Next Generation of Data Centers

A High-Growth Transformational Market

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September 2012

Alcatel·Lucent Enterprise

AGENDA

1. **Alcatel-Lucent**
2. Why Data Center needs to change?
3. What Alcatel-Lucent Enterprise is doing?
4. How we are doing it?
5. What you will get?

Alcatel-Lucent at a Glance

- **Headquarters:** Paris, France
- **Annual Revenues:** $22 billion
- **Employees:** 77,000 +
- 130 countries
- More than 100 Employee Nationalities

R&D PROFILE

- Annual Budget: $3.5 Billion
- Active Patents Held: 30,000+
- Patents Awarded in '10: 2,400
- Nobel Prizes Won: 7

THOMSON REUTERS
TOP100
GLOBAL INNOVATORS
2011

Alcatel·Lucent Enterprise

MIT`s 50 most innovative companies

Alcatel-Lucent
Apple
Dreamworks Animation
Dropbox
Facebook
Google
Intel
Spotify
Twitter
Etc.

Alcatel-Lucent is the only networking company on that list!

Alcatel·Lucent Enterprise

Bell Labs: Unrivaled Research Breadth and Depth

Since 1925!




Research

in Mathematics, Physical Sciences, Nanotechnology, Convergence and Computer Science

LIFE-CHANGING TECHNOLOGIES


- Transistor
- Cellular Telephony
- LASER
- UNIX
- DSL

RECENT BREAKTHROUGHS

- lightRadio™
- 100G optical transmission
- DSL Phantom Mode (300 Mbps!)
- 400G Network Processor
- Immersive Communications

Alcatel·Lucent Enterprise

The Alcatel-Lucent Story

Service Providers

High Leverage Network

- Universal Access
- Network Evolution
- Application Enablement
- Operational Trans-formation

Enterprise

Dynamic Enterprise

- Contact Center
- Communication
- Network Infrastructure

Complete End-to-End Solutions in All of Communications

ALCATEL-LUCENT CLOUDBAND™

Access-Mobile ,Fixed

CLOUD BASED MOBILE CONTROL PLANE

LIGHTRADIO™ λ

MPLS Broadband

Transport, MPLS, IP

CLOUD OPTIMIZED IP ROUTING

- Security
- SaaS Applications
- Awareness
- QoE Assurance

Carrier Data Centers

DATA CENTER CONNECT

Inter-data center fabric to enable virtual resource and service mobility, disaster recovery and optimal server/application placement.

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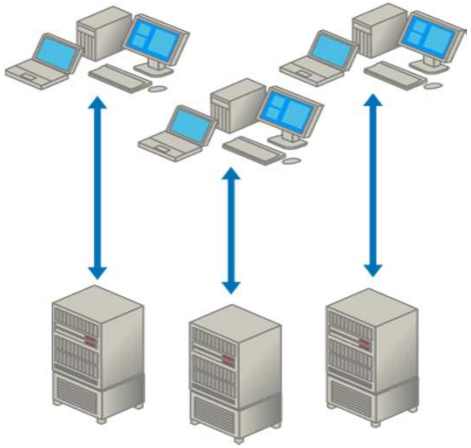
Demand & Traffic Pattern Shift Changed…



~95% Traffic
Client-Server Traffic

- **Fat Client application**
- Dedicated Server for specific applications
- Majority Client-Server traffic

>75%Traffic
Server-Server Traffic

- **Thin-Clients**
  - Web 2.0 applications
  - Smart devices
- Majority Server-Server traffic

Needs Architectural Shift with low latency, 10G & 40G Server Ports

New demands *inside* data center

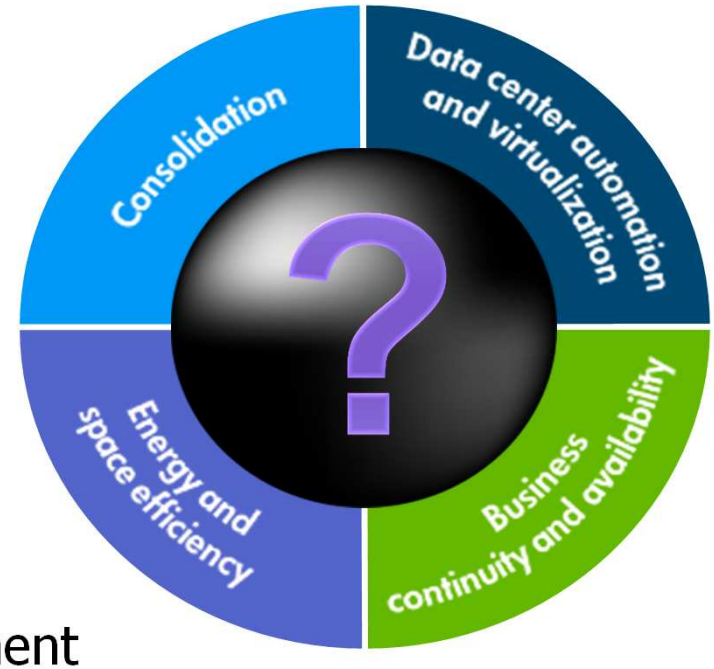
Typical 3 Layer networks needed for port expansion are expensive and Complex!

Better energy & space efficiency are required

Automation is needed for lower OPEX costs

Consolidation & virtualization are key drivers

Data center is now most business critical element



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BUILDING THE NEW DATA CENTER

Strategic view

- Shift spending to business priorities
- Improve business continuity
- Support new initiatives and promote growth

Operations view

- Reduce overall IT costs
- Allow for modular, scalable data centers
- Increase environmental sustainability

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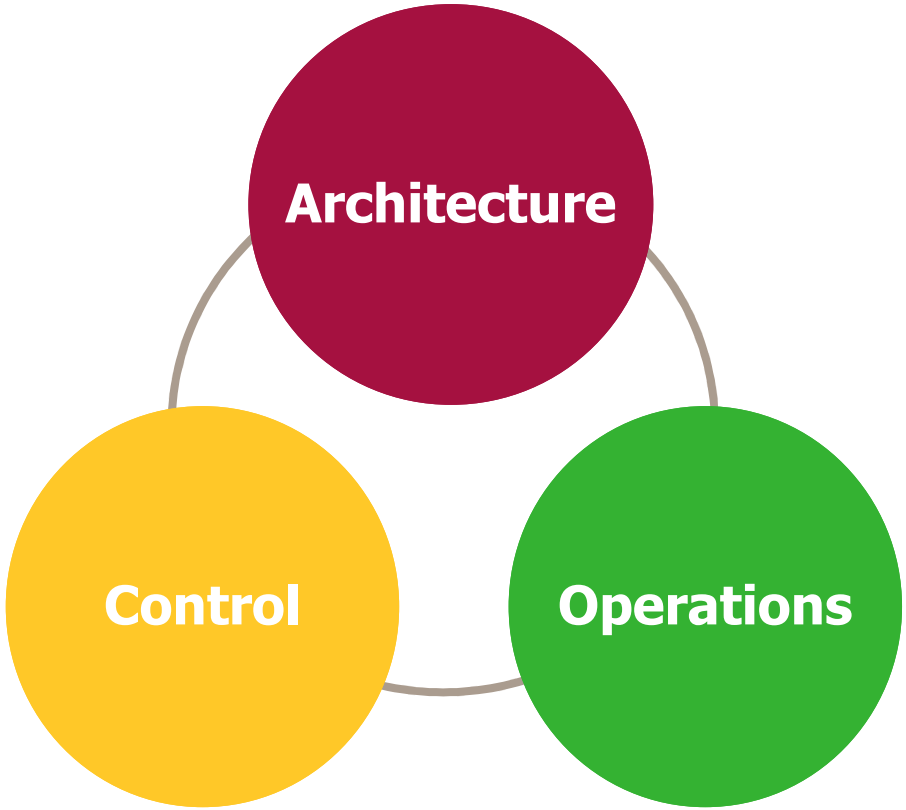
The Application Fluent Network (AFN)



Resilient Architecture

- **S**implified
- **S**calable
- **S**ecure

Automatic Control

- Dynamic Performance Tuning
- Quality Application Delivery

Streamlined Operations

- Low-Touch Provisioning
- Integrated SLA monitoring

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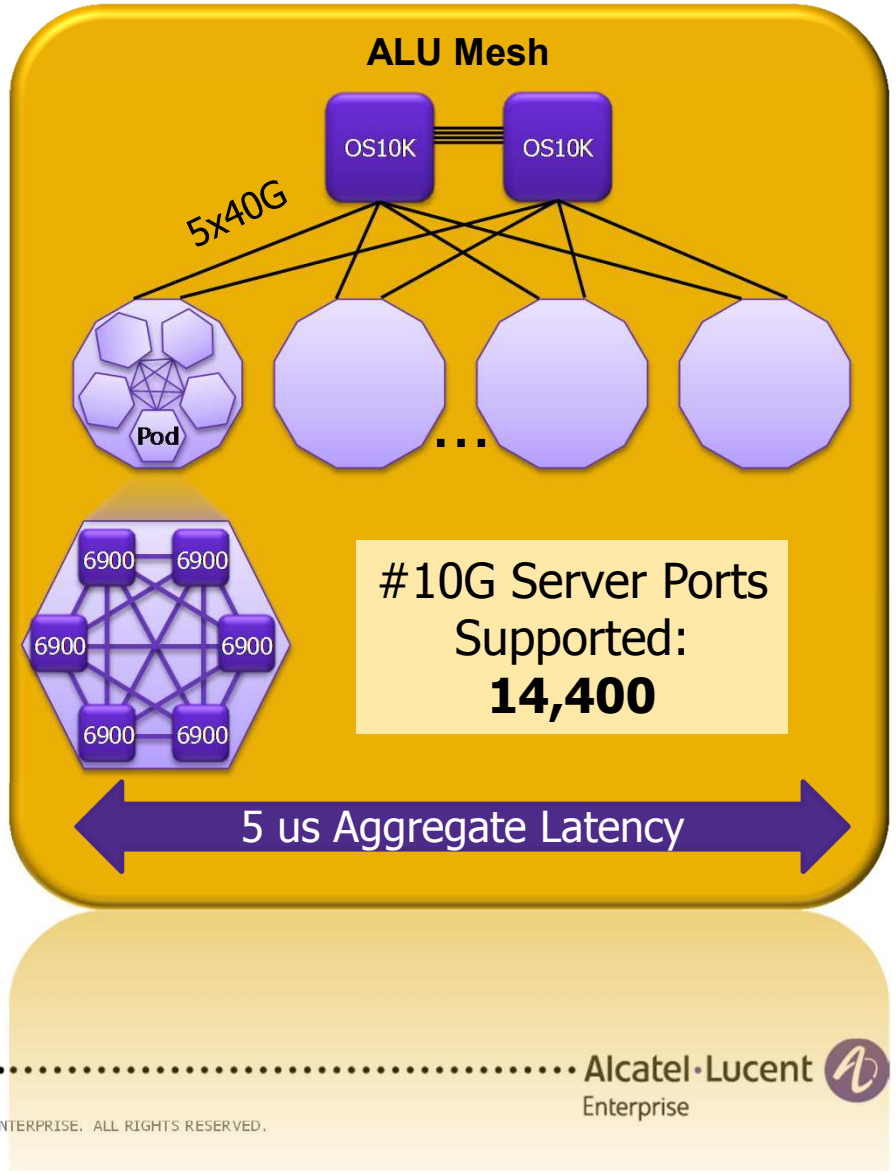
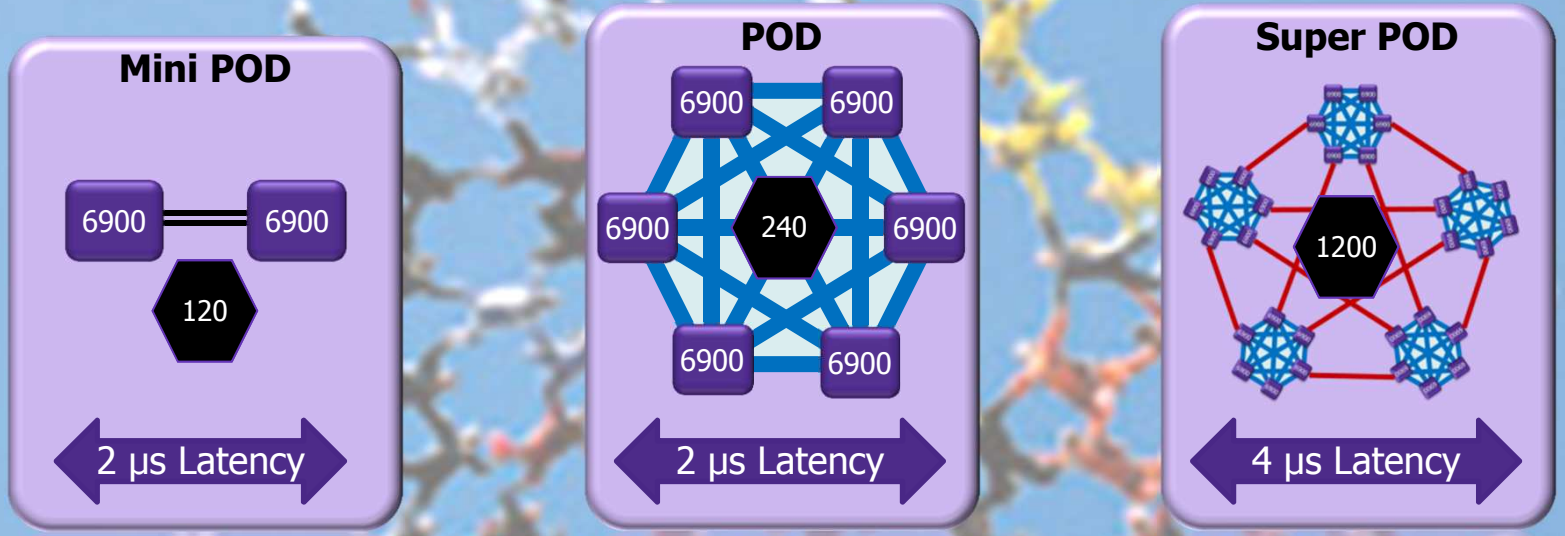
The Alcatel-Lucent Mesh
A Highly Scalable Architecture

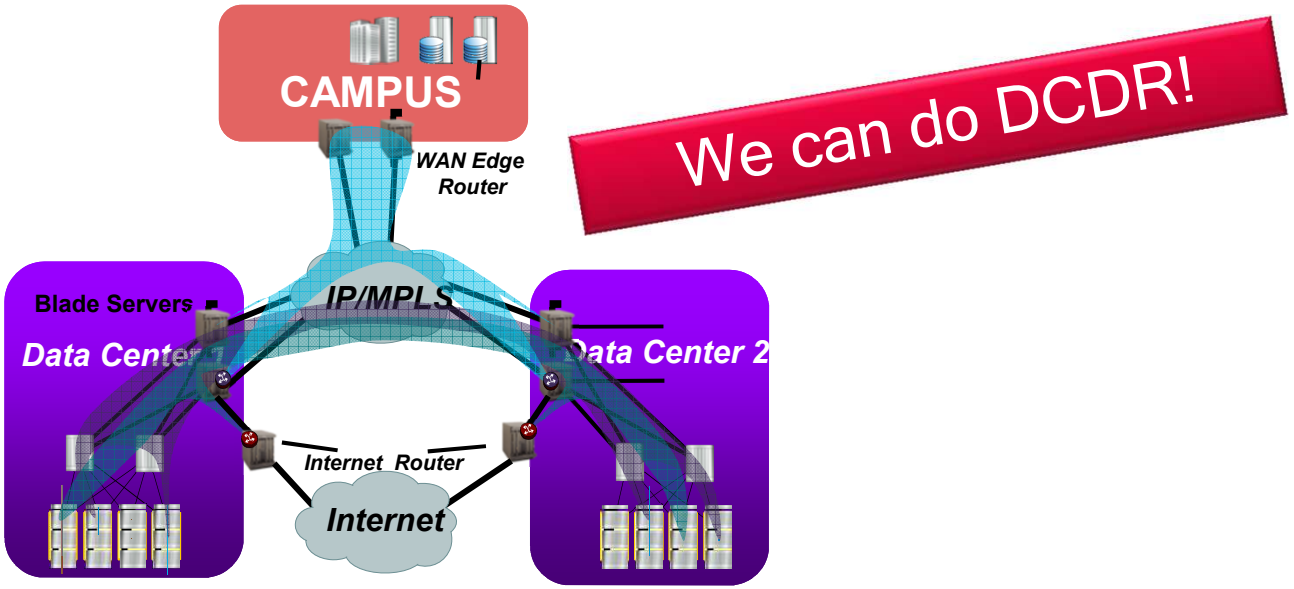
- A full mesh fabric allowing the **scalability** to go from a few hundred elements to thousands of elements
- **No single point of failure**
- Interconnection for
  - **Super POD**
  - **WAN**
  - **DC to DC** (Interconnect)



Extreme Scalability and Flexibility



Data Center Interconnect (DCI)
Unique WAN + LAN + VM Benefits



WAN

- Scalable interconnection of DC: **PBB/VPLS**
- End-to-end orchestration: VM + Network provisioning automation
- **Network configuration follows VMs across DCs**

The Benefits of Service Routers
Cloud-Ready, SP Proven

	IP Routers	Service Routers
VM Movement	Not possible	VPLS technology
DC Interconnect	No scaling	SPB and VPLS
Converged Networks	No traffic engineering	Enhanced QoS

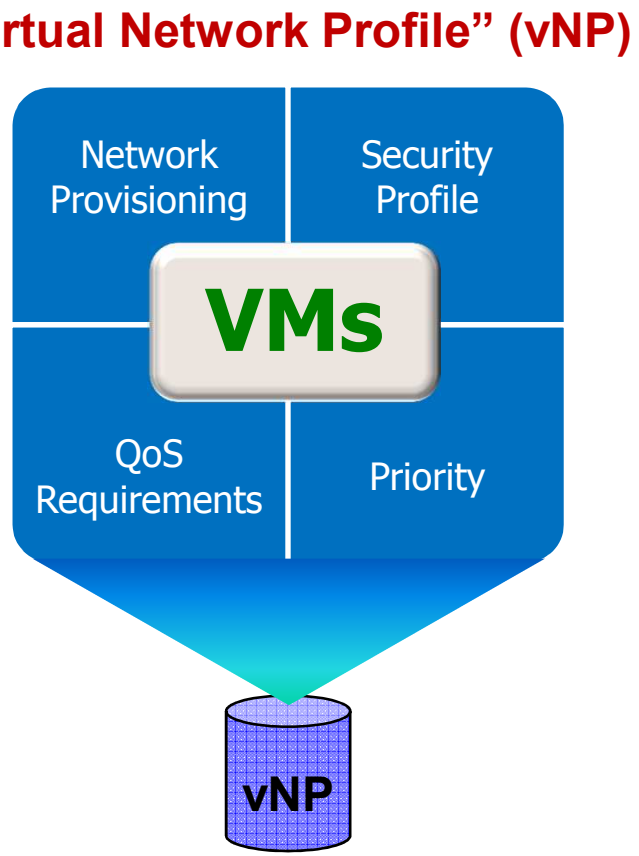
Applications Managed as a Service (vNP)

The Network Understands each VM:

- Provisioning requirements
- Security profile
- Expected QoS levels
- Priority of the application for the corporation

Network Automatically Manages VMs:

- Automatic discovery of VM location at creation time
- **Network configuration follows VM moves**
- Dynamic tuning of QoS parameters
- Requested VM moves to minimize latency



Connecting Mesh and Virtualization

Mesh Automatically Adapts with VM Movement

Visibility

- Provides a unified dashboard of switches, ports, hypervisors and virtual machines
- Live and historical data tracking and logging

Provisioning

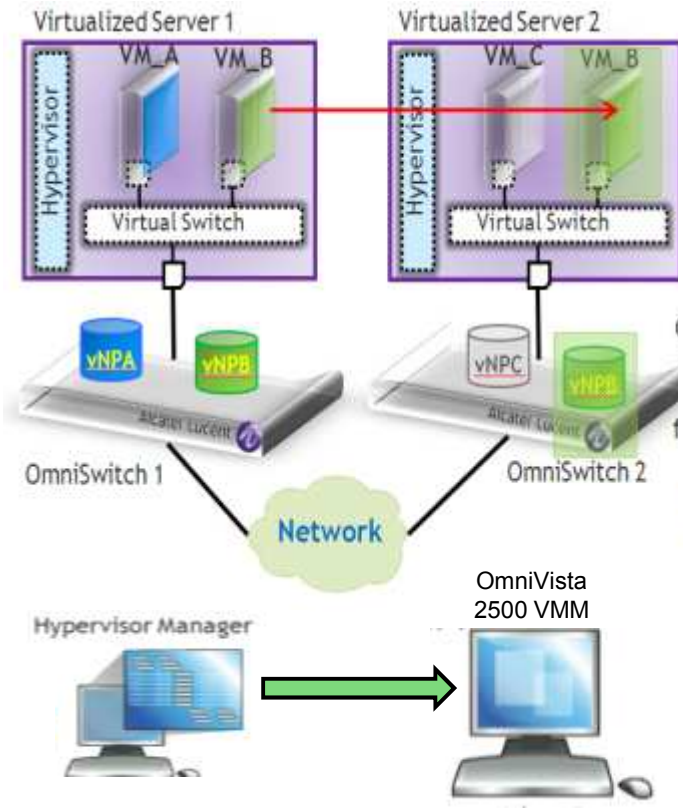
- Definition of bindings between VM and vNP

Movement

- Migration of vNP to new switch
  - Security & QoS parameters, VLAN configuration
  - Add, migrate, remove

Integration & Eco-System

- vCenter, Hyper-V, XENServer and KVM



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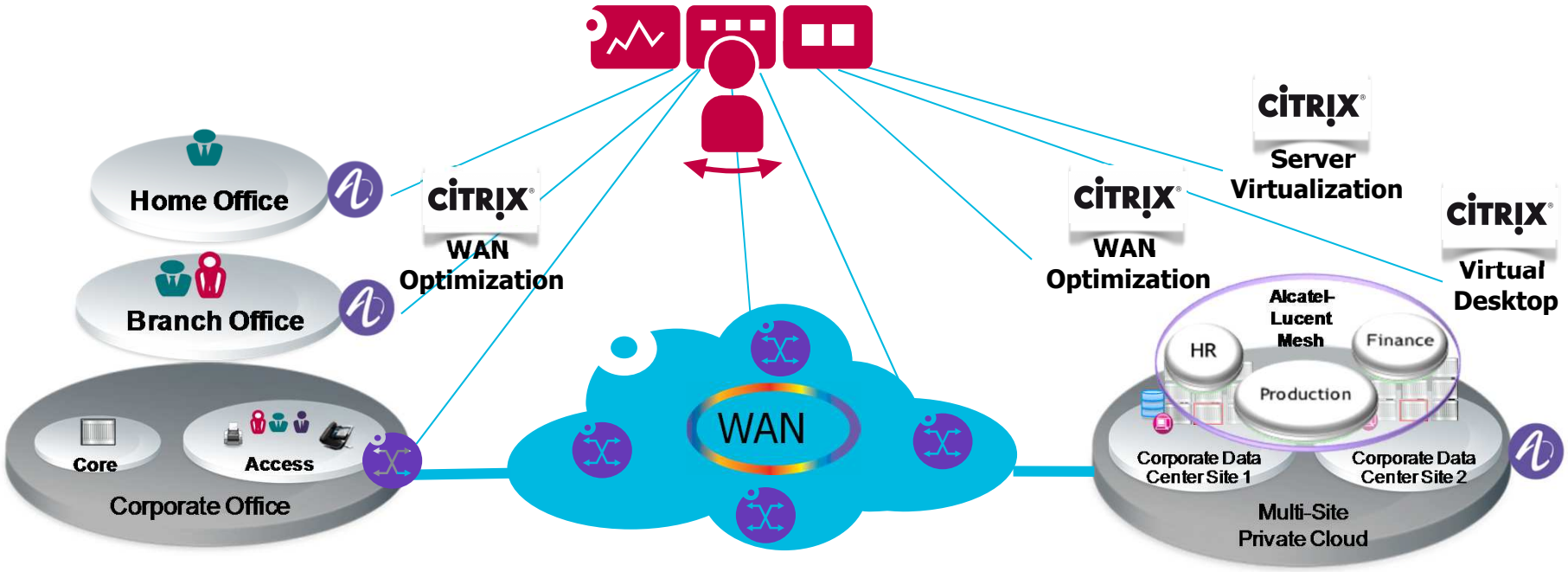
TRILL AND SPB-M
PBB VS TRILL Encapsulation

Function	PBB 	TRILL 
Implementation	Implemented by all major vendors in the SP space	**No existing implementations**
Deployments	**Deployed in major SP's globally**	**Developed for Enterprise campus**
HW support	No change, standard Ethernet	**New dataplane requiring new HW**
VPN Scale	**16 million with VID rewrite**	**4K VLANs**
MAC Scale	**Hides Customer MACs/VIDs from Provider network**	**MAC/VID explosion**
Forwarding	Cut thru switching	**Hop by hop trill header swap**
OAM	802.1ag & Y.1731 deployed for years	**Requires new standards to be created**
Punchline	**Well deployed and proven multi-vendor interoperability**	**Reinventing PBB step by step** as they are becoming aware of the issues already solved by PBB

THE UNIVERSAL SLA
Application Fluency Controls Integrated with Citrix

Quality User Experience

Simplified Provisioning and Management



CONVERGED NETWORK

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DATA CENTER NETWORK

ALU Data Center Directions

- Additional 40G, **10GbaseT**, FC interfaces, 100GigE (OS 10K)
- **Inline IDS/IPS module** in LAN chassis
- **Shortest Path Bridging (SPB)**
- Automation of VM provisioning with new EVB standard

- **Data Center Bridging features** (PFC, ETS, QCN, DCBX) enabling lossless Ethernet from Servers to SAN (iSCSI / FCOE)
- **SIP content-fluency** for voice and video optimization
- Auto-tuning of video application performance through multicast enhancements and traffic probes

- **MPLS LSR for Ethernet private WAN aggregation**
- Virtual Chassis for easier management and uplink performance
- Certified interoperability with Servers, NMS, SAN references

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WITH NEXT GENERATION DATA CENTER YOU WILL GET

Infrastructure that supports

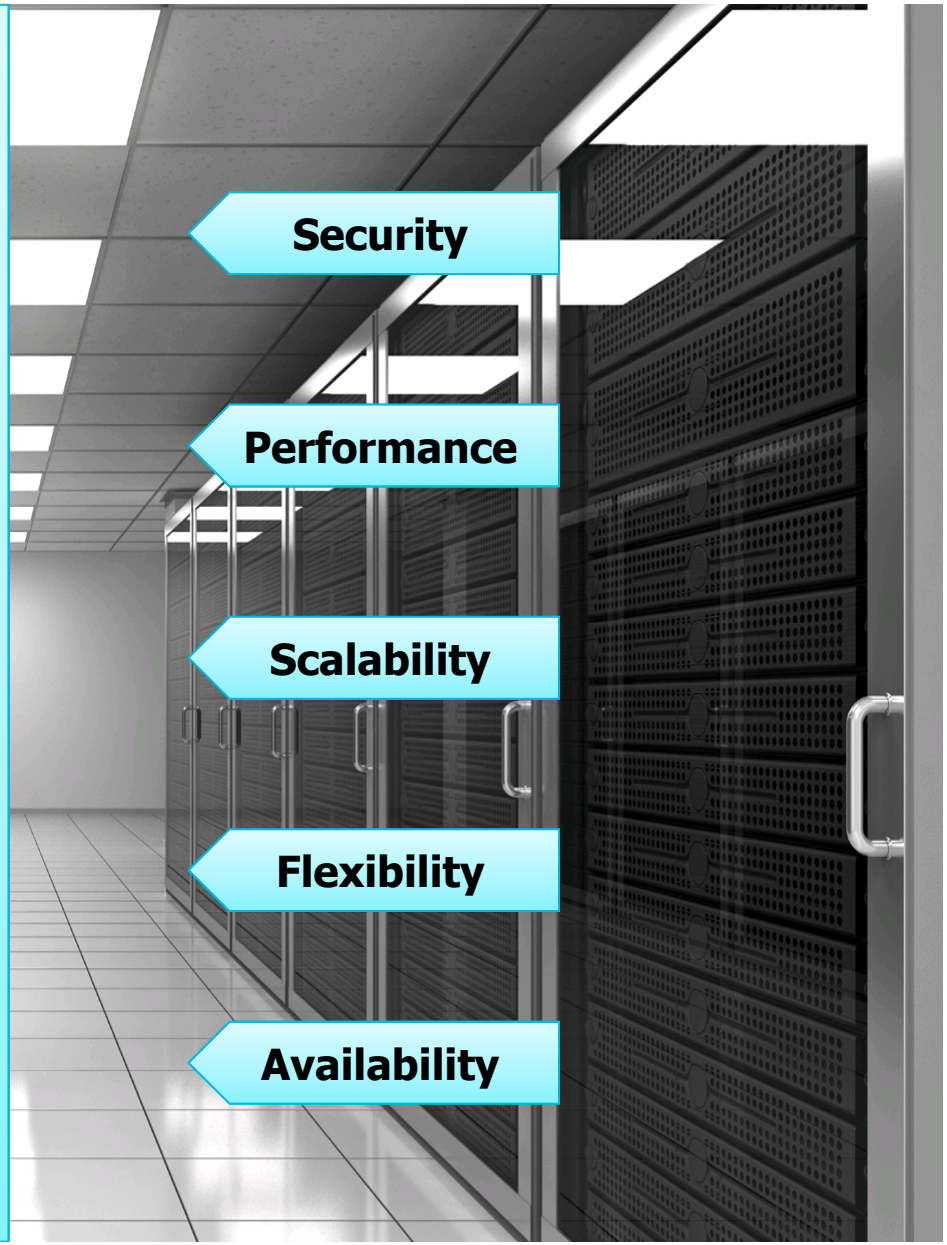
- New, bandwidth hungry, applications
- Multi-media streaming and sharing
- Collaboration

Scalable Architecture supporting

- Fast flat network, less routing
- Virtualization of both network and services
- Traffic pattern shift from north-south to east-west
- Wide eco-system

Peace in mind

- Simplified less error prone network
- Low OPEX cost with automatization
- Flexible, scalable network for future needs & SLA requirements
- Secure & energy efficient solution



Open Standards Based?

No Vendor Lock-in?

Don’t Be Fooled…

Not Every Red Car with a Horse is a Ferrari!

QUESTIONS ???

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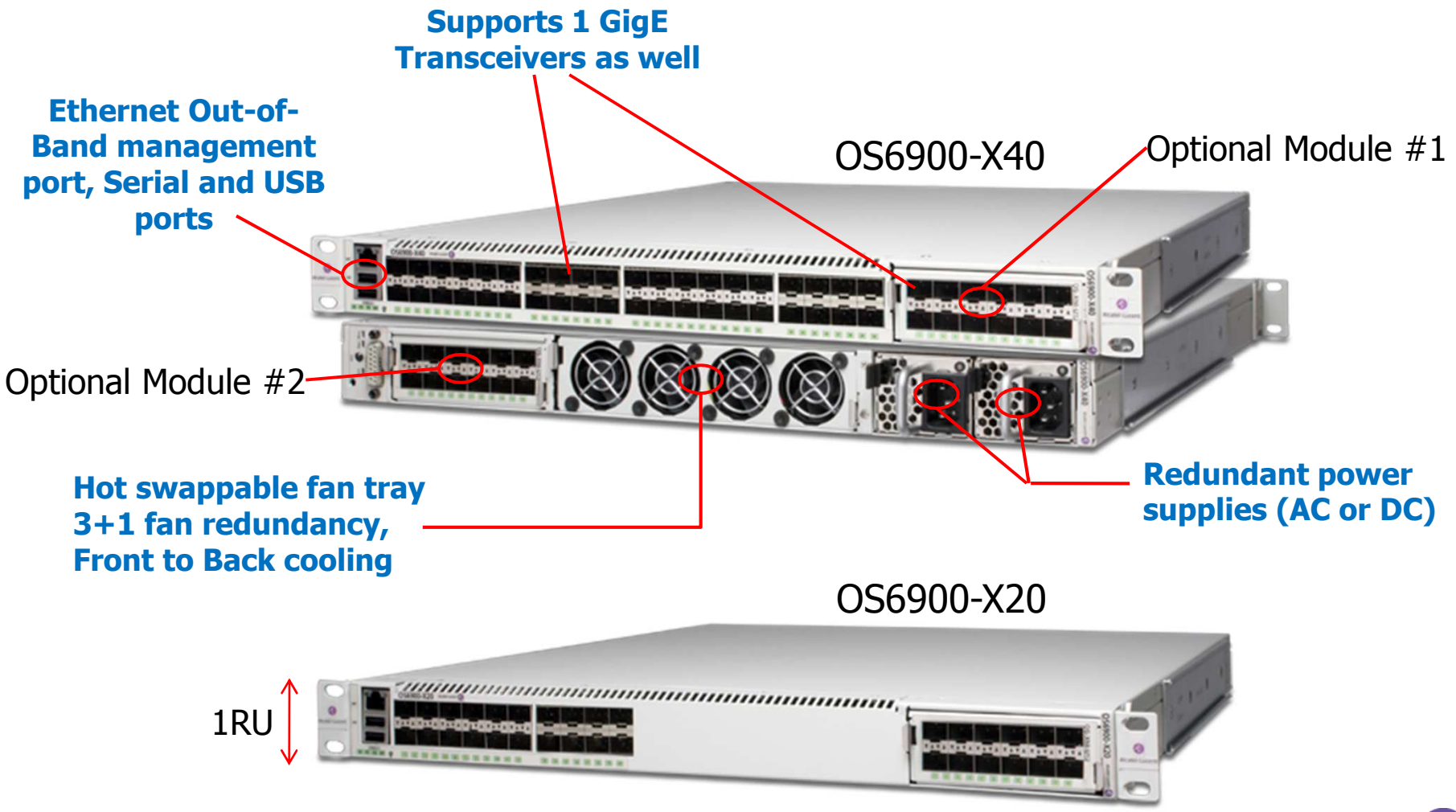
Thank You

BEST OF INTEROP 2011
Data Center & Storage
PRESENTED BY: InformationWeek analytics

Alcatel·Lucent Enterprise

OmniSwitch 6900
Hardware Details

Scale as you grow!



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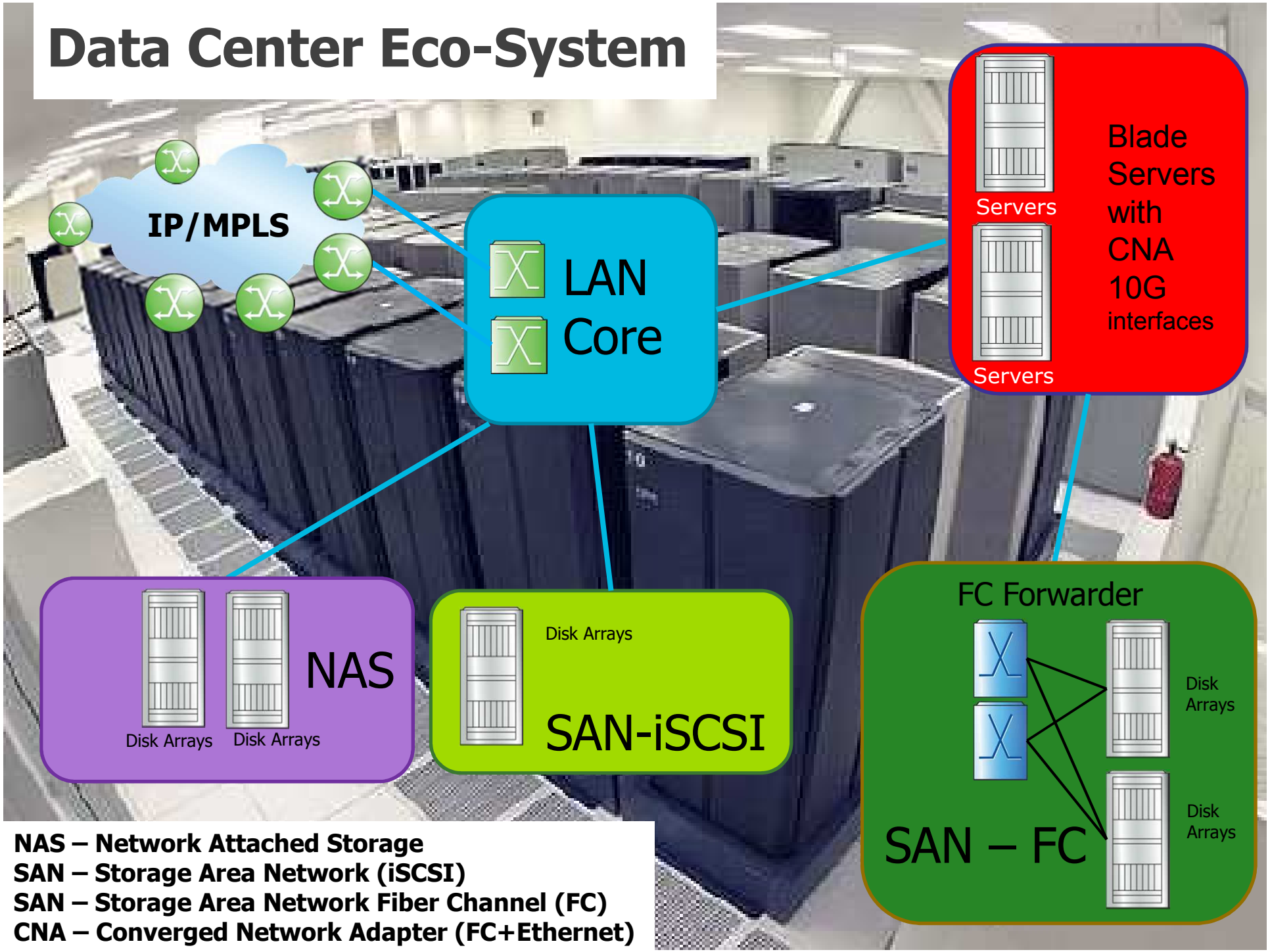
Data Center Eco-System



NAS – Network Attached Storage
SAN – Storage Area Network (iSCSI)
SAN – Storage Area Network Fiber Channel (FC)
CNA – Converged Network Adapter (FC+Ethernet)

TRILL AND SPB-M
FORWARDING