



BROCADE 

Brocade Data Center on Demand

Stanislav Pach

COMGUARD
security & networking

Brocade at a Glance

Company Overview

- Started in 1995
- 4500 people
- 2.3+ Billion Turnover
- SAN Switching 80%+ global market share
- Foundry Networks aquired in 2008
- Top 3 globally for Ethernet Switching
- HQ in San Jose, HQ Europe - Geneva



Brocade Strengths

90%+

Deployed in Global 1000
Company data centers

#1

SAN
marketshare
worldwide

#2

WW data center
networking
marketshare

1400+

Ethernet fabric
customers

**FIRST TO
MARKET**

Ethernet
fabrics

200,000+

Brocade SANs in
production worldwide

~30 MILLION

SAN ports shipped
worldwide

1.3 MILLION+

Virtual routers downloaded
worldwide

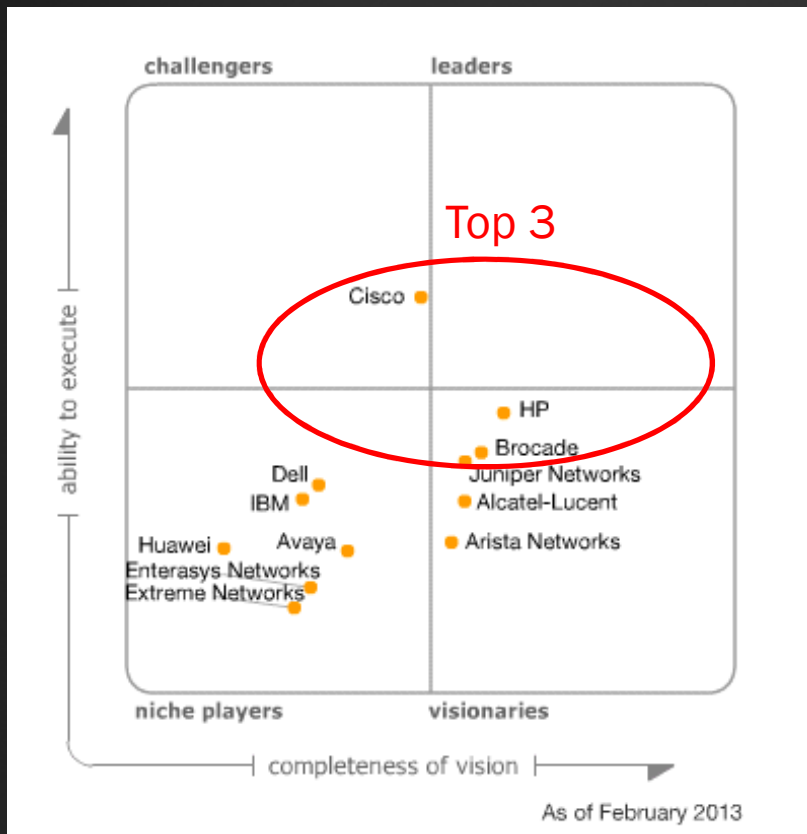
1 MILLION+

OpenFlow router
ports shipped



Gartner Data Center Networking Magic Quadrant

Market Leadership



“Brocade has depth of expertise across all data center networking technologies...The vendor should be considered for the shortlists of all data center network infrastructures and large cloud providers.”

Brocade Product Portfolio

Campus LAN

Layer 2-3



Brocade ICX 6430/6450



Brocade ICX 6650



Brocade ICX 7750



Brocade 6910
Ethernet Access Switch



Brocade NetIron
CES/CER Series



Brocade
MLXe Series



Brocade VDX
Series



Brocade ADX
Series

Service Provider



Brocade FCX Series



Brocade ICX 6610



Brocade FastIron SX Series

Data Center LAN

Layer 4-7



Brocade ADX 1000



Brocade ADX 4000



Brocade ADX 10000

Traditional Ethernet



Brocade FCX Series

Ethernet Fabric



Brocade VDX
6710/6720/6730/6740

Fixed

Layer 2-3



Brocade ICX 6650



Brocade ICX 7750

Chassis



Brocade MLXe Series



Brocade VDX 8770

Ethernet/IP



1860 Fabric
Adapter



1010/1020 CNA



815/825 HBA
415/425 HBA

Adapters



Brocade
Virtual
ADX



Brocade
Vyatta
vRouter

Software Networking



Brocade DCX 8510
Backbones



Brocade Blade FC16-32, -48
Switch Blade



Brocade 6520 Switch



Brocade 6505 Switch



Brocade 6510 Switch



Brocade DCX
and DCX-4S
Backbones



Brocade Blade
Server Switches



Brocade 300 Switch



Brocade 7800
Extension Switch



FC8-64
Blade



FS8-18
Encryption
Blade



FX8-24
Extension
Blade



Brocade Encryption Switch

FC8-64
Blade

FS8-18
Encryption
Blade

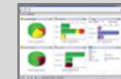
FX8-24
Extension
Blade

Fibre Channel

Data Center SAN

Brocade Network
Advisor

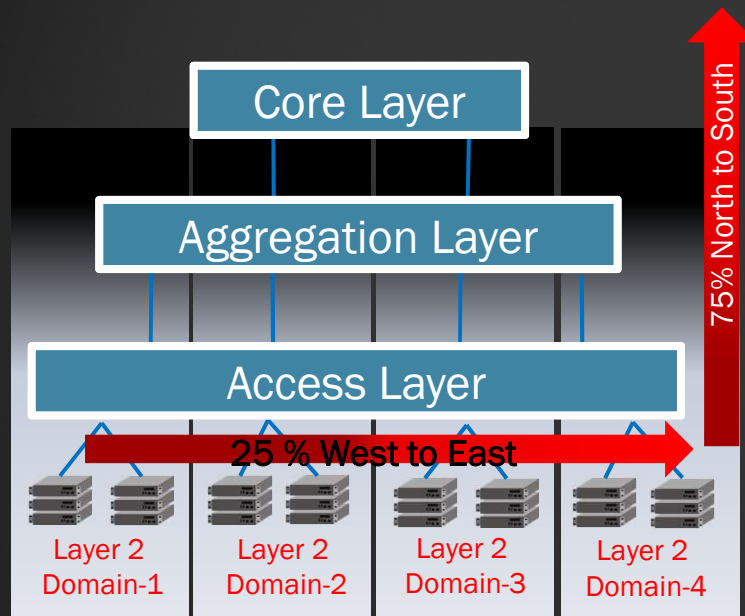
Simplified
Management
(SAN, LAN, VCS
Fabrics, Wireless)



Plug-ins and
Integration

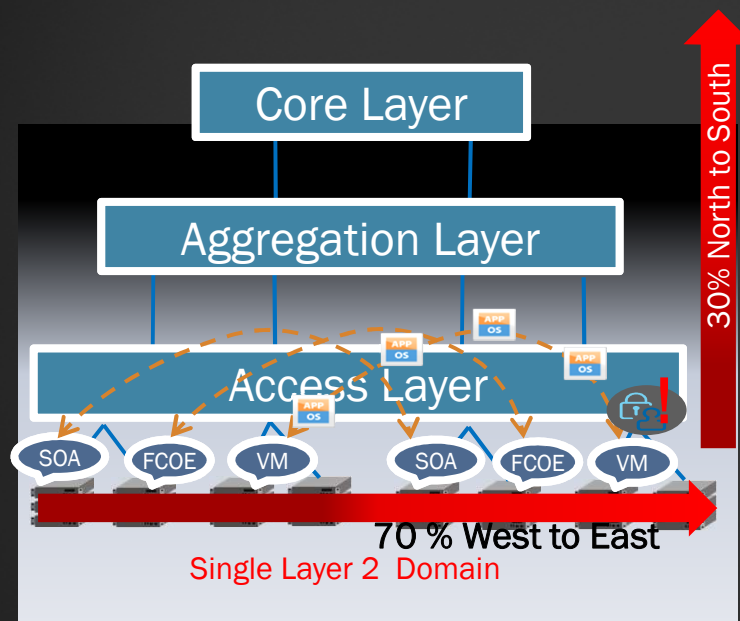


Classic Data Centre



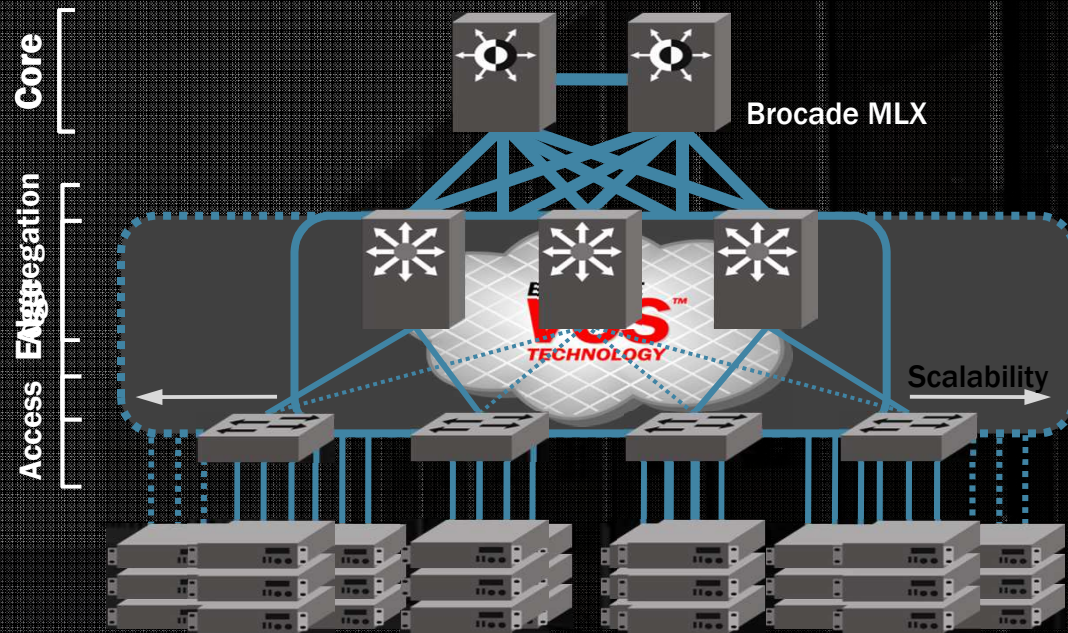
- **Generation One Data Centre**
 - Designed for North to South Traffic
 - Client to Server traffic model
 - Designed for transport, not the application
- **Generic Enterprise Solution**
 - Enterprise technologies -stacking
 - Enterprise topologies- STP, MSTP
 - Enterprise limitations – STP, stacking
 - Minimize Layer 2 fault domains
 - Increased Management footprint
 - Multi-layered, multi-protocol architectures for scalability

The Next Generation Data Centre



- Increased West to East traffic
 - Next Generation Apps (SOA, SAS, Web 2.0)
 - Server Virtualisation (VM) – Server to Server
 - Convergence (FCOE) – Server to Storage
- Drive for applications awareness
 - Applications the business enabler
 - DC designed around the application
 - Network needs to be aware of the apps
- The New DC needs to be flat
 - Single scalable Layer 2 Domain

CLASSIC HIERARCHICAL ETHERNET FABRIC ARCHITECTURE



Servers with 10 Gbps Connections



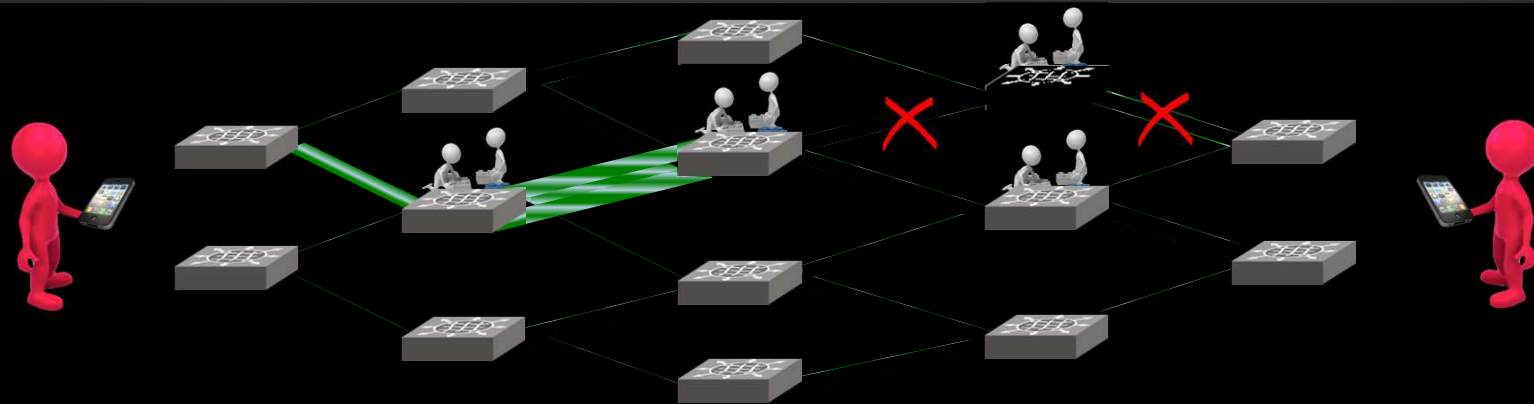
ETHERNET FABRICS



Let's try to avoid this in the current data centers

Classic Data Center Networks

Active/Passive, High Maintenance



SPANNING TREE: PASSIVE LINKS WASTE RESOURCES AND MONEY

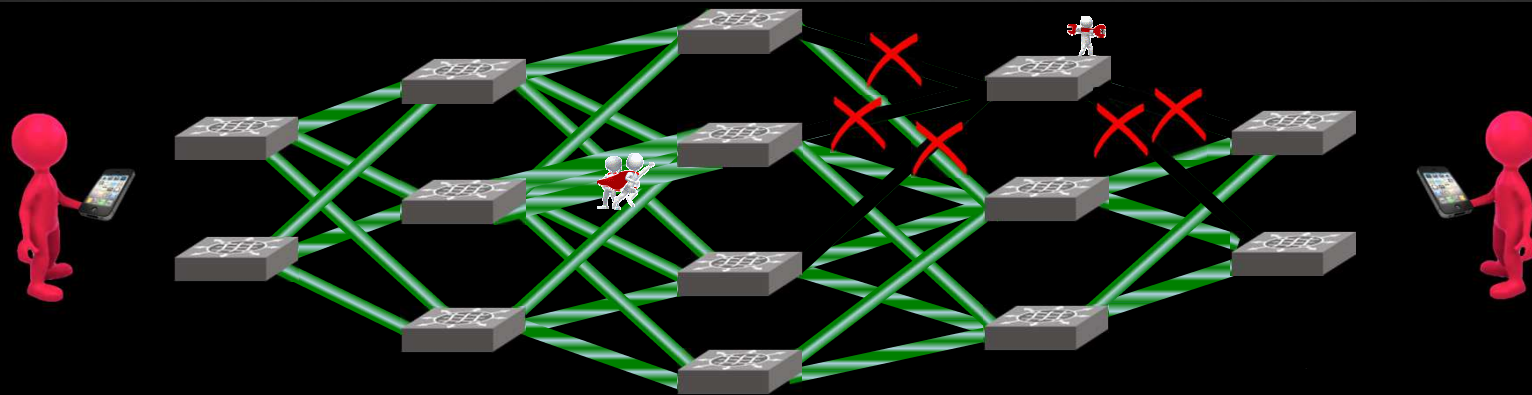
DEVICE LOSS: REQUIRES RECONVERGENCE, RECOVERY TIME AND HUMAN INTERACTION

CONFIGURATION CHANGES: MANUAL INTERACTION WITH MULTIPLE DEVICES REQUIRED

CAPACITY MANAGEMENT: ADDING CAPACITY MEANS MANUAL CONFIGURATION OF LAGS, AND CAN BE DISRUPTIVE

Data Center Networks based on TRILL: Ethernet Fabrics

- Active/Active, Fluid, Low Maintenance, Self Healing



TRILL: ALL LINKS ACTIVE, ECMP AND BROCADE TRUNKING MEAN "ALMOST PERFECT" LOADBALANCING

ADDING & REMOVING DEVICES: CAN BE DONE WITHOUT LOGGING INTO TO ANY DEVICES. NEW DEVICES LEARN FROM OTHERS

CONFIGURATION CHANGES: OFTEN PERFORMED AUTOMATICALLY WITHOUT HUMAN INVOLVEMENT

CAPACITY MANAGEMENT: SIMPLY PLUG IN A NEW CABLE AND CAPACITY WILL AUTOMATICALLY BE ADDED TO A LAG

INTELLIGENCE: CABLES ON SAME ASICS AND OF SAME LENGTHS AUTOMATICALLY FORM BROCADE TRUNKS

Automation



- Zero-touch provisioning
- Zero-touch VM discovery, configuration, and mobility
- Self-forming trunks
- Minimal configuration to add links or switches
- Manage many switches as a single logical device

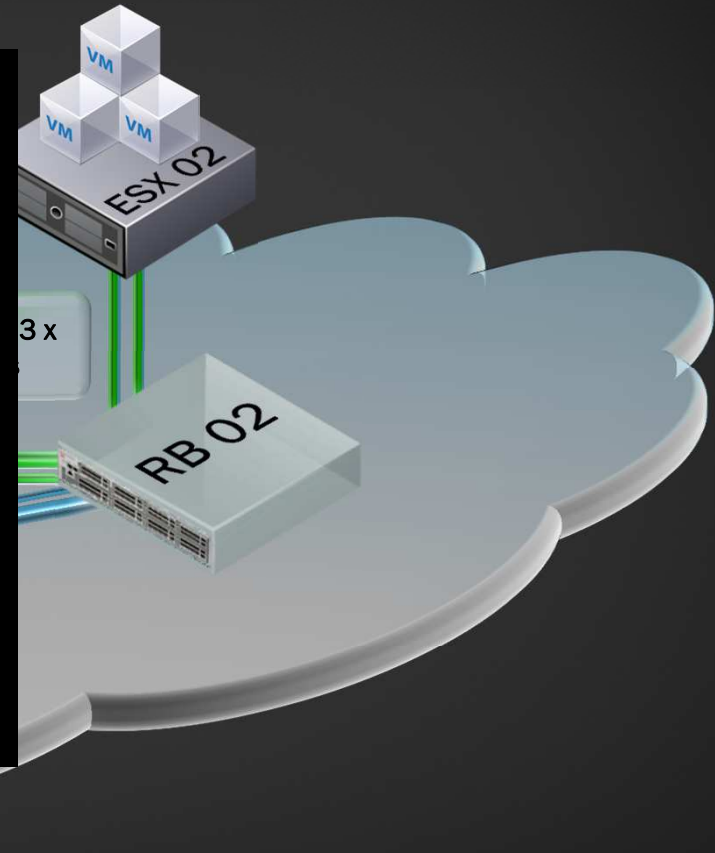


50% Lower Operating Expenses

Ethernet Fabrics

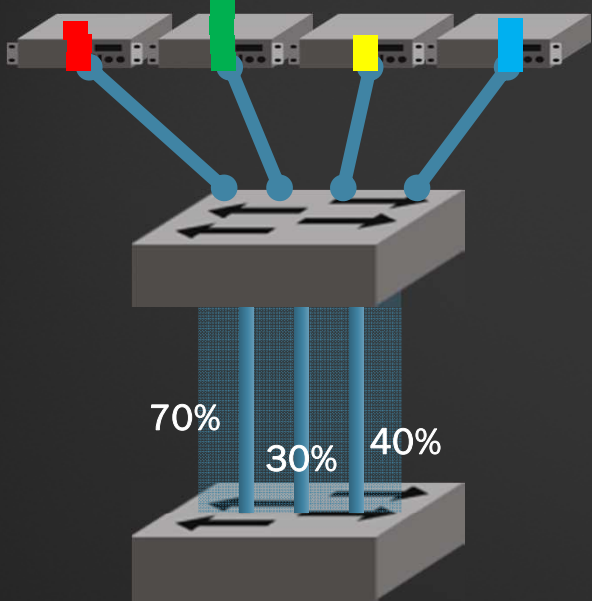
Equal Cost Multi-Pathing

```
RB3#  
RB3# show interface tengigabitethernet 3/0/4 | inc rate  
Queueing strategy: fifo  
  Input 2345.676196 Mbits/sec, 136723 packets/sec, 23.46% of line rate  
  Output 2357.405336 Mbits/sec, 146571 packets/sec, 23.57% of line rate  
RB3# show interface tengigabitethernet 3/0/5 | inc rate  
Queueing strategy: fifo  
  Input 2359.229476 Mbits/sec, 137774 packets/sec, 23.59% of line rate  
  Output 2362.919528 Mbits/sec, 149257 packets/sec, 23.63% of line rate  
RB3# show interface tengigabitethernet 3/0/6 | inc rate  
Queueing strategy: fifo  
  Input 2359.036972 Mbits/sec, 137794 packets/sec, 23.59% of line rate  
  Output 2363.925056 Mbits/sec, 149273 packets/sec, 23.64% of line rate  
RB3# show interface tengigabitethernet 3/0/17 | inc rate  
Queueing strategy: fifo  
  Input 2330.198824 Mbits/sec, 136464 packets/sec, 23.30% of line rate  
  Output 2367.180048 Mbits/sec, 144391 packets/sec, 23.67% of line rate  
RB3#
```

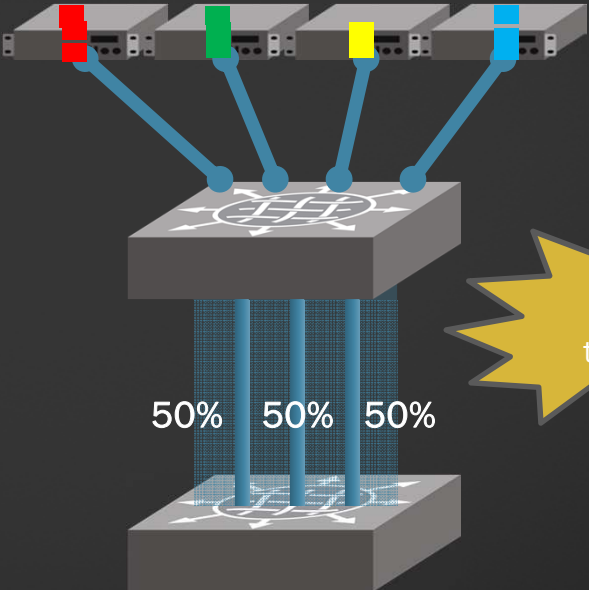


Ethernet Fabrics

INCREASE LINK EFFICIENCY WITH BROCADE TRUNKING



Traditional algorithms cause imbalances

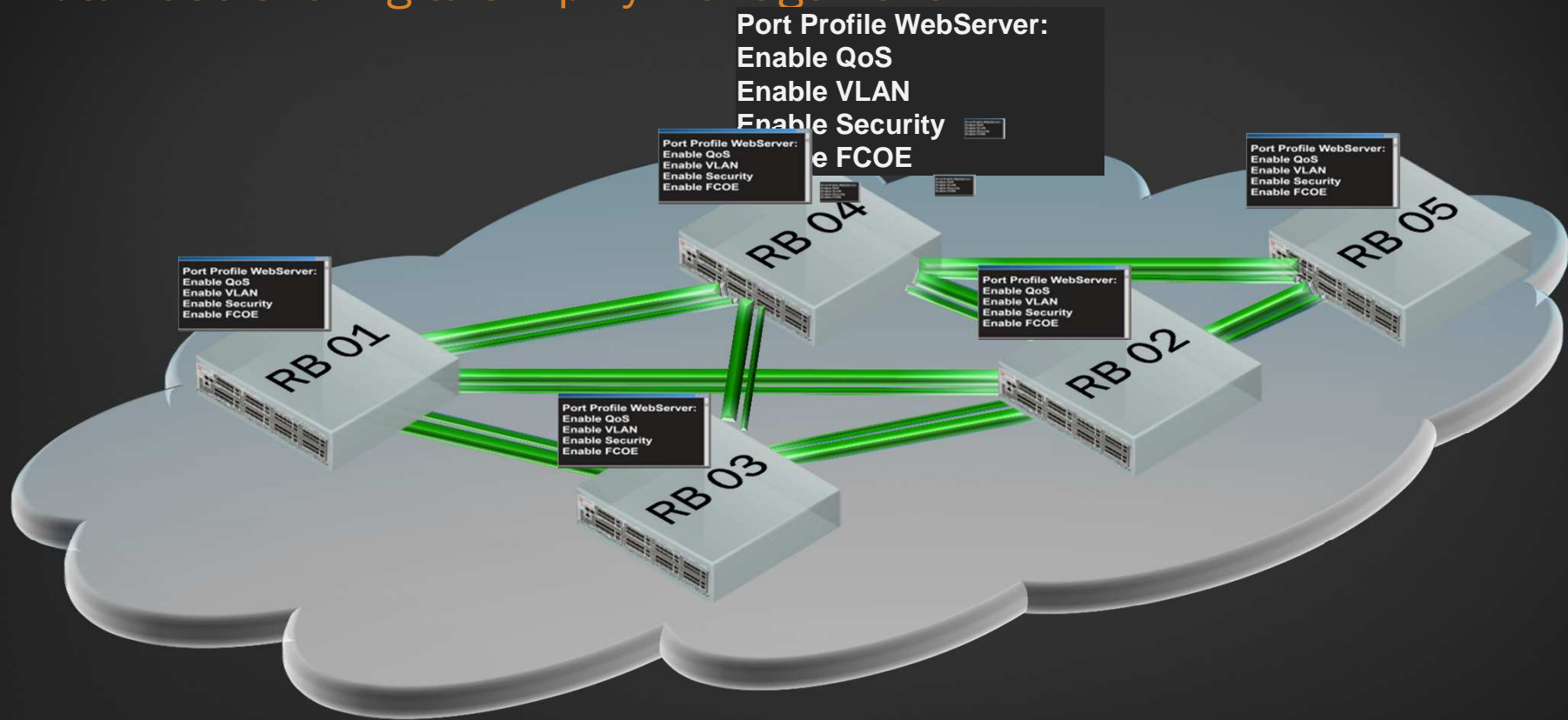


Brocade Trunking increase link efficiency



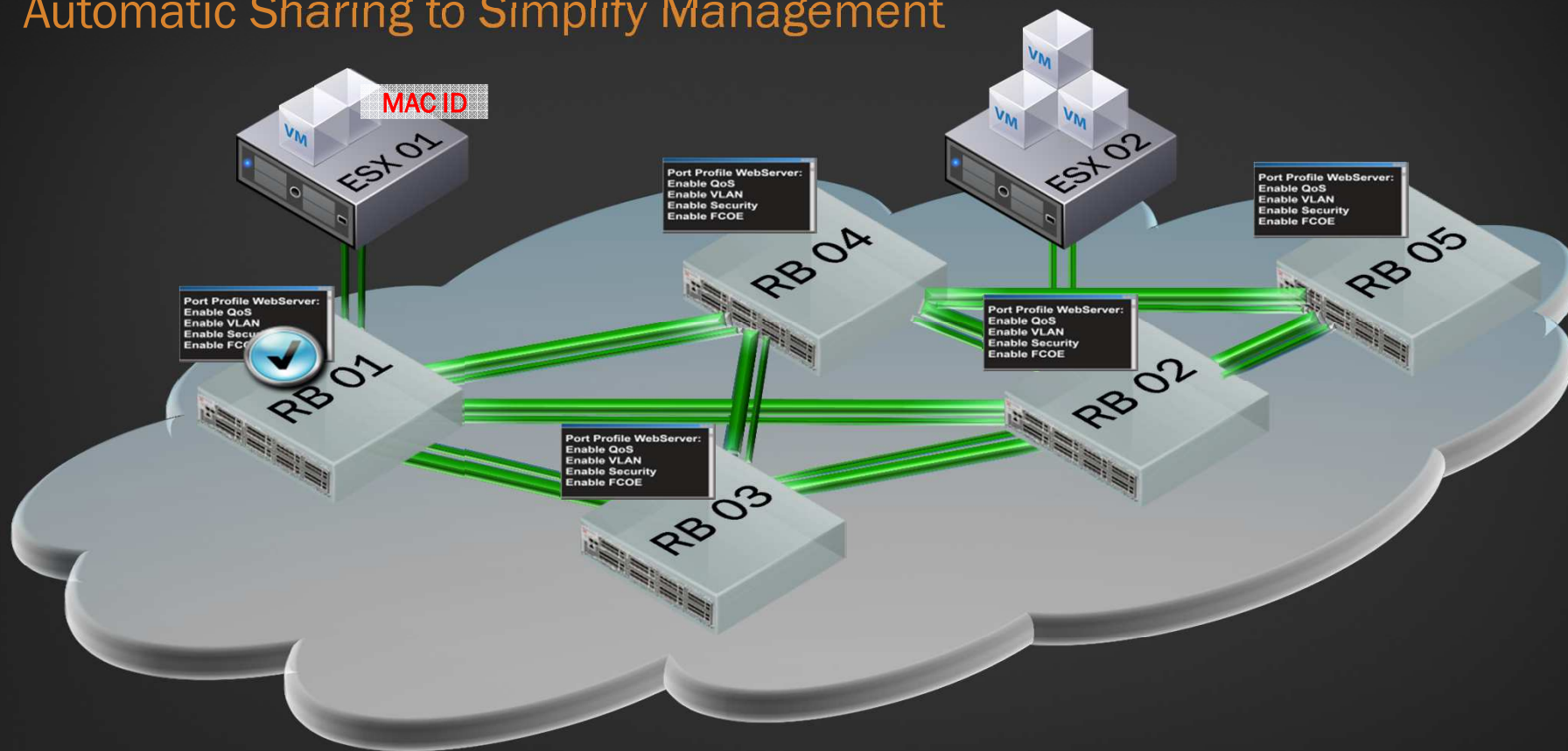
Sharing Port Profiles

Automatic Sharing to Simplify Management



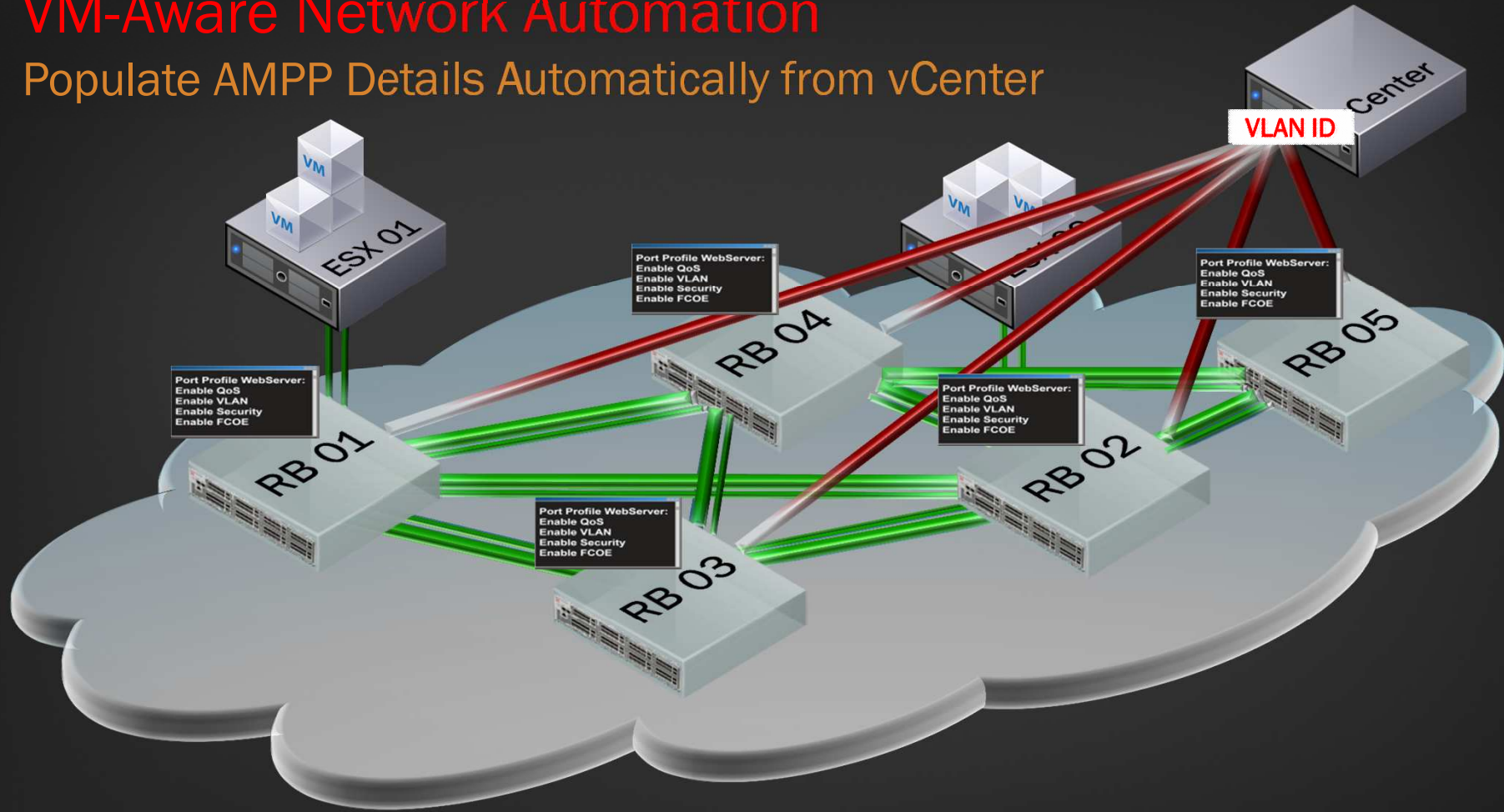
Sharing Port Profiles

Automatic Sharing to Simplify Management



VM-Aware Network Automation

Populate AMPP Details Automatically from vCenter



Brocade: Your Data Center Solution Partner



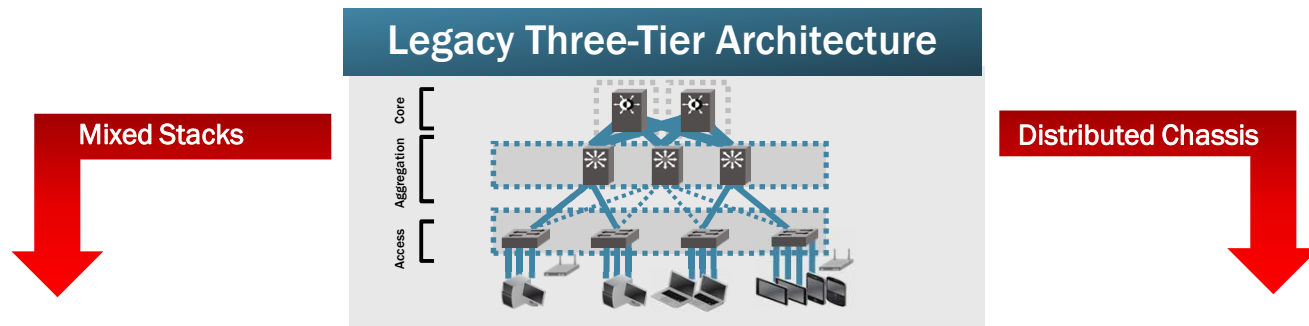


BROCADE 

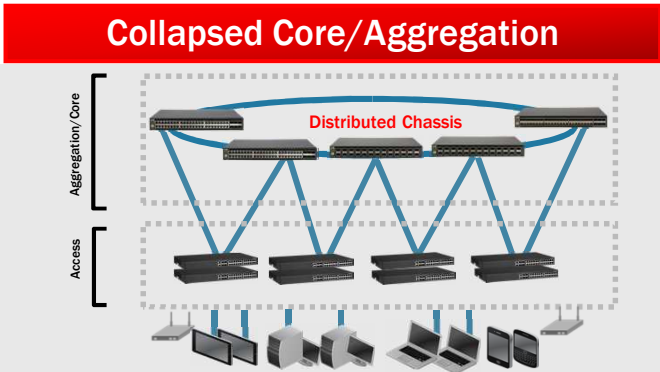
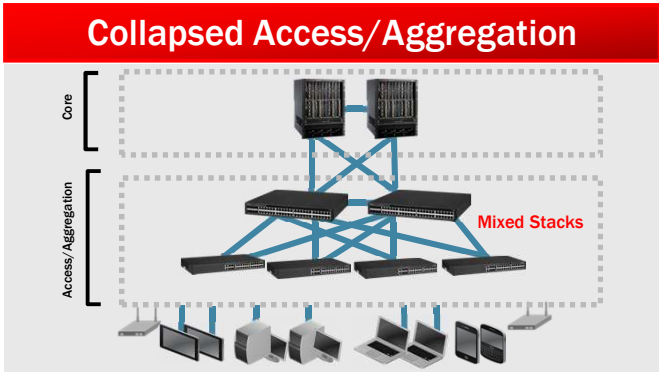
CAMPUS NETWORKING SOLUTIONS
Brocade HyperEdge Architecture™

Brocade HyperEdge Architecture

Enables the Effortless Network with Multiple Deployment Options



- Problems:**
- Costly to Manage
 - Fragmented Services
 - Rigid to Scale

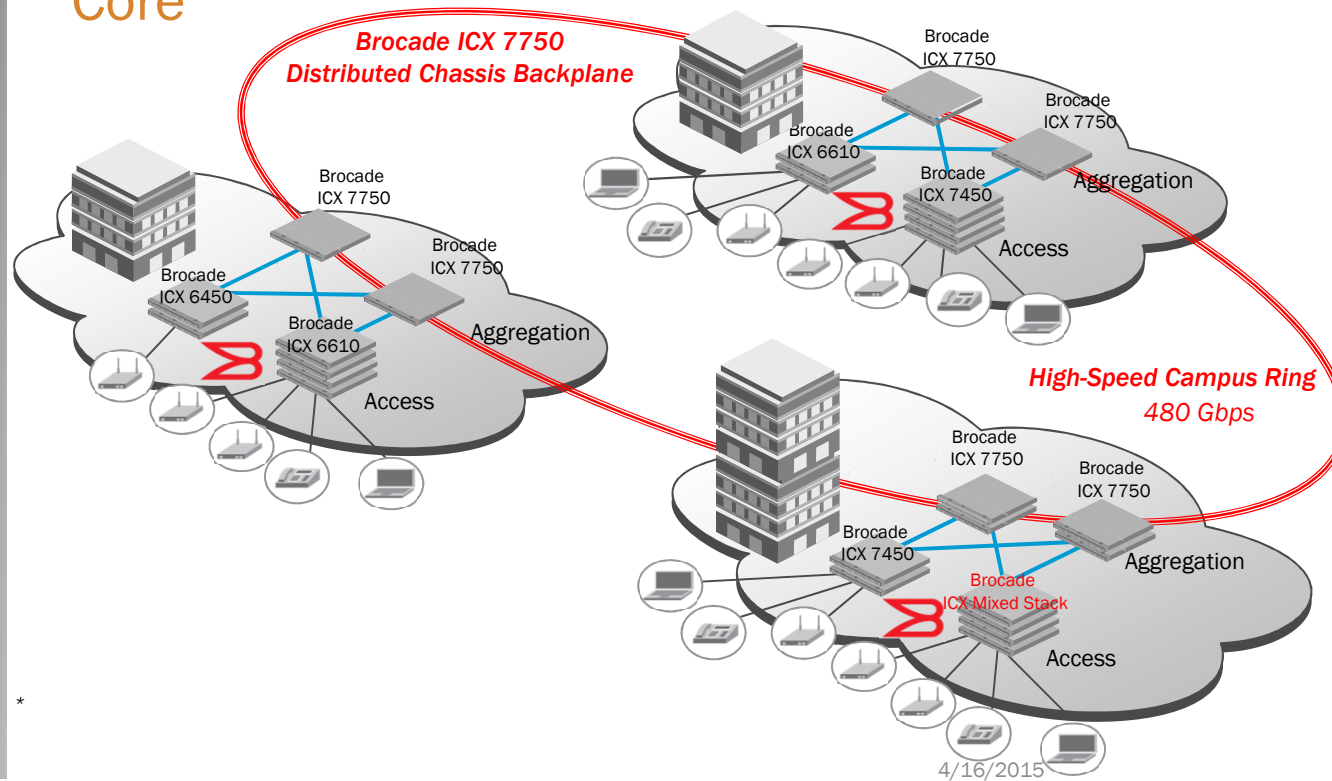


- Solutions:**
- Consolidated Mgmt
 - Shared Services
 - Scale-out Growth



HyperEdge Architecture Two Tier Campus Solution

Brocade ICX 7750 Distributed Chassis Collapses Aggregation and Core



Benefits

- **Simpler:** Collapsed agg/core layer eliminates one tier
- **Automated:** Single point of management across network layers
- **Lower Cost:** A fraction of the cost of a traditional chassis deployments
- **Highly Scalable:** Add switches where and when capacity is needed



Mixovaný Stacking a Distribuované služby

Jednoduché přidání vyšších routovacích funkcí do základních switchů

Ochrana investic

- Jednoduše a bez přerušení zvýšení kapacity a funkcí
- Pay as you grow

Redukce nákladů

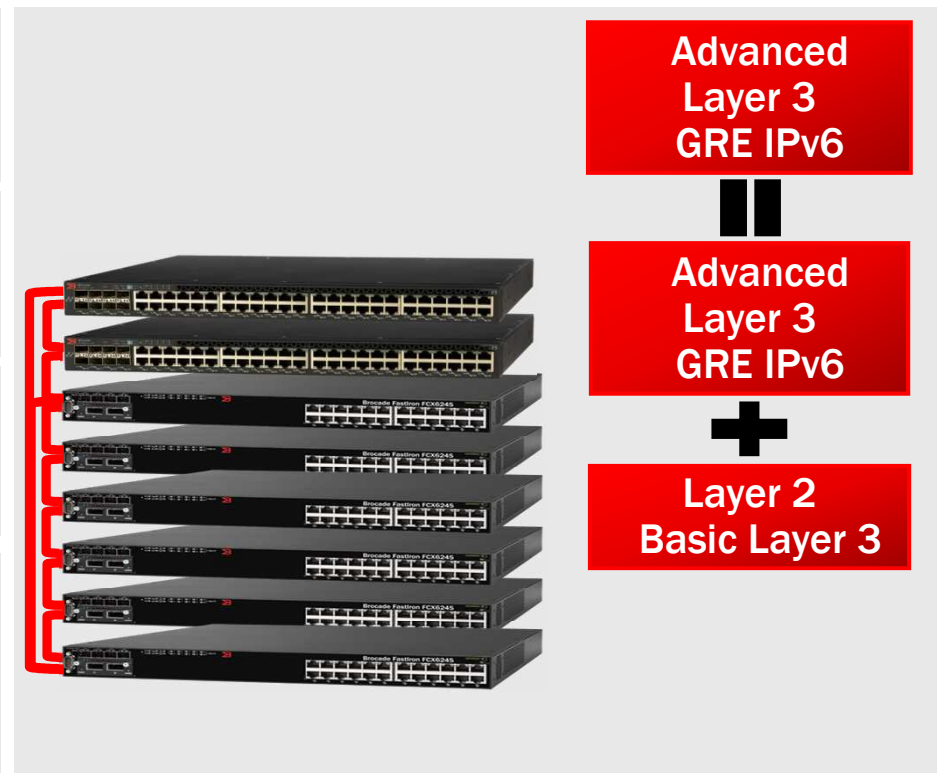
- Získejte premium funkce na switchích základní řady
- Redukujte vstupní finanční náklady

Zjednodušená správa

- Spravujte základní a prémiové switche v jednom okamžiku a tím redukuje náklady na správu

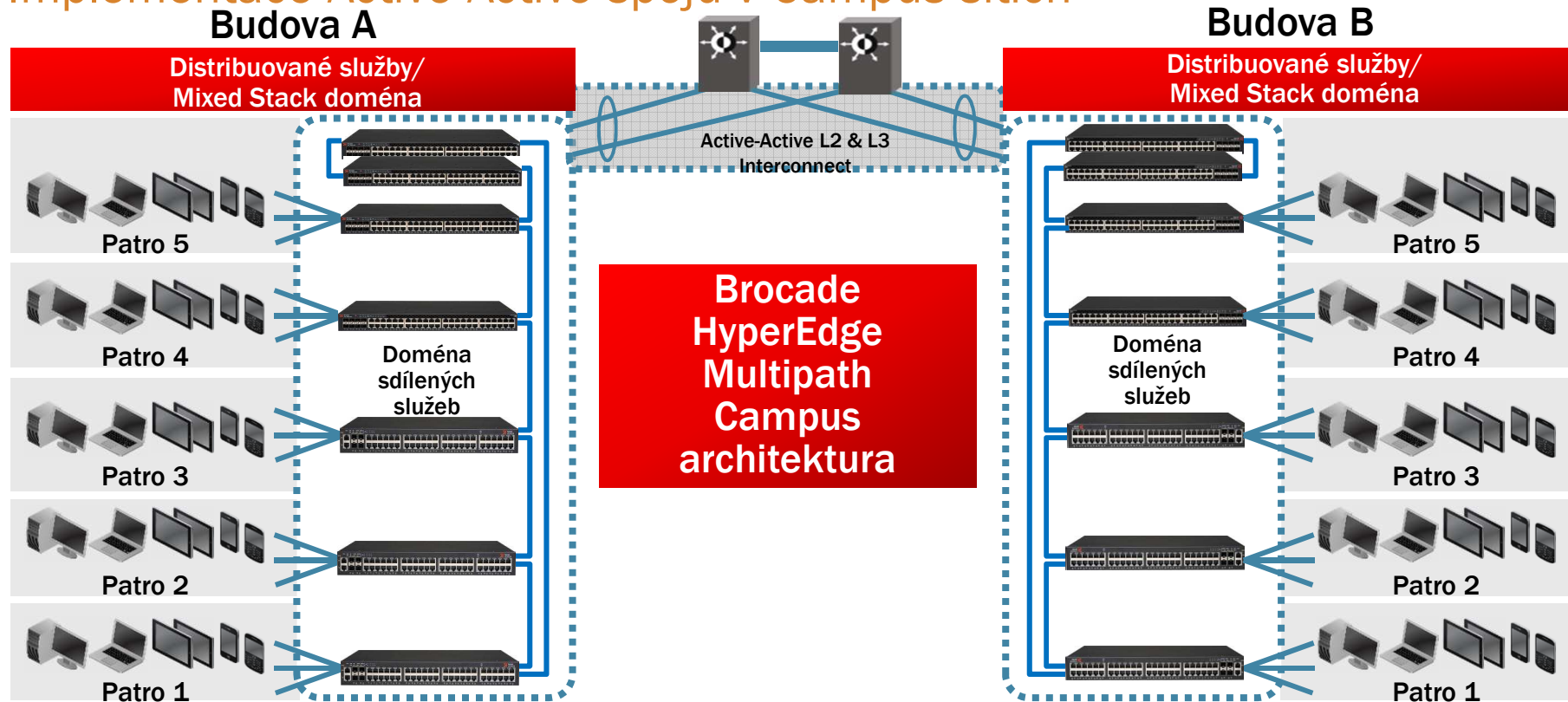
Maximalizujte výkon

- Zdvojnásobte stacking výkon switche Brocade ICX 6450 použitím všech čtyř 10 GbE portů pro stacking a využijte tím potencial 40GbE uplinků na switchi Brocade ICX 6610



Rozšíření HyperEdge architektury

Implementace Active-Active spojů v Campus sítích





BROCADE 10 GbE , 40 GbE and 100 GbE Routing Solutions

Brocade MLXe Series: High-Performance, Multiservice Router

A unified platform that scales from edge to core



Service Provider Core

Service Provider Edge

- **Leading performance and scalability**
 - Up to 15.36 Tbps forwarding capacity in a chassis
 - Up to 32 100 GbE, 128 40 GbE, 768 10 GbE, 1536 1 GbE ports
- **Advanced, scalable software features**
 - Proven stack: deployed in thousands of networks
 - Multiservice feature set (IPv4, IPv6, MPLS, L3 VPNs, VPLS, L2 PW)
 - Up to 2,000,000 IPv4 or 480,000 IPv6 routes, 2000 BGP peers
 - OpenFlow 1.0
- **Unified chassis for unparalleled operational efficiency**
 - 4-, 8-, 16-, 32-slot chassis with rear exhaust
 - Common software image
 - Best-in-class power efficiency
- **Optimum flexibility with purpose-built half-slot modules**
 - **D:** L2, IPv4, IPv6 **M:** L2, IPv4, IPv6, MPLS
 - **DM:** L2, IPv4, IPv6, MPLS **X/X2:** Scalable L2, IPv4, IPv6, MPLS
- **High availability**
 - Management, fabric, and 1+1 power redundancy
 - Hitless failover and upgrade; non-stop routing
 - NEBS Level 3-certified



AMS-IX (AMSterdam) Internet eXchange



Ďakujem



Ing. Stanislav Pach
Networking Department Manager
COMGUARD s.r.o.
www.comguard.cz
stanislav.pach@comguard.cz