Connect
Netzwerke für Ihren Erfolg

BROCADE

Connect Security Day 2016

Ethernet Fabric modernes Netzdesign

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Please See Risk Factors on Form 10-Q and Form 10-K Filed with the SEC

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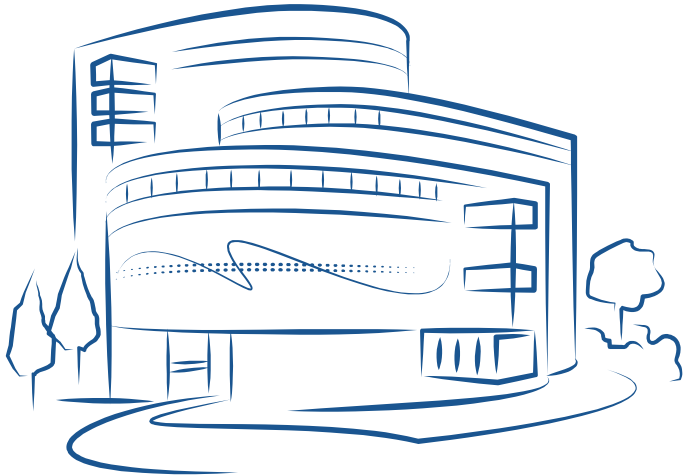
Agenda

Brocade Campus Networks

- Campus Fabric
- Brocade Data Security Solutions
- Brocade VDX
- IPv6
- Summary



Leading from Data Center to Network Edge

Positioned where the world is going

- New mobile edge
- New telco edge
- New enterprise edge
- Public/private cloud
- 5G
- IoT

 # 1 Service Provider Wi-Fi

 # 1 Storage Area Networking

 # 1 Hospitality Wi-Fi

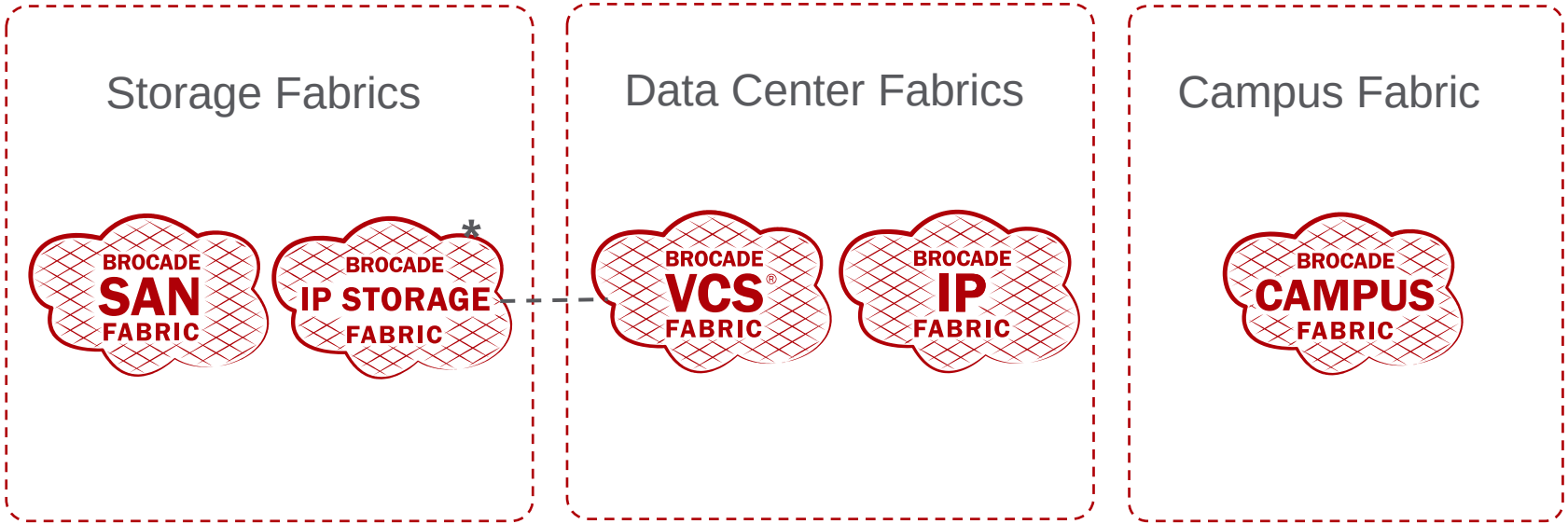
 # 2 Data Center Networking

 # 3 Enterprise Wireless LAN

 # 3 Enterprise Edge Networking in the U.S. & EMEA

Brocade Topologies

Portfolio of FABRICs

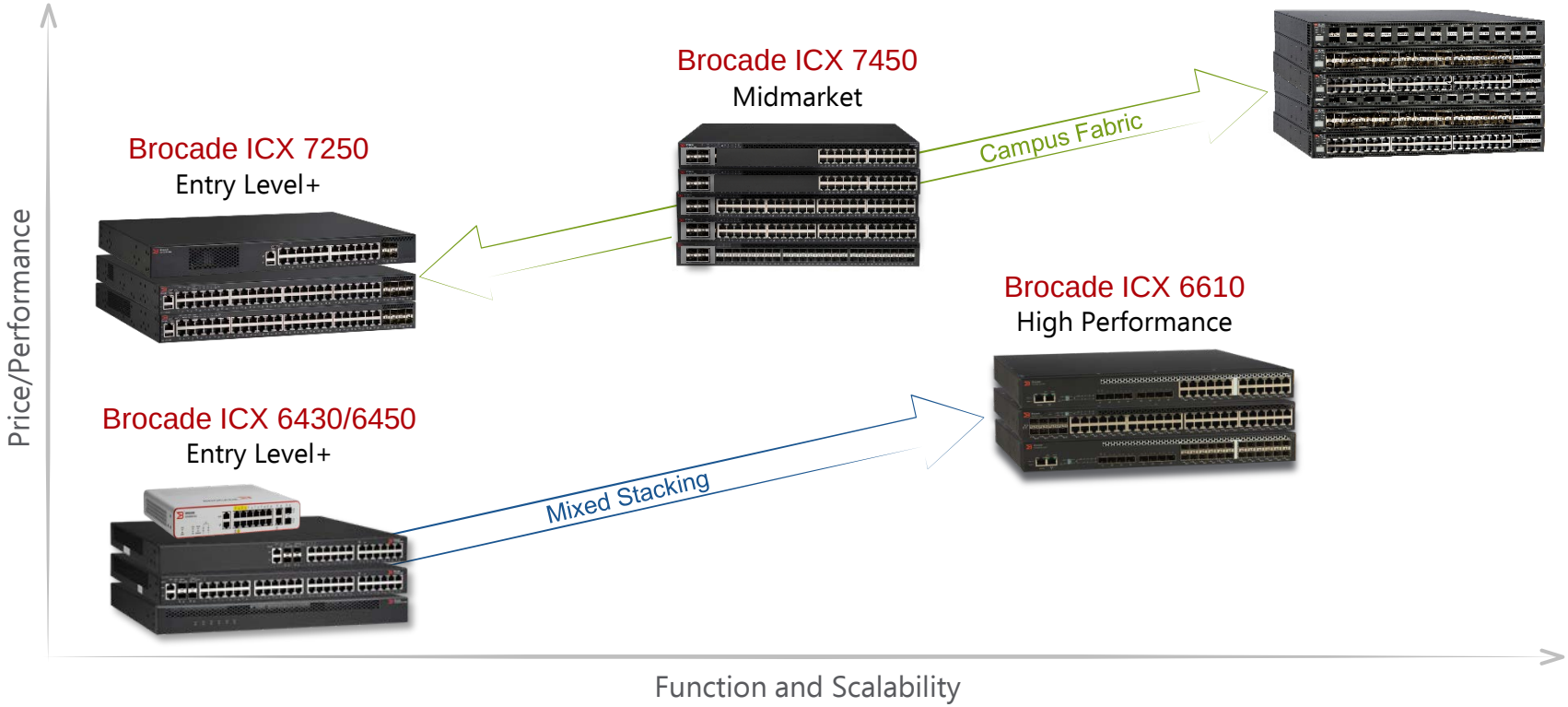


* IP Storage Fabric is based on Ethernet Fabric

Campus Fabric

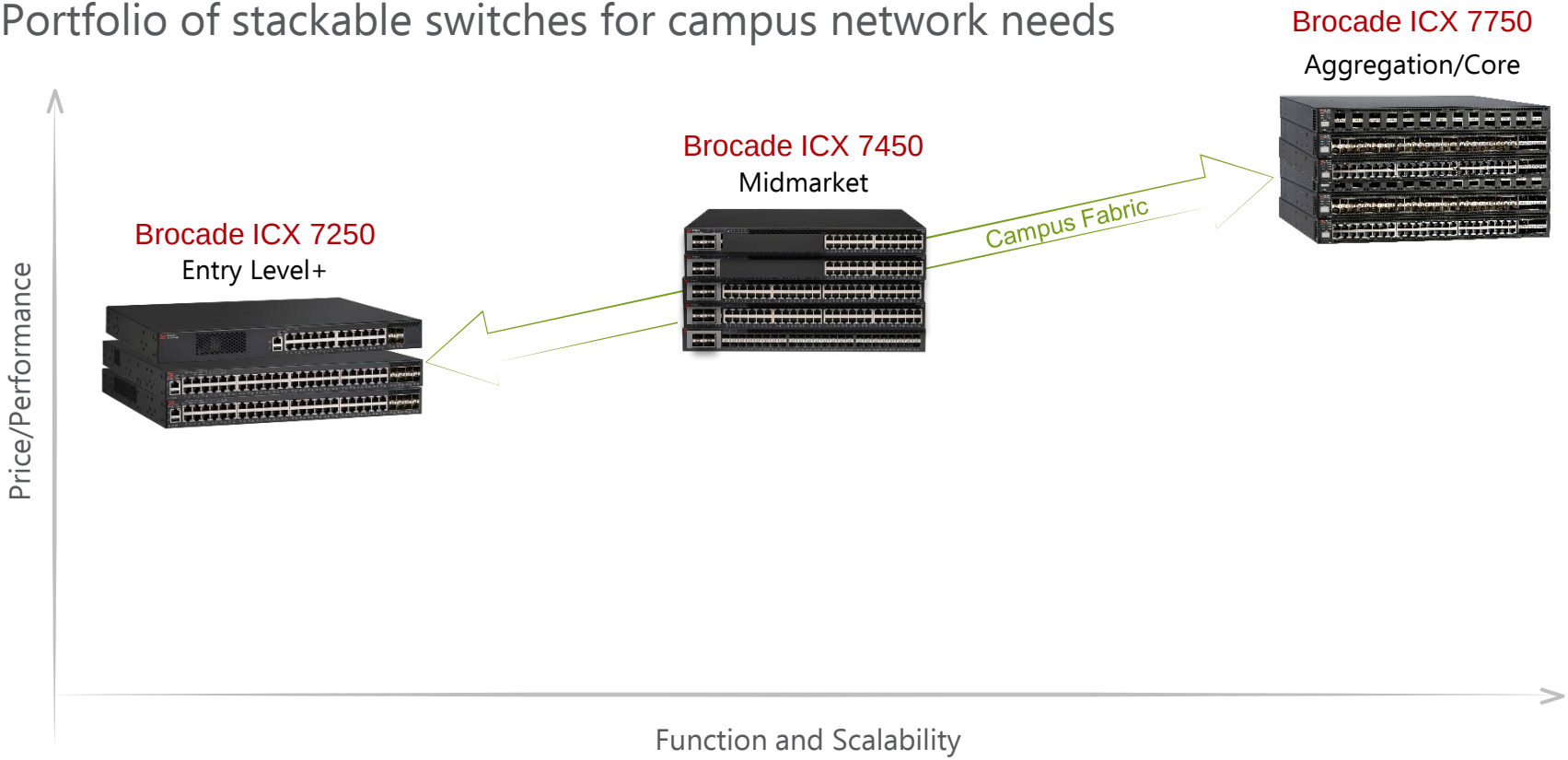
Brocade Campus

Portfolio of stackable switches for campus network needs



Brocade Campus

Portfolio of stackable switches for campus network needs

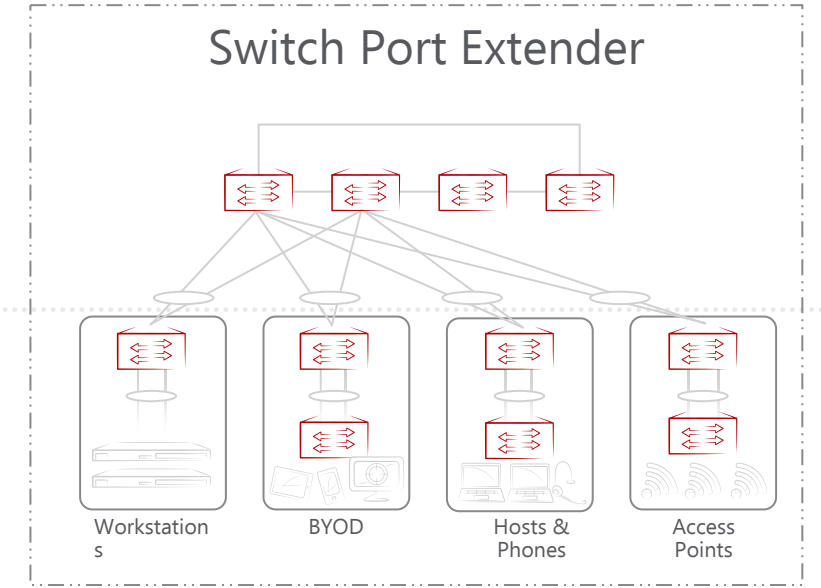


Philosophy behind Brocade SPX

- Ground up design done with **flexibility** in mind.
  - Rich ICX portfolio lending greater flexibility during deployment.
  - Ability to use ICX switches in either SPX mode or traditional stacking
  - No special licensing and same image would support SPX and traditional switching
- Open IEEE based **802.1br** standard
  - Avoid vendor lock-in with VN-TAG like solutions
  - Leads to investment protection and longevity of HW in field
  - All future ICX platforms will support the standard.
- **Cost savings** to get started with 802.1br
  - Pay as you grow model for switches in parent stack
  - Re-use / re-purpose switches
  - Scale-out design based on fixed configuration switches allowing logistical simplicity and low TCO

Campus Fabric

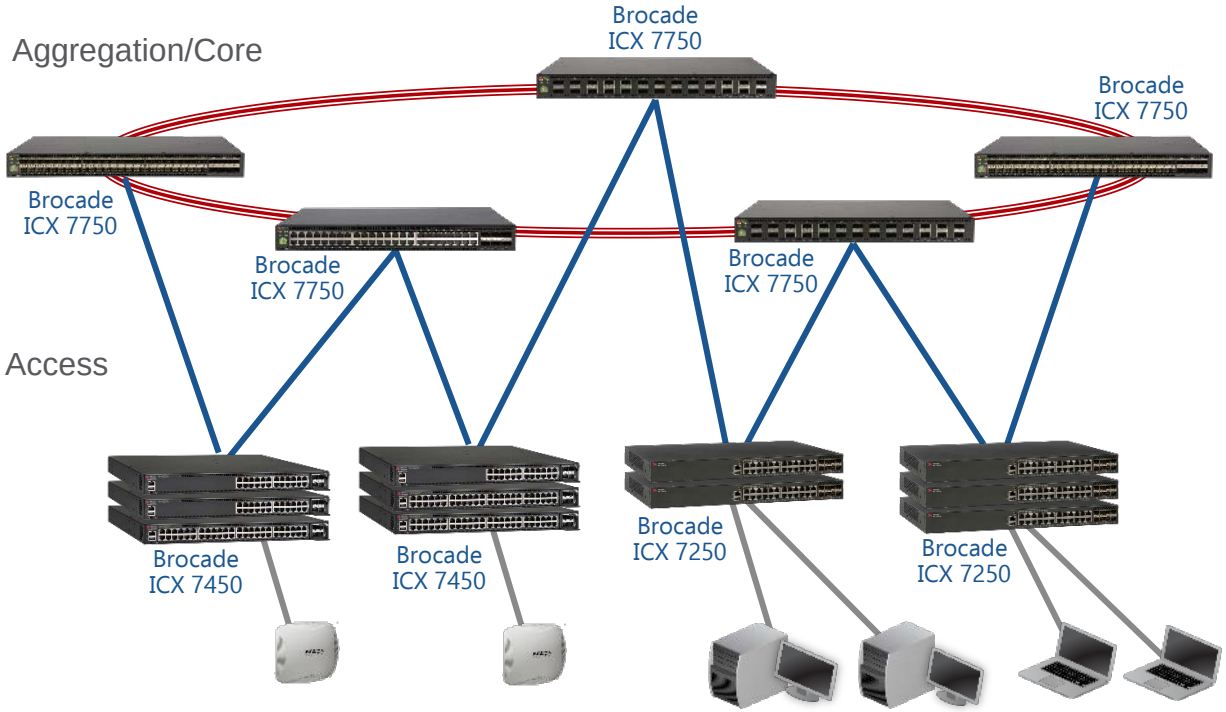
- Single point of mgmt.
- Mixed family stacking.
- Standards based(IEEE 802.1br)
- STP free design
- Scale out using fixed form switches
- Premium features inherited



Collapse access and aggregation

Distributed Chassis with Campus Fabric

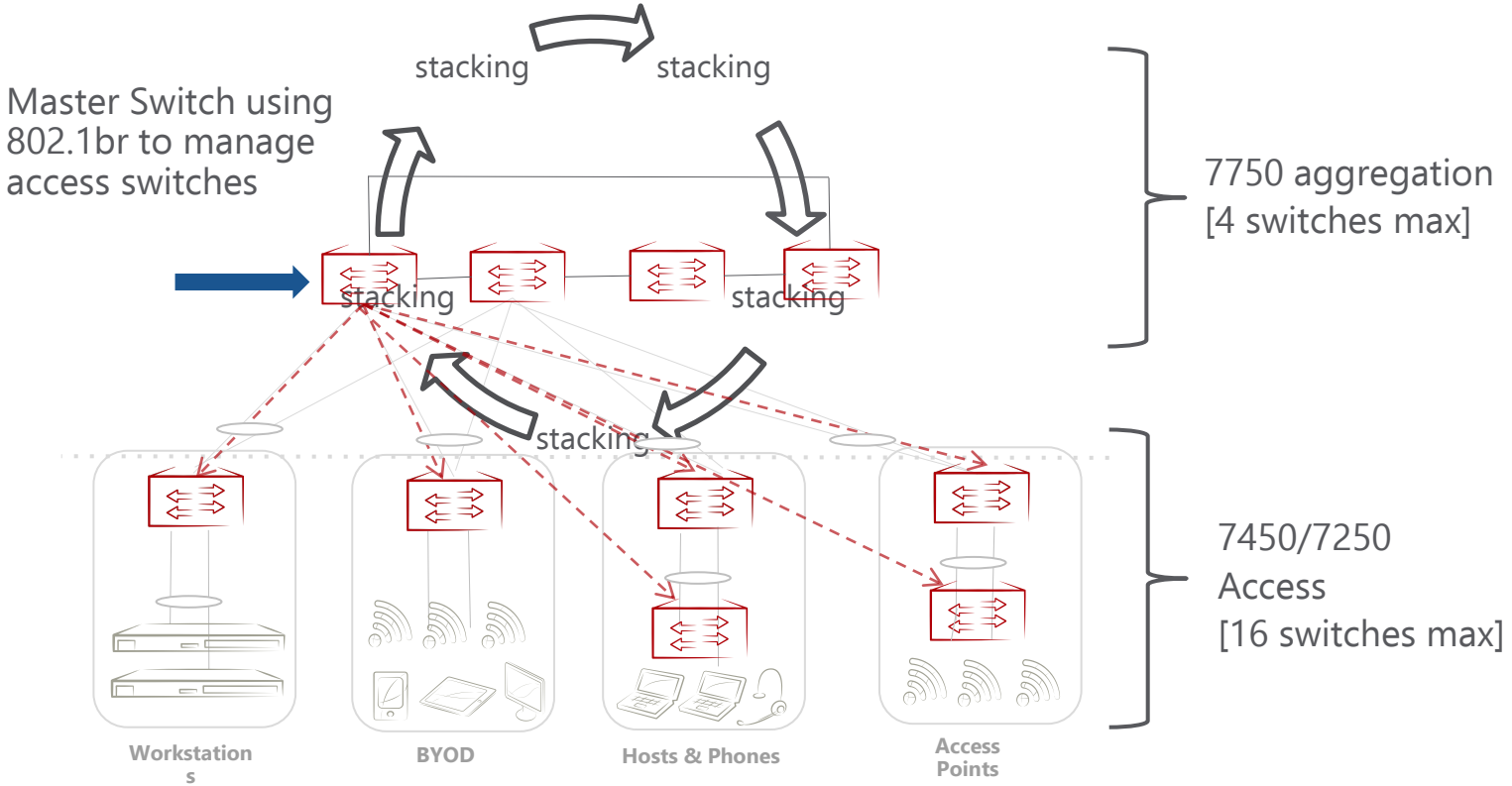
Access, aggregation, core layers—all in a single logical device



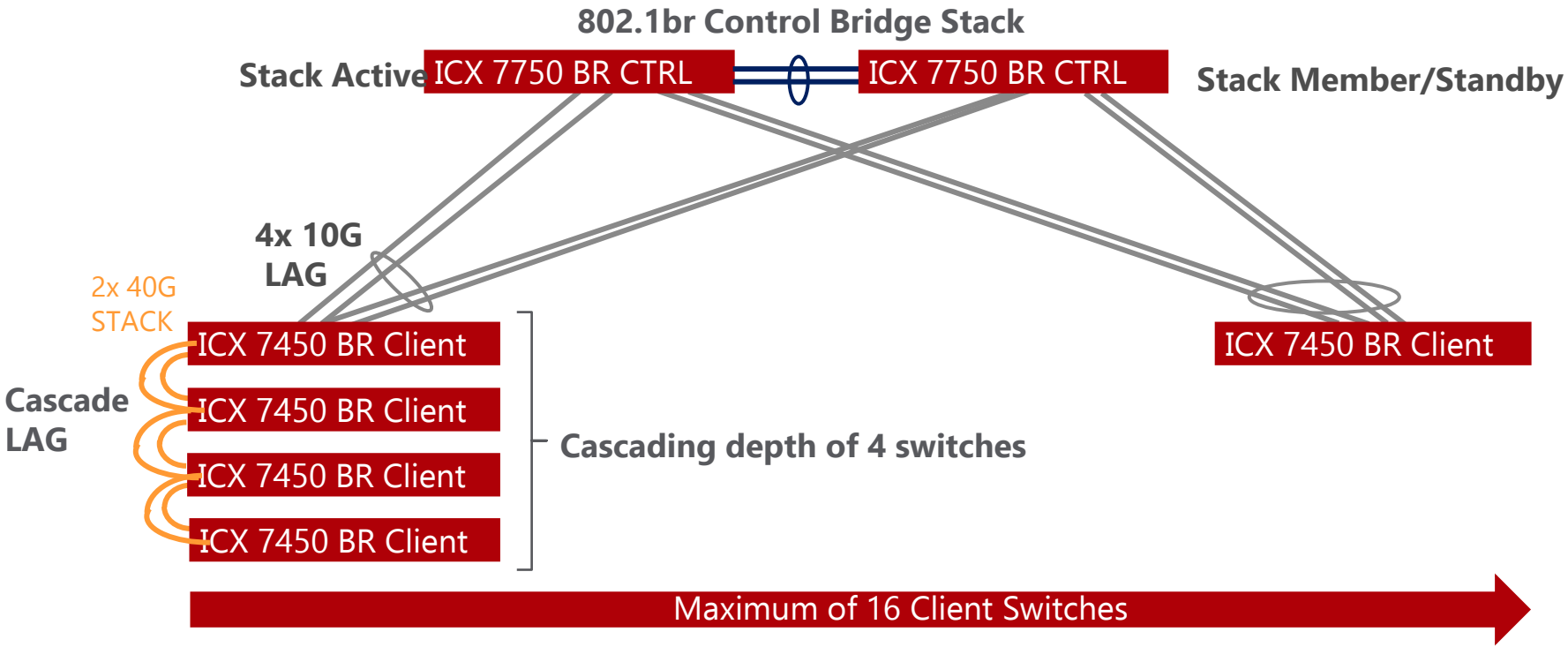
Benefits

- Scale-out networking
- Consolidated management across Brocade ICX 7xxx switches
- Shared services
- Maximum flexibility: Capacity when you need it, where you need it
- Low network operation costs
- Highly scalable
- SDN-capable

Switch Port Extender (SPX) Architecture



Phase 1- Switch Port extender

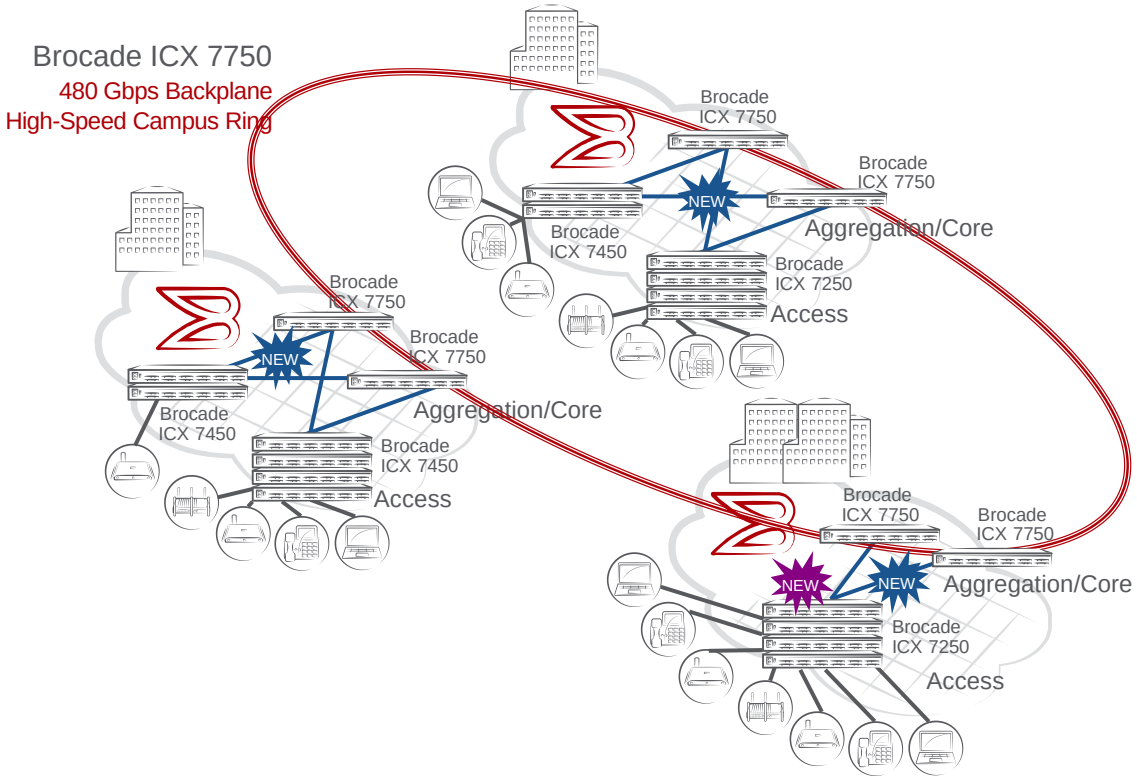


Campus Fabric Roadmap

	Dec 2015 FastIron 8.0.40 Phase I	2H FY16 FastIron 8.0.50 Phase II (uncommitted)
Switch Platforms	• Control Bridge: ICX 7750 • Port Extender(PE): ICX 7450	• Port Extender(PE): ICX 7250, 7450-32ZP
Scale	• PE switches: 16 • Chain depth: 4 • Access ports: 768	• PE Switches: 30+ • Chain depth: 6 • Access ports: ~1500+
Layer 2/Layer 3	• VLAN/STP/VE/LACP • OSPF/BGP/Multicast	• PBR
QoS	• DSCP marking	• Rate Shaping, Mirroring
High Availability	• SPX LAG • Hitless Failover	• Stack ISSU • Multiple uplinks in a chain
Security	• ACL	• DHCP snooping, IPSG, DAI, uRPF • NAC (802.1x, flex-auth, mac-auth,web-auth)
Analytics		• sFlow

Campus Fabric Solution

Brocade Distributed Chassis



Benefits

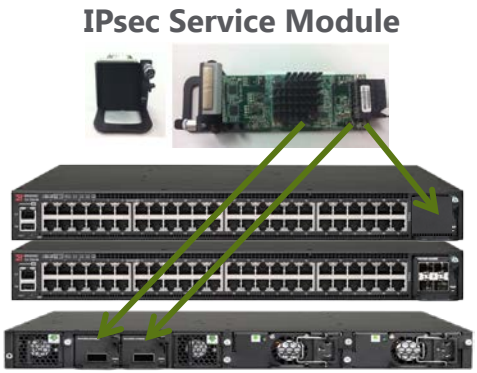
- Simpler: Collapsed access/ aggregation/core layer
- Automated: Single point of management across network layers
- Lower cost: A fraction of the cost of traditional chassis deployments
- Highly scalable: Add switches where and when capacity is needed

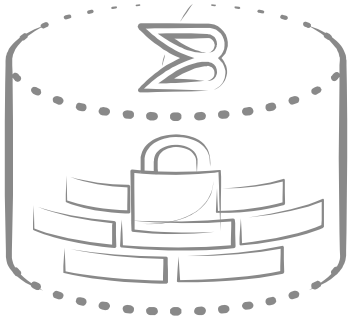
Brocade SPX Differentiation

- Brocade switches can be used in 802.1br mode or standalone mode. Competition sells fixed SKUs. Flexibility to re-purpose brocade switches into different roles.
- Brocade SPX leaf switches use the same image for both switch port extender and traditional switch functionality.
- Brocade approach is standards based IEEE 802.1br versus proprietary solutions by other vendors ex. VN-TAG.
- Brocade 802.1br requires a 1RU 7750(2x for HA) and does not require the purchase of an expensive chassis with redundant supervisors.
- Brocade has different options for the port extender clients (7450 with modules/7250 with PoD).

Brocade Data Security Solution

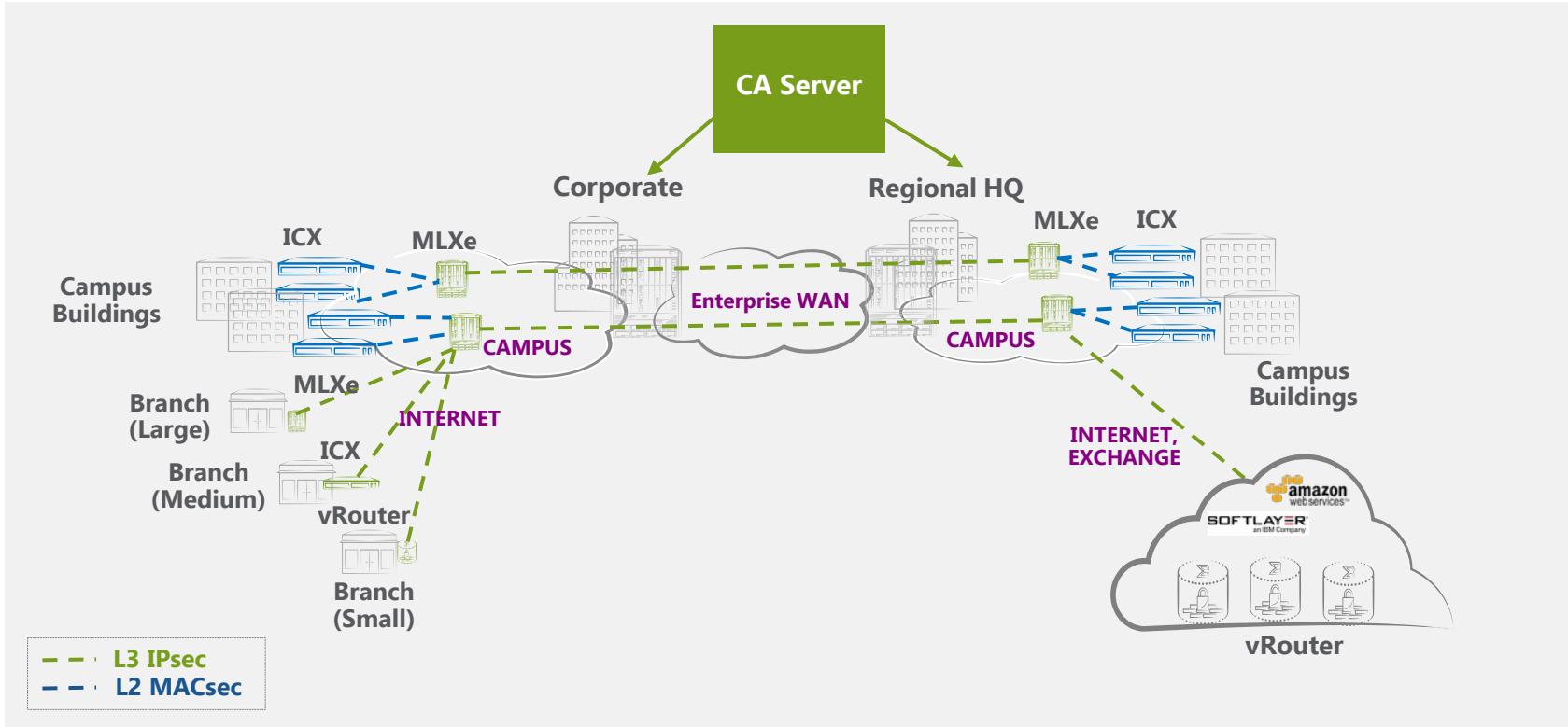
Software and Hardware Integrated IPsec Service





ICX 7450 IPsec Service	MLXe IPsec Service	vRouter IPsec Service
Services entire stack with Suite B AES-256 Encryption Isolates traffic via multi-VRF Supports jumbo frames	Encrypts in-line with ports using Suite B AES-256 Isolates traffic via multi-VRF Supports jumbo frames Load distribution	Encrypts using Suite B AES-256 Access cloud applications without hair-pinning through enterprise data center

Brocade End-to-End Network Encryption Use Cases

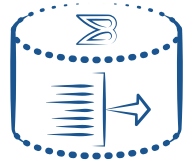


Brocade Integrated Encryption Offer

Product	Availability	Use Cases	IPsec Encryption Summary				
			Performance	Tunnels	Type	CSFC	Suite-B
MLXe IPsec Module	GA May 2006	• DC Interconnect • Enterprise WAN • Campus Hub • Internet Border • Branch (Large)	• 44 Gbps per module • 352 Gbps per chassis • 1.2 Tbps ready hardware	• 256 per linecard • 2K per chassis	• AES-GCM 128-bit • AES-GCM 256-bit	Compliant (Certified)	Compliant (Certified)
ICX IPsec Module	Limited Trial April 2016 GA 4Q2016	• Branch (Medium) • Campus Spoke-to-Spoke • Campus Spoke	• 10 Gbps per module • 10 Gbps per stack	• 20 per module • 20 per stack	• AES-GCM 128-bit • AES-GCM 256-bit	Compliant	Compliant
vRouter 5600 IPsec	GA May 2016	• Hybrid Cloud (AWS, Softlayer) • Branch (Small)	• 2 Gbps per 5600 (single tunnel) • 1 Gbps per 5600 (multiple tunnels)	• TBD	• AES-GCM 256-bit	Compliant	Compliant

Brocade L2 Encryption Offering

Feature highlights



Single Hop (128-bit)

- MACsec on MLXe
  - 128-bit MAC layer encryption
  - Built into 20×10/1 GbE card
  - Built into 4×10 GbE IPsec card
  - Campus Aggr (ICX<->MLXe), DCI (DWDM)
- MACsec on ICX
  - 128-bit MAC layer encryption
  - ICX 7450 -4X10GF module
  - ICX 6610 - 8x10G ports
  - Campus Aggr (ICX<->MLXe)

Multi Hop (128-bit, 256-bit)

- L2 over IPsec on MLXe
  - Secure L2 extension across large sites
  - No encryption required in transit network
  - Avoids large-scale multicast operational issues
  - DCI, WAN and Internet

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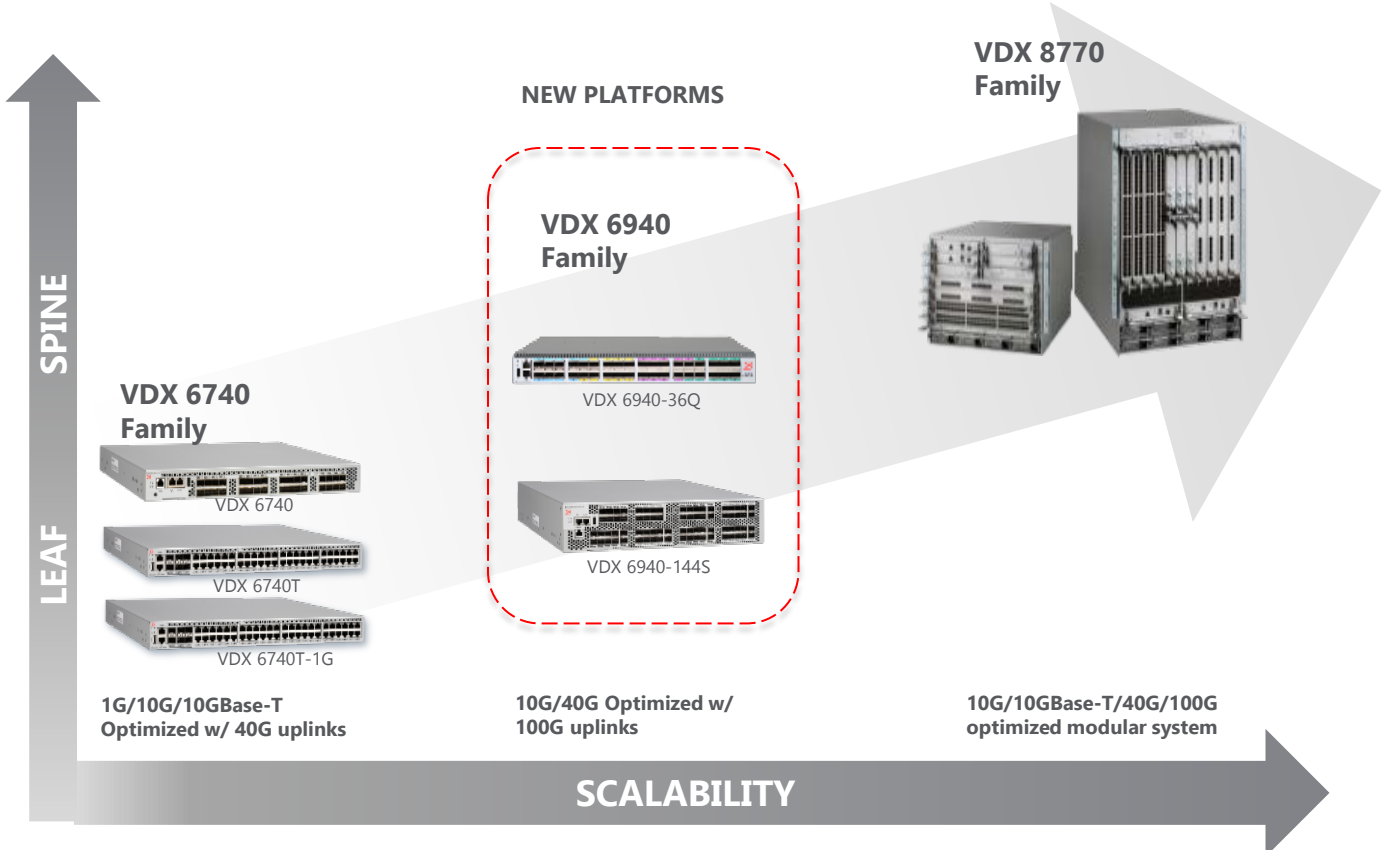
Brocade VDX

VDX Product Positioning

COMPLETE BREADTH OF PORTFOLIO FOR ETHERNET – AND IP FABRIC SOLUTIONS



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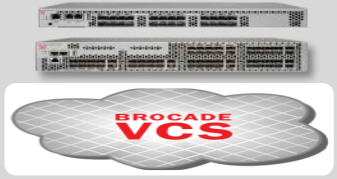
IPv6

Brocade's IPv6 Products

ICX
Campus Switches

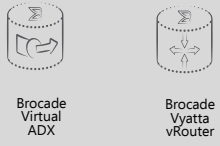
VDX
Ethernet Fabric Switch



MLX
IP/MLPS Router

CES, CER
Compact Edge Router

Cloud Products
vRouter, vADC



IPv6 Ready Edge

- ✓ Brocade IPv6 Compact Switch Solutions
- ✓ Standards-based IPv6 management and edge features
- ✓ Wirespeed IPv6 routing & forwarding in hardware
- ✓ Redundant power options
- ✓ Low power consumption for Greener use – reduced TCO
- ✓ 1-1.5 RU compact for factor – reduced TCO
- ✓ Copper, Fiber
- ✓ 10/40GE uplink choice for high-speed connectivity to agg/core

IPv6 Ready Aggregation/Core

- ✓ Brocade IPv6 Modular Solution – Port diversity & density
- ✓ Standards-based IPv6 software feature set
- ✓ Wire-speed IPv6 routing & forwarding in hardware
- ✓ Up to 1536 1G ports, 640 10G ports, 128 40G and 64 100G with wirespeed performance
- ✓ Copper, Fiber
- ✓ 10/100/1000 and 10GE modules mix and match
- ✓ Virtual Output Queuing for advanced buffering
- ✓ Redundant Management and Fabric Modules
- ✓ Redundant 1+1 Power Supplies
- ✓ Reduced power consumption for Greener solution & TCO

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Thank you

For more information, visit
www.brocade.com/campus

Brocade Product Portfolio