최적의 클라우드 서비스 플랫폼 - Cisco UCS

2010. 01. 26

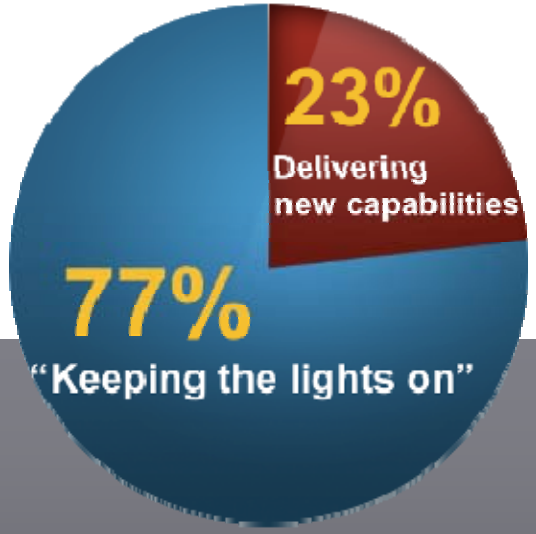
방항모 이사 / 데이터센터팀

Agenda

- 클라우드 컴퓨팅 배경/개요
- 시스코 클라우드 전략
- 클라우드 서비스 데이터 센터
- 클라우드 서비스 플래폼 - 시스코 **UCS**
- 결론

클라우드 컴퓨팅 등장 배경

IT 인프라스트럭쳐 변화 요구



복잡성
비용
변화/요구 대응성

비즈니스 좌절
IT 좌절

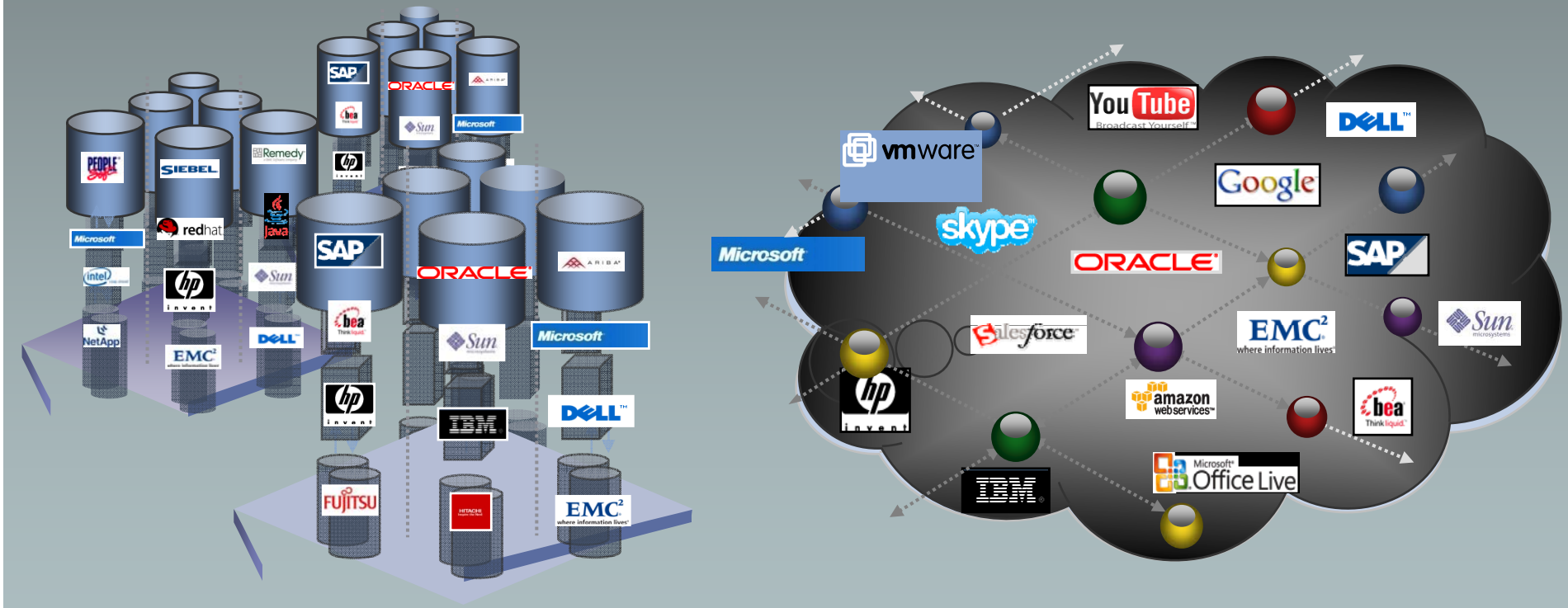
새로운 접근
방법 요구

클라우드 컴퓨팅 서비스

새로운 사고 - IT as a Service

IT 인프라스트럭쳐를

저비용, 고성능, 유연한 서비스 로 바꿈



Private clouds will transform how we think about IT:

X as a service : a Service-Based Consumption Model

클라우드 컴퓨팅 개요

“클라우드 컴퓨팅” 용어의 기원

- **“Comes from the early days of the Internet where we drew the network as a cloud… we didn’t care where the messages went… the cloud hid it from us” – Kevin Marks, Google**

- **The emerging cloud abstracts infrastructure complexities of servers, applications, data, and heterogeneous platforms**

  (“muck” as Amazon’s CEO Jeff Bezos calls it)

클라우드 컴퓨팅 정의

NIST

- **Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.**
- **This cloud model promotes availability and is composed of five essential characteristics, three service models, and four deployment models**
- **5 - key characteristics:**
  1. **On-demand self-service**
  2. **Ubiquitous network access**
  3. **Location-independent resource pooling**
  4. **Rapid elasticity**
  5. **Pay per use**

Gartner

- **As a style of computing where scalable and elastic IT-enabled capabilities are delivered as a service to external customers using Internet technologies.**
- **Five Refining Attributes**
  1. **Service-Based**
  2. **Scalable and Elastic**
  3. **Shared**
  4. **Metered by Use**
  5. **Uses Internet Technologies**

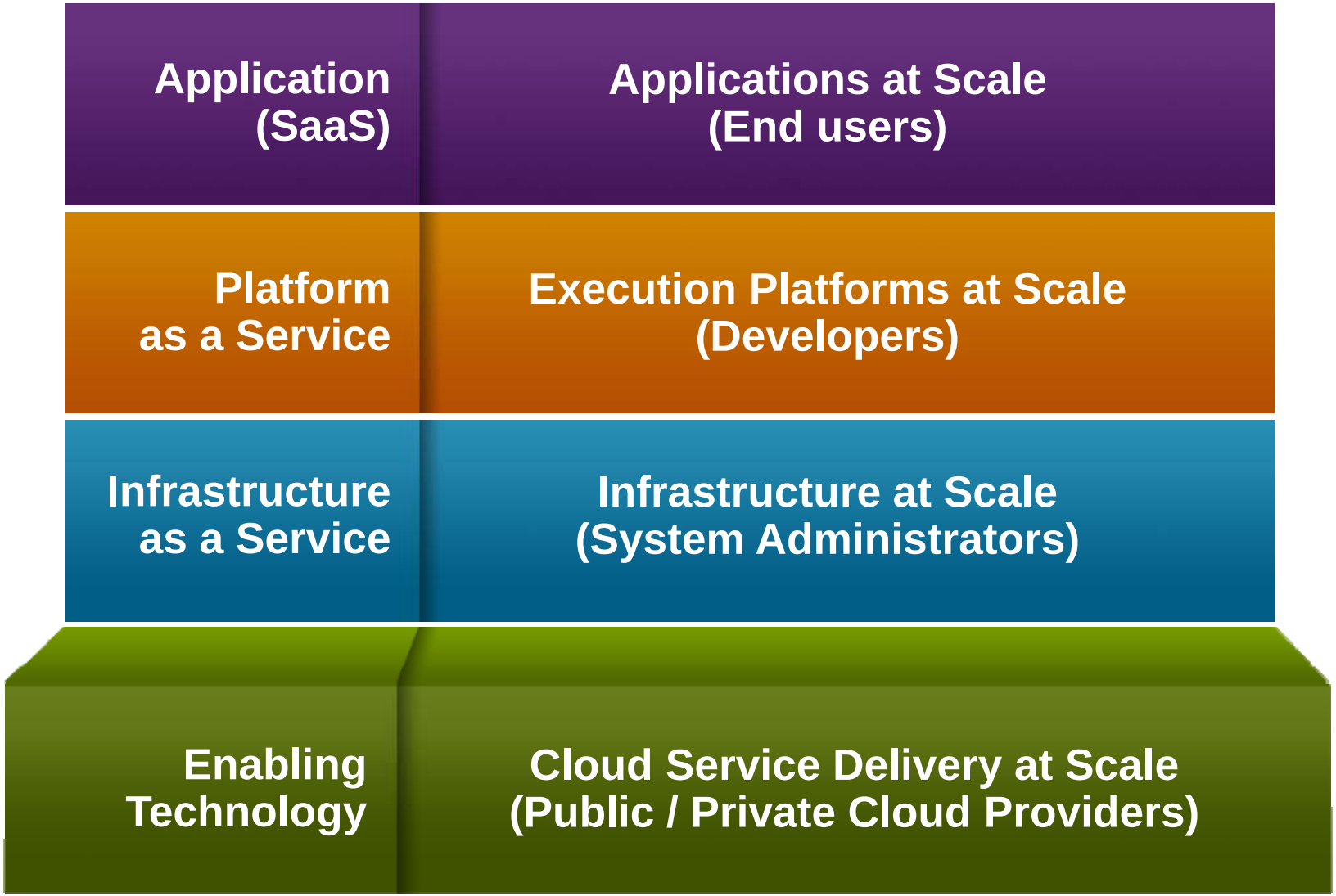
The National Institute of Standards and Technology (NIST), Information Technology Laboratory

클라우드 컴퓨팅 vs. 전통적인 IT 비교

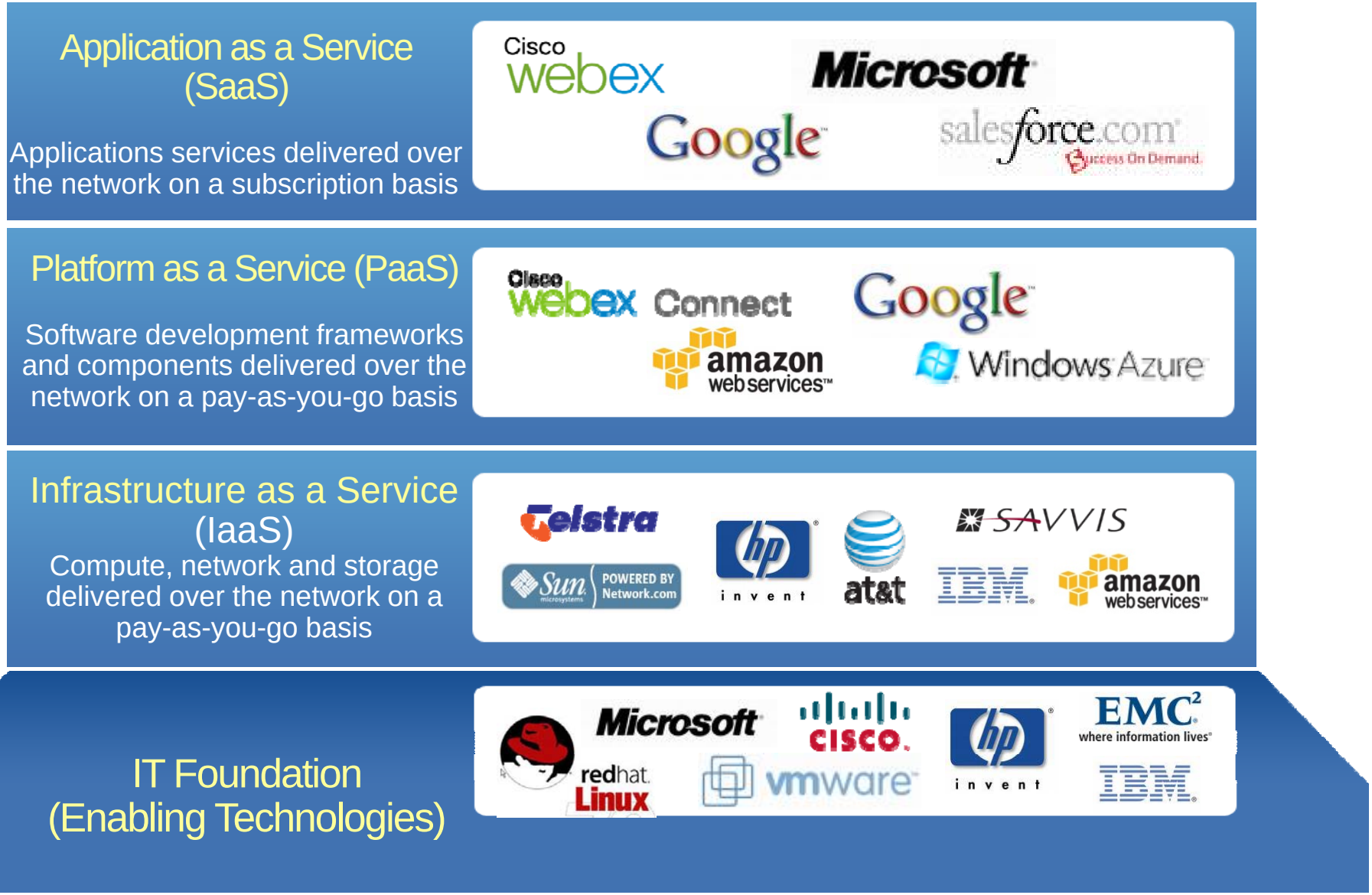
전통적인 컴퓨팅

	전통적인 컴퓨팅	클라우드 컴퓨팅
사용 자원	전용 자원	공유 자원
사용의 편리성	전통적인 **HW** 공급	자가 서비스
확장성	새로운 서비스 수동 공급	요구하는 만큼 공급
가용성	수동 복구	자동 복구
서비스 제공	수일/수십일	실시간/수분
비용	장비 구입 비용**(CapEx +OpEx)**	사용량만큼 지불 **(OpEx)**

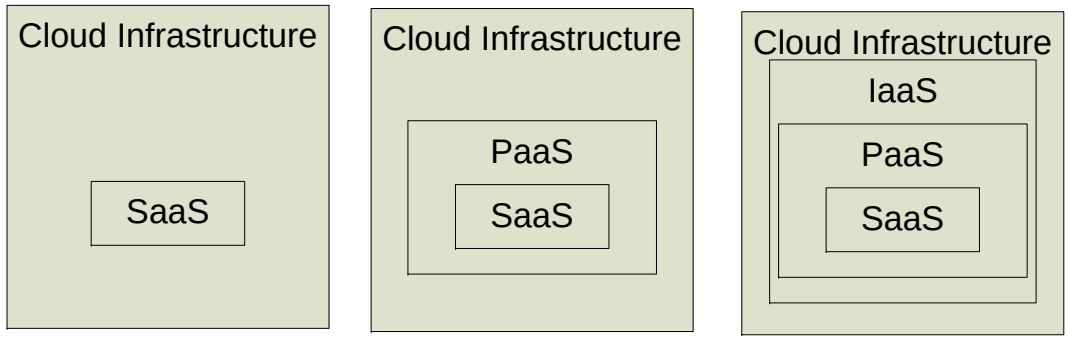
3 가지 클라우드 서비스 모델



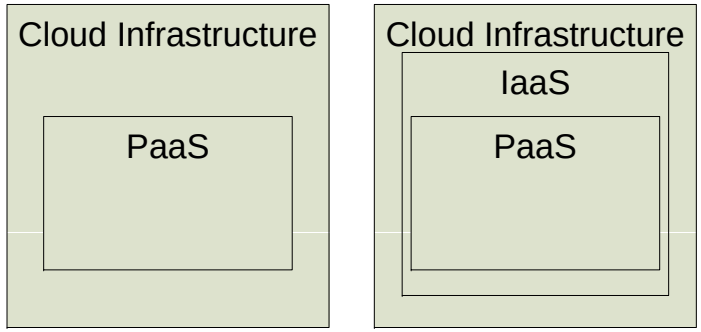
클라우드 서비스 주요 플레이어



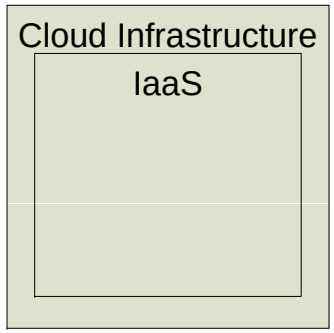
클라우드 서비스 모델 아키텍쳐



Software as a Service (SaaS) Architectures



Platform as a Service (PaaS) Architectures



Infrastructure as a Service (IaaS) Architectures

4 가지 클라우드 전개 모델

NIST Deployment Models

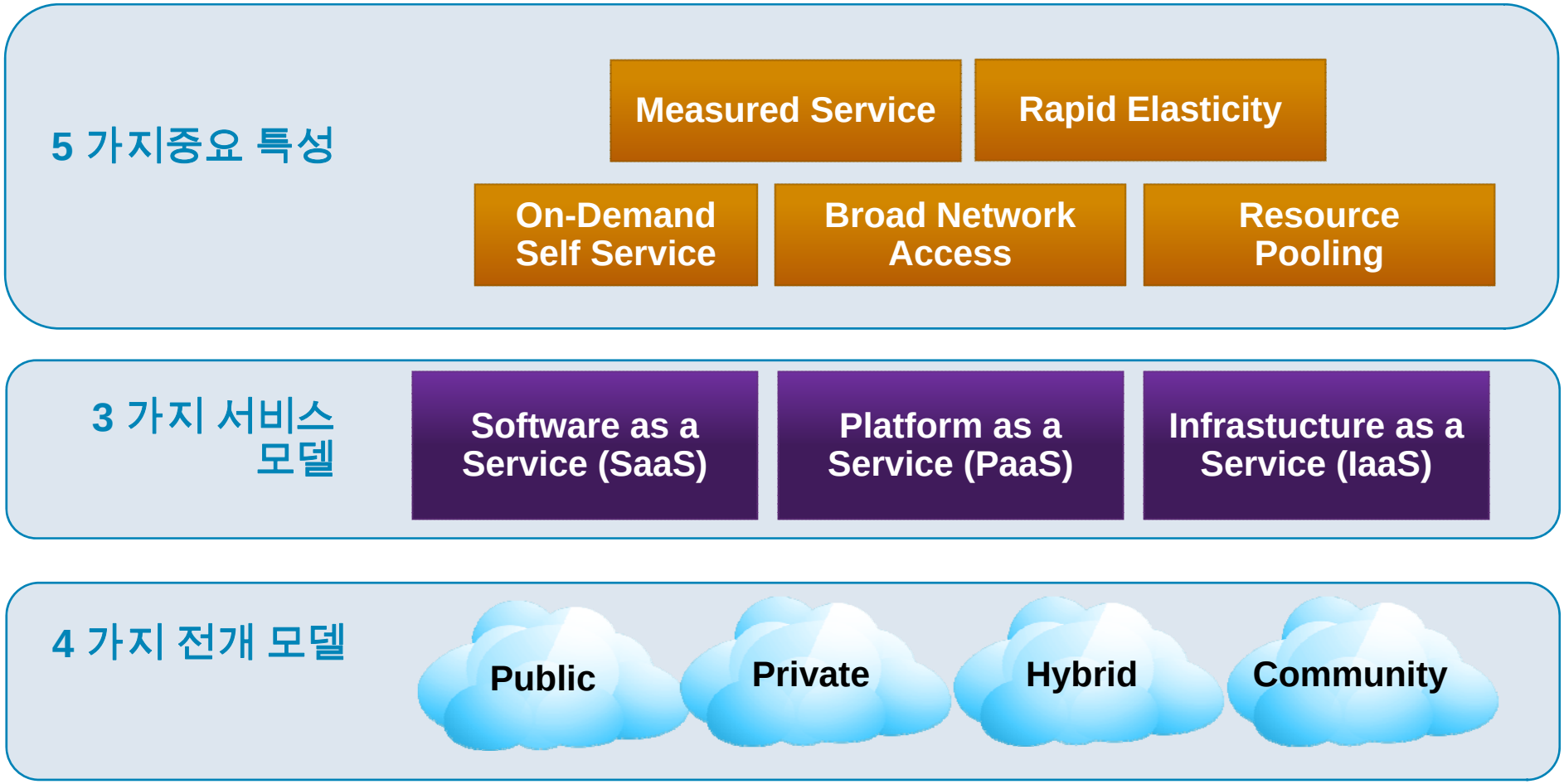
Public Cloud	Cloud infrastructure made available to the general public.
Private Cloud	Cloud infrastructure operated solely for an organization.
Hybrid Cloud	Cloud infrastructure composed of two or more clouds that interoperate or federate through technology
Community Cloud	Cloud infrastructure shared by several organizations and supporting a specific community

… and one other

Virtual Private Cloud	Cloud services that simulate the private cloud experience in public cloud infrastructure

클라우드 컴퓨팅 정의 프레임웍

Visual Model of NIST's Working Definition of Cloud Computing

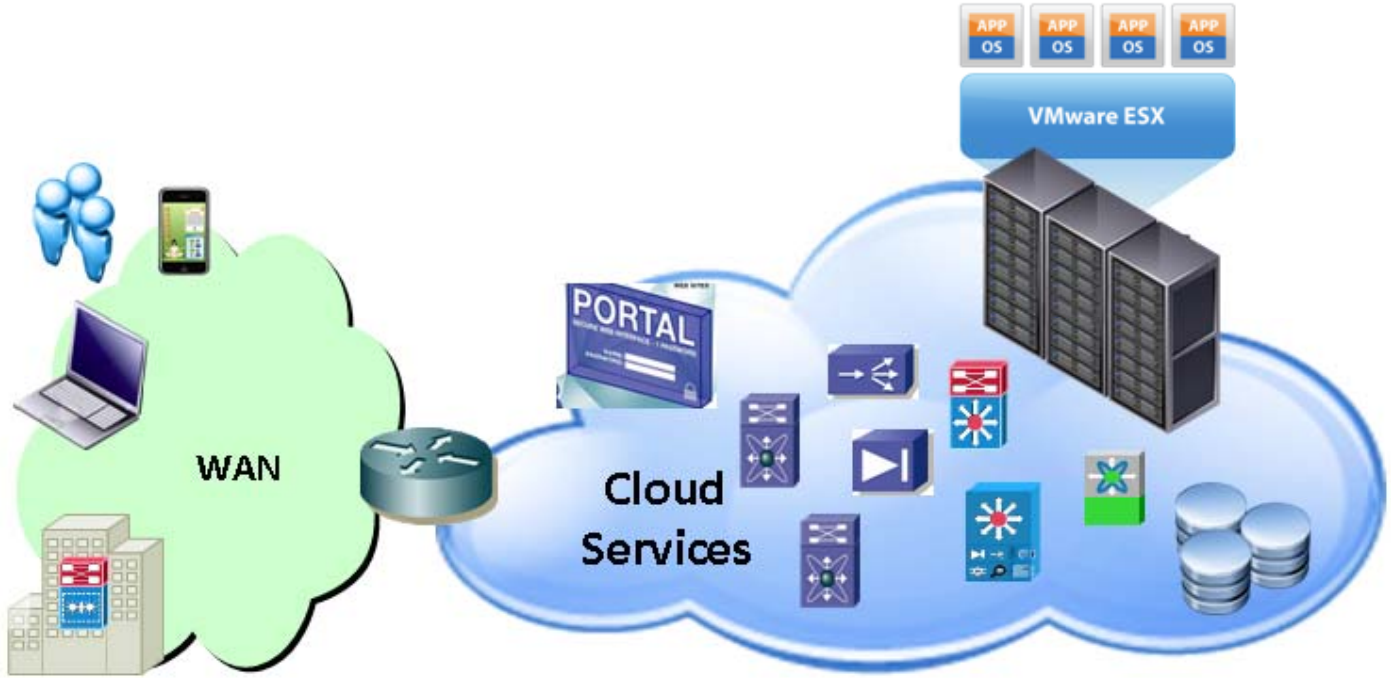


http://www.csrc.nist.gov/groups/SNS/cloud-computing/index.html

클라우드 컴퓨팅 서비스 전개

Service Portal
Virtualized
Elastic, Flexible
Automated
On-Demand provisioning
Multi-tenant

Secure
Dynamic
Service oriented
Pay-per-use Billing
Consolidated, Efficient



클라우드 컴퓨팅의 이점

클라우드 컴퓨팅

- 자원 할당의 유연성 제공
- 자원 할당의 효율성

이점

- 민첩한 **IT** 서비스 제공 **-** 실시간 서비스 제공

  Time to Market 50+% 감소

- 비용 최적화

  서버**/**스토리지 사용률 향상

  CAPEX 절감**(**보통 **50+%)**

  OPEX 절감**(25-30%)**

클라우드 컴퓨팅의 이점/사례

유연성
- **Capability**
- **Scalability**
- **On-Demand Availability**

비용
- **Efficient Utilization**
- **Capex to Opex**
- **Pay as You Go**

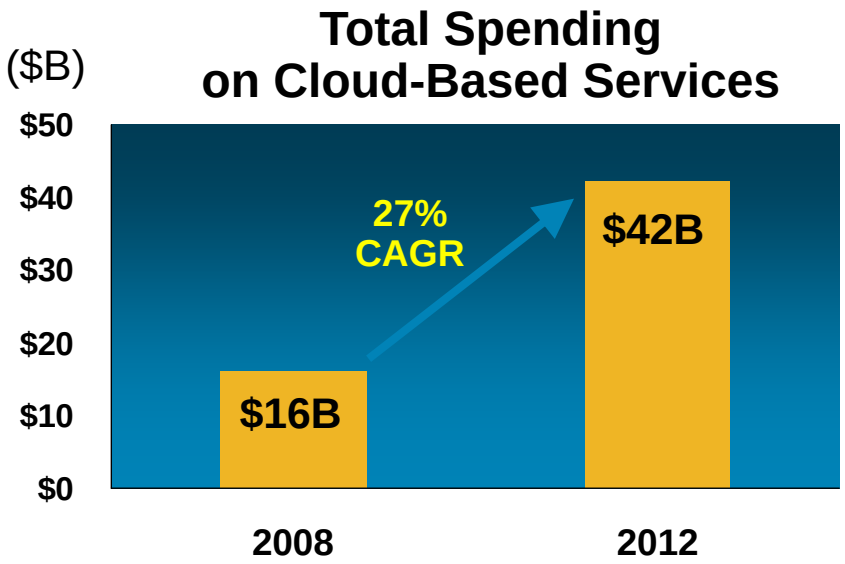
The NY Times used Amazon's EC2 and S3 services to convert and store 11 million articles into PDF form (generating 5.5TB of data) in 24 hours

Animoto, an application on Facebook, went from 25K to 250K users in 3 days. Animoto accomplished this by launching up to 4000 Amazon compute instances to meet demand

클라우드 컴퓨팅의 과제 : 신뢰성

클라우드 컴퓨팅의 경제적인 이점을 고려하기 전에, 기업은 신뢰성있는
클라우드 서비스 인프라스트럭쳐 요구

클라우드 컴퓨팅 시장 동향



- Cloud Services currently comprise 4% of Enterprise IT spending and projected to grow to 9% of total spending by 2012
- Cloud Services are projected to grow at 27% or 5x the rate of current Enterprise IT spending

Source: IDC, Oct 2008; approximately 50% of Services spend is defined as SaaS. The five segments of Enterprise IT include Business Applications, Application Development Software, System Software, Storage and Servers.

Per Gartner, by 2012 14% of infrastructure and operations architecture of the Fortune 1000 is expected to be private cloud.

시스코 클라우드 컴퓨팅 전략

기업의 클라우드 컴퓨팅 전개 모델

궁극적으로 소유와 제어의 구별이 중요하지 않게 됨

소유

통제

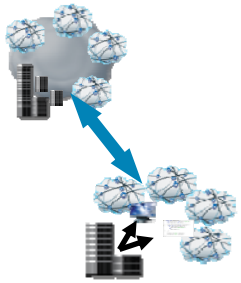
Internal Resources

All cloud resources owned by or

External Resources

All cloud resources owned by providers; used by many customers

Hybrid Cloud

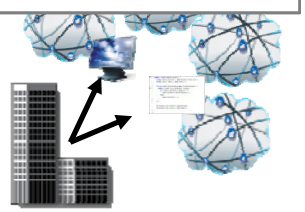


Interoperability and portability among Public and/or Private Cloud systems

Private

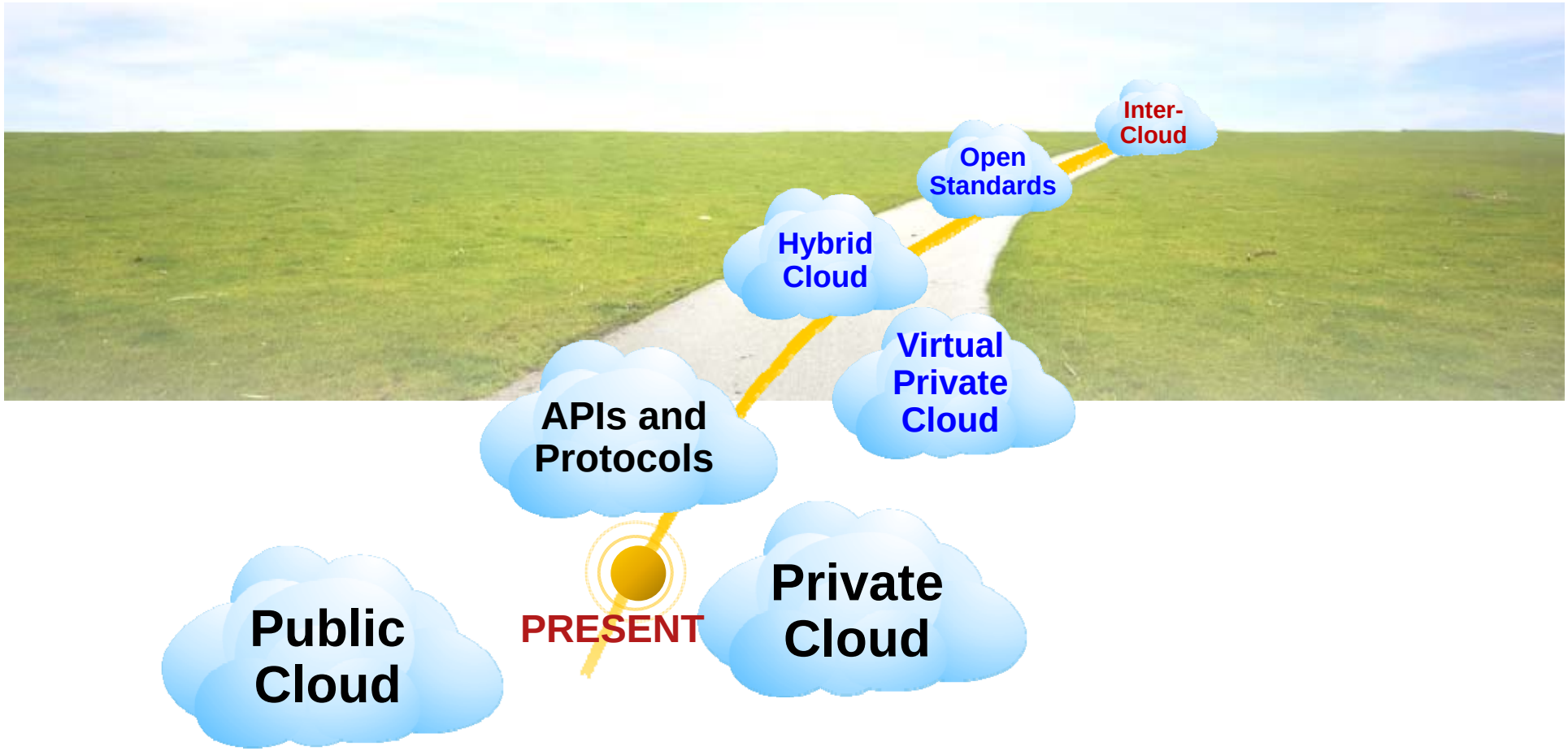
definition/ governance controlled by enterprise

c Cloud



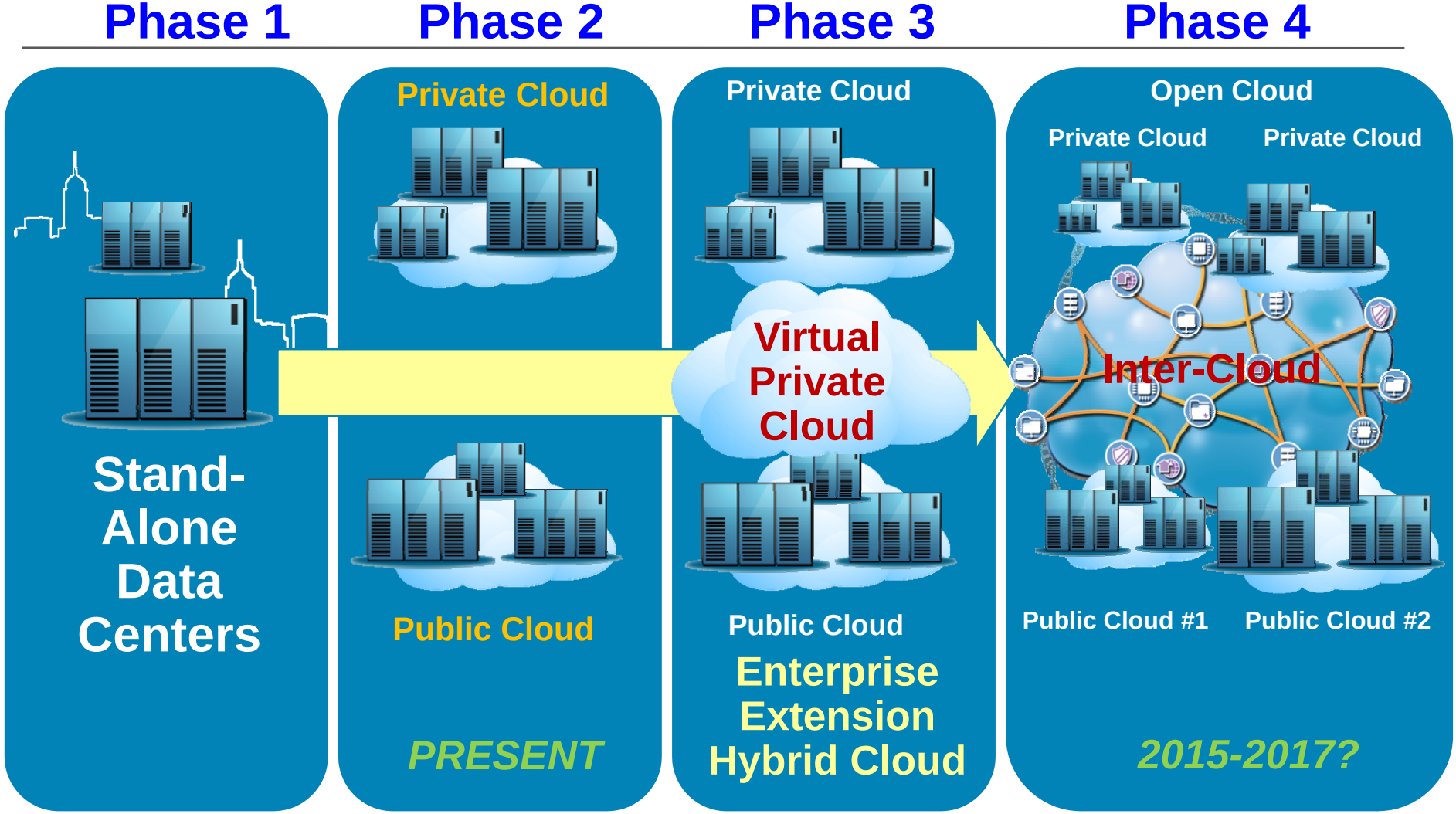
Cloud definition/ governance controlled by provider

클라우드 컴퓨팅 발전 방향



시스코 클라우드 비젼 : Inter-Cloud

클라우드의 진화



시스코 클라우드 전략

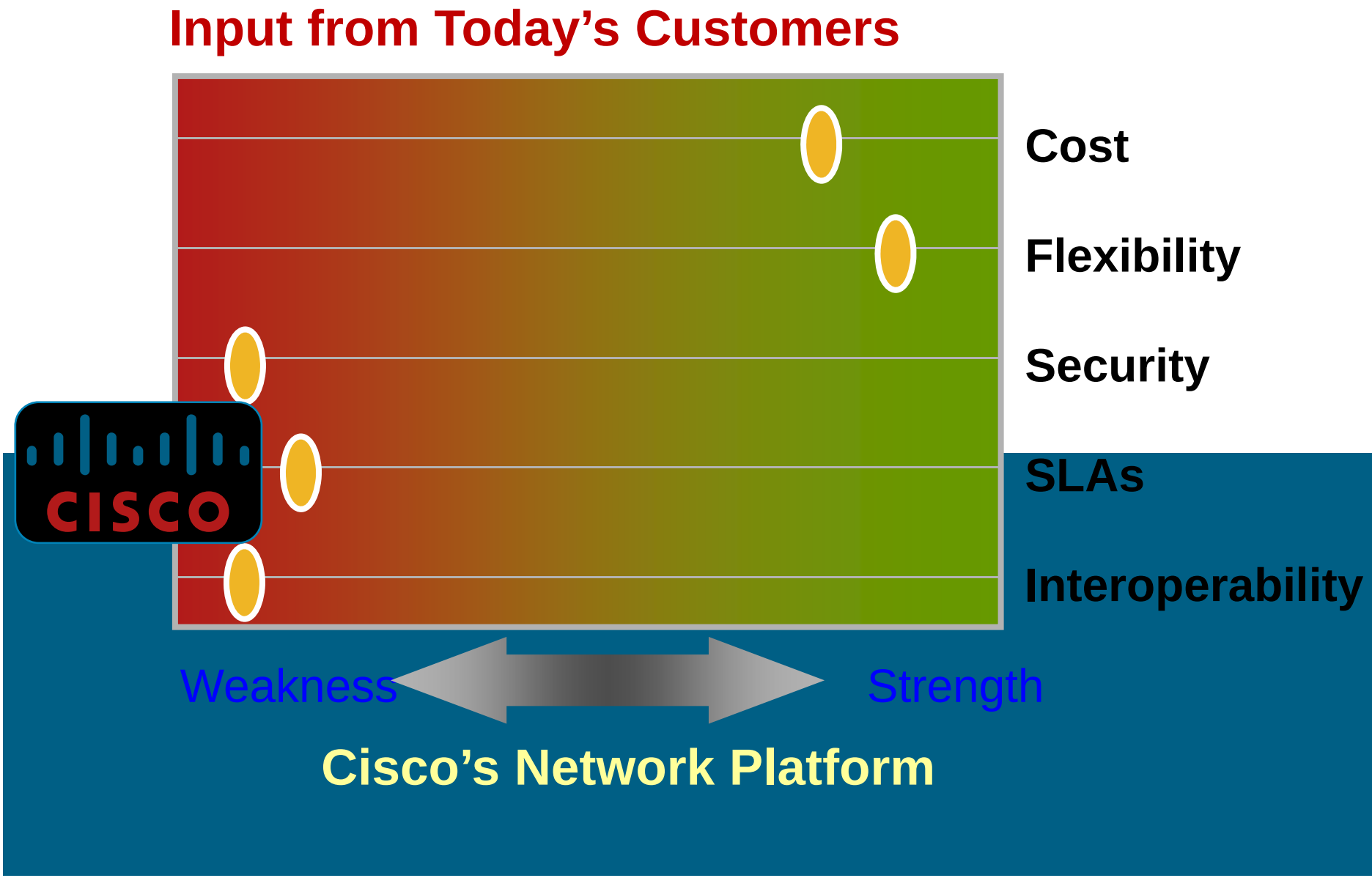
Addressing Our Customers' Business Challenges

Deliver products, solutions & services to organizations to build secure Clouds

Enable Service Providers to deliver secure Cloud solutions & services to their customers

Advance the market for Cloud by driving technology innovation, open standards and ecosystem development

시스코 클라우드 컴퓨팅 전략



시스코 클라우드 솔루션

Communications & Collaboration Solutions (Delivered via SaaS and On-Premise)

Collaboration and Unified Communications

End-to-End Cloud-Enabling Technology

Global Cloud Infrastructure **Private Cloud Computing** **Data Center 3.0 / Unified Computing**

Pervasive Trust & Security Solutions

Comprehensive Security Suite

시스코 클라우드 솔루션

시스코 UCS - Wire Once, Run Anything

- **Single point of management for compute, network and storage**
- **Architected to operate at massive network scale**
- **Designed and Optimized for Virtualization & Cloud**
- **Energy Efficient**

시스코 클라우드 솔루션

VCE vBlock- 패키지 솔루션

VCE : Virtual Computing Environment

- 빠른 **Deployment**

  Rapid deployment model of virtualized infrastructure

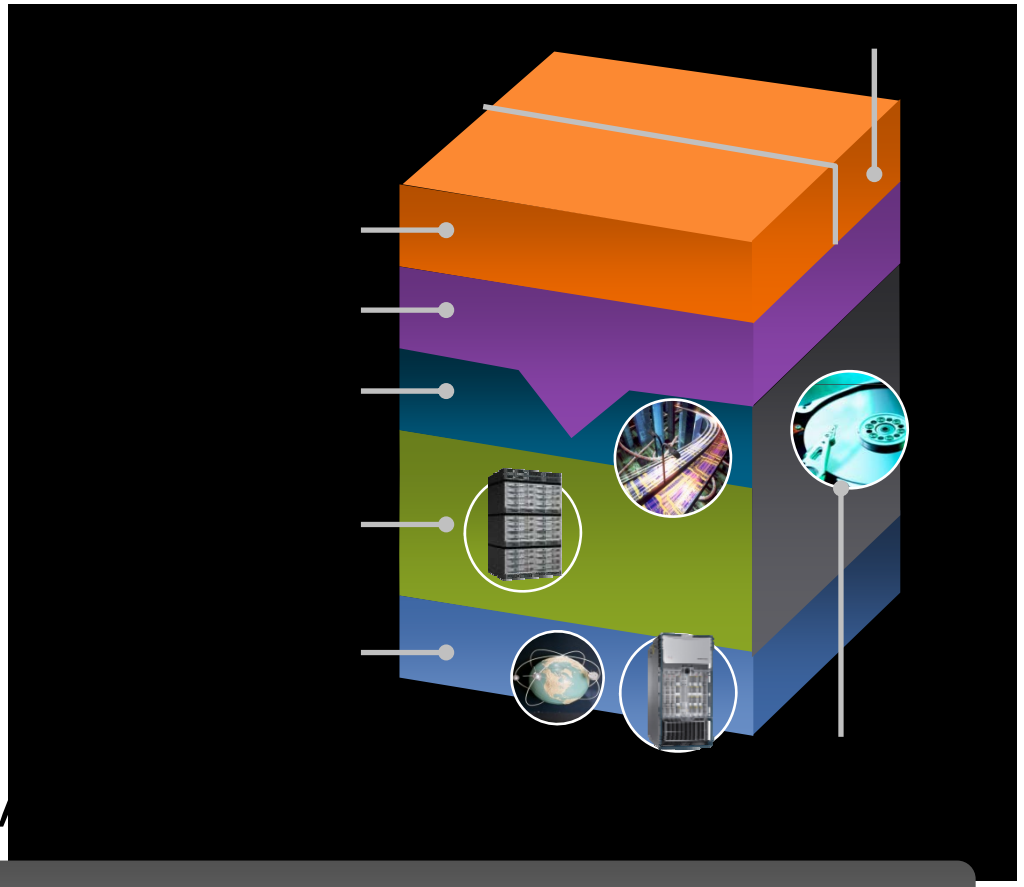
- **TCO** 절감

  Pre-integrated and validated solutions reduce total cost of ownership

- 서비스 수준 보장

  Service-level driven through predictable performance and operational characteristics

- **Improved compliance/security and reduced risk**

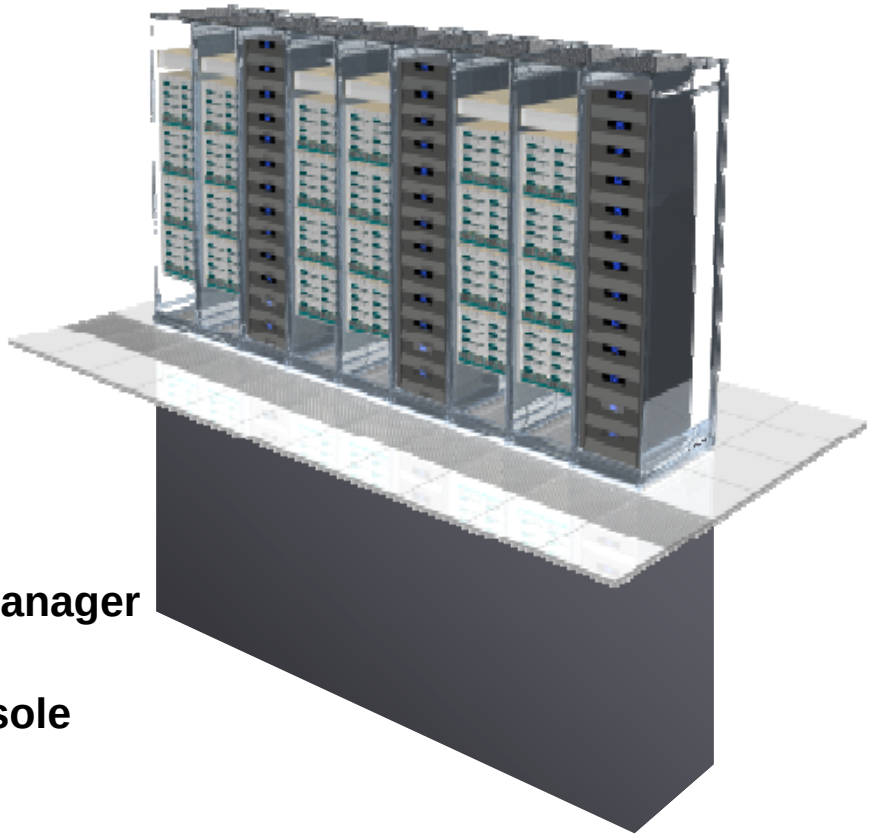


시스코 클라우드 솔루션

vBlock 패키지구성

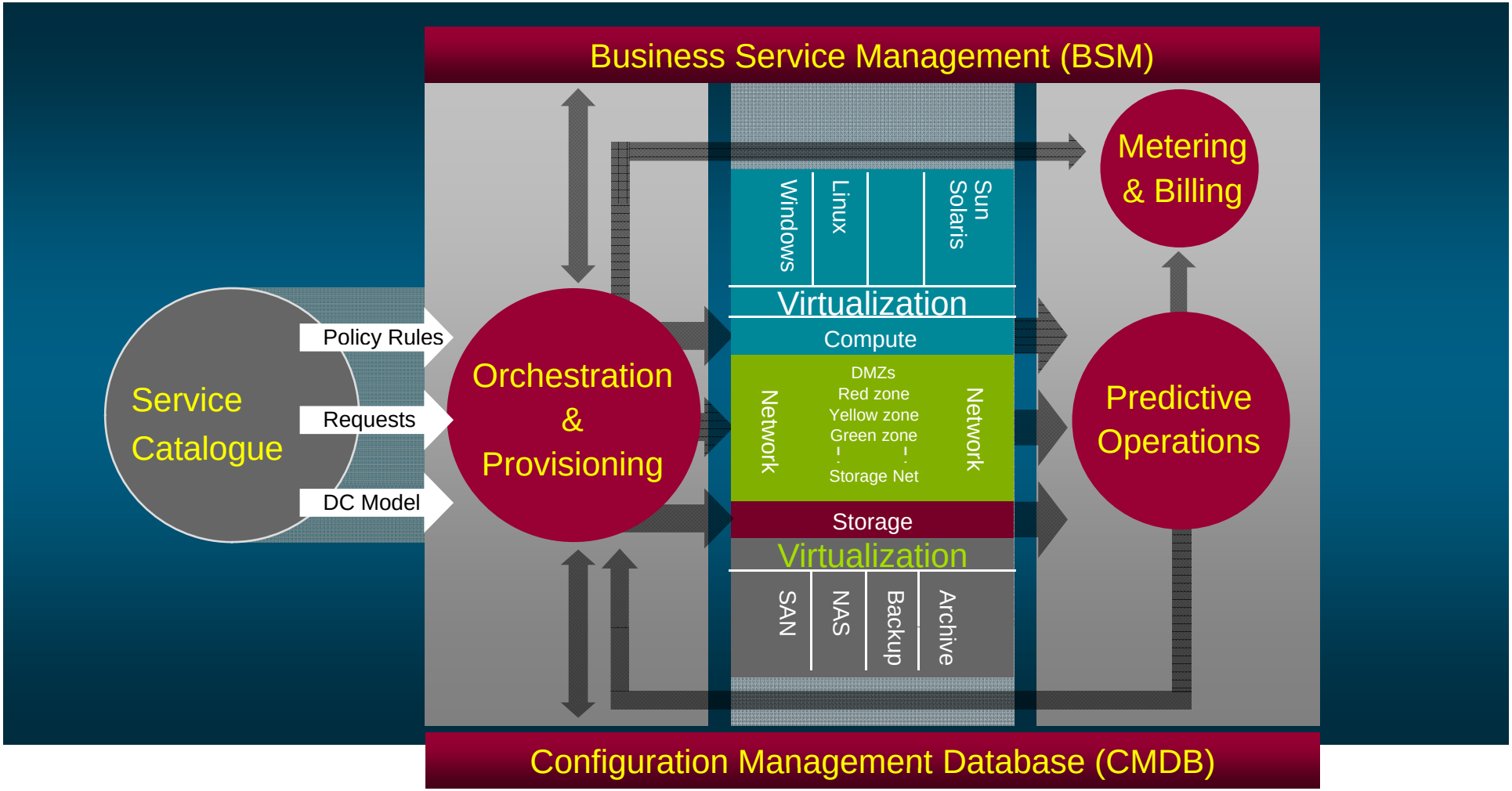
Vblock 2 Components

- **Compute (Cisco)**
  - Cisco UCS B-series
- **Network (Cisco)**
  - Cisco Nexus 1000V
  - Cisco MDS 9506
- **Storage (EMC)**
  - EMC Symmetrix V-Max
- **Hypervisor (Vmware)**
  - VMware vSphere 4
- **Management (All)**
  - EMC Ionix Unified Infrastructure Manager
  - VMware vCenter
  - EMC Symmetrix Management console
  - EMC PowerPath
  - Cisco UCS Manager
  - Cisco Fabric Manager



클라우드 서비스 데이터 센터

차세대 데이터 센터 표준 구조

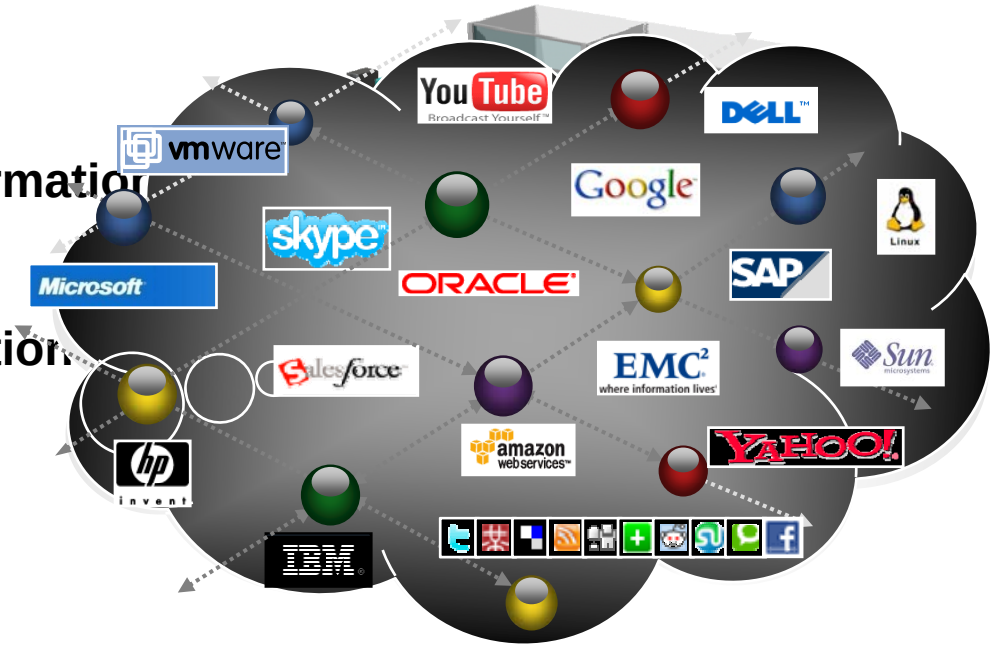


차세대 데이터 센터 (NGDC)

Data Center Transformation

- **I/O Consolidation**
  - **Unified IO, Unified Fabric**
- **Virtualized Data Center**
  - **DC Infrastructure Transformation**
- **Automated Provisioning**
  - **DC Operation Transformation**
- **Green Data Center**
  - **Power, Cooling, Space**

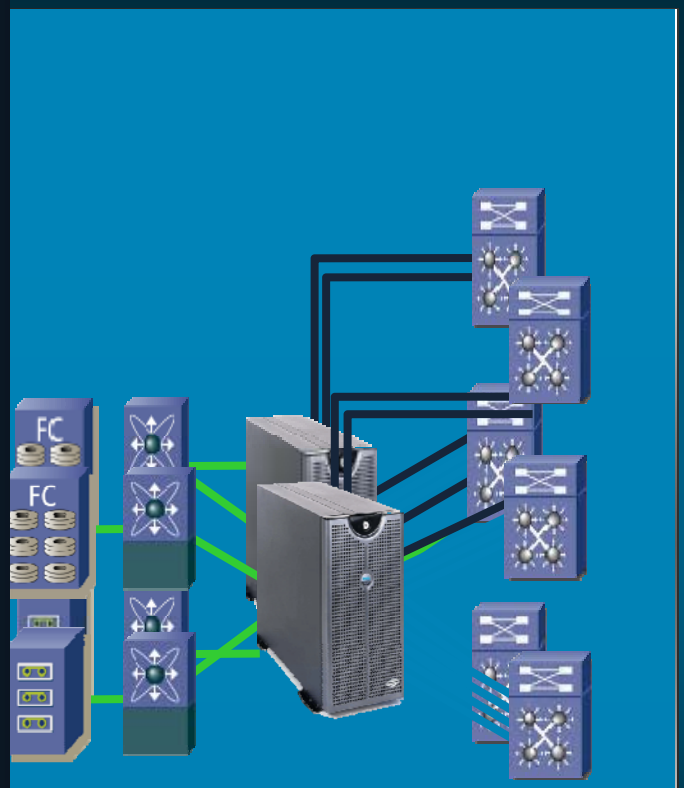
- **Cloud Services**



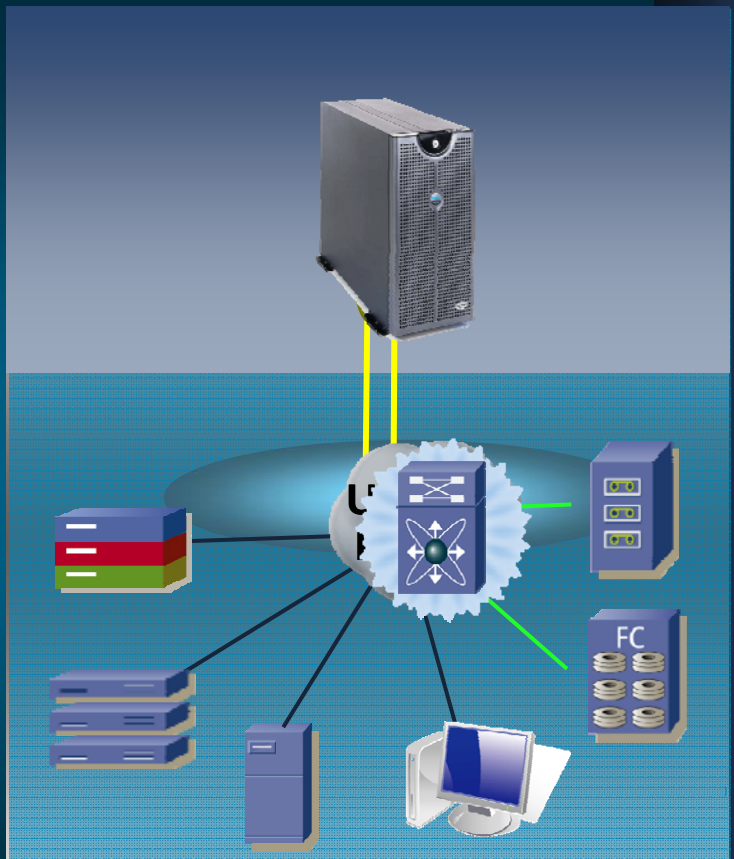
August 23, 2007
Next-Generation Data Centers - A First Look At The Future Of Data Center
(IDG NGDC Conference in SF (2007.8))

데이터 센터 인프라

통합 패브릭/ IO 통합



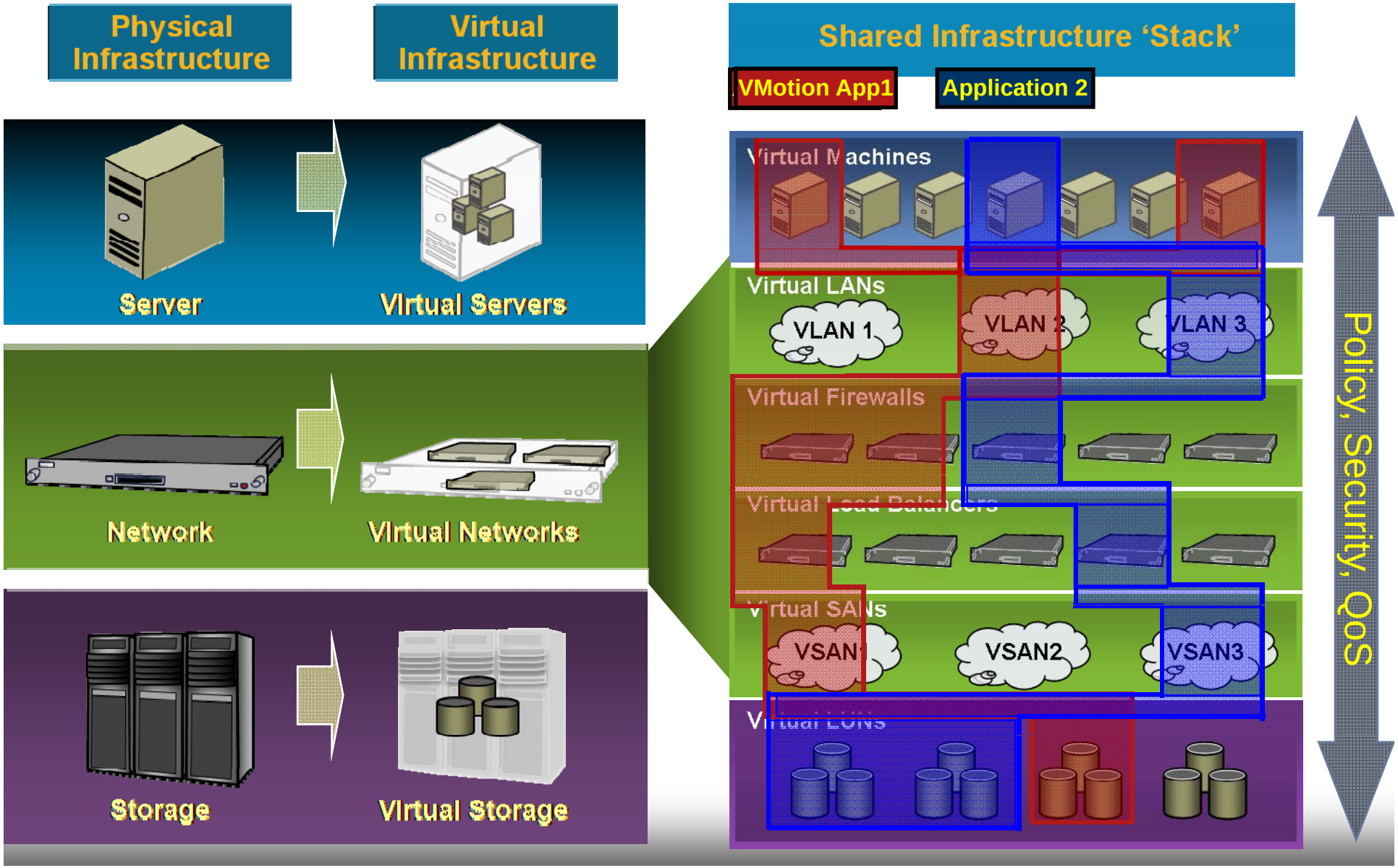
Complexity, Cost, Power



Efficient, Simpler Operations

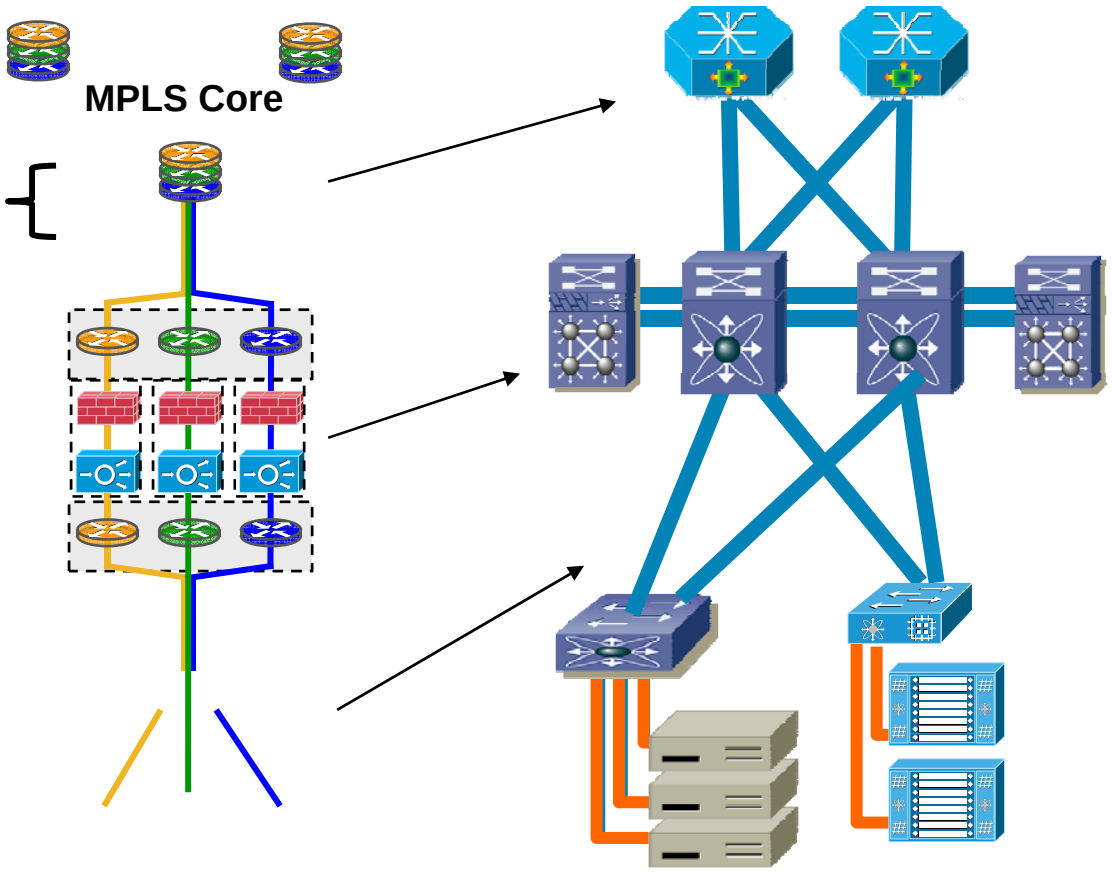
데이터 센터 인프라 / 운영

가상화 / 자동화 프로비져닝



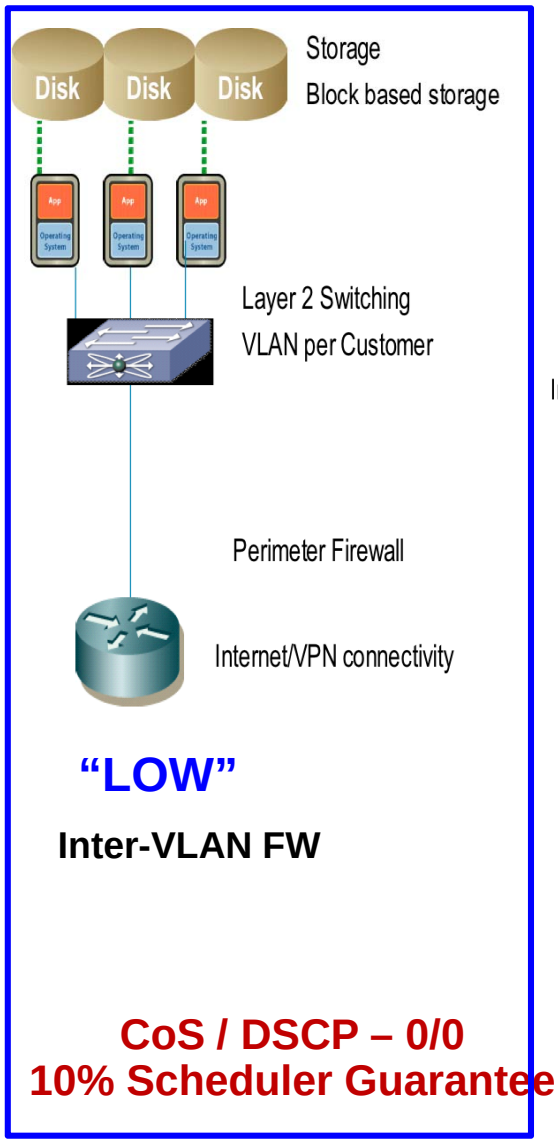
클라우드 설계
전네트워크인프라에 걸친 분리 ***(Segmanetation)***

- **VN-Link** allows per-VM segmentation of traffic with full switching features
- **VLANs and VRFs** keep L2 / L3 customer traffic isolated
- **VDC(Virtual Device Contexts)** further isolate traffic and enhance operations
- **Virtual partitioning of** data center **services** such as **SLB, firewalling**, etc.



클라우드 설계

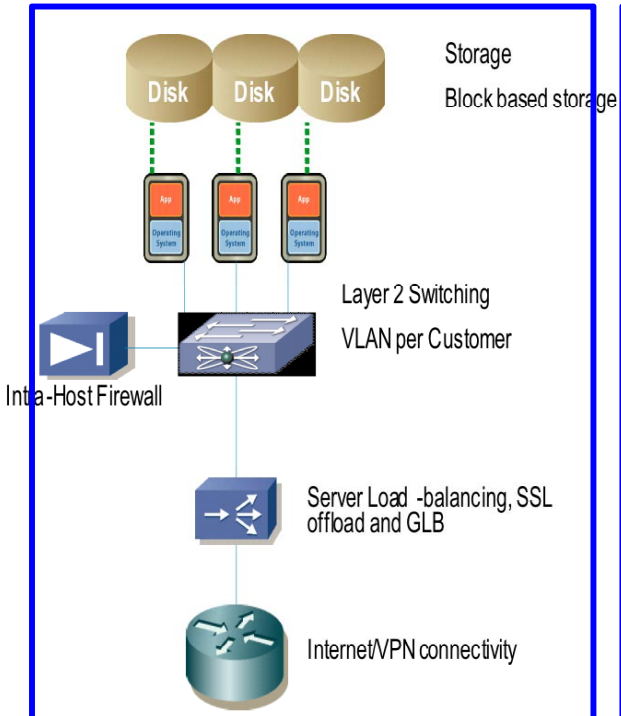
서비스 계층 (Service Tiers) – Security, SLA



"LOW"

Inter-VLAN FW

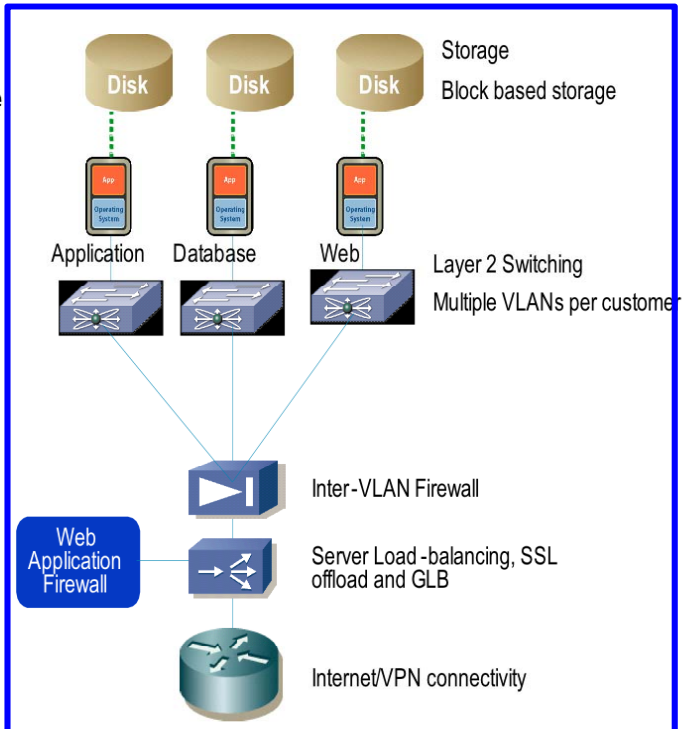
CoS / DSCP – 0/0
10% Scheduler Guarantee



"MEDIUM"

Intra-host (inter-VM) FW
Virtualized FW via IP ACL Redirect
No VMotion

CoS / DSCP – 4/32
90% Scheduler Guarantee

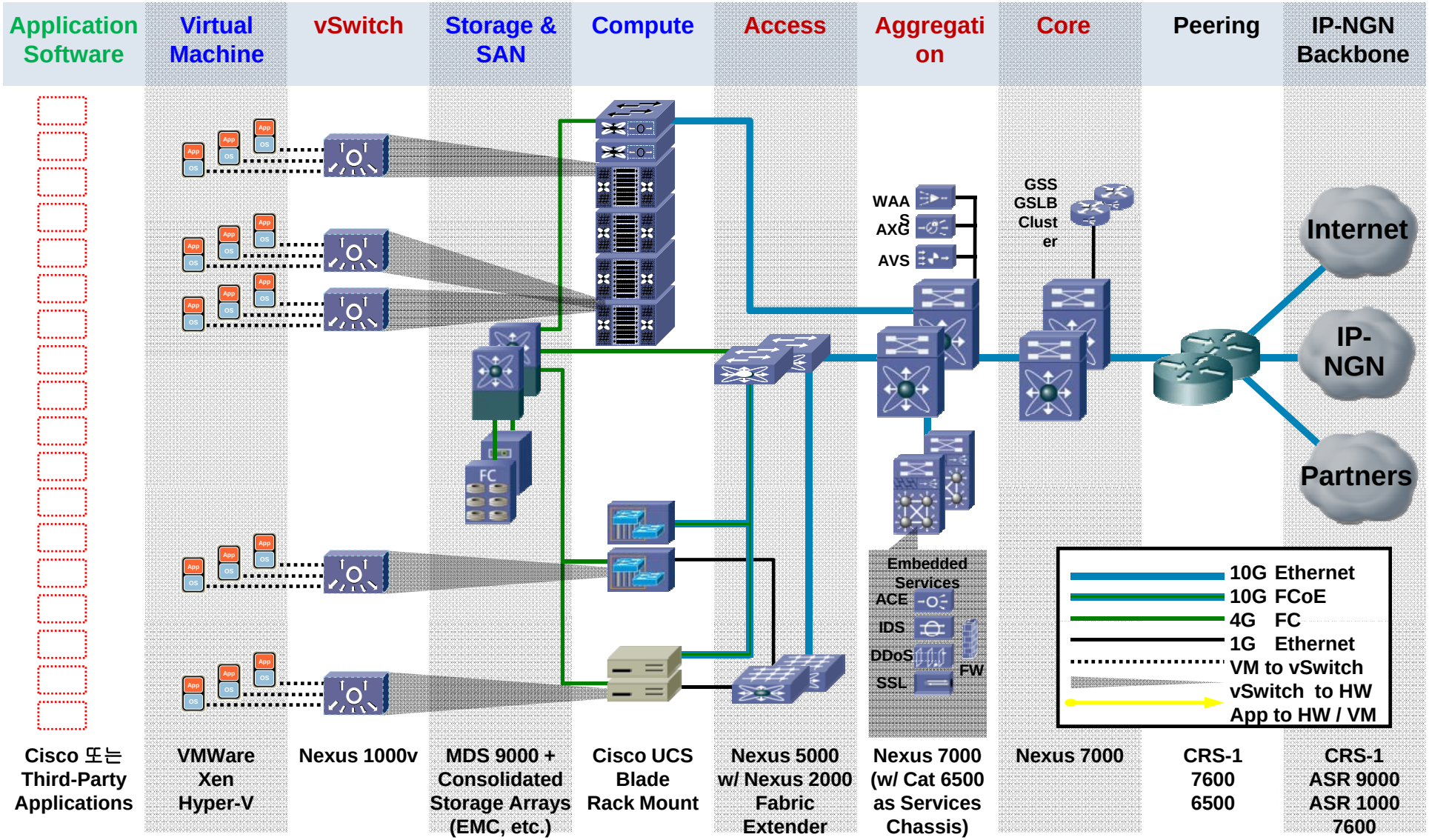


"HIGH"

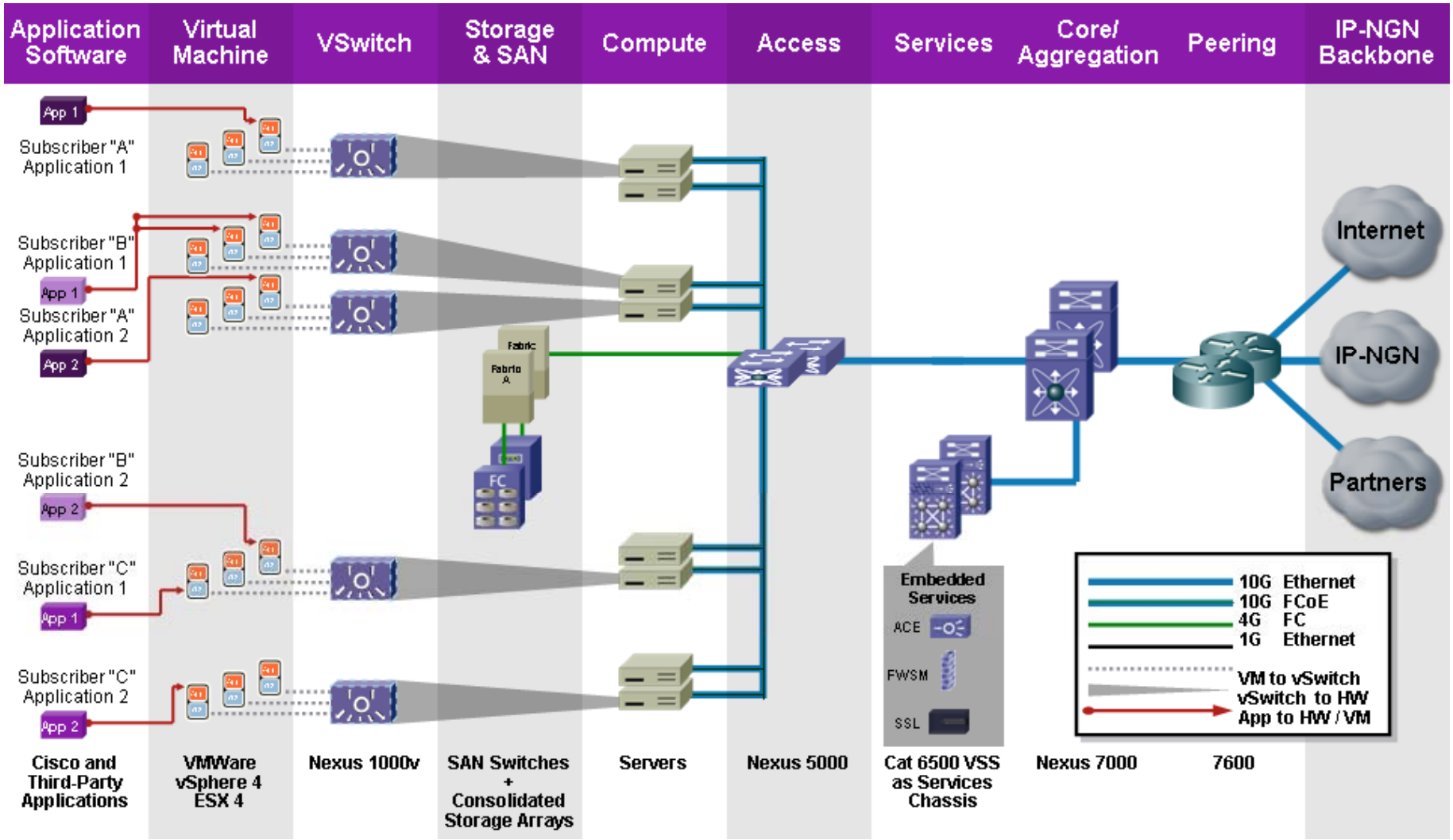
Inter-VLAN FW
WAF Firewall
Intra-VLAN Policy Enforcement (FSWM)

CoS / DSCP – 5/46
Priority (no police)

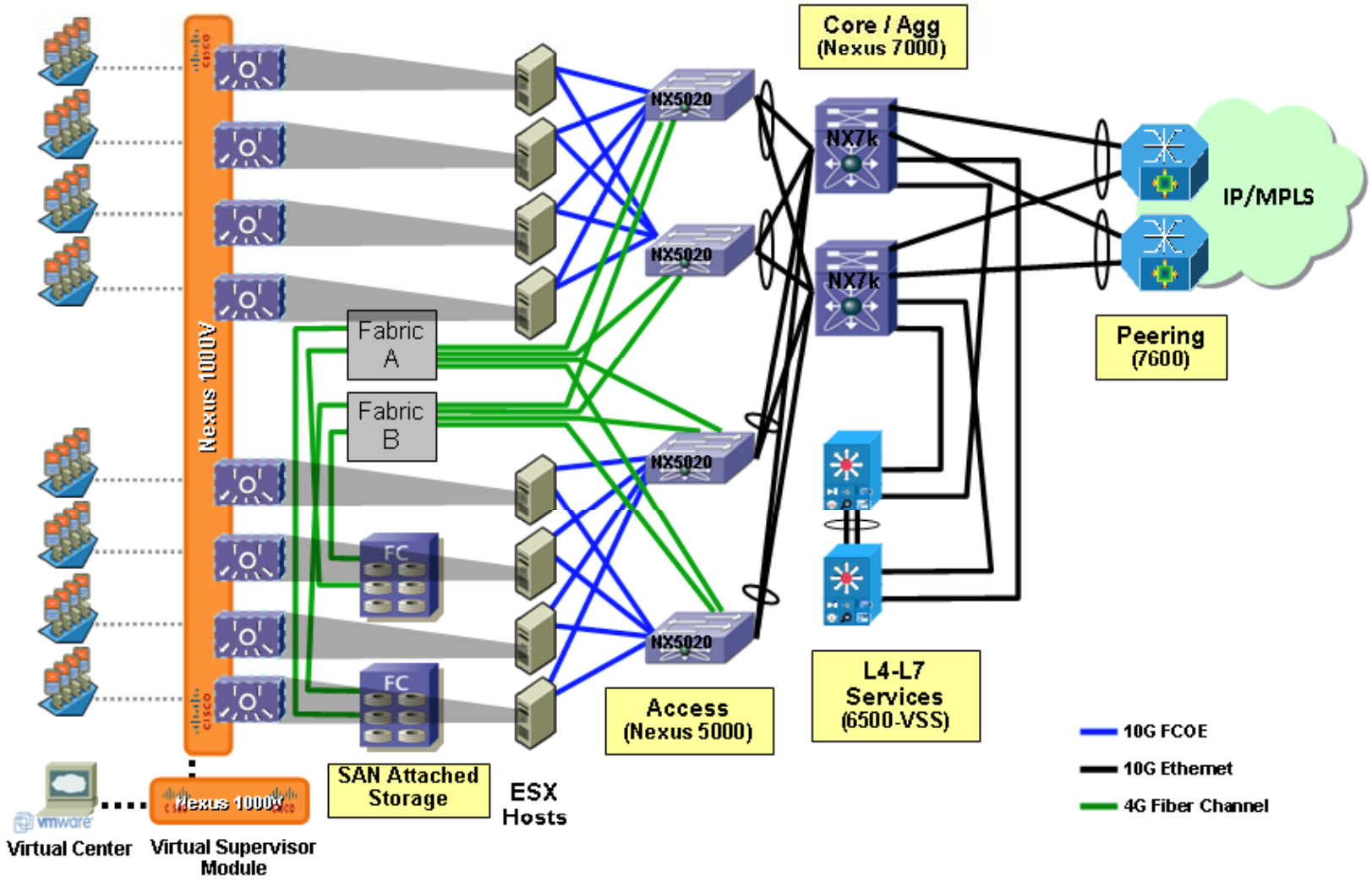
시스코 클라우드 플랫폼



IaaS 솔루션 아키텍쳐



IaaS 솔루션 토폴로지

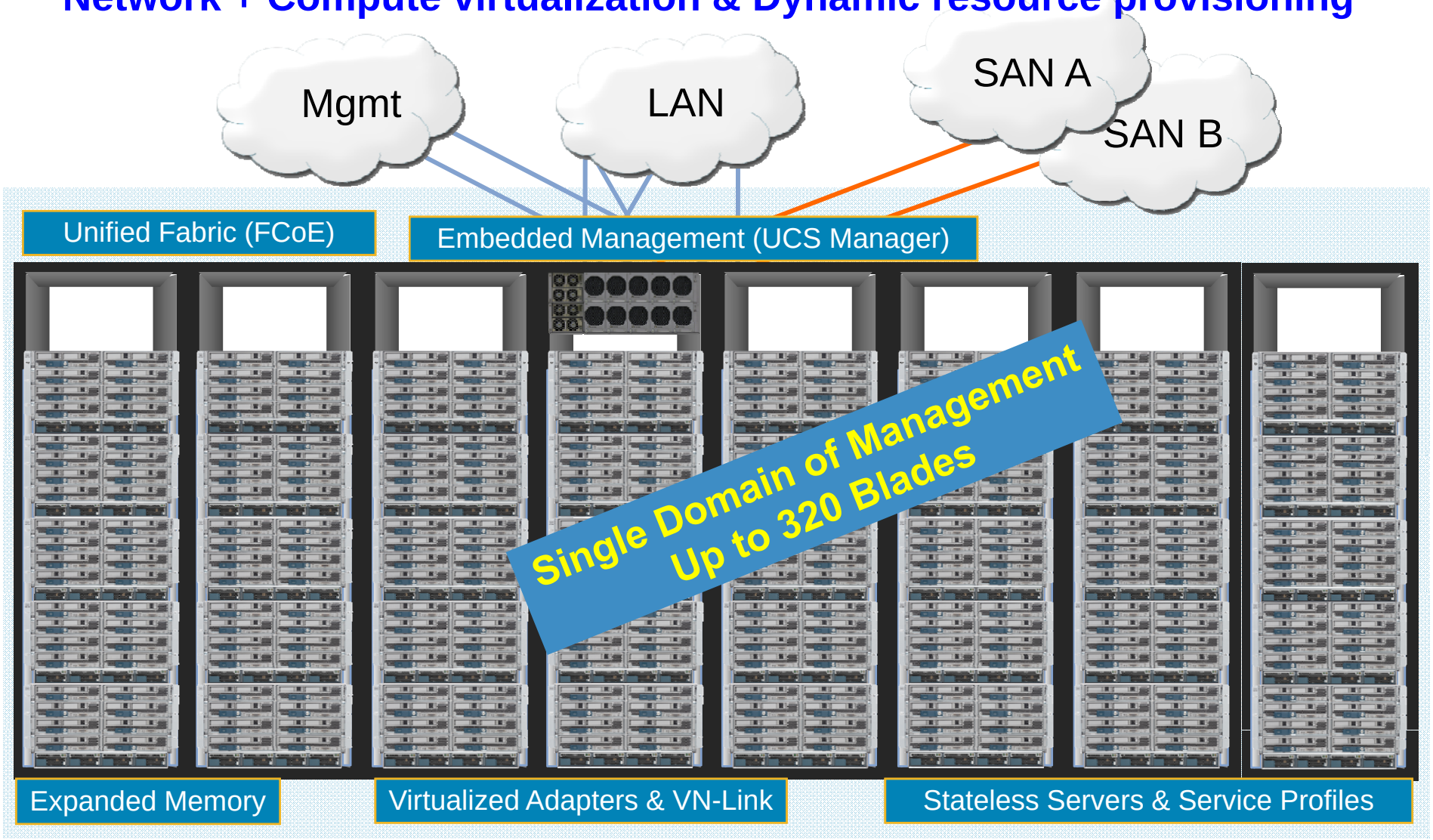


최적의 클라우드 서비스 플랫폼 – 시스코 **UCS**

Cisco Unified Computing System

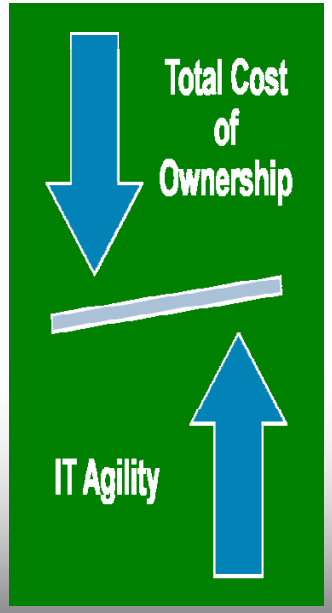
Single, scalable integrated system

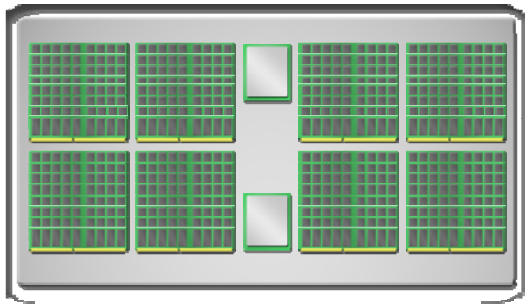
Network + Compute virtualization & Dynamic resource provisioning



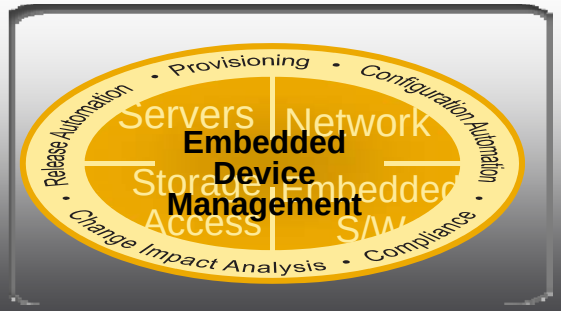
시스코 **UCS**의 **5** 가지 혁신

통합 패브릭
(Unified Fabric)

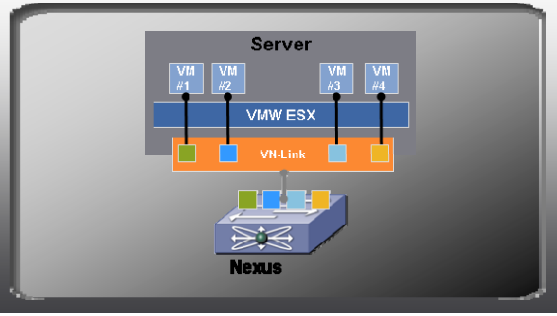




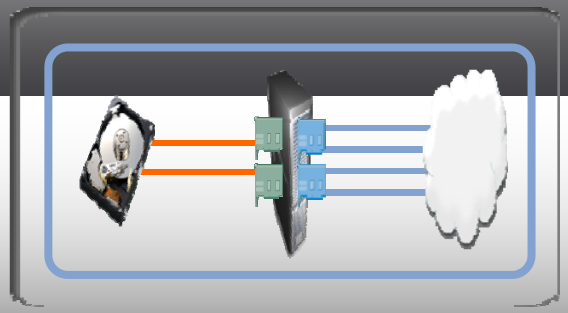
메모리 확장 기술
(Memory Expansion Technology)



통합 관리 시스템
(Embedded Management)



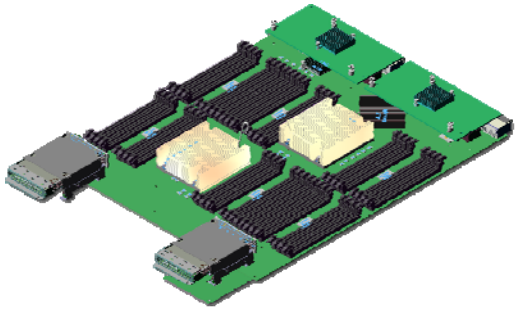
가상화 어댑터
(Virtualized Adapter - VN-Link)



동적 프로비져닝
(Dynamic Provisioning)

Cisco Memory Extended Technology

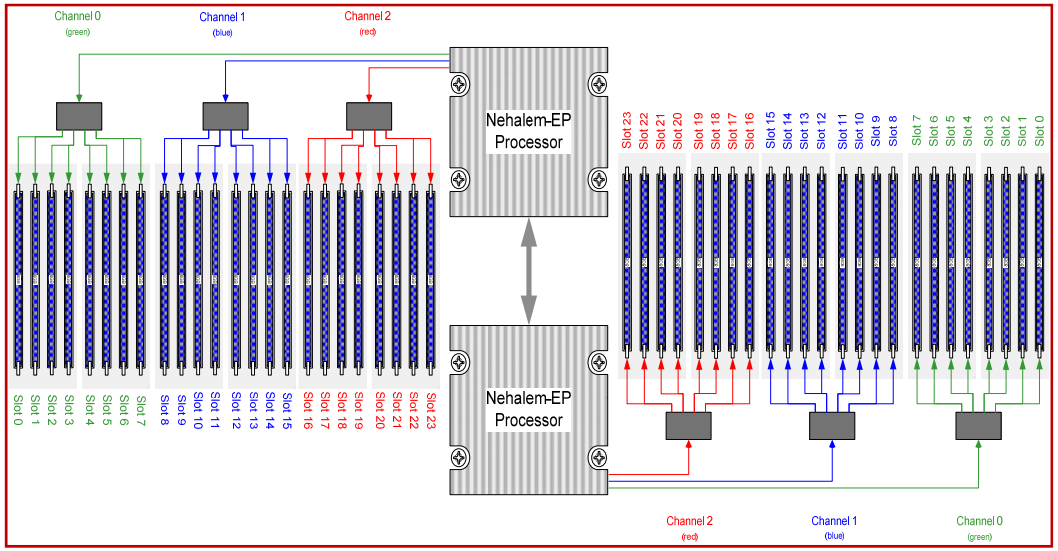
UCS Extended Memory



- 48 DIMM slots in a 2 socket Nehalem-EP blade

  Standard 2 socket Nehalem-EP only supports 12 slots
- Industry standard DDR3 DIMMs
- Up to 384GB per 2 socket blade
- Transparent to OS and applications

4x the memory, 100% standard



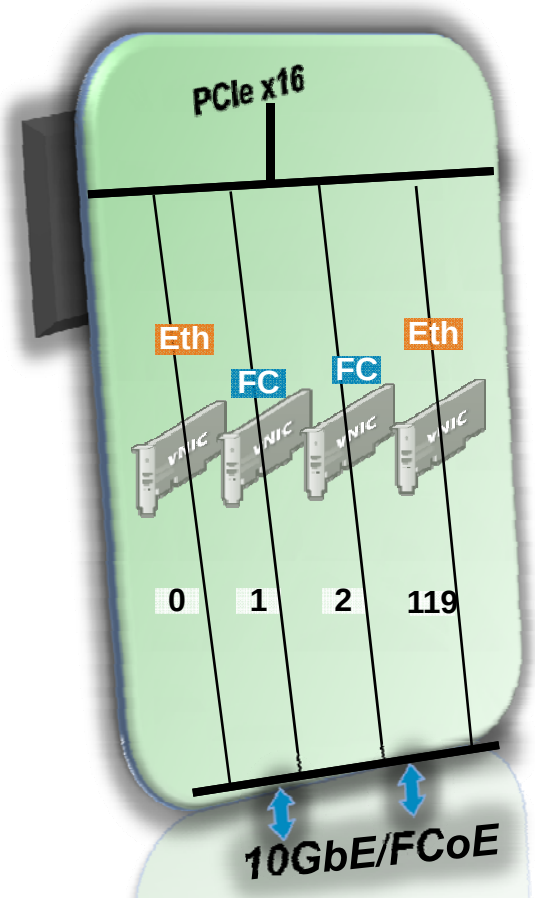
- **Reduced server costs**

  Purchase fewer servers for memory-bound applications
- **Reduced power and cooling costs**
- **Reduced software costs**

  Most software is licensed on a per-socket basis

Virtualized Adapter

*업계 유일의 **H.W** 기반 **I/O** 가상화 지원*



H.W 기반 I.O 가상화 지원
Cisco UCS Palo I/O Card

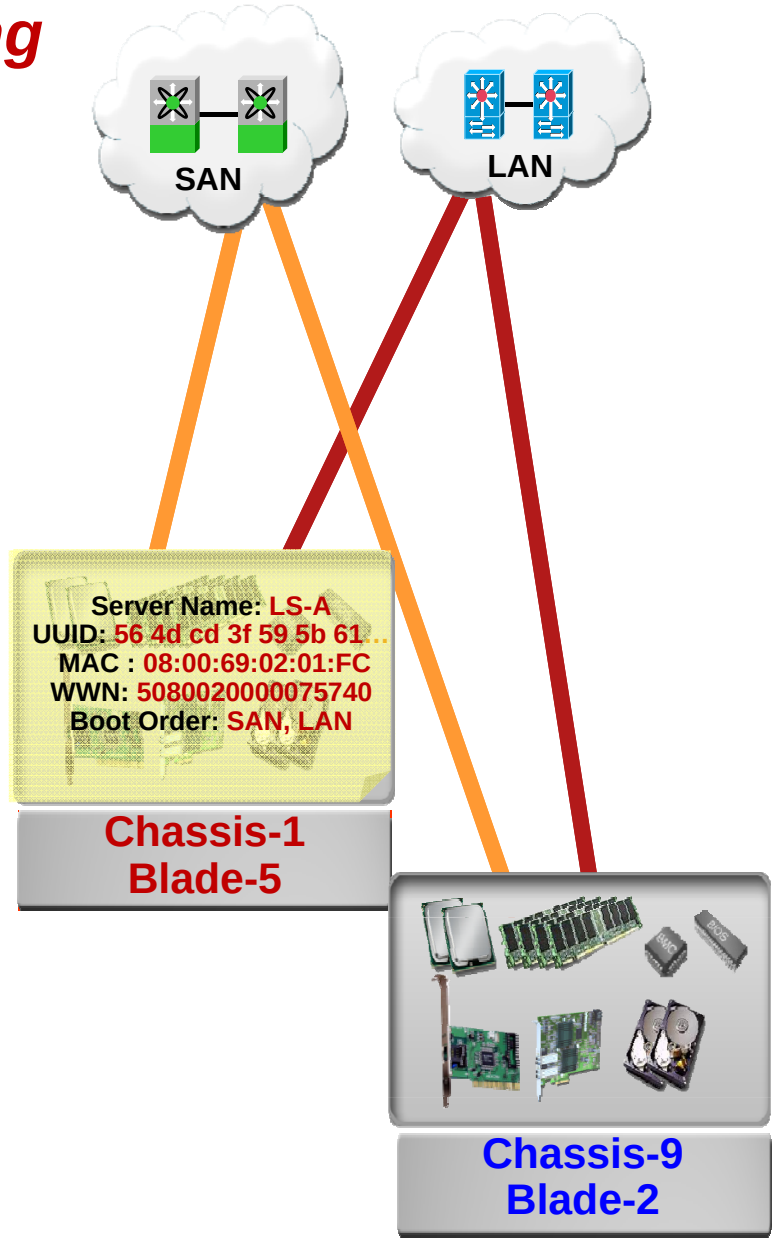
- **H.W기반 가상 I/O기술 업계 최초 지원**
  - Ethernet & Fiber Channel I/O 모두 지원
  - 최대 128개 H.W 기반 가상 I/O 제공
- **표준 기반 구성**
  - PCIe 2.0 x16 , 기본 2Port 10GE Phy
  - FCoE 기본 지원
- **H.W 기반 높은 성능 제공**
  - Cut Through 방식의 3.2 usec 지연속도
  - Real 10Gbps 성능 제공
  - H.W 기반 QoS,ACL,SPAN 등 기능 지원
- **업계 표준 기반 기술 선도**
  - NIV & VN-Link 기술 적용
  - 현재 표준화 진행 중… - 2008년 9월

  Cisco,VMWare 공동 제안

Dynamic Provisioning

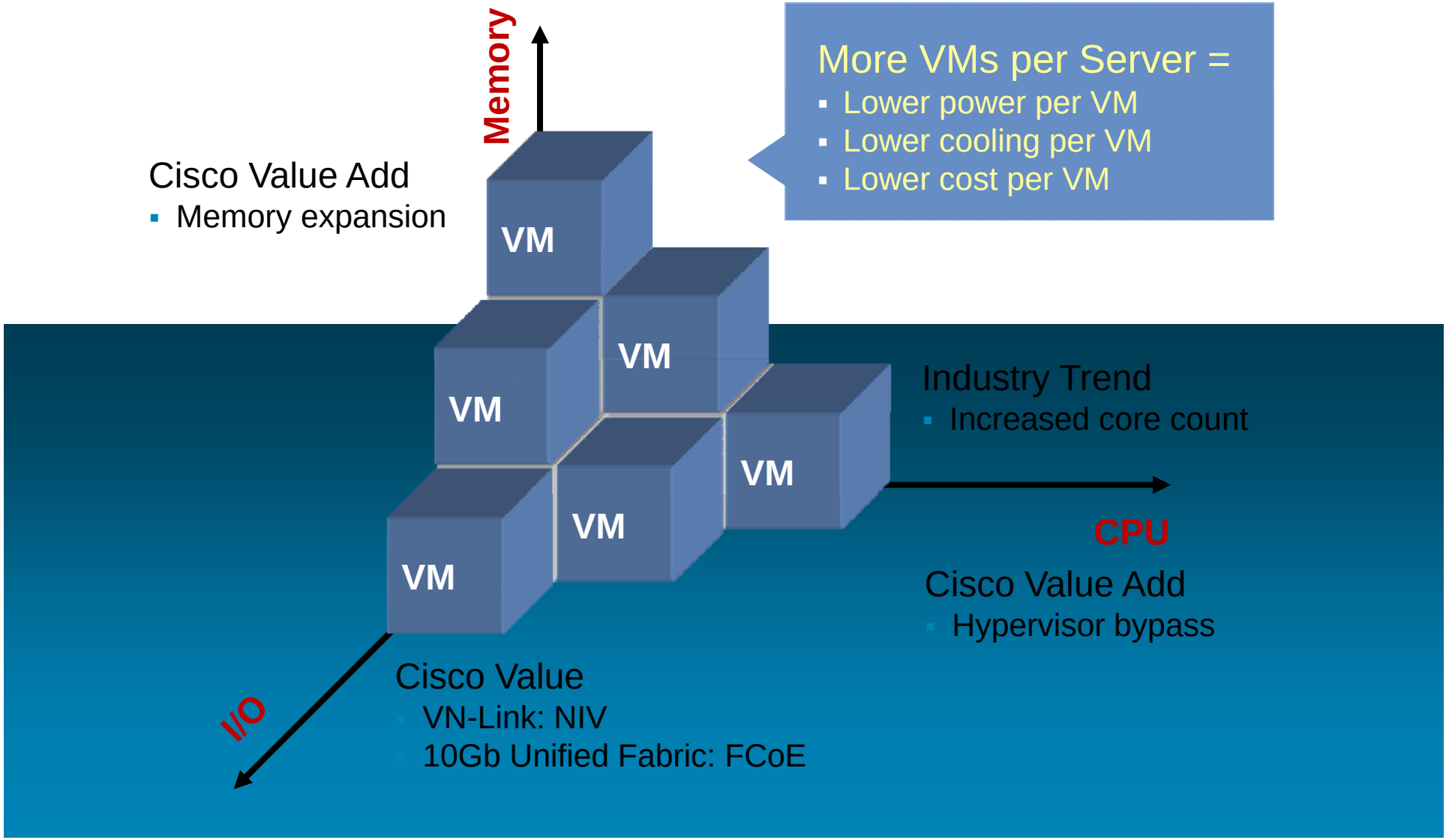
Integrated Stateless Computing

- **Attributes no longer tied to physical hardware**
  - **Not just identity**
  - **Seamless server mobility**
  - **Within interconnect domain**
- **Dynamic Provisioning**
  - **Complete infrastructure repurposing**
  - **Integrated with 3rd party tools**



Cloud Computing Optimized Platform

Virtualization Scalability



Cisco UCS Application

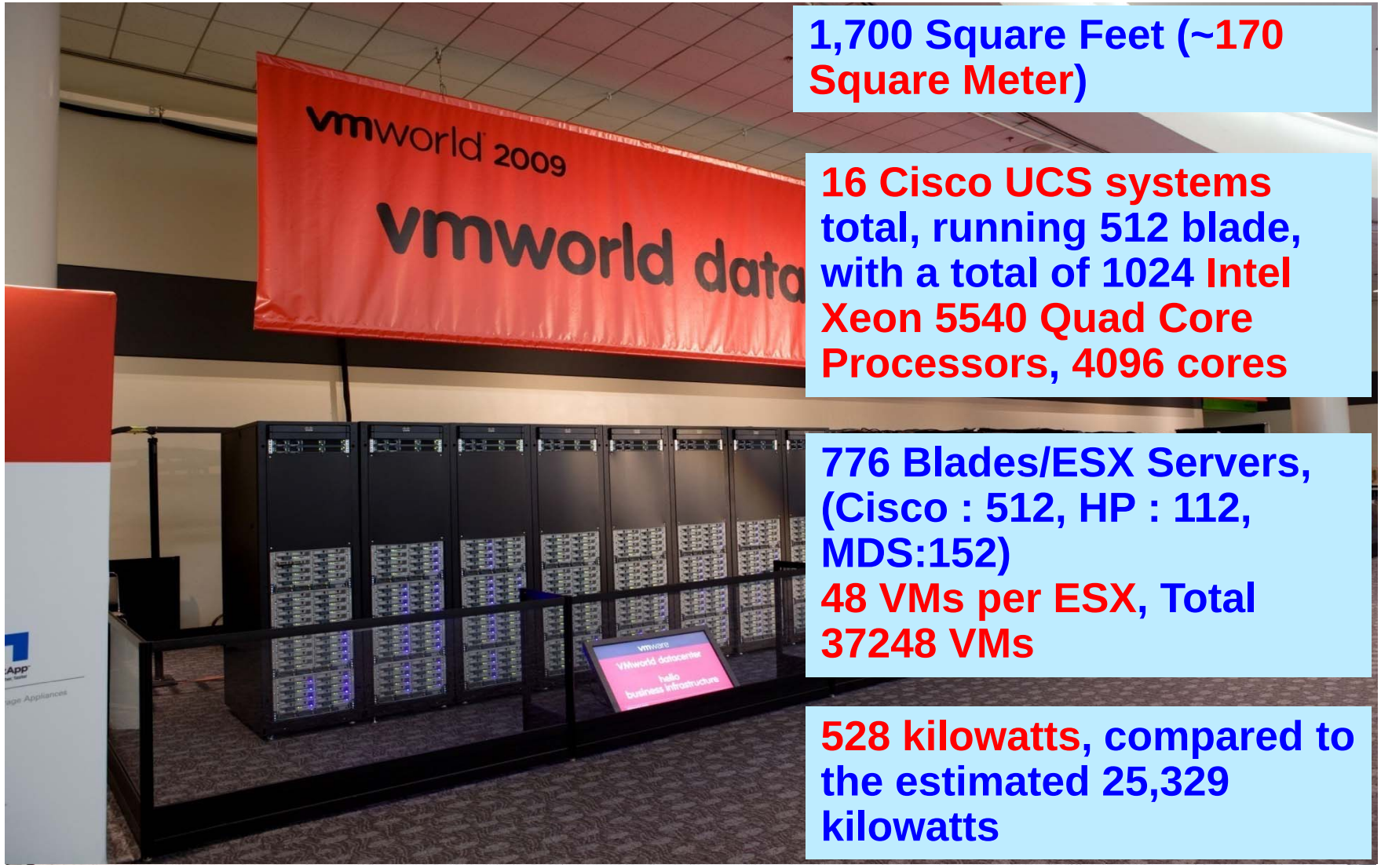
- **Virtualization Platform**
  - **Virtual Infrastructure, VDI**
- **Large Memory Application**
  - **Enterprise – Decision Support, Business Processing**
  - **HPC (High Performance computing)**
- **Cloud Computing**
  - **IaaS/PaaS/SaaS**

결론

차세대 데이터센터 클라우드 서비스 전략

통합 컴퓨팅 아키텍쳐/시스템을 통하여,
가상화 데이터 센터를 구축하고,
클라우드 서비스 를 가능하게 함으로써
클라우드 컴퓨팅의 이점을 극대화

Cisco UCS @ vmworld 2009 in San Francisco



1,700 Square Feet (~170 Square Meter)

16 Cisco UCS systems total, running 512 blade, with a total of 1024 Intel Xeon 5540 Quad Core Processors, 4096 cores

776 Blades/ESX Servers, (Cisco : 512, HP : 112, MDS:152)
48 VMs per ESX, Total 37248 VMs

528 kilowatts, compared to the estimated 25,329 kilowatts

http://www.youtube.com/watch?v=aOnNpBkRam0