

CLOUD COMPUTING AND THE NEW NETWORK

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SETTING THE AGENDA FOR THE NEXT DECADE

A wide-angle photograph of a city street lined with tall, modern skyscrapers. The street is paved and has a central green space with small trees. A large, bright yellow square is superimposed in the center of the image, containing the text "THE NEW NETWORK IS HERE" in white, bold, sans-serif capital letters.

THE
NEW
NETWORK
IS HERE

Juniper Networks is transforming the
experience and economics of networking

JUNIPER NETWORKS – LEADER IN THE HIGH PERFORMANCE NETWORKING

Customer

Top 100 service providers



Fortune 100 enterprises



Public sector

GOVERNMENT



Market

Recognition

- Market leader in
Key network solution such as
- Routing
 - Switching
 - Security
 - Mobile solution

Q1, 11 Highlight

Operational excellence

- \$1,102 million, up 21% Y/Y
- Non-GAAP EPS \$0.32
- Cash flow from operations, \$240M
- Service Provider 67% of revenue
- Enterprise 33% of revenue

OUR MARKET POSITION IS STRONGER

WHAT THEY ARE SAYING: DATA CENTER



“Juniper out innovated an entire industry...from newcomer to thought leader practically overnight.”

Jon Oltsik, Enterprise Security Group, Network World, 28 Feb 2011

“The combination of architectural vision, competitive pricing and the overall support model, that’s what brought us to Juniper.”

Andrew Bach
NYSE Euronext, 23 Feb 2011

“Juniper’s QFabric drives simplicity into the data center, a value long overdue.”

Andre Kindness
Forrester Research, eWeek,
23 Feb 2011

“QFabric was designed to handle the increasing demands put on the network from mobile applications and cloud computing, so the timing is right.”

GigaOM, 23 Feb 2011

“One of the most innovative things I’ve seen in the switching market for years.”

Mark Fabbi, Gartner
San Jose Mercury News, 23 Feb 2011

CLOUD NETWORKING – RAPIDLY EMERGING OPPORTUNITIES

“ ... outsourcing technology hardware to a third party and then paying according to usage ... commodity services such as data storage will move into the cloud and then be piped back into the building, as with power and water.”

FT

“ ... Like the switch from electricity generators to the electricity grid ... ”
Nick Carr

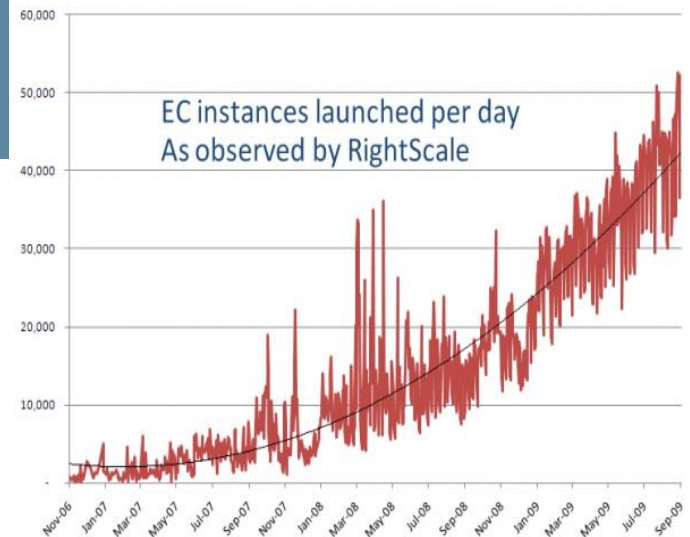
IDC: cloud services a
\$45B Market by 2013

➤ Merrill Lynch Estimates "Cloud Computing"
To Be \$100 Billion Market

Ten Cloud Computing Companies Plus Two "Unconventional Plays"

➤ Cloud is Bigger Than the Internet - II

Nothing Changes Everything, But This Changes a Lot of Things



UTILITY COMPUTING ARRIVES

Amazon Elastic Compute Cloud (EC2)

“Compute unit” rental: \$0.10-0.80/hr.

- 1 CU \approx 1.0-1.2 GHz 2007 AMD Opteron/Xeon core

“Instances”	Platform	Cores	Memory	Disk
Small - \$0.085 / hr	32-bit	1	1.7 GB	160 GB
Large - \$0.34 / hr	64-bit	4	7.5 GB	850 GB – 2 spindles
XLarge - \$0.68/ hr	64-bit	8	15.0 GB	1690 GB – 3 spindles

No up-front cost, no contract, no minimum

Billing rounded to nearest hour; pay-as-you-go storage also available

A new paradigm (!) for deploying services?

USE CASE: ANIMOTO.COM

Animoto is a video rendering & production house with service available over the Internet.

- With their patent-pending technology and high-end motion design, each video is a fully customized orchestration of user-selected images and music in several formats, including DVD.

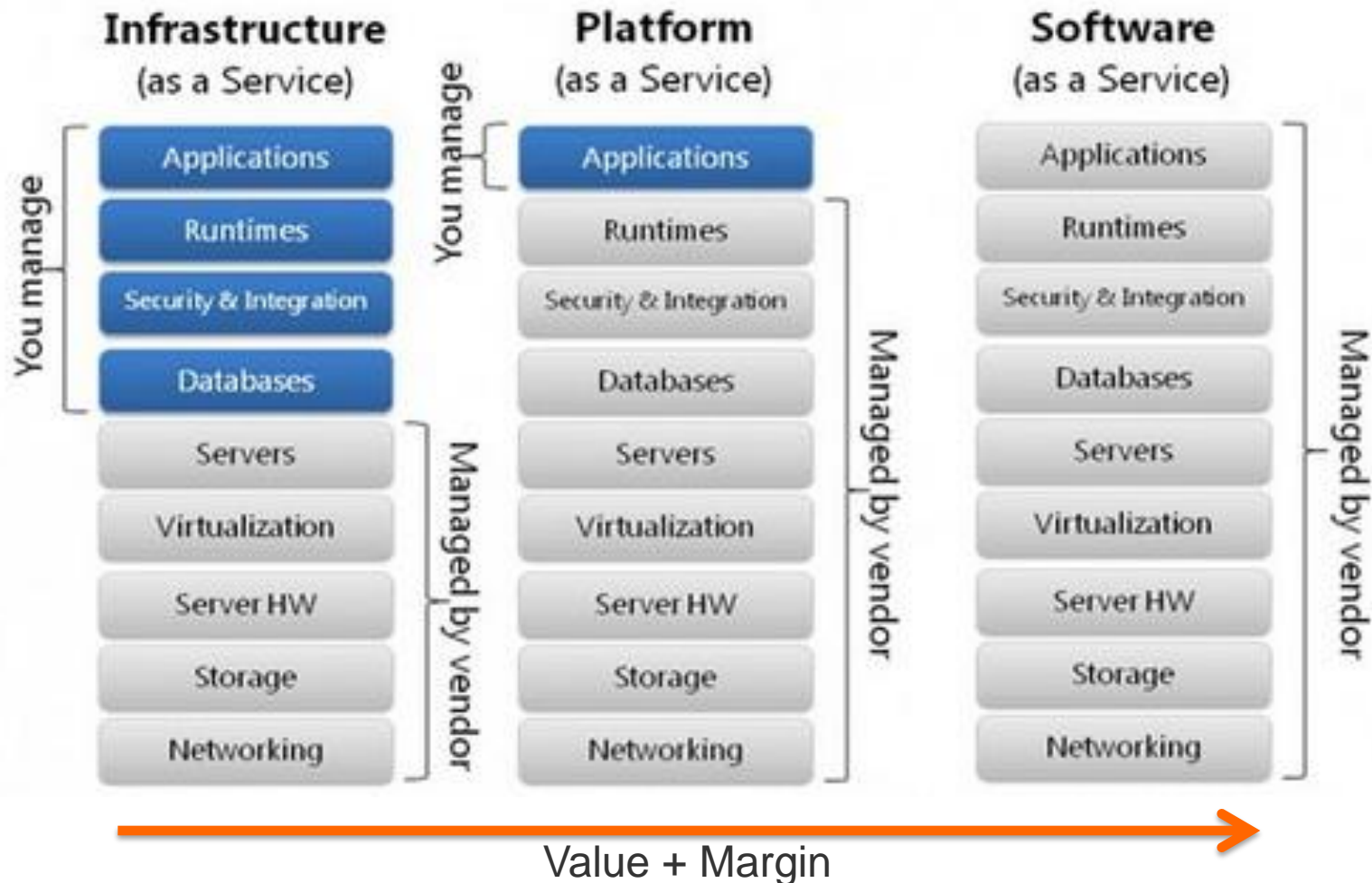
Animoto is entirely hosted on Amazon Web Services

Released Facebook App: users were able to easily render their photos into MTV like videos

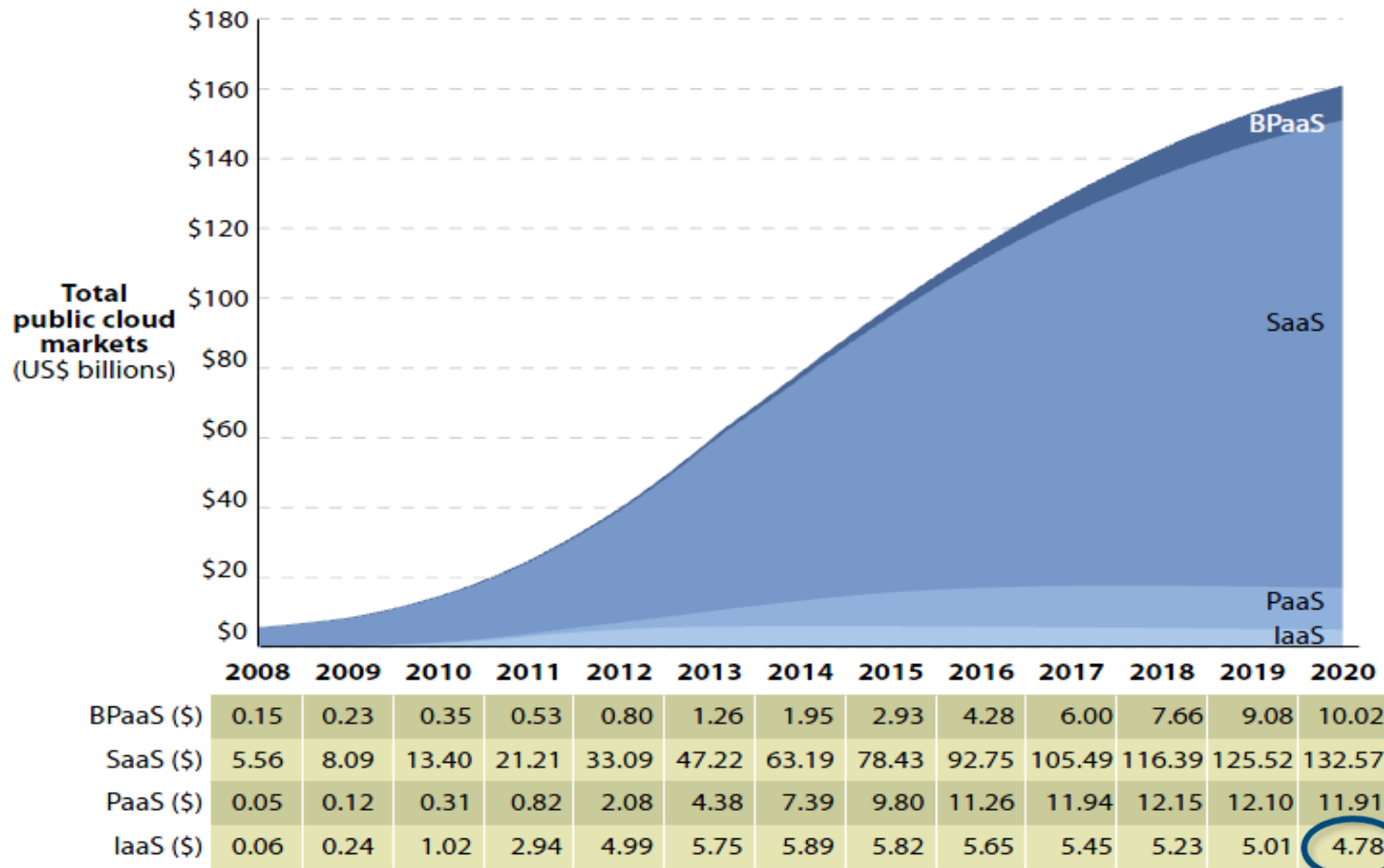
- ramped from 25,000 users to 250,000 users in three days
 - Signing up 20,000 new users per hour at peak
 - server requirements went from 50 to 3500 servers in 5 days.
 - Two weeks later scaled back to 100 servers
-
- *“Before AWS, we simply could not have launched Animoto.com and our professional video rendering platform at our current scale without massive CapEx and a lot of VC funding. **The viral spike in Animoto video creations we experienced this week would have been disastrous without AWS.**”*
- Brad Jefferson the Co-Founder and CEO of Animoto



IAAS V PAAS V SAAS



FORRESTER PREDICTIONS



Really?

58161

Source: Forrester Research, Inc.

THE EVOLUTION OF APPS TO SAAS

Applications as Software in the SP Cloud

Applications on platform stacks in the SP Cloud

Applications on virtual servers in the SP Cloud

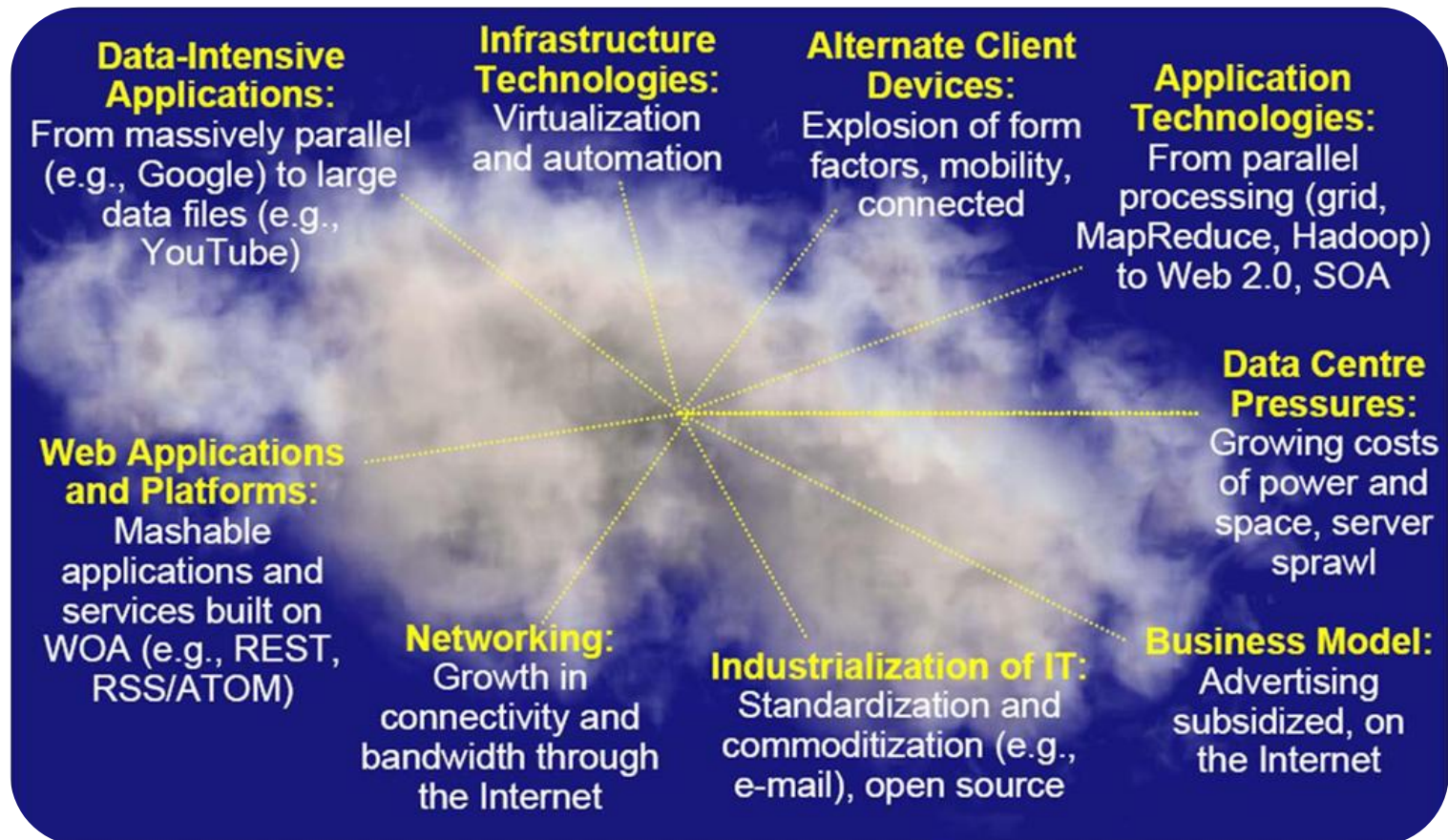


Same VMs Migrated to SP Cloud

Applications on virtual servers in the enterprise DC

Applications on physical servers in the enterprise DC

WHAT ARE THE FORCES SHAPING THE RISE OF CLOUD COMPUTING

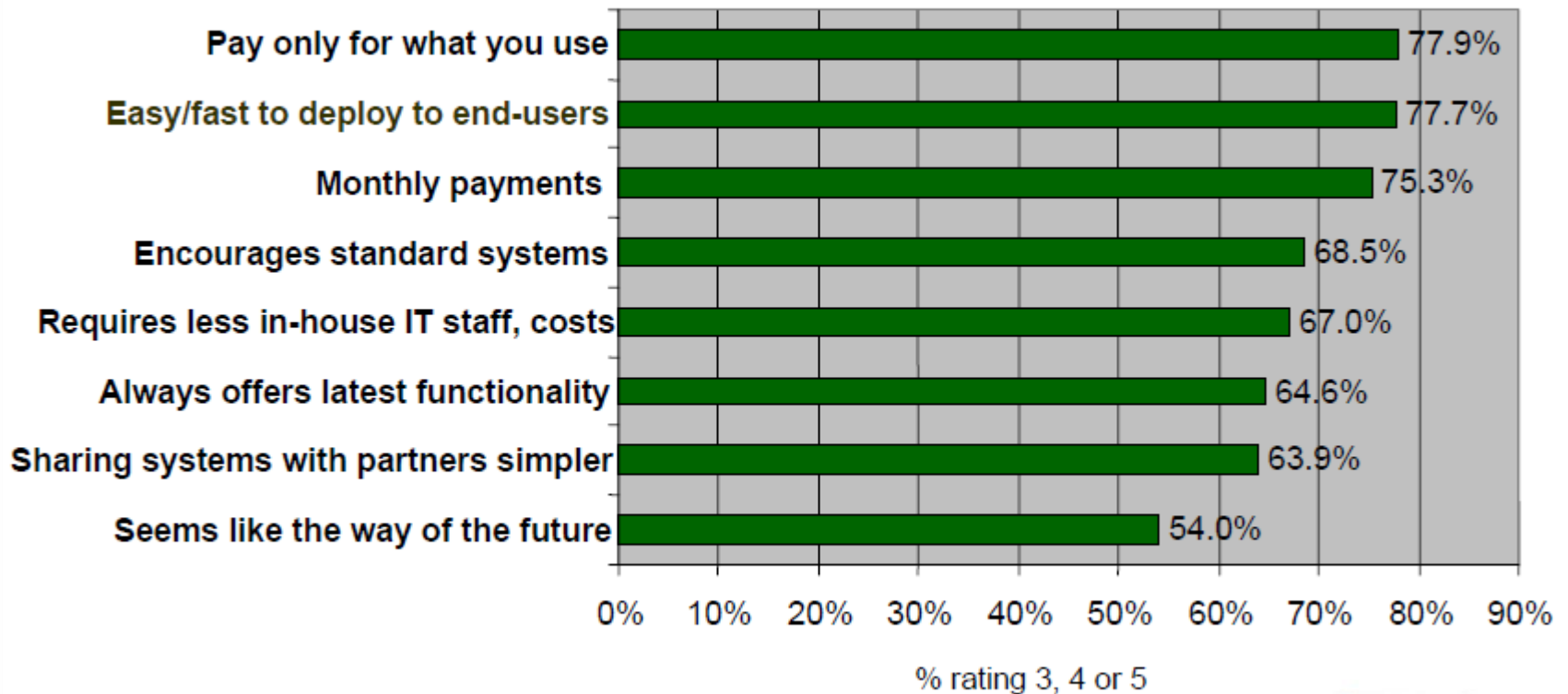


Source:
Gartner.

WHY IT CLOUD SERVICES?

Q: Rate the *benefits* commonly ascribed to the 'cloud'/on-demand model

(Scale: 1 = Not at all important 5 = Very Important)



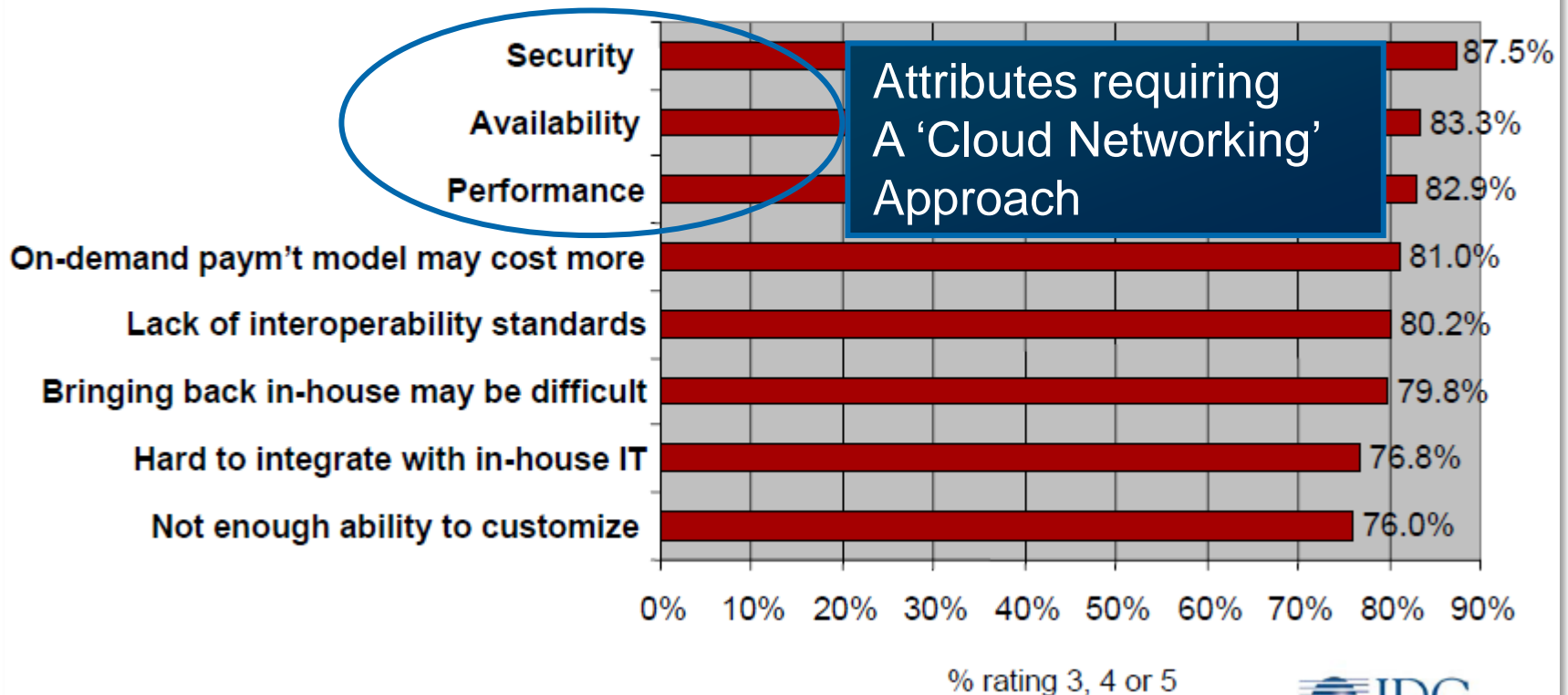
Source: IDC Enterprise Panel, 3Q09, n = 263



WHY NOT CLOUD SERVICES?

Q: Rate the *challenges/issues* of the 'cloud'/on-demand model

(Scale: 1 = Not at all concerned 5 = Very concerned)



Source: IDC Enterprise Panel, 3Q09, n = 263



JUNIPER'S VISION FOR CLOUD NETWORKING



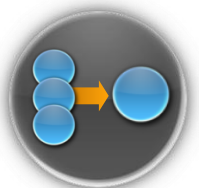
Open:

Architecture is open at the device, network and application layer facilitating creation of a multi layered eco-system accelerating service creation and delivery



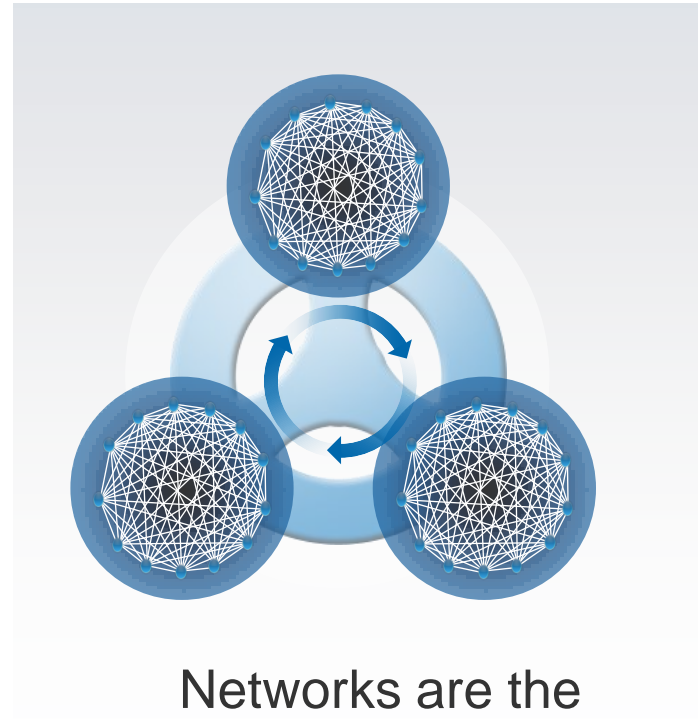
Secure:

Comprehensive security to protect users, device, network and application while providing flexibility for cloud services



Scalable:

Simplify architecture to improve scalability, Automate processes to scale service delivery and support network capacity and subscriber scale with High Performance Platforms.



Networks are the
Foundation of Cloud
Services

WHY SCALE MATTERS...

Web Images Videos Maps News Shopping Mail more ▾



Juniper



Search

About 43,600,000 results (0.08 seconds)

[Advanced search](#)

Everything

Images

Videos

News

Shopping

Realtime

More

Sunnyvale, CA

[Change location](#)

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Juniper Networks offers high-performance network solutions that help service ...

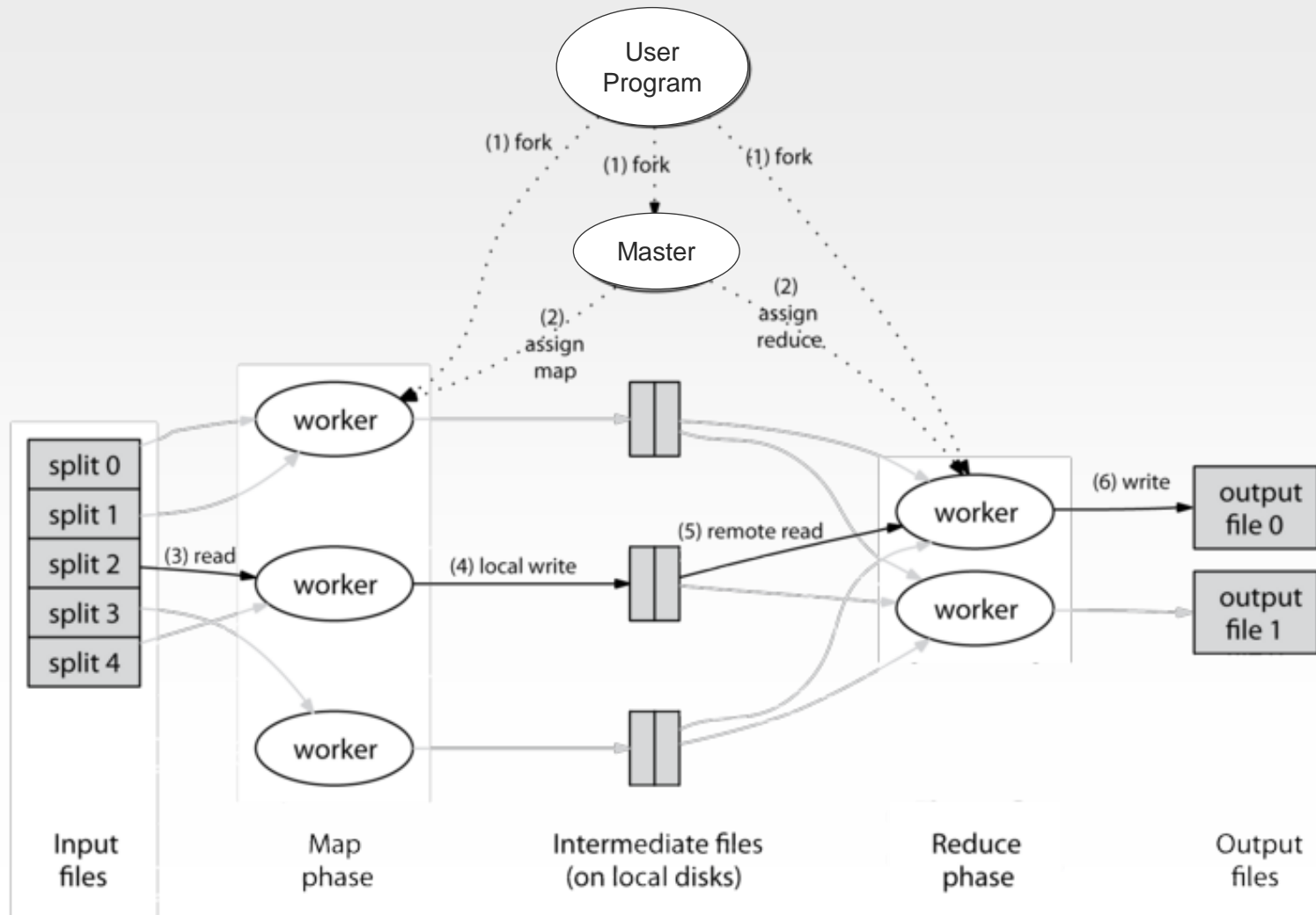
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MAPREDUCE

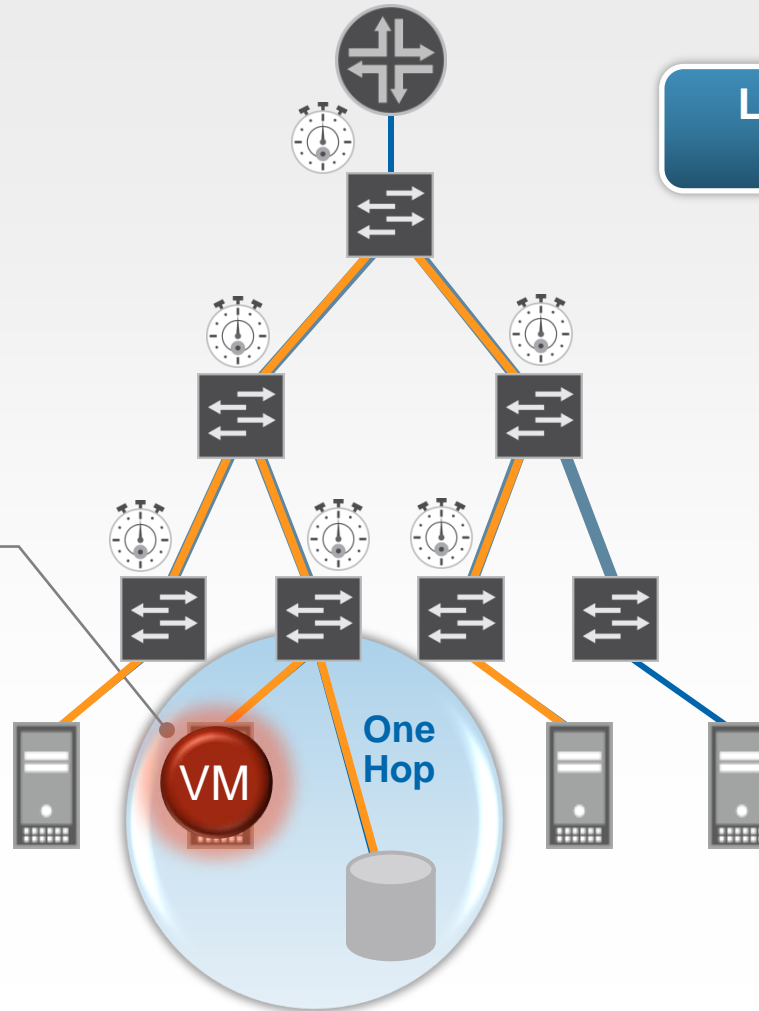


THE TYRANNY OF TREES

Typical tree configuration

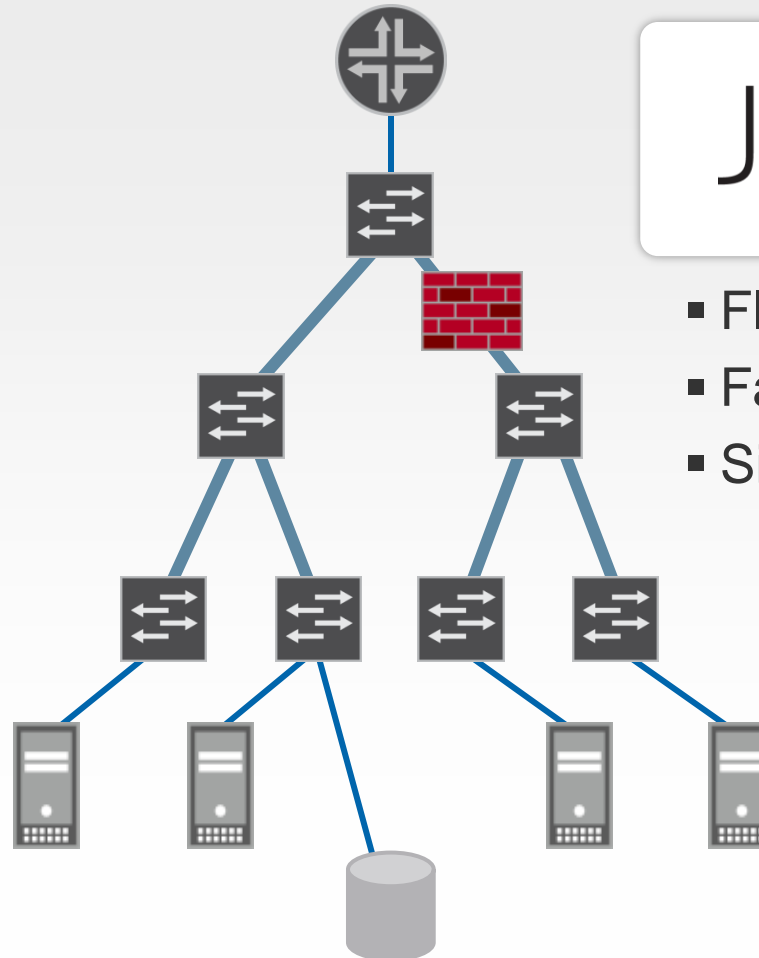
Location matters in a tree architecture

Bubbles
Optimal performance



TRANSFORM THE NETWORK

Typical tree configuration



JUNIPER
NETWORKS

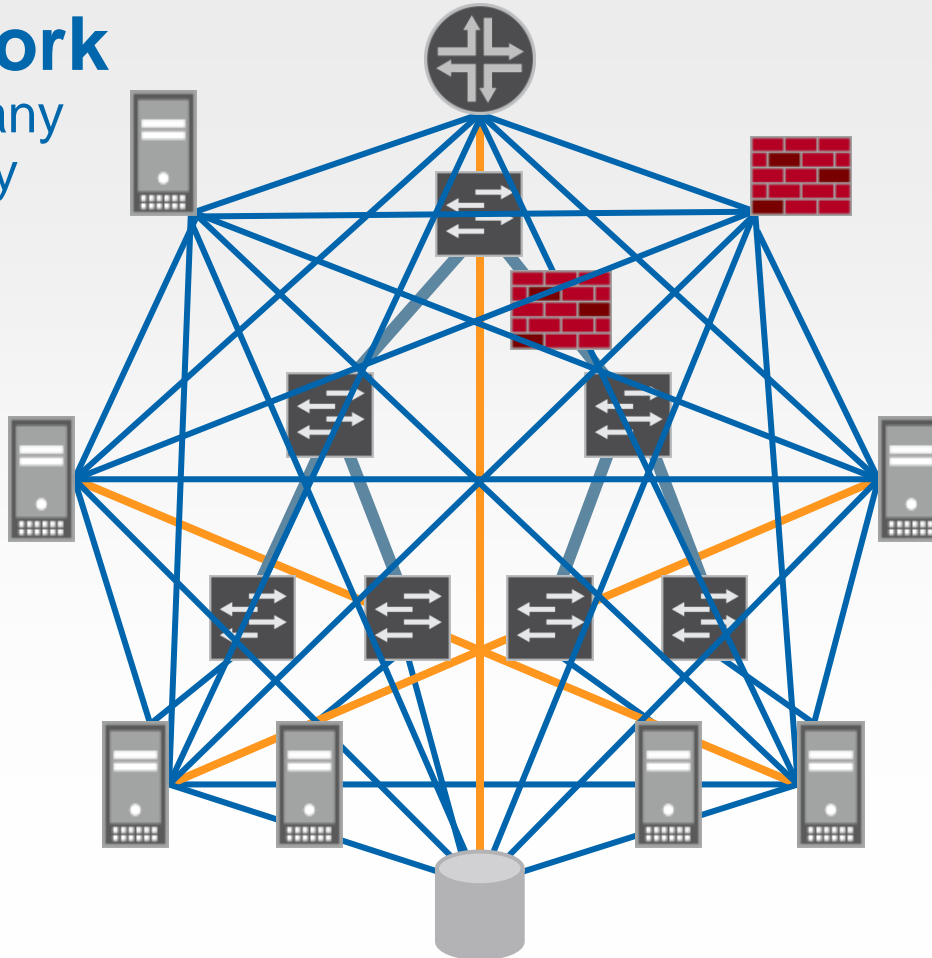
- Flat scalable fabric
- Fast
- Simple

Transform the Network

TRANSFORM THE NETWORK

One Network

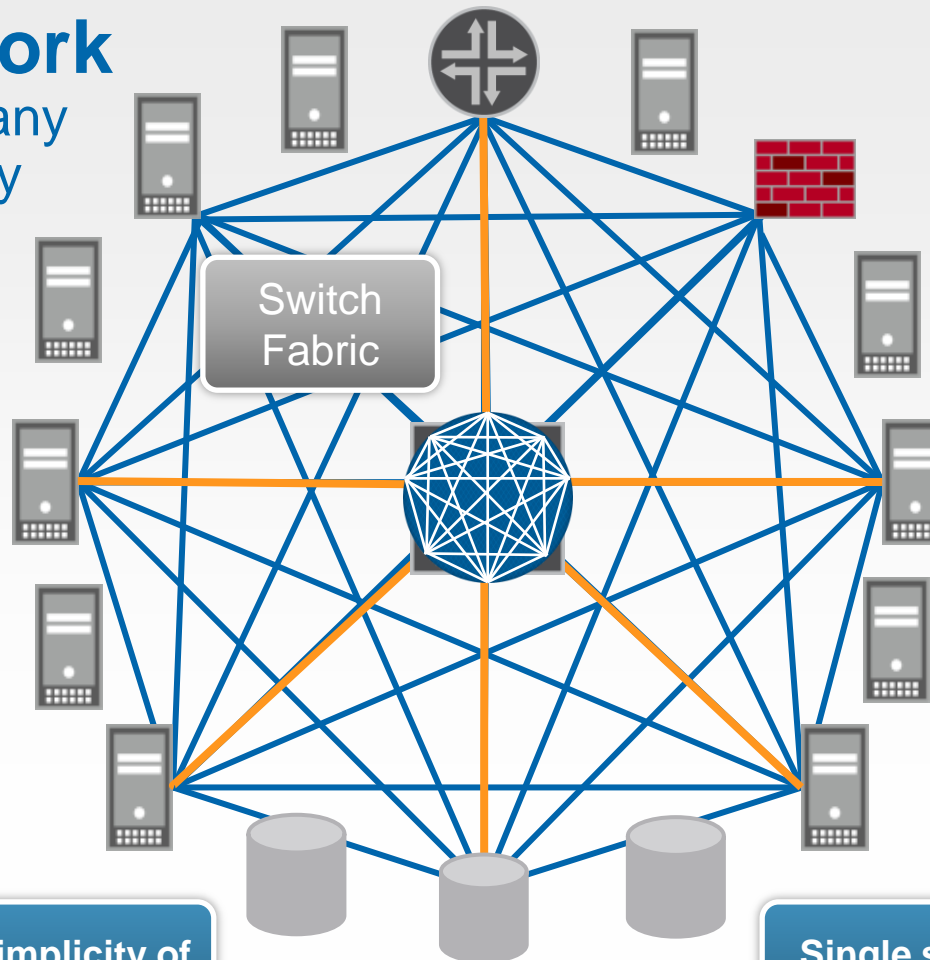
Flat, any-to-any
connectivity



TRANSFORM THE NETWORK

One Network

Flat, any-to-any
connectivity



Single device
 $N=1$

Switch Fabric

Data Plane

- Flat
- Any-to-any

Control Plane

- Single device
- Shared state

Performance and simplicity of
a single switch

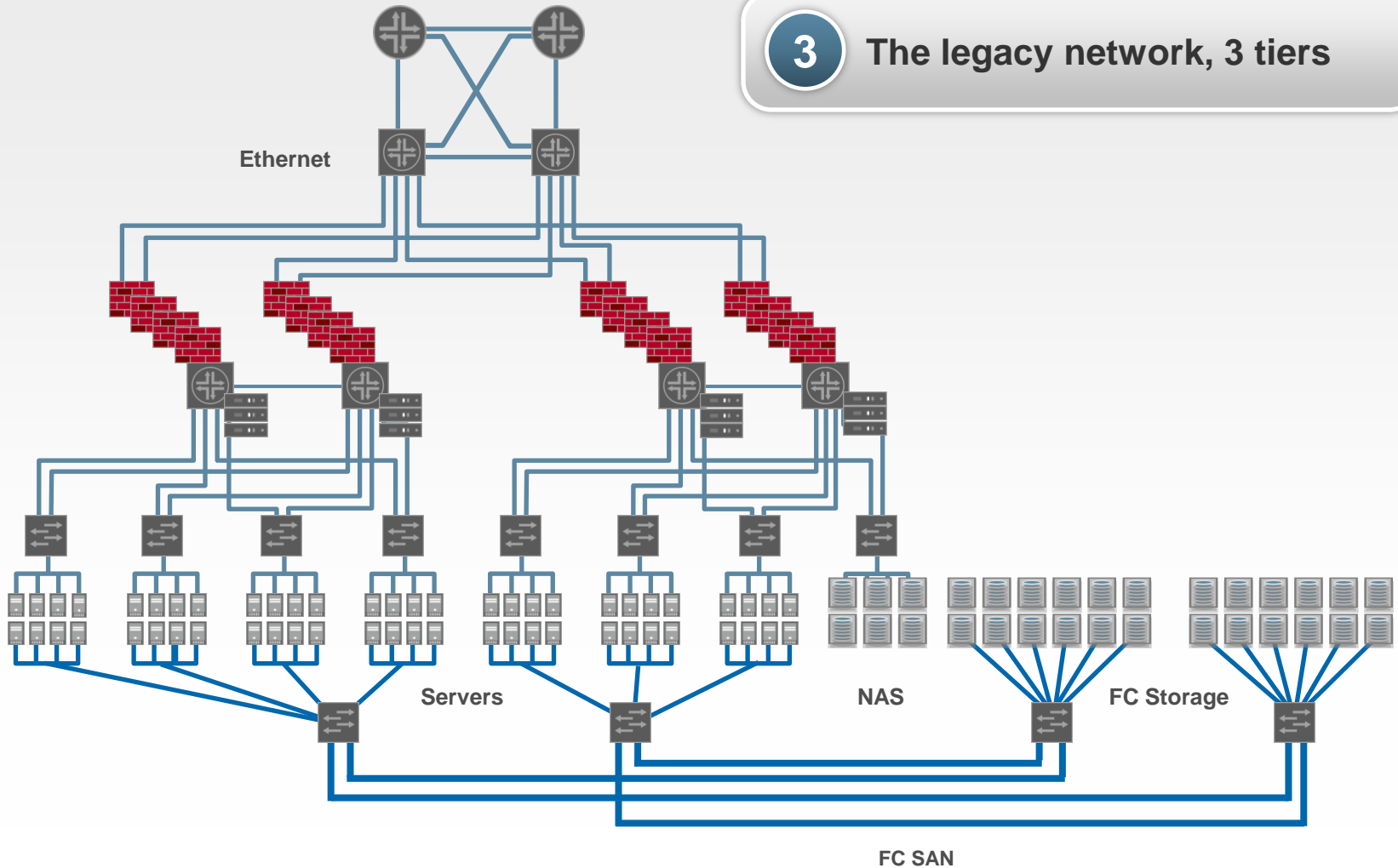
Single switch does not scale
Single point of failure

TRANSFORM THE NETWORK

3 — 2 — 1

3

The legacy network, 3 tiers

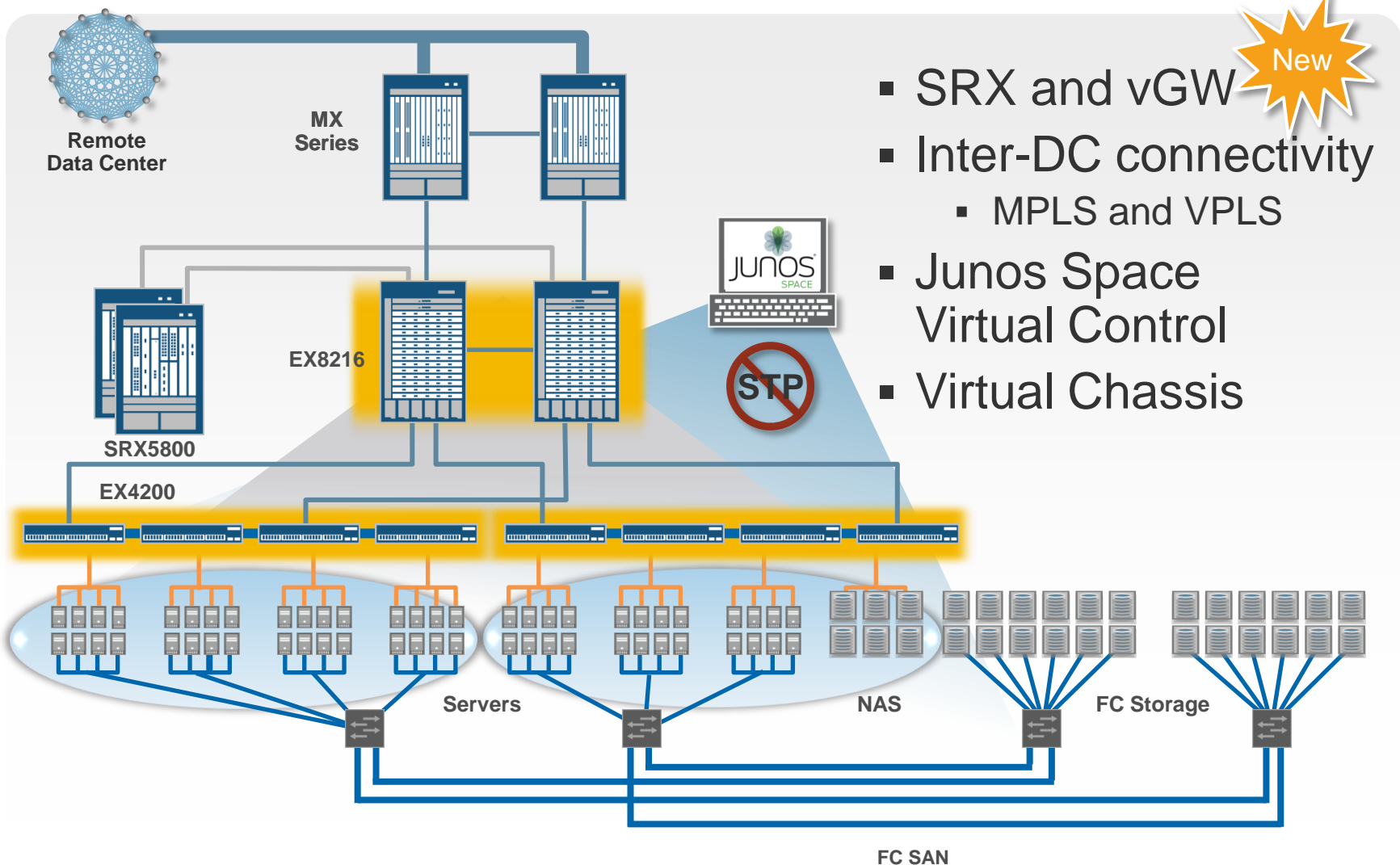


DELIVER TODAY – 2 TIERS

3

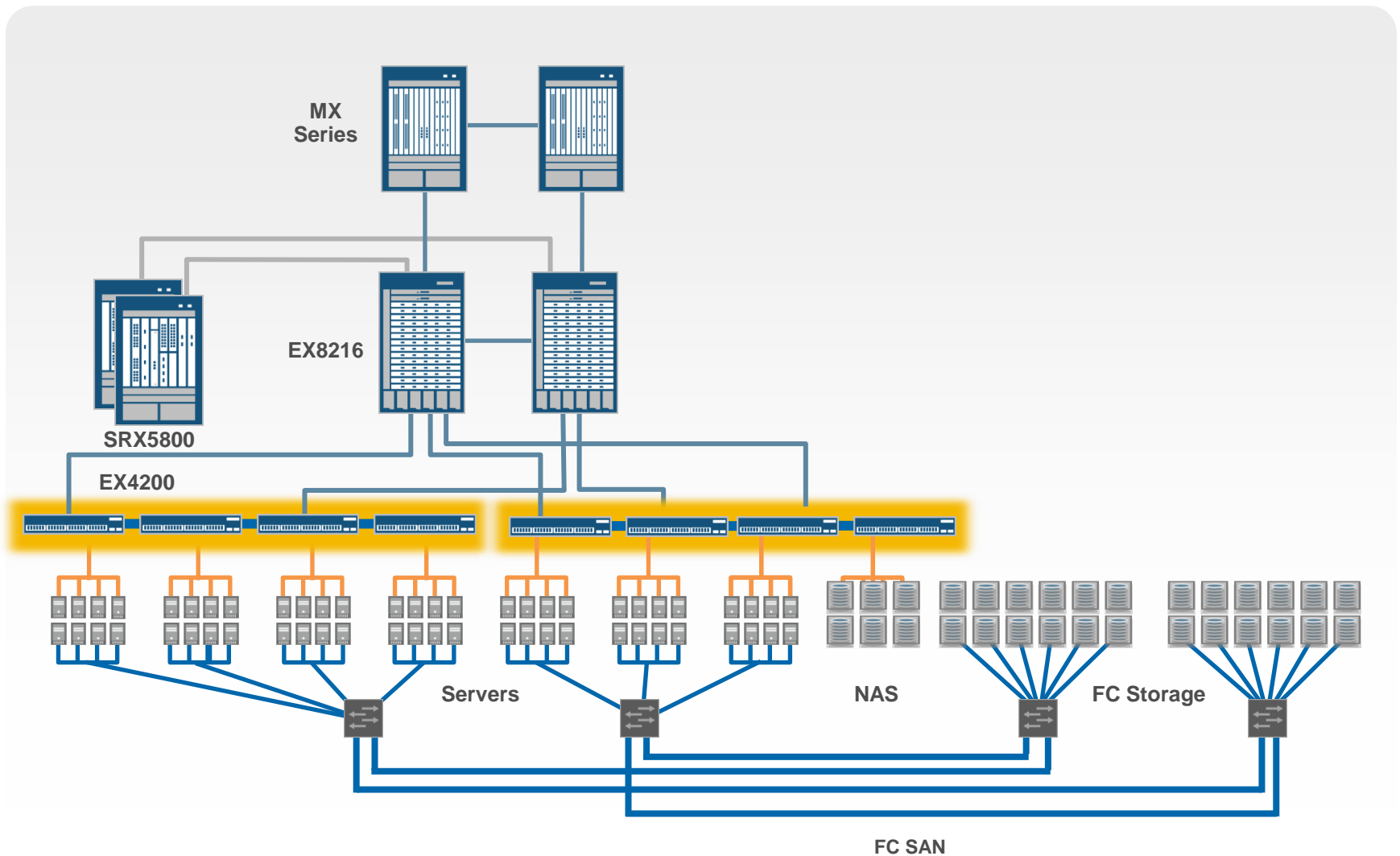
2

1



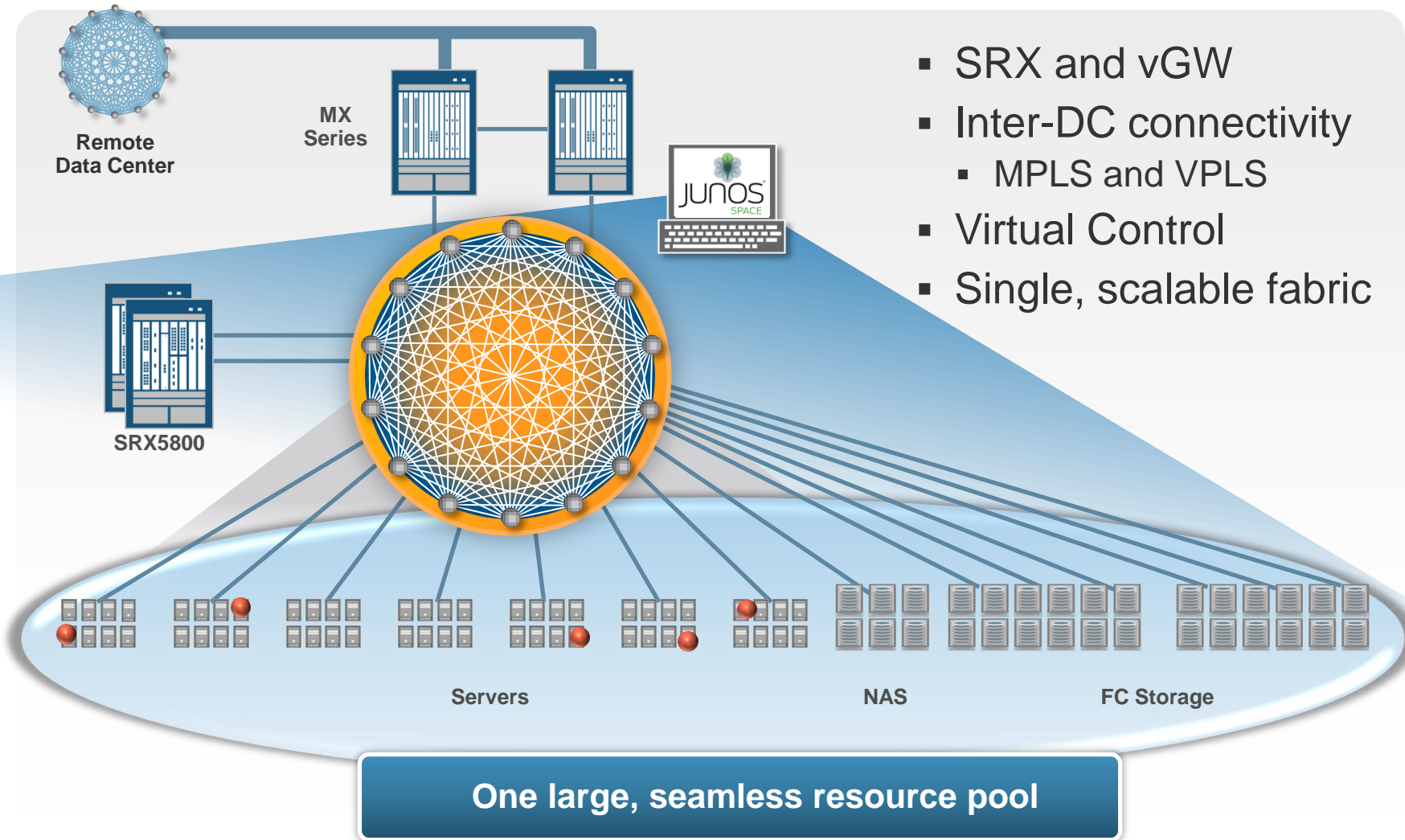
DELIVER SOON – 1 TIER

3 – 2 – 1



DELIVER Q3 2011 – 1 TIER

3 – 2 – 1



JUNOS SOFTWARE: THE POWER OF ONE

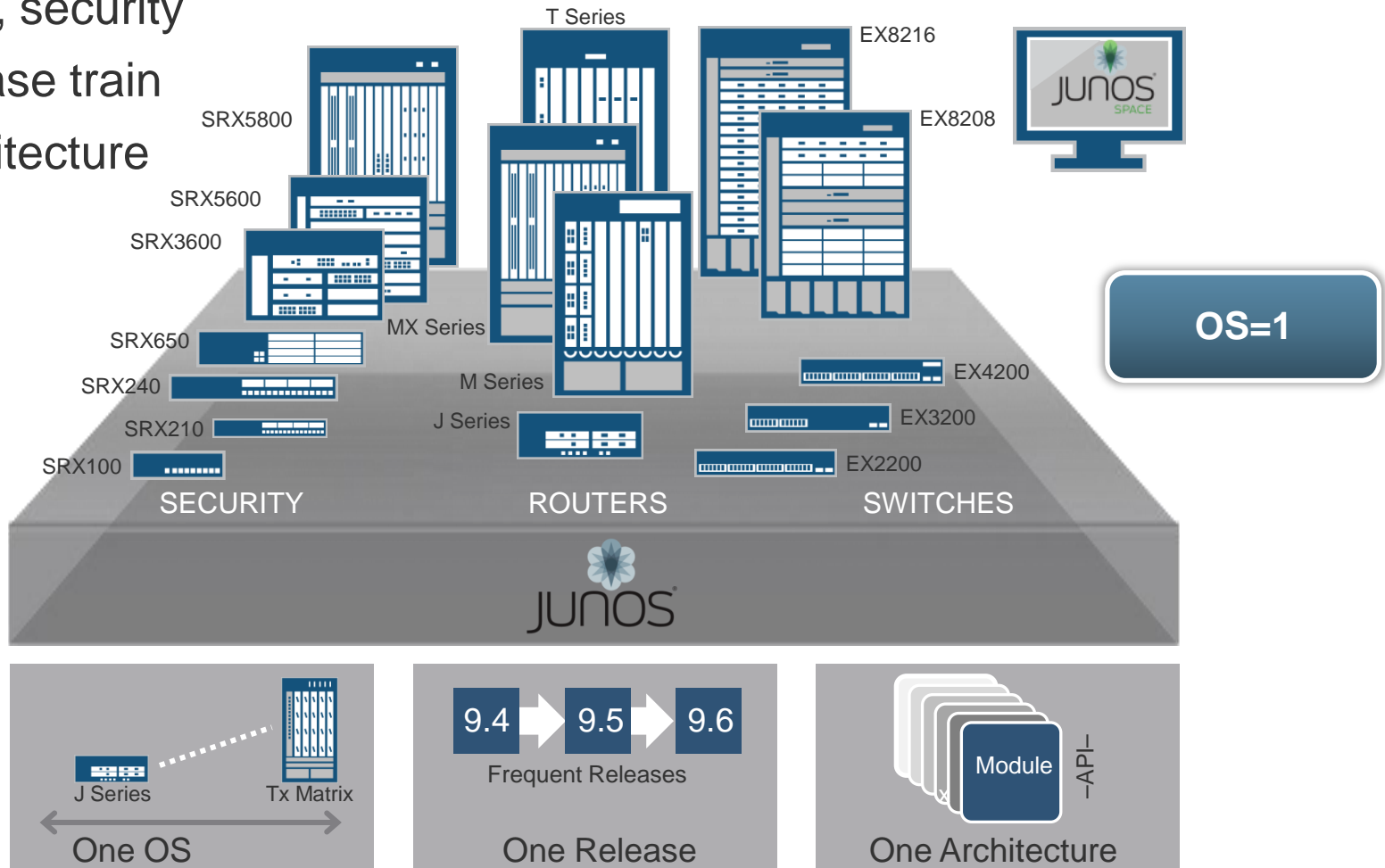
3 — 2 — 1



Across routing,
switching, security

One release train

One architecture



JUNOS SPACE ORCHESTRATES THE NEW NETWORK



The New Network With Junos Space



Characteristics:

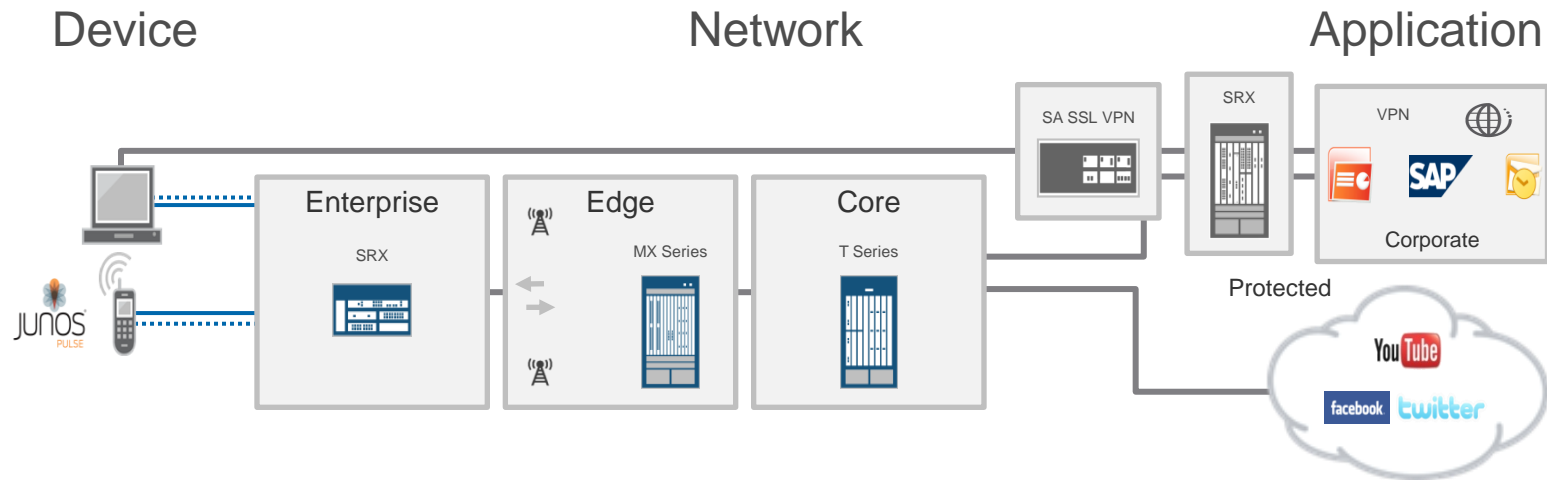
- Common, cross-device platform for automation of virtual and physical networks
- Plug/Play application environment
- User-centric, task-oriented interface
- Correlated network, security, app and user intelligence

Consequences:

- Improved top and bottom line benefits
 - Rapid scaling of application infrastructure
 - Reduced Opex
- Optimal security, scale and resource efficiency

CLOUD NETWORKING SECURE APPLICATION DELIVERY

PROTECTED



DEVICE

- SSL encryption
- API for security applications



NETWORK

- Stateful firewall,
- Application & identity awareness



APPLICATION

- Intrusion prevention
- App secure,
- vGW



SSL VPN

INTRODUCING THE JUNOS PLATFORM

Expanded portfolio of open software platforms



Network
Operating
System “on the
Box”



Network
Application
Platform “Beyond
the Box”



Integrated
Network Client
“on the
Device”

MOVING UP THE VALUE STACK

INCREASED DEVELOPER CHOICE



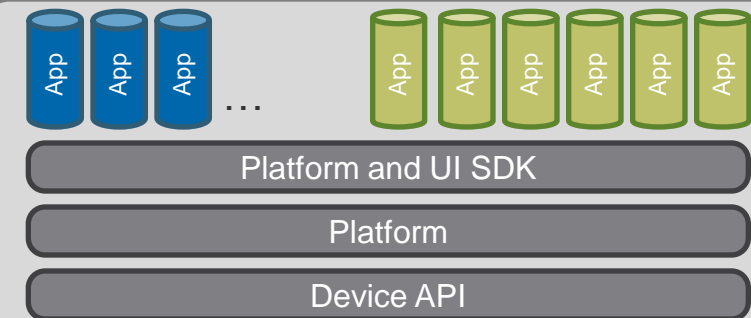
User
Application
Layer



Partner opportunity
for network end-point
innovation



Network
Application
Layer

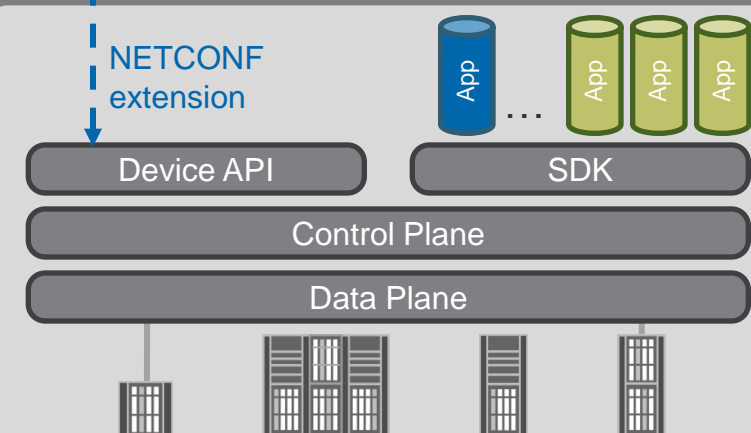


Developer opportunity for
cross-device innovation

SDK: JS SDK (Language
Java, etc OS: CentOS
J2EE API)



Network
Layer



Developer opportunity
for on-device innovation

SDK: JunosSDK
(Language: C/C++
OS: FreeBSD7.1
POSIX API
JUNOS API)

IN SUMMARY



Cloud Computing is changing the way that enterprise is approaching computing
Juniper believes that the new paradigm for computing needs a network to match
We believe that this new network, suited to cloud is built on these three pillars:

Scalability – Internet scale needs carrier grade networks

Security – The number one concerns before businesses move to cloud

Openness – Cloud users want flexibility and power, not lock in

Without the network, there is no cloud.





everywhere