



NetApp



CISCO

NetApp and Cisco

Building a Service-Ready
Multi-Tenant Infrastructure
for Higher Education





Queensland
Education,
Science & Technology
Network



NetApp

A Perfect Complement



CISCO



NetApp



CISCO

Industry Leadership	Storage	Servers & Networking
Ethernet Expertise	10GbE leader 1 st FCoE Storage	Dominates Ethernet Space
Protocol Support	Unified Storage	Unified Fabric
Virtualization Focus	Leading Storage Innovator	1 st Virtualized Servers
Administration	Simplified Data Management	Simplified Network Infrastructure

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A Decade of Joint Innovation



Ethernet Leadership

- Ethernet leaders establish alliance
- 1st joint solution, resell Nexus/MDS
- NetApp ships 1st 10GbE storage
- Joint SAN business doubles
- Global Dynamic Lab

Unified Data Center

- NetApp & Cisco launch FCoE
- Cisco unifies computing w/UCS
- Cisco & NetApp virtualization leaders

Accelerating Shared Infrastructures

- 1st secure multi-tenancy solution
- Solutions for critical apps, VDI, cloud
- Validated architectures
- Pre-tested, scalable configurations



Simplified Ethernet Solutions
10GbE
FCoE
Virtualized Dynamic Data Center
Secure Multi-Tenancy
FlexPod

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A Shared Vision for the Datacenter





Unify Fabric

- Leverage the power & simplicity of Ethernet
- Converge compute, network, storage layers
- Wire once, evolve as needed



Eliminate IT Silos

- Do more with less
- 50% savings across compute, network, storage
- Compute to storage visibility, management



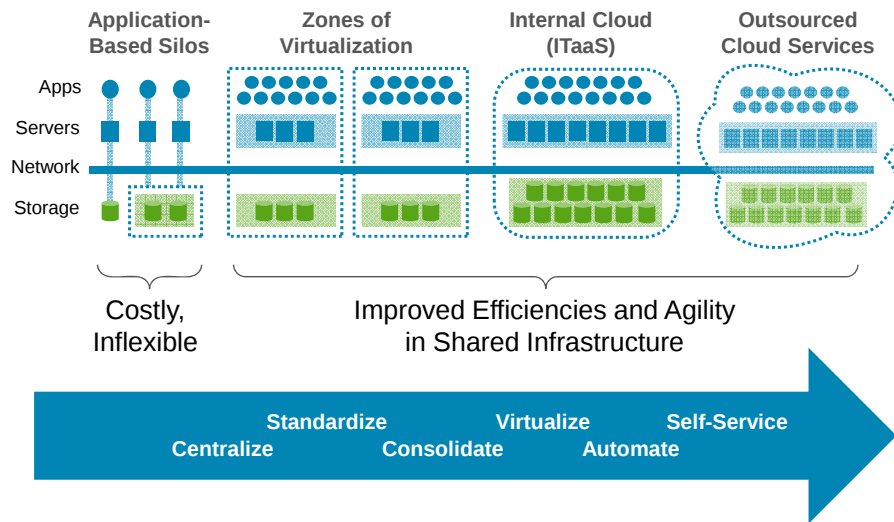
Evolve to ITaaS deployed on Multi-Tenant, Agile Infrastructures

- Unprecedented business agility
- Nondisruptive scalability
- Automation

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Data Center Evolution



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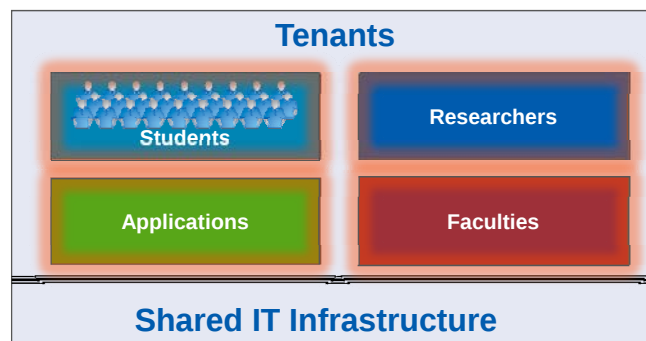
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Multi-Tenancy Basics



- Shared infrastructure: hardware and software
- Consolidation of diverse requirements
- Administrative isolation and control

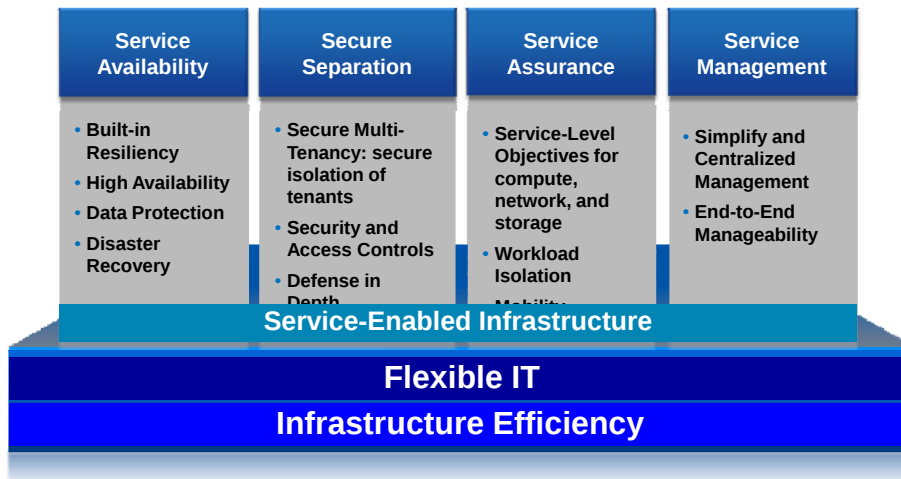


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The Four Pillars on a Rock Solid Foundation

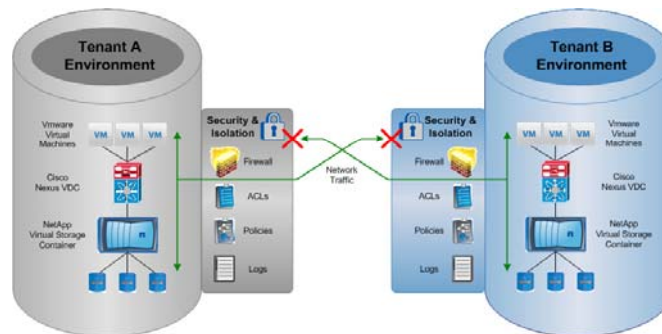
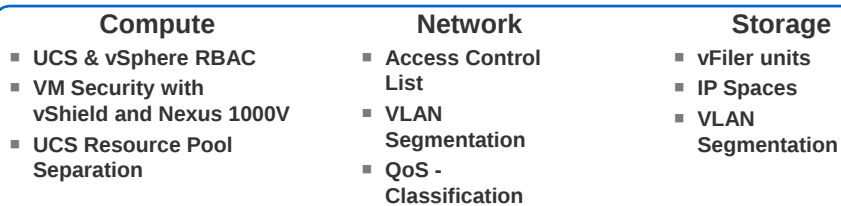


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SMT - Tenant Separation

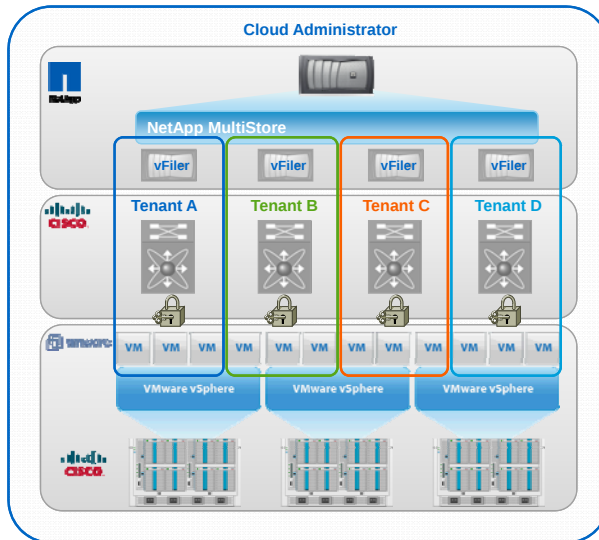


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SMT - Access Control



Define Roles

- Cloud Administrator
- Tenant Administrator
- Tenant User

Role Based Access Control

- UCS Manager
 - Server Admin
 - Network Admin
 - Storage Admin
 - Customized Admin
- vCenter
 - Privilege Assignment
 - User Group Association
 - Permission Assignment

Access Control List

- Nexus 1000V, 5000, 7000

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NetApp Foundational Technologies



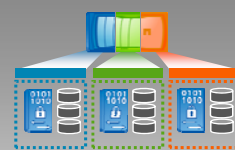
Multi-Protocol

- Block- FC, FCoE, iSCSI
- NAS - CIFS, NFS, HTTP
- One Platform Supporting All Protocols Natively
- High Performance Access - 10Gbps Ethernet & FCoE, 4/8Gbps FC



Storage Efficiency

- Deduplication
- Thin Provisioning
- Space Efficient Clones
- RAID-DP
- Thin Replication



Multi-Store

- Platform for stateless computing and virtualization
- Multi-rack architecture
- Form factor independent
- Enterprise-class x86
- Standards-based

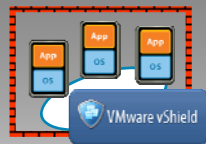
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VMware Foundational Technologies

enabling Secure Multi-Tenancy



vShield Zones

- Policy Based VM Level Separation between Tenants
- Policy Based VM Separation between Application layers
- Full Integration with Nexus 1000v



HyperVisor

- Industries Leading Server Virtualization Technology
- vMotion & Storage vMotion
- Dynamic Resource Scheduling
- Resource Pooling

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Cisco Foundational Technologies



VN-Link

- Virtualization aware access layer
- Compatible with switching platforms
- Combine VM and physical network operations
- Standards-based



Unified Fabric

- Enterprise-class top-of-rack switch
- Designed for server connectivity
- Lossless low latency
- I/O Consolidation around Ethernet
- Standards-based



Unified Computing

- Platform for stateless computing and virtualization
- Multi-rack architecture
- Form factor independent
- Enterprise-class x86
- Standards-based

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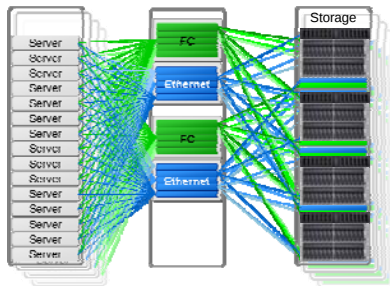
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Cisco UCS and NetApp Simplified Architecture

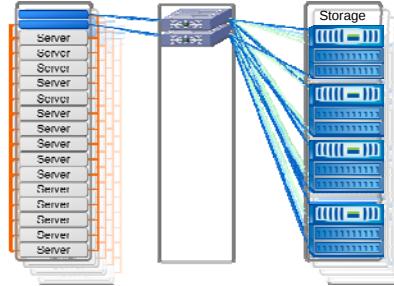


Legacy Connectivity



- Disparate technologies
- Multiple points of management for switches, blades, storage
- High cable and component count

Cisco UCS with NetApp



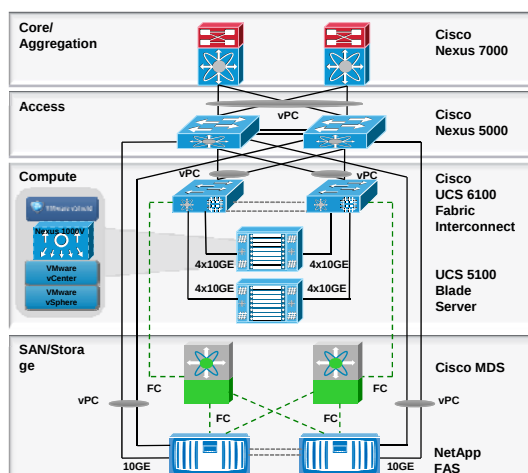
- Unified fabric with FCoE and 10GbE
- Single point of management for UCS, single point for storage
- Reduced cabling and components

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SMT Architecture v1.0



Compute

- vCenter Heartbeat
- VMware HA
- vMotion/Storage vMotion
- UCS Fabric Redundancy

Network

- vPC
- EtherChannel
- N1KV Active/Standby VSM
- Link/Device Redundancy

Storage

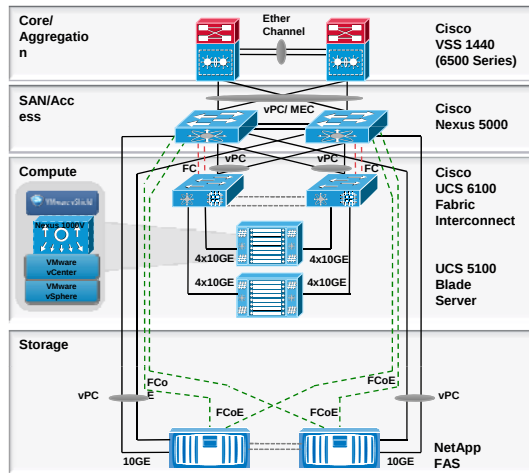
- RAID-DP
- NetApp HA
- Snapshot
- SnapMirror/SnapVault

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SMT – The Architecture Adapts



Compute

- vCenter Heartbeat
- VMware HA
- vMotion/Storage vMotion
- UCS Fabric Redundancy

Network

- vPC
- EtherChannel
- N1KV Active/Standby VSM
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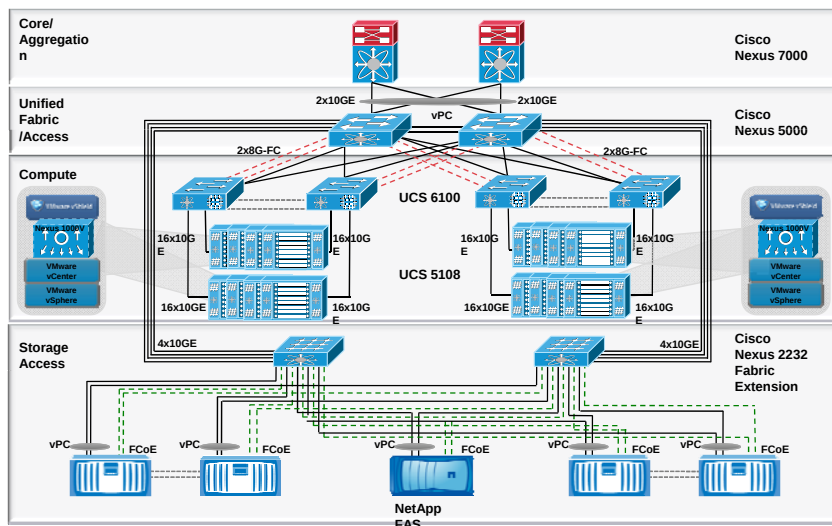
- RAID-DP
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- SnapMirror/SnapVault

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SMT – The Framework Scales

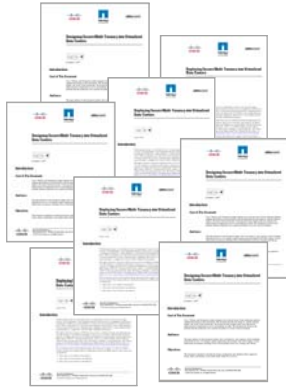


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Jointly Validated Best Practices and Reference Architectures



- Thoroughly tested and documented to address mutual customer business needs
- Enables design/service level consistency and standardization
- Mitigates risk of multi-vendor solutions
- Reflect partnership breadth and depth spanning a range of workloads
 - Exchange 2010 (VMware & Hyper-V)
 - Oracle RAC
 - SAP
 - Desktop Virt. (XenDesktop & View)
 - Secure shared private clouds
- Enabled for 3rd party orchestration

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Joint Solutions



Mission Critical Applications

- Efficient, affordable and automated
- Maximize service levels, eliminate data loss



Desktop Virtualization

- Lowest TCO per desktop
- Unparalleled user experience
- Unprecedented control and security



Virtualized Shared Infrastructures

- Eliminate IT silos while enabling journey to the cloud
- Secure segmentation of shared resources

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Mission Critical Applications



Efficiency

Efficiently Maximize Application Uptime

- More mailboxes, databases, etc. per server
- Use 50% less storage
- Tight integration and automation

Flexibility

Accelerate Application Lifecycle

- Reduce provisioning times from weeks to minutes
- Self-service provisioning from labs to production
- Dynamic, non-disruptive scalability

Uptime

Efficiently Maximize Application Uptime

- Protect against hardware failures
- Planned maintenance with zero downtime
- Application-aware, near-instantaneous backup/recovery
- Protection against unplanned downtime and disasters

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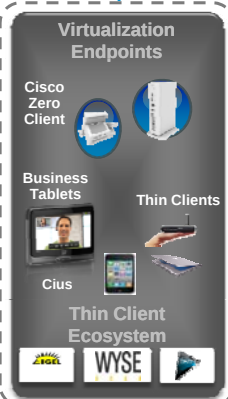
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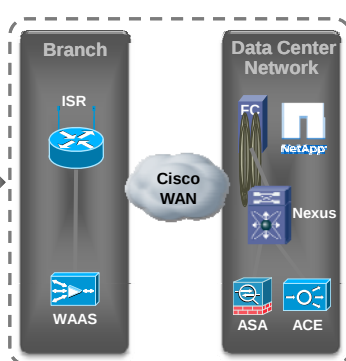
VXI: virtualised End-to-End System



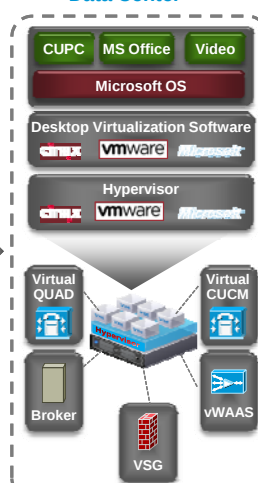
Virtualised Collaboration Workplace



Virtualisation Aware Network



Virtualised Data Center



End-to-End Security, Management and Automation

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FlexPod for VMware

VMware vCenter
vSphere Enterprise Plus
vCenter Standard

Infrastructure
2 Nexus 5548 (per 3 FlexPods) with Fabric Services
2 Nexus 1010 (per 3 FlexPods)
2 Fabric Interconnect 6120

Cisco UCS
2 Fabric Interconnect 6120
3 B-Series 5108 Chassis
9 B-Series B250M2 + VIC
6 B-Series B200M2 + VIC

NetApp FAS3210A
2 DS2246 450GB SAS Shelves
2 256 GB FlashCache
2 10Gbps IP Interfaces
4 4Gbps FC Interfaces
NetApp Complete Bundle

1 Rack DC Solution
30 Westmere CPUs (180 Cores)
2 TB Server Memory
72 Gbps Compute + Storage Access
512 GB SSD Storage Cache
42 TB Storage

1 Enterprise IT Infrastructure
Catering for a 1,500 seat organization using all four

- VMware VDI (Windows 7)
- MS Exchange 2010
- MS Sharepoint 2007
- MS SQL 2008R2

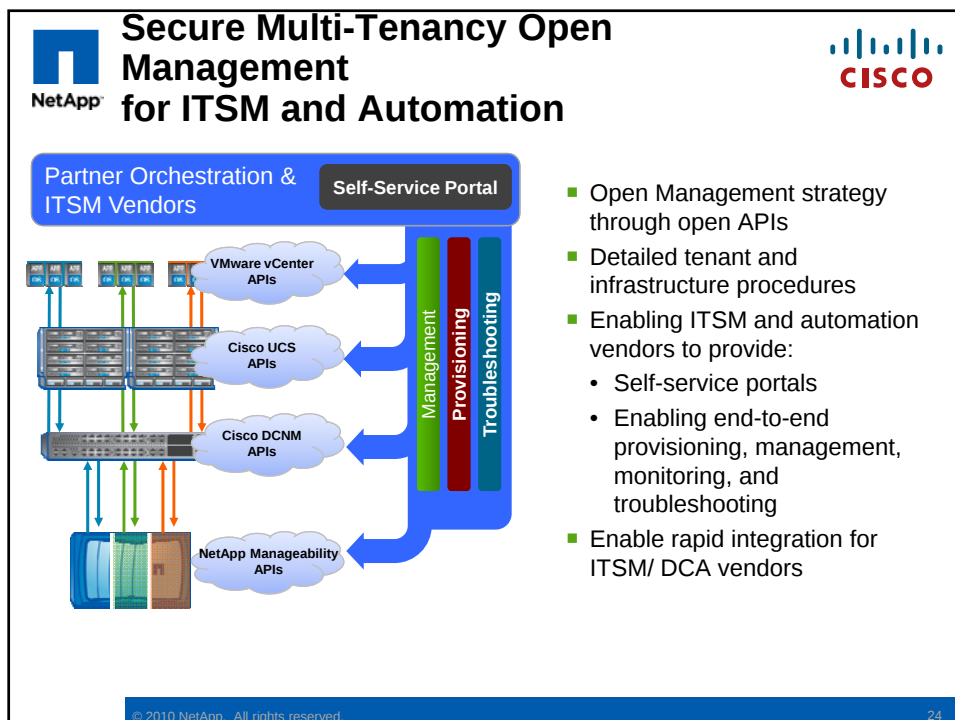
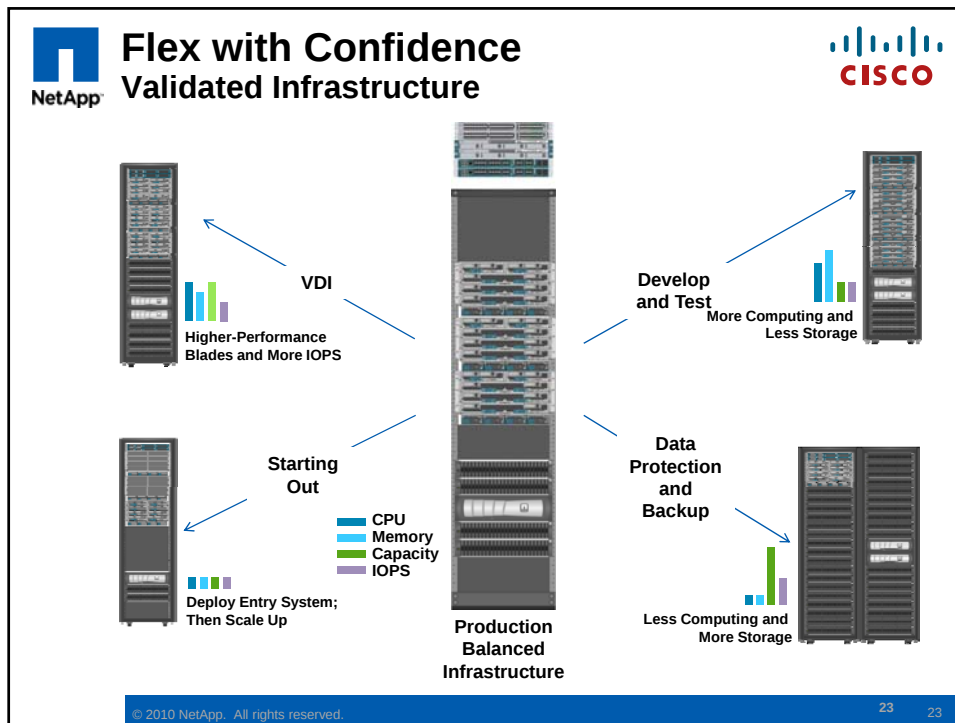
Two classes of compute supporting high-density & general virtualized workloads

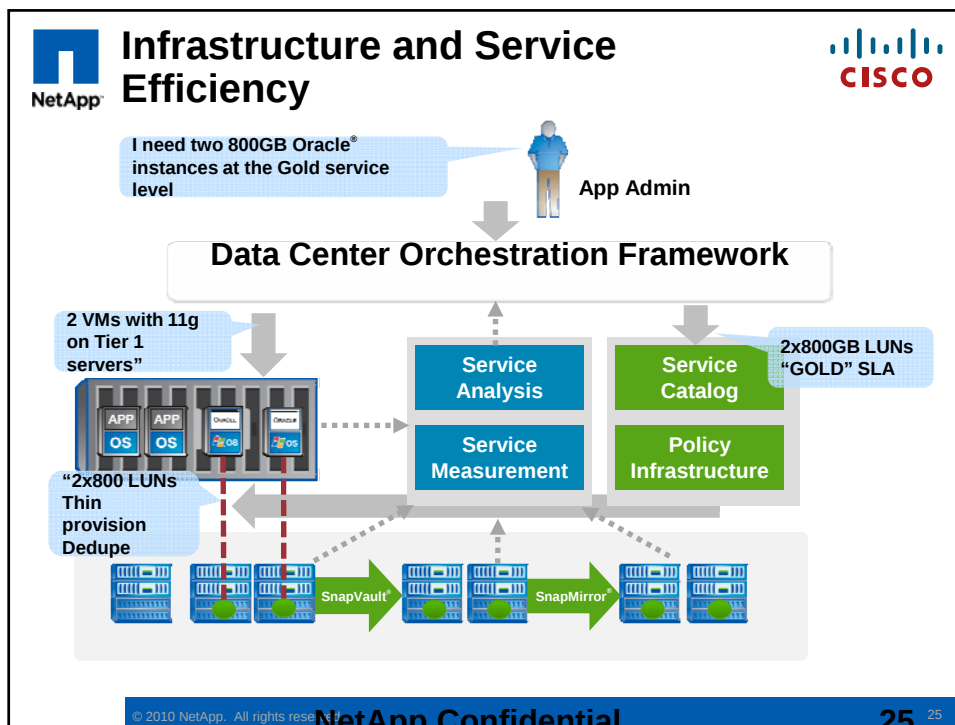
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Scale Out with FlexPod for VMware

- **Scale out with standard and proven configurations**
 - Predictable and highly efficient
 - Capacity and performance
 - Floor space, power, and cooling
 - Or scale up within a FlexPod
- **Benefits**
 - Reduce effort for architecture, design, deployment, and testing
 - Reduce infrastructure deployment cycle time by up to 50%
 - Manage resource pools, not individual systems
 - Storage, computing, and networking

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NetApp **Cooperative Support Model** **CISCO**

Building on Years of Cooperative Support Excellence to Create a More Efficient, Flexible, and Scalable Support Solution



- Expanded and enhanced support resolution process
- Focused on the most efficient method to resolve customer issues
- Support available across a full spectrum of support products – new and legacy
- More than a “single solution” cooperative support model – scales and grows

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Customer Success

Real Customers, Real Results



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Thank You

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Backup

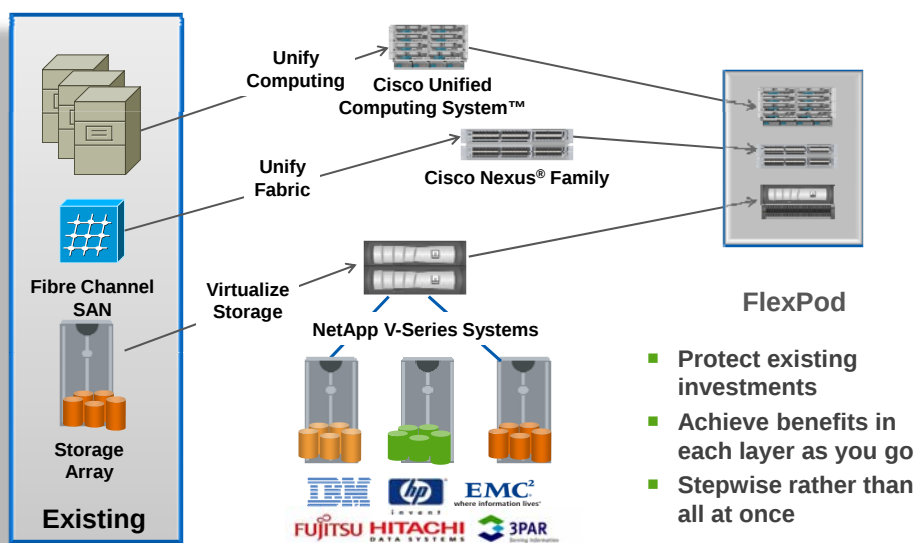
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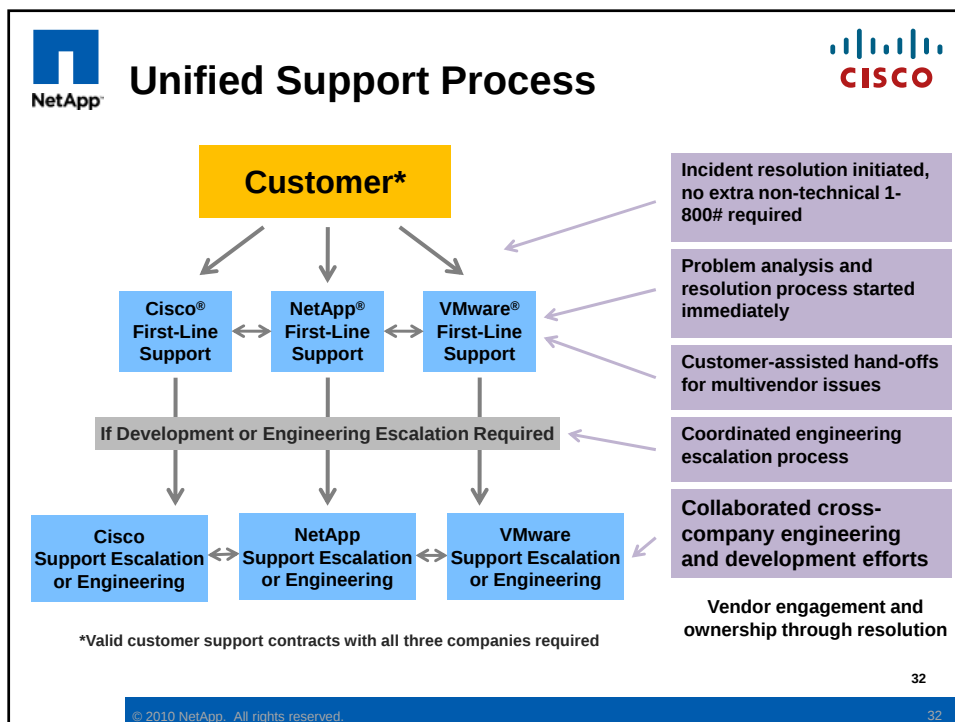
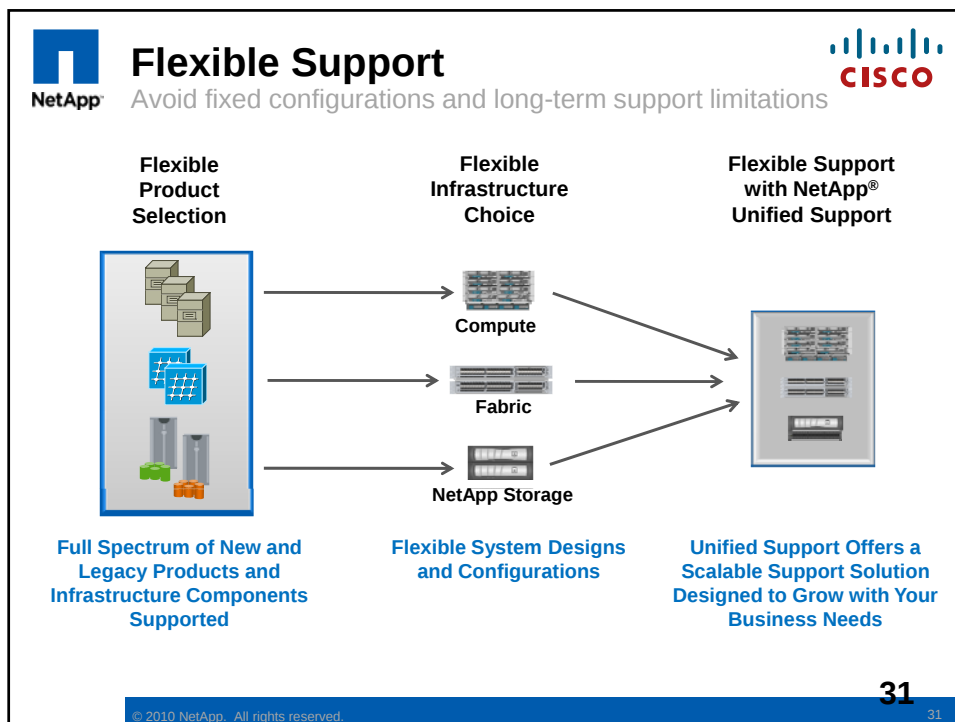


Build on Existing Investments



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FlexPod for VMware



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vSphere Enterprise Plus
vCenter Standard

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Two classes of compute supporting high-density & general virtualized workloads

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Centralized Management with FlexPod for VMware

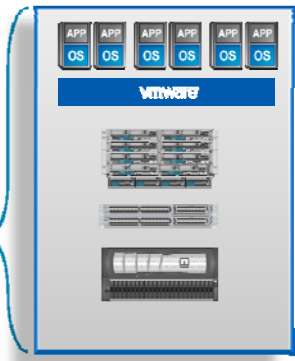


VMware vCenter

NetApp Storage Plug-ins

Cisco UCS Manager





VMware vCenter

- Automated workflows
- Scalable, extensible platform

Cisco® UCS Platform

- Embedded unified management
- Integrated with VMware vCenter

NetApp OnCommand

- Manager suite: Automate, analyze, and control
- Integration with VMware vCenter Server
- Enables server administrators to perform storage tasks

Extensible Open Management





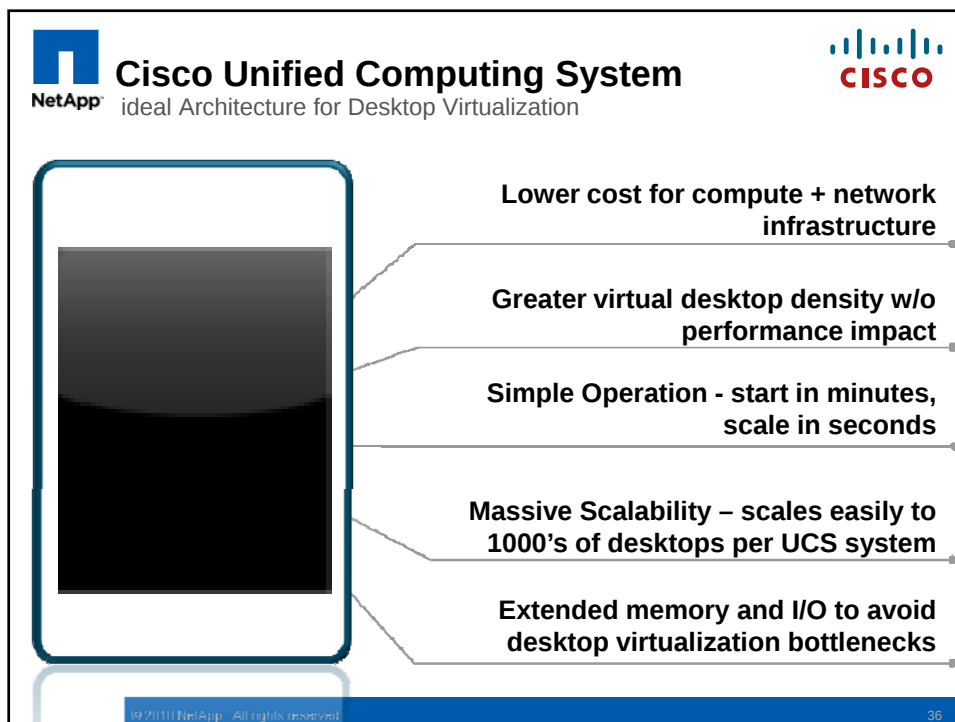
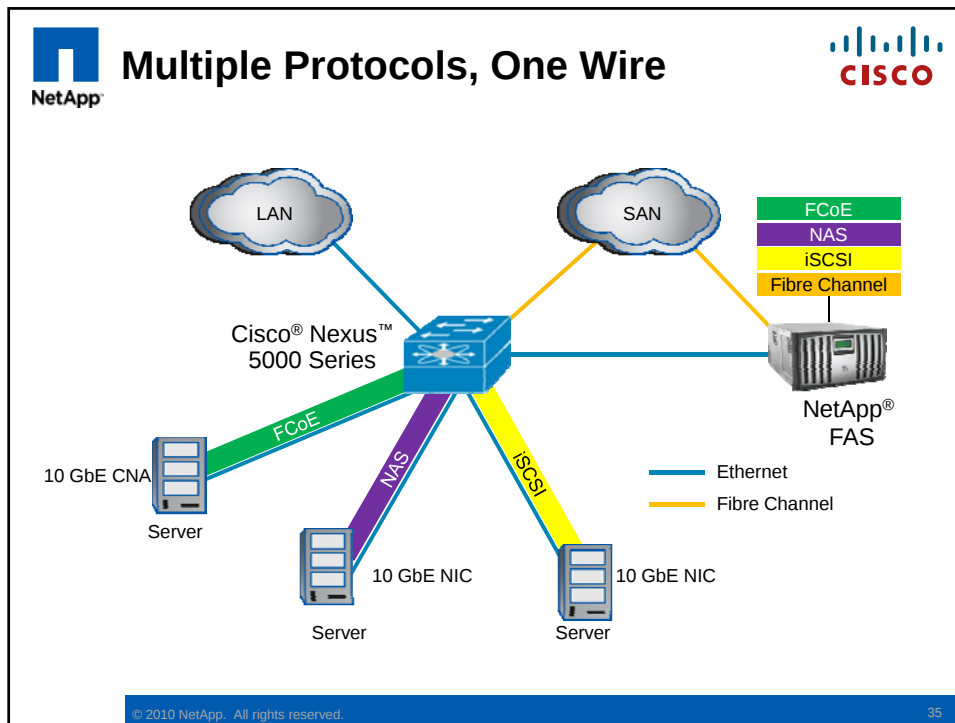






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Cisco Unified Desktop VDI 'Backpack' for 89xx/99xx IP Phones

- Software
 - Zero Client
 - PCoIP Chipset
 - ICA/RDP Software
 - Interactive media outside display protocol
- Hardware
 - 2 Monitor
 - 4 USB
 - Analog audio/video
 - Power Over Ethernet
 - 802.3 AT



Success Story End-to-End Virtualization



A fast-growing medical examination and review (IME) company; building a national network via expansion, mergers, and acquisitions

Challenge: Implement cloud infrastructure to address tripling growth, deliver application availability, and slash IT costs

Solution: Fully virtualize local apps and desktops of acquired companies using VMware® vSphere™ and View on Cisco UCS with NetApp® storage

Benefits:

- Incorporates new acquisitions in days instead of months
- Avoided >\$1M staffing costs; saved ~\$500K in capex/opex
- Supports 2,000+ employees with 3 racks/4 FTEs versus 15 racks/25 FTEs

"The Cisco/NetApp/VMware infrastructure is a game-changer. We can run our entire business on an integrated and verified platform that we deployed in our data center in just a matter of hours. This infrastructure is where everybody's going to be in 2012, but we're already here."

— Brian Denton, CTO, ExamWorks



Additional Customer Success



- Suncorp
 - “By implementing NetApp, Cisco, and VMware technology, we have increased our storage efficiency, introduced greater flexibility, and reduced our total IT costs. We have also improved our ability to develop and bring new product and service applications to market and respond to customer demands quickly.”
- Subaru
 - “We have been testing our new (NetApp/Cisco) FCoE infrastructure over the last few months and have been impressed most by the performance. For instance, we are seeing over 75% greater performance on SQL versus our existing DAS solution. We've also been able to dramatically reduce our overall complexity for our storage and networking by streamlining down to a single network technology: Ethernet .”
- Nixon Peabody
 - “As we looked around there was no question that NetApp is the leader in Ethernet based storage and Cisco is the leader in networking.”

