Ethernet Technology Summit

FCoE Deployment in a Virtualized Data Center

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Agenda

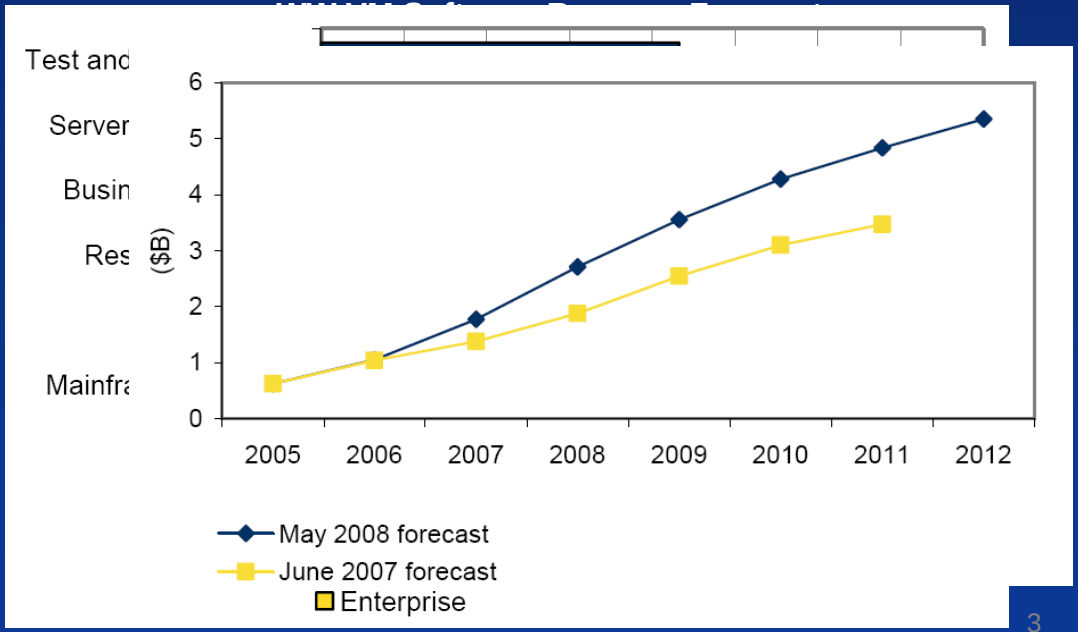
- Trends in Virtualized Data Centers
- FCoE CNA Compatibility with FC
- IO Virtualization with FCoE CNAs
- FCoE Phased Deployment
- Software FCoE v/s FCoE CNA Deployment
- VM Mobility and QoS with FCoE CNA
- Brief Case Study of FCoE Deployment

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



Source: IDC Virtualization Tracker Survey, 2008

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Virtualized Data Center Trends

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

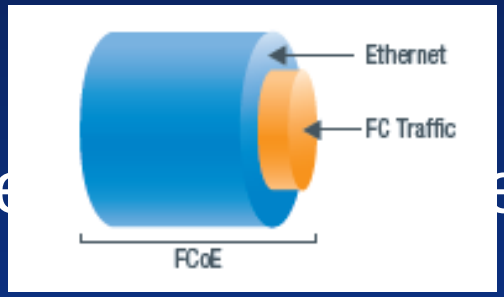
Virtual Machine IO Performance near Physical Machine requiring more bandwidth per server
(IO Virtualization, Hardware assists, Offloads)

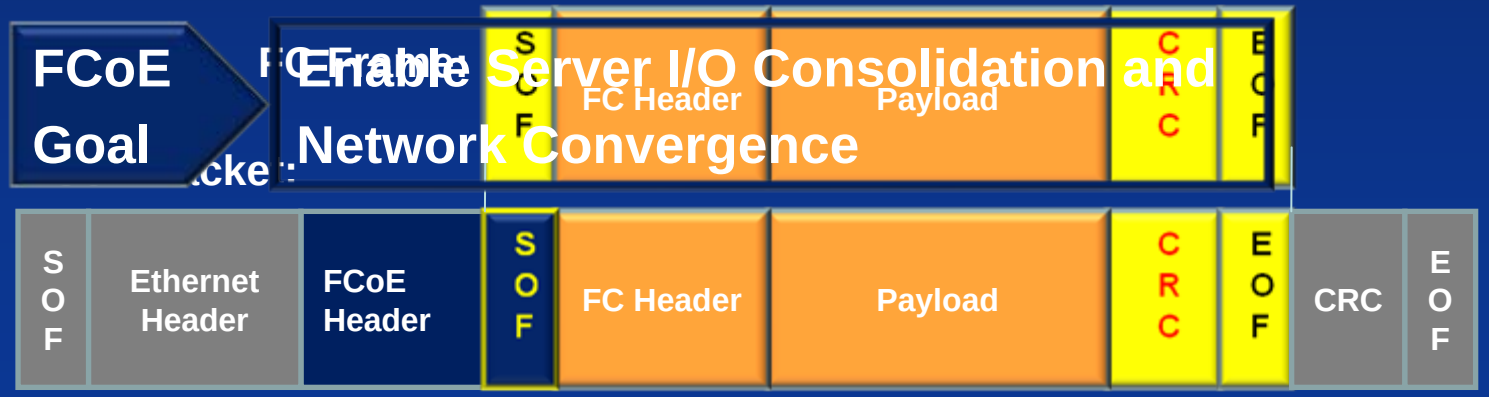
Reduced Hardware Components reduces Power and Cooling cost
(Nearly 60% of data center cost comes from Power and Cooling)

Simplified Management and Dynamic Provisioning

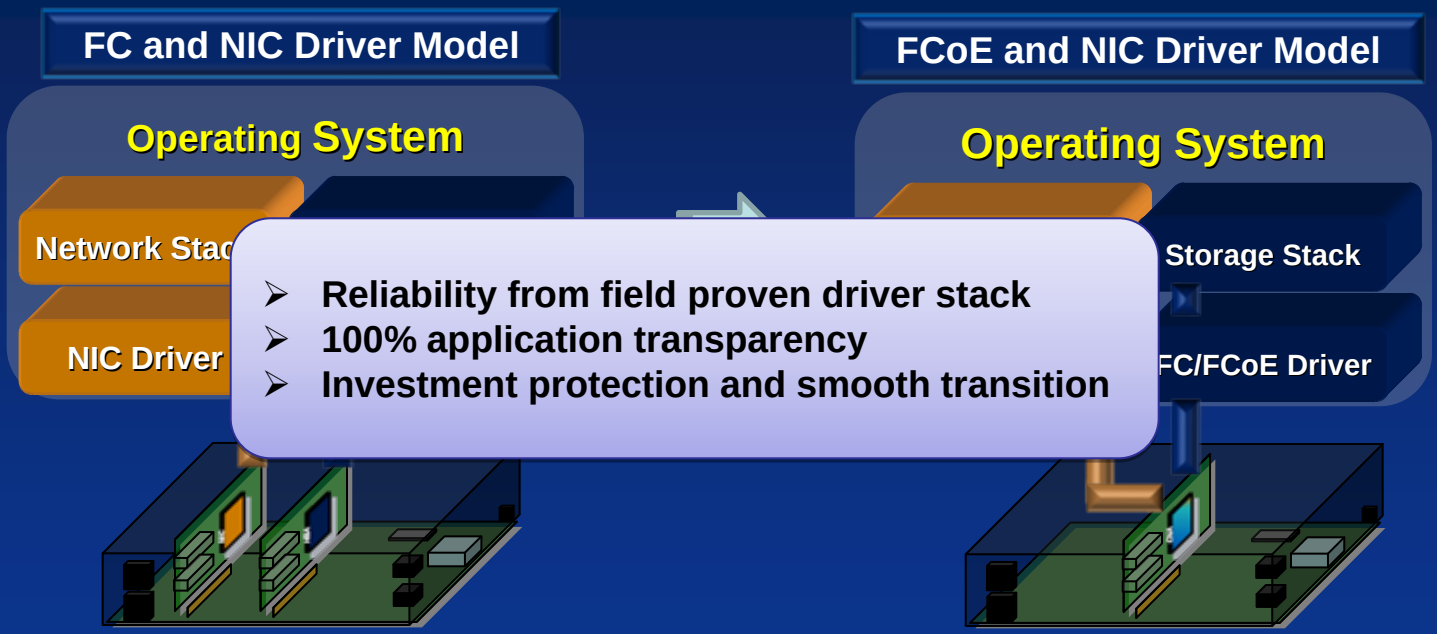
FCoE Overview

- It is just Fibre Channel encapsulated in Ethernet
- FC frames are [illegible] enroute



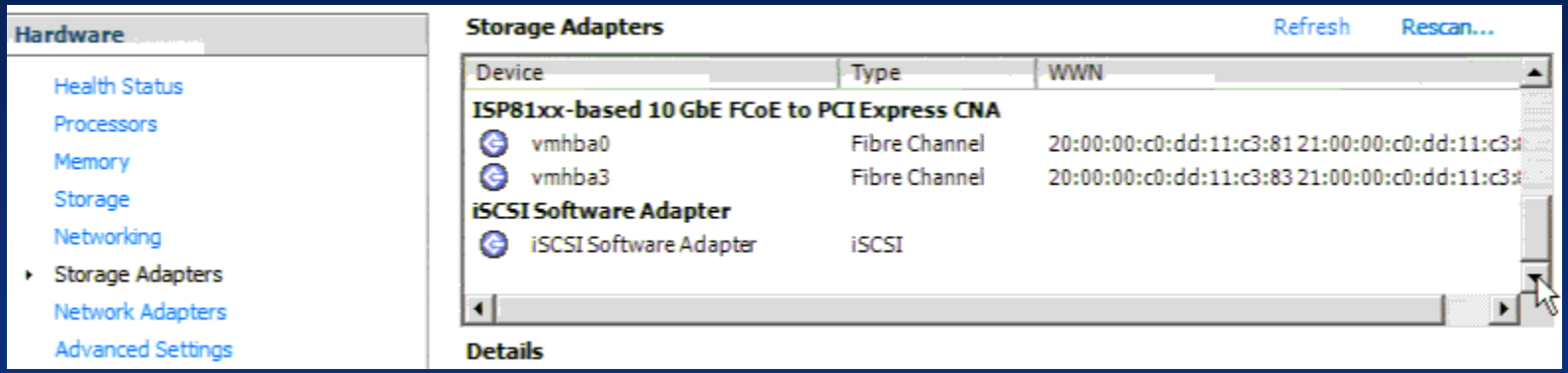


FCoE CNA Software Compatibility



Operating System view of FCoE CNA

Storage



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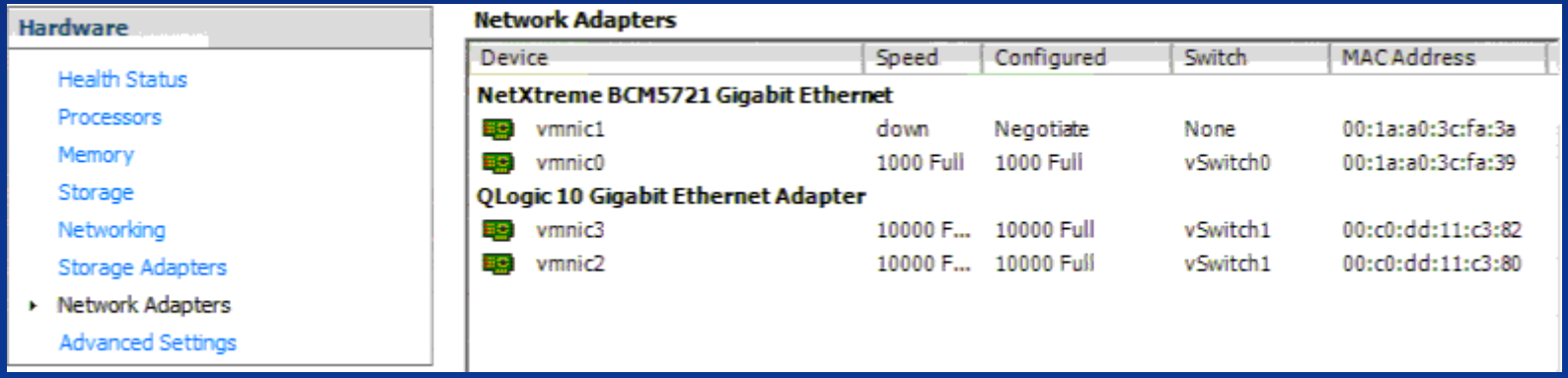
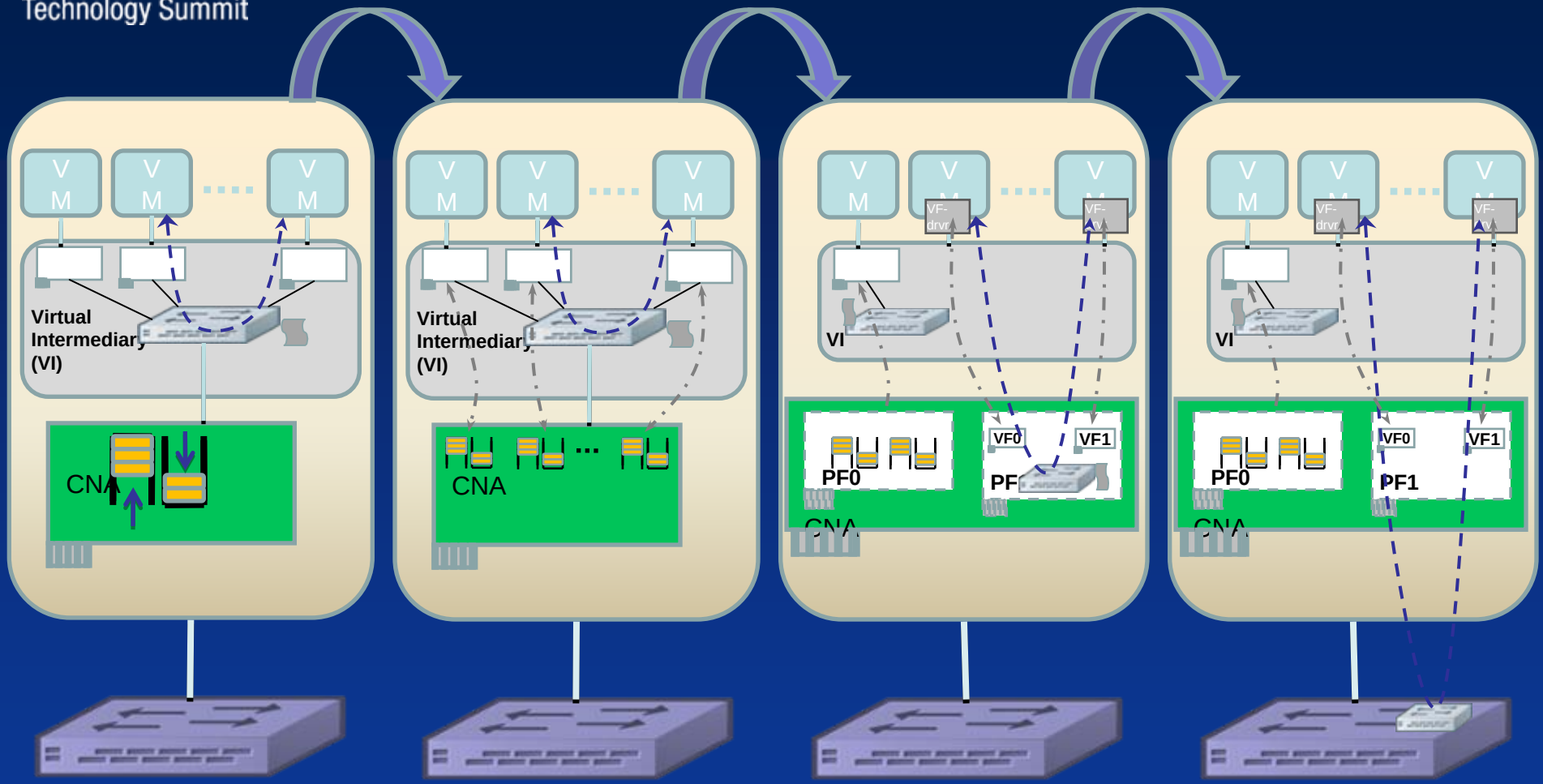


FCoE CNA Management Compatibility

- Deploy common SAN practices such as FC zoning, LUN masking, etc.
  - Tra[illegible] ma[illegible]
- Build f[illegible]oftware
  - San[illegible]
- 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



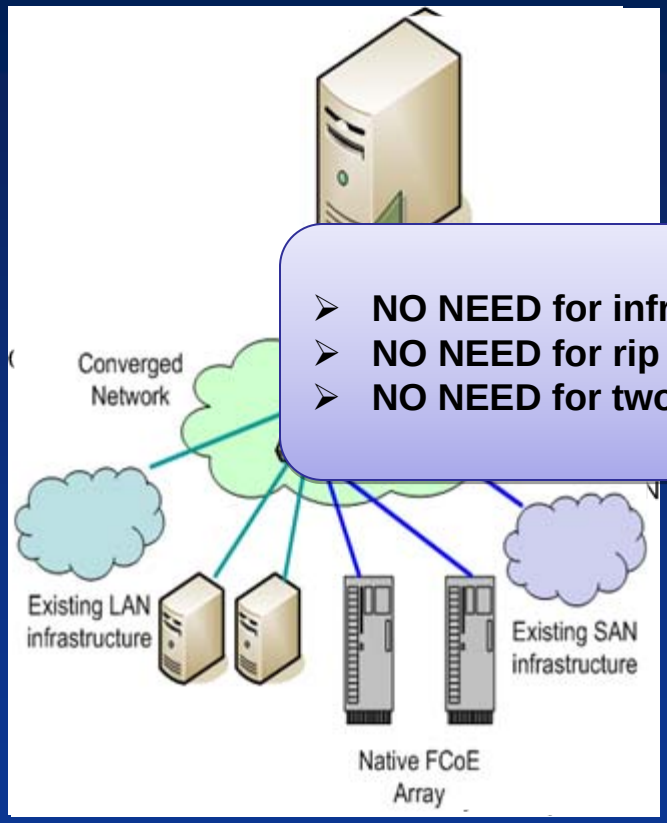
I/O Virtualization SW based

IOV NIC Assist

SR-IOV

NIV/VEPA

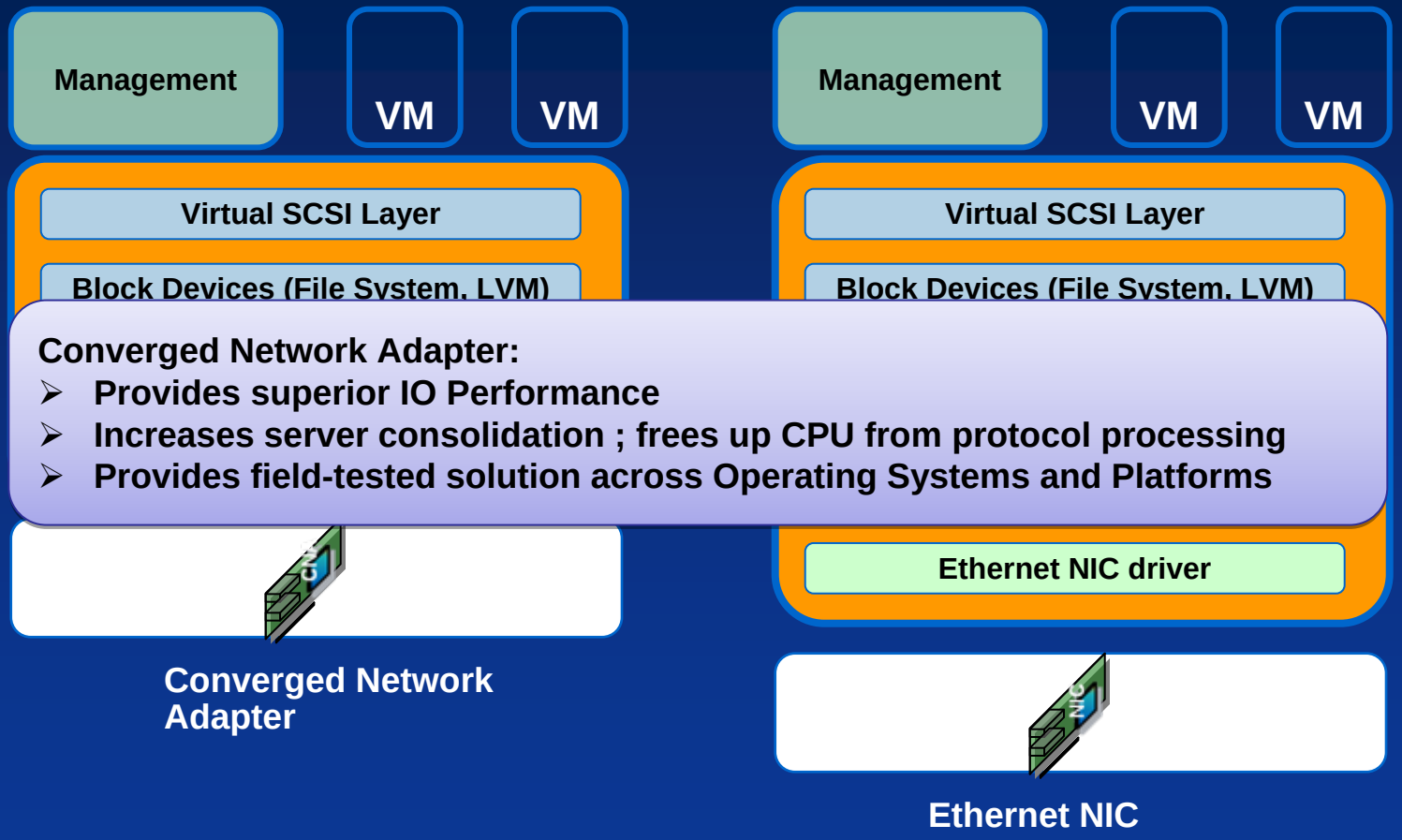
FCoE Phased Deployment



- TODAY: Dual adapters and networks for LAN and SAN
- PHASE 1: CNA reduces power, enables efficient use of
- rk
- ith current networks
- PHASE 3: Simplified data center with Server and Network Consolidation reduces IT cost

- **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**

Software FCoE v/s FCoE CNA Deployment



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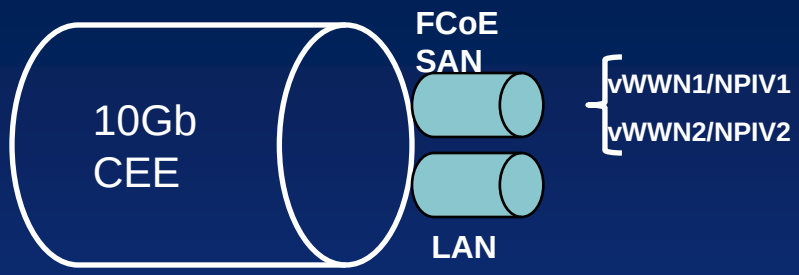
Why not Software FCoE?

- 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

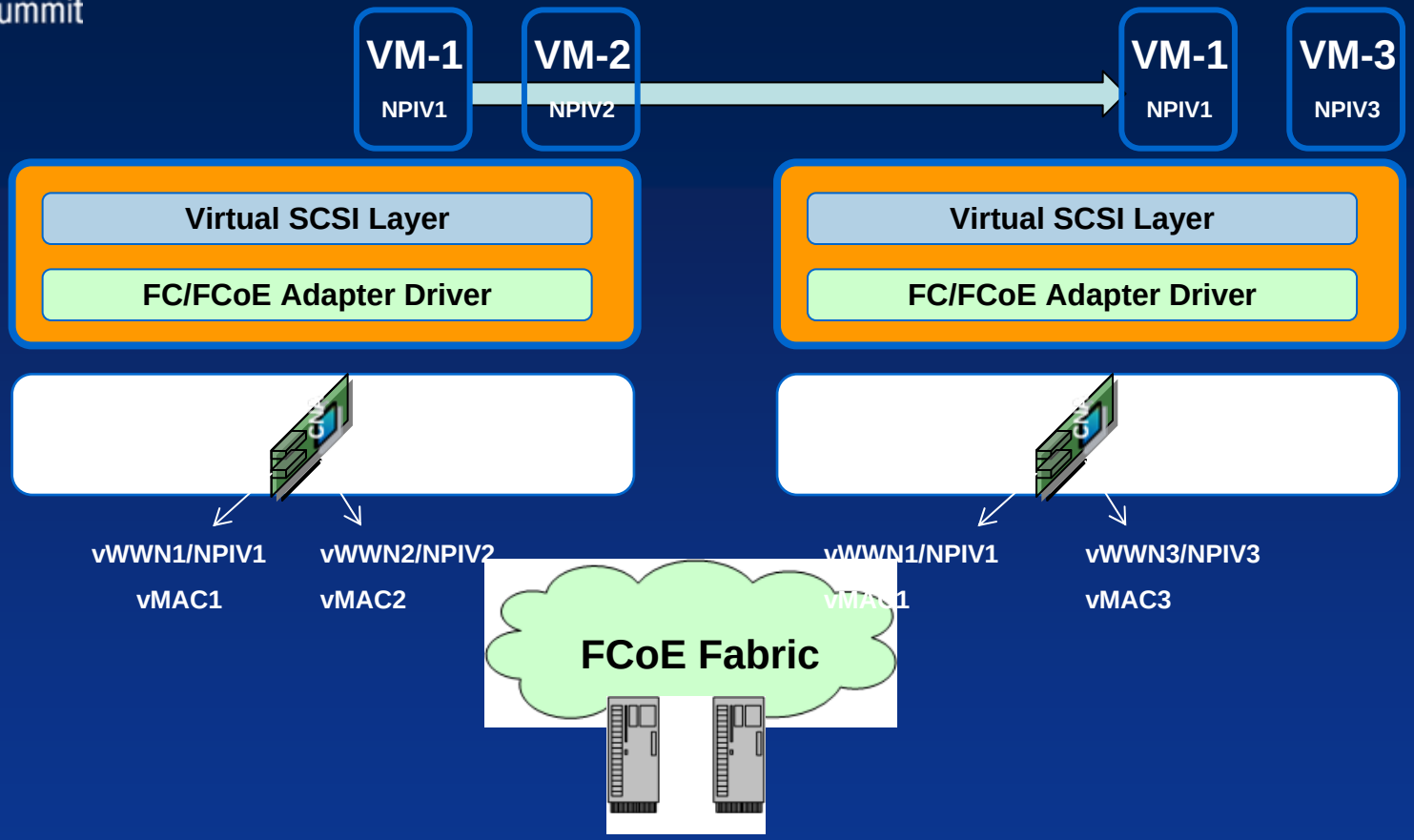
QoS Configuration with FCoE CNA



SAN and LAN bandwidth allocation using ETS

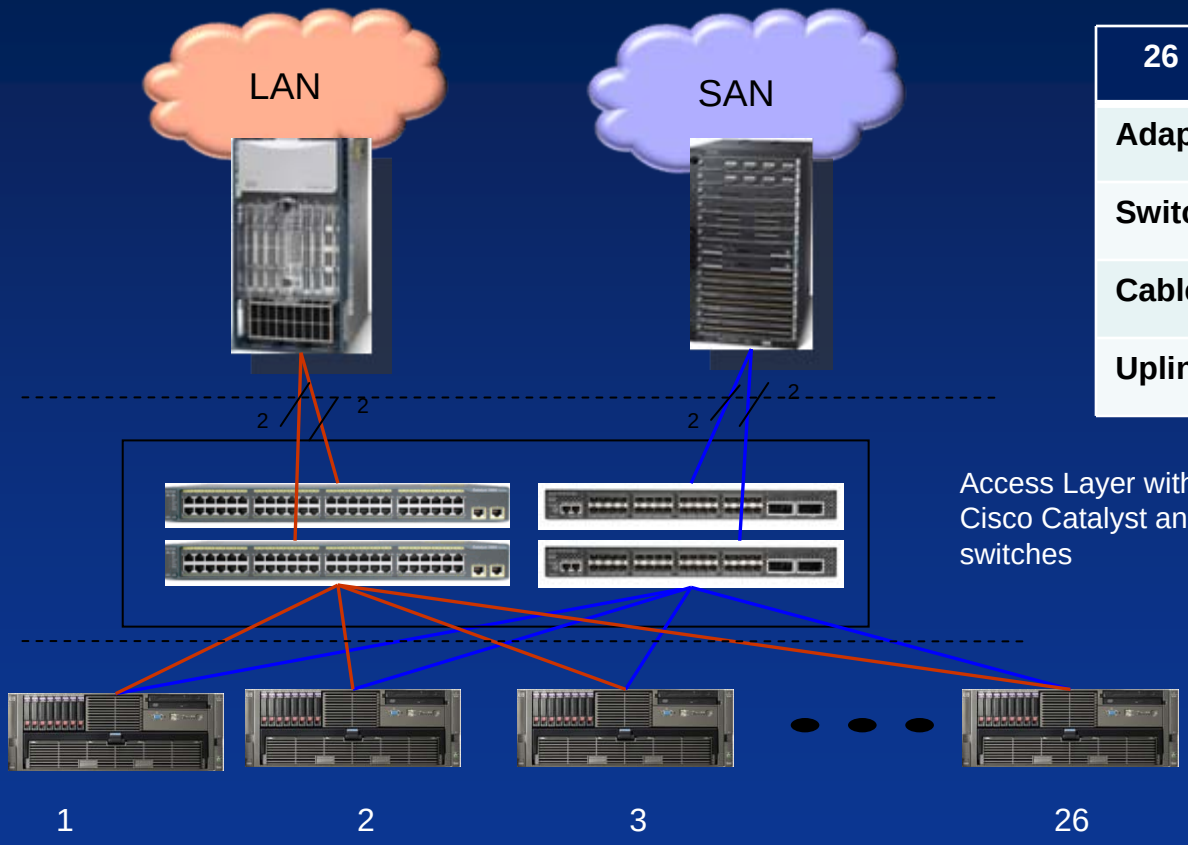
- Enhanced Transmission Selection (ETS) protocol allows bandwidth percentage allocation across FCoE SAN and Networking traffic
- Further, FC level QoS can be configured for the bandwidth allocated at FC level

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

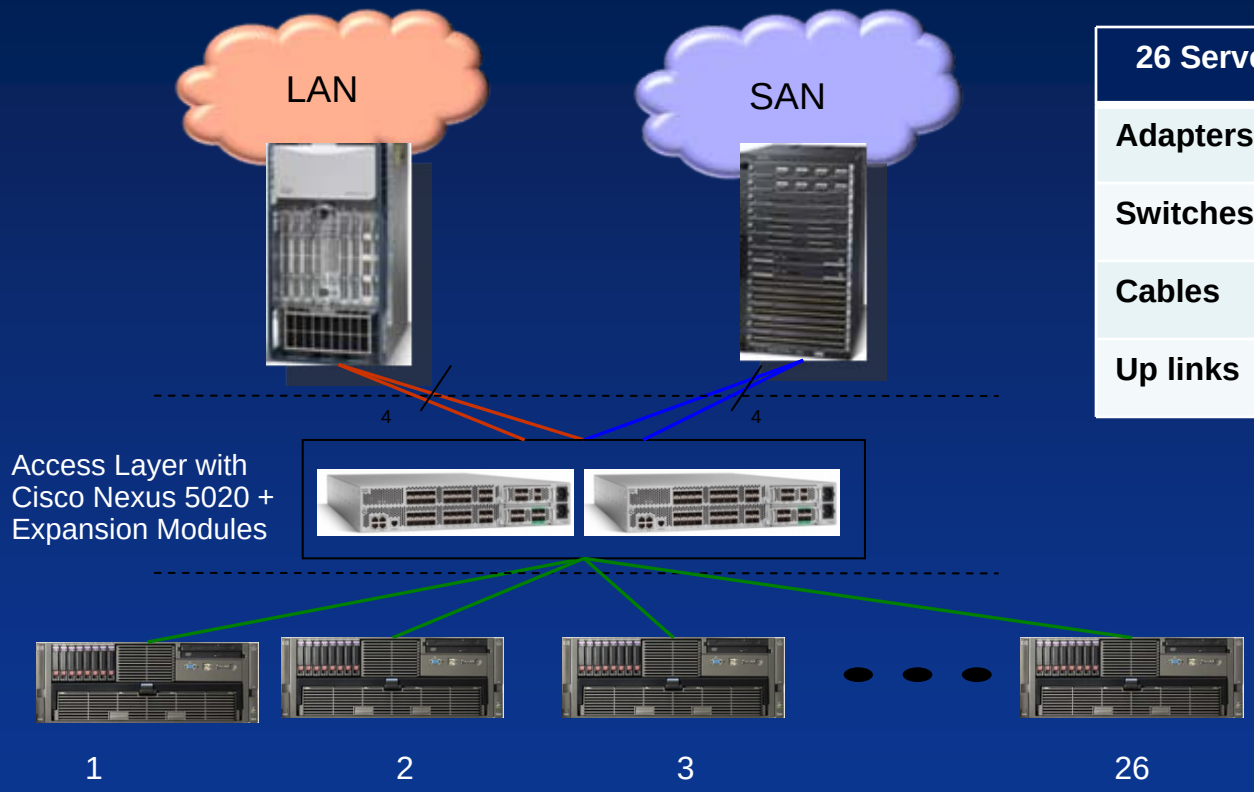
Case Study – Before CNA deployment



26 Servers	Ethernet	FC	Total
Adapters	26	26	**52**
Switches	2	2	**4**
Cables	56	56	**112**
Uplinks	4	4	**8**

Access Layer with Cisco Catalyst and MDS switches

Case Study – After CNA deployment



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
Total	**$7500**	**$6000**

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

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Q&A