



Building a Phased Plan for End-to-End FCoE

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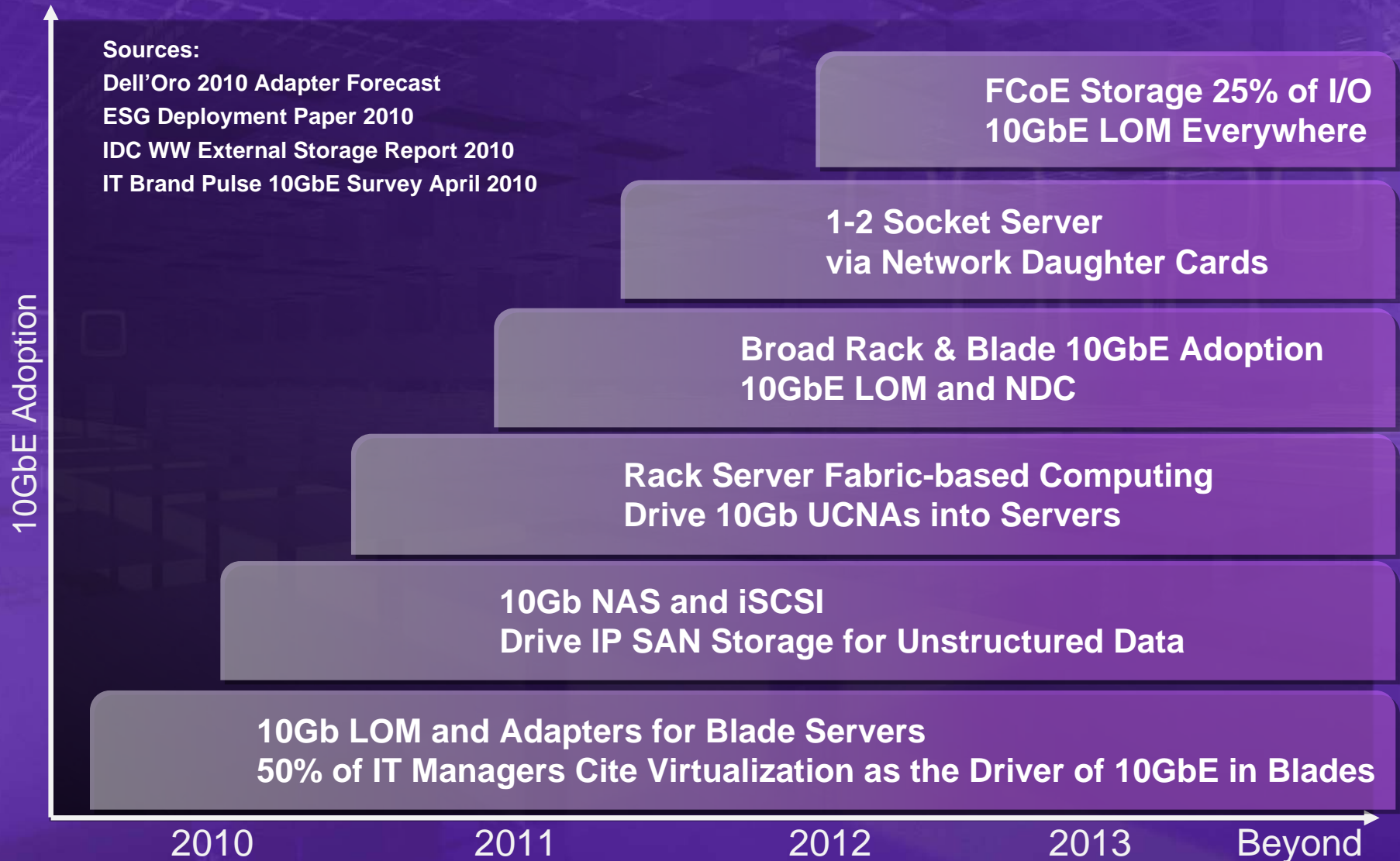
Server Virtualization - # Driver of ELX Value



- #1 Driver of 10Gb Deployment
- Core to Cloud Computing
- Top Catalyst for Convergence
- Emulex Software Differentiation
- Driver of Bandwidth Aggregation

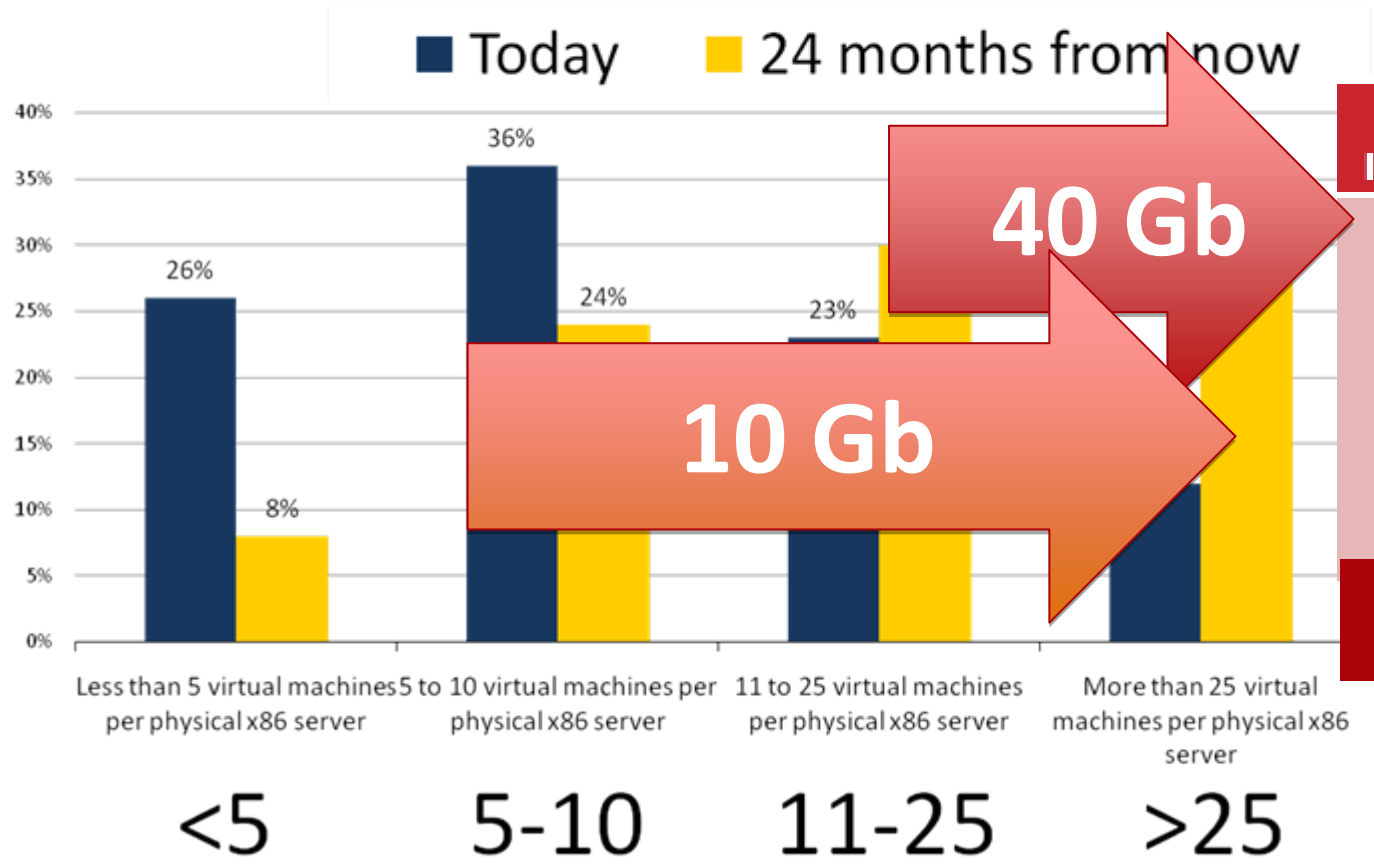


10GbE and Converged Networking Adoption



VM Density drives more I/O throughput

What would you estimate is the average number of virtual machines per physical x86 server in your environment today? How do you expect this to change over the next 24 months? (Percent of respondents, N=463)



Server Virtualization Impact on the Network

It has created more network traffic in the data center (30%)

1 Impact

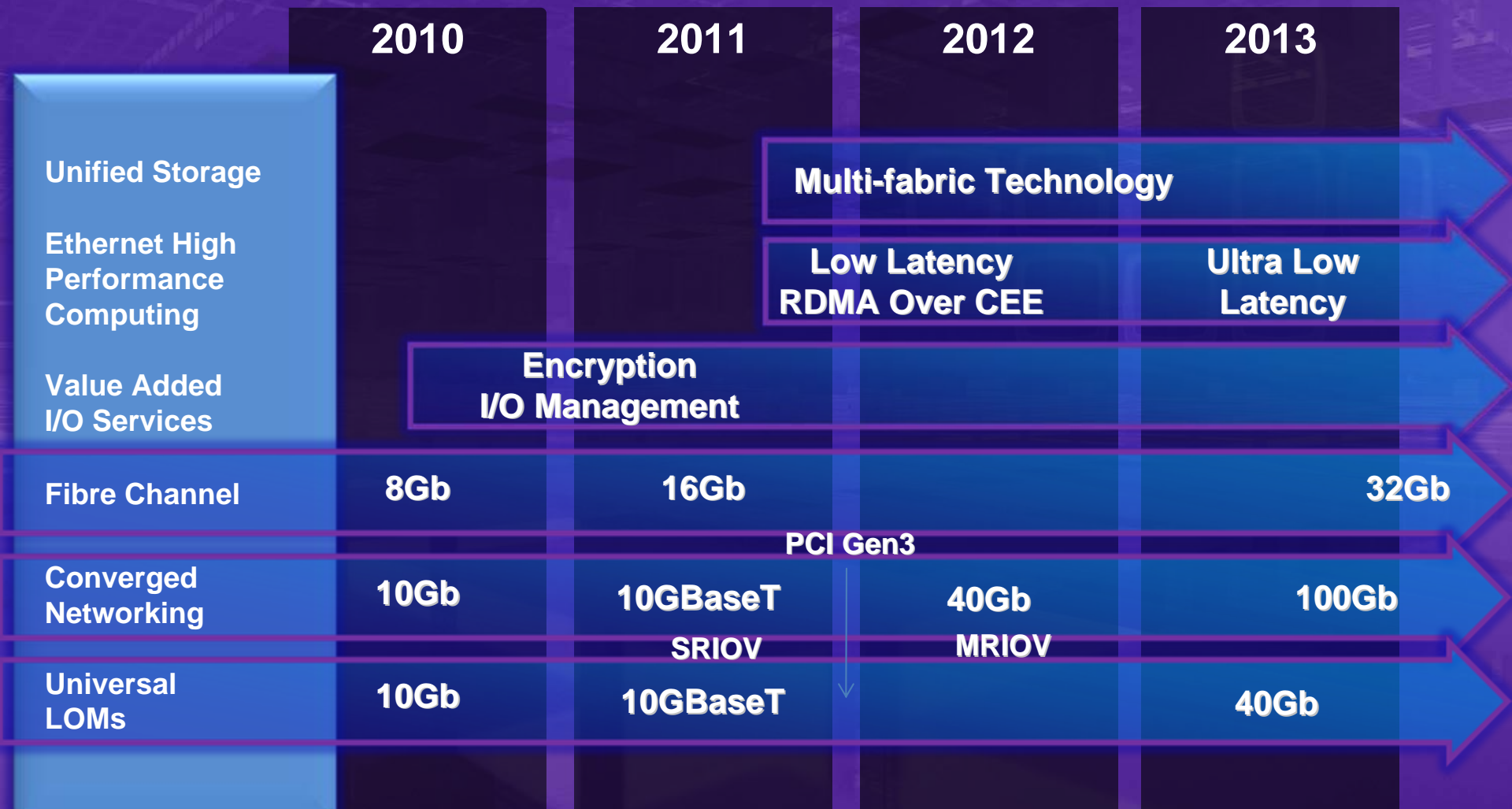
VMware – The Most Important IT Company



CPU's	Cores	VMs/ Core	Gb/Sec	Total GB	LOM Ports	UCNA Ports	HA Ports	Extra CNAs
1	4	6	0.15	4	2	0	0	0
2	4	8	0.20	13	2	1	2	1
2	8	10	0.20	32	2	2	4	2
4	4	12	0.30	58	2	4	8	4
4	8	14	0.30	134	2	5	10	5
8	8	16	0.30	307	2	11	22	11

Every 8VMs/System Drives the Need for a Extra UCNA Adapter !

I/O Industry Road Map



Busting the Convergence Myths



Rip & Replace Required...

Convergence Cost > 2 Networks...

LOMs Can't Do Storage...

Convergence is More Complex...

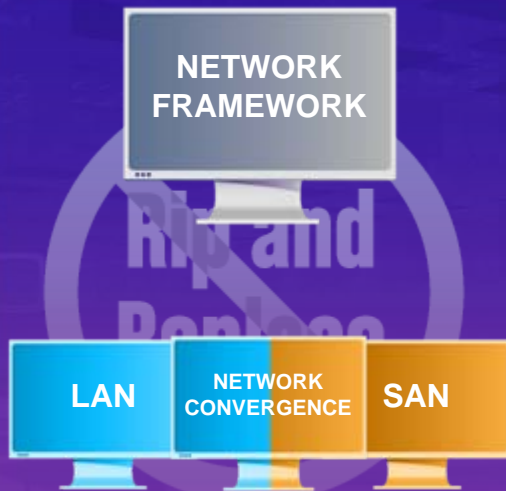
Convergence Means Performance Tradeoffs...



No Rip and Replace Required

Future Proof

Investment Protection



Protects Your Management Investment

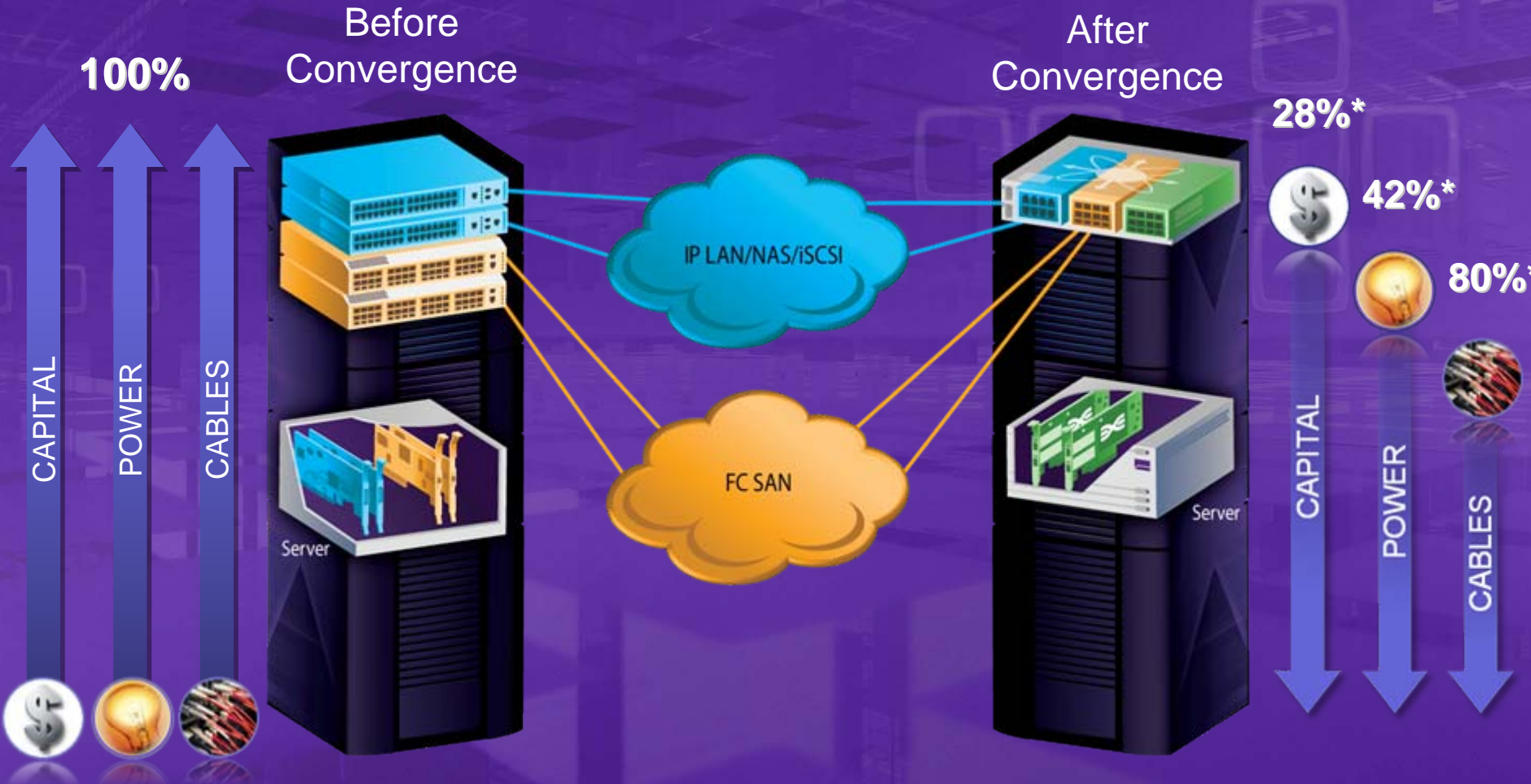


Protects Your Configuration Investment



Protects Your LAN & SAN Investment

Convergence Cost > 2 Networks

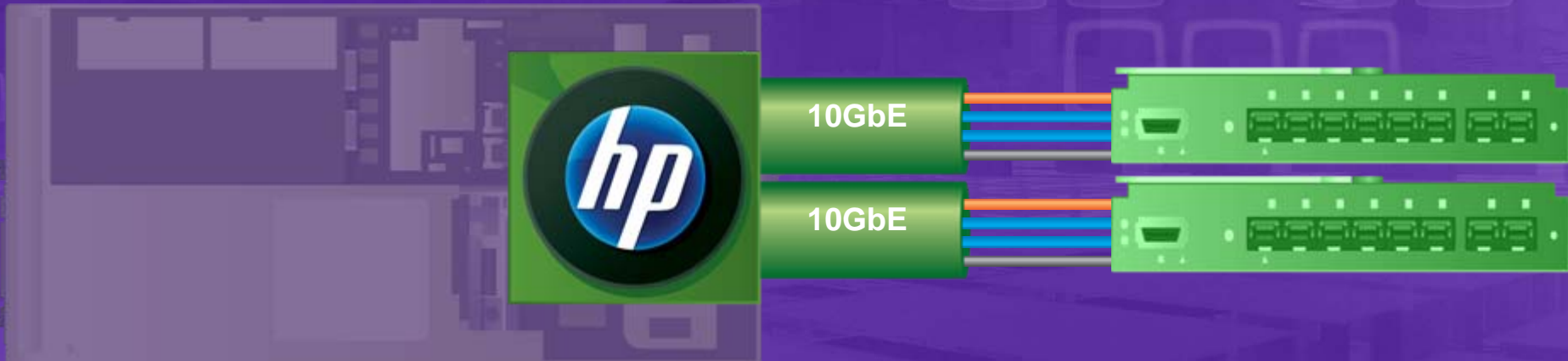


* Data from Emulex Convergenomics Calculator

Convergence is too Complex...



Deploying 6 NICs and 2 FCoE Ports

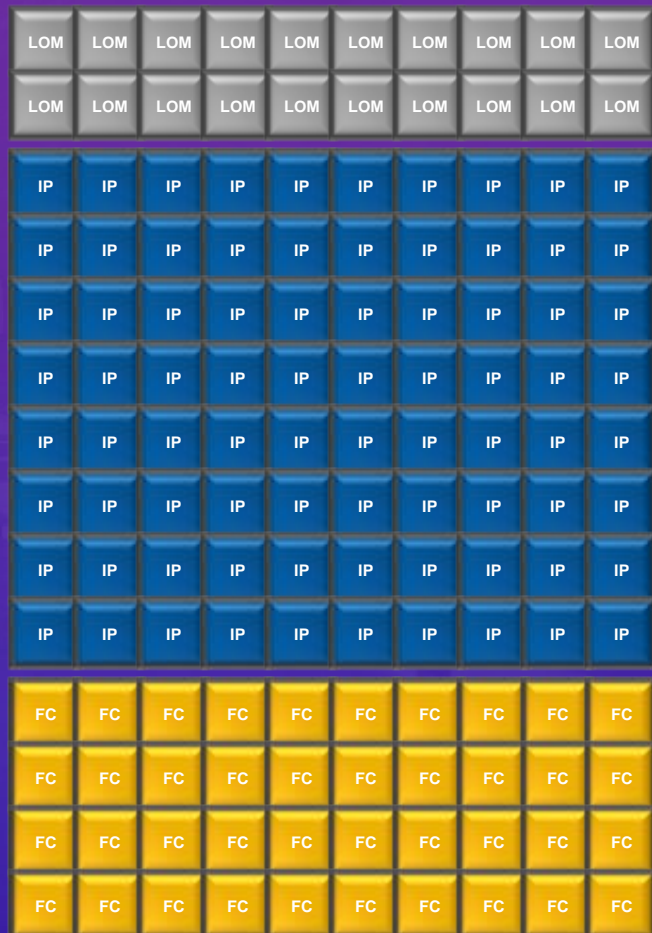


Consolidation of Networks, Conservation of Power, Controlling Costs....



Convergence Is More Complex

Before Convergence 140 Cables



After Convergence 60 Cables



(Based on 2 LOM, 8 IP and 4 FC Ports on 10 Servers)



Convergence Means Performance Tradeoffs

40 Gb/Sec

- **Wider Track:
More Data Lanes**
- **No Virtualization
Conflicts**
- **Capacity for
Provisioning**

900K IOPS/Sec

- **Faster Engine:
More Transactions**
- **More VMs/CPU**
- **QoS you demand**
- **Performance for
Storage**



Convergence in the Data Center

24 Months of Convergence



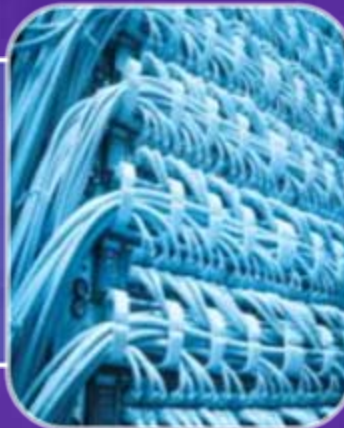
- HP FlexFabric
- IBM Virtual Fabric
- Cisco UCS
- VMware vNICs
- Virtual Switch
- ESX HW iSCSI
- ESX FCoE
- VM vStore
- Blade Switches
- Blade PTMs
- TOR Switches
- Core Directors
- HP iSCSI/FCoE
- NetApp iSCSI/FCoE
- EMC iSCSI/FCoE
- DELL iSCSI/FCoE
- IBM iSCSI
- 10GbE LOM
- 10GbE CNAs
- HW iSCSI/FCoE
- x86 and Unix
- Blade and Rack



Converged
Fabric-based
Computing



Convergence
for Server
Virtualization



Converged
Switching

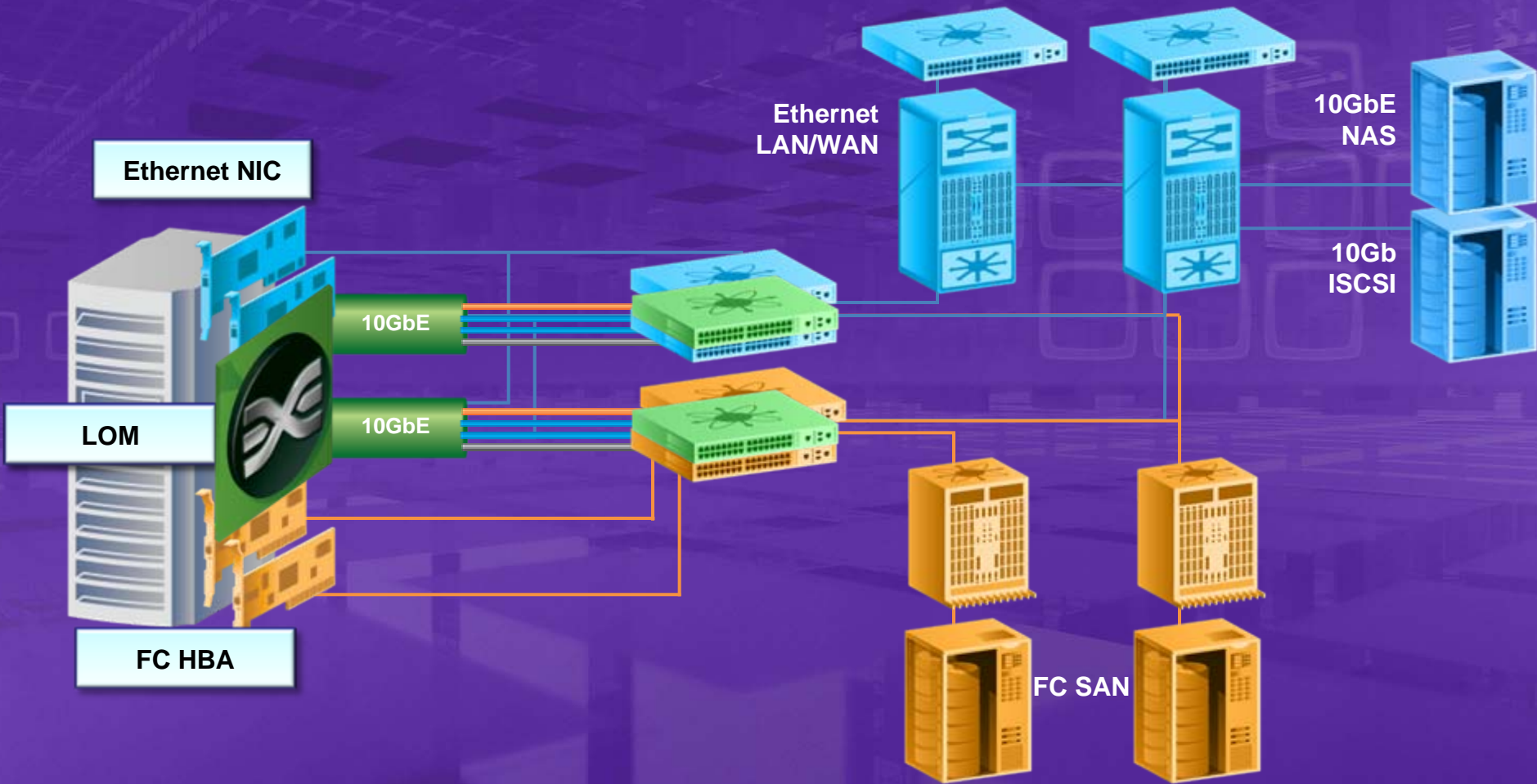


Converged
Storage



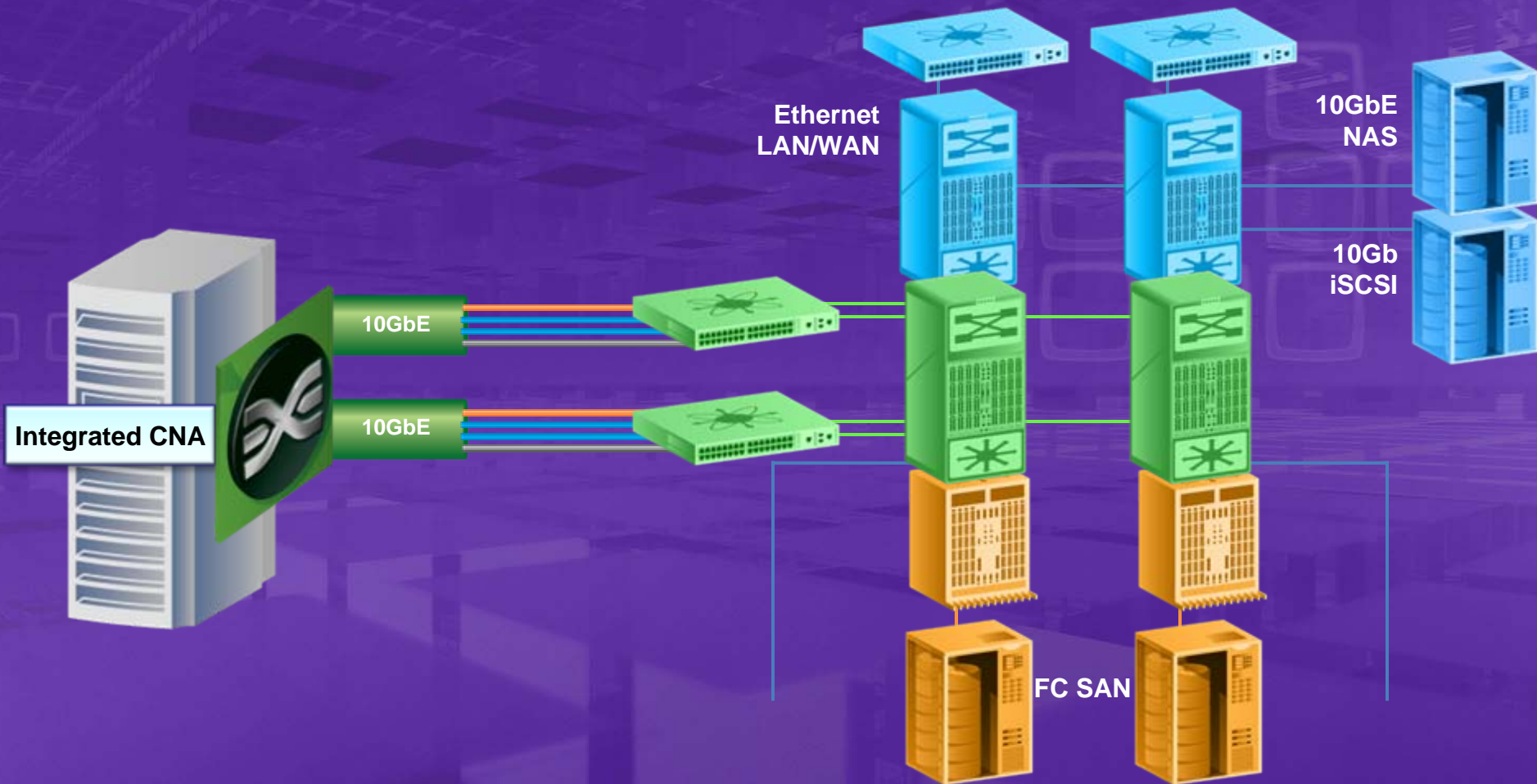
Converged
Adapters &
LOMs

Phase 1 – Host Based Convergence



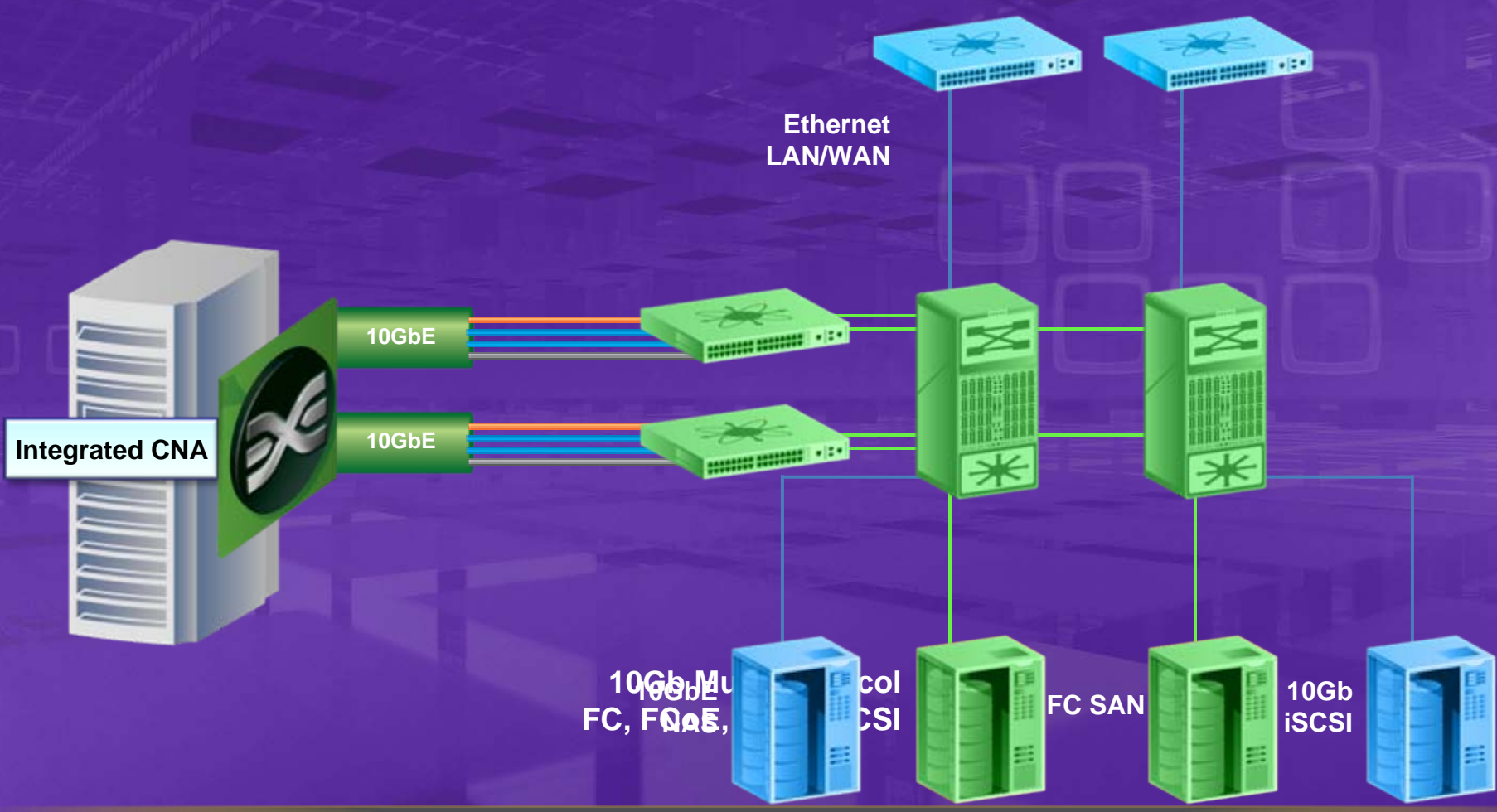
The 1st Phase of Network Consolidation will Occur in the Server Rack

Phase 2 – Network Cores Converge



The 2nd Phase will Consolidate IP and FC Networking

Phase 3 – Storage Convergence



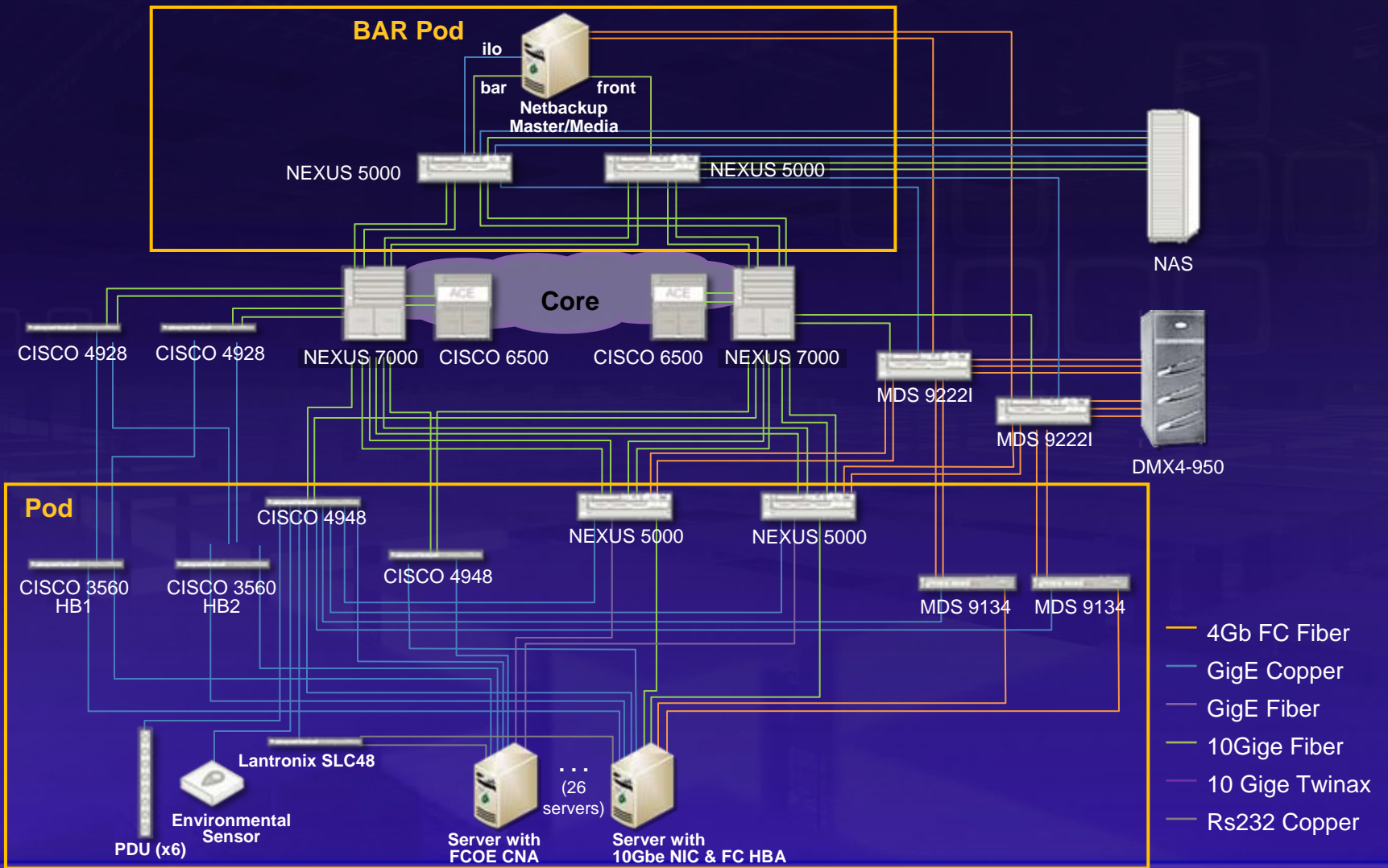
The 3rd Phase will Converge Storage

Case Study: Major Transportation Company

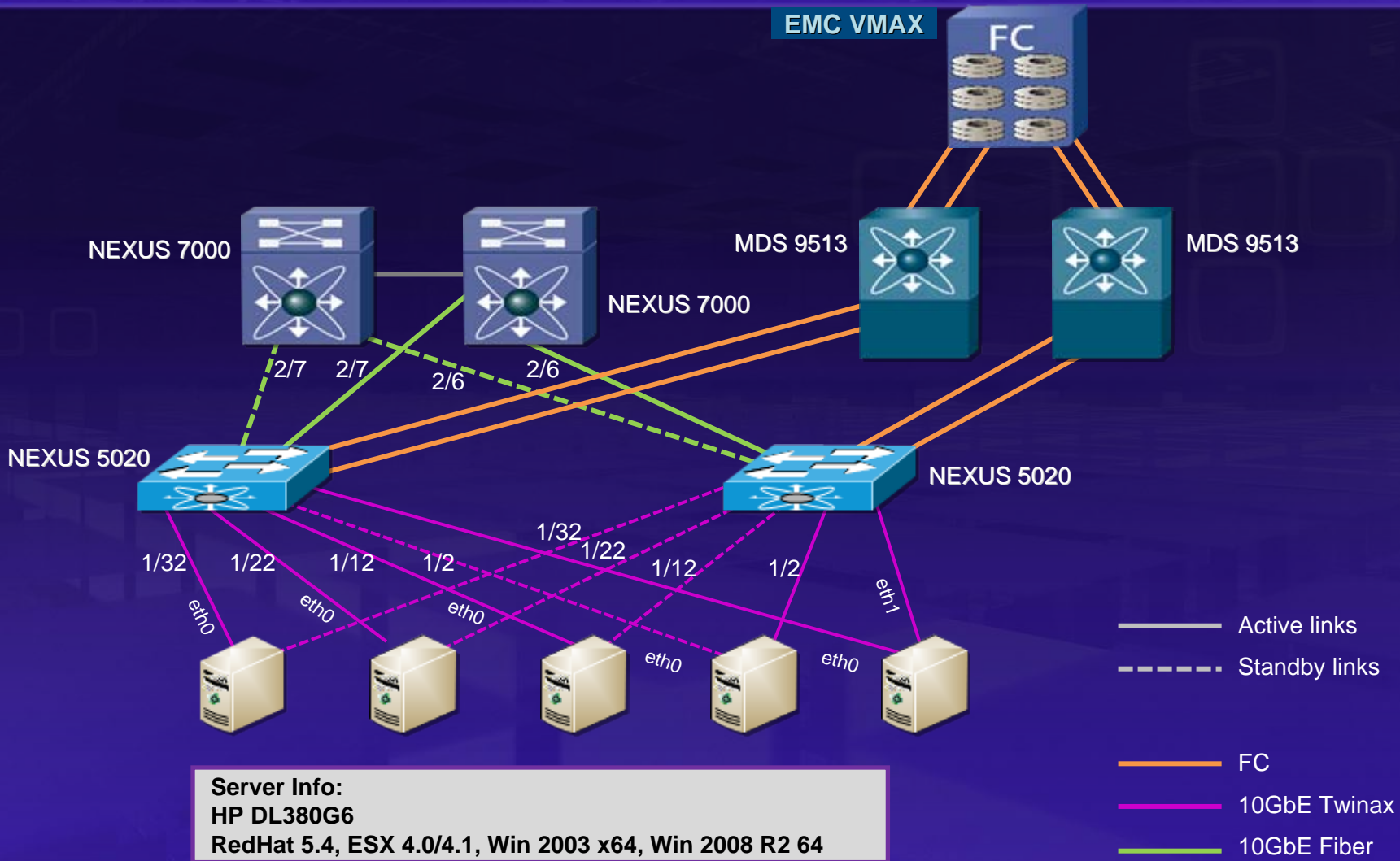


- **Opportunity Came When Moving Data Center to New Location**
- **Focused Goals For Improvement**
 - Energy consumption
 - Physical material costs
 - Simplify infrastructure to three supported operating systems: ESX, Windows, Linux
 - Cabling complexity
 - Cabinet density
- **Consolidate new and existing corporate applications for business and technical advantages**
- **Business and technical justification for full network convergence utilizing 10GB and FCoE to fully leverage virtualization capabilities**

Proof of Concept Environment



Deployment



Real Savings with FCoE



Convergenomics Cost Calculator

Migration From 1GE & 4G FC to 10G CEE Based Convergence

Adjust the default settings in Organization Profile using the up/down arrows or by entering a number and see the cost benefits of converged networking.

Adjust the Organization Profile

(Restore Defaults)

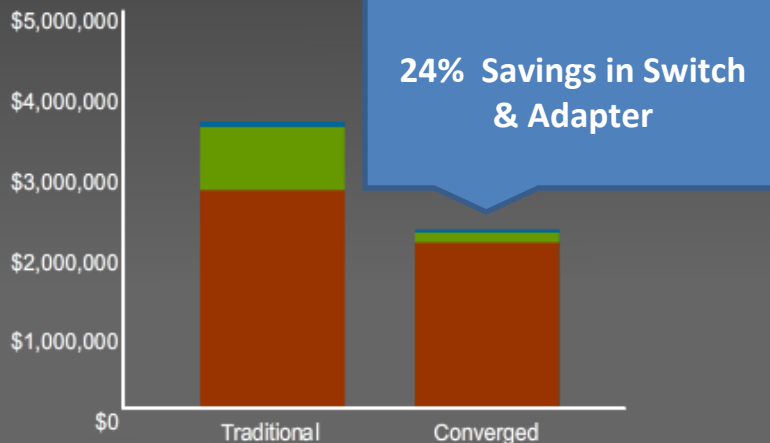
	Without Convergence	With FCoE Based Convergence
Number of Servers	500	500
Number of LAN Connections Per Server	6	
Number of SAN Connections Per Server	2	
Number of Converged Ethernet Connections Per Server		2

+ Additional Configurable Parameters

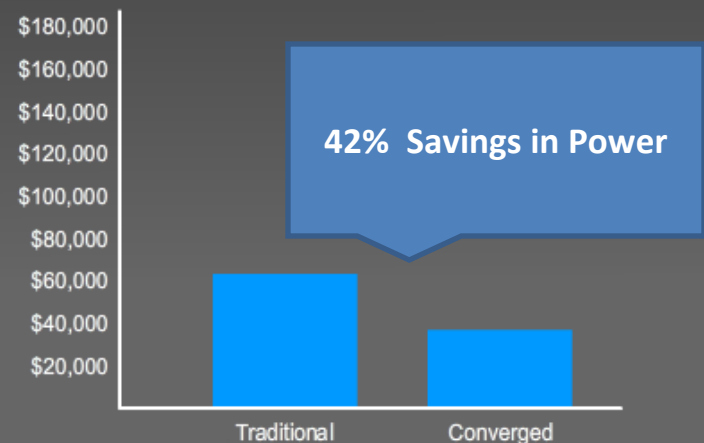
Results

	Without Convergence	With FCoE Based Convergence	Savings
Switch & Adapter Costs	\$ 2,895,500	\$ 2,197,200	24 %
Cost of Power Consumed	\$ 72,518	\$ 41,943	42 %
Cable Installation Costs	\$ 845,800	\$ 130,000	85 %
Number of inter-rack cables	4,229	1,400	67 %
Power Utilized (Kwh)	517,979	299,592	42 %

Cost Benefits with FCoE Enabled Convergence



Power Utilized (Kwh)





Convergence- By The Numbers...

28

% Savings on Capital Cost with Network Convergence

50%

percentage of 10GbE ports shipped on all servers by 2H CY12

49%

2009-1014 10GbE Market CAGR

80

% savings in cable costs for network convergence



48

average number of VMs per server by 2012

77%

of IT Managers adding a 2nd NIC/UCNAs to servers

50Gb

I/O bandwidth/server will grow to 50Gb by 2013

42

% of power and cooling savings with convergence

Emulex
connects
servers, storage *and* people



OneConnect™



OneCommand™
KEY MANAGER



OneCommand™
VISION



OneSecure™

EMULEX
CONNECTED



LightPulse™



OneCommand™
MANAGER



OneCommand™