



Cisco UCS Virtualized Adapter Overview



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Outline

- Cisco UCS Overview
- UCS Virtualized Adapter
Overview
IO Challenges
Key Benefits of Adapter
Deployment Scenarios

Cisco Unified Computing System (UCS)



A single system that unifies

- Compute: Industry standard x86
- Network: Unified fabric
- Virtualization: Control, scale, performance
- Storage Access: Wire once for SAN, NAS, iSCSI

Embedded management

- Increase scalability without added complexity
- Dynamic resource provisioning
- Ability to integrate with broad partner ecosystem

Energy efficient

- Fewer servers, switches, adapters, cables
- Lower power and cooling requirements
- Increase compute efficiency by removing I/O and memory bottlenecks

UCS: An Ideal Platform for Virtualization

Key Innovations for Virtualization

*Intel Xeon 5500
(Nehalem
Architecture)*



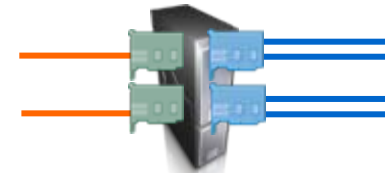
Processor

*Cisco Extended
Memory
Technology*



Memory

*Cisco Virtualized
Adapter w/
Hardware VN-LINK*



IO



Cisco UCS Virtualized Adapter Overview

Adapter designed for both single-OS and VM-based deployments

- Network Interface Virtualization support
- VN-link capable hypervisor integration

PCIe standard compliant

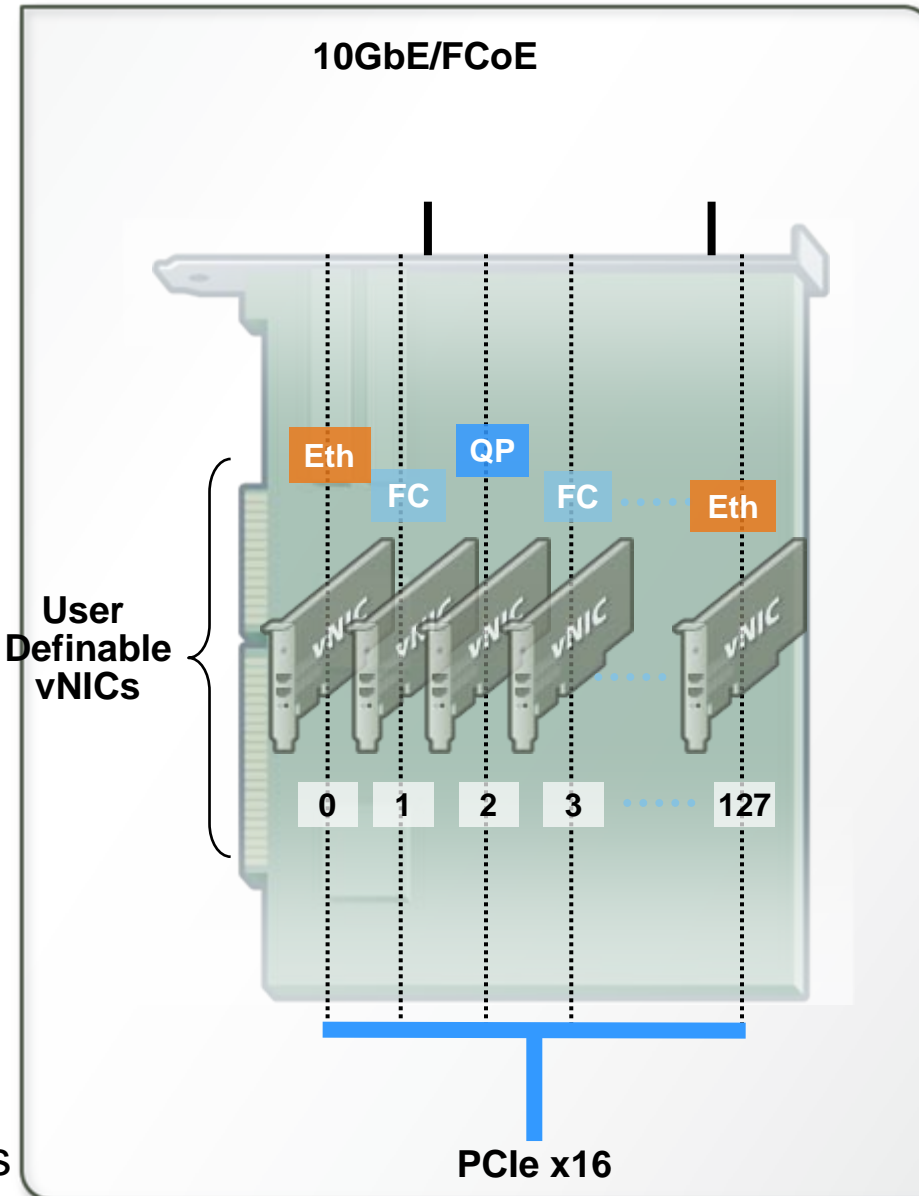
High Performance

- 2x 10Gb
- Low latency
- 500K IOPS
- Cut-through architecture

The OS sees up to ~128 distinct PCIe devices

- Ethernet vNIC and FC vHBA
- Two physical ports to the backplane
- Each PCIe device can have multiple network identities on each port

Capable of OS/Hypervisor bypass solutions

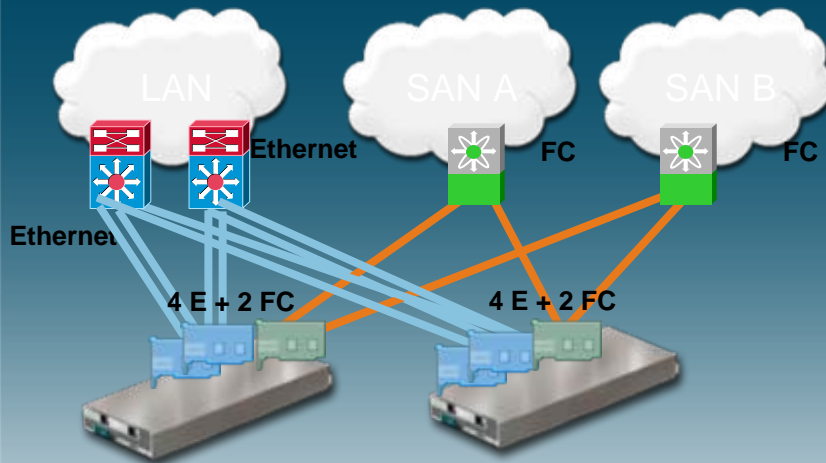




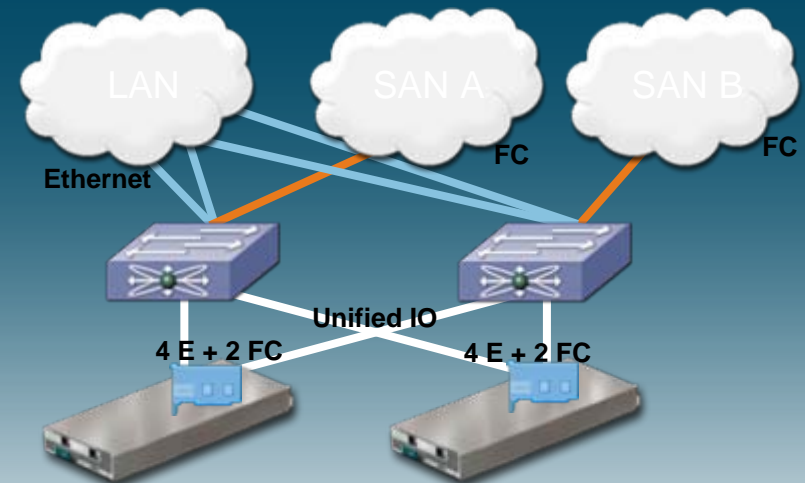
Consolidate and Reduce Infrastructure

Capex & Opex Savings

Today



With Cisco Virtualized Adapter



UCS Virtualized Adapter Benefits

- Consolidate adapters, switches, cables
- Savings from power & cooling
- **ONLY adapter to offer up to 128 virtual interfaces**

IO Challenges Faced by Customers Today

*Scale IO while
Containing Costs*

*Simplify Operations
and Collaborate*

*Provide Agility and
Flexibility*

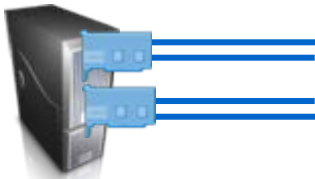
*Optimize IO for
Virtualized
Environments*

Stateless Computing: Flexibility for Any Application

Business Agility for Customers



Web Servers



2-4 NICs

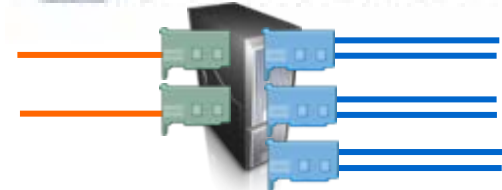
Database Servers

ORACLE



4+ NICs & 2+ HBAs

Virtual Servers



4-8 NICs & 2+ HBAs

Customer Requirement: Same Infrastructure (adapter) can be used for any application

- Same blade can be used for any IO needs
- UCS Virtualized adapter creates any combination of NICs & HBAs (up to 128 virtual adapters)

Example Use Cases

- Re-purpose servers - Use as VMware VDI servers during day (6NICs + 2HBAs), use as computational server (4NICs) during night
- Consolidate infrastructure – Use same server pool for different types of applications

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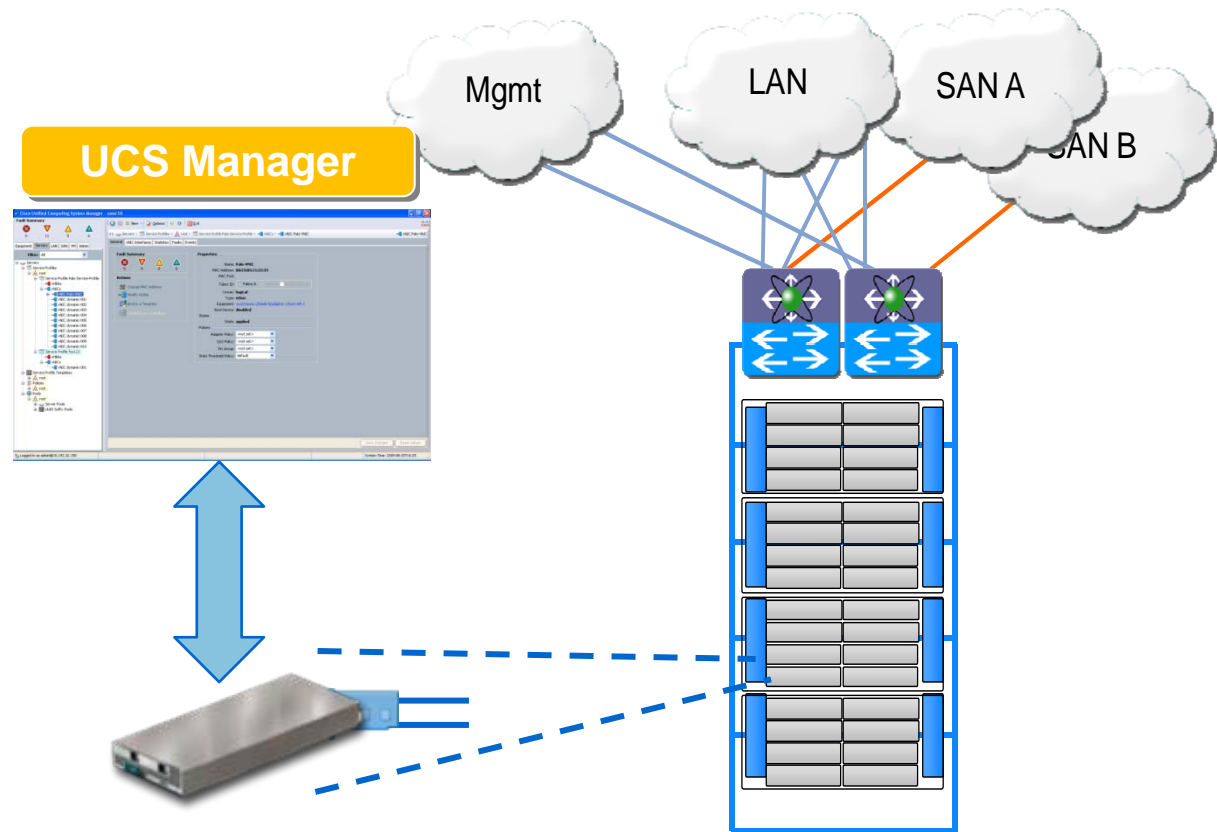
Simplify Management of Adapters/Networking

Huge OPEX Savings



Ease of Management

- UCS Virtualized Adapter centrally configured and managed through “Service Profiles” in UCS Manager
 - Manage MAC addresses, QoS and Adapter Policies
- Automatic Network Configuration:
 - VLAN configuration pushed from network
 - No need to configure trunking driver
 - NIC Teaming driver not needed
- Simple OS stack
 - No agents or configurations



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Optimize IO for Virtualized Environments

Perfect Adapter for Hypervisors



IO / Network Interface Requirements

Virtualization host typically needs multiple types and # of interfaces (4+ NICs, 2 HBAs)

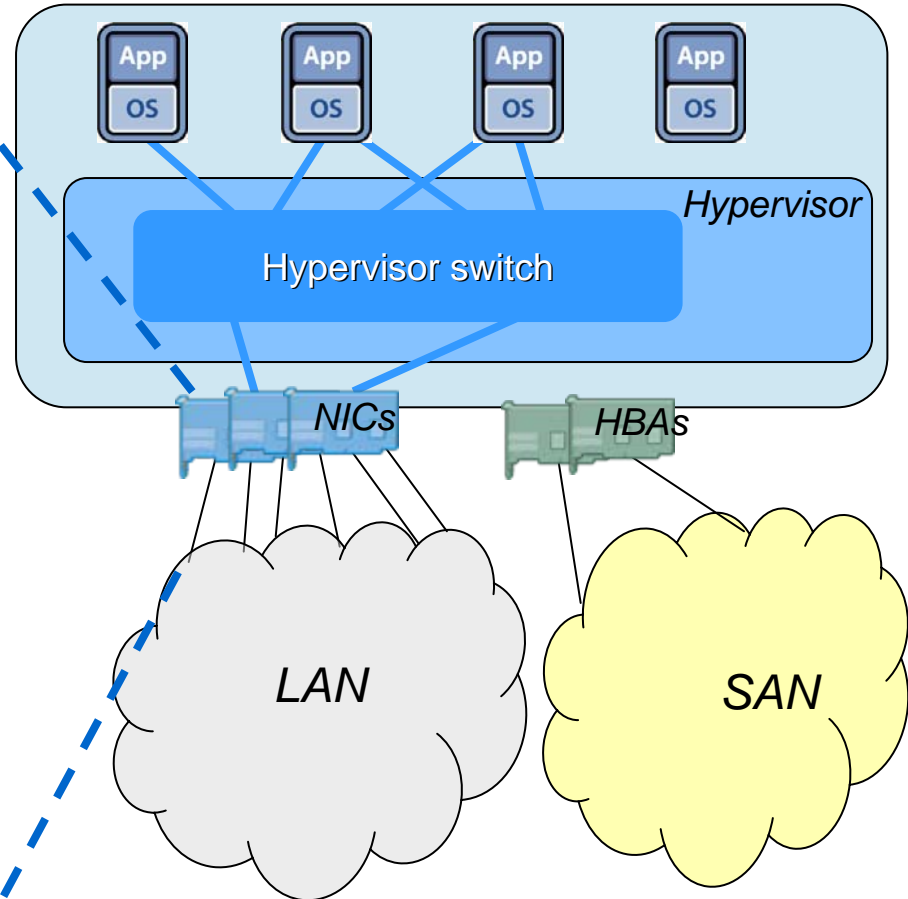
- SAN interfaces to share app data across multiple hosts
- Multiple distinct LAN interfaces to isolate and guarantee traffic for host console, VM/application data, Vmotion & backup

VM-aware, consistent policies; Maintain existing operations model (need for VN-LINK)

Cisco Solution

UCS Virtualized Adapter is the ONLY adapter that can consolidate multiple interfaces into a single physical adapter with HW VN-LINK support

- Distinct & isolated LAN & SAN interfaces with single adapter, allowing bandwidth reservations
- HW VN-LINK capability provides VM-awareness

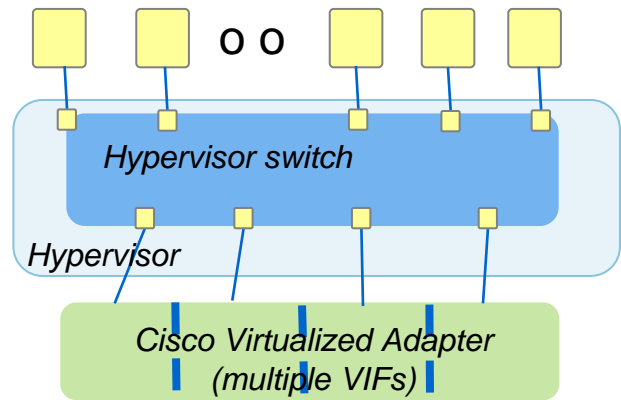


Deployment Options for Virtualized Environments

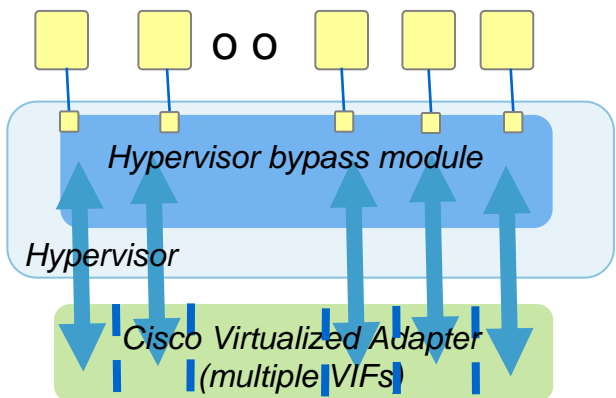
Two Options Available



Traditional Deployment



Pass Thru Switching (PTS) Deployment



What	Hypervisor switch uplinks connect to Cisco virtual interfaces (VIFs)	Each VM connects to a Cisco virtual interface (VIF)
Consistent Functionality	Hypervisor switch features applies to virtual servers Physical switch features applies to physical servers	Consistent switch (physical) features for both virtual and physical servers

Summary

Cisco Virtualized Adapter Solves Today's IO Challenges

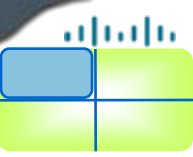
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Scale Applications without IO Restrictions

Capex & Opex Savings

Scalable Management –
centralize adapter
management thru Service
Profiles

Provides Fabric Failover - no
need for NIC teaming
certification for every OS

Deploy QoS to provide
application level traffic
engineering

Flexible - Create any number
& type of adapters (up to 128)
with a single physical adapter

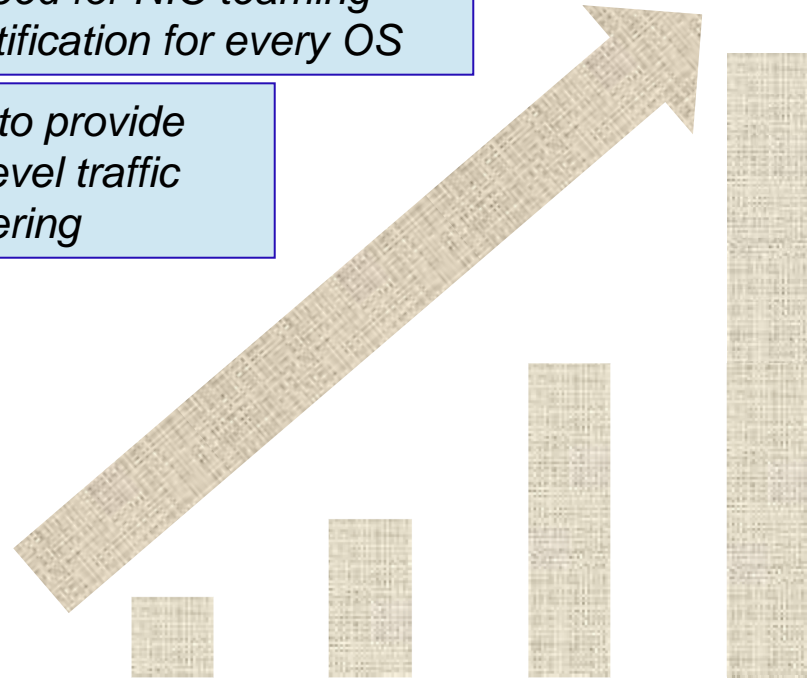
High Performance & Low Latency

Line rate IO performance

~500 KIOPs

~10 usec back-to-back latency with
standard OS stack

Hence, Applications are NOT gated by IO to scale
application performance



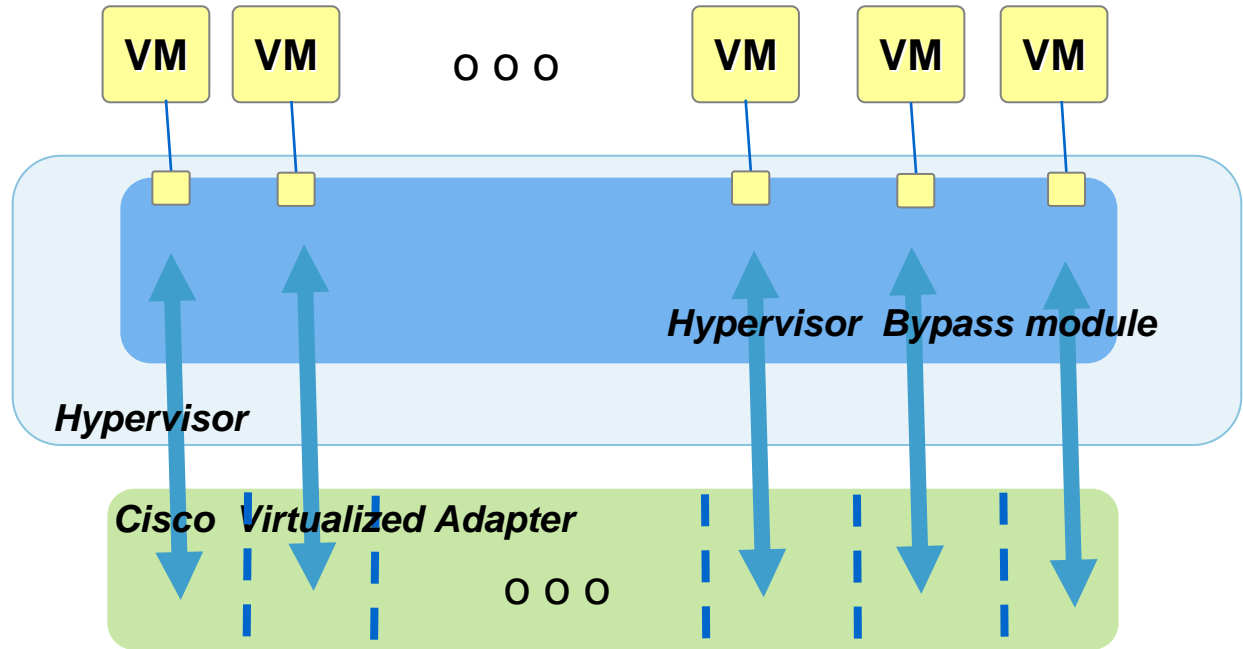
Optimize IO for Virtualized Environments

VM-Aware Networking w/o Disrupting Operational Model



Pass Thru Switching (PTS)

- Each VM vnic maps to a different virtual interface (VIF)
- IO to/from VM enters hypervisor bypass module... it passes thru to Cisco VIF (frees up CPU cycles)
- Allows consistent policies for VMs as well as physical servers
- Policies maintained during Vmotion



Cisco VN-Link: Virtual Network Link

Policy-Based VM Connectivity

Mobility of Network & Security Properties

Non-Disruptive Operational Model

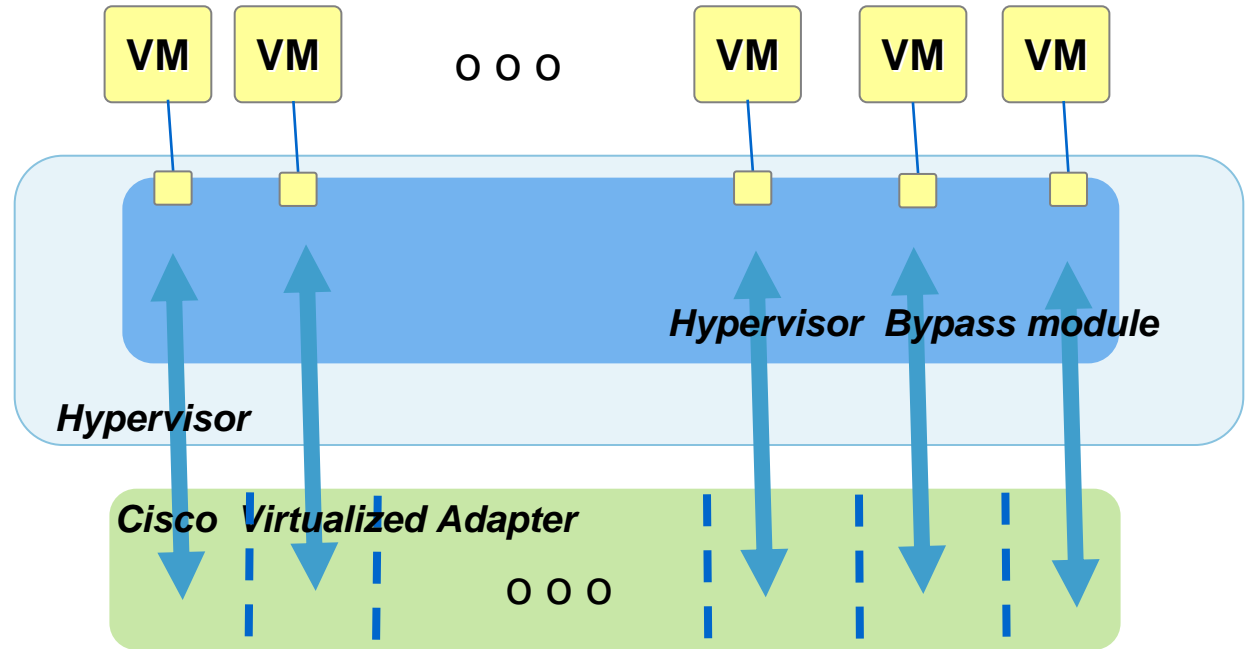
Optimize IO for Virtualized Environments

PTS Performance Advantage (TBD)



Performance #s from TMEs

- *PTS Performance*
- *UPT Performance*



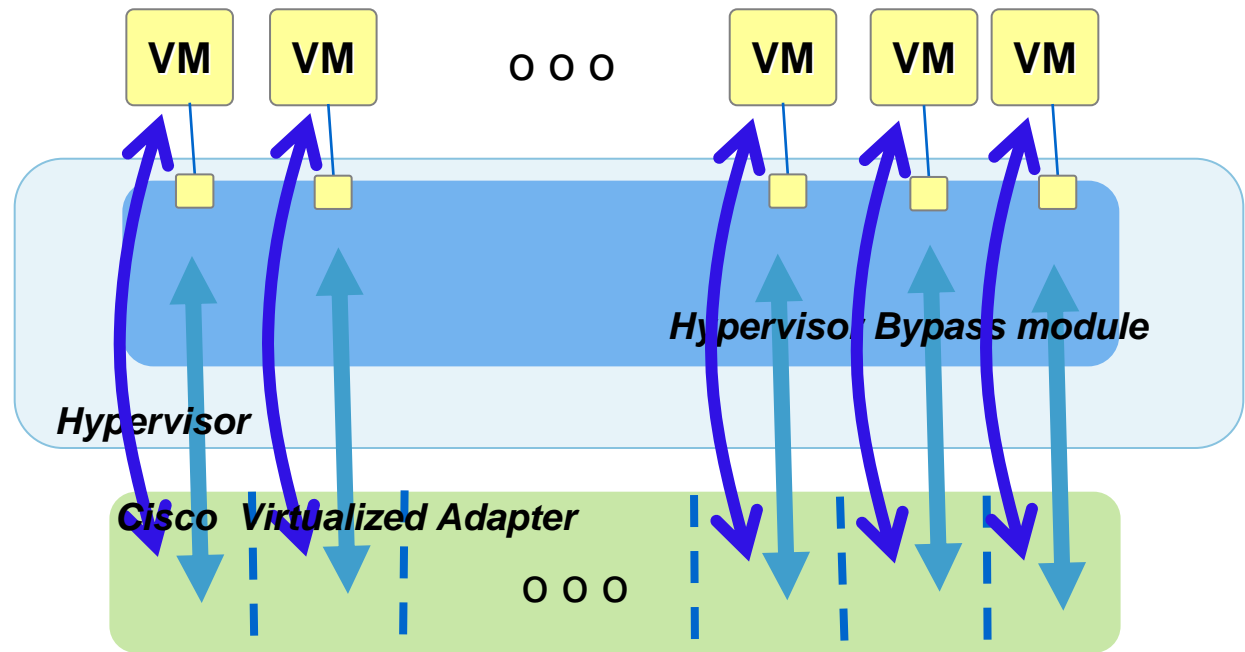


Optimize IO for Virtualized Environments

VM-Aware Networking w/o Disrupting Operational Model

Uniform Pass Thru (UPT) - Future

- Bypass of Hypervisor datapath... Guest OS Device Driver datapath talks directly to Cisco Virtualized adapter
- Much higher Performance (native HW performance)
- Vmotion allowed still ... control path thru hypervisor



Cisco VN-Link: Virtual Network Link

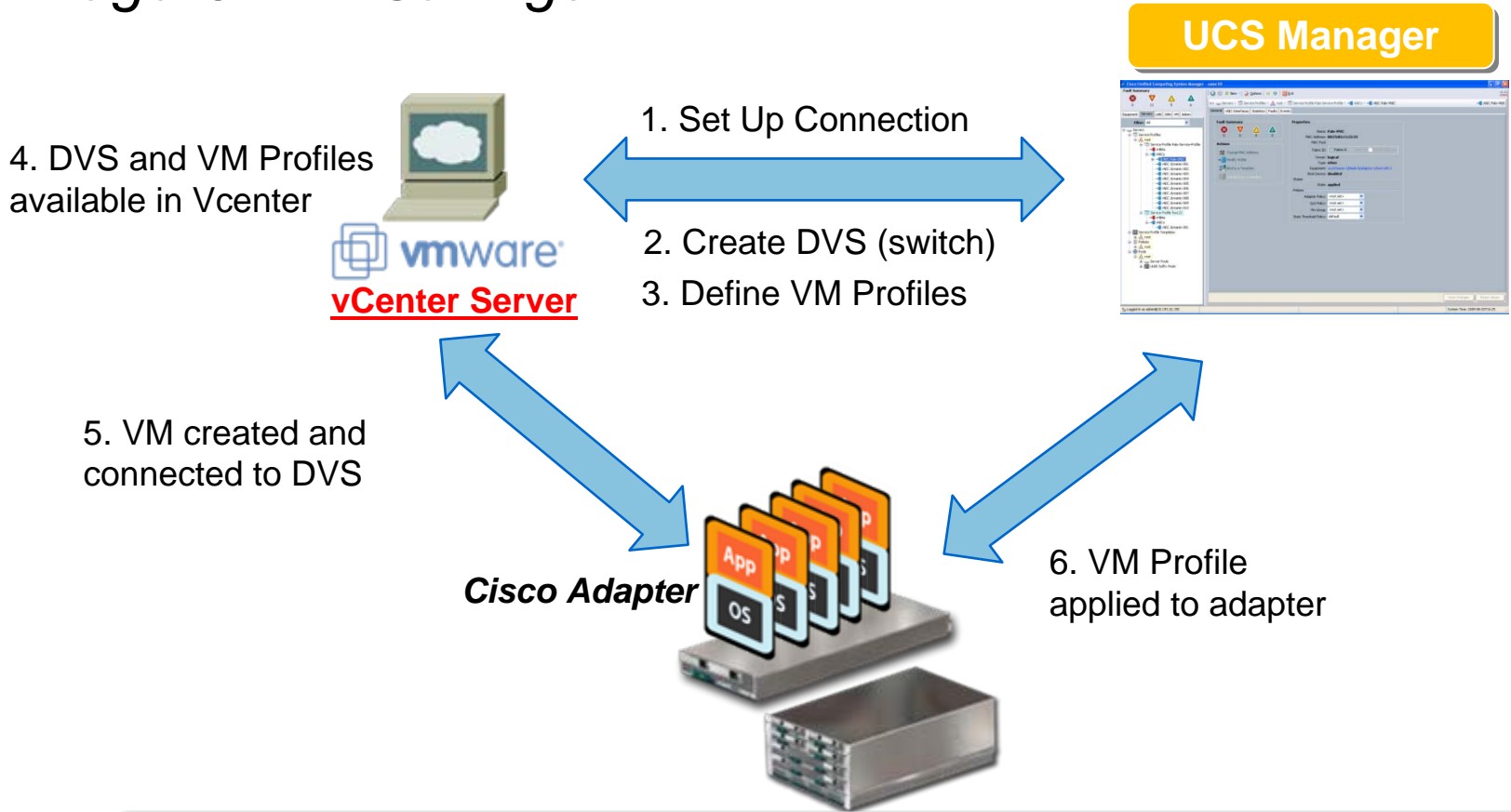
Policy-Based VM Connectivity

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Simplify Management and Facilitate Collaboration

Huge OPEX Savings

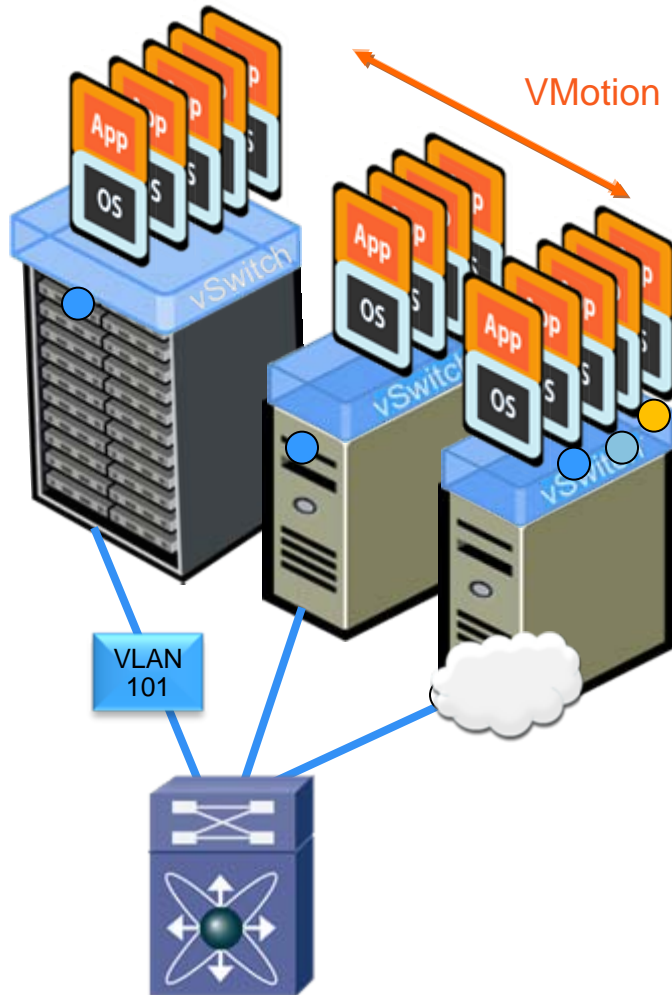


Cisco Virtualized Adapter Benefits

- Tight integration with hypervisor mgmt tool (e.g. vCenter)
- Network admin sets up network policies, server admin applies them – facilitate collaboration between groups
- Clear demarcation of responsibility between diff groups



VN-Link Brings VM Level Granularity



Problems:

- VMotion may move VMs across physical ports—policy must follow
- Impossible to view or apply policy to locally switched traffic
- Cannot correlate traffic on physical links—from multiple VMs

VN-Link:

- Extends network to the VM
- Consistent services
- Coordinated, coherent management