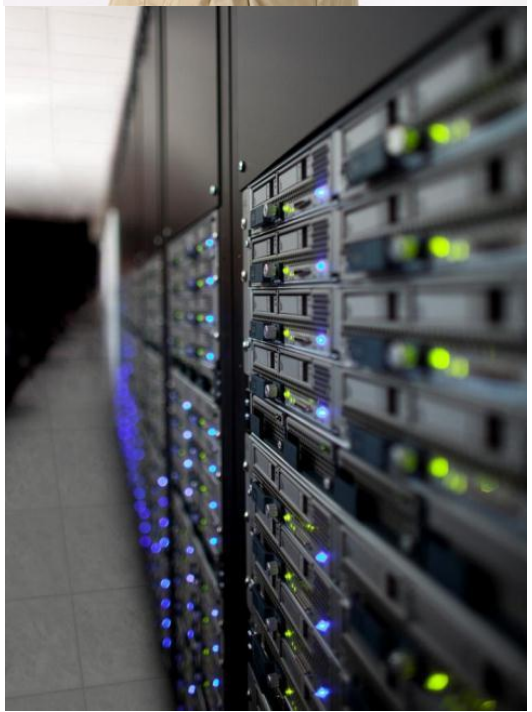
Cisco Connect

Seoul, Korea
March 28 – 29, 2013

x86컴퓨팅의 새로운 정의 Cisco UCS



강 동 환 부장

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Cisco Systems, Solution SE(DataCenter)

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Cisco Connect

cisco

Agenda

- 되돌아 보는 x86의 역사
  - 지난 30년간의 x86의 역사를 되돌아 보고 …
- FCoE (Fiber Channel over Ethernet)
  - I/O통합을 위한 혁신적인 FCoE기술을 살펴 봅니다.
- UCS, 그리고 혁신
  - x86 컴퓨팅을 새롭게 열어나가는 UCS의 혁신적인 기술들과 비전을 소개 합니다.
- 맺음말

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되돌아 보는 x86의 역사

IBM XT

IBM PC SERVER 500

Compaq Proliant

‘1980 ‘1990 ‘2000 ‘2010

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되돌아 보는 x86의 역사

4Mhz

CPU **x5,800**

23.2Ghz
(2.9Ghz * 8 Core)

1,024KB

MEMORY **x1,600**

16GB

10Mb

NETWORK **x1,000**

10Gb

1Gb

FC SAN **x8**

8Gb

‘1980 ‘1990 ‘2000 ‘2010

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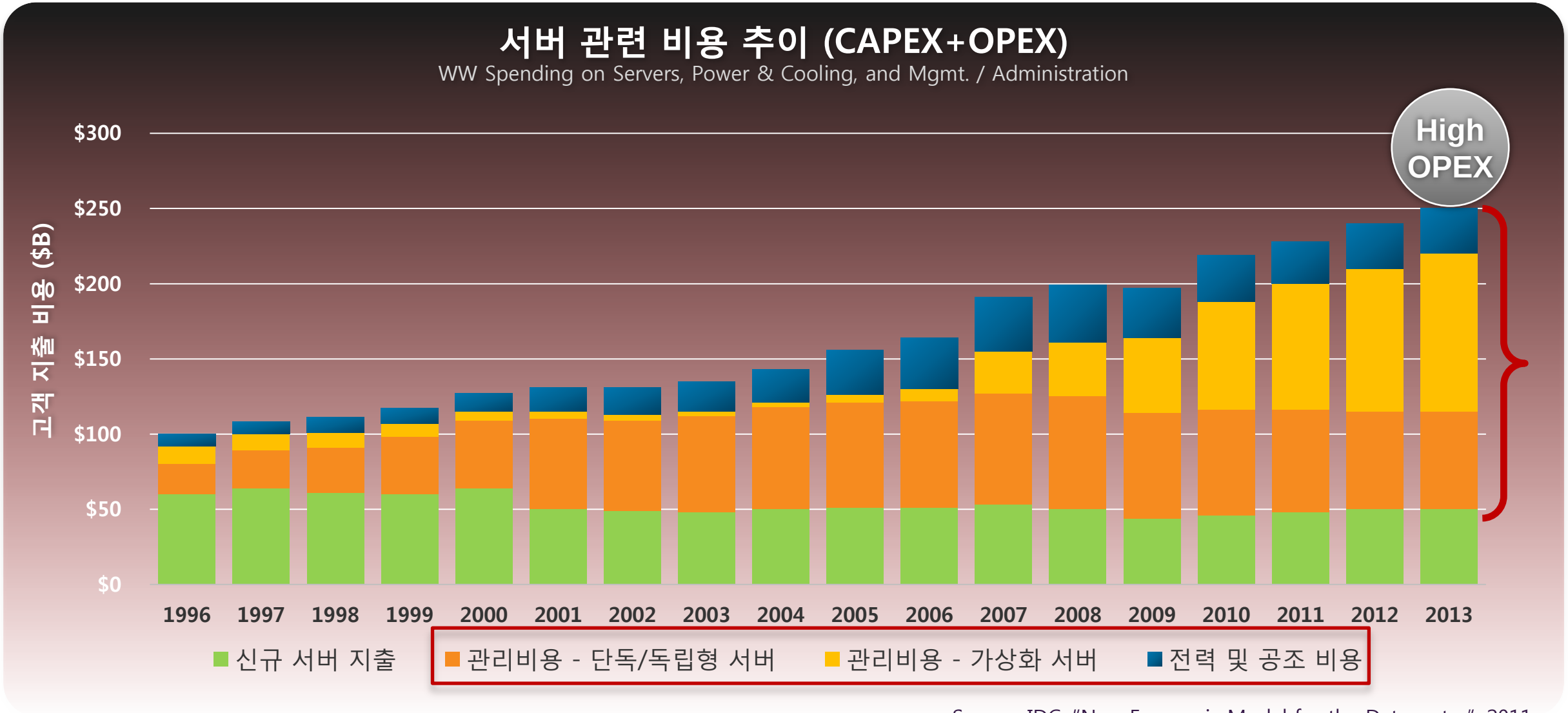
비용 관점에서 돌아본 서버



Source: IDC, "New Economic Model for the Datacenter", 2011

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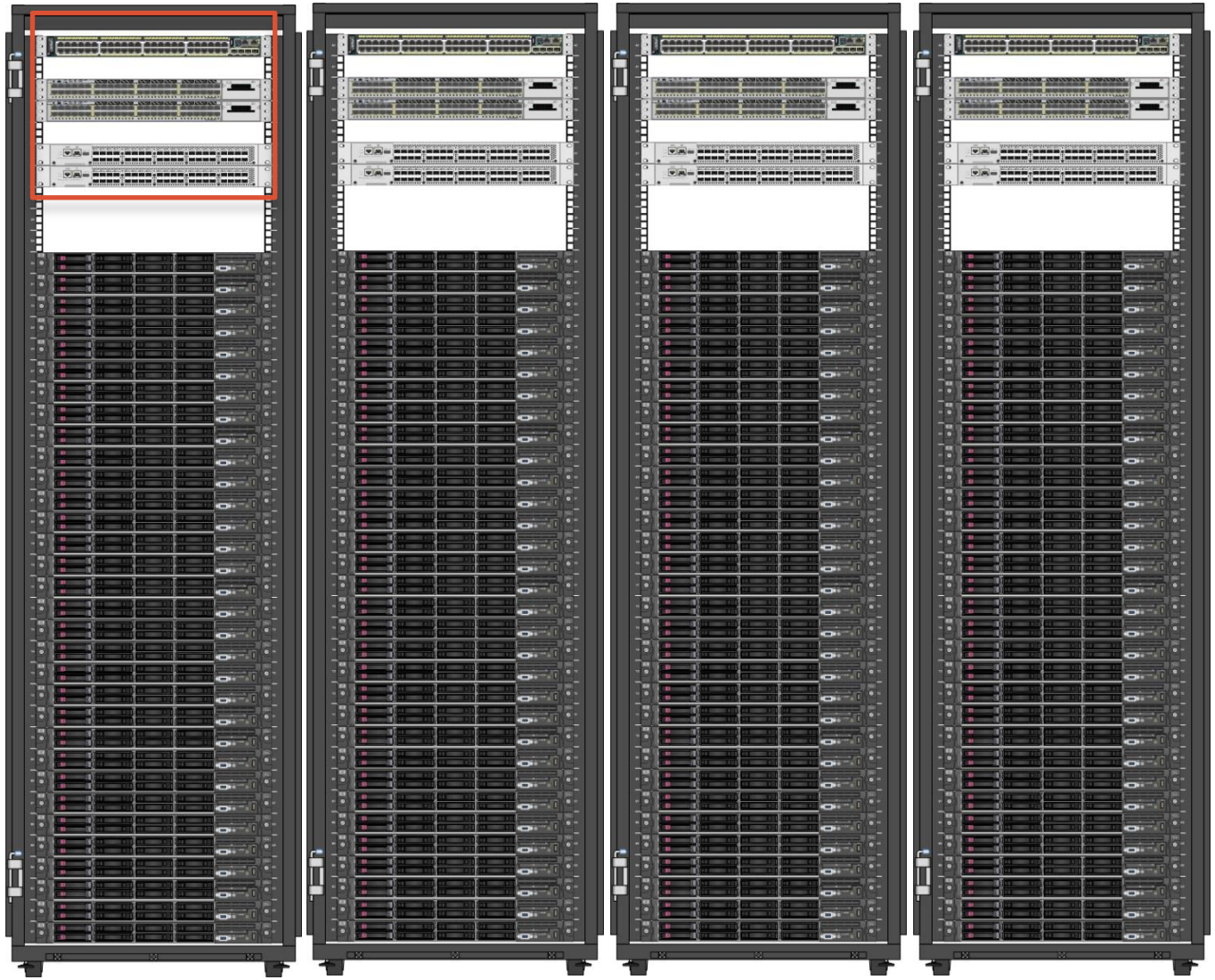
전통적인 DataCenter Rack 디자인



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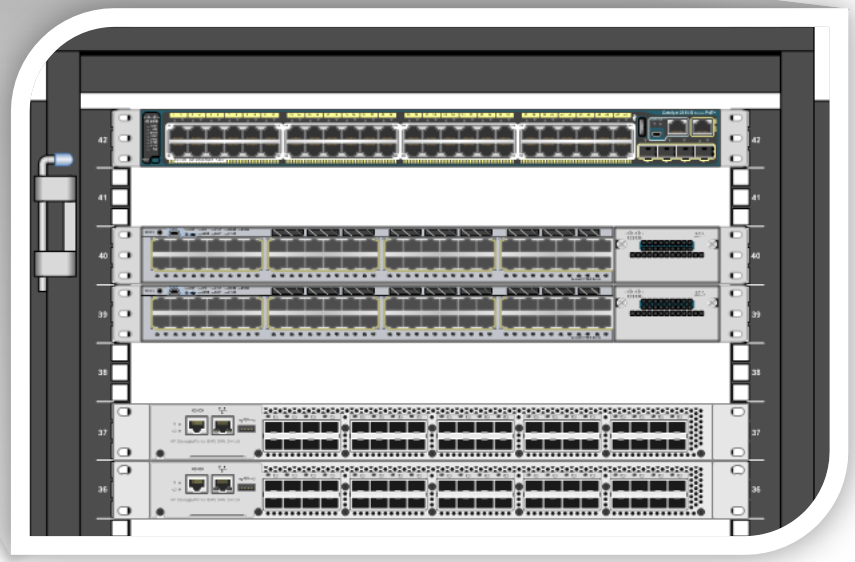
전통적인 DataCenter Rack 디자인



관리용(MGMT) 스위치
(48 Port)

Ethernet 스위치
(이중화, 48 Port)

FC SAN 스위치
(이중화, 48 Port)

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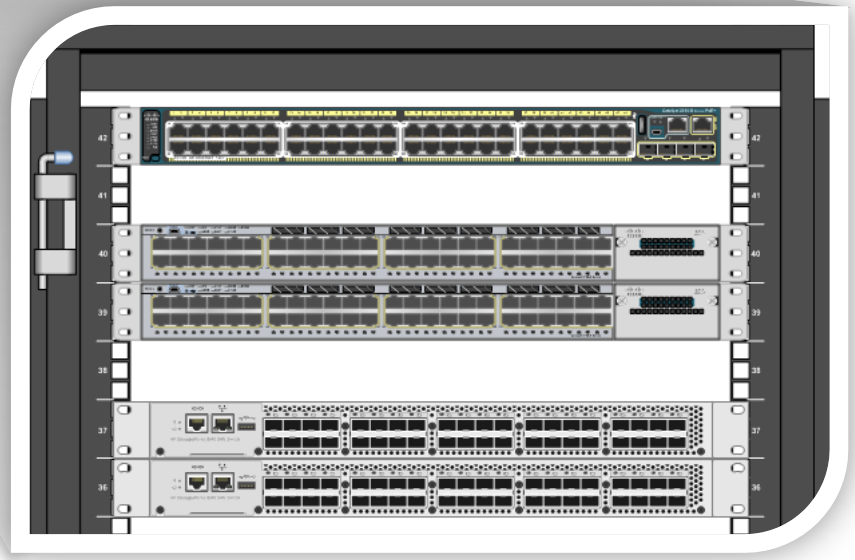
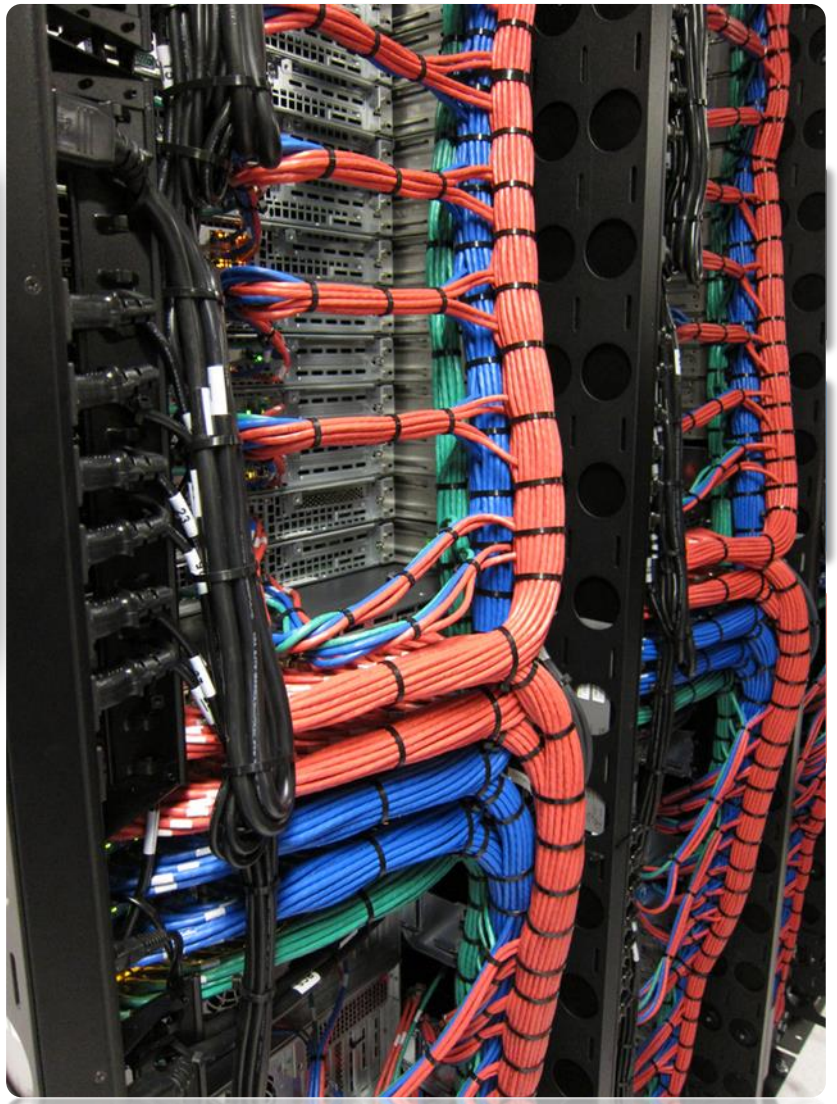
전통적인 DataCenter Rack 디자인





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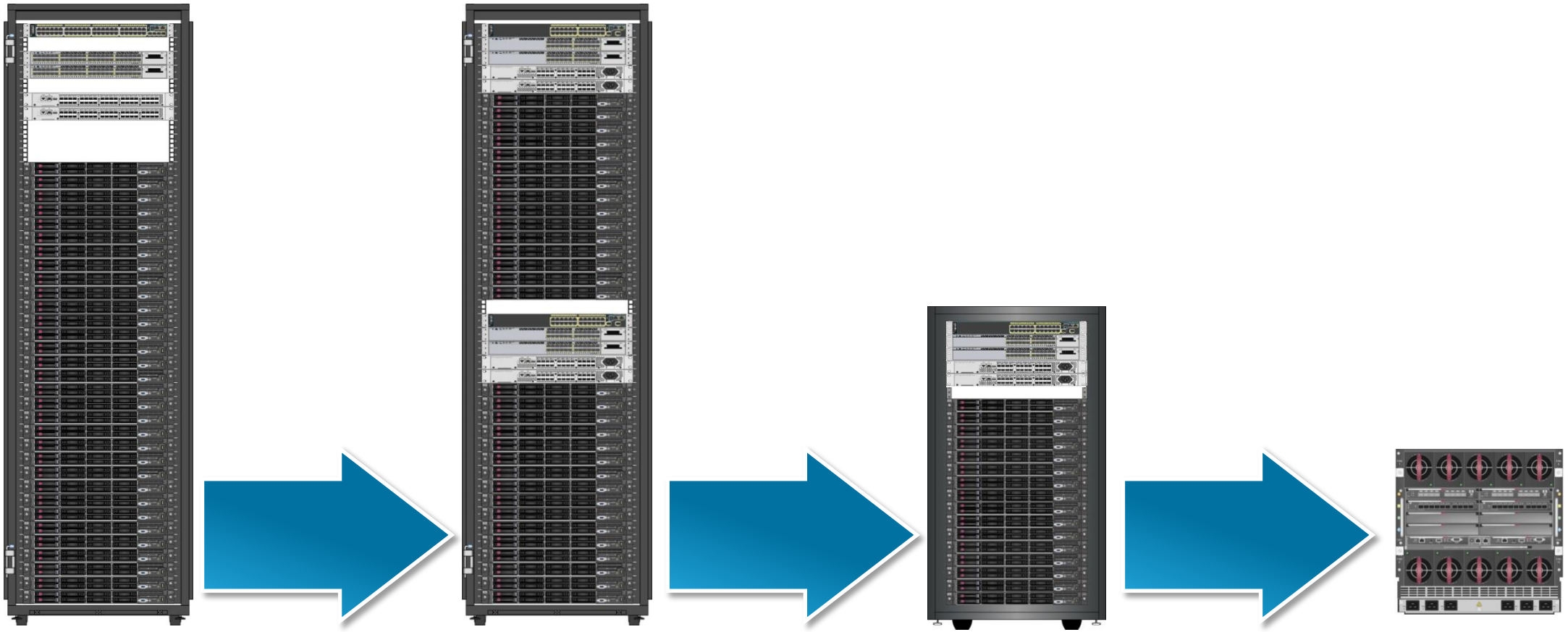
Blade서버, 어떻게 탄생 하였나요?



Full-Rack Design

5:32

Half-Rack Design

5:16

Mini-Rack Design

5:16

Blade Design

6:16

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"30년이 넘은 x86의 역사 속에서 과연 혁신이 있었을까요?

혁신 없는 발전만 해 온 것은 아닐까요?

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Fiber Channel over Ethernet (FCoE)

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서버 네트워킹의 핵심

LAN

SAN

Ethernet Frame/IP Packet
송신자 중심의 아키텍처
Data/NFS/CIFS/iSCSI

Fiber Channel Frame
수신자 중심의 아키텍처
FC SAN

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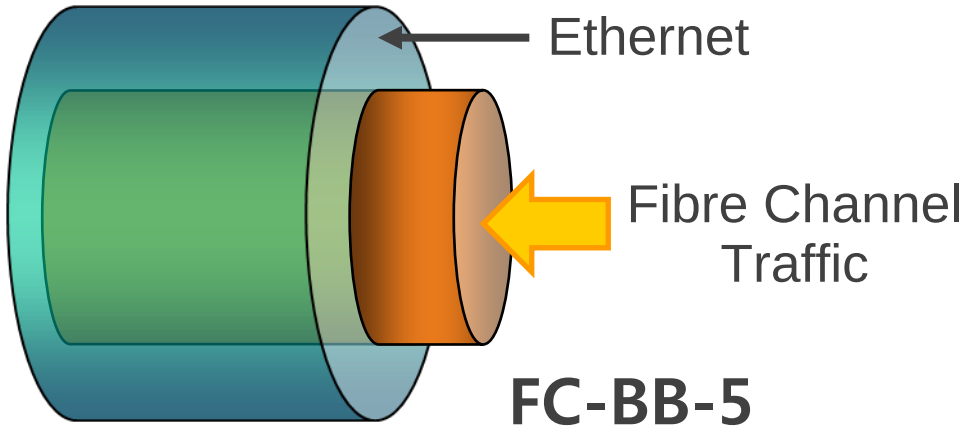
FCoE가 무엇인가요?

FC 프레임을 Ethernet에 매핑



- 완벽한 FC 모델 기반
- FC와 동일한 메카니즘
- WWN, FC-ID, Zoning, RSCN

FCoE 는 Fibre Channel

cisco, DELL, EMC² where information lives, EMULEX We network storage, hp, IBM, Microsoft, NetApp, Novell, QLOGIC, redhat, vmware

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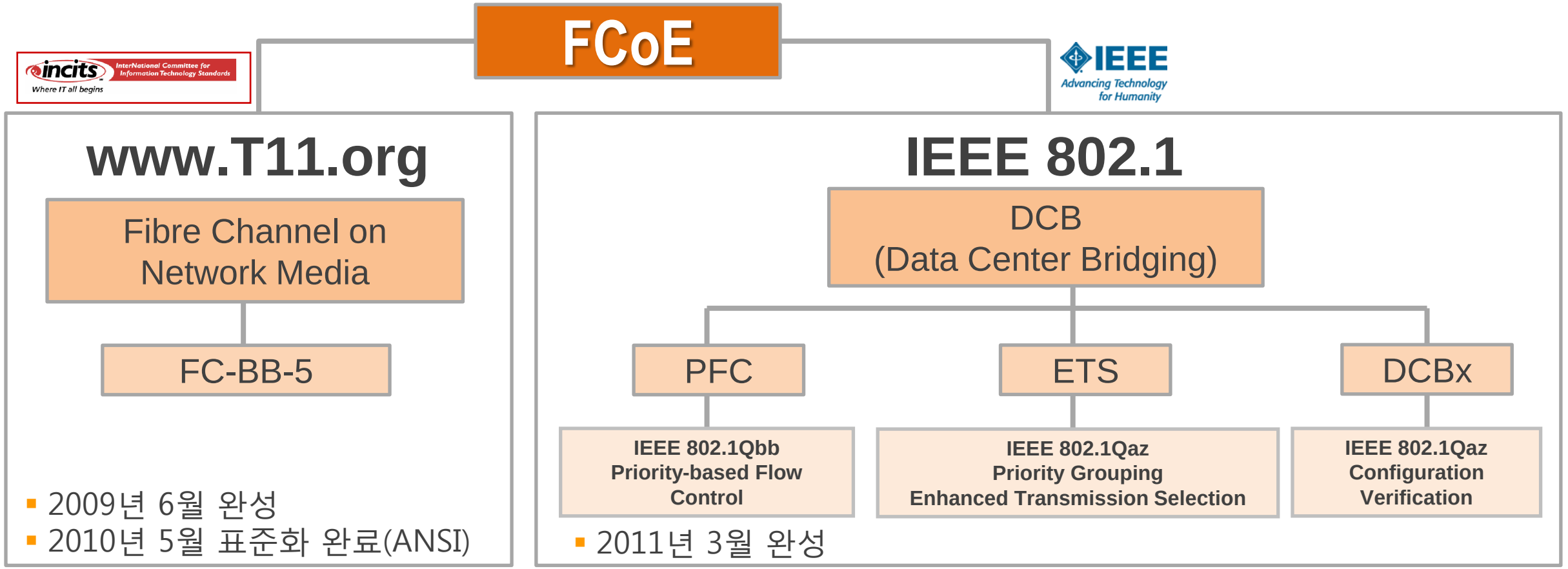
FCoE는 표준 프로토콜 인가요?



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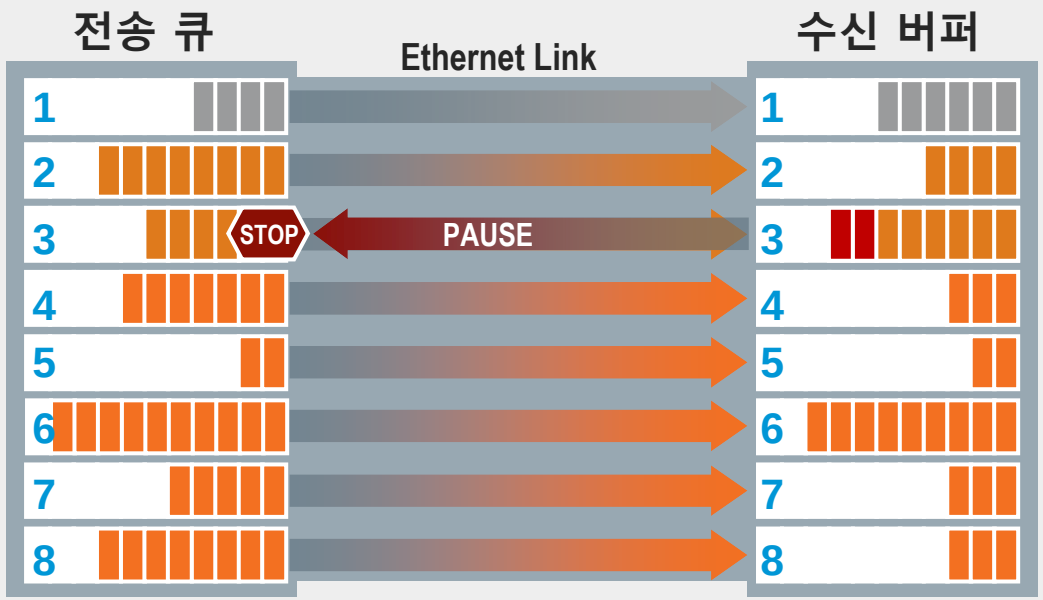
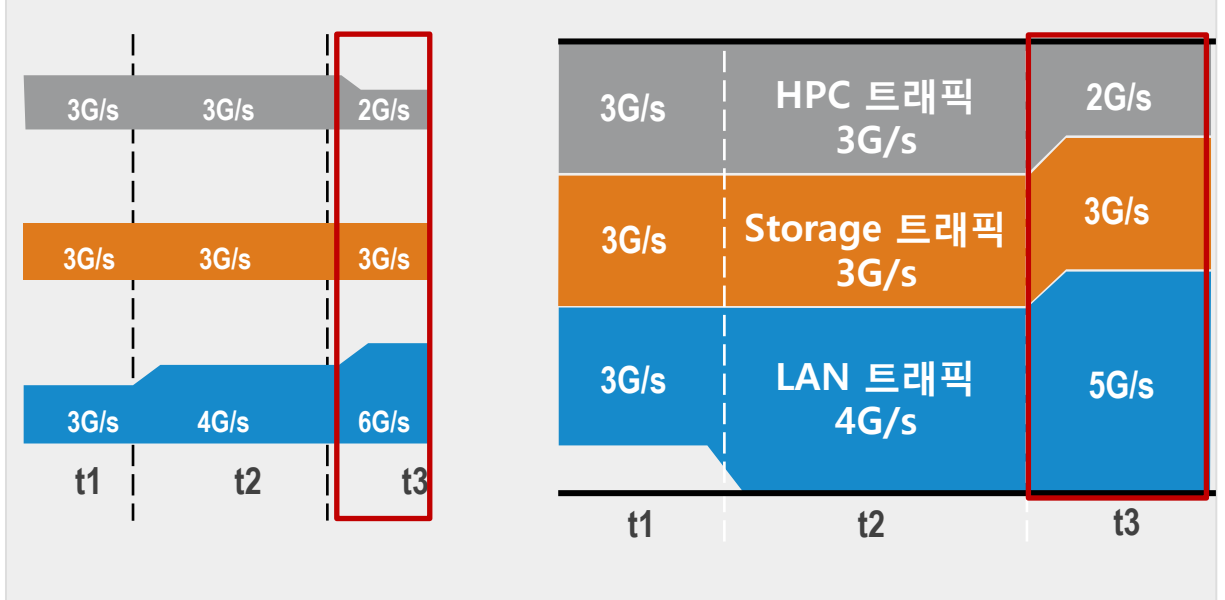
FCoE, 안정적인가요?

Priority-based Flow Control-PFC (IEEE 802.1Qbb)



Bandwidth Management (IEEE 802.1Qaz)



- 802.1Q Tag의 Priority Field 기반 (3bit)
- 8개의 서로 다른 Priority를 가지는 Virtual Link별로 PAUSE Frame 처리

- HPC 트래픽 – 우선순위 “High”—20% 대역폭 보장
- Storage 트래픽 – 우선순위 “High”- 30% 대역폭 보장
- LAN 트래픽 – 우선순위 “Medium” - 50% 대역폭 보장

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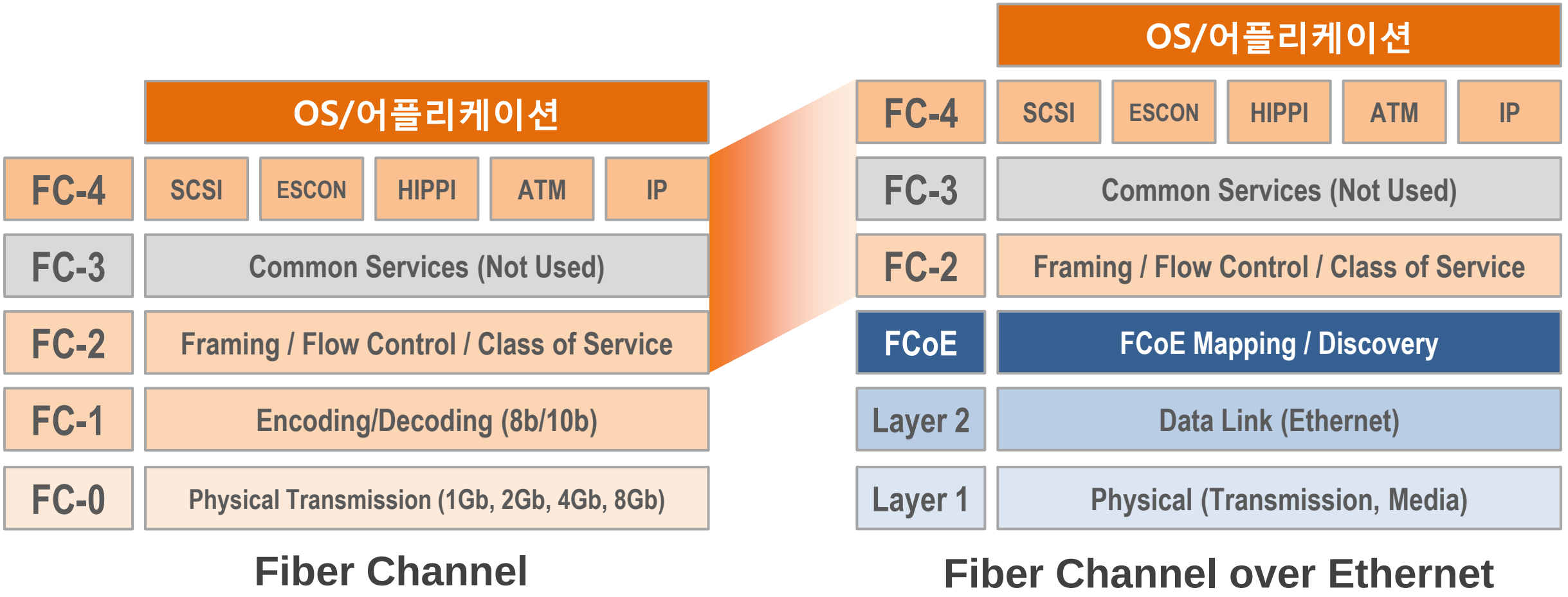
FCoE, FC와 무엇이 다른가?



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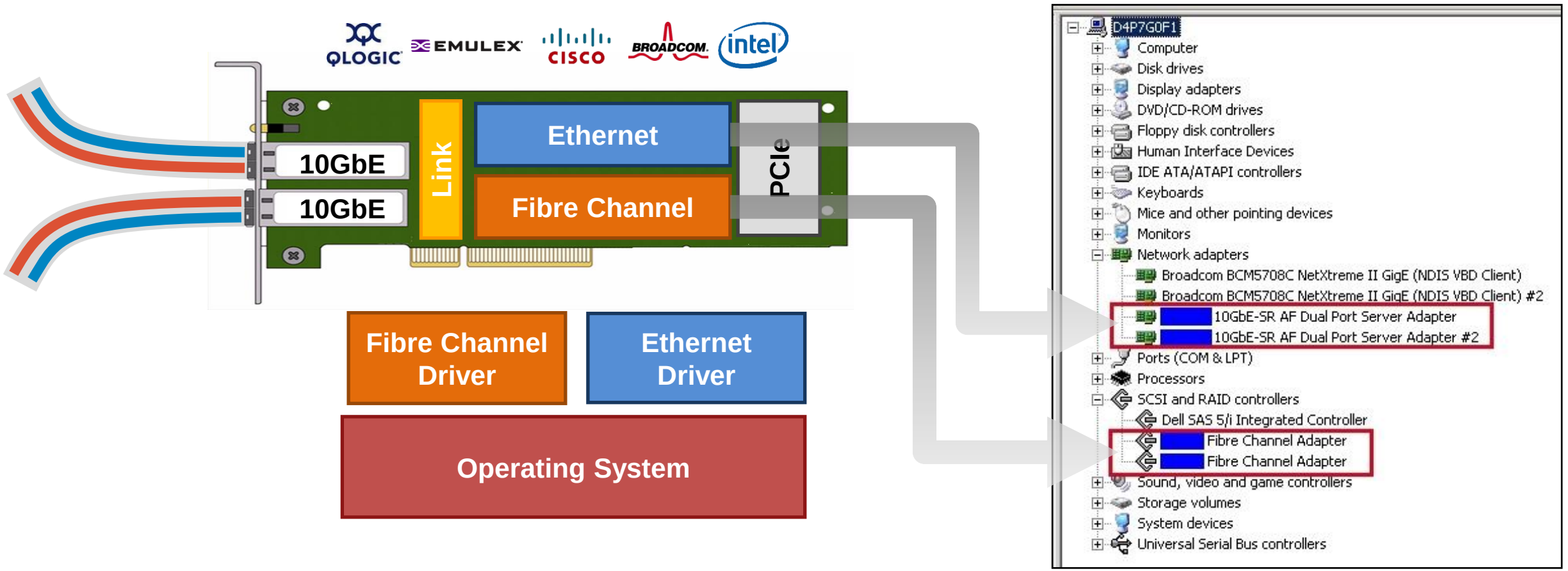
Ethernet과 FC를 하나로, CNA



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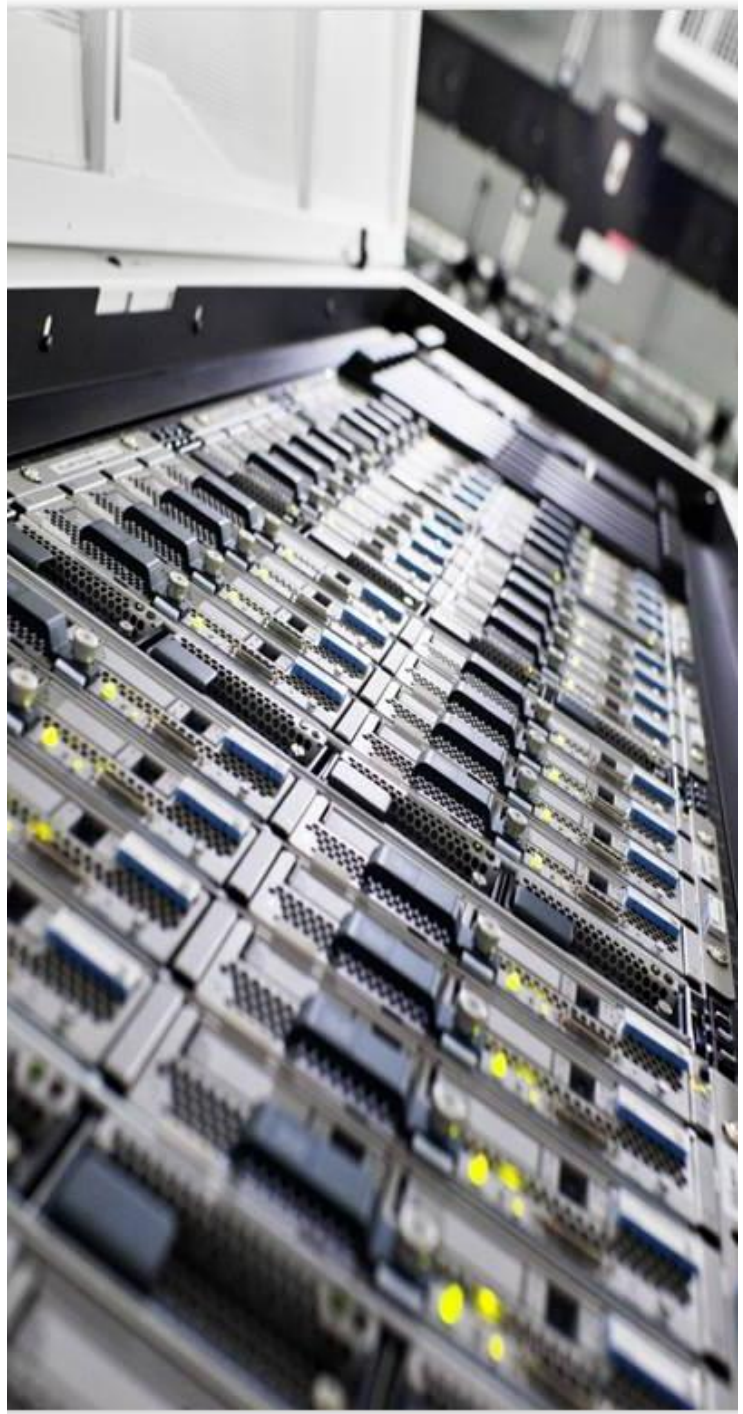
UCS, 그리고 혁신



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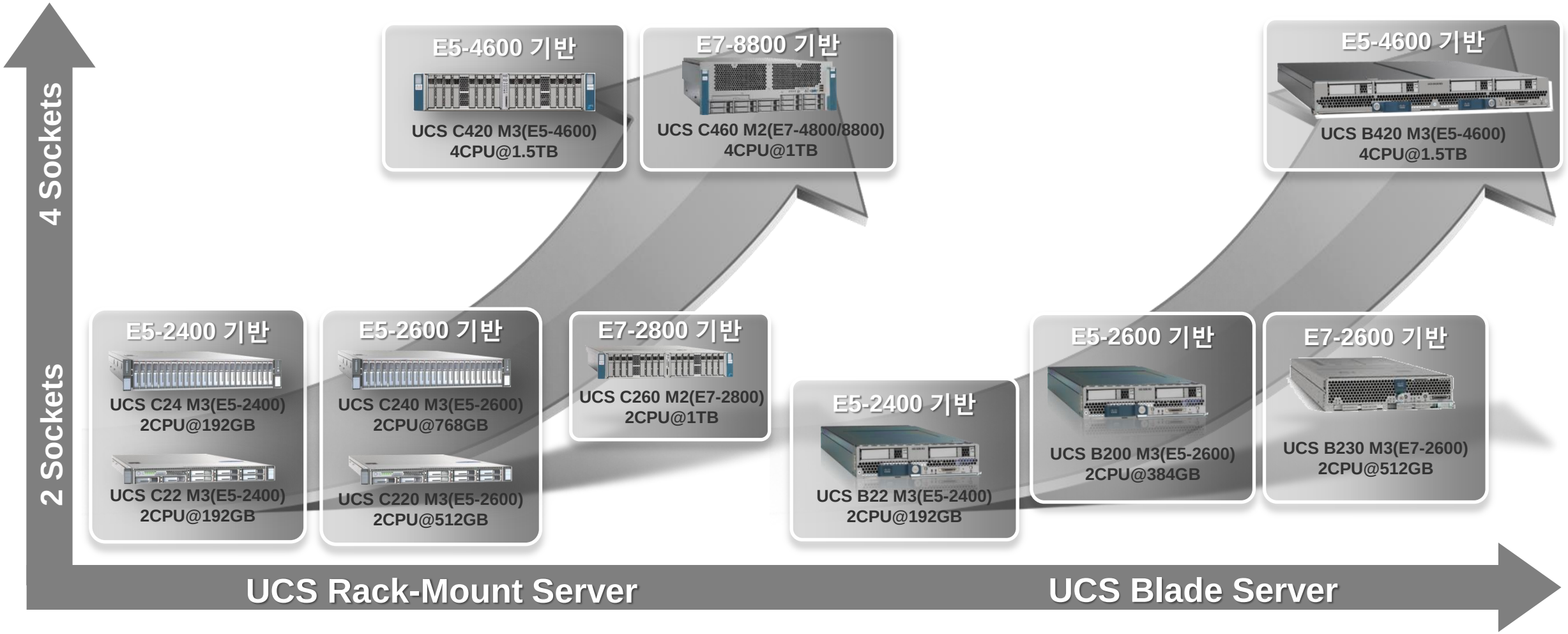
UCS 서버 제품군



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Cisco의 Computing Vision

LAN/SAN,
관리네트워크의 통합
패브릭

단 한번의
케이블링으로
지속적인 사용

단순한 구성 요소

Stateless 컴퓨팅 환경
(서버 구성 정보와
H/W의 완벽한 분리)

물리적 환경 및 가상화
환경에 대한 통합 관리

자동화를 위한 관리
체계 및 인터페이스

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UCS, 어떻게 구성 되나요?

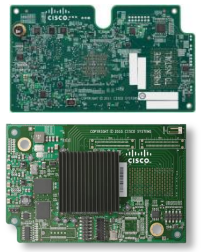
UCS

Chassis

Server Module

Fabric Interconnect

FEX(IOM)



VIC

UCS Manager

- 혁신적인 아키텍처
- FCoE기반의 Unified Fabric/Network
- 높은 백플레인 개방률(63%)
- Service Profile을 통한 하드웨어 추상화 기능

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UCS, 어떻게 구성 되나요?

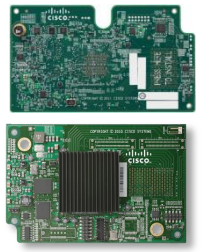
UCS

Chassis

Server Module

Fabric Interconnect

FEX(IOM)



VIC

UCS Manager

- 업계를 주도하는 높은 성능과 수많은 World-Record
- Unified Computing지원
- 다양한 폼팩터 제공(Half/Full Size Blade)

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UCS, 어떻게 구성 되나요?

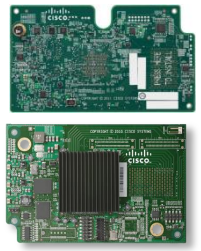
UCS

Chassis

Server Module

Fabric Interconnect

FEX(IOM)



VIC

UCS Manager

- 높은 성능과 확장성 제공
- 저지연(Low-Latency), 다목적 10Gb Ethernet 기반 Fabric(FCoE 및 Unified Port 지원)
- 데이터센터 네트워크 통합 (LAN, SAN, MGMT)

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UCS, 어떻게 구성 되나요?

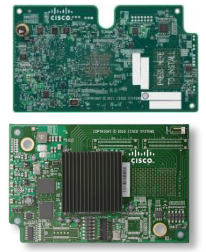
UCS

Chassis

Server Module

Fabric Interconnect

FEX(IOM)



VIC

UCS Manager

- FCoE기반 데이터센터 네트워크 통합
- 단순한 연결(10GBASE)
- 확장된 대역폭(80Gb, 160Gb)

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UCS, 어떻게 구성 되나요?

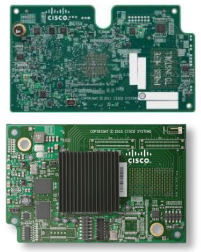
UCS

Chassis

Server Module

Fabric Interconnect

FEX(IOM)



VIC

UCS Manager

- FCoE기반 NIC와 HBA를 통합
- VN-Link 기반의 가상화 인지 네트워크 기능 제공
- 40Gb/80Gb의 높은 성능
- Pass-Through 스위칭 및 Hypervisor by-pass 지원

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UCS, 어떻게 구성 되나요?

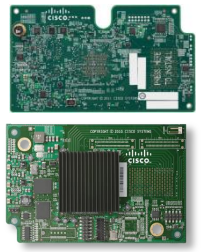
UCS

Chassis

Server Module

Fabric Interconnect

FEX(IOM)



VIC

UCS Manager

- 단일 관리 도메인 환경 제공 (160대)
- 서버, 스토리지 및 네트워크에 대한 동적인 프로비저닝 기능
- Service Profile을 통한 “Stateless” 컴퓨팅 환경 제공

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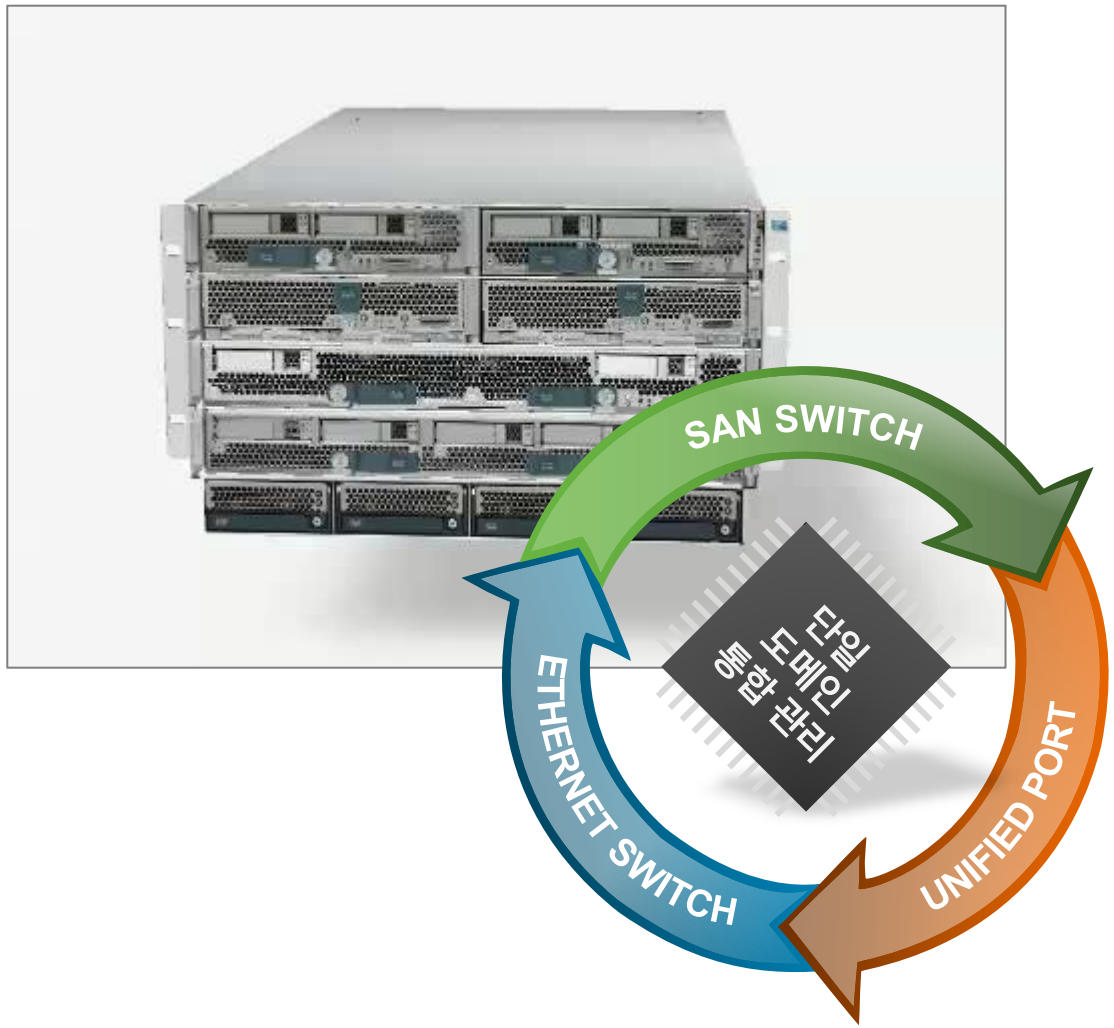
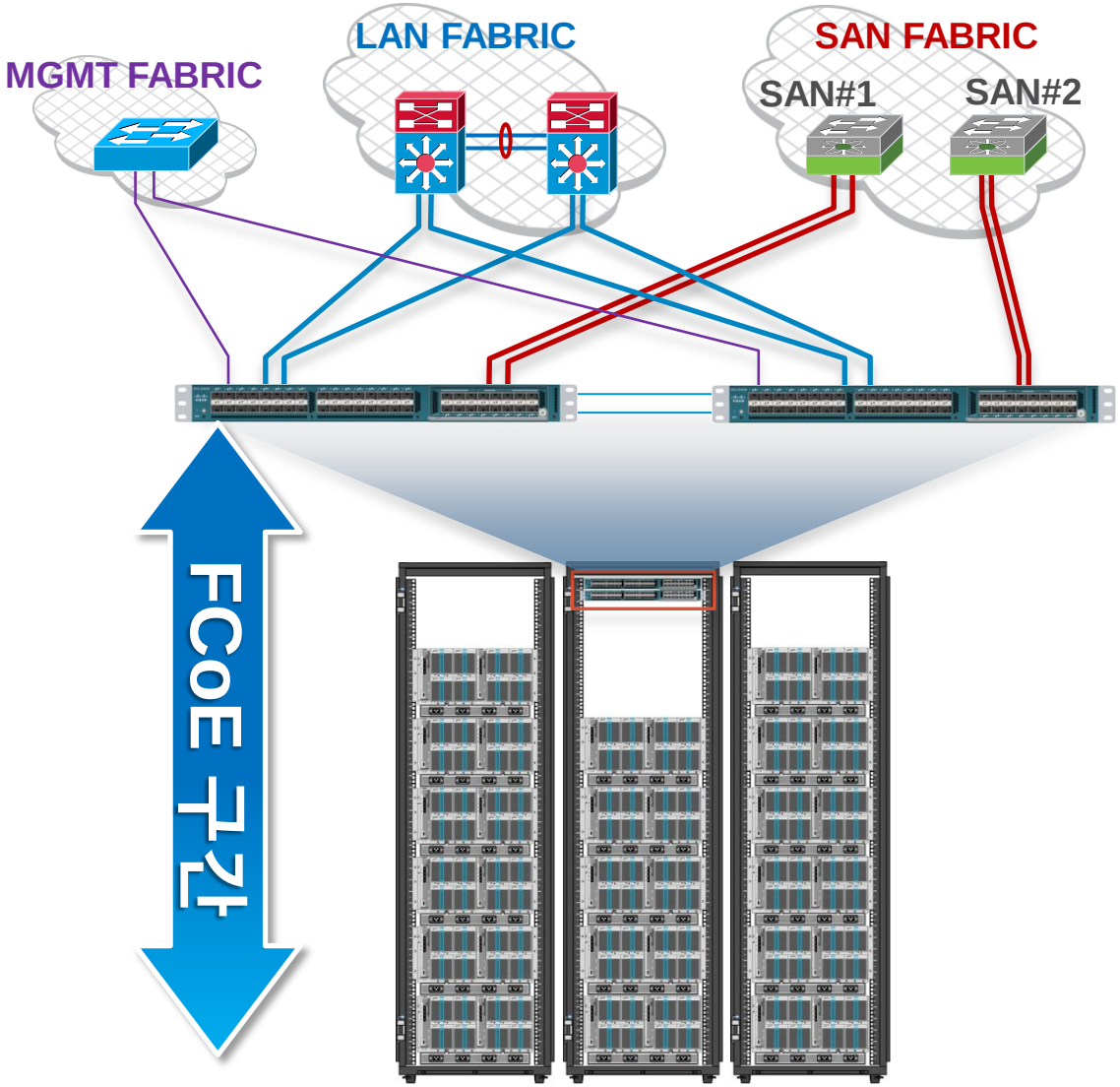
UCS Fabric Interconnect의 정체





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UCS IOM과 VIC

- Fabric Interconnect의 Remote Line Card (Fabric Extender, FEX)
- IOM당 40Gb/80Gb의 대역폭
- FCoE기반의 LAN/SAN 통합

- mLOM 및 Mezz. 형태의 VIC
- VIC당 40Gb 또는 80Gb의 대역폭
- FCoE기반의 LAN/SAN 통합 및 PCIe 인터페이스 가상화 지원

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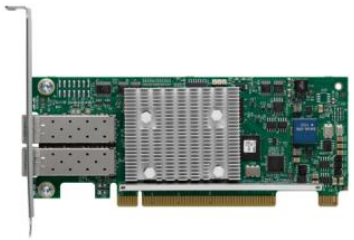
I/O 가상화, VIC로 실현하다

	Cisco VIC 1240	Cisco VIC 1280	Cisco VIC 1225
			
PCI 규격	PCIe Gen2 x 16 (64Gbps, 8GB/Sec)	PCIe Gen2 x 16 (64Gbps, 8GB/Sec)	PCIe Gen2 x 16 (64Gbps, 8GB/Sec)
Embedded CPU	3 @ 675 MHz	3 @ 675 MHz	3 @ 675 MHz
Uplinks	2 x 2 x 10GE(40Gb)	2 x 4 x 10GE (80Gb)	2 x 10GE
가상 인터페이스	***256***	***256***	***256***
Ethernet 인터페이스	0-256	0-256	0-256
FC 인터페이스	0-256	0-256	0-256
Failover 처리	**하드웨어 지원**	**하드웨어 지원**	**하드웨어 지원**
폼팩터	Modular LOM	Mezzanine	PCIExpress 2.0 x16
Network 처리량	40-80* GB	80 GB	20 GB

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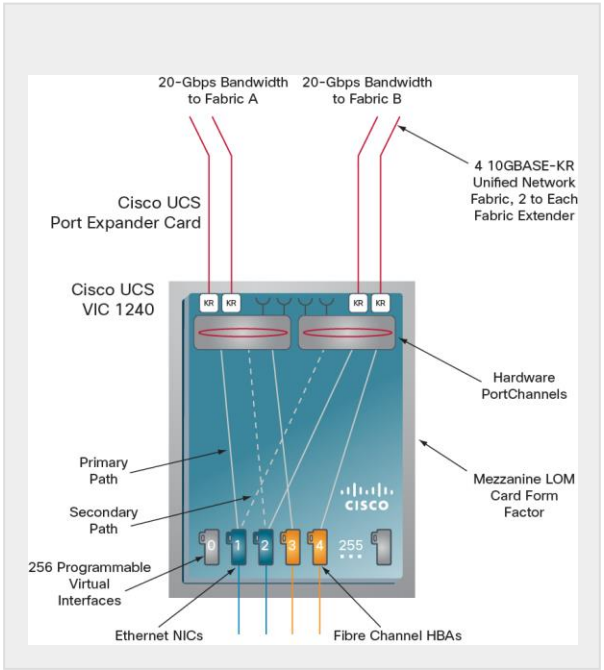
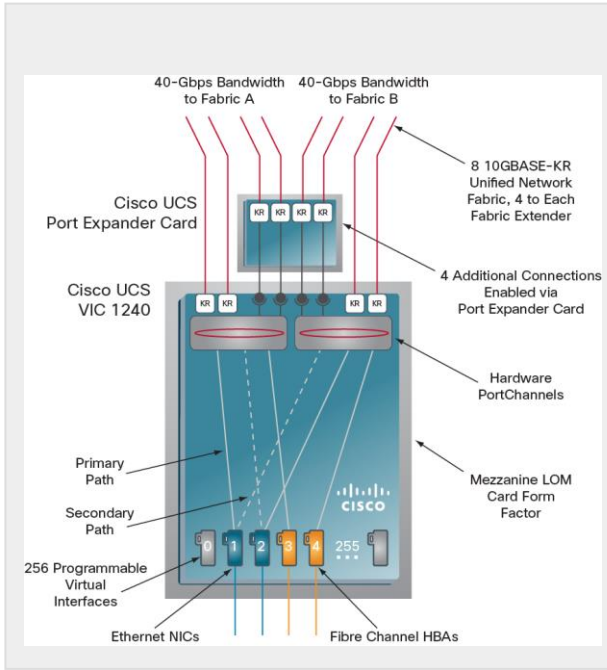
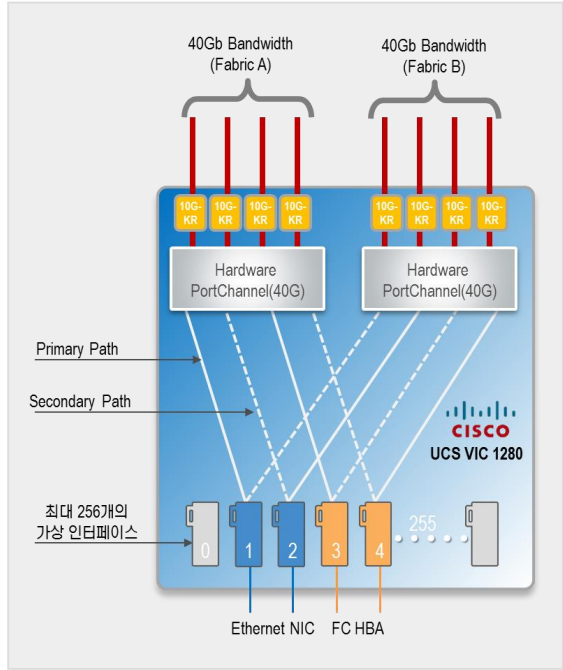


UCS VIC 1240 mLOM (40Gb)



UCS VIC 1240 + Port Expander (80Gb)



UCS VIC 1280 (80Gb)

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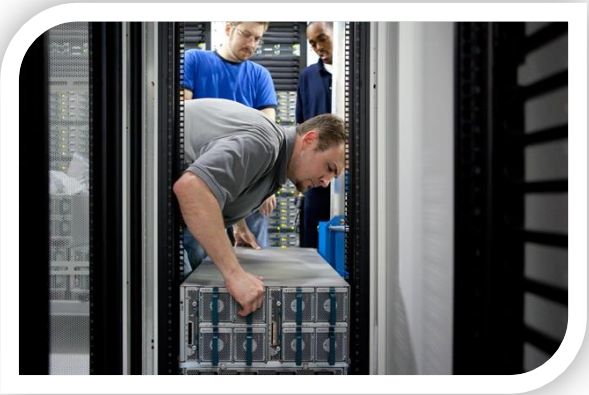
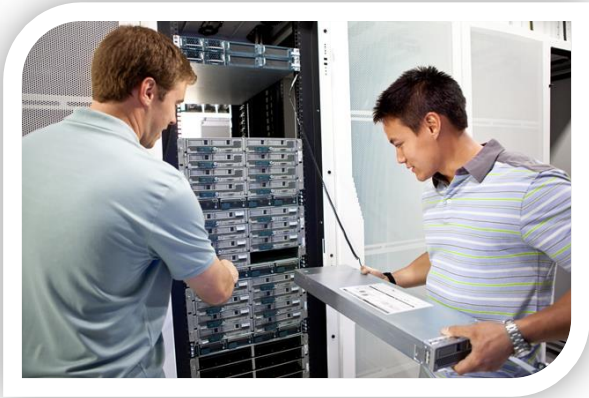
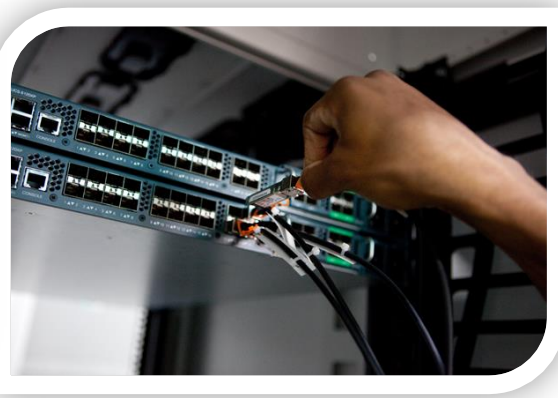
UCS, 정말 단순한가요?



샤시를 설치하고



서버 모듈을 장착하고



Fabric Interconnect와 IOM을 연결하면 끝!

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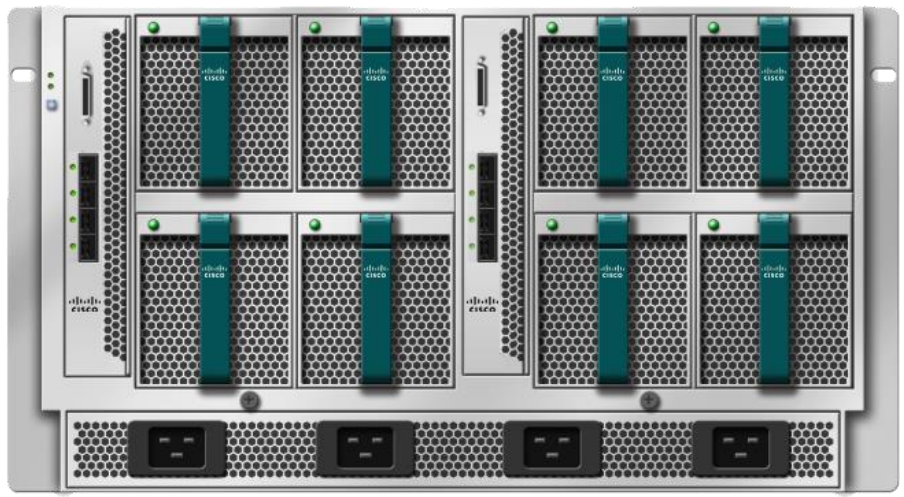
시스템 설계의 핵심 사상

어떻게 하면 많은 I/O모듈을 집어 넣을 수 있을까?

냉각…? 팬을 많이 달고 빨리 돌리면 되지 뭐…



어떻게 하면 I/O를 단순하게 할 수 있을까?

효율적인 냉각을 위해 높은 백플레인 개방률을 제공해야 해!

x86 아키텍처는 혁신이 필요해!

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UCS 2104XP
FAN STATUS
FAN 1
FAN 5
FAN 2
FAN 6
FAN 3
FAN 7
200-240V~

"x86서버 관리,
이대로 좋으신가요?

수십,수백대의 서버,
일관성 있게 잘 관리하고 계신가요?

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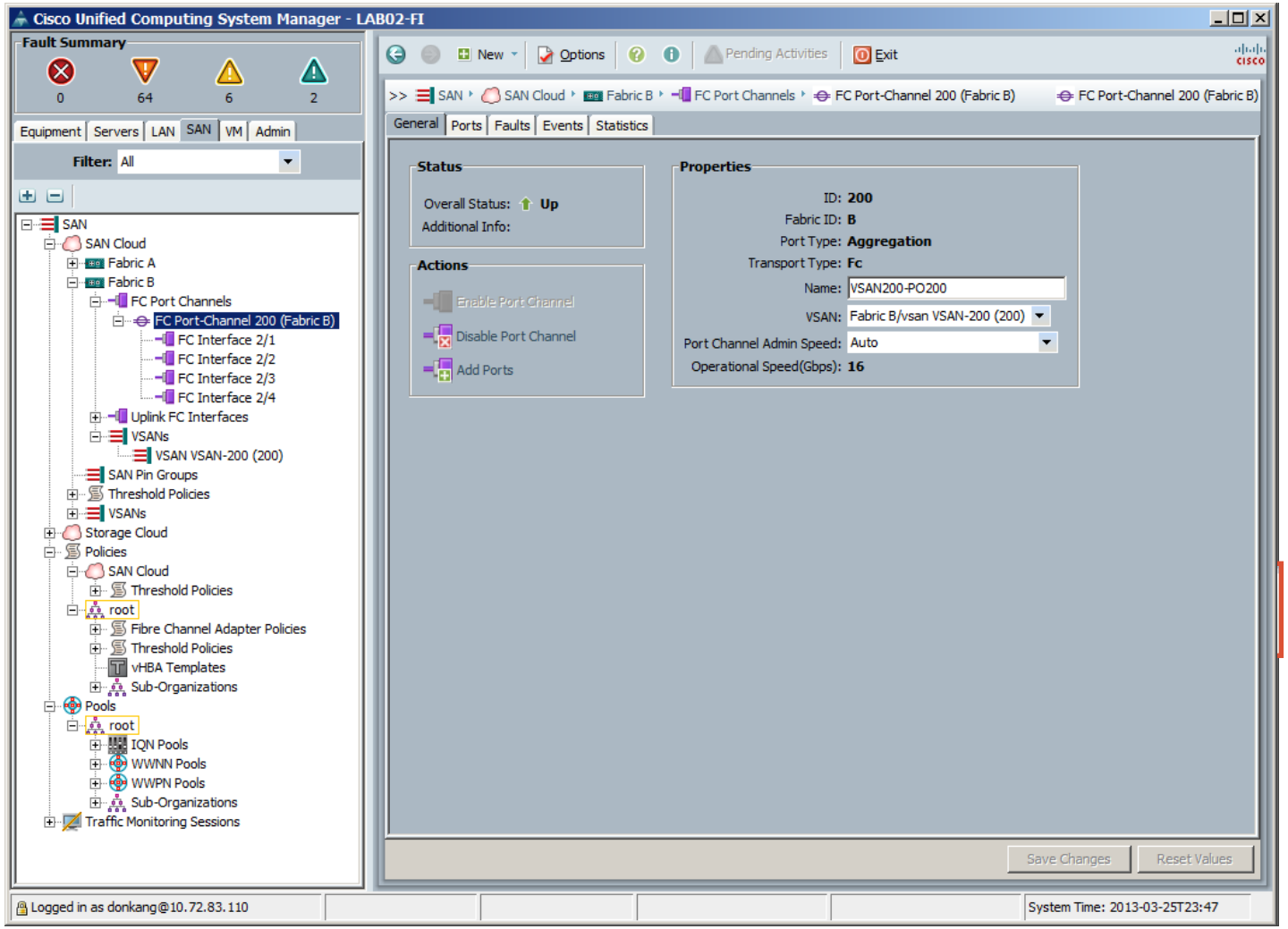
UCS Manager, 얼마나 강력한가?



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x86 서버의 관리에 대한 개념을 바꾸다!

- Number of vHBAs
- HBA WWN assignments
- FC Boot Parameters
- HBA Firmware

- RAID settings
- Disk scrub actions
- RAID Controller Firmware
- Disk Firmware

- Remote KVM IP Settings
- Call Home behavior
- Remote KVM Firmware

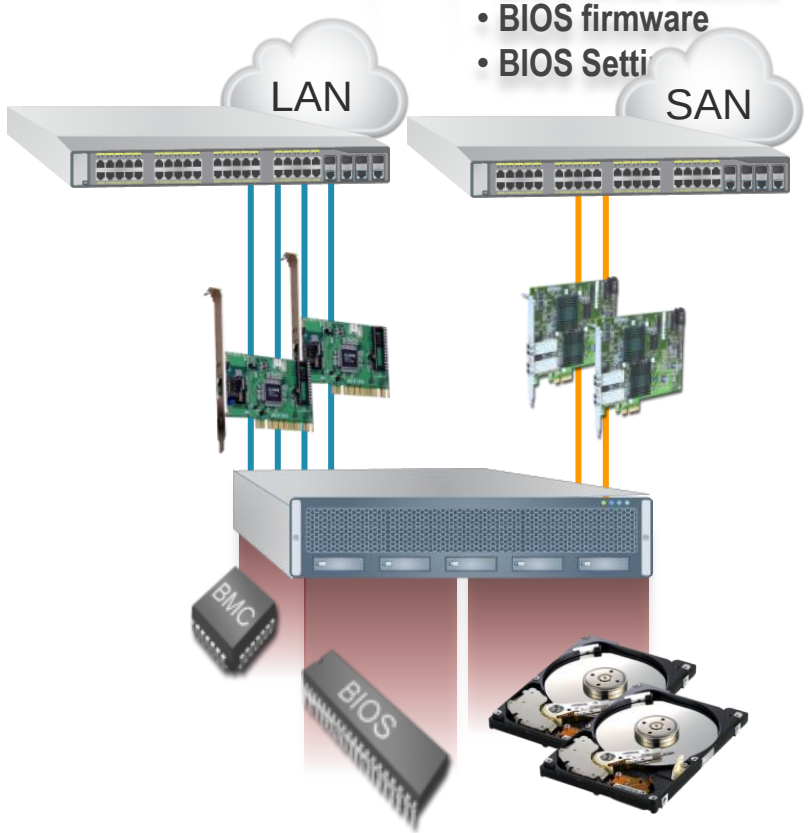
- Server UUID
- Serial over LAN
- Boot order
- IPMI settings
- BIOS scrub actions
- BIOS firmware
- BIOS Setti

- FC Fabric assignments for HBAs

- QoS settings
- Border port assignment per vNIC
- NIC TX/RX Rate Limiting

- VLAN assignments for NICs
- VLAN tagging config for NICs

- Number of vNICs
- PXE settings
- NIC firmware
- Advanced feature settings



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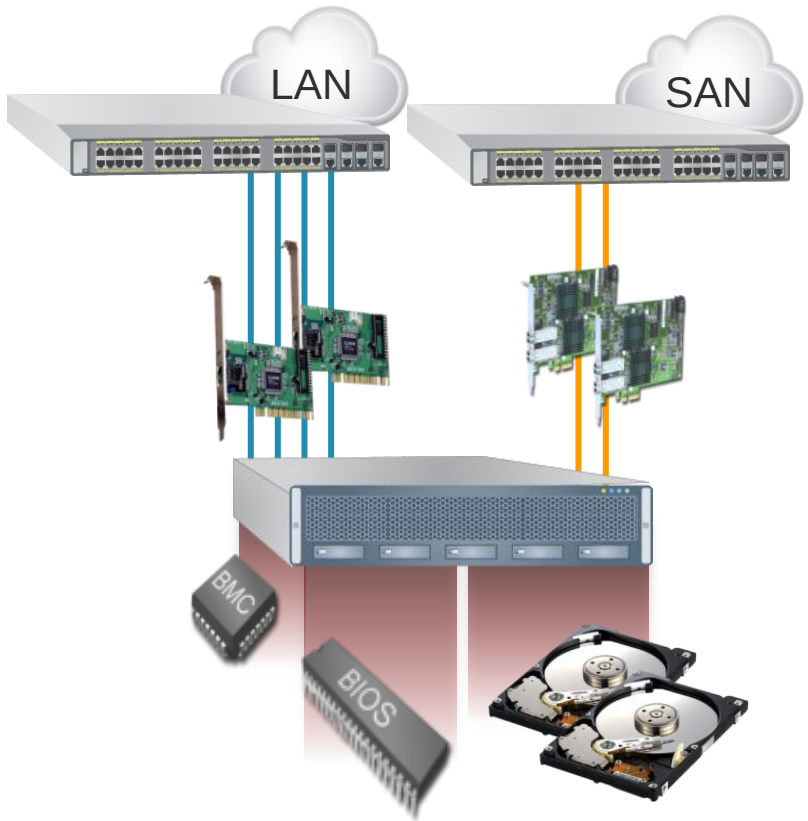
x86 서버의 관리에 대한 개념을 바꾸다!

UCS Service Profile

- NIC MACs
- HBA WWNs
- Server UUID
- VLAN Assignments
- VLAN Tagging
- FC Fabrics Assignments
- FC Boot Parameters
- Number of vNICs
- Boot order
- PXE settings
- IPMI Settings
- Number of vHBAs
- QoS
- Call Home
- Template Association
- Org & Sub Org Assoc.
- Server Pool Association
- Statistic Thresholds
- BIOS scrub actions
- Disk scrub actions
- BIOS firmware
- Adapter firmware
- BMC firmware
- RAID settings
- Advanced NIC settings
- Serial over LAN settings
- BIOS Settings



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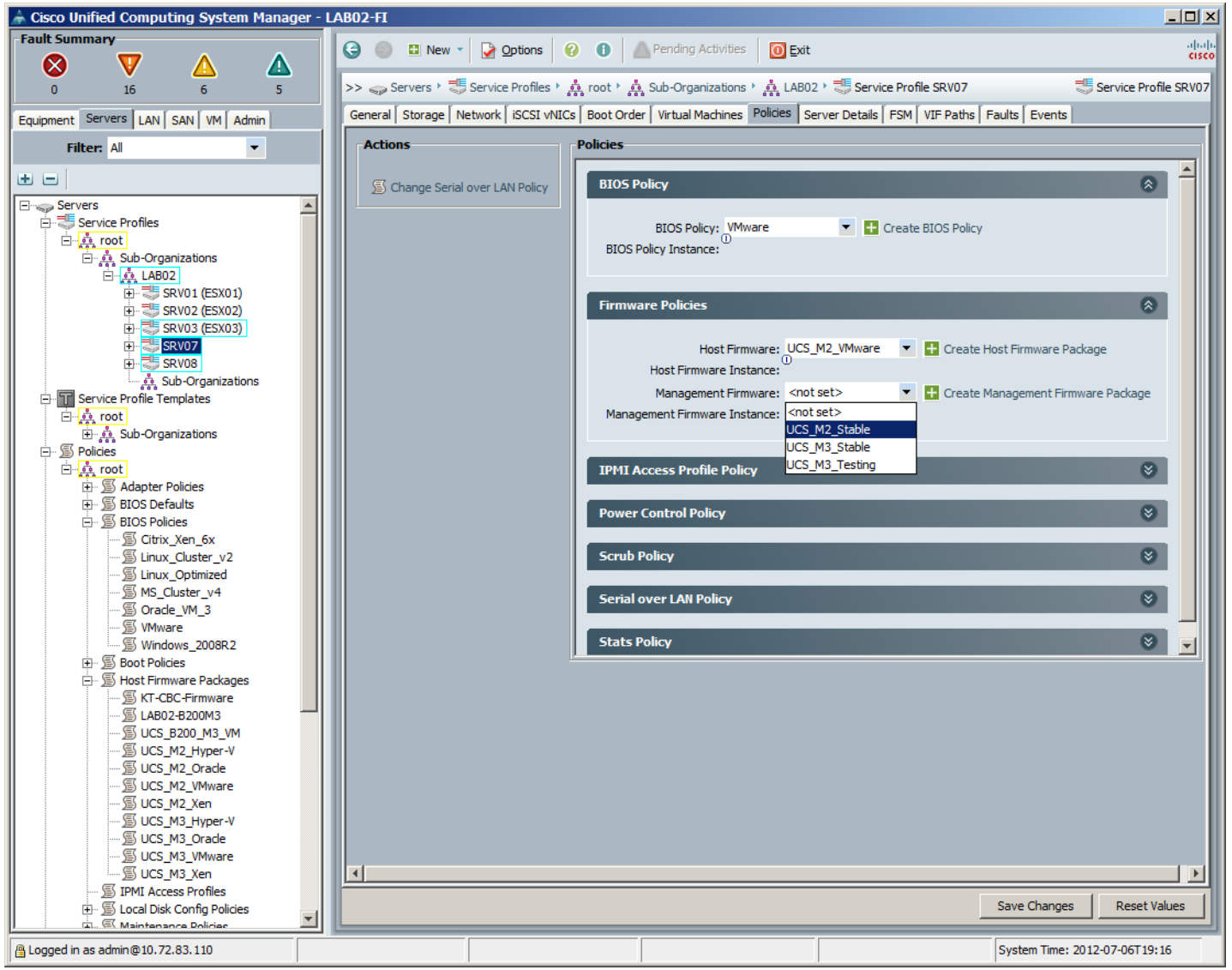

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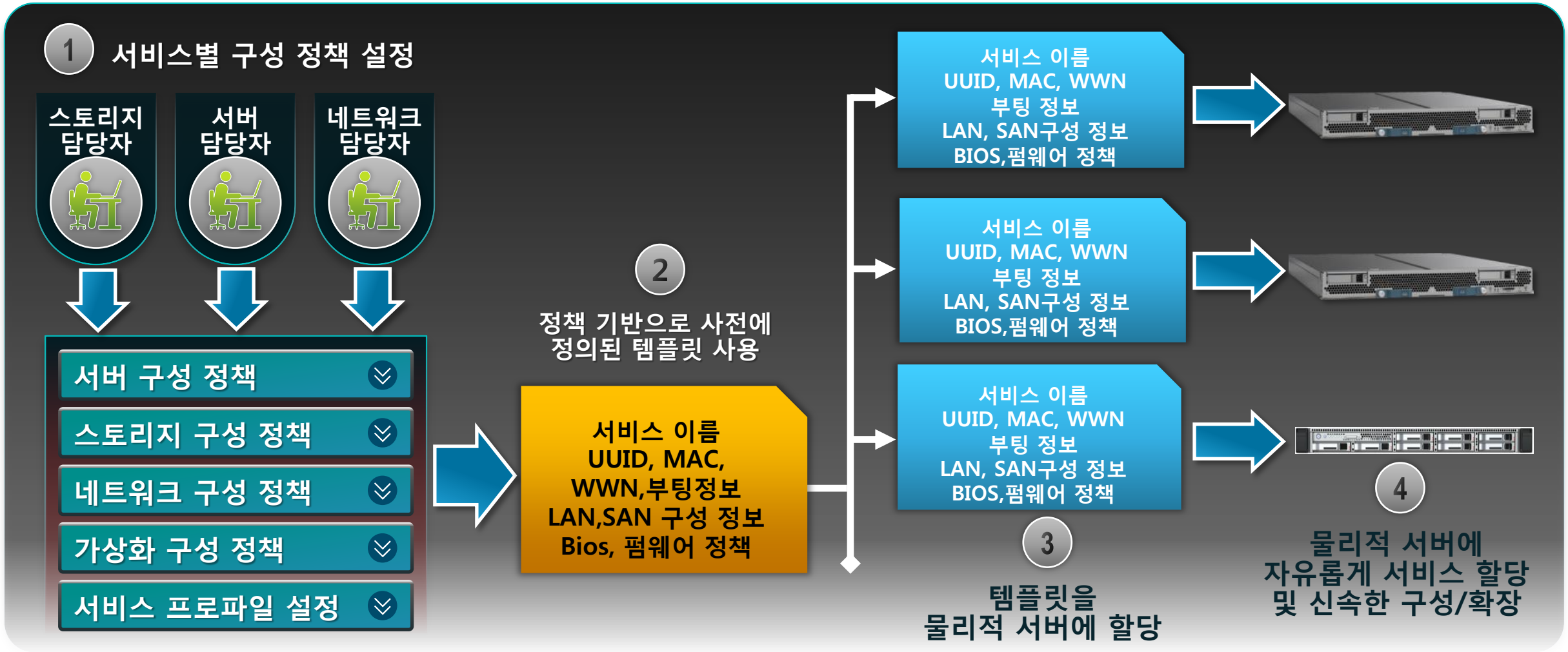
개념의 전환, Stateless Computing



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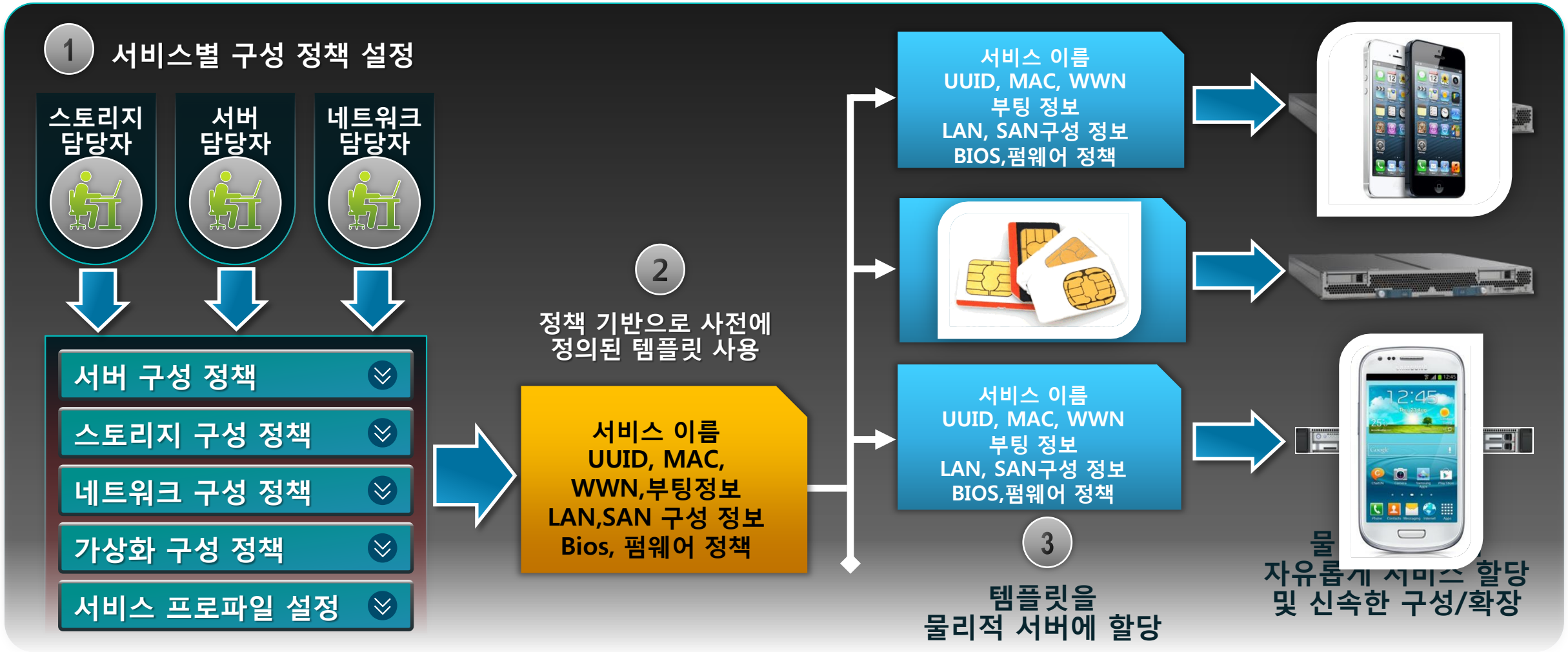
개념의 전환, Stateless Computing



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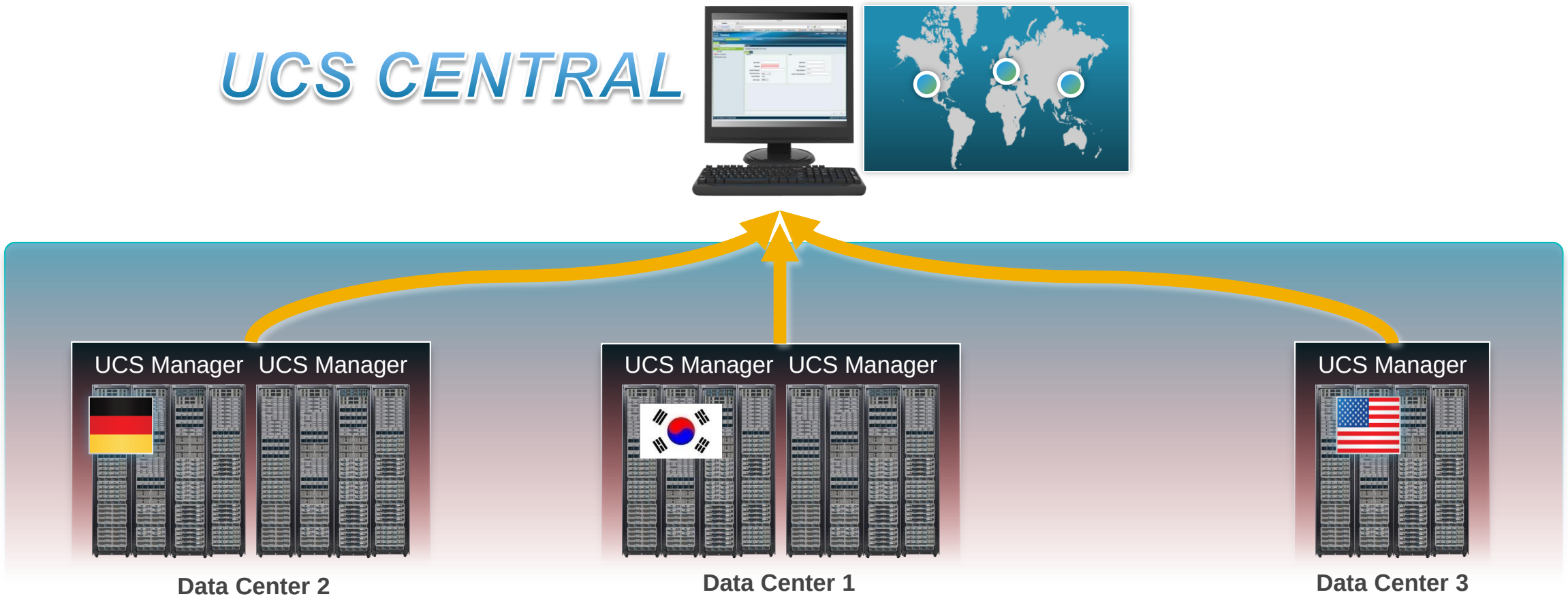
원격 데이터센터의 통합 관리, 가능할까요?



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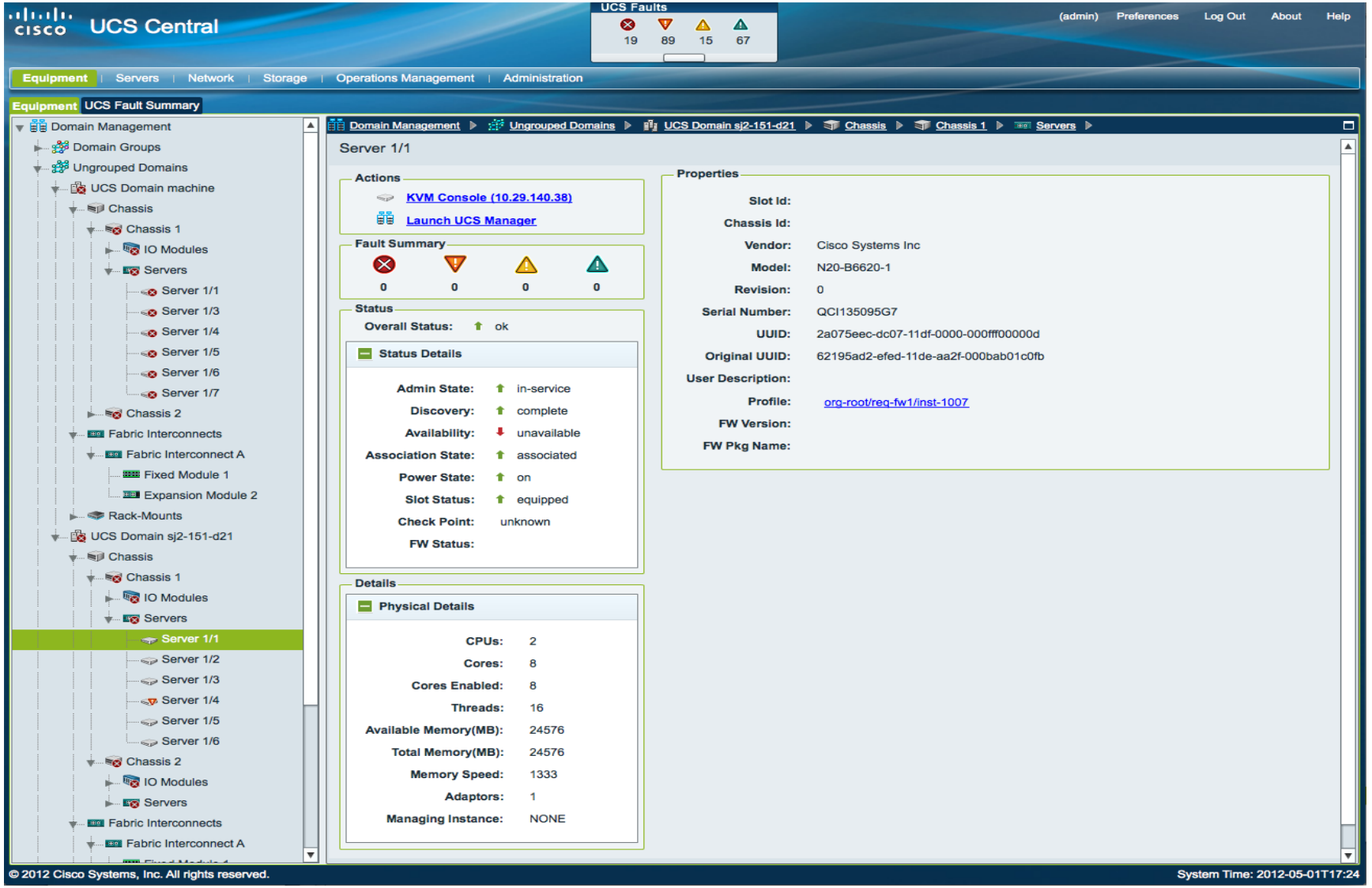
원격 데이터센터의 통합 관리, 가능할까요?



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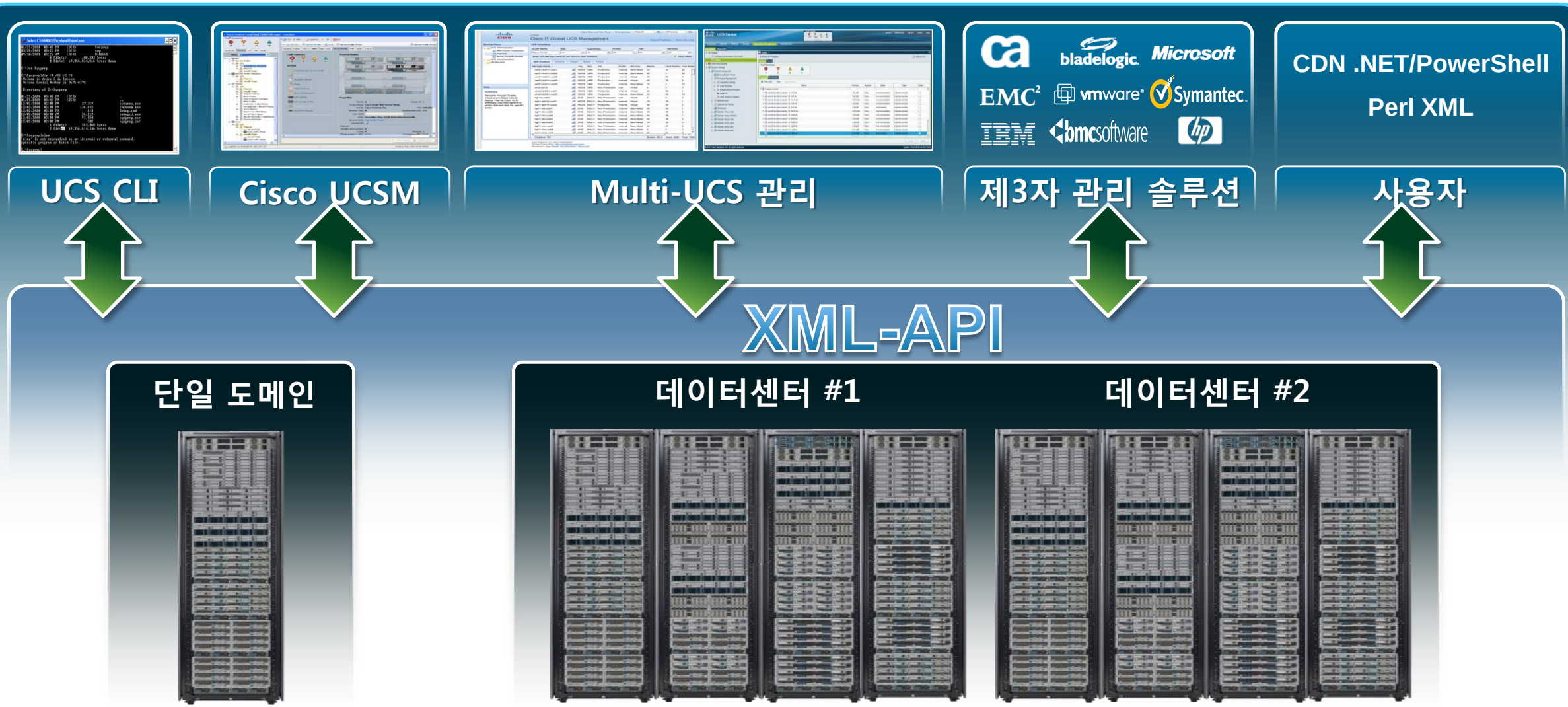
막강한 관리 기능의 비밀, XML-API



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“가상화 확산의 가장 큰 걸림돌이 무엇이라고 생각하시나요?

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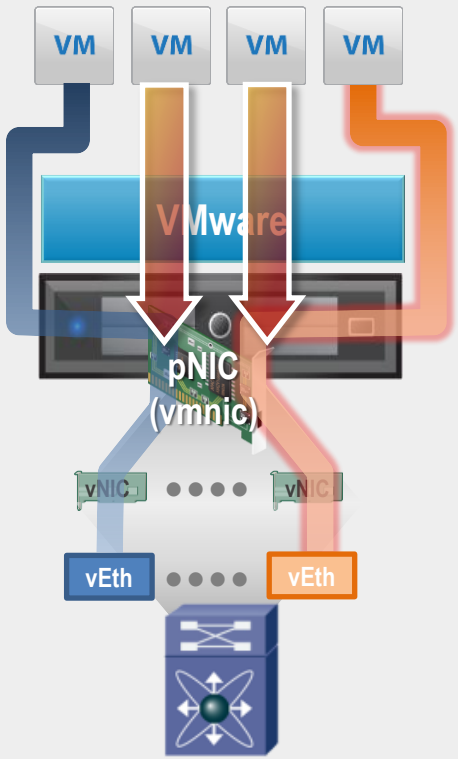
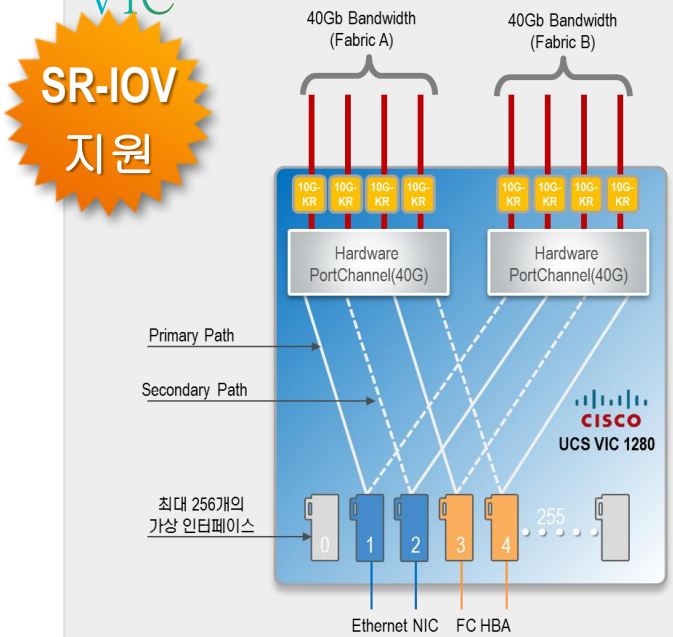
가상화의 오버헤드를 극복하라!



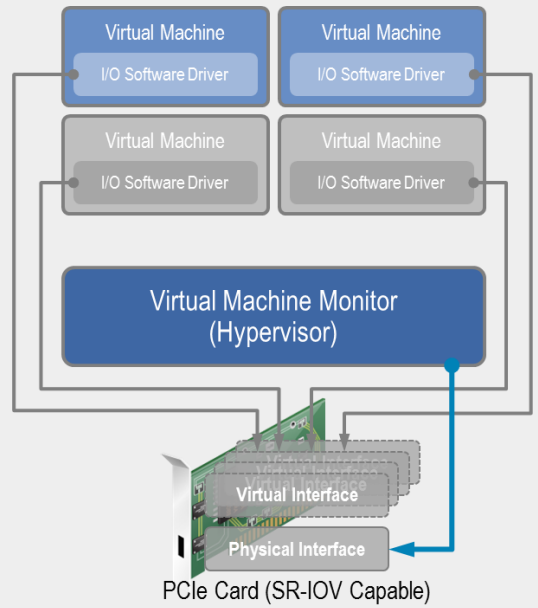
Hypervisor bypass
(DirectPath IO)

Cisco VIC



- ✓ 운영체제, Hypervisor 에 독립적인 *PCI Device 가상화*
- ✓ UCSM-Hypervisor간의 자동화된 할당/관리/운영
- ✓ Live-Migration 지원 (vMotion)

SR-IOV



- ✓ PCI-SIG 표준
- ✓ 운영체제, Hypervisor 의 변경 필요

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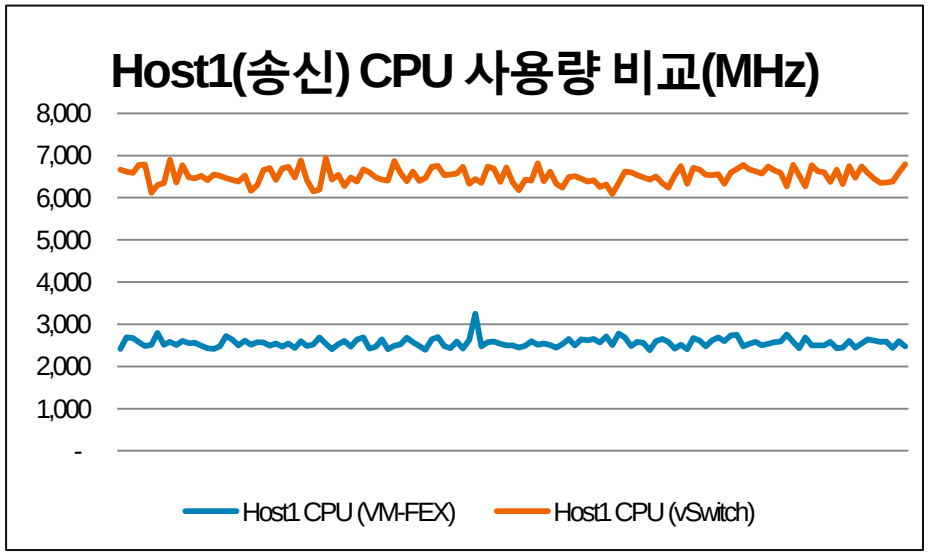
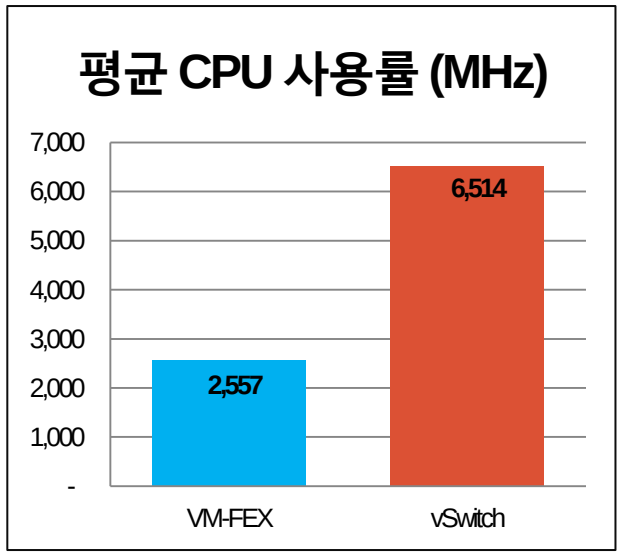
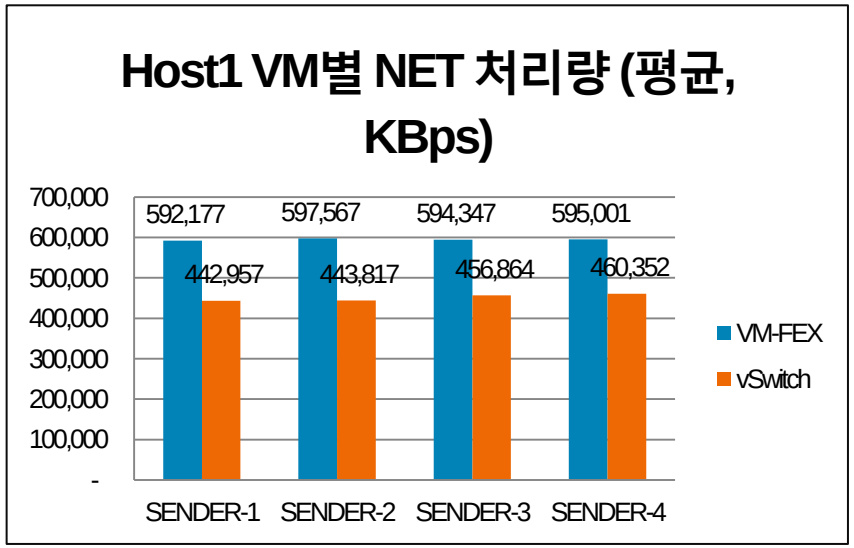
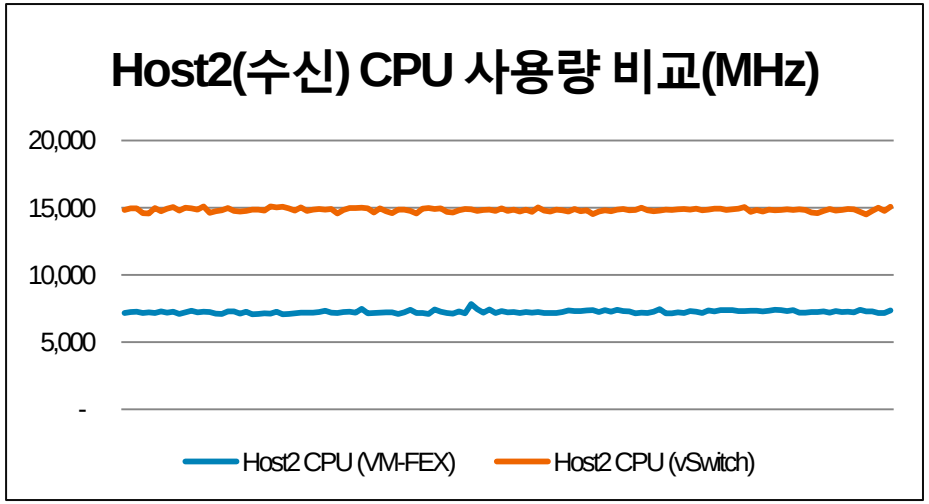
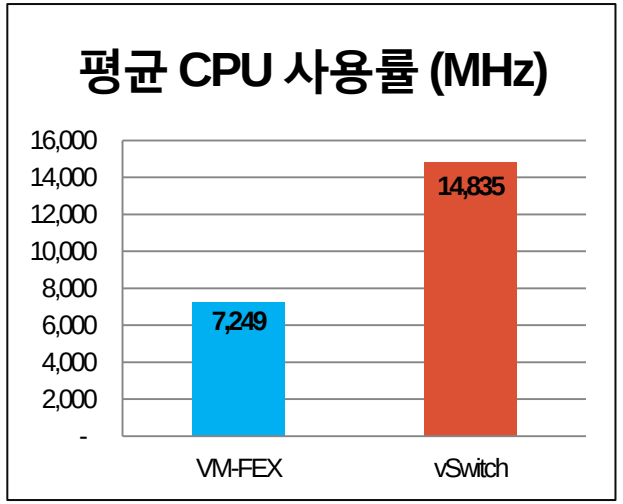
가상화 오버헤드의 실체

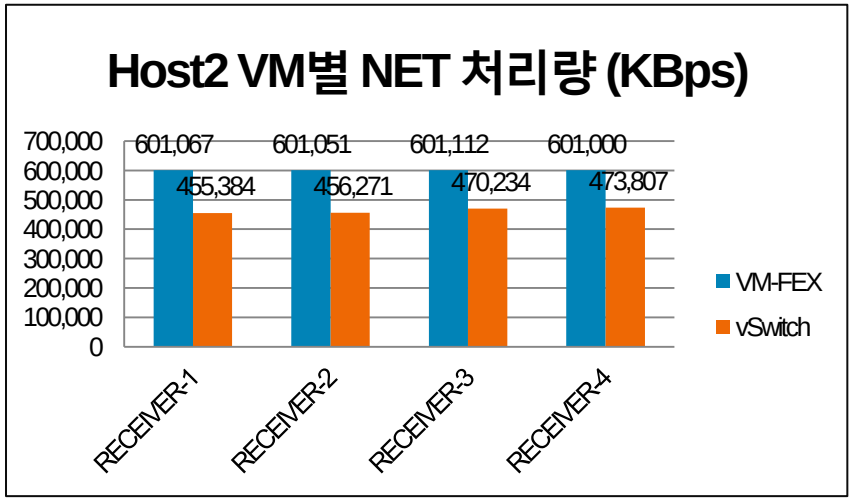












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맺음말

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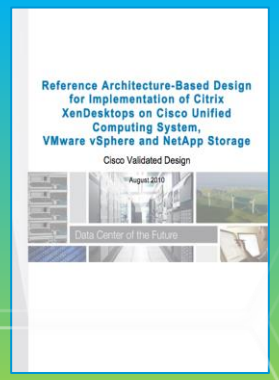
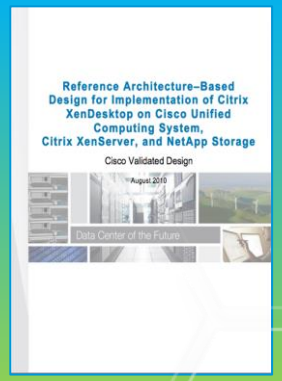
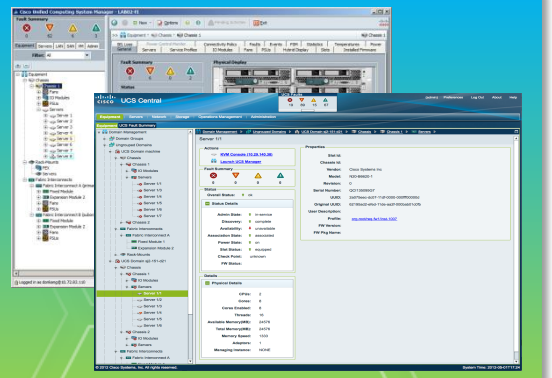
Why Cisco UCS?

검증된 디자인 (CVDs)

혁신적인 관리







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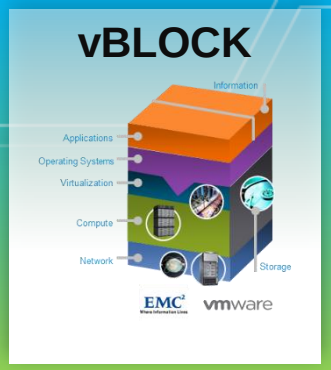
풍부한 Infrastructure



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UCS 출시 3년의 성적표

Rapid Rate of Global Cisco UCS Customer Adoption

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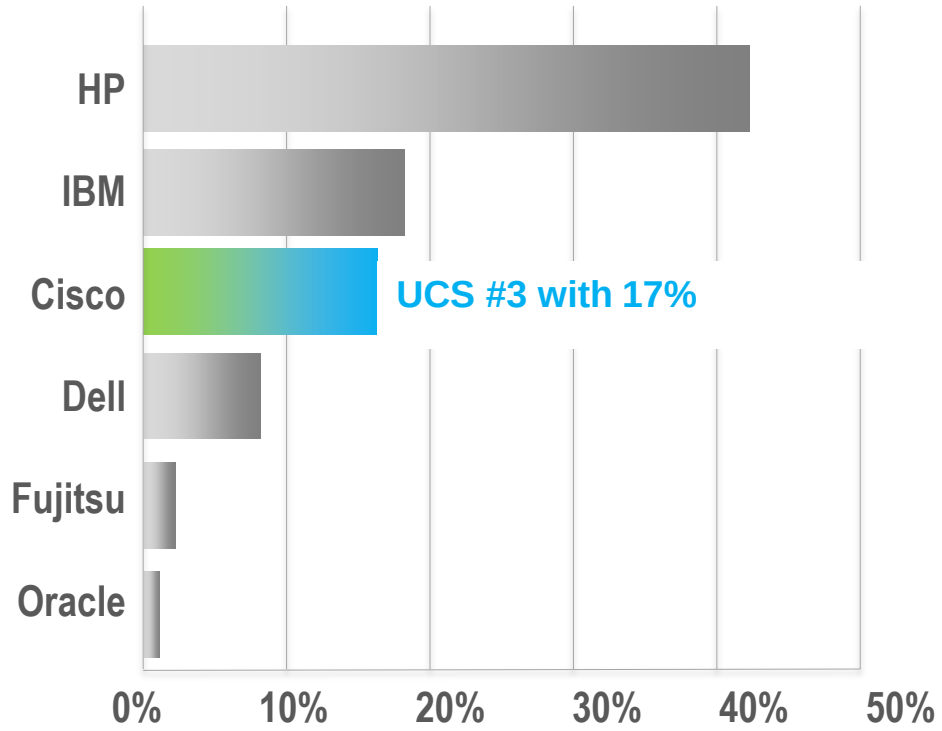
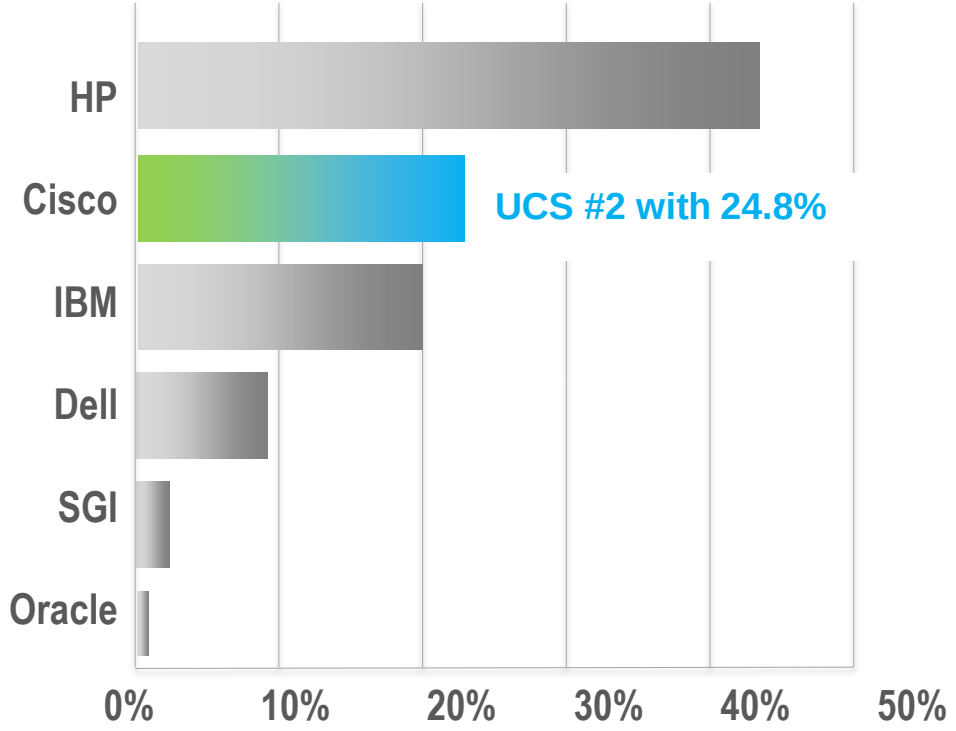
UCS 출시 3년의 성적표

x86 Server Blade Market Share, Q3 CY12 [1]

WW Market Share



US Market Share



UCS는 새로운 혁신을 통하여 서버 시장을 재편

Cisco는 x86 서버 시장에서 가장 빠르게 성장하는 회사 [2]

17,000개 이상의 World Wide UCS 고객

Source:

[1] IDC Worldwide Quarterly Server Tracker, Q3 2012, November 2012, Revenue Share

[2] IDC Q3 CY11 Server Forecaster, Based on Blade Revenue

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Thank you.

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