

# FCoE Deployment in a Virtualized Data Center

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# Agenda

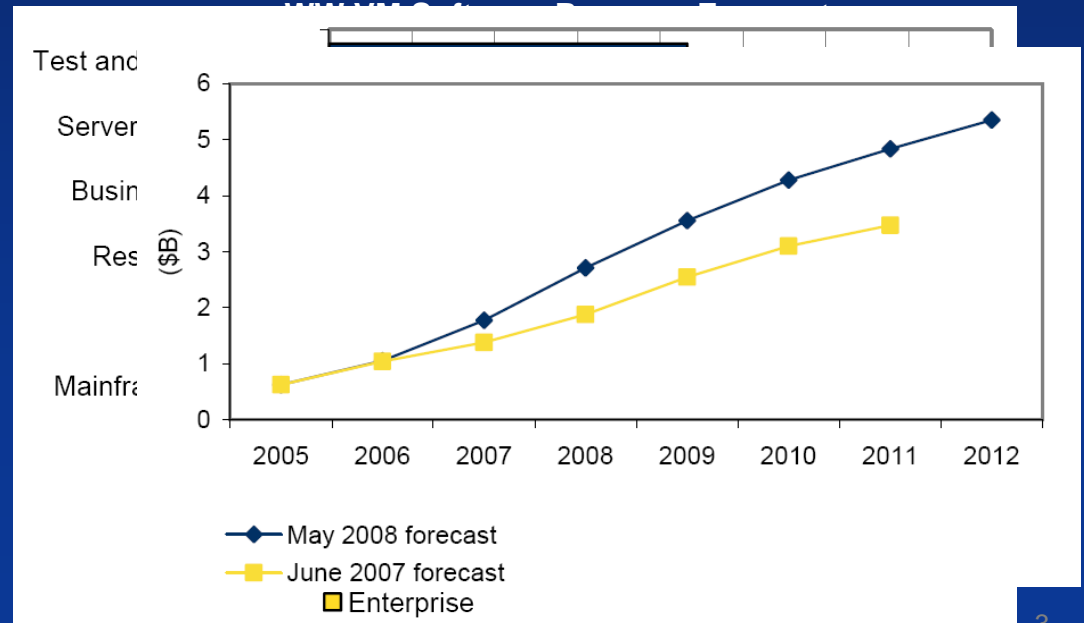
- Trends in Virtualized Data Centers
- FCoE CNA Compatibility with FC
- IO Virtualization with FCoE CNAs
- FCoE Phased Deployment
- Software FCoE v/s FCoE CNA Deployment
- VM Mobility and QoS with FCoE CNA
- Brief Case Study of FCoE Deployment

# Drivers for Virtualization

IDC survey suggests virtualization driven by 4 key factors

- Server consolidation
- Business continuity
- Test and development
- Resource pooling and sharing leading to dynamic provisioning

Industry experiencing rapid growth of virtualization



# Virtualized Data Center Trends

**Multi-Core CPUs allow bigger and multiple workloads, increase server consolidation**

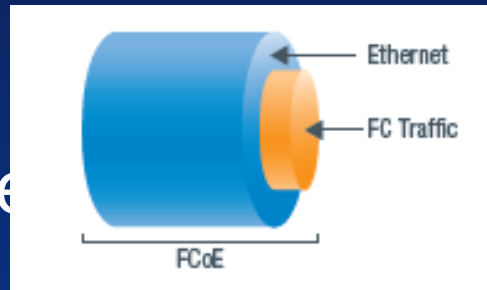
**Virtual Machine IO Performance near Physical Machine requiring more bandwidth per server  
(IO Virtualization, Hardware assists, Offloads)**

**Reduced Hardware Components reduces Power and Cooling cost  
(Nearly 60% of data center cost comes from Power and Cooling)**

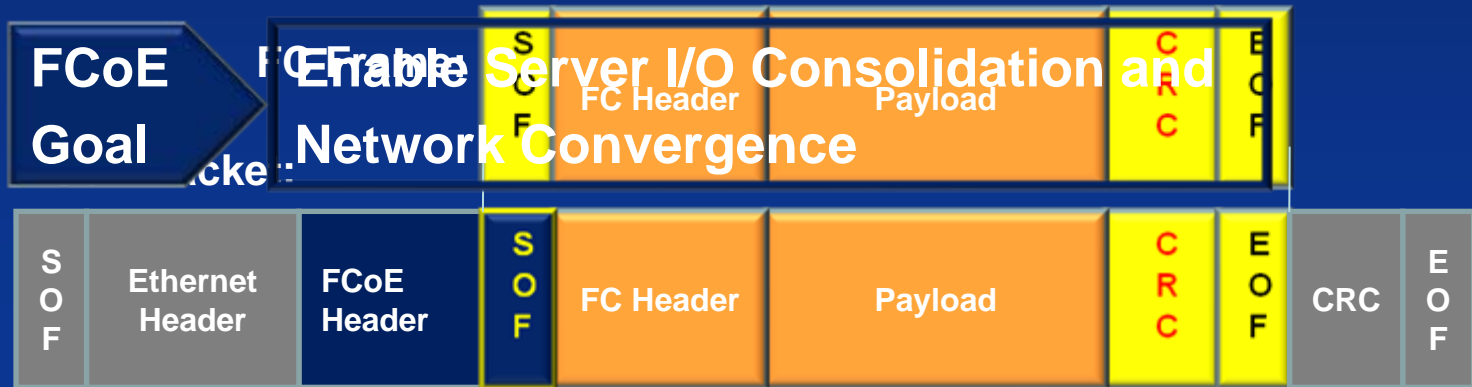
**Simplified Management and Dynamic Provisioning**

# FCoE Overview

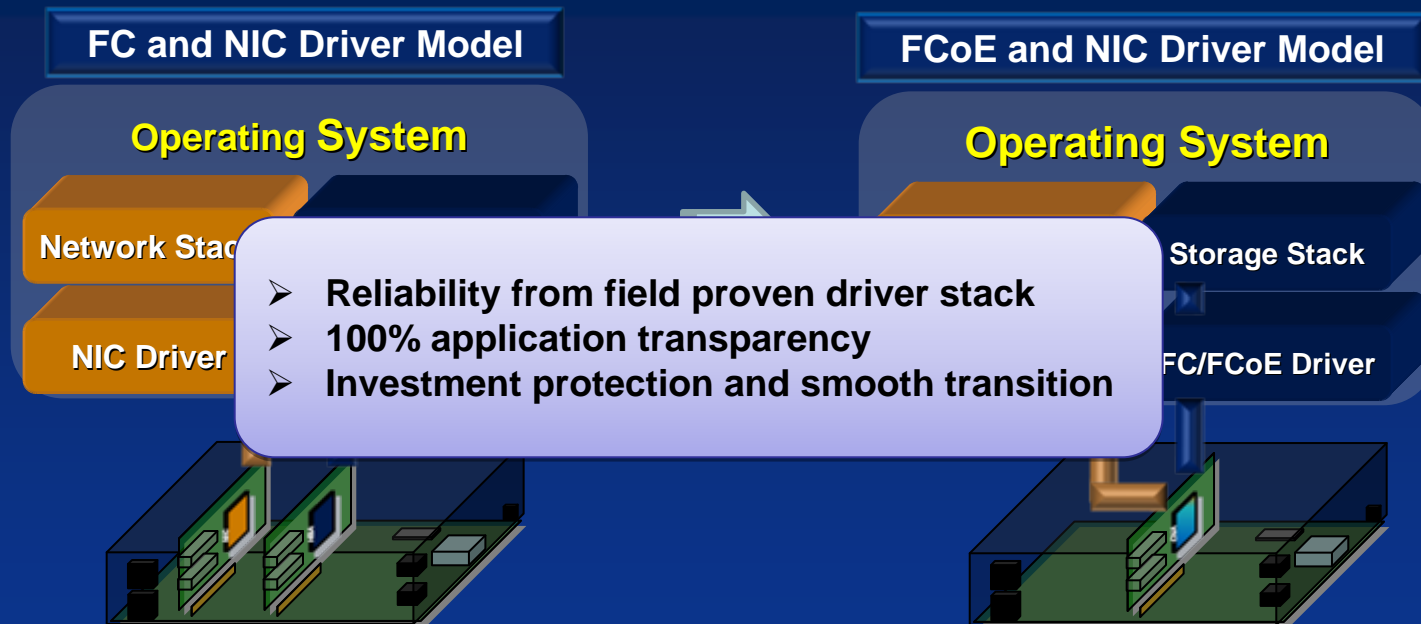
- It is just Fibre Channel encapsulated in Ethernet



- FC frames are sent inroute

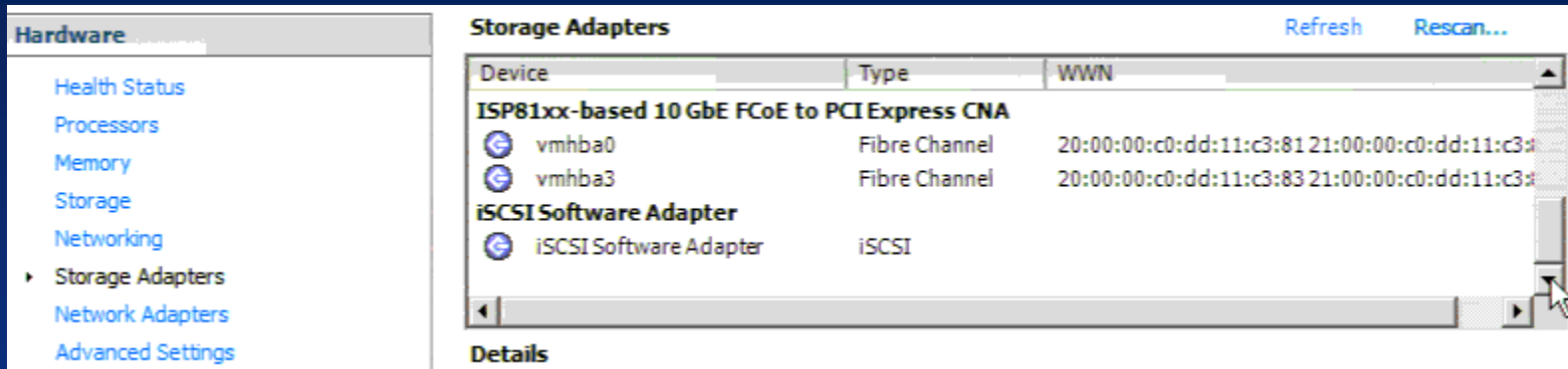


# FCoE CNA Software Compatibility



# Operating System view of FCoE CNA

## Storage

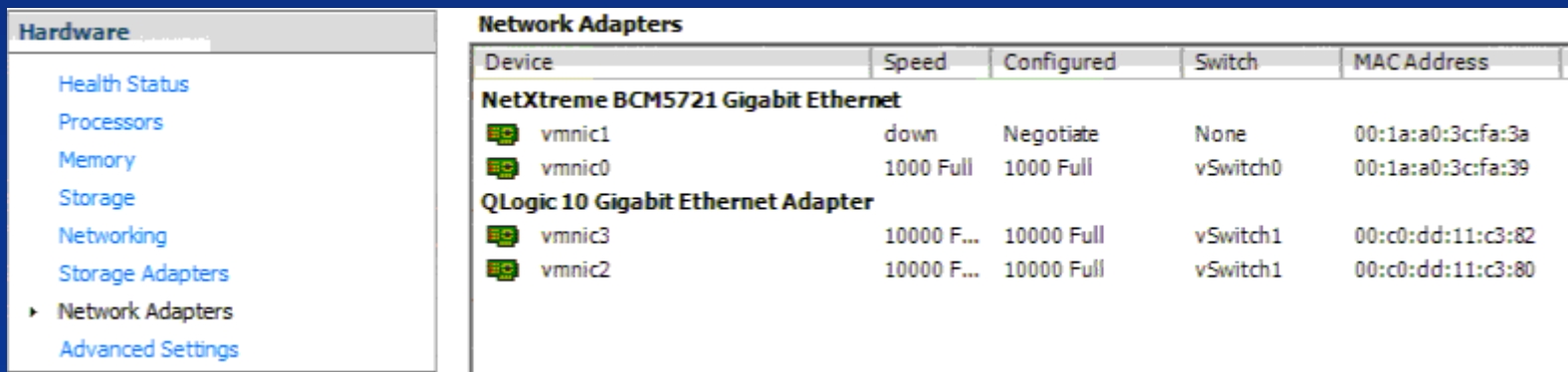


**Storage Adapters** Refresh Rescan...

Device	Type	WWN
<b>ISP81xx-based 10 GbE FCoE to PCI Express CNA</b>		
vmhba0	Fibre Channel	20:00:00:c0:dd:11:c3:81 21:00:00:c0:dd:11:c3:81
vmhba3	Fibre Channel	20:00:00:c0:dd:11:c3:83 21:00:00:c0:dd:11:c3:83
<b>iSCSI Software Adapter</b>		
iSCSI Software Adapter	iSCSI	

**Details**

## Ethernet



**Network Adapters**

Device	Speed	Configured	Switch	MAC Address
<b>NetXtreme BCM5721 Gigabit Ethernet</b>				
vmnic1	down	Negotiate	None	00:1a:a0:3c:fa:3a
vmnic0	1000 Full	1000 Full	vSwitch0	00:1a:a0:3c:fa:39
<b>QLogic 10 Gigabit Ethernet Adapter</b>				
vmnic3	10000 F...	10000 Full	vSwitch1	00:c0:dd:11:c3:82
vmnic2	10000 F...	10000 Full	vSwitch1	00:c0:dd:11:c3:80

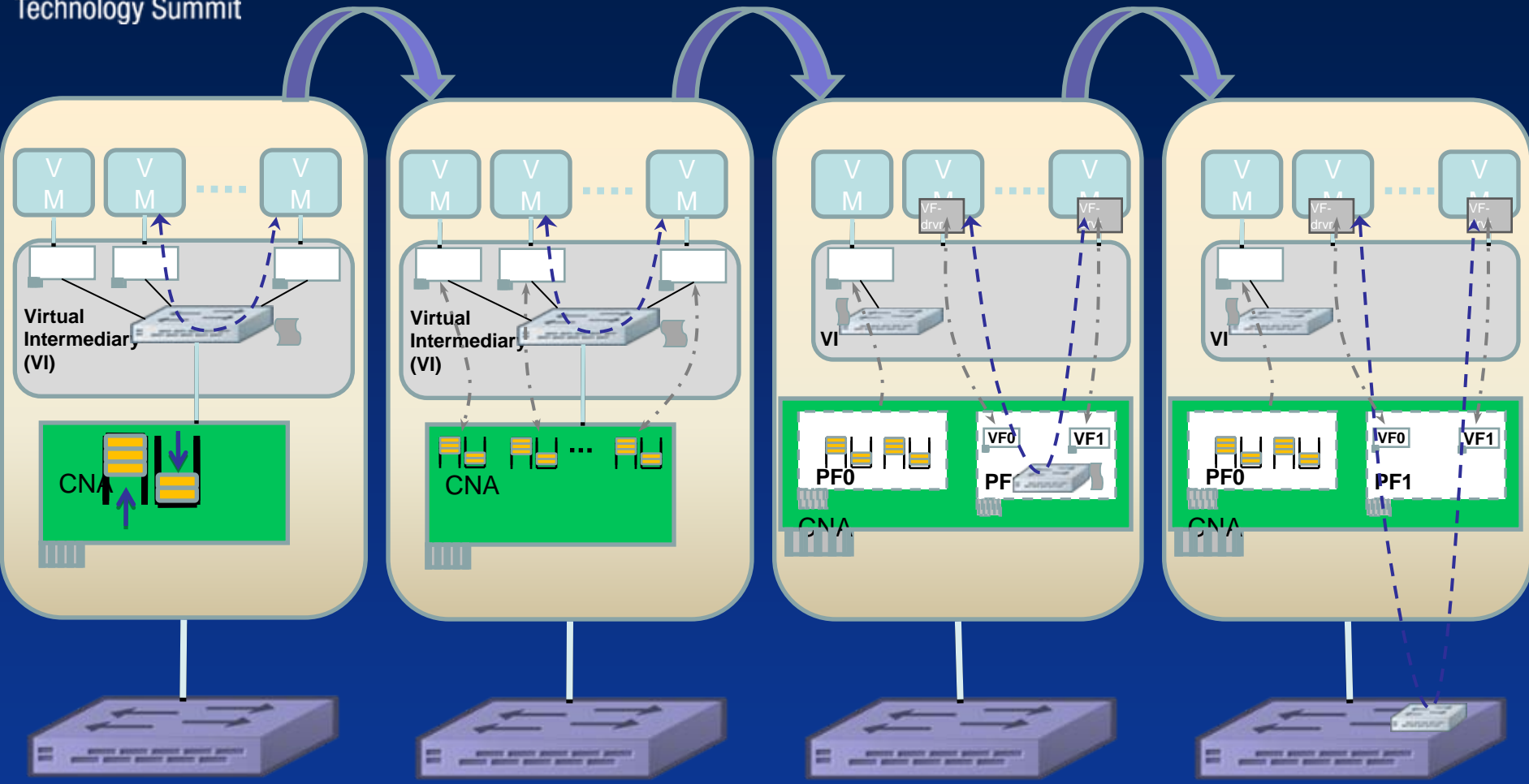
# FCoE CNA Management Compatibility

- Deploy common SAN practices such as FC zoning, LUN masking, etc.
  - Transparent Layer 2 FCoE to FC address mapping
- Build for compatibility
  - San software
- Troubleshoot LAN/SAN issues
  - Unique MAC address or “Ethertype” for FCoE data traffic

- Reuse proven SAN & LAN management practices
- Reuse familiar SAN & LAN management tools
- Reuse in-house SAN & LAN admin expertise



# IO Virtualization with FCoE CNA



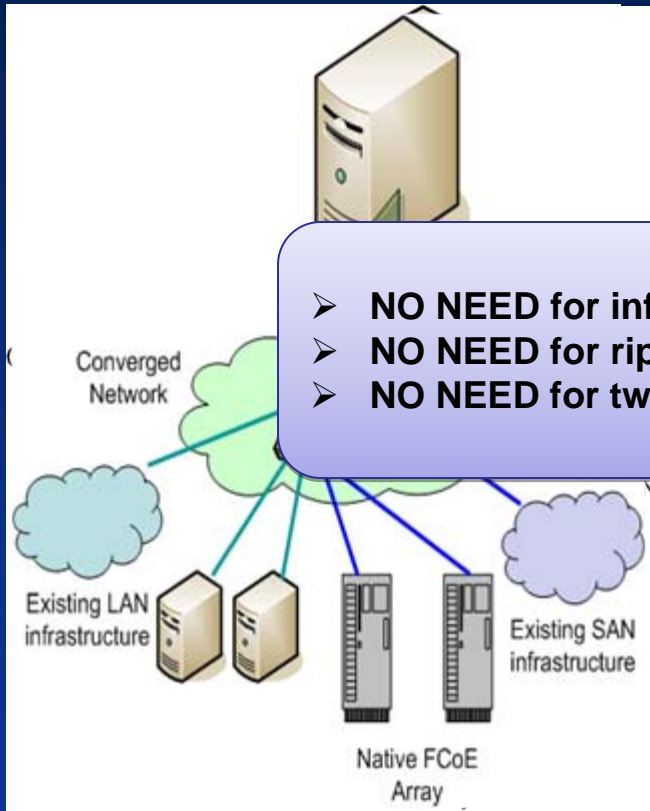
I/O Virtualization  
SW based

IOV NIC Assist

SR-IOV

NIV/VEPA

# FCoE Phased Deployment



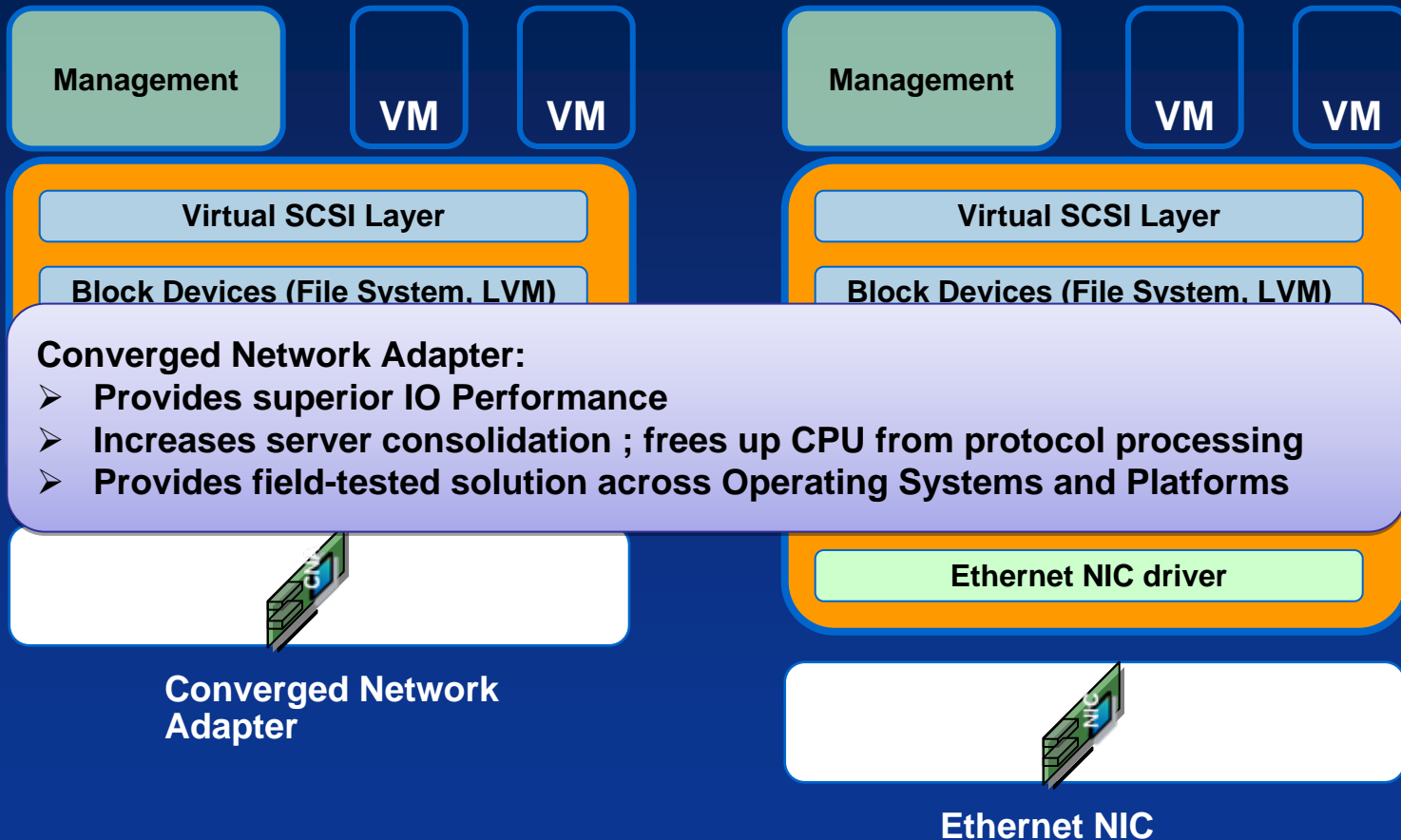
- **NO NEED** for infrastructure overhaul; deploy in phases
- **NO NEED** for rip and replace; use existing LAN & SAN
- **NO NEED** for two convergence technologies; one fits ALL

- TODAY: Dual adapters and networks for LAN and SAN
- PHASE 1: CNA reduces power, enables efficient use of

current networks

- PHASE 3: Simplified data center with Server and Network Consolidation reduces IT cost

# Software FCoE v/s FCoE CNA Deployment



## Why not Software FCoE?

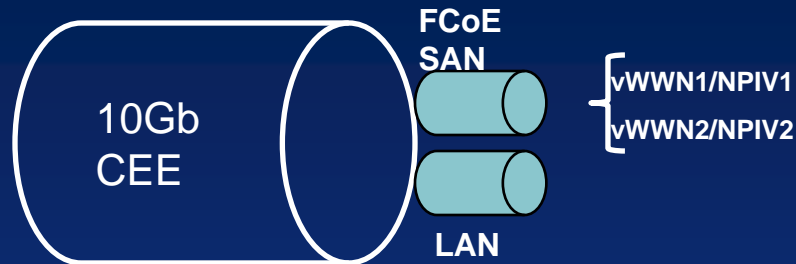
- Performance disclaimer from “FCoE Initiator Functional Specification\*”:

*“This is a software FCoE solution, there are code paths which are CPU intensive (e.g. FC-CRC calculation). Depending on the CPU power, when I/O traffic through the FCoE ports is heavy, CPU utilization could go very high.”*

\* - Source:

Solaris Open Storage – FCoE Initiator Functional Specification, v1.00, Jul 30, 2008

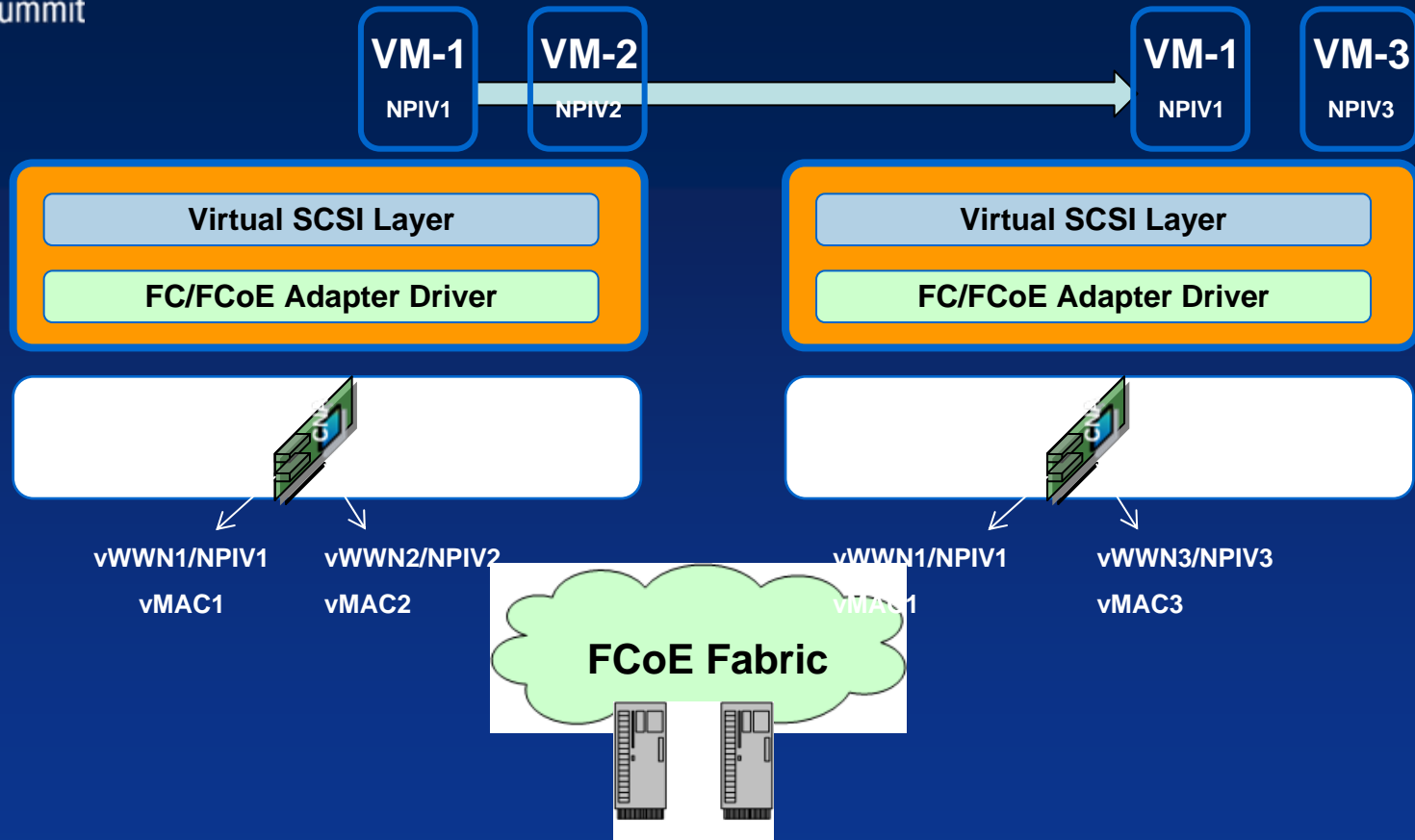
# QoS Configuration with FCoE CNA



SAN and LAN  
bandwidth allocation  
using ETS

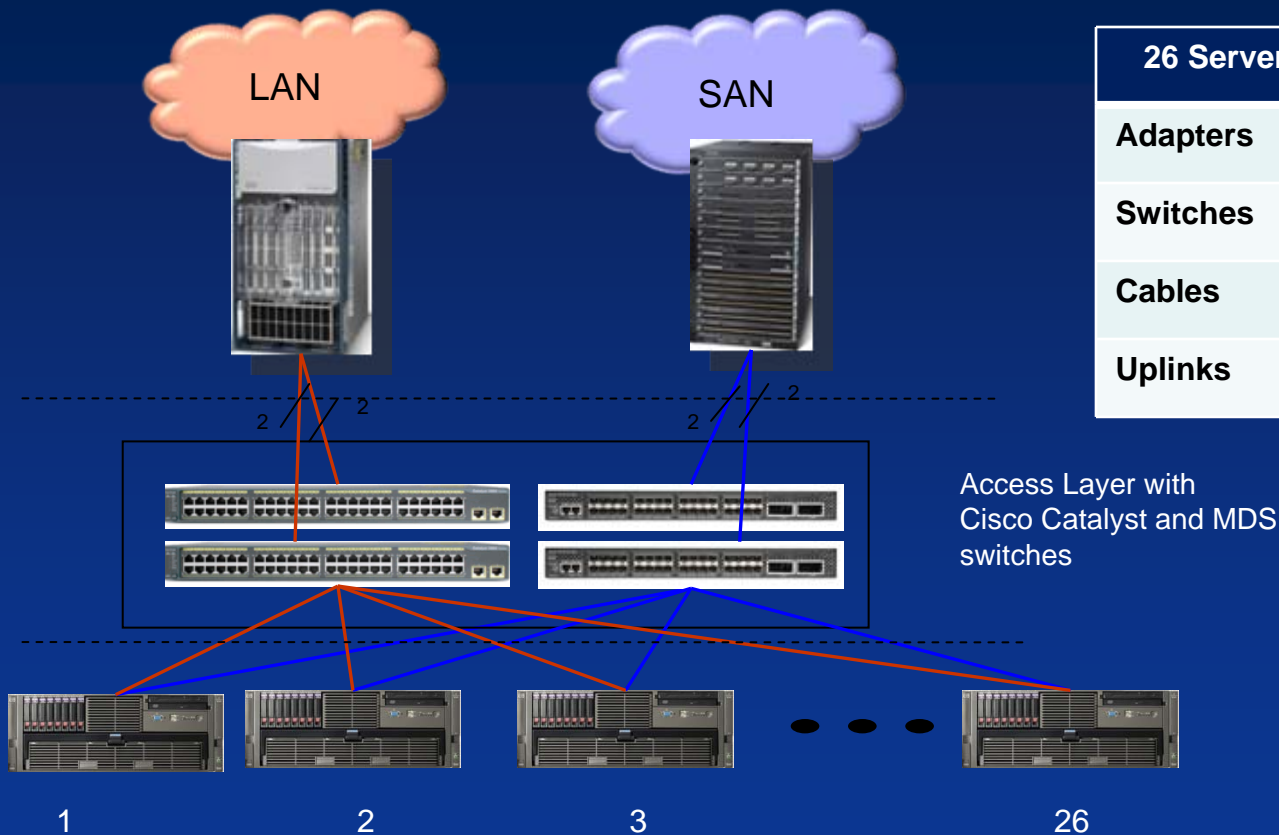
- Enhanced Transmission Selection (ETS) protocol allows bandwidth percentage allocation across FCoE SAN and Networking traffic
- Further, FC level QoS can be configured for the bandwidth allocated at FC level

# VM Mobility with FCoE CNA



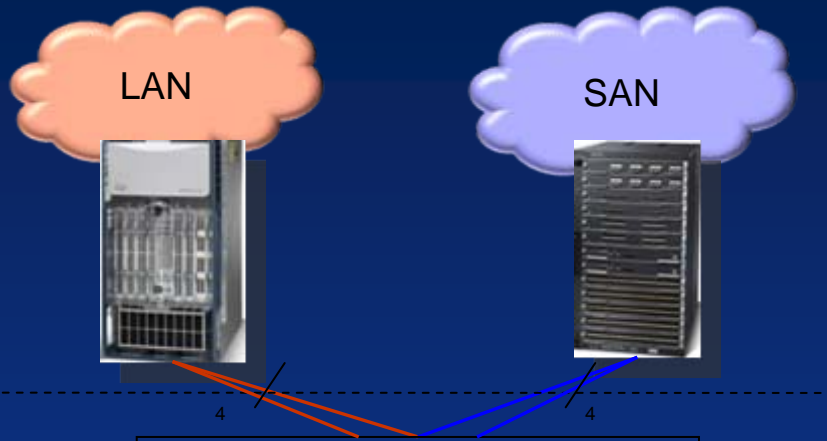
- FCoE supports N-port ID Virtualization similar to FC
- FC zoning configuration migrated with NPIV
- All other Virtual Port properties migrated to new host along with NPIV

# Case Study – Before CNA deployment

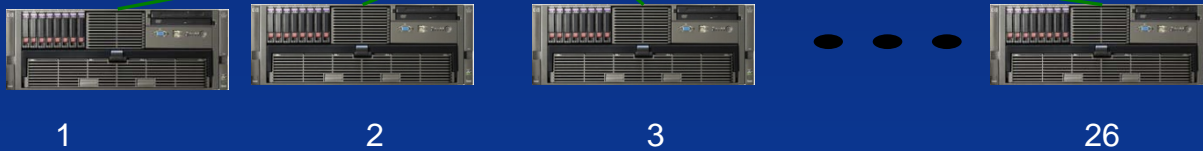


26 Servers	Ethernet	FC	Total
<b>Adapters</b>	26	26	<b>52</b>
<b>Switches</b>	2	2	<b>4</b>
<b>Cables</b>	56	56	<b>112</b>
<b>Uplinks</b>	4	4	<b>8</b>

# Case Study – After CNA deployment



Access Layer with  
Cisco Nexus 5020 +  
Expansion Modules



26 Servers	CNA	Total	Savings
Adapters	26	26	50%
Switches	2	2	50%
Cables	60	60	46%
Up links	8	8	0%



# Cost Savings from FCoE CNA deployment

## Cost per server

Component	FC and Ethernet	FCoE
Cable	\$300	\$200
FC HBA (2-port)	\$1200	-
1GbE NIC (2-port)	\$800	-
10GbE FCoE CNA (2-port)	-	\$1800
FC switch	\$2400	-
1GbE switch	\$2800	-
FCoE switch	-	\$4000
<b>Total</b>	<b>\$7500</b>	<b>\$6000</b>

**20%** ↓

# What to look for when you buy FCoE CNA?

- Full FCoE protocol offload
- Full 10GbEE NIC functionality with stateless offloads
- Certified across Operating Systems and Platforms
- Single ASIC solution with low power dissipation
- Leveraged from years of FC expertise and field proven drivers and management apps
- End-to-end ecosystem support

# Q&A

