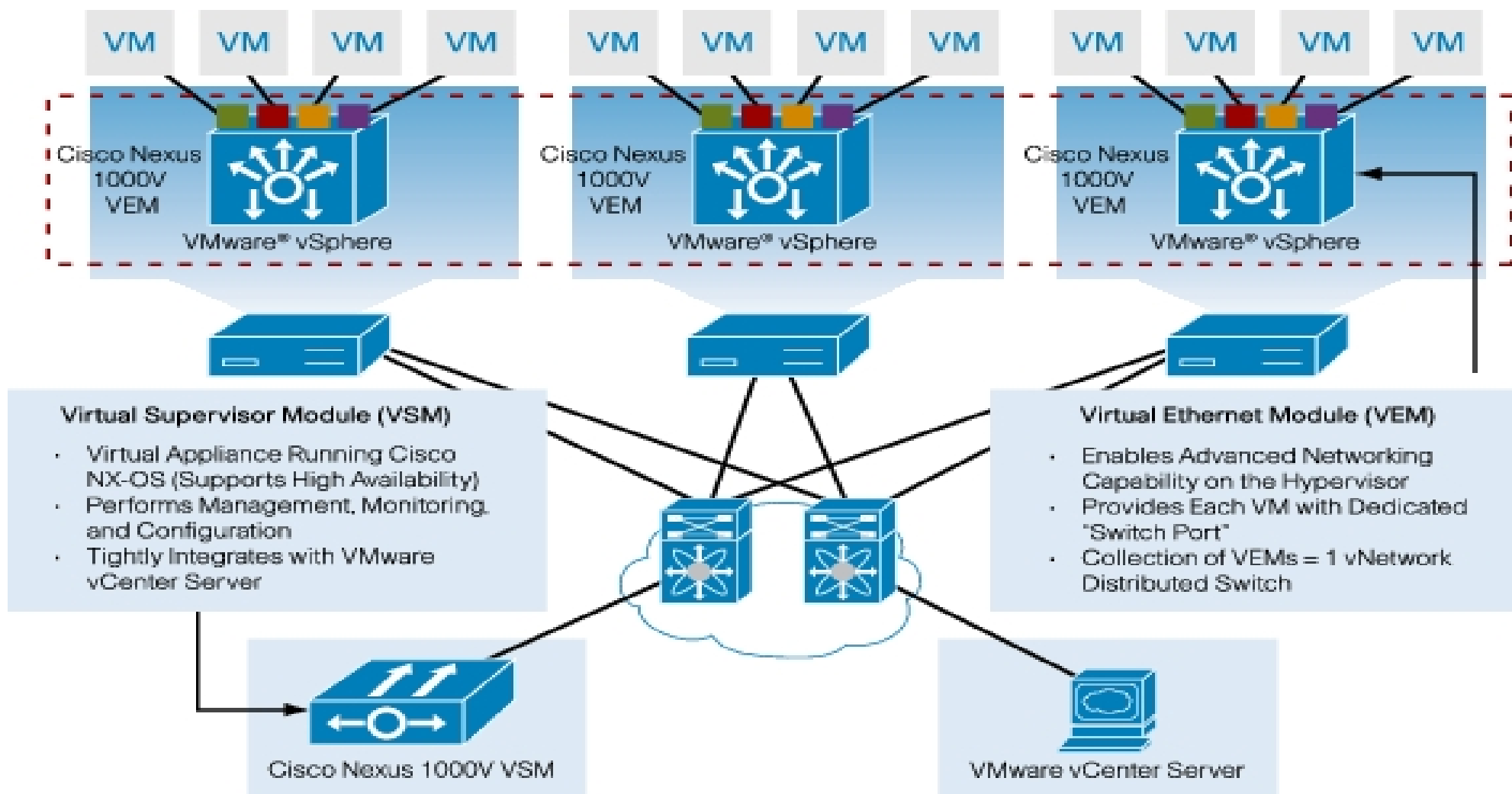
- High VM density = Greater Utilization
- Reduced Data Center footprint
- UCS Memory Expansion

- VM Performance

- Tier 1, Low-Latency, Real-Time Apps
- Dynamic QoS for VM Migrations
- Tiered QoS for Shared Infrastructure
- UCS I/O Virtualization
- UCS Memory Expansion
- 10Gb Ethernet Fabric



# Network Virtualization



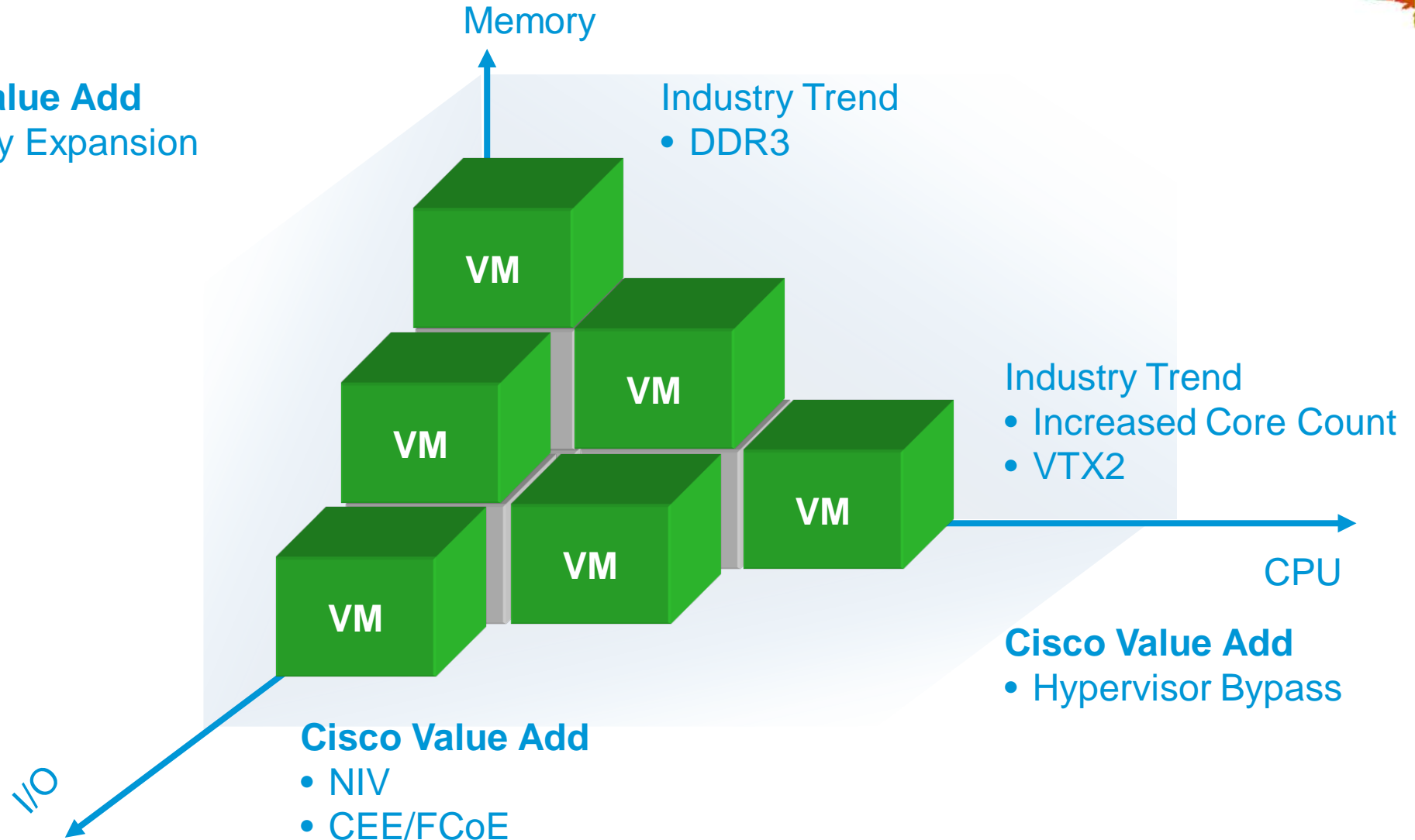


# VM Efficiency



**Cisco Value Add**  
• Memory Expansion

**Industry Trend**  
• DDR3



**Industry Trend**  
• Increased Core Count  
• VTX2

**Cisco Value Add**  
• Hypervisor Bypass

**Industry Trend**  
• Intel QPI

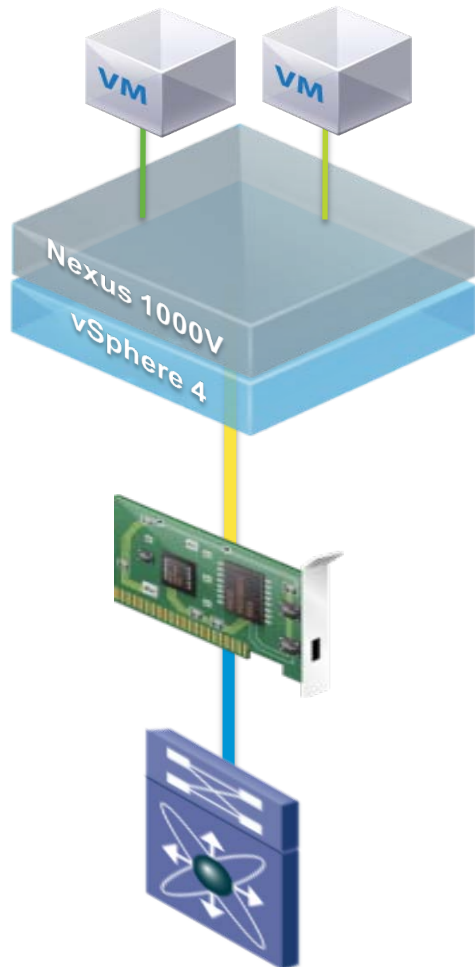
**Cisco Value Add**  
• NIV  
• CEE/FCoE



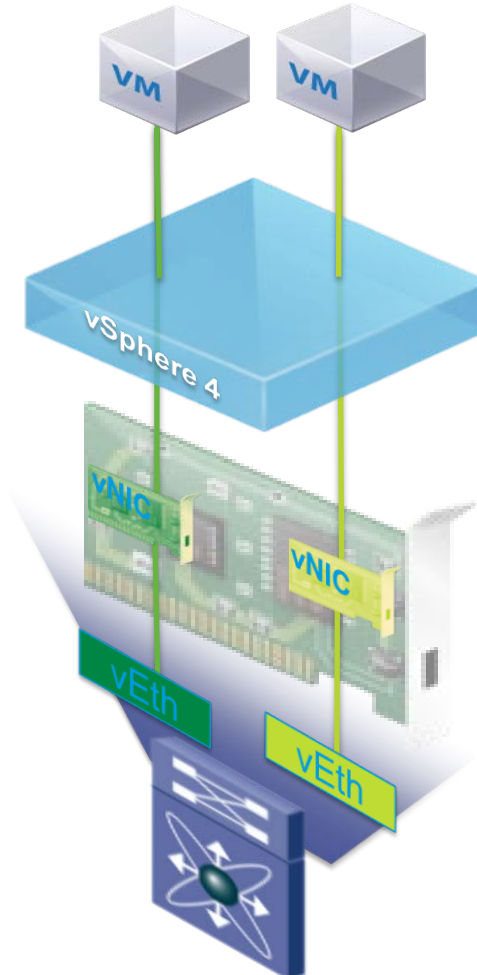
# VM Performance



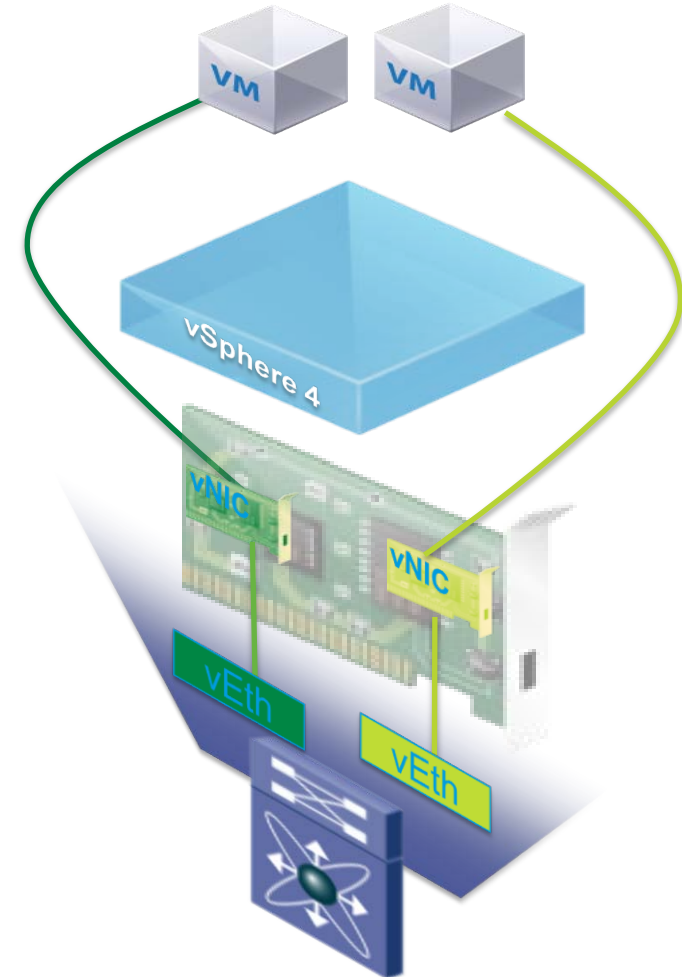
## VN-Link in Software



## VN-Link in Hardware



## VN-Link in Hardware VMDirectPath





# Multiple Aspects of Virtualization



## Cisco Unified Infrastructure

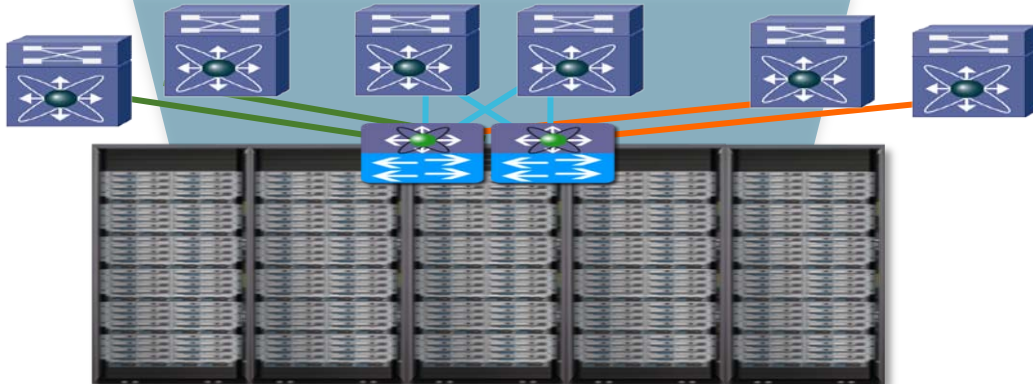
VM Security & Policy

VM Mobility

VM Performance

VM Efficiency

Network Virtualization



- **VM Security & Policy**
  - Security visibility into VMs
  - Dynamic security policy as VMs move
  - Tiered QoS for Shared Infrastructure
  - Cisco vPath (1000v), vNAM
  - Virtual Security Gateway (VSG)
- **VM Mobility**
  - Intra-DC, Inter-DC Mobility
  - Simplified L2 Architecture in DC
  - Cisco Nexus 1000v
  - Cisco FabricPath / TRILL
  - Cisco OTV



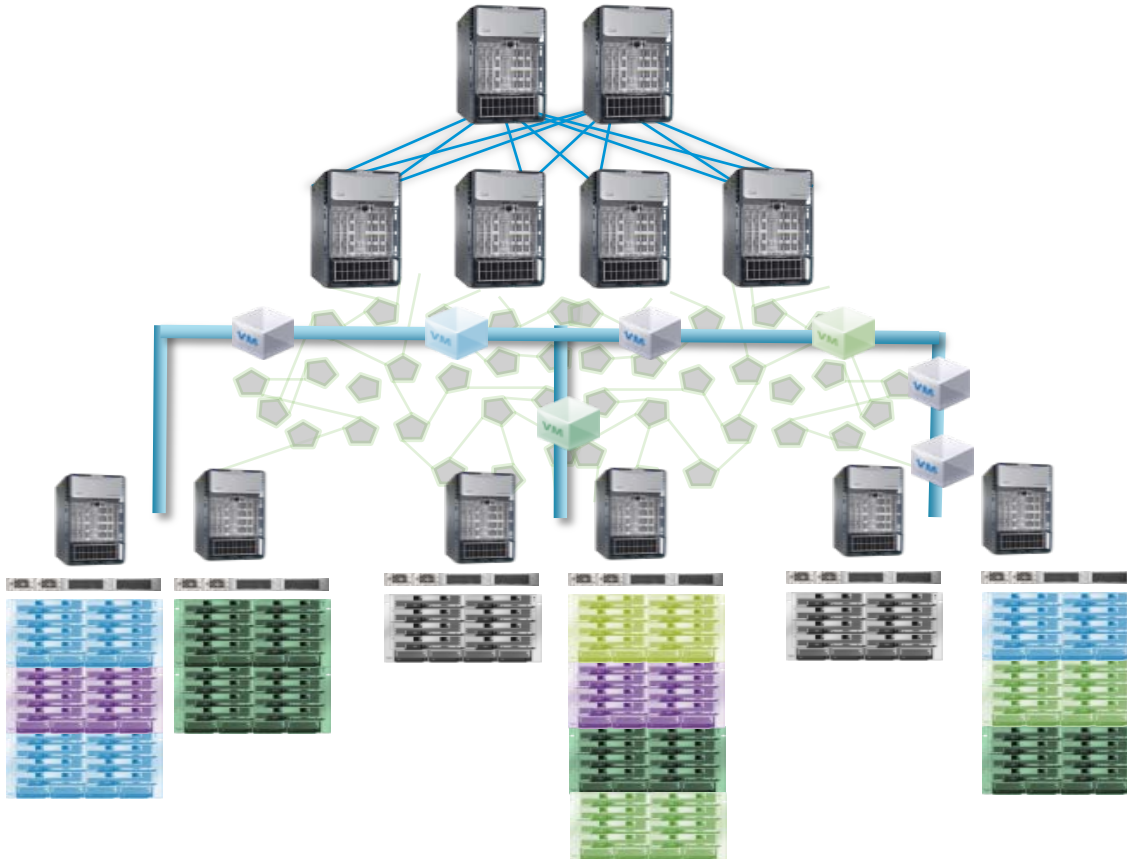
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# VM Mobility Cisco FabricPath

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- Data Center-Wide Scalability at Layer 2



- Available on Nexus 7000
  - 160 Tbps fabric, up to 8000 10GbE ports
  - 2.56 Tbps bi-sectional bandwidth for storage
- Deterministic latency
- Creates location independence for VMs in the data center



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# VM Mobility

## Cisco Overlay Transport Virtualization (OTV)

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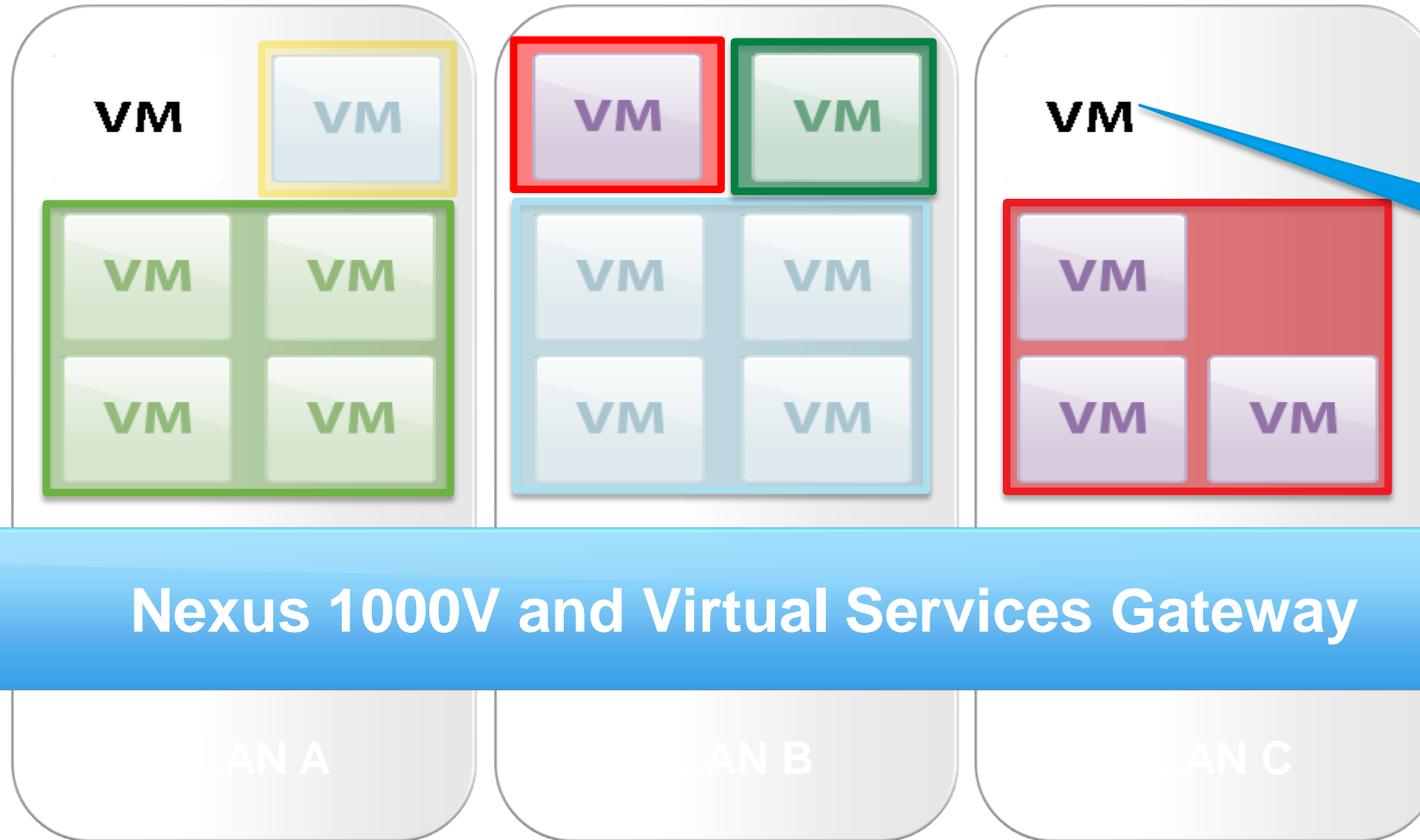
Ethernet Encapsulated Over IP



- Seamlessly extend the LAN between data centers
- Ideal for long distance vMotion and Site Recovery Manager
- Brings operational transparency to VM IP address management
- Dynamic/automated – connections between data centers established on the fly



# VM Security & Policy



New VM powers on

Nexus 1000V and Virtual Services Gateway



High Zone



Medium Zone



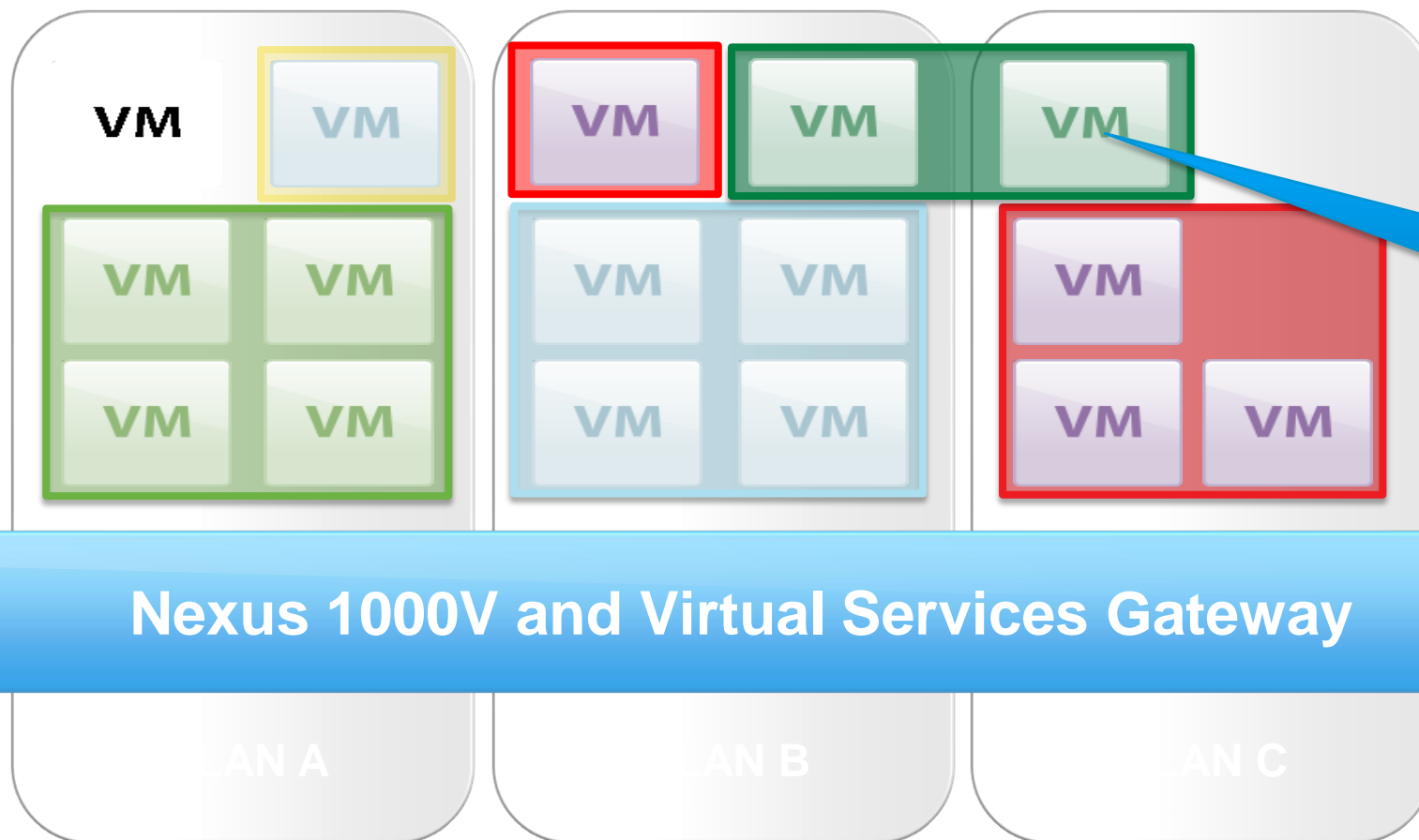
Low Zone



Quarantine Zone



# VM Security & Policy



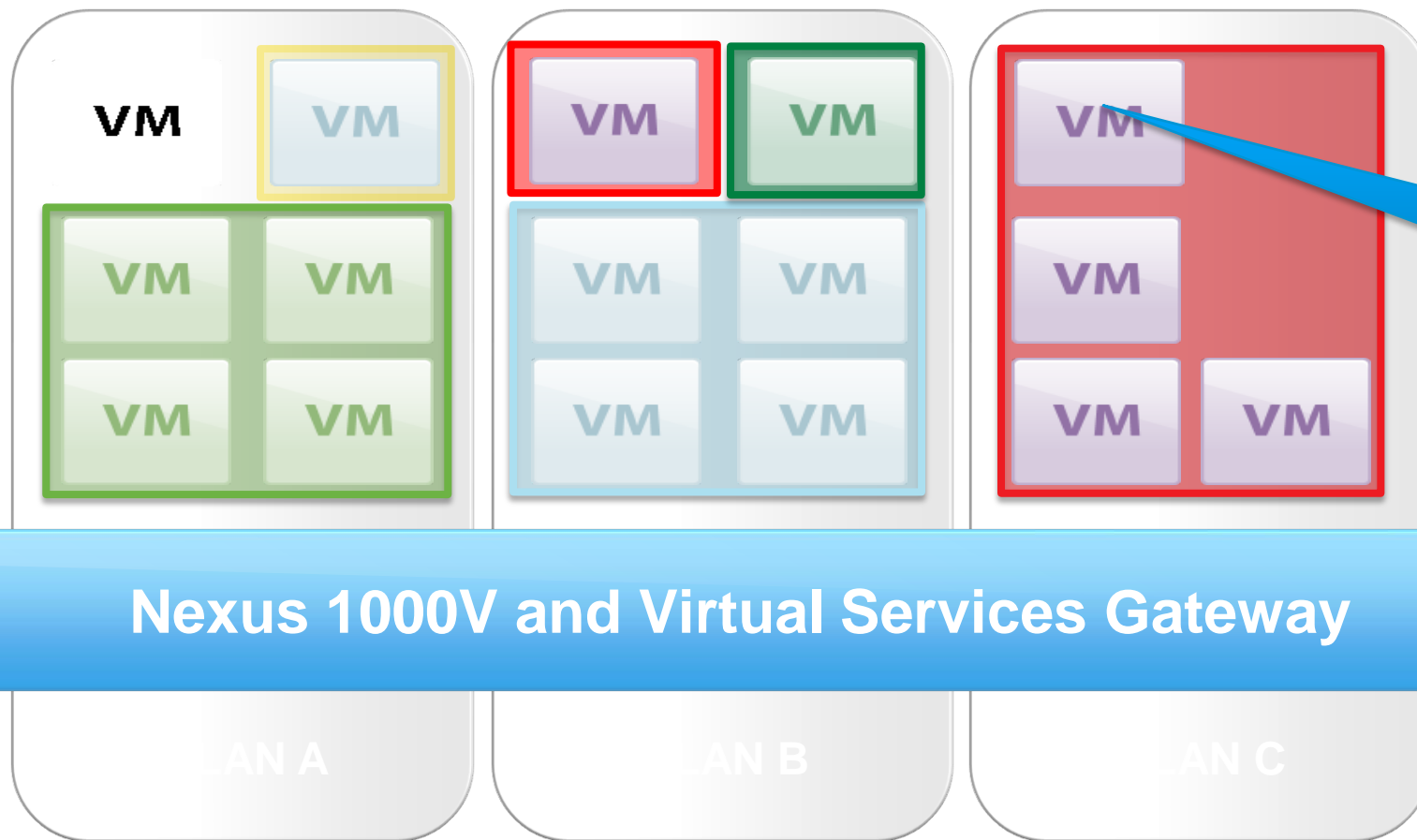
Based on policy, placed in "high trust" zone

## Nexus 1000V and Virtual Services Gateway

- High Zone
- Medium Zone
- Low Zone
- Quarantine Zone



# VM Security & Policy



## Nexus 1000V and Virtual Services Gateway

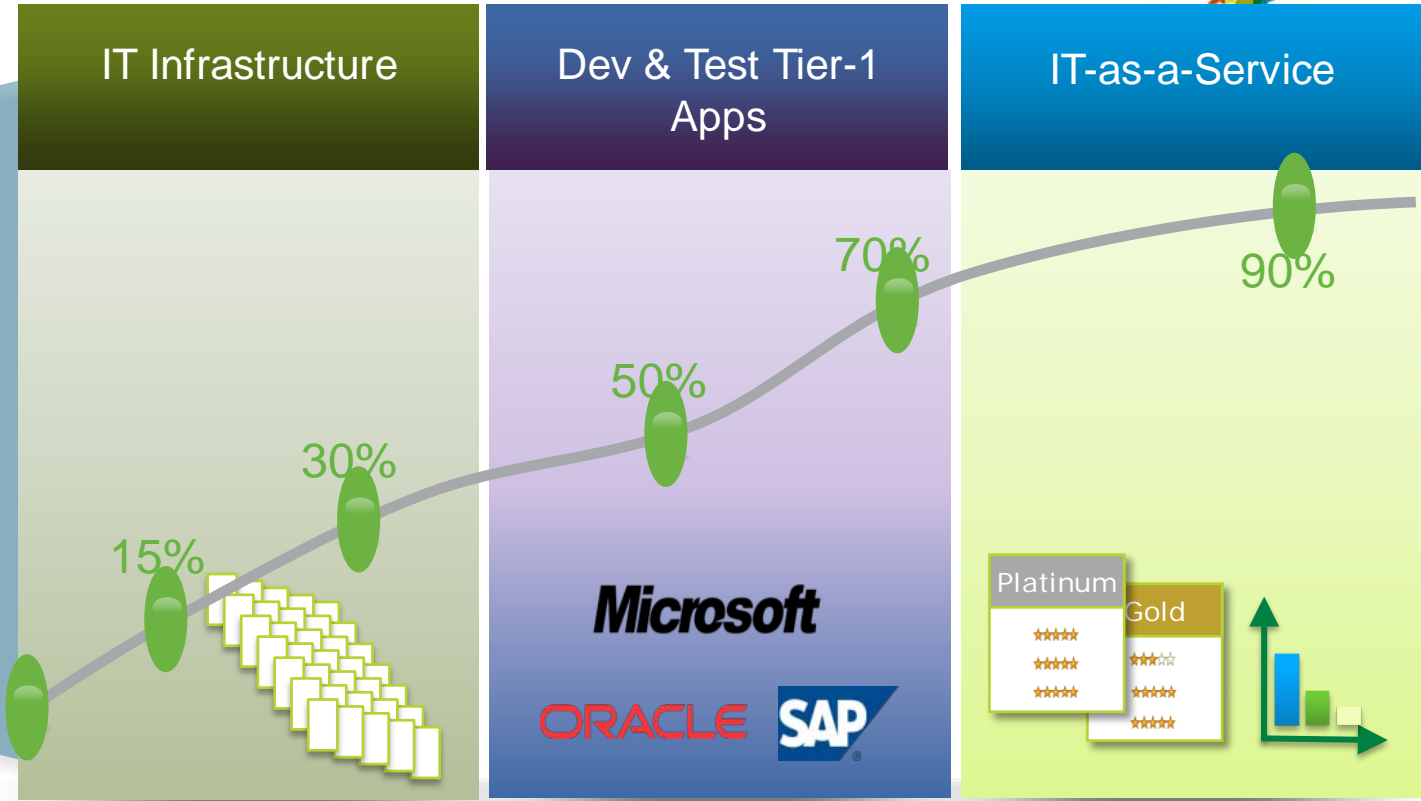
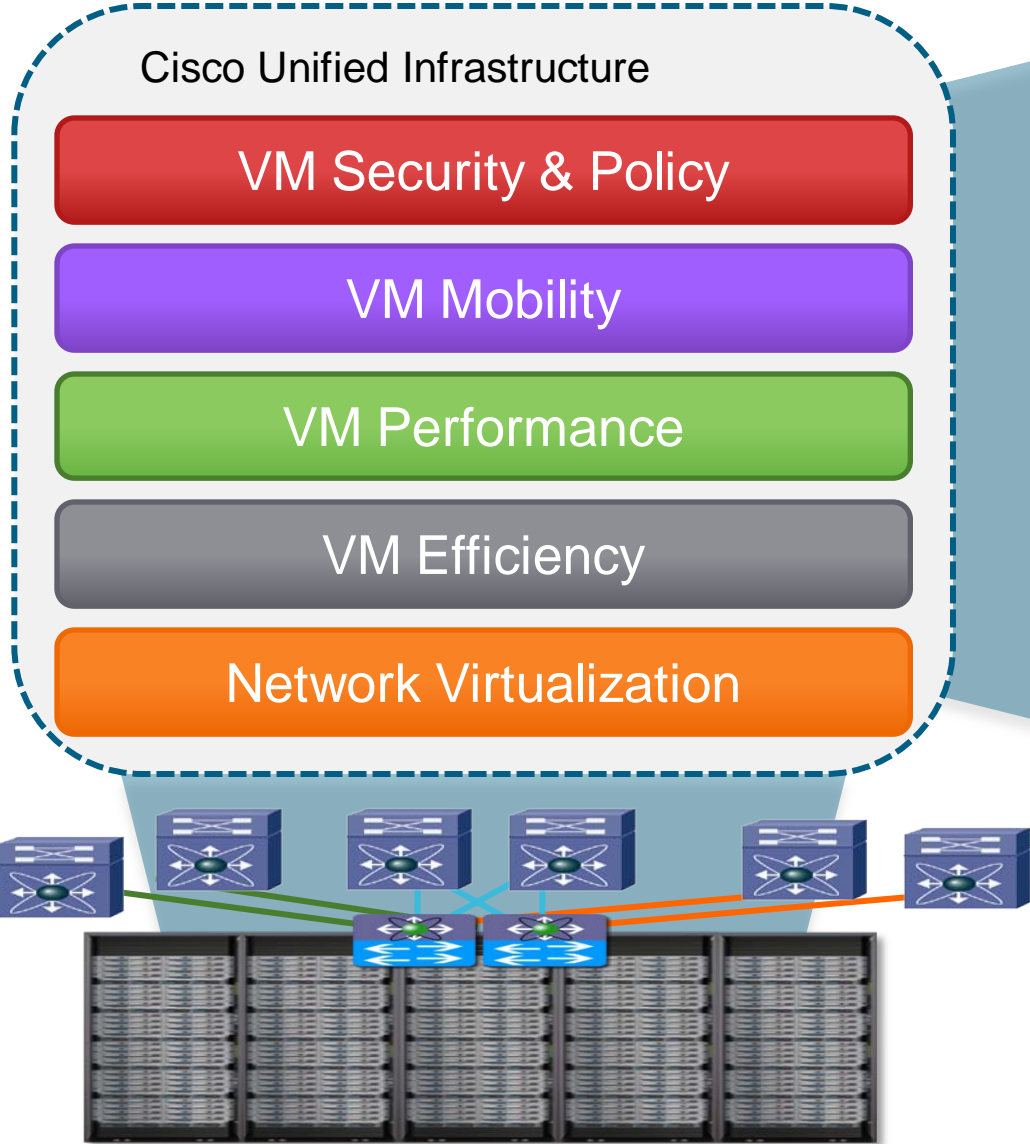
-  High Zone
-  Medium Zone
-  Low Zone
-  Quarantine Zone



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# Journey to Pervasive Virtualization

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Increase IT Efficiency, Reduce Operational Costs and Improve Performance



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# Virtualization

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1.1

Saved \$200,000 annually in IT resources, avoided \$333,000 in desktop hardware, and will support 1000 employees with four-person IT department

“With Cisco UCS, ExamWorks can support the same number of people with a staff of four. Avoiding the need for 16 full-time positions saves more than **\$1.1 million** annually.”

– Brian Denton, CTO, **Examworks**



# Automation

Speed Deployments, Reduce Mistakes,  
Enable Services



## Consolidation

- Standardize LAN / SAN infrastructure
- Reduce # of Operating Systems
- Reduce cabling
- Increase application bandwidth 10x
- Enable dynamic QoS



## Virtualization

- Increase VM density
- Increase VM performance
- Enable VM mobility (intra/inter-site)
- Enable VM-aware security

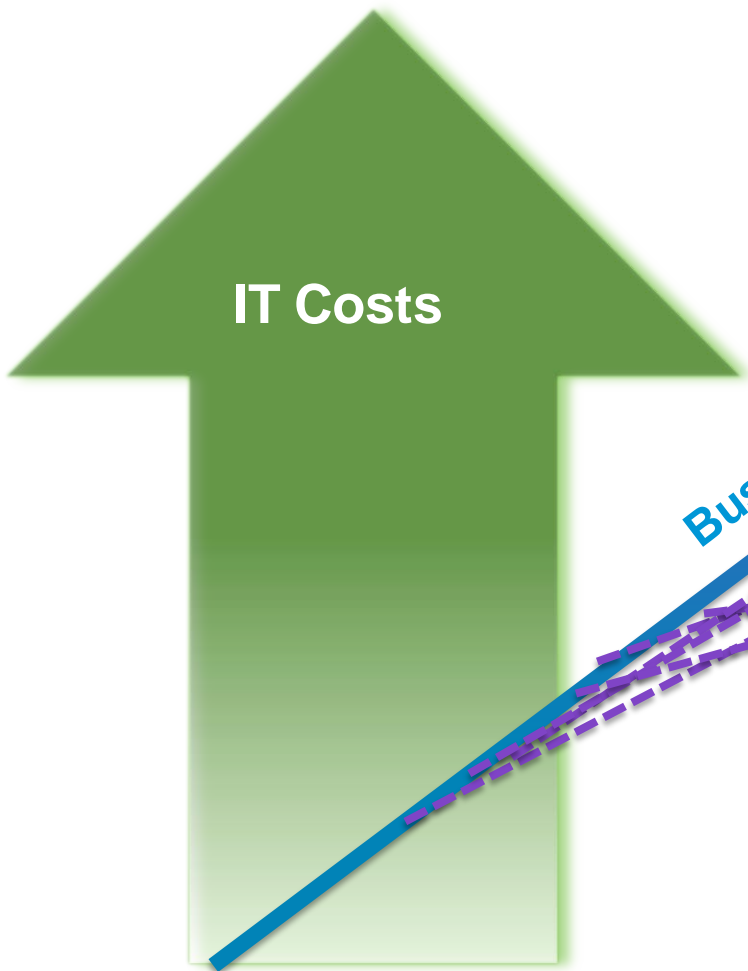


## Automation

- Reduce points of management
- Enable Stateless Computing
- Enable Policy-Based provisioning
- Simplify overall IT operations



# Automation



**Business Demand for IT Services**

- Stateless Computing
- Unified Management
- Dynamic Network Services
- Dynamic VM Mobility
- Automated Backup / DR
- Open APIs
- Service Catalog and Service Creation

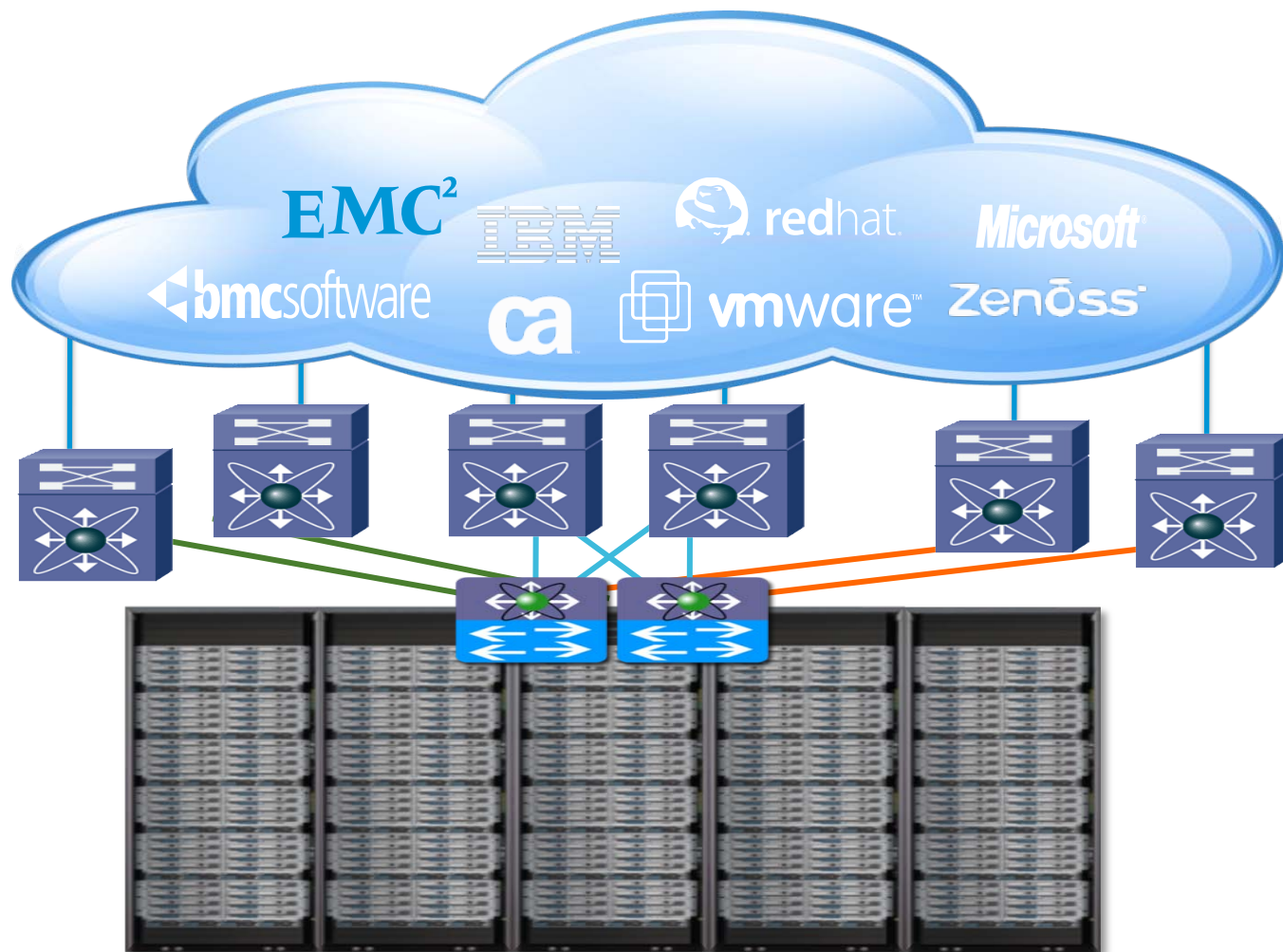
- Simplify Deployments
- Reduce Operational Costs
- Increase Business Time-to-Market



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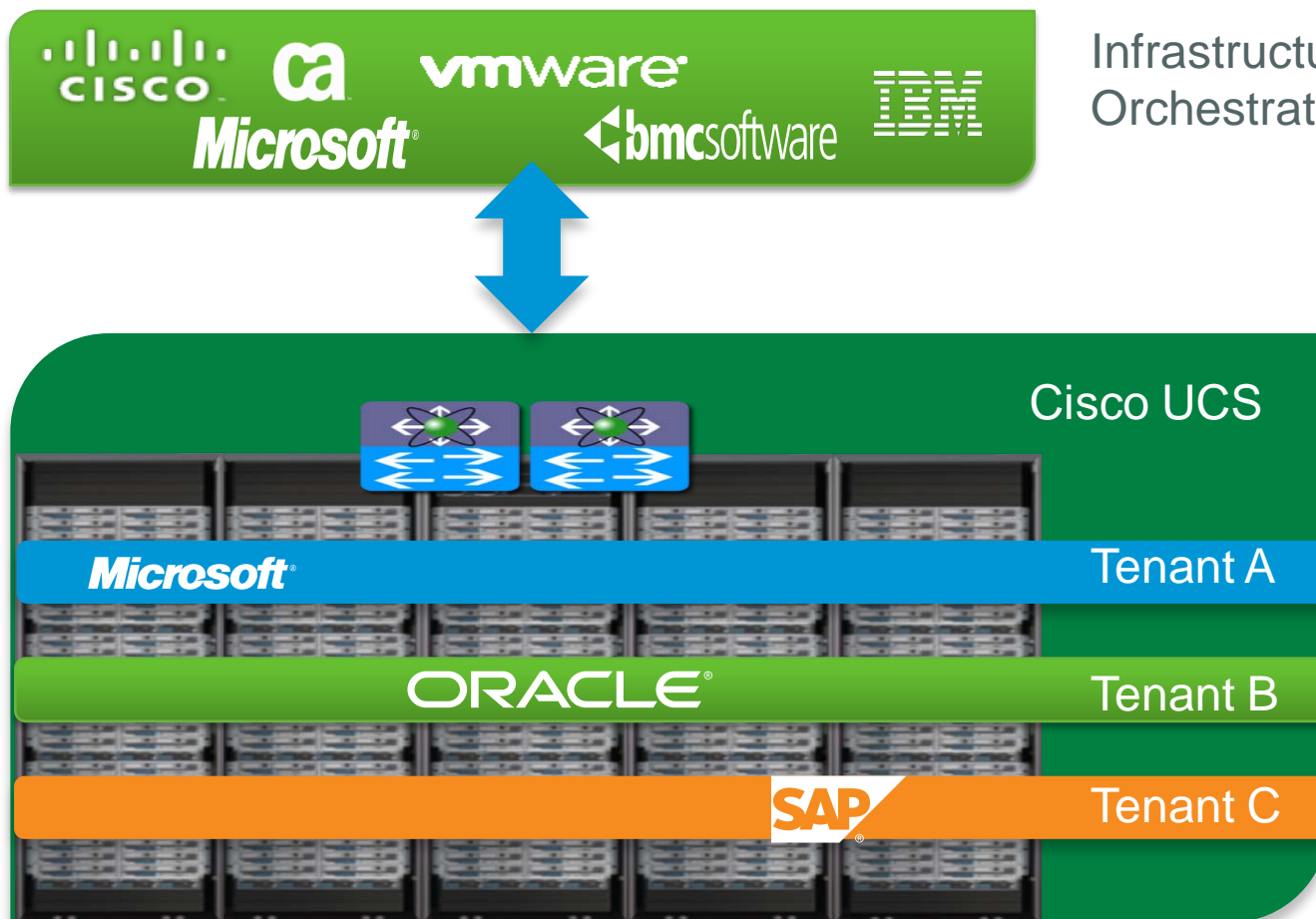
# Automation - Flexibility

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- Open Ecosystem
  - NewScale
  - Tidal
  - BMC Cloud Lifecycle Manager
  - HP Ops Manager, IBM Tivoli
  - EMC Ionix UIM
  - VMware vCloud Director
  - CA, Zenoss
- Open Standards
  - 10Gb Ethernet, CEE
  - FCoE
  - TRILL
- Open APIs & Scripting
  - Cisco UCS API (XML)
  - Powershell

# Cisco UCS Enables Automation

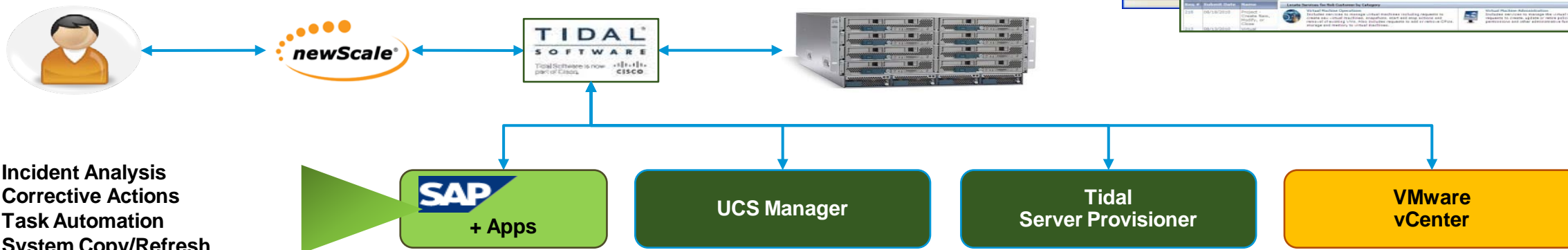
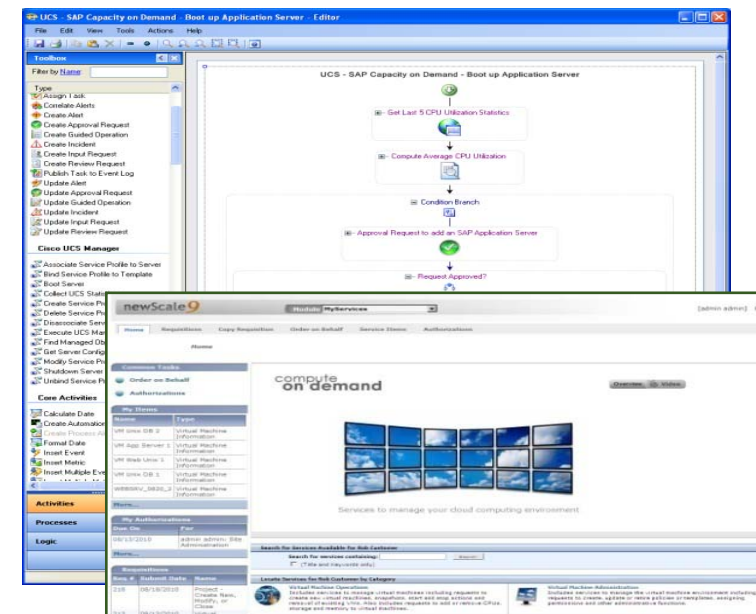


Infrastructure  
Orchestration Layer

- Cisco UCS offers simple integration with Infrastructure Orchestration tools
- Single IP address for orchestration across hundreds of x86 nodes
- Single XML API for orchestration of all aspects of UCS from compute to network to storage
- Service profiles permit rapid repeatable deployment and re-configuration of compute resources
- Offers a secure multi-tenancy architecture

# Cisco Intelligent Automation for Cloud

- Proven, industry-leading storefront for self-service IT
  - Superior ease of use
  - Highly extensible and customizable UI and service catalog
- Integrated physical and virtual provisioning offers full-range IaaS
  - Open API's and integration capabilities support heterogeneous data centers and existing customer IT investments
- Bundled with Advanced Services to leverage datacenter expertise
  - Guide customers through cloud adoption cycle



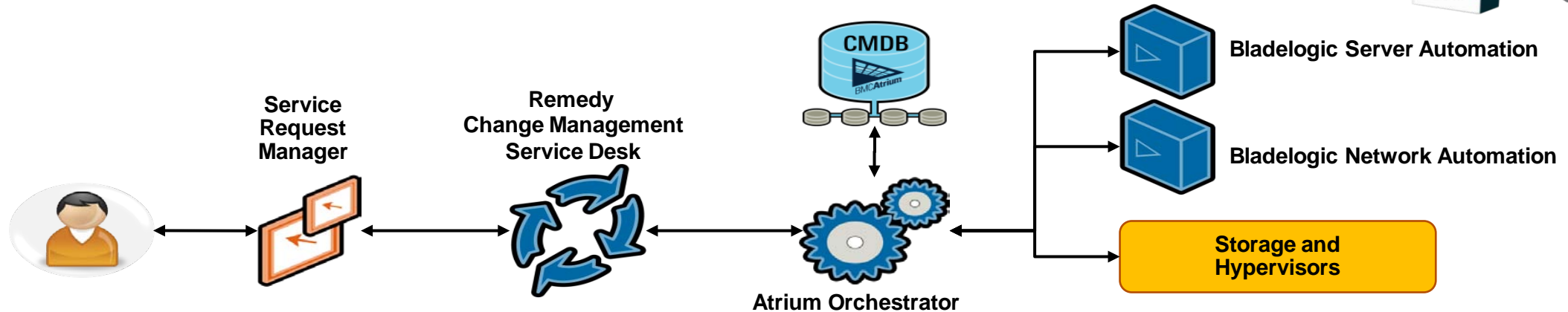
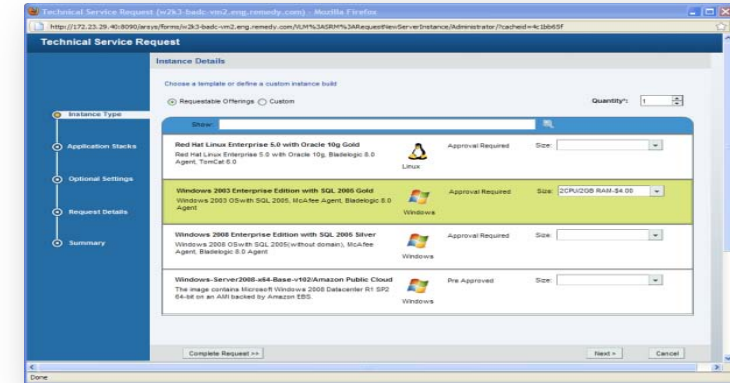
- Incident Analysis
- Corrective Actions
- Task Automation
- System Copy/Refresh

# Cloud Deployment on UCS and Nexus

*Service Provider, Large-Scale Private Cloud Solution*

- Operate private and public clouds
  - Self-service request portal
  - Automated fulfillment
  - Optional approval process
- Pre-integrated, full-stack toolset
  - UCS, Nexus, services, hypervisor, OS, software
  - Provisioning, monitoring, compliance

## BMC Cloud Lifecycle Manager





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# Automation

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# 30

Reduction of operational costs by **30%** and capital costs by 20% while delivering agility to meet customer demand

“Cisco UCS provides us with tremendous flexibility.... Our IT team can provision a new service overnight, so it is ready to go live in time for next-day trading. It’s also great news for our customers who are looking for increased choice and best execution services,” says Yarrow..”

– Philip Yarrow, Director of Electronic Trading, **Winterflood**

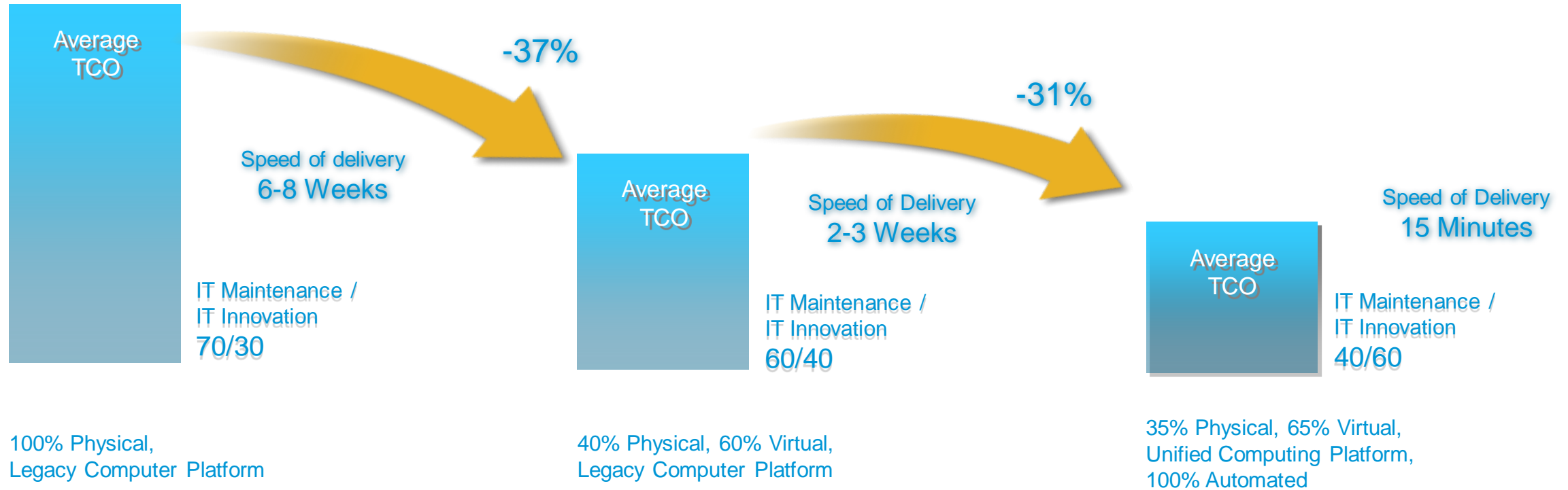


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# Cisco IT Case Study – “CITEIS”

## Cisco IT Elastic Infrastructure Services (Internal Private Cloud)

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Virtualization

Unified Infrastructure  
and Automation



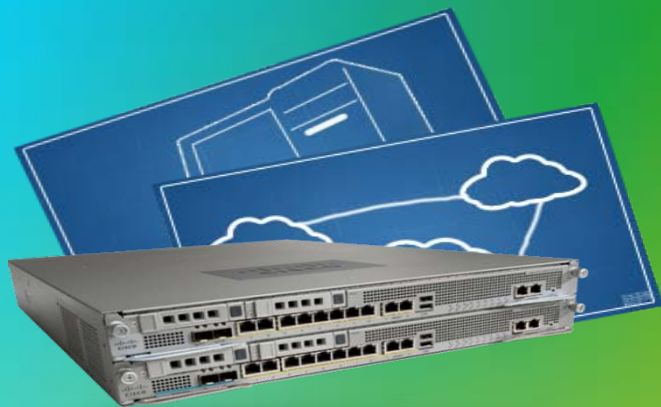
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# Cisco's Cloud Strategy

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## Essential Infrastructure for Building Clouds



For customers to build and  
 operate private clouds

## Solutions for Deploying Cloud Services



For customers to deploy  
 fully-tested, best-of-breed  
 cloud services

## Innovation to Accelerate Use of Clouds



For users to access and  
 collaborate using secure  
 cloud services



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# Private Cloud Architecture and Portfolio

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## Business Application Solutions

vmware citrix

EMC<sup>2</sup>  
where information lives



Virtual Desktop Infrastructure (VDI)



Cisco VXi

ORACLE



Microsoft

Tier-1 Business Applications

Cloud Management



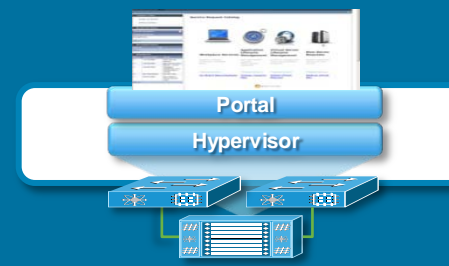
## Integrated Computing Stacks



Vblock



FlexPod



Cloud Starter



Microsoft

## Unified Data Center Networking



Unified Fabric



Unified Network Services



Unified Computing

vmware





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# Desktop Virtualization and Collaboration

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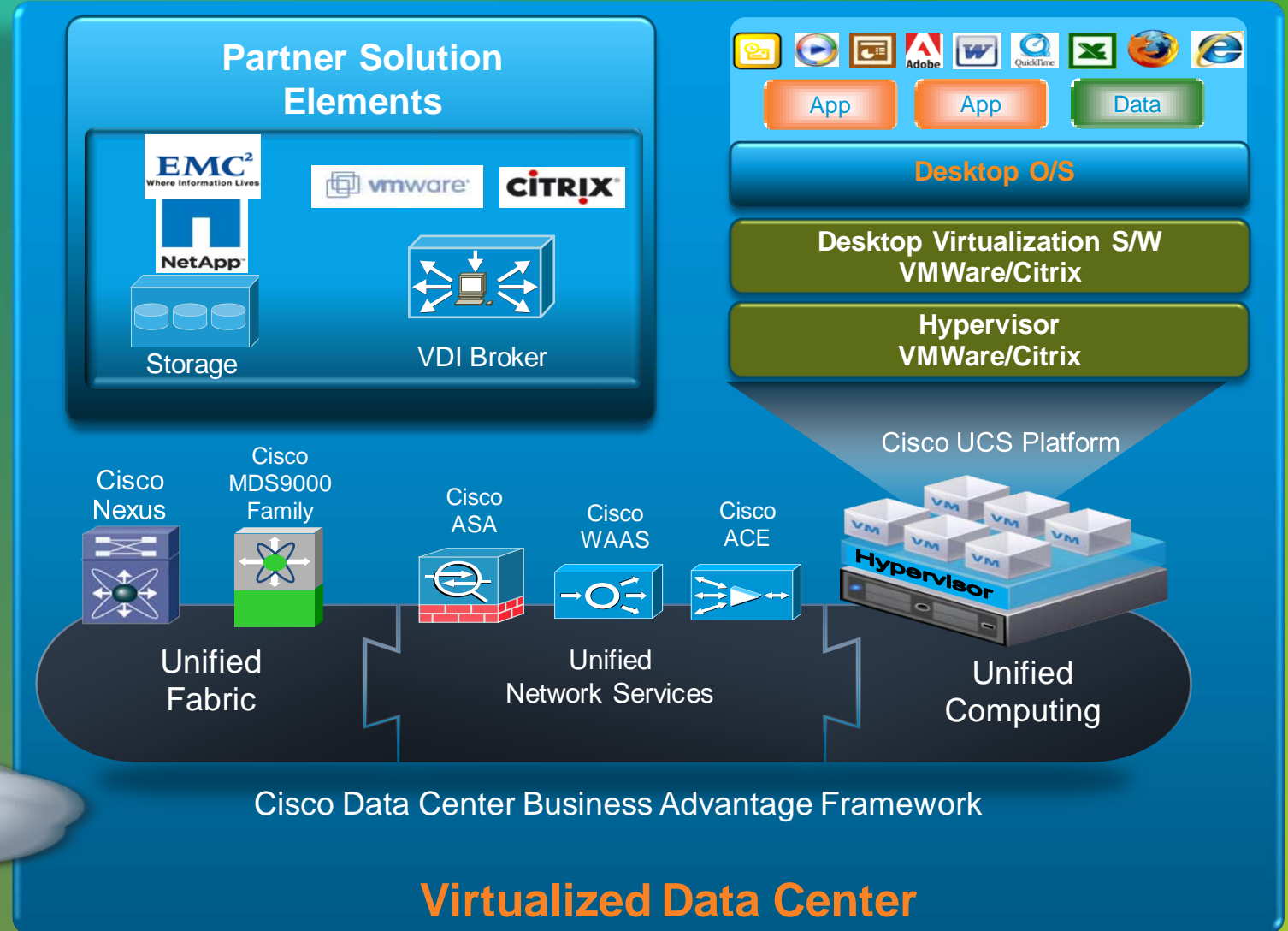


- Removes deployment barriers
- Combined joint partner solutions with industry leaders
- Cisco Validated Designs & Services to accelerate customer success

Clients



WAN





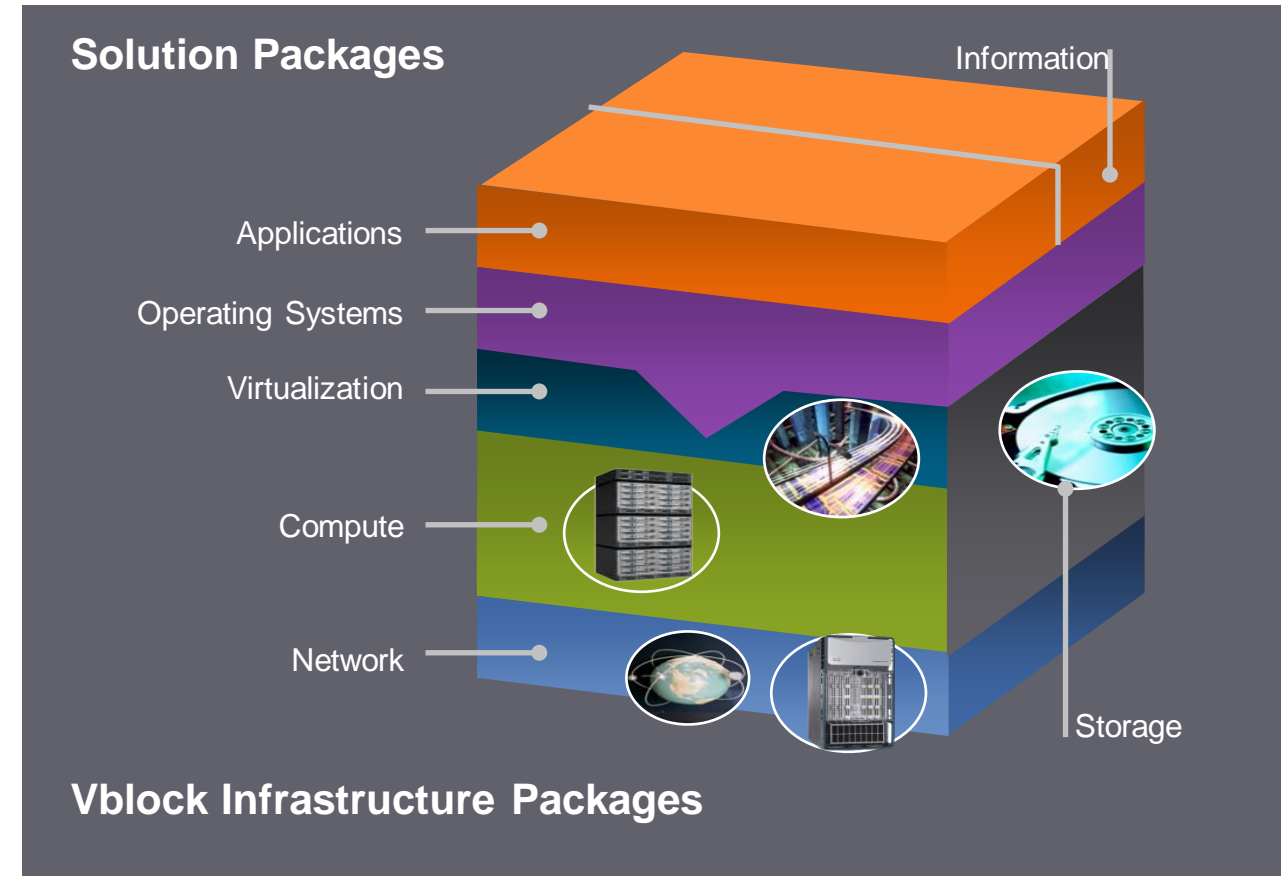
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# VCE Vblock Infrastructure Packages

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- Rapid deployment model of virtualized infrastructure
- Pre-integrated and validated solutions reduce total cost of ownership
- Service-level driven through predictable performance and operational characteristics
- Improved compliance/security and reduced risk



Accelerate Time to Results – Reduce TCO



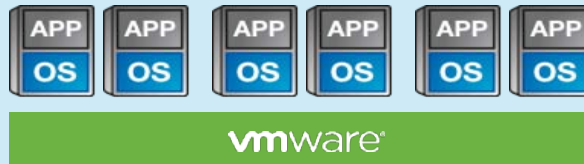
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# FlexPod for VMware

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VMware®  
vSphere®  
vCenter®



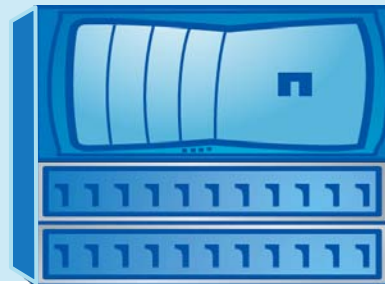
Cisco®  
UCS B-Series  
UCS Manager



Cisco Nexus family  
switches  
Cisco 1000V



NetApp® FAS  
10 GbE/FCoE



- Complete DC in one rack cabinet
- Base configuration supports 1,500 users for four popular workload applications simultaneously
  - Virtual Desktop Infrastructure
  - Microsoft® Exchange
  - Microsoft SharePoint®
  - Microsoft SQL Server®
  - With headroom for multiple applications
- Flexibility to support multiple classes of compute and storage in a single FlexPod™



Proven, Flexible, and Future-Proof Data Center Solution



# Private Cloud: Unified Fabric

## A Single Network Infrastructure for the Data Center



### INNOVATIONS

- Architectural Flexibility and Scale
  - Consolidated I/O
  - Workload mobility
  - Simplified Management
  - VM-aware networking
- Convergence
  - Scalability
  - Intelligence

Network-based approach for systems excellence

### BUILDING BLOCKS

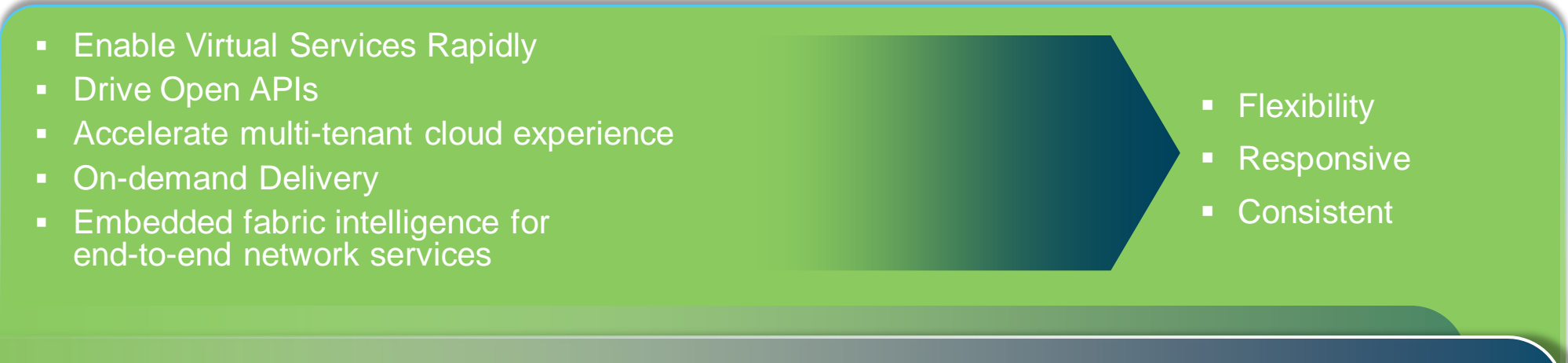




# Private Cloud: Unified Network Services A New Approach to Delivering Network Services

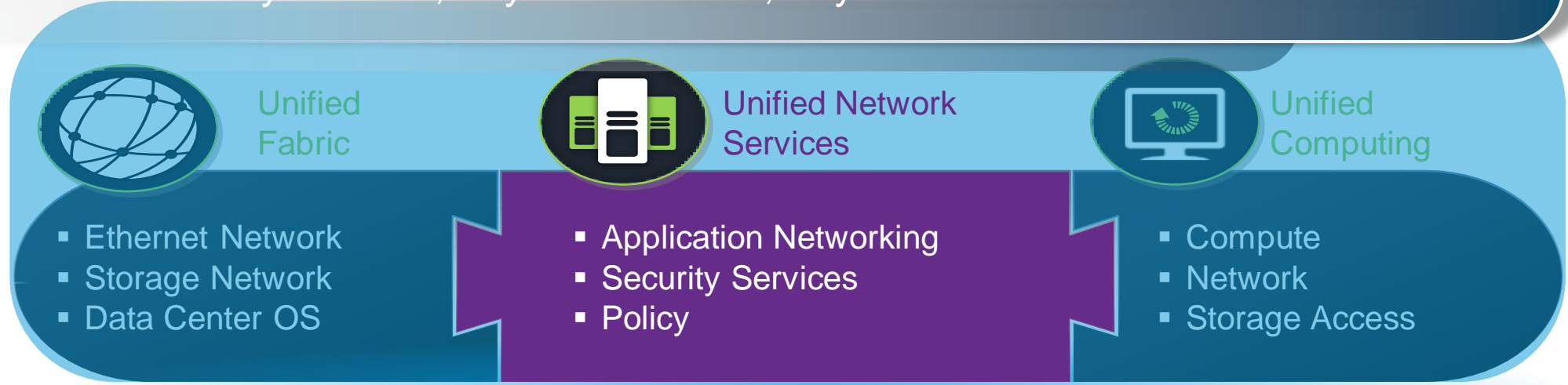


## INNOVATIONS



Any Service, Any Form Factor, Any Platform

## BUILDING BLOCKS





# Private Cloud: Unified Computing

## Compute Building Blocks with Integrated Access

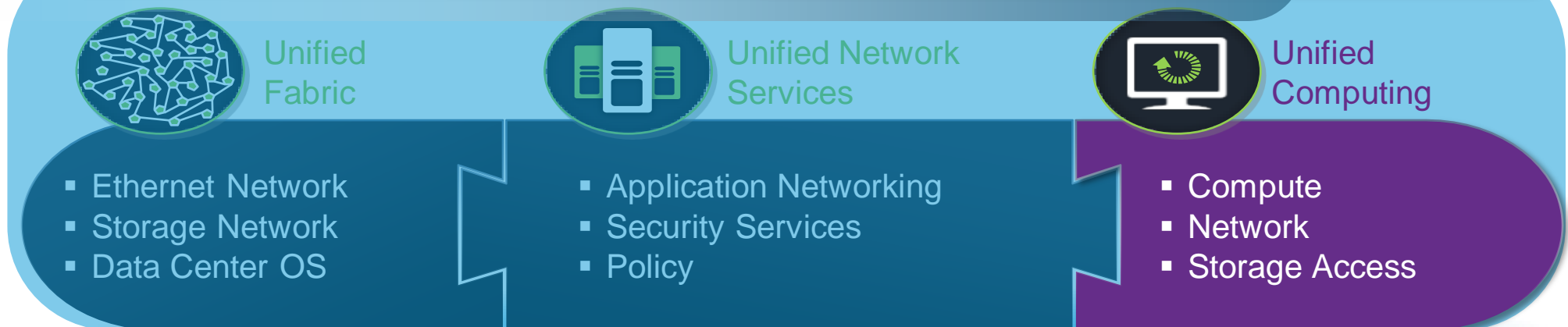


### INNOVATIONS

- Consolidation of Network, Compute, Storage Access and Virtualization
  - Scalable & dynamic compute resources for open, virtualized and non-virtualized environments
  - Embedded Management
  - Foundation for Cloud
  - Ecosystem Expansion: 40+ ISVs
- Resource Utilization
  - Simplicity
  - Workload mobility

Scalable, dynamic compute resources for open environments

### BUILDING BLOCKS





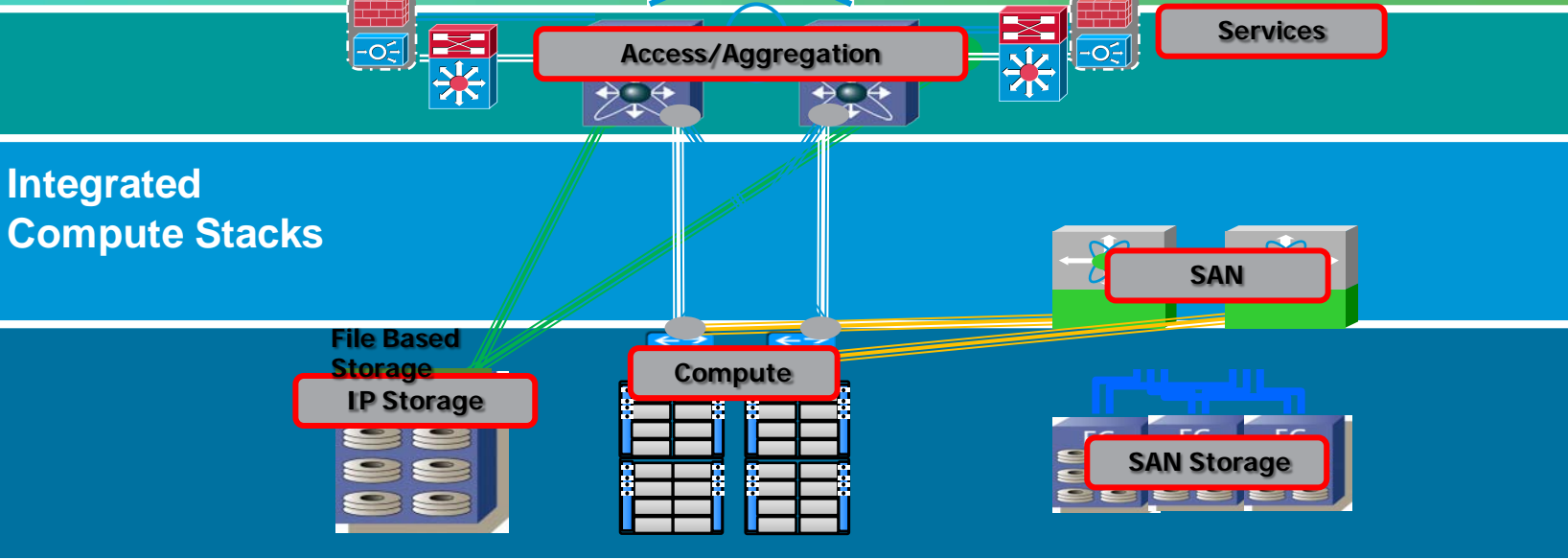
# Private Cloud – Building Blocks

## Virtualized Multi-Tenant Data Center



### Data Center Interconnect

### Unified Data Center Networking



- Application Mobility
- Disaster Recovery
- Business Resiliency
- Secure Multi-Tenancy
- Application Development
- Regulatory Compliance
- VDI Guaranteed Delivery
- ERP/CRM Resource on Demand
- Desktop Virtualization
- Infrastructure as a Service
- Backup / Recovery



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# Cisco Borderless Network Security/Cloud Architecture

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4

## Policy

(Access Control, Acceptable Use, Malware, Data Security)

**Policy**

Corporate Border  
Applications and Data

Corporate Office

Branch Office

Physical Infrastructure

Virtual Infrastructure

Private Clouds

Public Clouds

## Cisco Security Enforcement Array



Borderless Data Center

3

Borderless Internet

2

Borderless Edge Zones

1

Airport

Mobile User

Attackers

Partners

Customers

Coffee Shop

Home Office



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# Cloud Lifecycles Services

*Helping customers along the Journey*

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## Cloud Strategy Service

### Assess Strategy

- Technology and Security
- Management Tools
- Operational Readiness
- Business Case
- Chargeback Approach
- Program and Architecture Management Offices

Accelerate Time to Value

## Cloud Planning and Design Service

### IaaS Design

- Technology and Security
- Tools Architecture
- SLA Design
- Chargeback Design
- Program and Architecture Management Offices

Worldwide Expertise  
 Worldwide Presence

## Cloud Implementation Service

### Implement

- Technology, Security, Tools, Facilities
- Orchestration Integration
- Workload Migration
- Staging and Validation
- Program and Architecture Management Offices

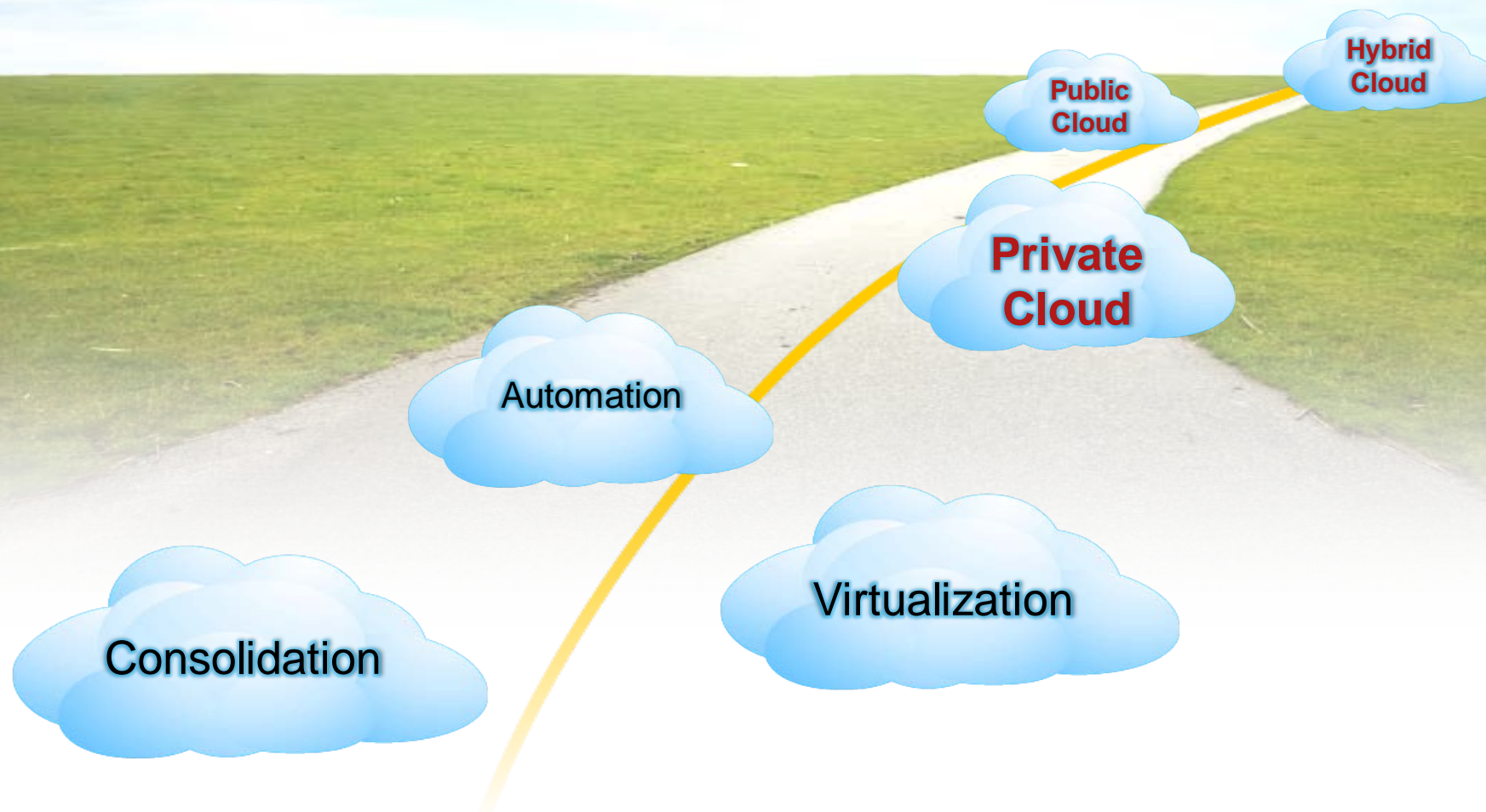
Proven Delivery  
 Capability



Cisco  
Networkers 2011  
May 19, Toronto, Canada

# Ready for the Cloud?

Knowledge  
Is Power.  
Learn. Share. Collaborate.



# Questions?

Thank you.

