QFX3500

Sales Deck

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AGENDA

1. Trends in 10GbE
2. Summary of the QFX3500
3. Competitive
4. Positioning
5. Use Cases

7. Product Deep Dive
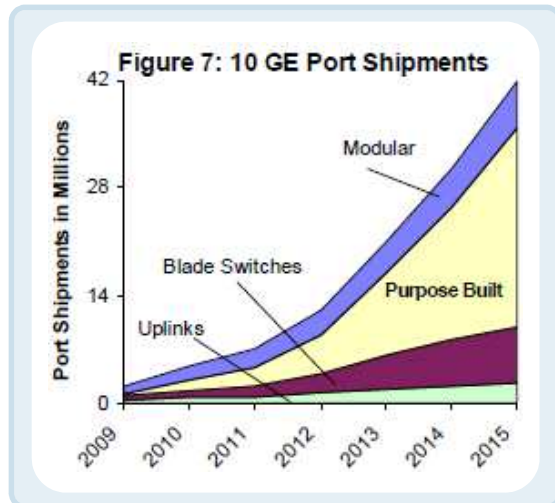8. Competitive Deep Dive
9. Summary
10. Reference

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"All you have to do is touch the right key at the right time and the instrument will play itself."

Johann Sebastian Bach

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Figure 8: 10 GE Revenue

Dell`Oro Group

Figure 7: 10 GE Port Shipments
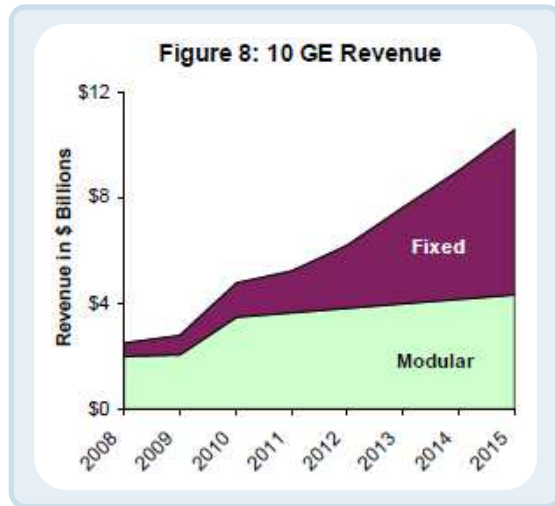
Dell`Oro Group

10 GbE port revenues

- 10 GbE port revenues for **fixed platforms** has projected to change from **$4.8B in 2009** to **$10.6B in 2015**
- **Module** 10GbE revenues **remains flat**

10 GbE port shipments

- Note: Purpose-built (**top-of-rack**) shipments are **increasing**
- 10 GbE port shipments to **increase** from **4.9M in 2010** to **42.1M in 2015**

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INTRODUCING QFX3500

- Sub microsecond latency

- Line rate throughput for all frames sizes on all ports

- Standards-based Layer-2, Layer-3, and I/O Convergence

- Supports feature rich implementation of IEEE DCB standards for converged networks; enabling FCoE, iSCSI and NAS deployments

- FCoE transit and FCoE-FC gateway, interoperability with both Brocade and Cisco Fibre Channel SANs (including support for multi-hop FCoE)

- Interoperability with major CNA vendors

- It's Green, RoHSS, China RoHSS, Gold 80 Plus, Green Recycle, WEEE, REACH

- **QFabric ready!**

Flexible all-in-one switch, deploy everywhere

Source: Juniper Networks QFX3500 Switch Assessment, *Network Test*, February 2011

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QFX 3500 Summary

Front View

Rear View

DATA CENTER ACCESS

- **1 RU high fixed configuration**

- Low power consumption

- 48 10GbE ports
  - 12 Ports 10GbE or **2/4/8G FC**
  - 36 Ports 10GbE or 1Gb

- *4 x 40G fabric uplink ports
  *(can also operate in 10G mode)

- **All ports have L2/L3**

- **All ports FCoE and DCB**

- **Redundant AC power supply**

- **Front-to-back air flow**

* Future

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QFX3500 AN INDUSTRY FIRST…

Industry's first shipping high density (>24 ports) 10GE ToR switch that…

- Fastest (sub-microsecond at all packet sizes).

- Highest throughput (1.24Tbps)

- Highest scalability for server virtualization (96K MAC addr.)

- "Flex-uplink support" (can run at 10GbE or *40GbE).

- "Flex-management" (by itself or *QFabric Node).

- "Flex-mode ports" (soft configurable 10GbE or 2/4/8G FC)

- Fully compliant FC-BB-5 FCoE-FC Gateway

* Future

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QFX3500 AND NEXUS 5548

Against nearest competitor (Nexus 5548):

- Non disruptive, no additional hardware for **FC ports**

- Non disruptive, no additional hardware for Layer-3 support.

- **2x faster**

- *40GbE uplinks

- **3x scale (MAC addresses)**

- ½ the power

- 33% higher throughput

* Future

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NETWORK TEST ASSESSMENT

Highlights from QFX3500 testing include the following:

- Sub-microsecond average latency

- Unicast and multicast average latency are virtually identical

- Line-rate throughput for all frame sizes, both for unicast and multicast traffic

- Layer-2 and Layer-3 unicast throughput virtually identical

- Interoperability with the Cisco MDS 9148 Fibre Channel switch

- No impact on latency of multicast traffic when concurrently forwarding multicast and FC/FCoE storage traffic

networktest

Source: Juniper Networks QFX3500 Switch Assessment, *Network Test*, February 2011

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SECURITIES TECHNOLOGY ANALYSIS CENTER (STAC) TEST RESULTS

Simulates Trading Transactional Performance

| Description
Supply to Receive
Latency, 1 Producer to 5 | Juniper
QFX3500/
IBM LLM | Cisco
4900M/29West | Cisco
Nexus
5010/29West | Voltaire
IB/IBM LLM |
|---|---|---|---|---|
| Highest Supply Rate (msg/sec) | 1,500,000 | 1,300,000 | 1,300,000 | 1,000,000 |
| Mean (micro seconds) | 9 | 15 | 14 | 8 |
| Max (micro seconds) | 16 | 30 | 33 | 47 |
| Standard Deviation | 0 | 1 | 1 | 1 |

The Juniper QFX3500 in combination with IBM server and middleware with SolarFlare NICs delivered the best performance to date for product combinations with 10GE switches.

This product combination delivered more messages faster with lower jitter than any other audited report in the STAC library.

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PRODUCT STRUCTURE

Base Unit

Front view

Rear view

List Price $34,000

Spares

Power Supply

Fan

Management Board

Software License

FCoE-FC Gateway feature license

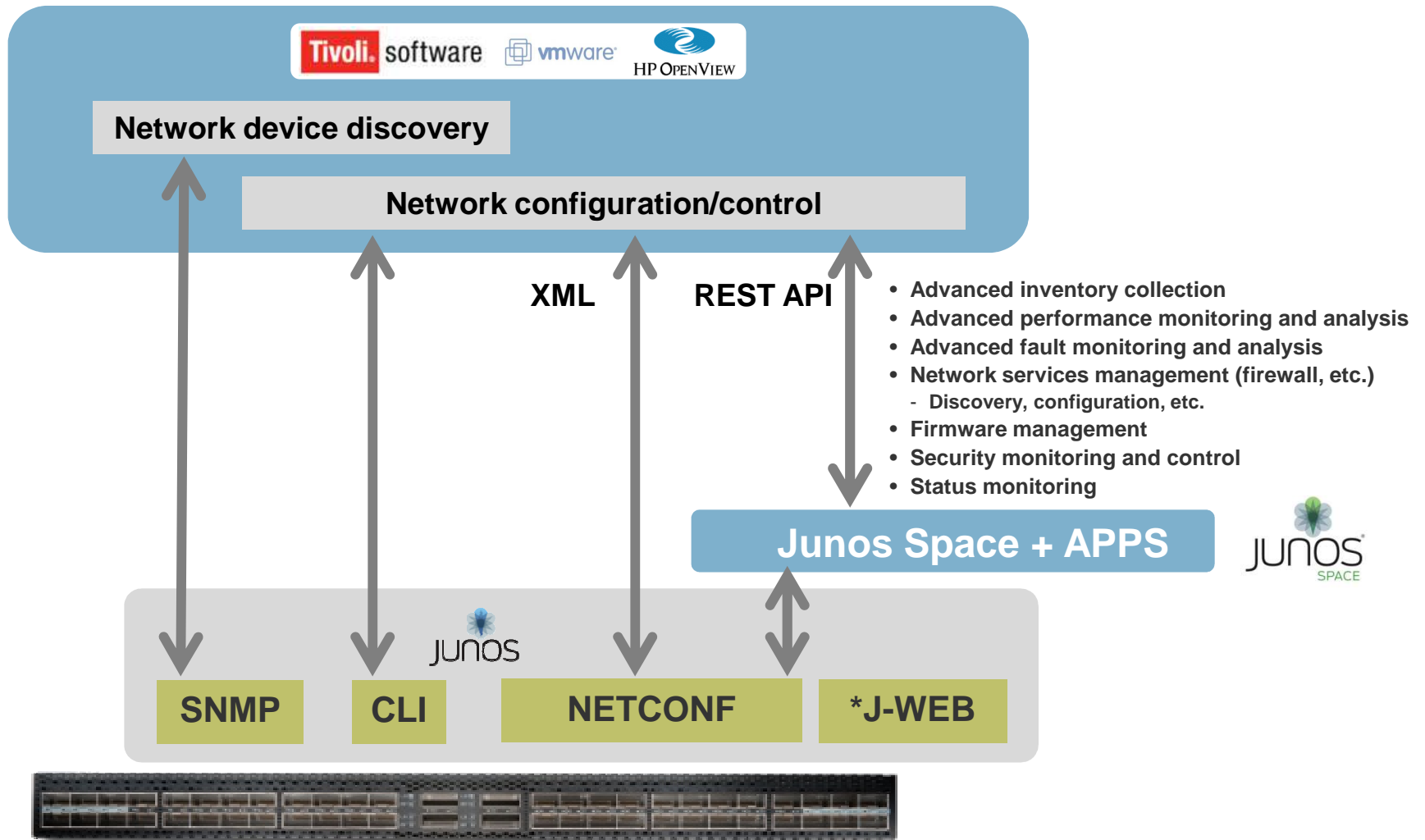**List Price $5,000**

Optics & DAC
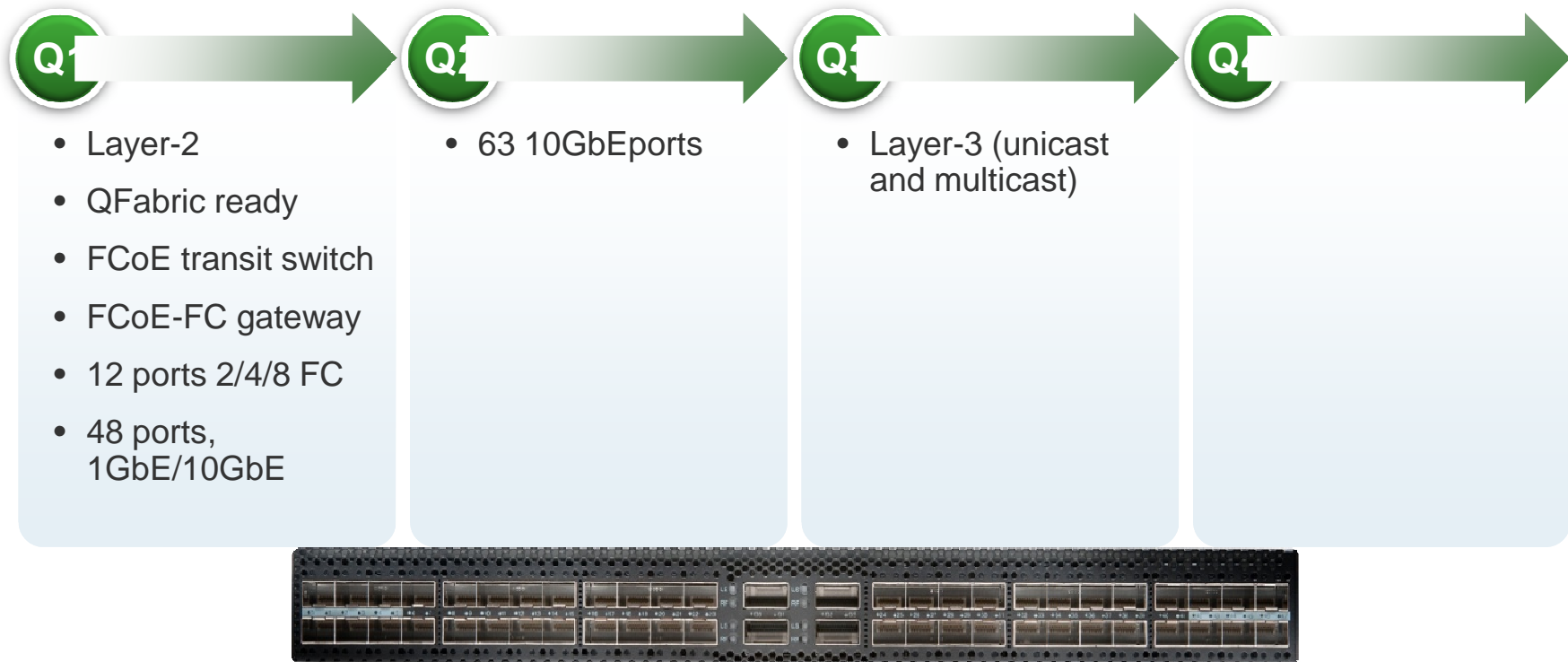
1, 3, 5, 7m DAC   10GE USR, SR, LR   8G-FC-SW   1GE SX, LX, BaseT

QFX3500 MANAGEMENT

Network device discovery

Network configuration/control

XML **REST API**

- Advanced inventory collection
- Advanced performance monitoring and analysis
- Advanced fault monitoring and analysis
- Network services management (firewall, etc.)
  - Discovery, configuration, etc.
- Firmware management
- Security monitoring and control
- Status monitoring

Junos Space + APPS

SNMP	CLI	NETCONF	*J-WEB

* Future

QFX3500 HIGH-LEVEL ROADMAP 2011

Q1
- Layer-2
- QFabric ready
- FCoE transit switch
- FCoE-FC gateway
- 12 ports 2/4/8 FC
- 48 ports, 1GbE/10GbE

Q2
- 63 10GbEports

Q3
- Layer-3 (unicast and multicast)

Q4

* Refer to SOPD for detailed roadmap

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QFX3500 DATACENTER POSITIONING

CORE

MX Series
EX8200

ACCESS

10 GbE   QFX3500

1 GE   EX4200

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QFX3500 AND EX4500

QFX3500

10GbE access for data center

- Low latency switch design (<1 µSec)
- FCoE transit switch & FCoE-FC gateway
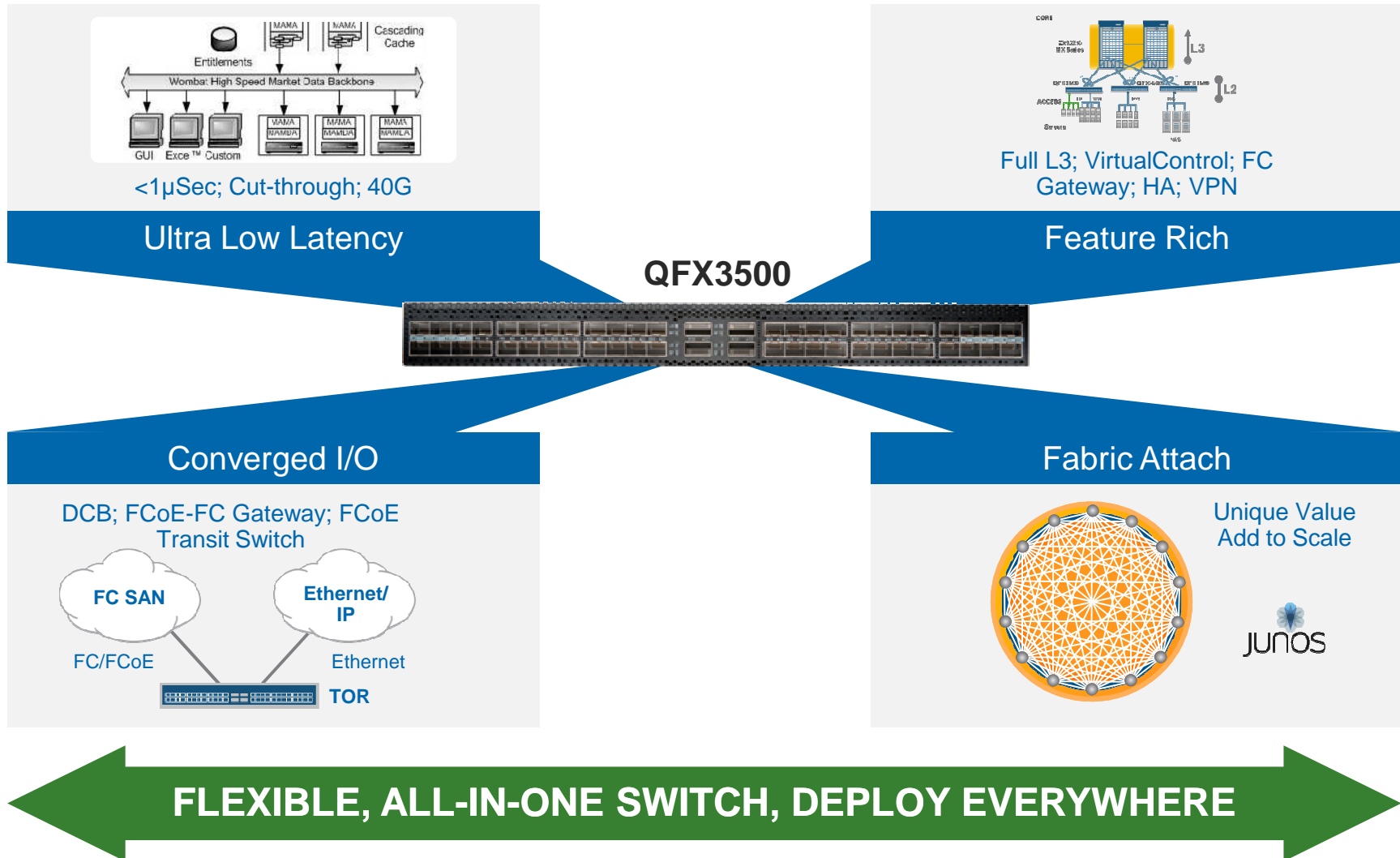- Lead to QFabric

EX4500

DC access with a mix of GbE and 10GbE
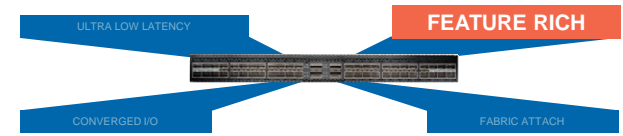
- Virtual chassis support
- FCoE transit switch

Small campus and DC aggregation/core

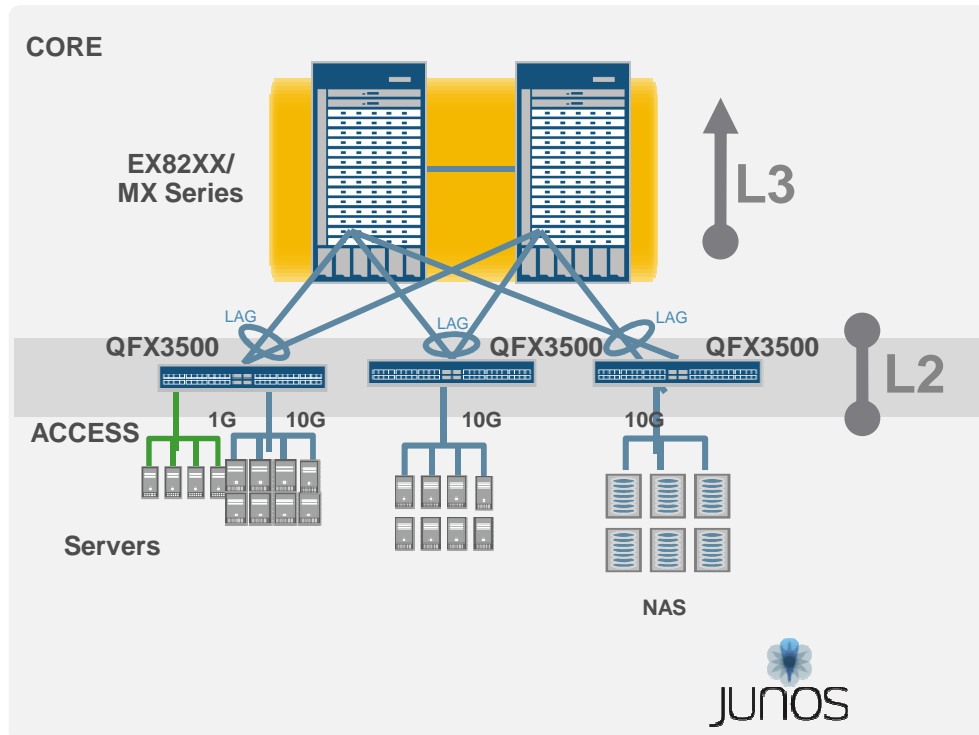- Virtual chassis support
- Rich L2/L3 feature set

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USE CASE SUMMARY QFX3500

<1µSec; Cut-through; 40G

Ultra Low Latency

Full L3; VirtualControl; FC Gateway; HA; VPN

Feature Rich

QFX3500

Converged I/O

Fabric Attach

DCB; FCoE-FC Gateway; FCoE Transit Switch

FC SAN

Ethernet/ IP

FC/FCoE

Ethernet

TOR

Unique Value Add to Scale

JUNOS

FLEXIBLE, ALL-IN-ONE SWITCH, DEPLOY EVERYWHERE

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HIGH-PERFORMANCE ETHERNET LAYER-2 ACCESS

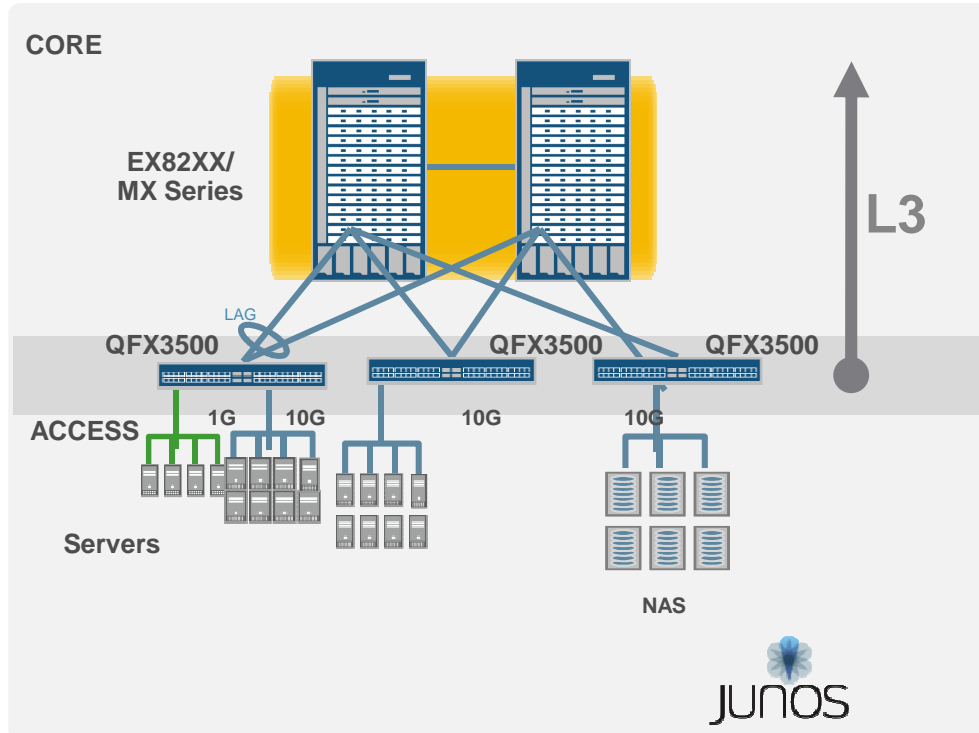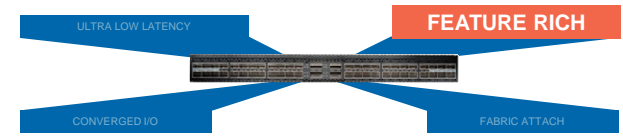## Layer-2 access use case

Requirements

- 10GbE server access
- Copper and/or fiber cabling
- Support virtualized servers
- Option for GbE server

QFX3500 solution

- 48 (*63) ports wirespeed 10GbE w/ DCB
- Copper DAC and SFP+ fiber support
- Sever virtualization support
- Supports GbE servers (36 ports)
- Future proof 40GbE uplink hardware

* Future

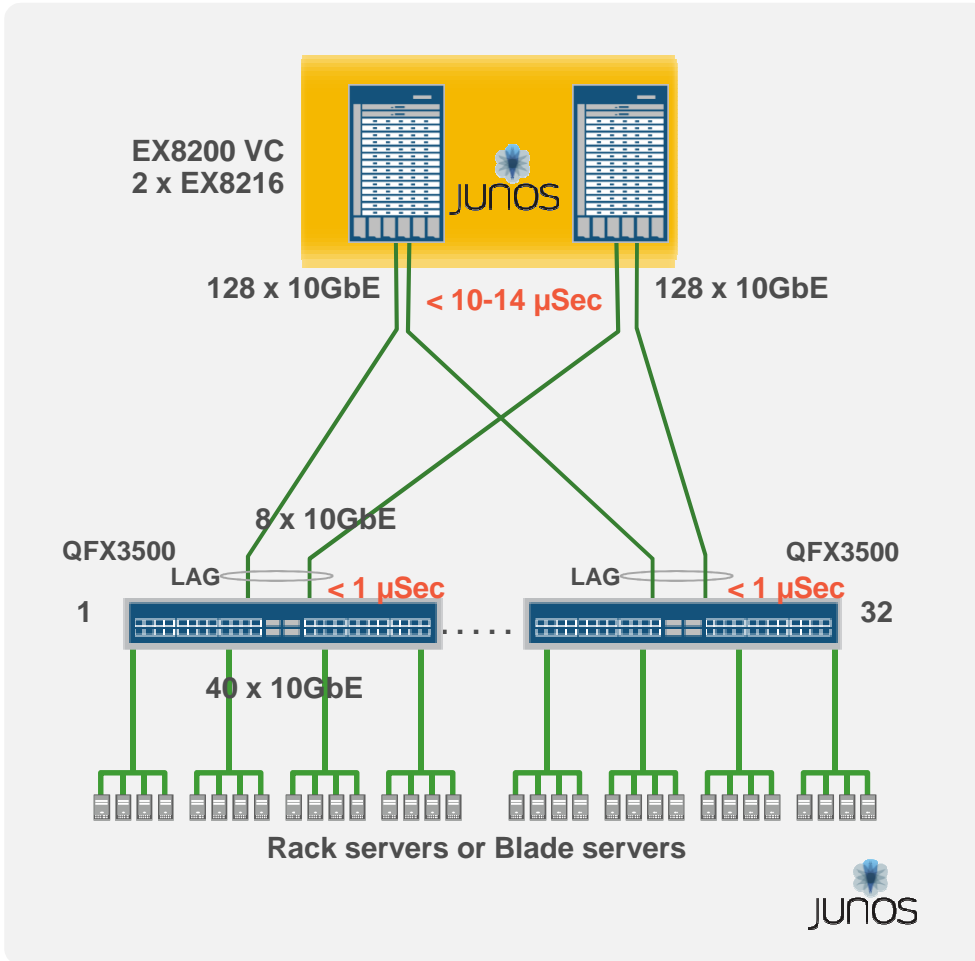# HIGH-PERFORMANCE ETHERNET LAYER-2/3 ACCESS

Requirements

- 10GbE server access
- Copper and/or fiber cabling
- Support virtualized servers
- Option for GbE server
- L2/L3 switching and routing protocol

QFX3500 solution

- 48 (*63) ports wirespeed 10GbE
- Copper DAC and SFP+ fiber support
- Sever virtualization support with L2/L3 Support
- Supports GbE servers (36 ports)
- *Future proof 40GbE uplink hardware

CORE

EX82XX/ MX Series

L3

LAG

QFX3500   **QFX3500**   **QFX3500**

1G   **10G**   **10G**   **10G**

ACCESS

Servers

NAS

JUNOS

* Future

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HPC USE CASE

**EX8200 VC
2 x EX8216**

128 x 10GbE **< 10-14 µSec** 128 x 10GbE

8 x 10GbE

QFX3500 **< 1 µSec** QFX3500

LAG LAG

1 32

40 x 10GbE

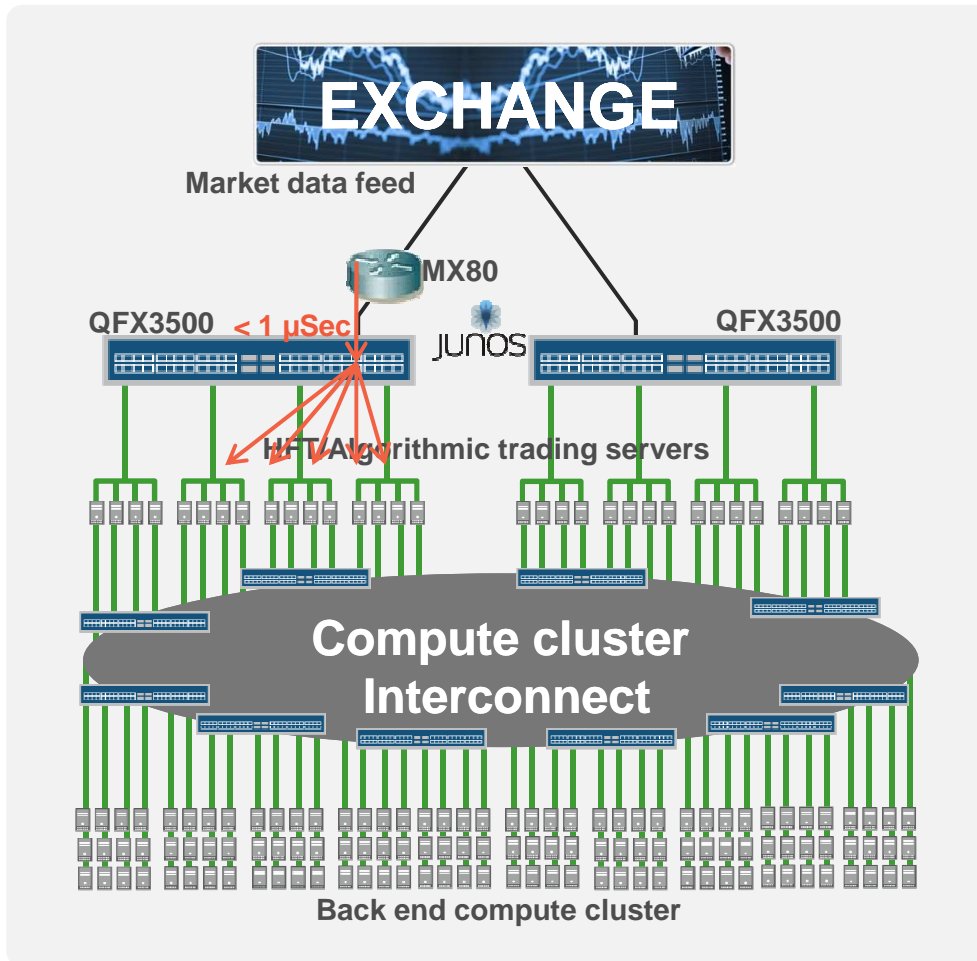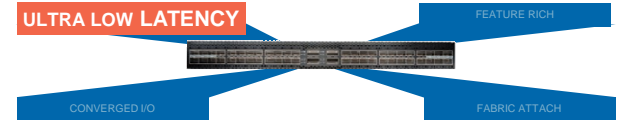**Rack servers or Blade servers**

Requirements

- 10GbE server access
- ULL switching
- Low over subscription at scale
- Support RDMA applications
- Option for inter cluster routing

QFX3500 solution

- 48 (*63) ports wirespeed 10GbE
- Copper DAC and SFP+ fiber support
- ULL cut-through switching
- L3 routing option on EX8200
- Scale to 1,280 10GbE servers

* Future

HFT/FSI ULL USE CASE

EXCHANGE

Market data feed

MX80

QFX3500   < 1 µSec   QFX3500

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HFT Algorithmic trading servers

Compute cluster Interconnect

Back end compute cluster

Requirements

- GbE and 10GbE market feed
    - BGP/OSPF peering with exchanges
    - Dual feed
    - L3 multicast
- 20-40 10GbE attached trading server per switch
    - <1 µSec latency
    - Cut through switching
    - Low jitter L2 multicast
- Wirespeed (Unicast & multicast)

Lexington Avenue solution
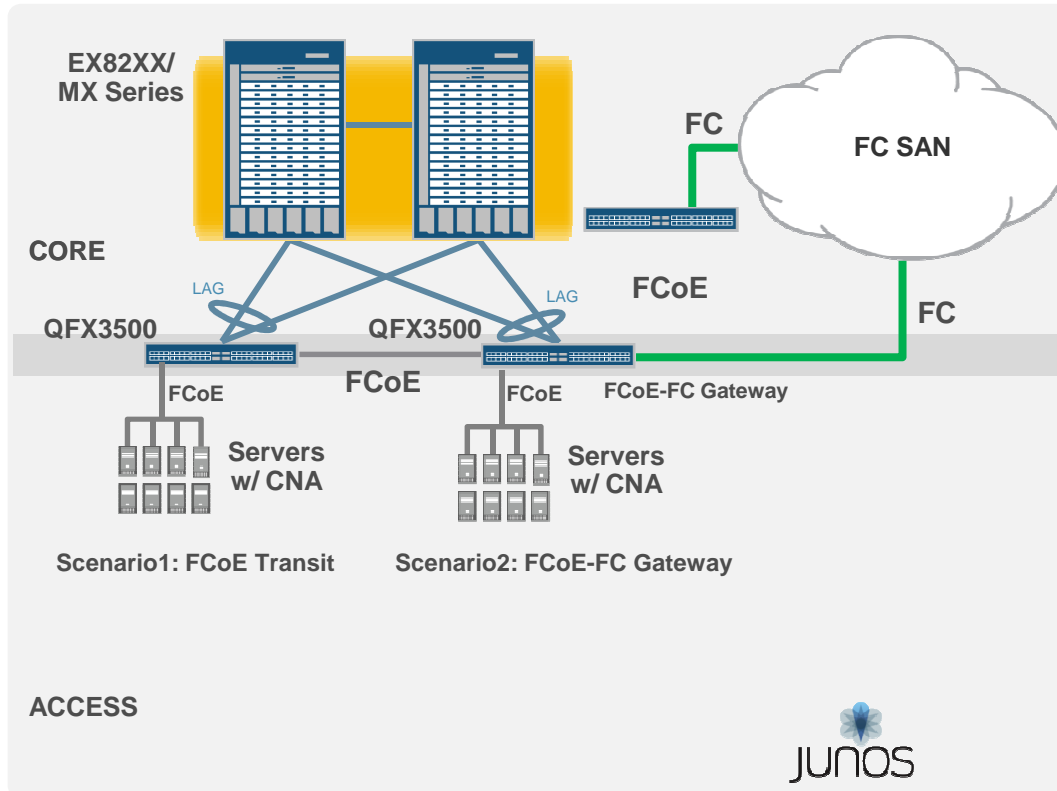
- ULL/Cut-through switching
- 48 (*63) ports wirespeed 10GbE
- ULL & low jitter multicast

* Future

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HIGH-PERFORMANCE DCB, STORAGE, & I/O CONVERGENCE

FCoE transit switch use case

EX82XX/ MX Series

FC

FC SAN

CORE

LAG

LAG

FCoE

FC

QFX3500

QFX3500

FCoE

FCoE

FCoE

FCoE-FC Gateway

Servers w/ CNA

Servers w/ CNA

Scenario1: FCoE Transit

Scenario2: FCoE-FC Gateway

ACCESS

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Requirements

- 10GbE server access
- Copper and/or fiber cabling
- DCB support
- FIP snooping support
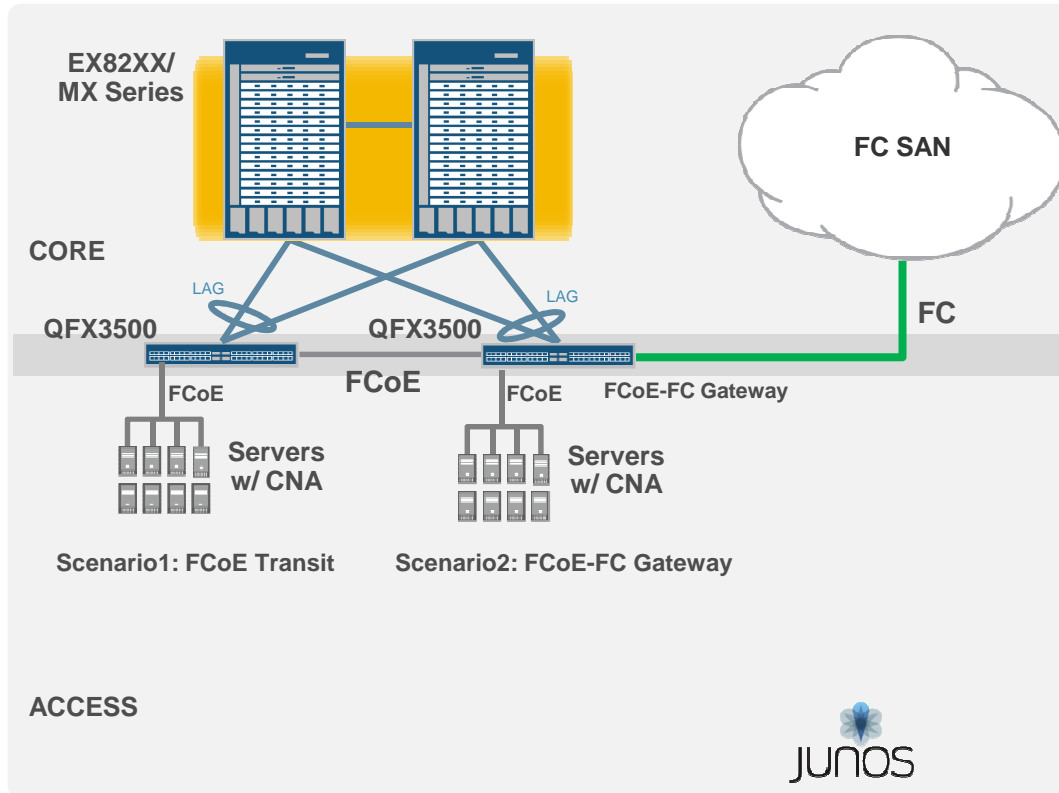
QFX3500 solution

- 48 (*63) ports wirespeed 10GbE
- Copper DAC and SFP+ fiber support
- DCB & FCoE Transit switch support
  - FCoE is standard on all ports
  - PFC, ETS, DCBX support
  - FIP snooping support

* Future

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HIGH-PERFORMANCE DCB, STORAGE, & I/O CONVERGENCE

FCoE-FC Gateway use case

EX82XX/
MX Series

FC SAN

CORE

LAG

LAG

FC

QFX3500

QFX3500

FCoE

FCoE-FC Gateway

FCoE

FCoE

Servers
w/ CNA

Servers
w/ CNA

Scenario1: FCoE Transit

Scenario2: FCoE-FC Gateway

ACCESS

JUNOS

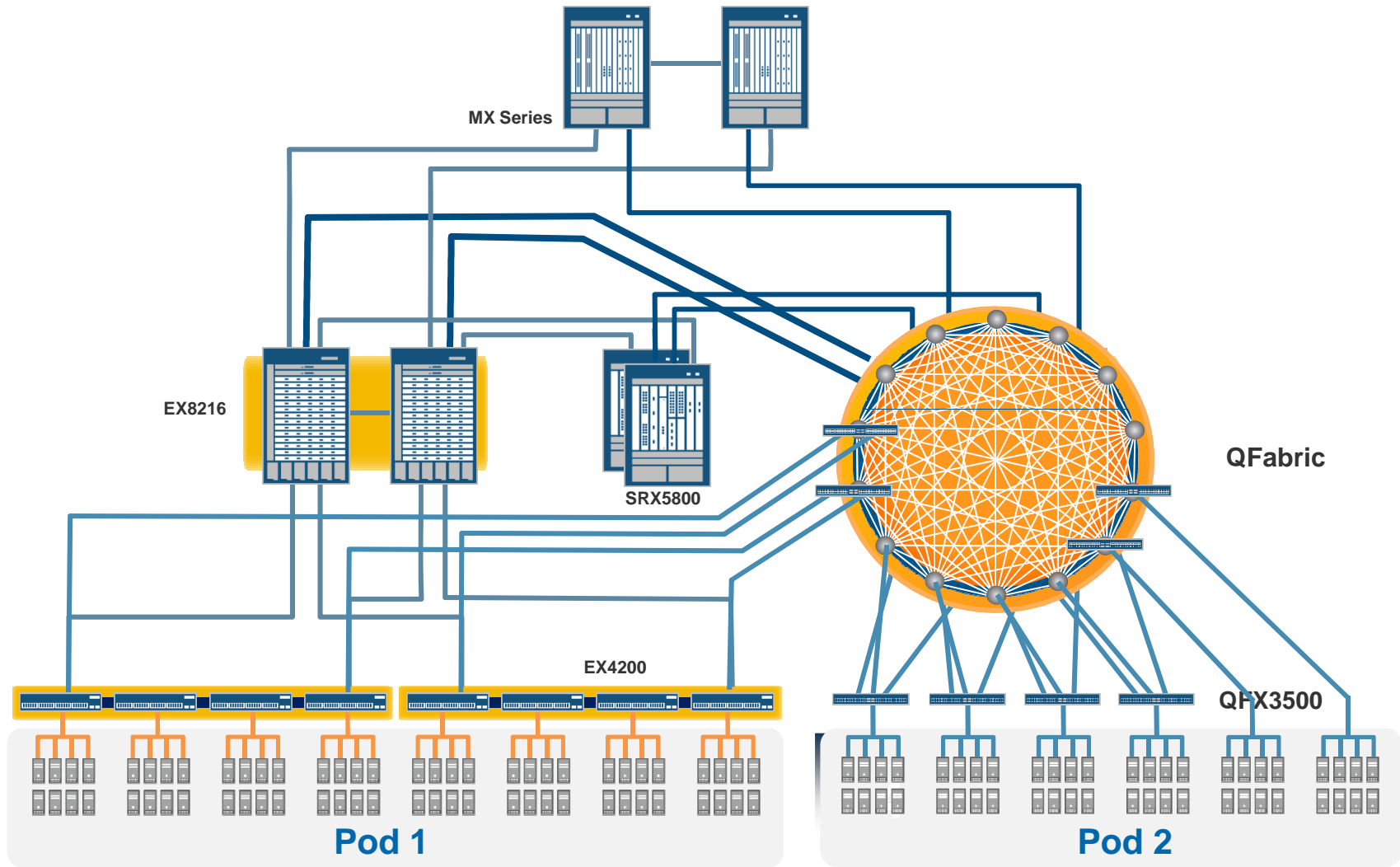## Requirements

- 10GbE server access
- Copper and/or fiber cabling
- High availability
- DCB & FCoE-FC Gateway support

QFX3500 solution

- 12 ports of 2/4/8G FC (no additional modules needed)
- Copper DAC and SFP+ fiber support
- Hardware & software HA
- DCB & FCoE-FC Gateway support
  (Note: this is not a FC Switch)

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FABRIC EDGE SOLUTION OF
JUNIPER QFABRIC ARCHITECTURE

ULTRA LOW LATENCY   FEATURE RICH

CONVERGED I/O   **FABRIC ATTACH**

MX Series

EX8216

SRX5800

QFabric

EX4200

QFX3500

Pod 1

Pod 2

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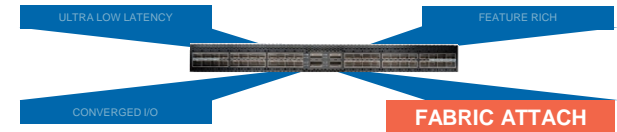
QFX3500 DEEP DIVE

PERFORMANCE & SCALE

Front view

Rear view
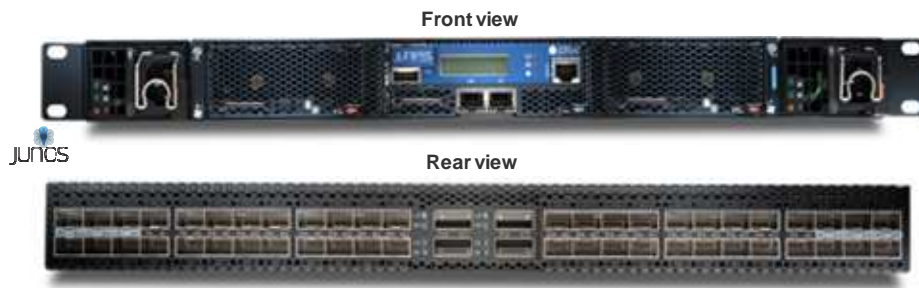
Feature	Scale
Throughput	1.28 Tbps
Forwarding	960 MPPS
Latency	<900 nanoseconds
Packet buffer	9MB shared
MAC address	96K
IPv4 routes	12K prefixes + 8K host routes
Multicast groups	3500
Firewall filter	1,500
Maximum power	365 Watts
Nominal power	295 Watts
Nominal power per port	~4 Watts
Depth	28"
Air flow	Front to back

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ENVIRONMENTAL CONSCIOUS – QFABRIC

Health and Safety

Restriction of Hazardous Substances Directive (RoHS): 6/6
Restricts Lead, Mercury, Cadmium and three other substances*

Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): Strict EU compliance that addresses the production and use of chemical substances

China Restriction of Hazardous Substances Directive (China RoHS):
All items shipped to China have to be marked as compliant or non-compliant*

Energy Efficient

80 PLUS: Initiative to promote energy efficiency in power supply units (PSU); **GOLD** certifies products that have more than 87% energy efficiency

The Waste Electrical and Electronic Equipment (WEEE): European Community directive requires Products designed for recyclability; It imposes the responsibility for the disposal of electronic waste on the manufacturers

Resource Conservation

Recycled Material:
A portion of the product, and/or its packaging is made of recycled material

* Restricts Lead, Mercury, Cadmium Hexavalent chromium (Cr6+), Polybrominated biphenyls (PBB) and Polybrominated diphenyl ether (PBDE)

PORTS FLEXIBILITY

*(4 ports, 40G/40GbE, Fiber) or *(15 ports, 10GbE, Fiber)

18 ports, 1GbE, Copper

36 ports, 10GbE or 1GbE, Fiber

12 ports, 10GbE or 2/4/8G FC

48 SFP+ ports, 10GbE, Fiber
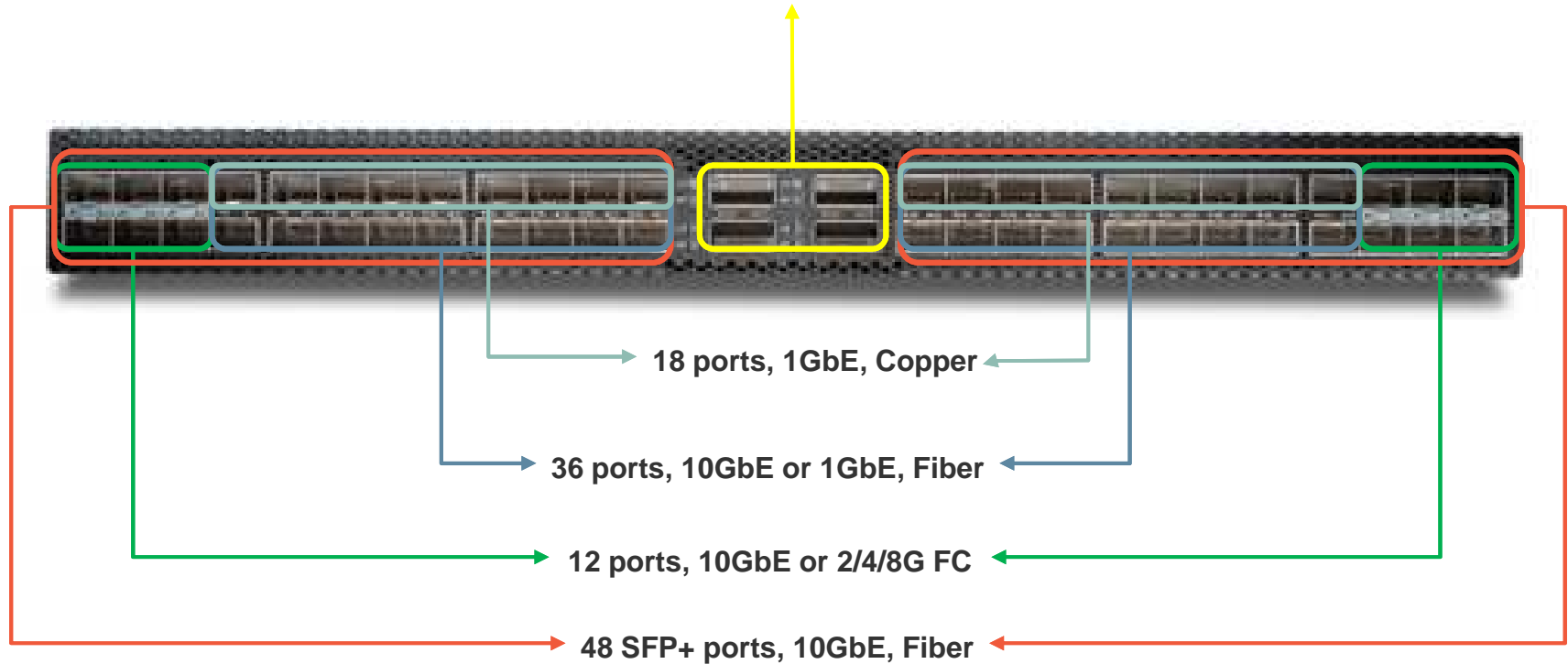
HIGH AVAILABILITY (HA) DESIGN

Front view

Dual redundant fan tray

Hot pluggable

Dual 1+1 redundant power supply

Hot pluggable

110-240 volt AC

TRANSCEIVER SUPPORT

SFP optical transceiver
2/4G or 8G FC-SW

Rear view

FC SFP

GbE SFP Copper

***QSFP+ ports**

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SFP transceiver
SR, LR, 1000BaseT

GbE SFP Optical

10GbE SFP+

Direct Attached/Twinax SFP+ copper
1, 3, 5, 7 meter

SFP+ optical transceiver
USR, SR, LR

* Roadmap

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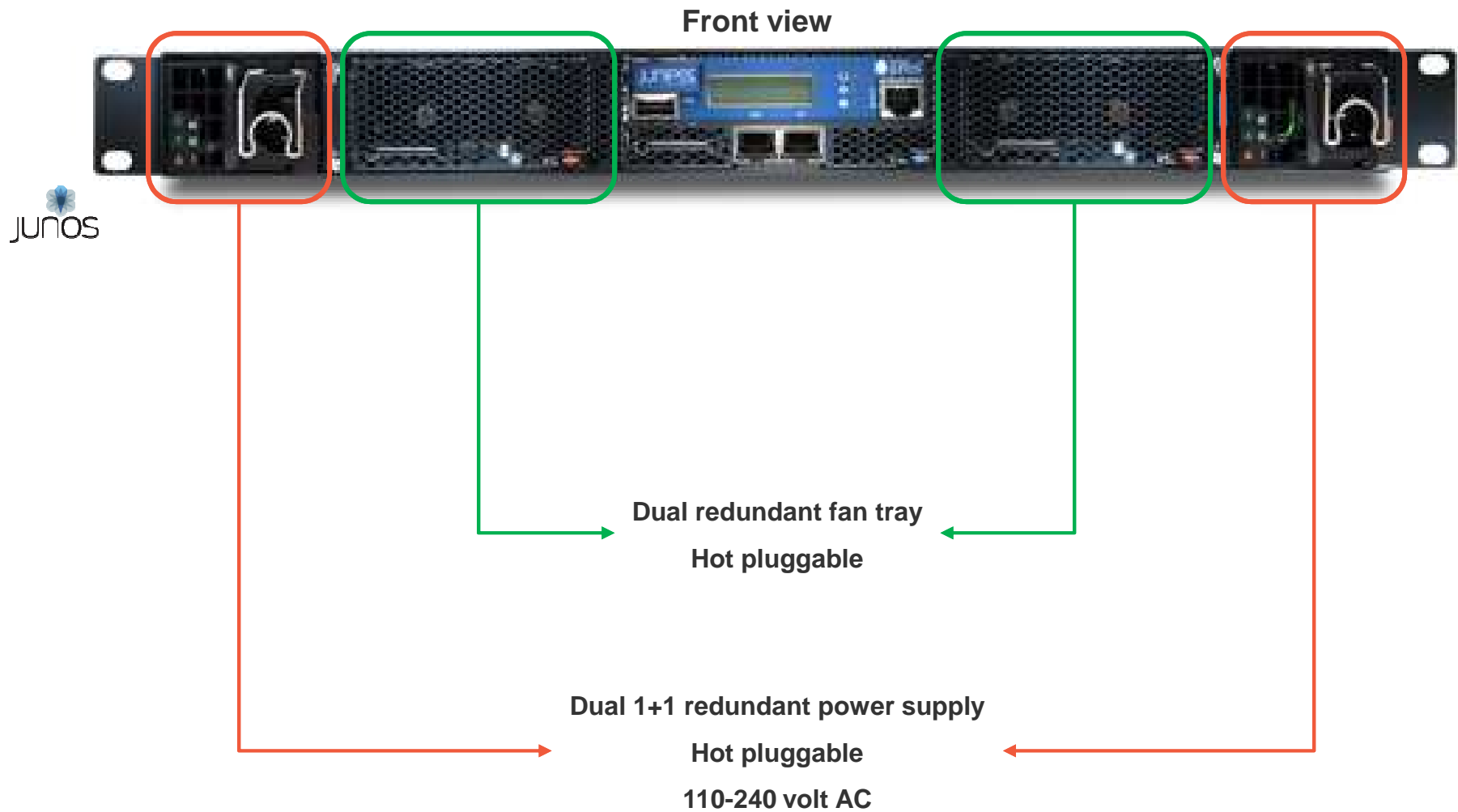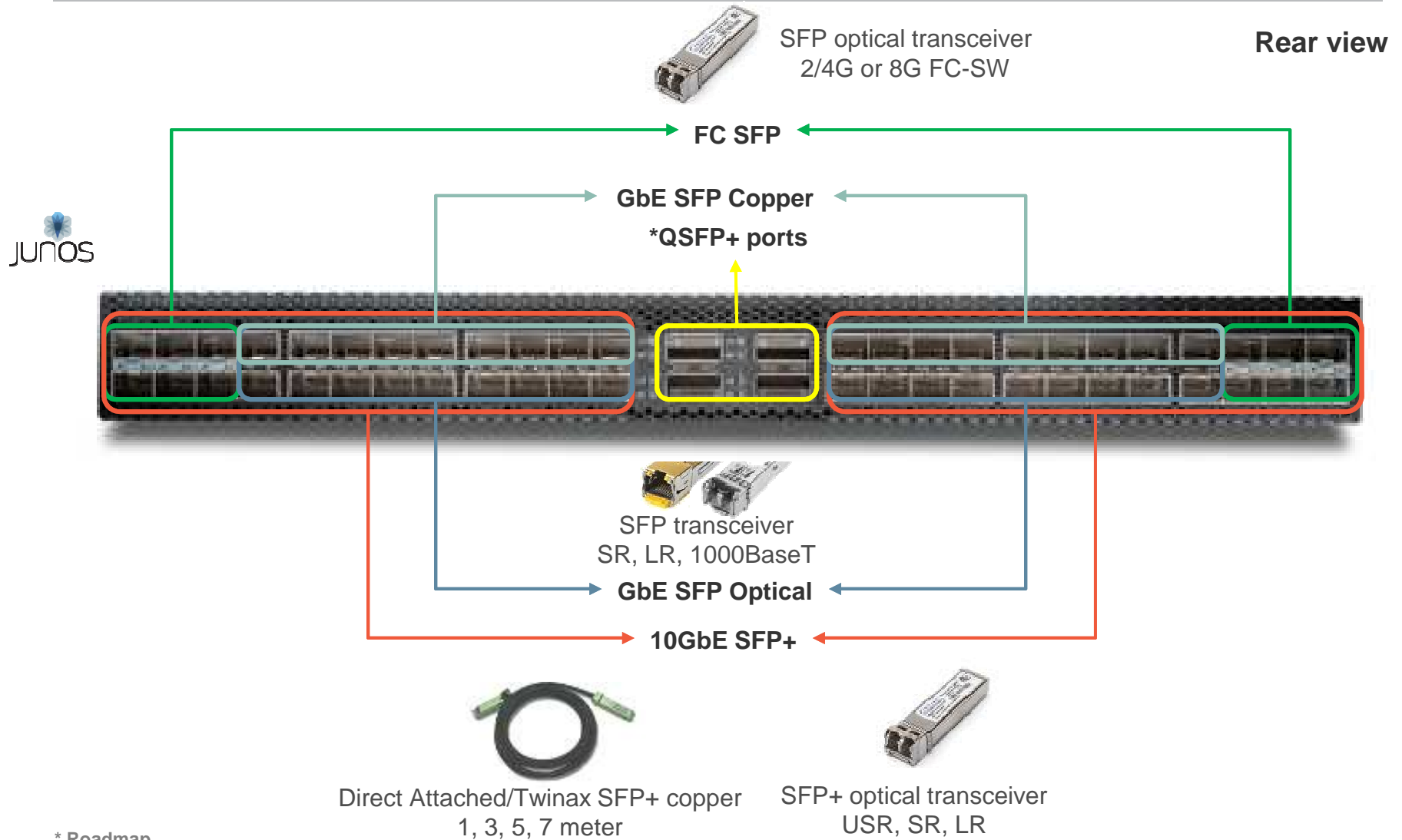
TRANSCEIVER SELECTION

Transceiver Type	Protocol	Speed	Supported ports	Cable type	Cable Length
SFP+ 10GE-SR	Ethernet	10GbE	All SFP+	MMF	300m (OM3)
SFP+ 10GE-USR	Ethernet	10GbE	All SFP+	MMF	100m (OM3)
SFP+ 10GE-LR	Ethernet	10GbE	All SFP+	SMF	10km
SFP+ DAC	Ethernet	10GbE	All SFP+	Twinax DAC	1, 3, 5, 7m
SFP 1GE-T	Ethernet	GbE	Top row 6-41	Cat5/6	100m
SFP 1GE-SX	Ethernet	GbE	6-41	MMF	500m (OM3)
SFP 1GE-LX	Ethernet	GbE	6-41	SMF	10km
SFP 8GFC-SW	Fibre Channel	2/4/8G FC	0-5, 42-47	MMF	150m (OM3)
*QSFP+ to SFP+ DAC	Ethernet	10GbE	4 QSFP+ ports	Twinax DAC	1, 3, 5, 7m

* Please refer to Roadmap

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QFX3500 LAYER-2 UNICAST STORE AND FORWARD
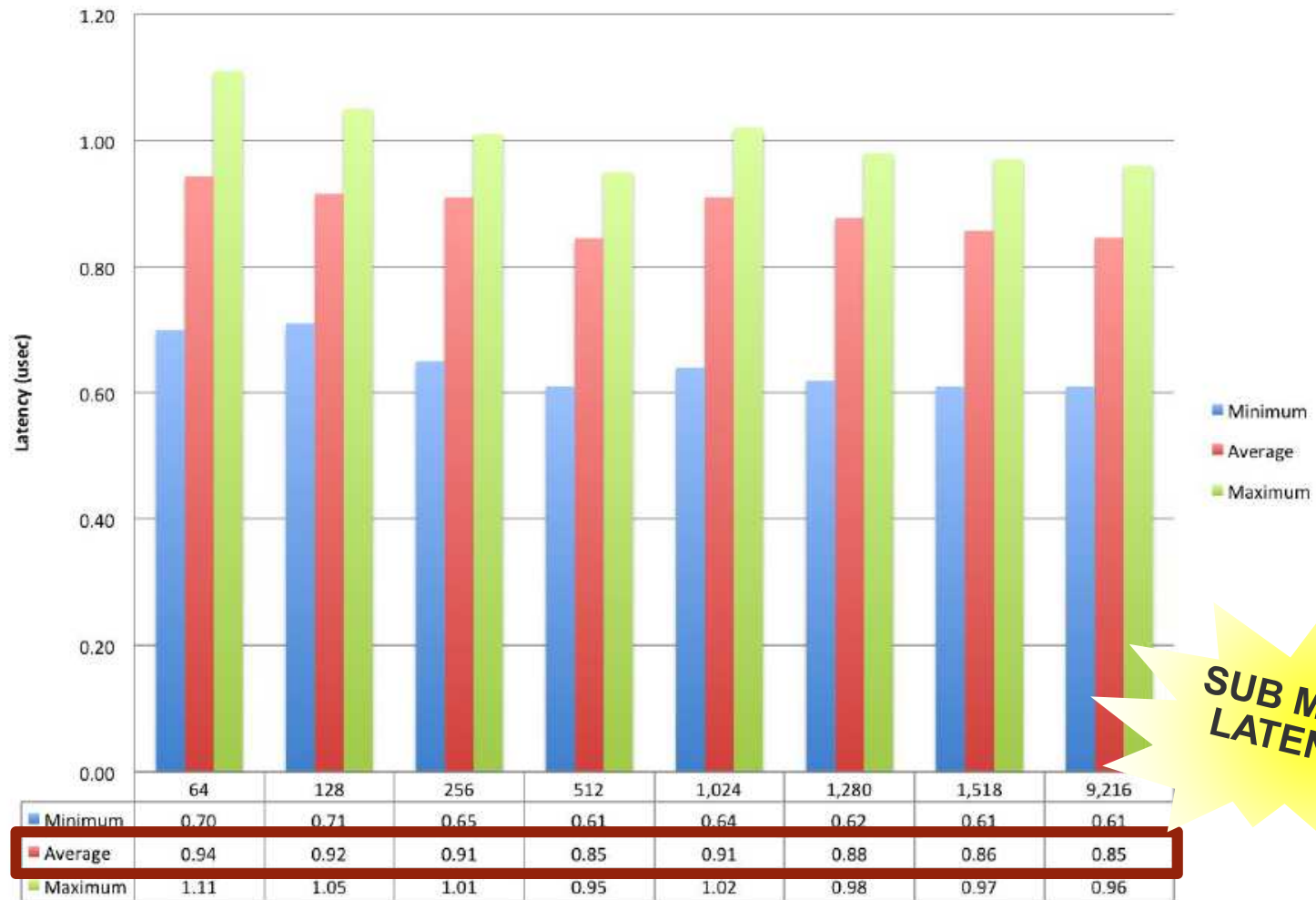
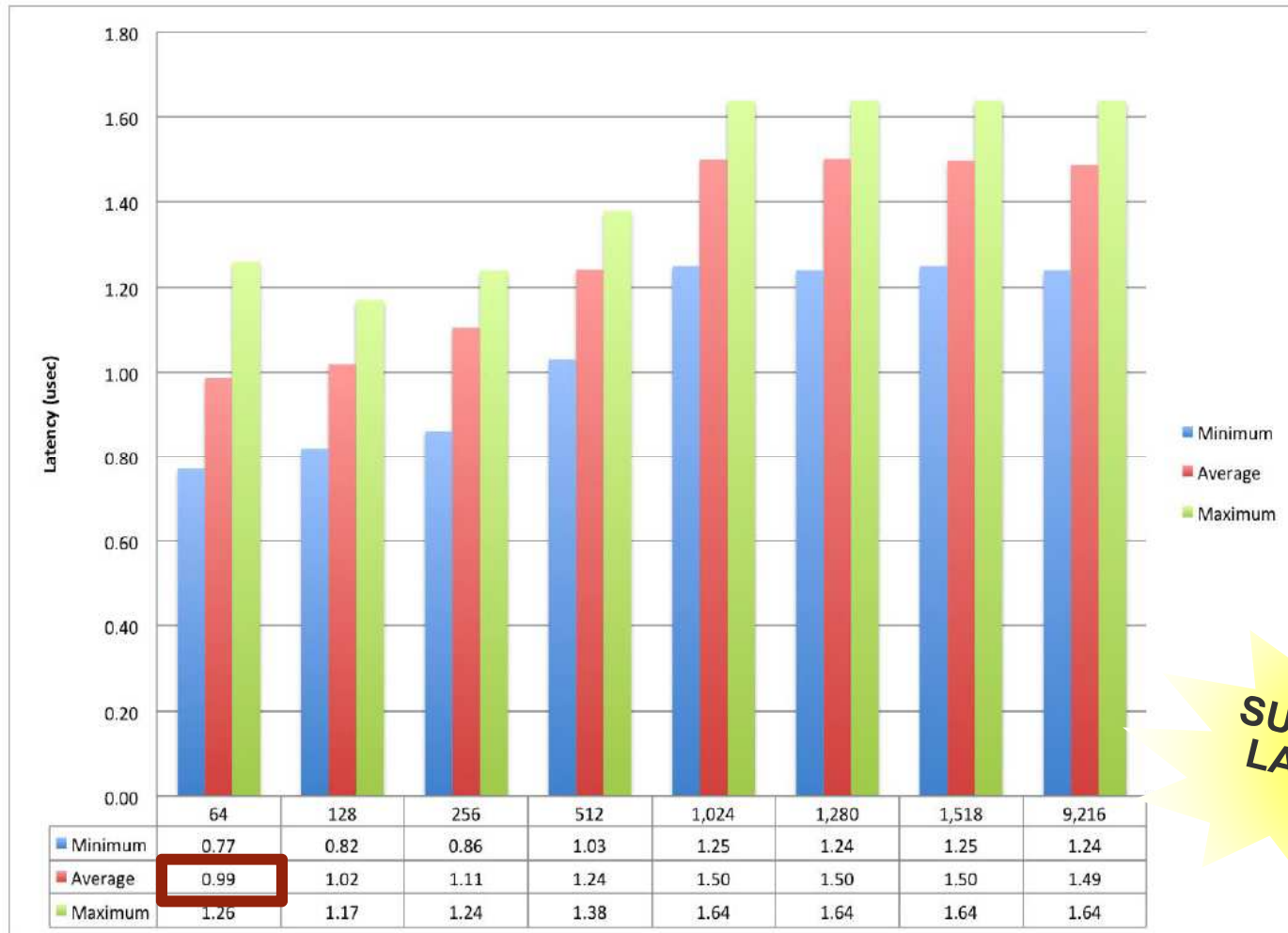|	64	128	256	512	1,024	1,280	1,518	9,216
Minimum	0.70	0.71	0.65	0.61	0.64	0.62	0.61	0.61
Average	0.94	0.92	0.91	0.85	0.91	0.88	0.86	0.85
Maximum	1.11	1.05	1.01	0.95	1.02	0.98	0.97	0.96

SUB MICRO LATENCY

Source: Juniper Networks QFX3500 Switch Assessment, *Network Test*, February 2011

Across Different Packet Sizes

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QFX3500 LAYER-2 UNICAST CUT-THROUGH

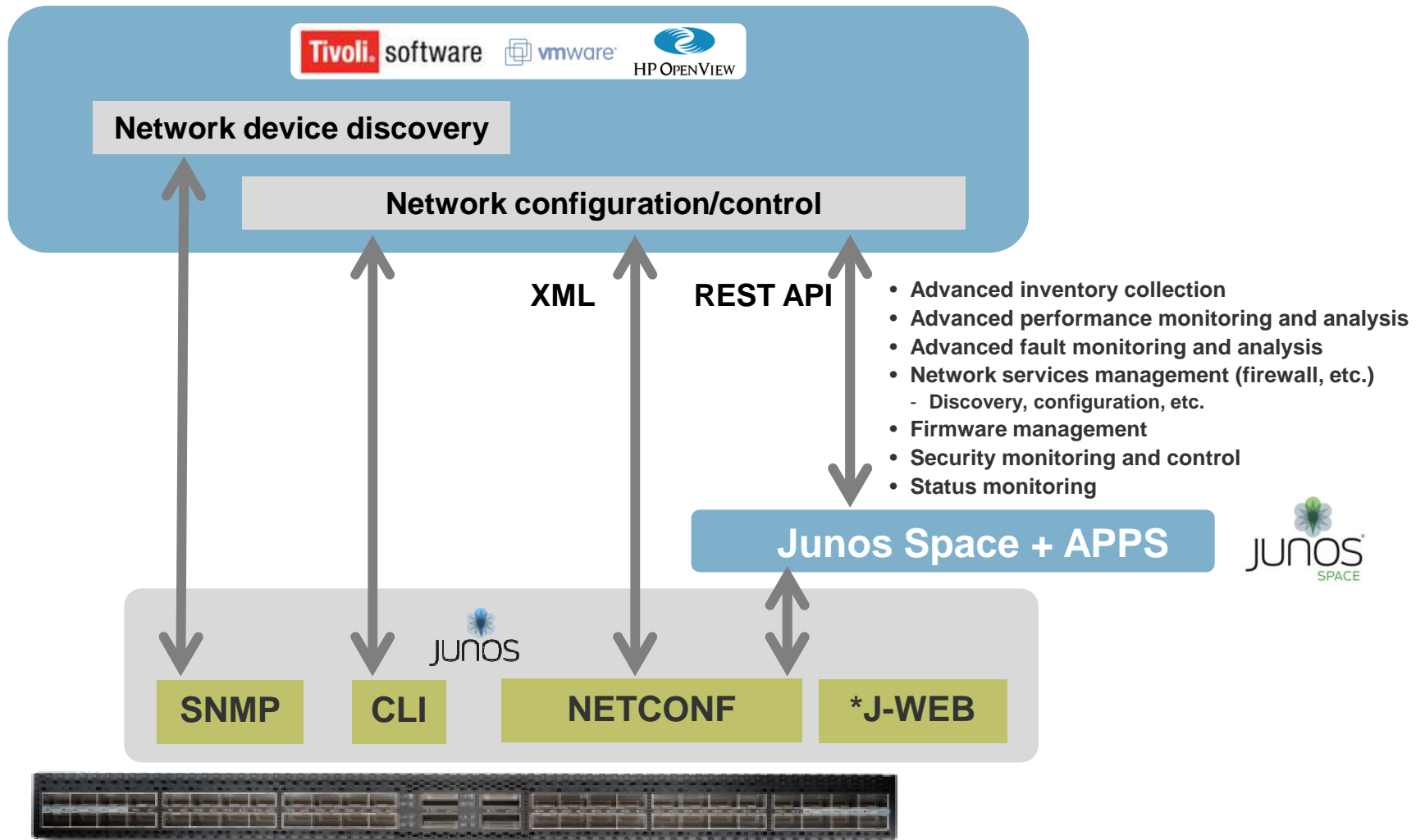|	64	128	256	512	1,024	1,280	1,518	9,216
Minimum	0.77	0.82	0.86	1.03	1.25	1.24	1.25	1.24
Average	0.99	1.02	1.11	1.24	1.50	1.50	1.50	1.49
Maximum	1.26	1.17	1.24	1.38	1.64	1.64	1.64	1.64

SUB MICRO LATENCY

Source: Juniper Networks QFX3500 Switch Assessment, *Network Test*, February 2011

Across Min Size Packet

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QFX3500 MANAGEMENT

Tivoli software vmware HP OpenView

Network device discovery

Network configuration/control

XML   **REST API**

- Advanced inventory collection
- Advanced performance monitoring and analysis
- Advanced fault monitoring and analysis
- Network services management (firewall, etc.)
  - Discovery, configuration, etc.
- Firmware management
- Security monitoring and control
- Status monitoring

Junos Space + APPS

JUNOS SPACE

JUNOS

| SNMP | CLI | NETCONF | *J-WEB |

* Future

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JUNOS SPACE SUPPORT

ETHERNET DESIGN

- Focused on datacenter network infrastructure deployment
- Provides scalable workflow to apply best practice configuration on a large selection of switches
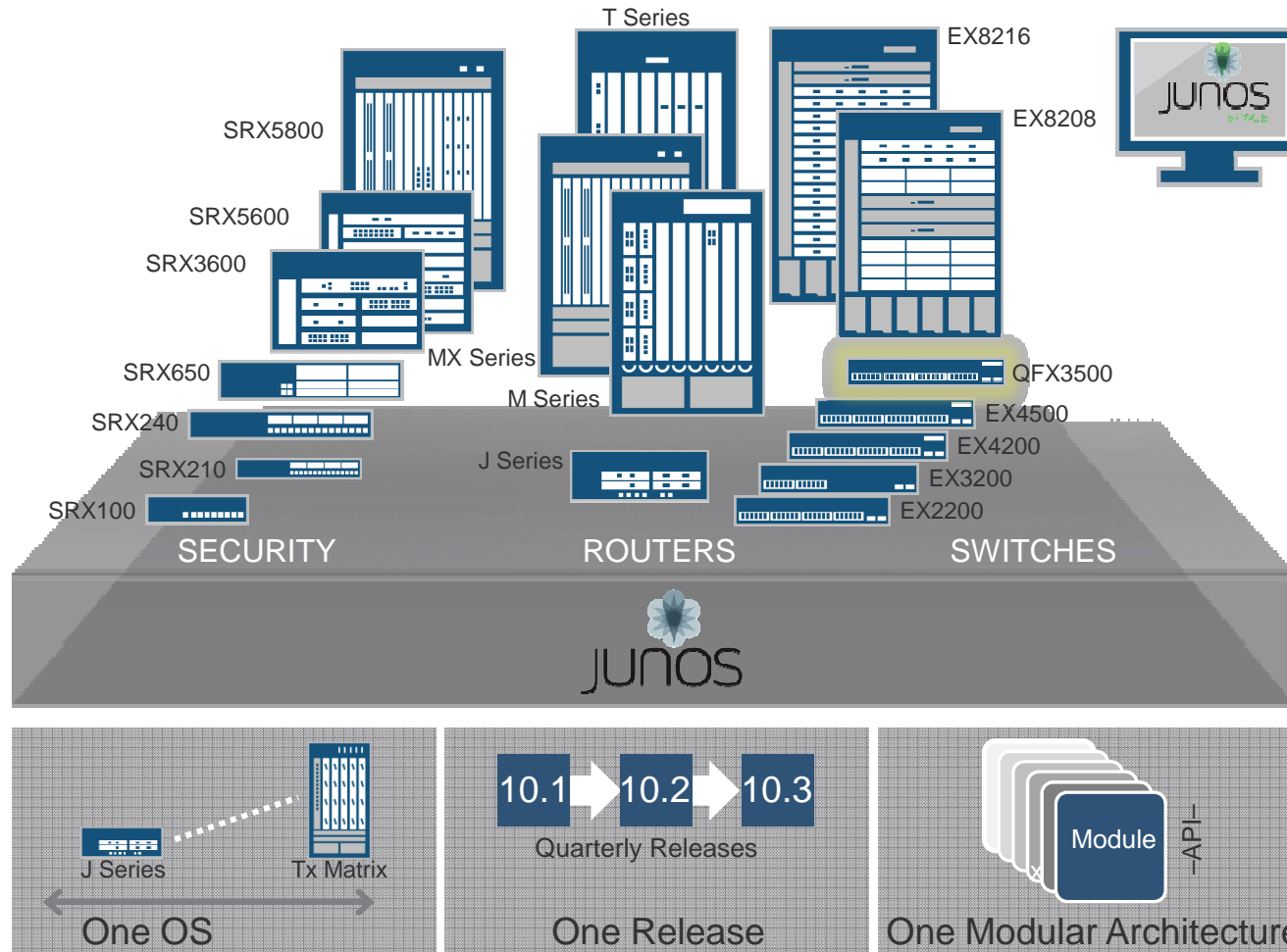- Best practice configuration includes port security, QoS, STP

VIRTUAL CONTROL

- Physical and virtual from a single pane of glass
- Open architecture
- No proprietary lock-ins
- Works with open APIs
- Manage 100s of hosts from a single instance

SERVICE NOW

- Fault and case management
- In-device, script-based failure monitoring
- Lights-off incident creation with J-TAC
- 30% MTTR reduction

DAY ONE SUPPORT FOR QFX3500

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ONE OPERATING SYSTEM FOR THE NEW NETWORK

T Series

EX8216

SRX5800

EX8208

SRX5600

SRX3600

MX Series

QFX3500

SRX650

M Series

EX4500

SRX240

EX4200

SRX210

J Series

EX3200

SRX100

EX2200

SECURITY

ROUTERS

SWITCHES

JUNOS

J Series · Tx Matrix

One OS

10.1 → 10.2 → 10.3

Quarterly Releases

One Release

Module

–API–

One Modular Architecture

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COMPETITIVE DEEP DIVE

PRICING

	Juniper QFX 3500	Cisco Nexus 5548	Cost Difference
Base Price	$34K	$36.8K	**+2.8K**
FCoE to FC gateway	$39K	$43K	**+4K**

List prices

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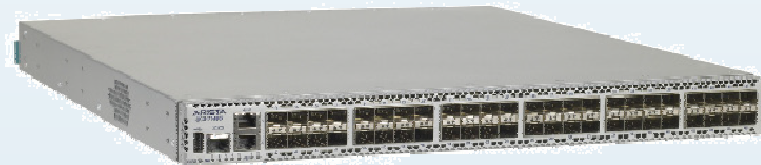
PERFORMANCE AND FEATURES

CISCO NEXUS 5548

- Juniper latency is **2.2 times faster**
- Juniper throughput is **~33% better**
- Juniper scales better for **virtualization**
- Juniper MAC Tables **3 times** larger
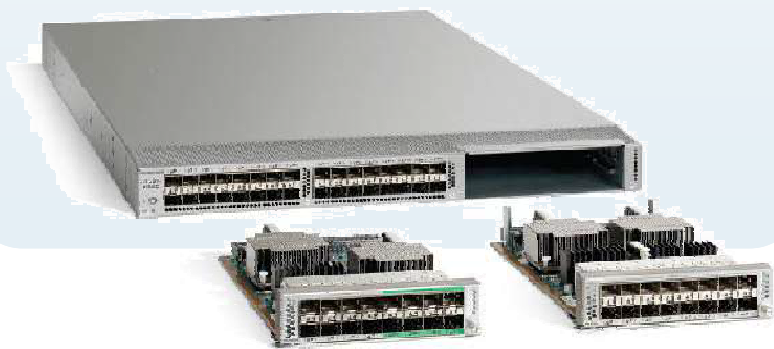
ARISTA 7148

- Juniper throughput is **~33% better**
- Juniper scales better for **virtualization**
- Juniper MAC tables **3 times** larger
- No convergence

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QFX3500 VS. CISCO NEXUS 5548

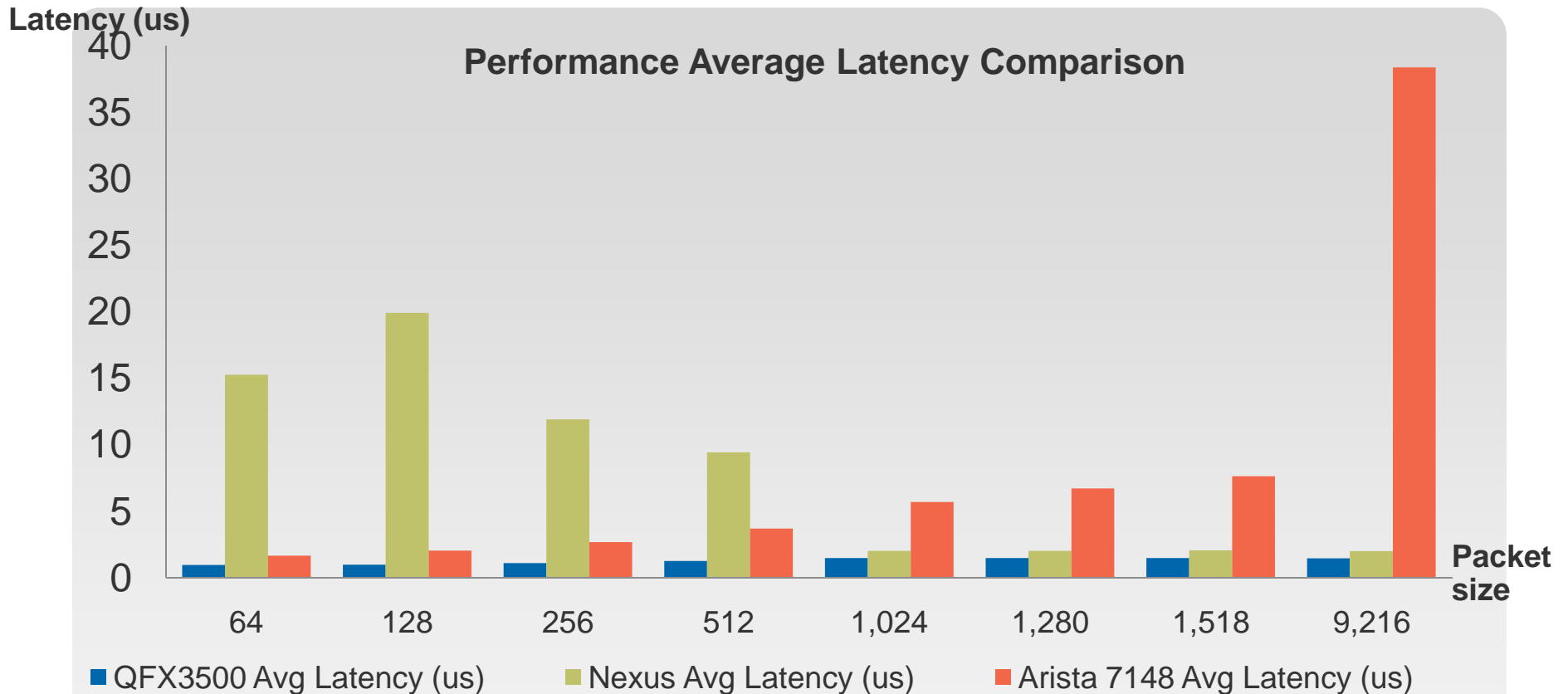| Attribute	QFX3500	Cisco 5548
Latency	<900ns cut-through <900ns s&f	2usec (N5548)
Port Density ▪ 10 G ▪ 40 G(QSFP)	48 4 (*Future)	48 (N5548) None
L2/L3	L2, L3	L2, L3: Disruptive new HW required
Path to Fabric	Building block for Stratus Fabric	FabricPath
Throughput and packets/sec	1.28 Tbps	960 Gbps
Convergence	FCoE transit switch	FCoE
	FC gateway	FC needs additional expansion module
Server virtualization	Path to fabric supporting large L2 domain	Unknown Fabric scale
	96K MAC, 20K IPv4 host	32K MAC
	Standards based virtualization	Proprietary solution based on VN-link
Management simplification	Multiple devices managed as single switch with single control plane	Each device managed separately adding to OPEX and complexity

JUNIPER NETWORKS

QFX3500 VS. ARISTA 7148SX

Attribute	QFX3500	Arista 7148SX
Latency	<900ns	>1200ns US
10GbE Port Densities	Max 63 10G ports	Max 48 10G ports
40GbE Port Densities	4 QSFP+ ports (*Future)	None
Throughput	1.28 Tbps	960 Gbps
Storage and I/O convergence	FCoE transit switch (Base) FC Gateway (License)	No support

Data center bridging	DCB support:
	   PFC
	   ETS and
	   QCN (future)
		No support

HPC support	RoCEE, iWarp	No RoCEE
Virtualization support with Large L2 domain: MAC Table IPV4 routes	96K MAC 20K IPv4	16K MAC Small 16K IPv4 hosts
Multicast groups	3,500	2000
Typical power consumption	295 W	600 W

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QFX3500 VS. BROCADE VDX6720

Attribute	QFX3500	Brocade VDX6720
Latency	<900 ns cut-through <900 ns s&f	>1.2usec Cut-through only
Throughput	1.28 Tbps	1200 Gbps
Convergence	FCoE FC Gateway	Yes No
Lower Jitter with Single Asic	Single ASIC	Multiple ASICs
Protocols	L2/L3	L2/No L3
Port Density: 10G 40G	64 4	60 0
Large L2: MAC Table	96K MAC	32K

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PERFORMANCE: AVERAGE UNICAST LATENCY
QFX3500 VS. CISCO 5548, ARISTA 7148

Latency (us)

Performance Average Latency Comparison

Packet size

■ QFX3500 Avg Latency (us)　　■ Nexus Avg Latency (us)　　■ Arista 7148 Avg Latency (us)

QFX is the only sub-1us switch at all packet sizes and at 100% load

PERFORMANCE: UNICAST JITTER
QFX3500 VS. CISCO 5548 AND ARISTA 7148
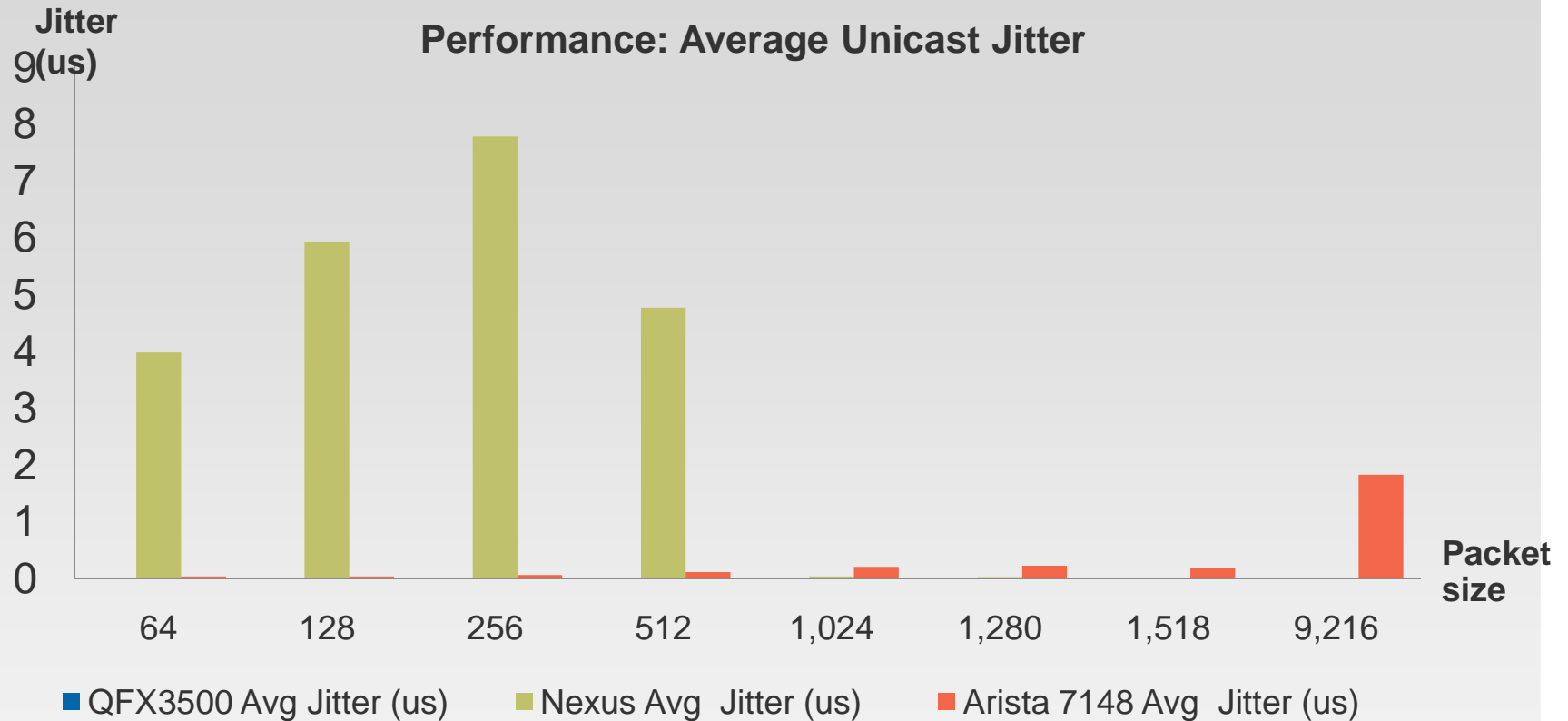
Performance: Average Unicast Jitter

Jitter (us)

Packet size

■ QFX3500 Avg Jitter (us) ■ Nexus Avg Jitter (us) ■ Arista 7148 Avg Jitter (us)

Practically NO jitter.
Consistent performance at all packet sizes at full load

JUNIPER NETWORKS

PERFORMANCE: MAX THROUGHPUT
QFX3500 VS. CISCO 5548 AND ARISTA 7148

Cisco starts dropping packets at 87% load
Arista starts dropping packets at 93% load
QFX does not drop a single packet at 100% load for any packet size

JUNIPER NETWORKS
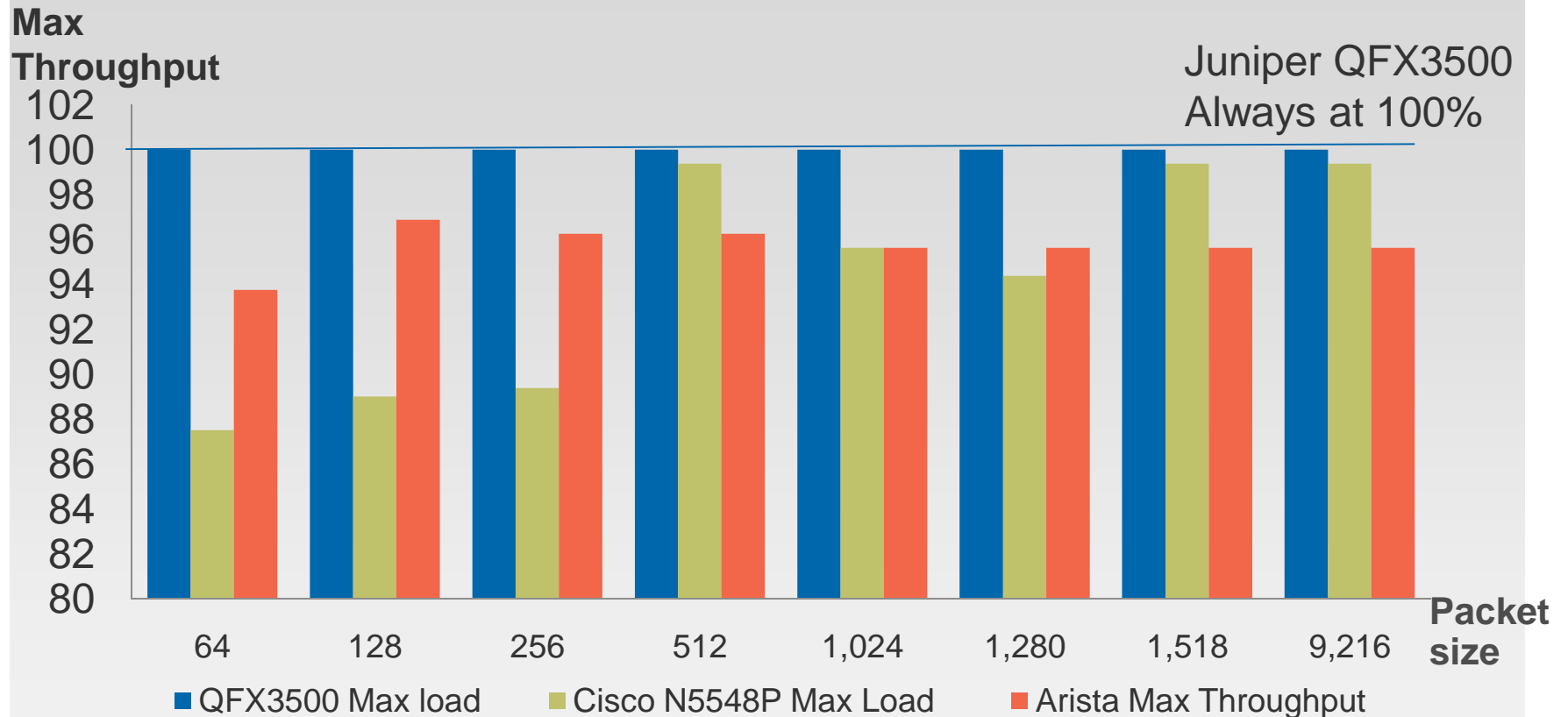
QFX3500: HOW DO WE STACK UP TO THE COMPETITION?

	QFX3500	Cisco Nexus 5548	Arista 7148	Brocade VDX6720
Latency	<900 ns Cut-through <900 ns s&f	2000 nsec Cut-through Only	1200 nsec Cut-through Only	>1.2usec Cut-through Only
Throughput	1.28 Tbps	960 Gbps	90 Gbps	1200Gbps
Convergence	FCoE FC Gateway	FCoE FC expansion module	None	Yes No
Lower Jitter with Single ASIC	Single ASIC	Multiple ASICs	Multiple ASICs	Multiple ASICs
Protocols	L2/ L3	Not full L3 at all ports. Needs expansion module for L3	L2/L3	No L3
Port Density: 10G 40G	64 4	48 0	48 0	60 0
Large L2 : MAC Table	96K MAC	32K	16K	32K

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SUMMARY QFX 3500

- Sub microsecond latency

- Line rate throughput for all frames sizes on all ports

- Standards-based Layer-2, Layer-3, and I/O Convergence

- Supports feature rich implementation of IEEE DCB standards for converged networks; enabling FCoE, iSCSI and NAS deployments

- FCoE transit and FCoE-FC gateway, interoperability with both Brocade and Cisco Fibre Channel SANs (including support for multi-hop FCoE)

- Interoperability with major CNA vendors

- It's Green, RoHSS, China RoHSS, Gold 80 Plus, Green Recycle, WEE, REACH

- **QFabric ready!**

Flexible all-in-one switch, deploy everywhere

Source: Juniper Networks QFX3500 Switch Assessment, *Network Test*, February 2011

REFERENCES

1. QFX3500 data sheet :
   http://www.juniper.net/us/en/local/pdf/datasheets/1000361-en.pdf

2. QFX3500 FAQ:
   http://www-int.juniper.net/fst/pdfs/qfx3500_faqs.pdf

3. QFX3500 (SOPD) Statement of Product Direction
   http://www-int.juniper.net/fst/pdfs/qfx3500_sopd.pdf

4. Hotsheets:
   Cisco: https://matrix.juniper.net/docs/DOC-55891
   Arista: https://matrix.juniper.net/docs/DOC-55840

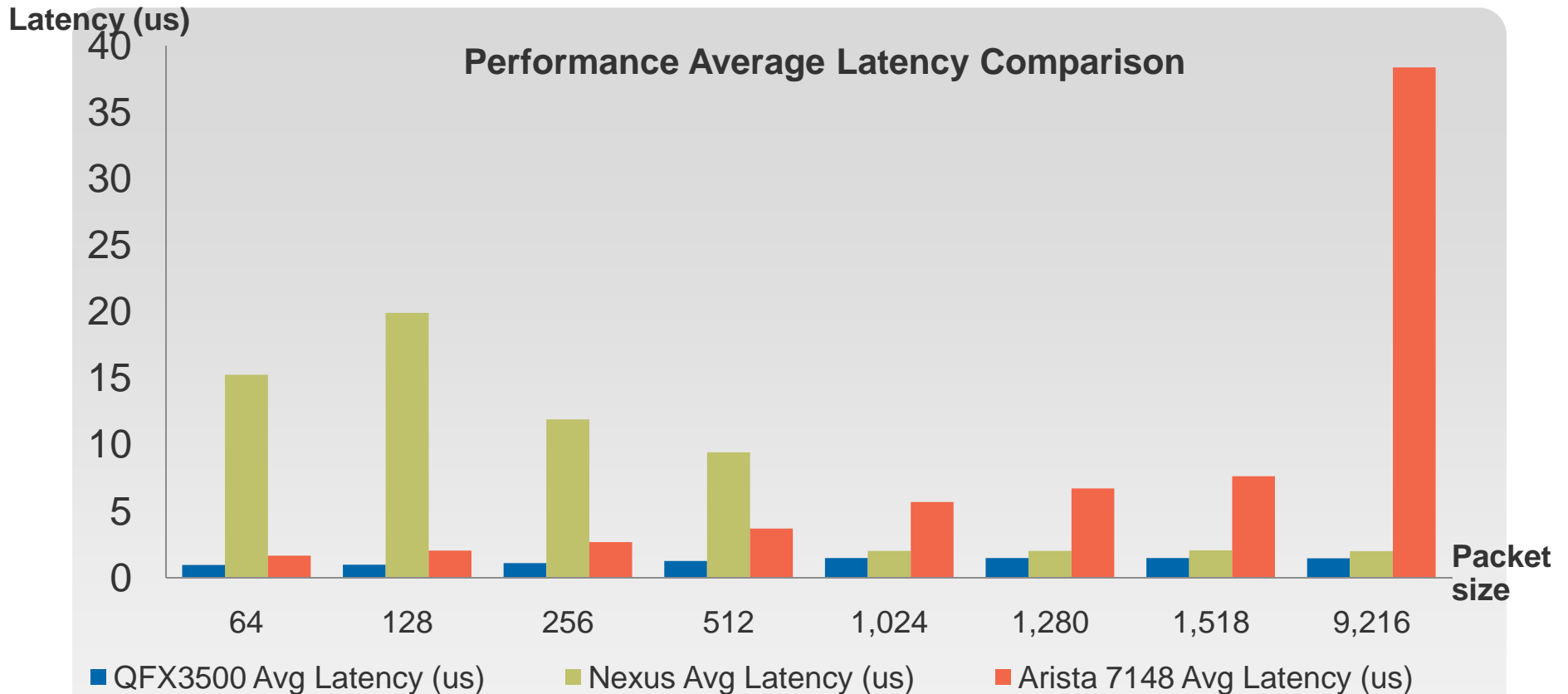everywhere

BACK UP SLIDES

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**PERFORMANCE TEST RESULTS
QFX3500 COMPARED WITH:
CISCO NEXUS 5548 & ARISTA 7148S**

**SUTAPA & XIANGHUI
FSG MKTG.**

PERFORMANCE: AVERAGE UNICAST LATENCY
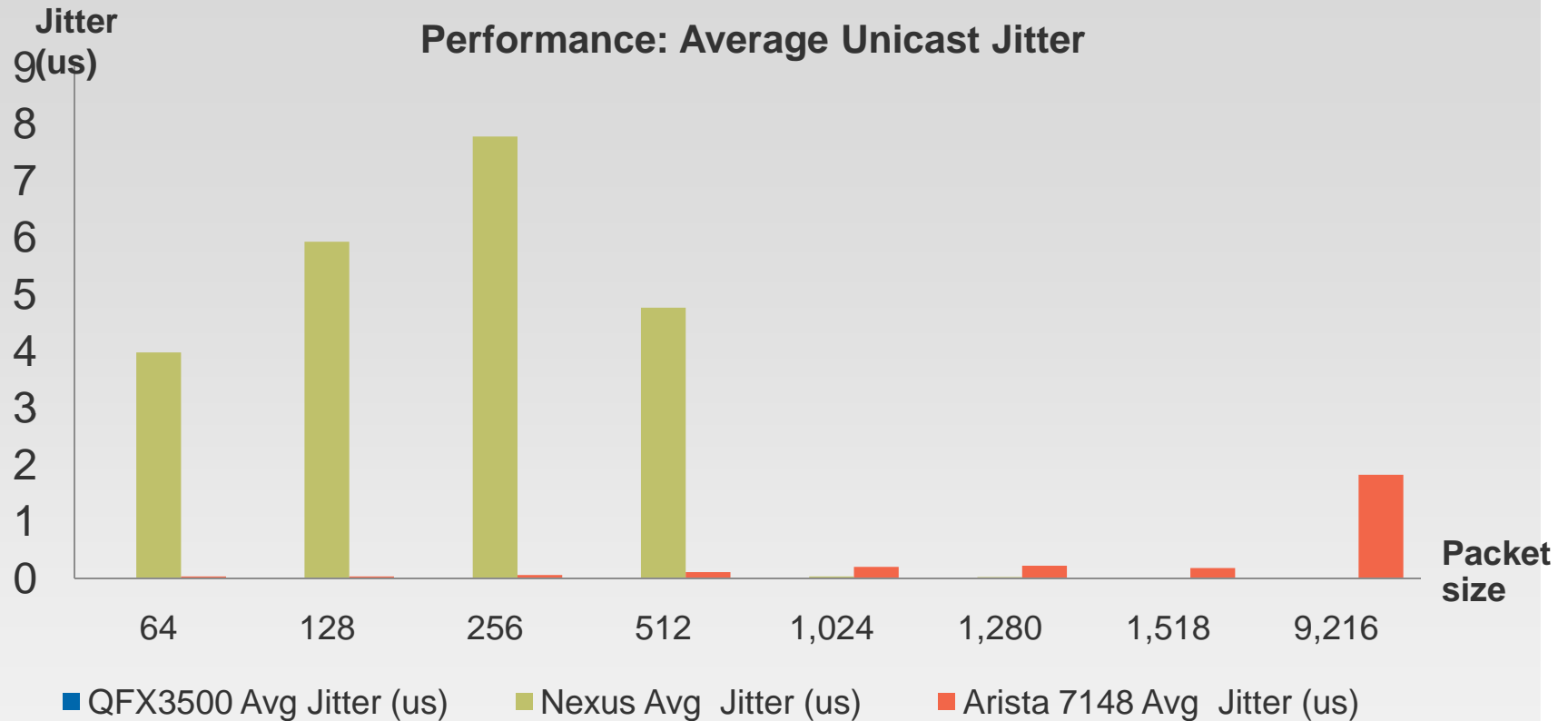## QFX3500 VS. CISCO 5548, ARISTA 7148

Latency (us)

Performance Average Latency Comparison

Packet size: 64, 128, 256, 512, 1,024, 1,280, 1,518, 9,216

- ■ QFX3500 Avg Latency (us)
- ■ Nexus Avg Latency (us)
- ■ Arista 7148 Avg Latency (us)

QFX is the only sub-1us switch at all packet sizes and at 100% load

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PERFORMANCE: UNICAST JITTER
QFX3500 VS. CISCO 5548 AND ARISTA 7148

Performance: Average Unicast Jitter

Legend:
- QFX3500 Avg Jitter (us)
- Nexus Avg Jitter (us)
- Arista 7148 Avg Jitter (us)

Practically NO jitter.
Consistent performance at all packet sizes at full load

PERFORMANCE: MAX THROUGHPUT
QFX3500 VS. CISCO 5548 AND ARISTA 7148
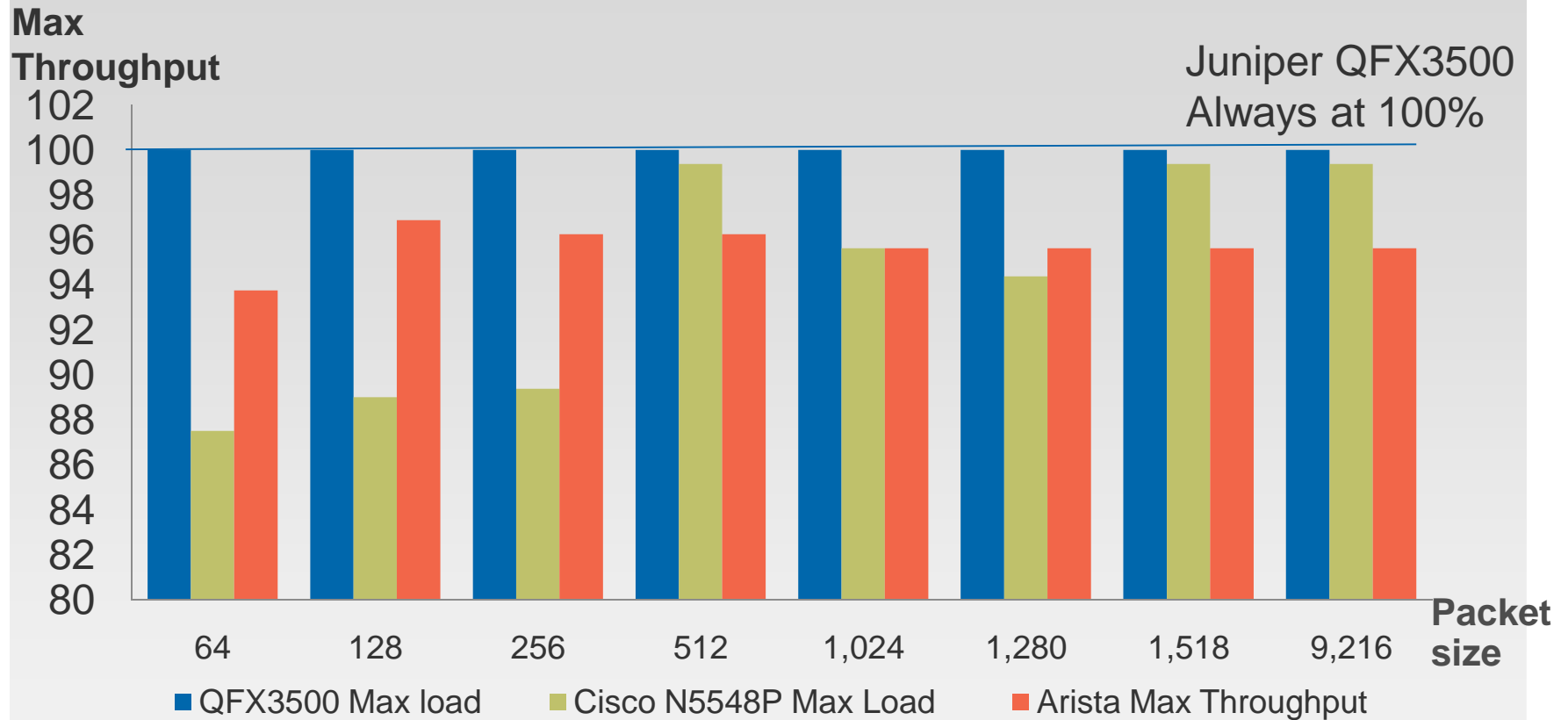
Max Throughput — Juniper QFX3500 Always at 100%

Legend:
- QFX3500 Max load
- Cisco N5548P Max Load
- Arista Max Throughput

Packet size: 64, 128, 256, 512, 1,024, 1,280, 1,518, 9,216

Cisco starts dropping packets at 87% load
Arista starts dropping packets at 93% load
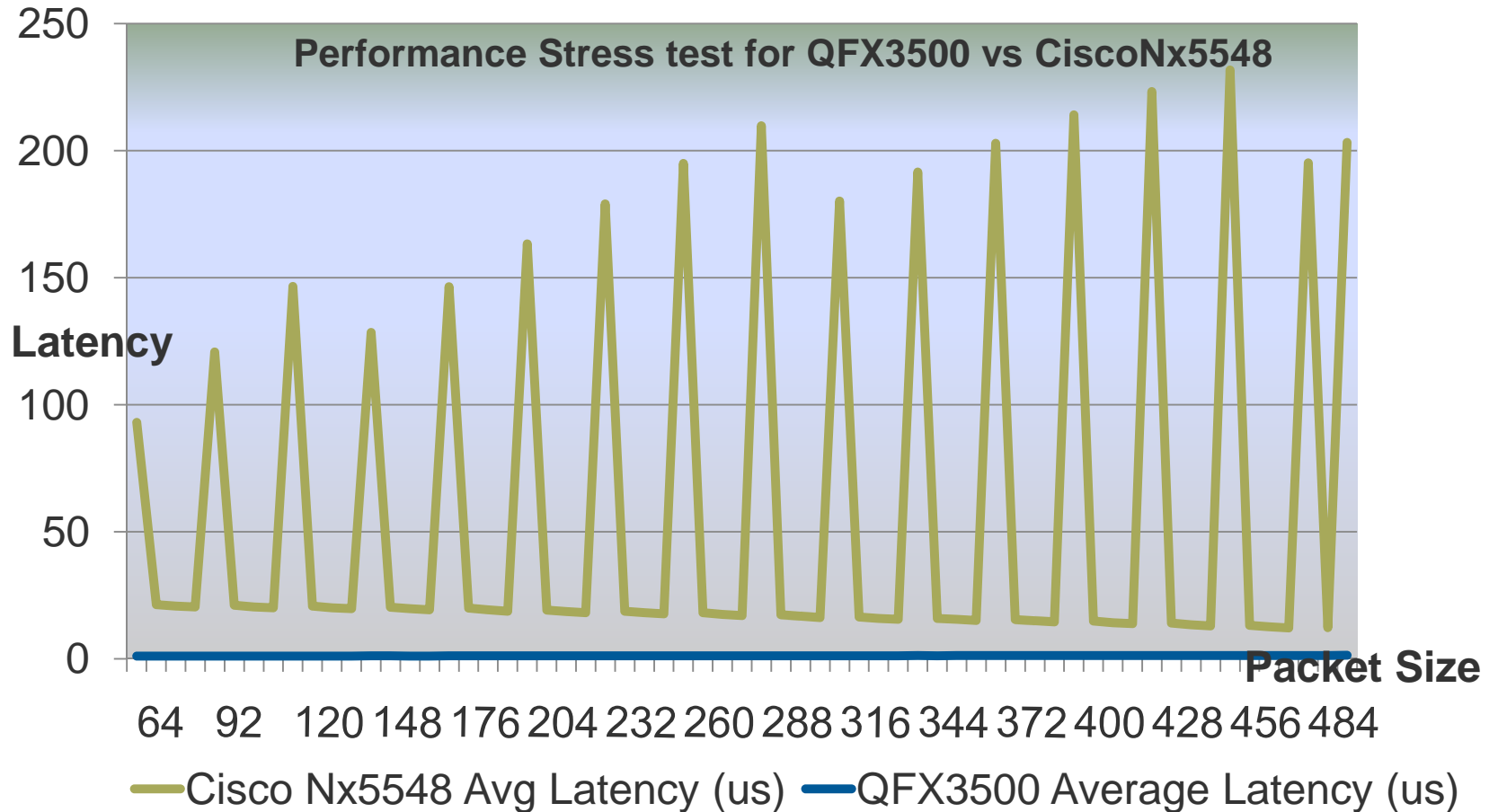**QFX does not drop a single packet at 100% load for any packet size**

JUNIPER NETWORKS

PERFORMANCE: MULTICAST JITTER
QFX3500 VS. CISCO 5548 AND ARISTA 7148

Latency (us)

Performance: Average Multicast Jitter

■ QFX3500 Avg Jitter (uSec)   ■ Cisco Nx5448 Avg Jitter (uSec)   ■ Arista 7148 Avg Jitter (uSec)
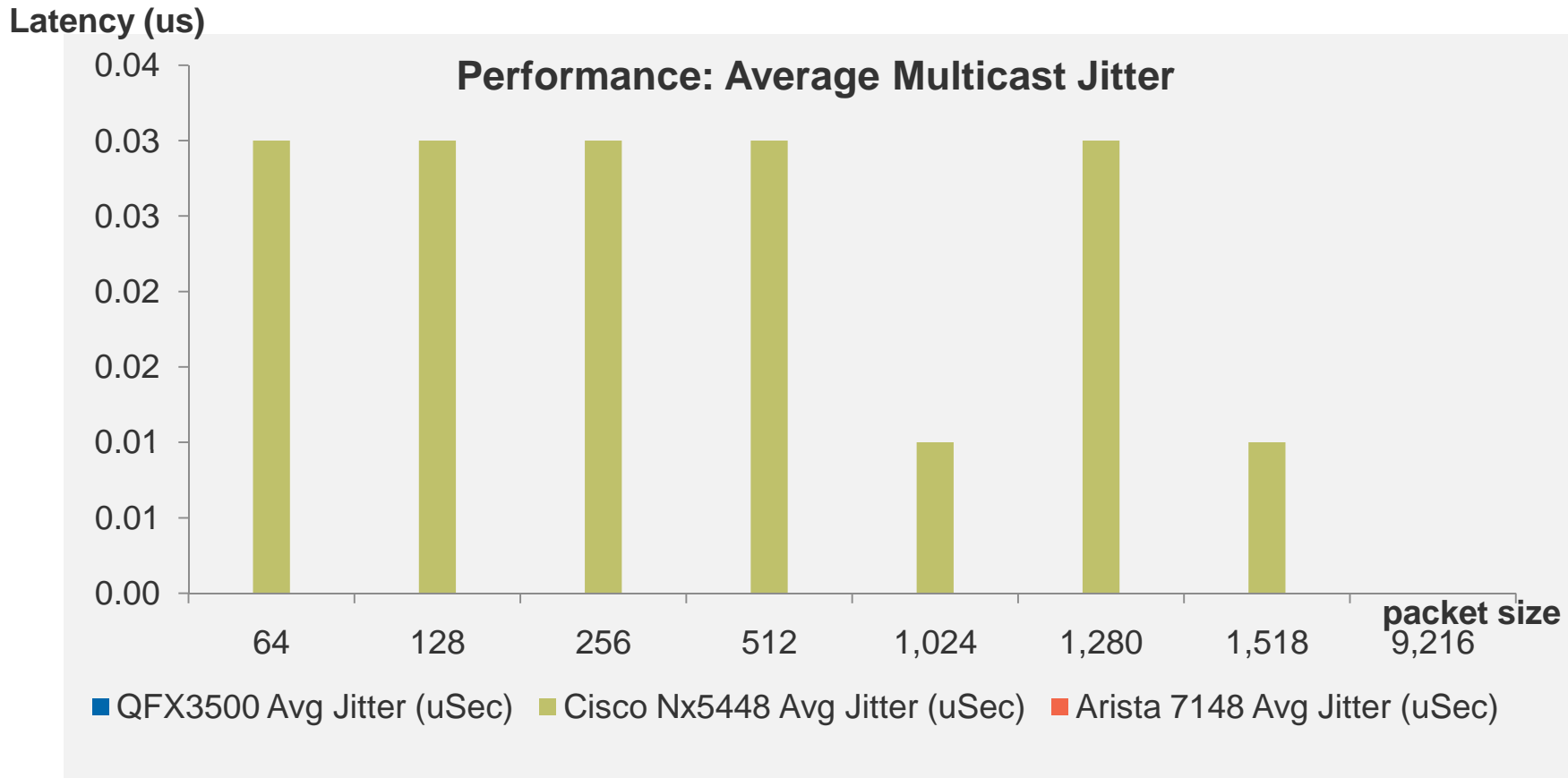
QFX3500 practically has NO jitter.
Nexus 5548 has jitter for all packet sizes.

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STRESS TEST ACROSS PACKET SIZES 64 + 7X CISCO NX

Performance Stress test for QFX3500 vs CiscoNx5548

Legend: Cisco Nx5548 Avg Latency (us) — QFX3500 Average Latency (us)

Nexus 5548 highly unsuitable for financials.
Nexus 5548 avg latency > 200 microsec across packet sizes

PERFORMANCE: AVERAGE MULTICAST LATENCY
QFX3500 VS. CISCO 5548, ARISTA 7148

Latency (us)

Performance Average Multicast Latency

■ QFX3500 Avg Latency (uSec) ■ Cisco Nx5448 Avg Latency (uSec) ■ Arista 7148 Avg Latency (uSec)
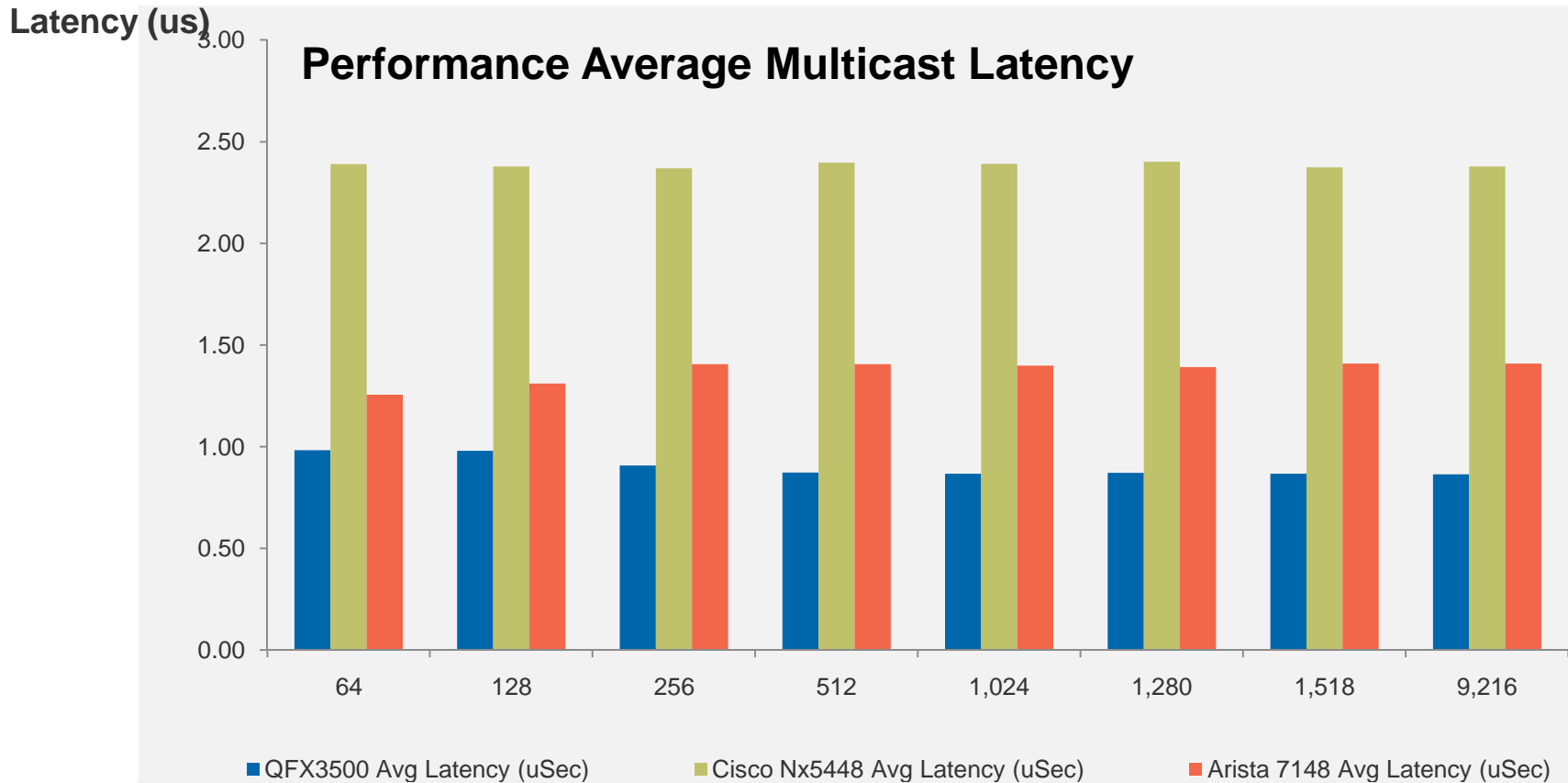
QFX3500 multicast latency identical to unicast latency

QFX3500 has sub 1us for all packet sizes at 100% load

Cisco consistent latency of 2.5us , Arista cannot perform less than 1us latency.

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