

Ethernet Storage: Next-Generation Storage Unification Engine

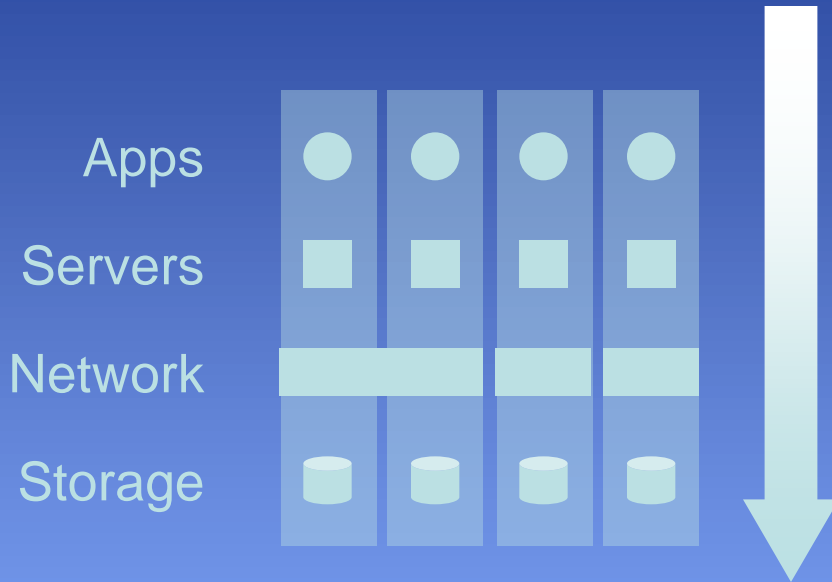
Mike McNamara, NetApp

Agenda

- Data Center Trends and Challenges
- Why Ethernet for Storage
- Recommendations

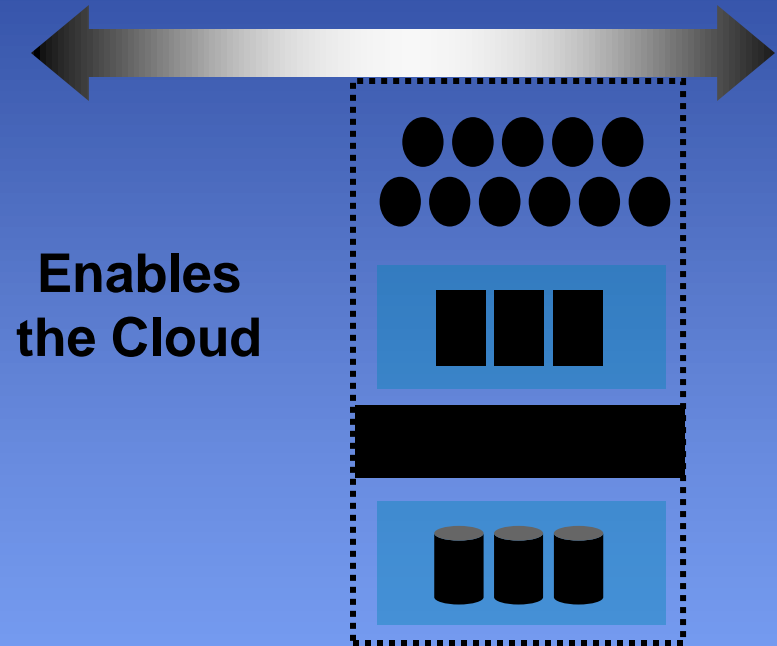
Transformation of IT Infrastructure

Project-Based Infrastructure



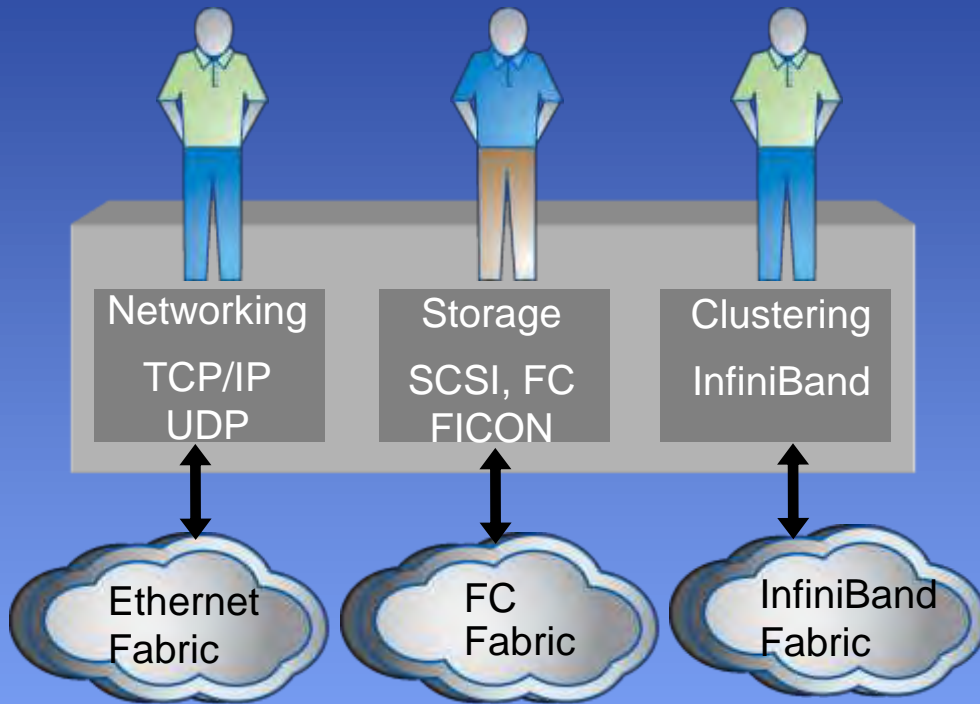
Siloed	Little or no reuse, always new
Inefficient	Wasted, unused resources
Inflexible	Difficult and expensive to change

Service-Oriented Infrastructure



Elastic	Reuse, faster time to market
Efficient	Pool resources, lower TCO
Dynamic	Respond to business needs

Data Center Challenges



- Infrastructure efficiency
 - Multiple network interfaces increase capital expenses
- People and skill consolidation
 - Disparate expertise and manual processes increase operational costs
- Technology advances
 - Server virtualization and multicore processors increase bandwidth needs

Ethernet Storage Can Help

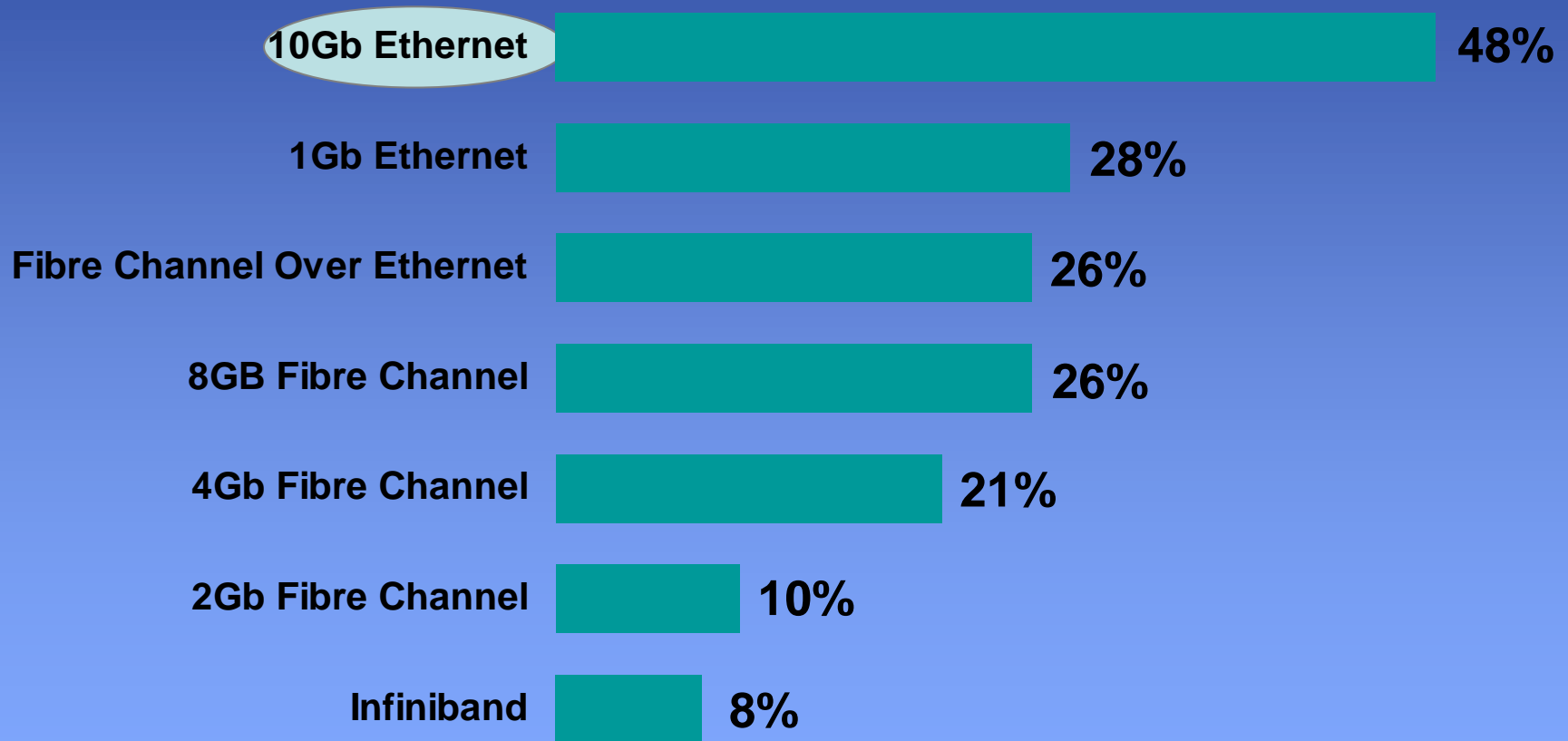
- Benefits:
 - Ubiquitous, cost-effective network
 - Pervasive skill set
 - Simplified interoperability
 - Virtualization optimized

“NetApp’s IP storage solution enabled us to deliver capacity on demand. We’ve been able to shrink new-project storage activation from 8 weeks down to days.”

Andrew Crabb, Group Manager, Data and Storage Solution Center, Telstra

Customer Networking Plans

Please indicate which of the following front-end connectivity options will be used 24 months from now to connect servers to networked storage systems. (Percent of respondents, N=447, multiple responses accepted. December 2008)



Cost Efficiency at Sensis Utilizing NetApp Ethernet Storage

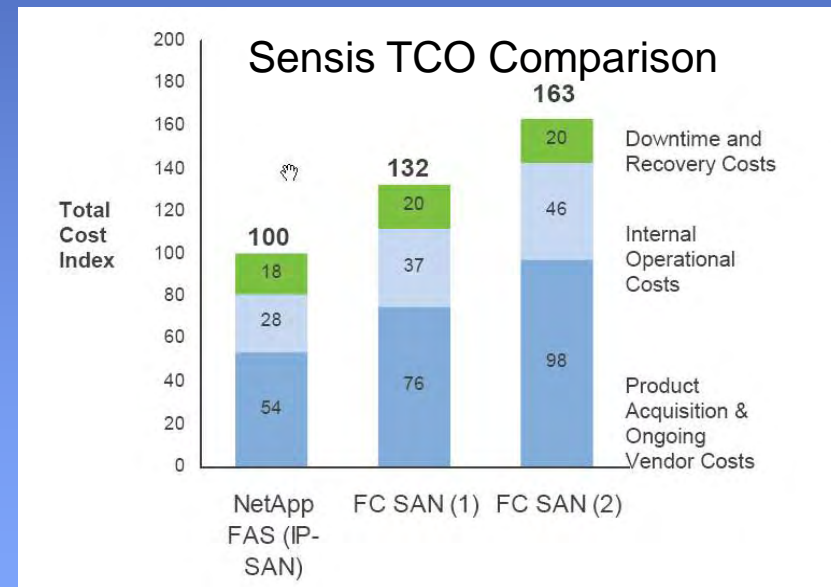
■ Challenge

- Costly, inflexible FC SAN
- Provisioning storage was slow and costly
- Solution to support 50%+ annual growth
- More responsive and cost-efficient storage solution

■ Benefits

- 47% reduction in total IT cost over 5 years
- 28% reduction in storage
- 50% reduction in operational expenses
- Fewer FTE hours per TB
- 2x faster recovery

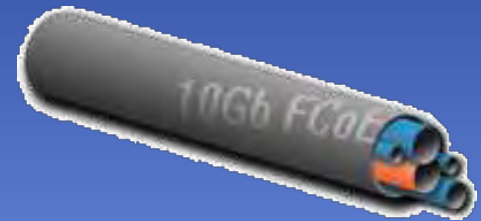
Sensis is a leading information services company in Australia with 3,500 employees, 6,100 servers and AU\$1.86B in revenue.



Why Ethernet for Storage

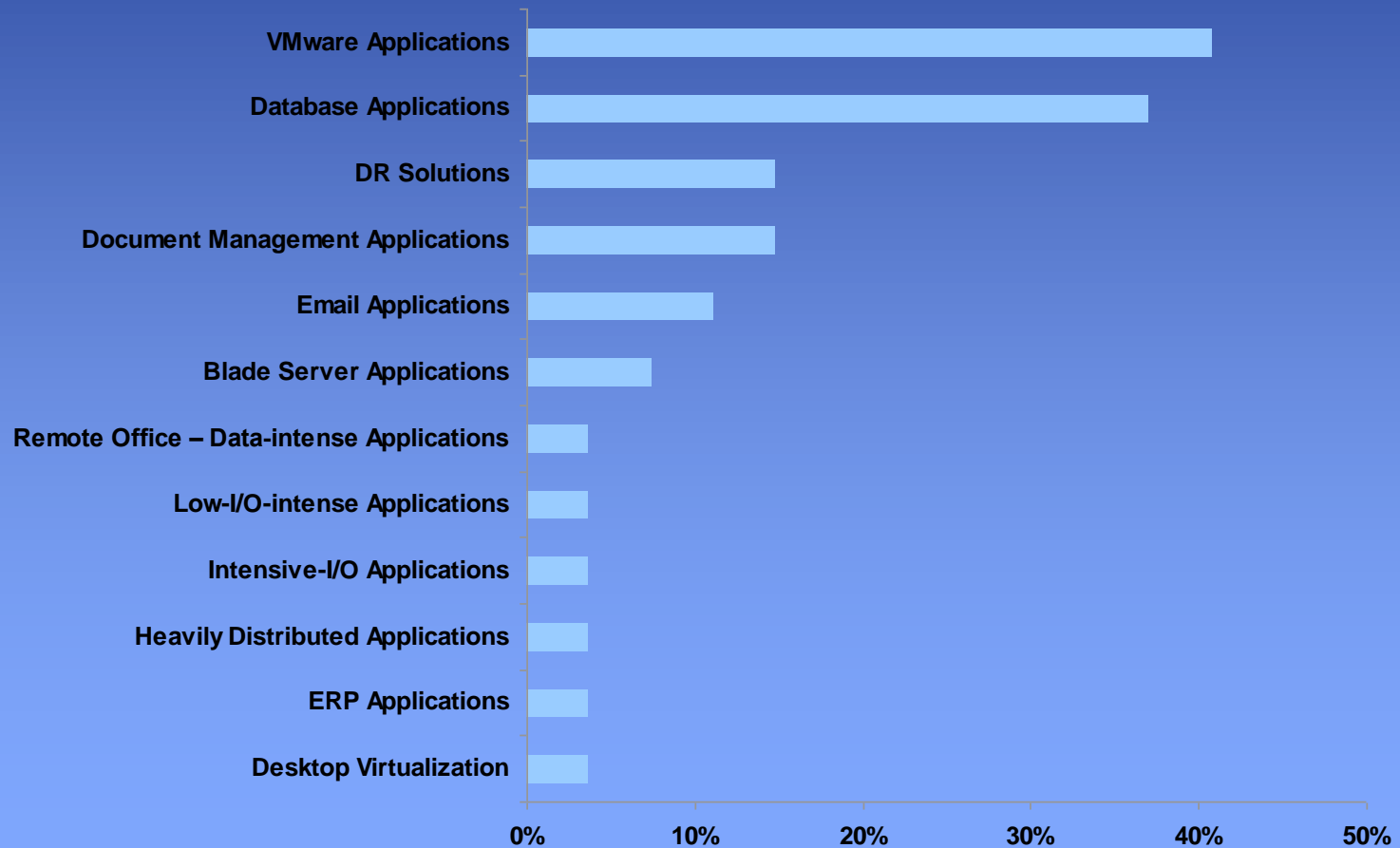
FCoE: Smooth Transition from FC SAN

- FCoE enables Fibre Channel to run on a lossless Ethernet network
- Benefits
 - Fewer cables
 - Block I/O and Ethernet traffic coexist on same cable
 - Fewer adapters
 - Less power
 - Interoperates with existing SANs
 - Same SAN management



Applications Benefiting From FCoE

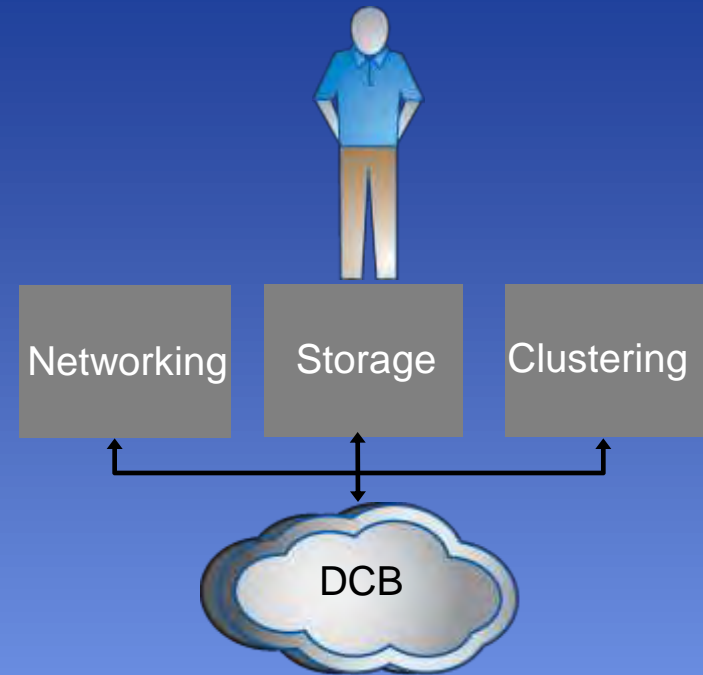
Which applications will benefit most from FCoE?



Source: TheInfoPro (12/14/09): Full Sample. n=27. * Note that due to multiple responses per interview, total *may* exceed 100%

Ethernet Enhancements Benefit FCoE, iSCSI, and NAS

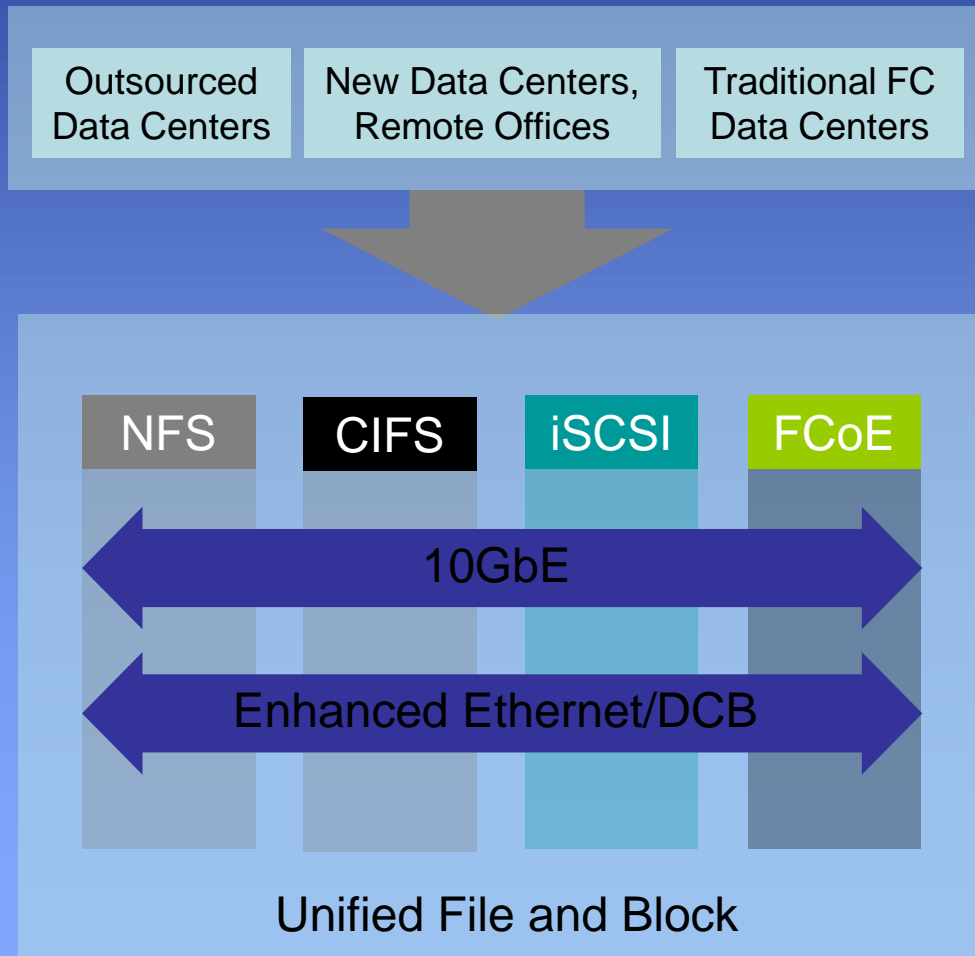
- IEEE Ethernet enhancements*:
 - Lossless transport
 - Priority flow control
 - Congestion notification
 - Enhanced transmission selection
 - Pending ratification 1H 2010
- Benefits
 - Consolidation (LAN, storage) reduces capital and operational costs
 - Higher performance (10GbE followed by 40GbE) improves unified design, multicore computing and virtualization bandwidth



*Known as Data Center Bridging (DCB)

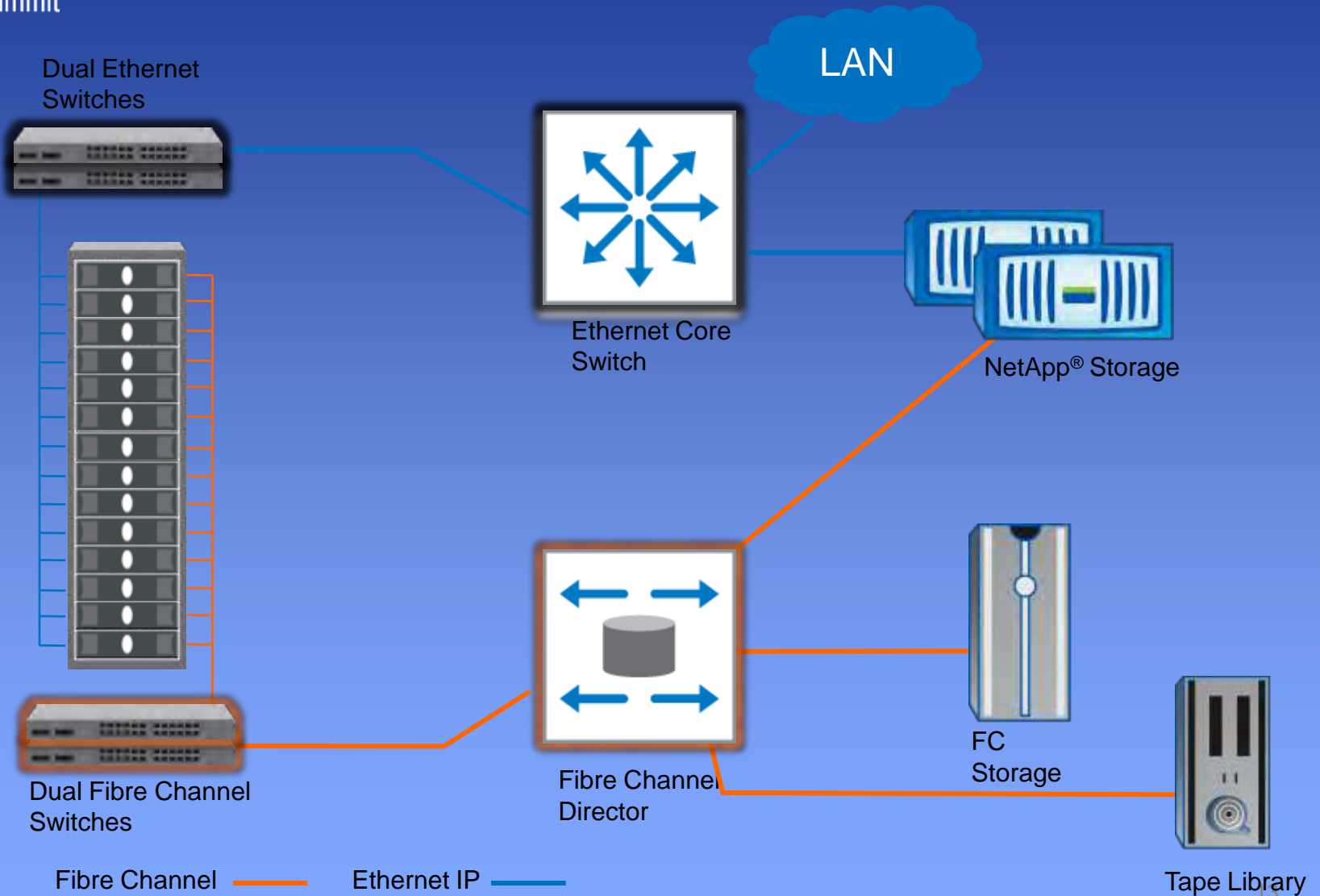
Ethernet Unifies Data Center Storage

Solve All Your Use Cases

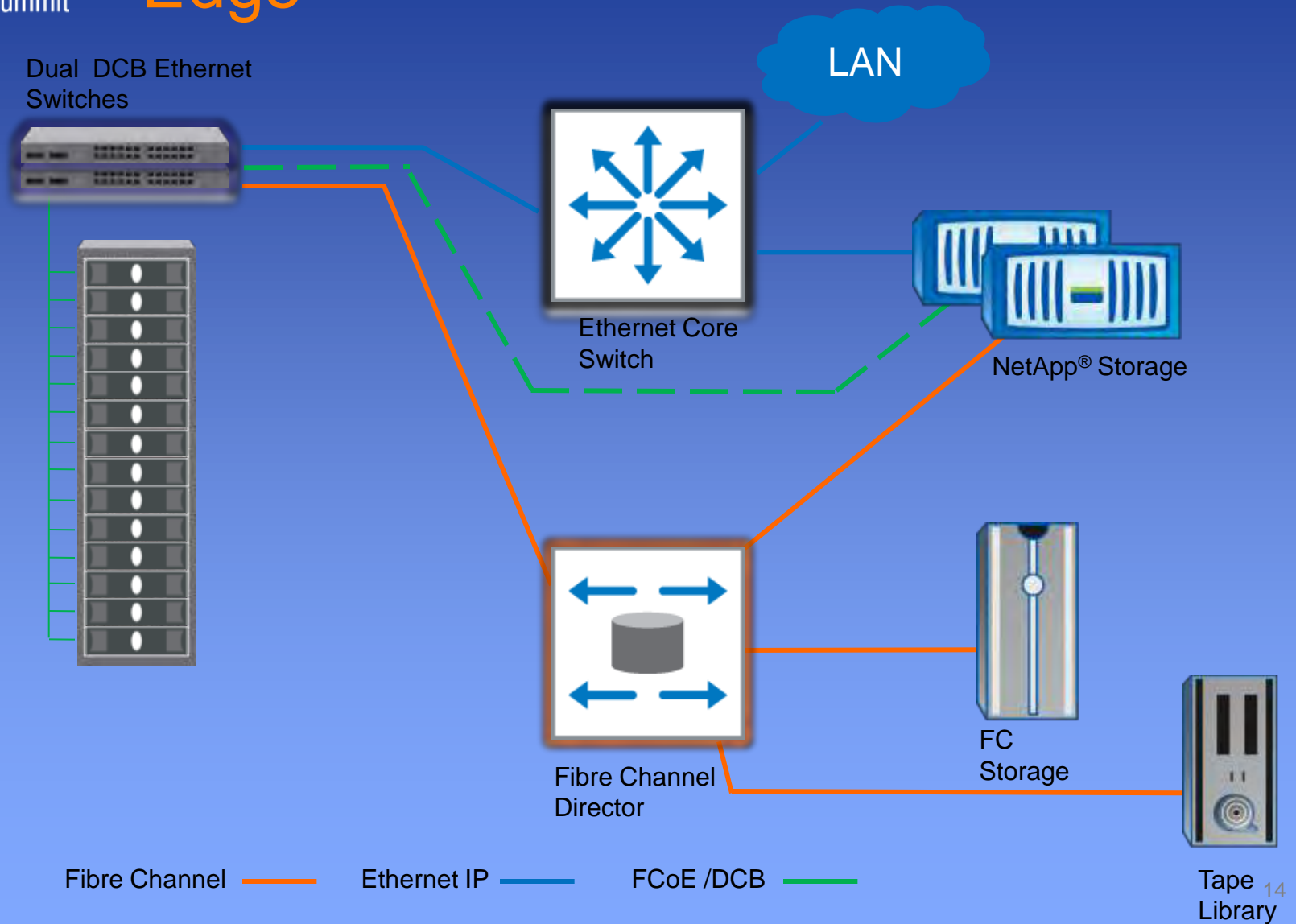


- Increased asset and storage utilization
- Simplified storage and data management
- Reduced costs through consolidation
- Improved storage and network efficiencies

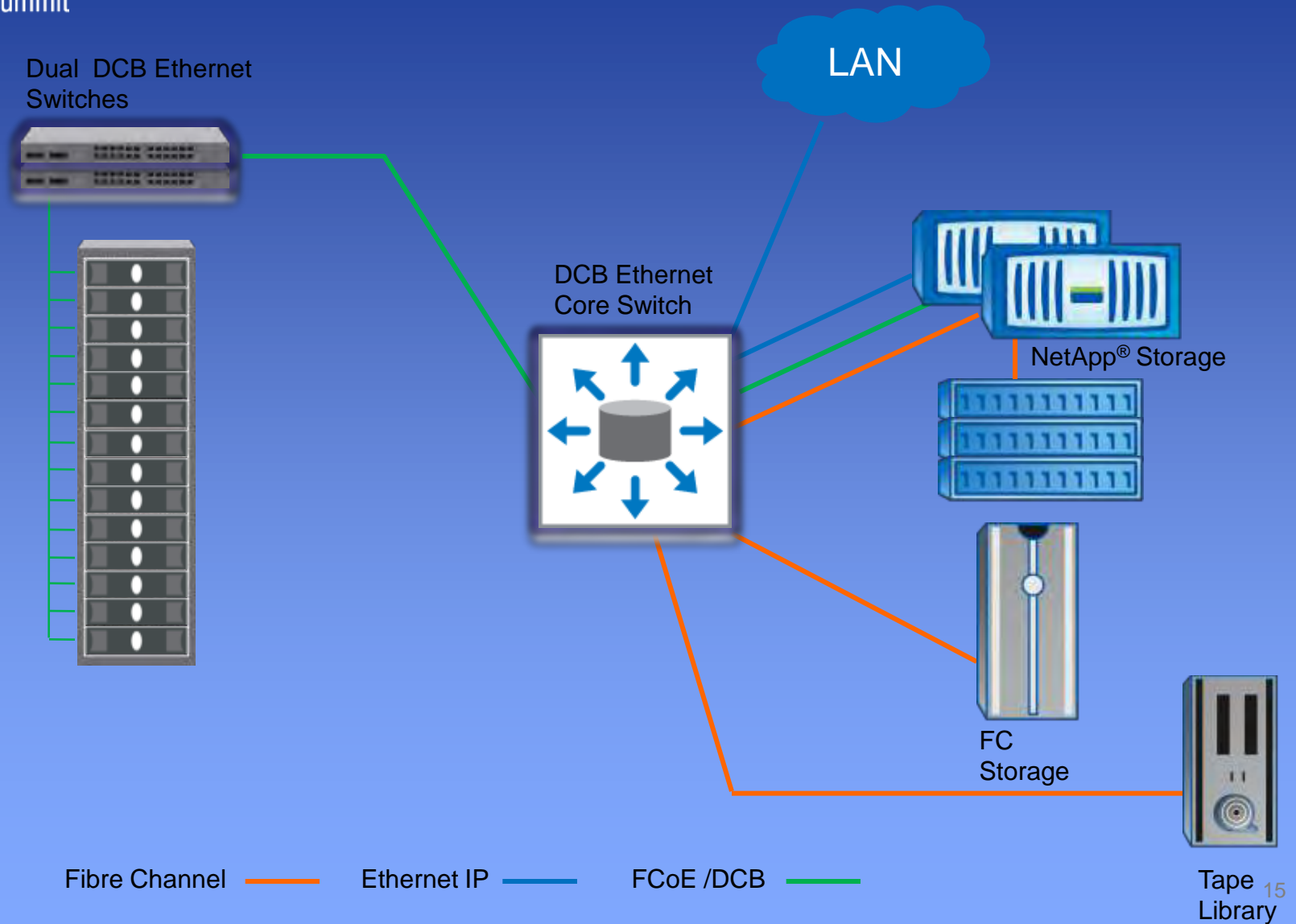
Traditional Data Center



Transition to DCB / FCoE at the Edge



Transition to the Core



Robust Ethernet Ecosystem Support, NetApp Example



Hosts

Operating Systems

- Windows®, Red Hat, SuSE, Oracle® Linux®, Solaris™, AIX, HP-UX, ESX, Netware
- Native iSCSI software
- Virtualization
 - VMware®, Microsoft® Hyper-V™, Citrix Xen

Adapters

- Alacritech iSCSI HBA
- Brocade CNA
- Chelsio NIC, TOE
- Emulex CNA
- Intel® Server Adapters
- QLogic iSCSI HBA, CNA
- Native VMware®, AIX iSCSI HBAs



Fabric

Ethernet Switches

- Brocade 8000
- Cisco Catalyst
- Cisco Nexus
- Extreme Networks
- Foundry Networks
- Juniper EX Series
- Nortel
- Blade Network Technologies RackSwitch
- Dell PowerEdge Blade Enclosures
- HP BladeSystem
- IBM BladeCenter



Systems

FAS GbE Ports

- FAS6080/6040: 12 onboard/52 max
 - 24 10GbE ports
- FAS3170/3160: 4 onboard/36 max
 - 16 10GbE ports
- FAS3140: 4 onboard/36 max
 - 16 10GbE ports
- FAS2050: 4 onboard/8 max
- FAS2020: 4 onboard/4 max



Service

Services

- Data Assessment
- Data Migration for SAN and NAS
- Data ONTAP® GX Implementation
- FCoE Deployment Service
- Rapid Deployment for SAN and NAS
- Virtualization Services

Recommended Next Steps

- Use NAS and iSCSI for Ethernet savings today
 - Serve mission-critical apps, e.g. Exchange, SAP, Oracle
 - Cost effective 1GbE, high performance 10GbE
 - New datacenters: Ethernet
 - Remote offices: iSCSI

- Implement FCoE for new FC deployments
 - Consider timing, ecosystem of FCoE/DCB
 - The future of Fibre Channel is over Ethernet
 - Investment protection with unified storage

“As we looked around there was no question that NetApp is the leader in Ethernet based storage and Cisco is the leader in networking.”

Peter Allen, Director of IT Operations, Nixon Peabody

Summary

- Ethernet storage will dominate and transform the data center within 5 years
 - Less cost and complexity
 - Economics favor Ethernet
 - Enhanced reliability and consolidation with DCB/FCoE standards
- With Ethernet, you'll always win

