



JUNIPER NETWORKS | JUNIPER DAY
16 октября 2018

MULTI-CLOUD SOLUTION UPDATE

Vladimir Urayev

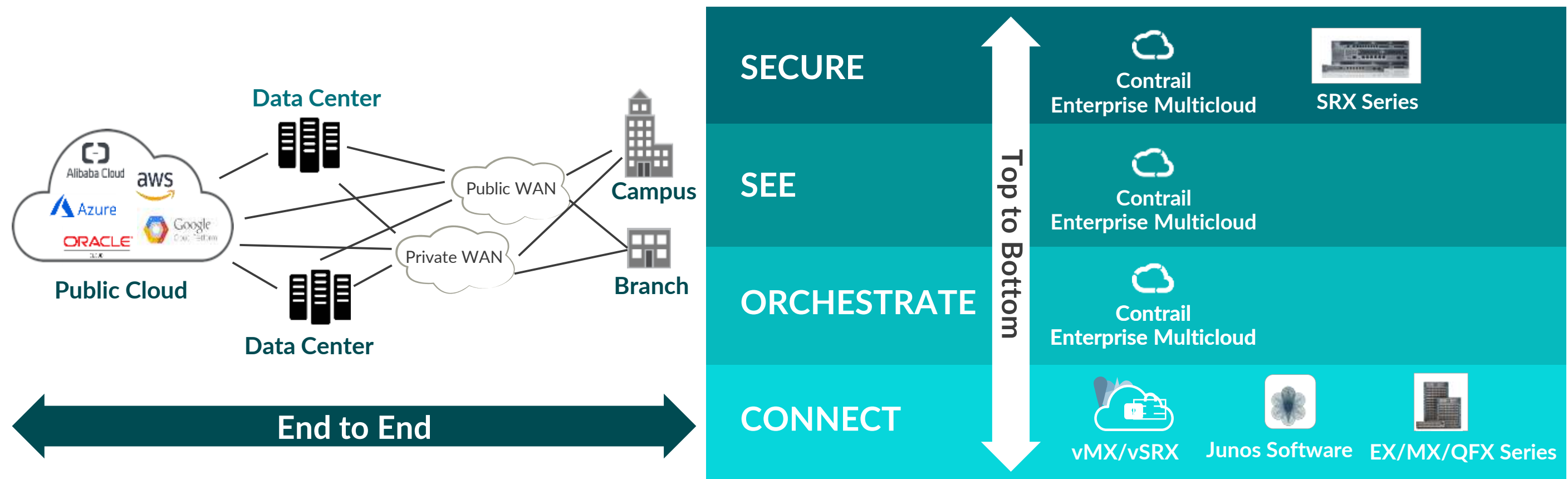
Oct 2018

LEGAL DISCLAIMER

This product roadmap sets forth Juniper Networks' current intention and is subject to change at any time without notice. No purchases are contingent upon Juniper Networks delivering any feature or functionality depicted on this roadmap.

OPERATING AS MULTI-CLOUD

Manage resources as a single, cohesive infrastructure



JUNIPER NETWORKS NAMED A LEADER BY GARTNER

Magic Quadrant for Data Center Networking



Juniper is recognized for:

- Having a deep portfolio of hardware and software solutions
- Leading with automated, open and standards-based approaches
- Vision and product roadmap which aligns well with emerging customer requirements for intent-based data center networks with self-healing capabilities, based on open standards.
- Strong history of providing high performance solutions for large-scale environments, including service providers and large enterprises.
- Juniper Networks should be shortlisted for all enterprise data center networking opportunities worldwide, especially in larger enterprises

Gartner, Inc., Magic Quadrant for Data Center Networking, Andrew Lerner, Joe Skorupa. 11 July 2018.

This graphic was published by Gartner, Inc. as part of a larger research document and should be evaluated in the context of the entire document. The Gartner document is available upon request from Juniper Networks.

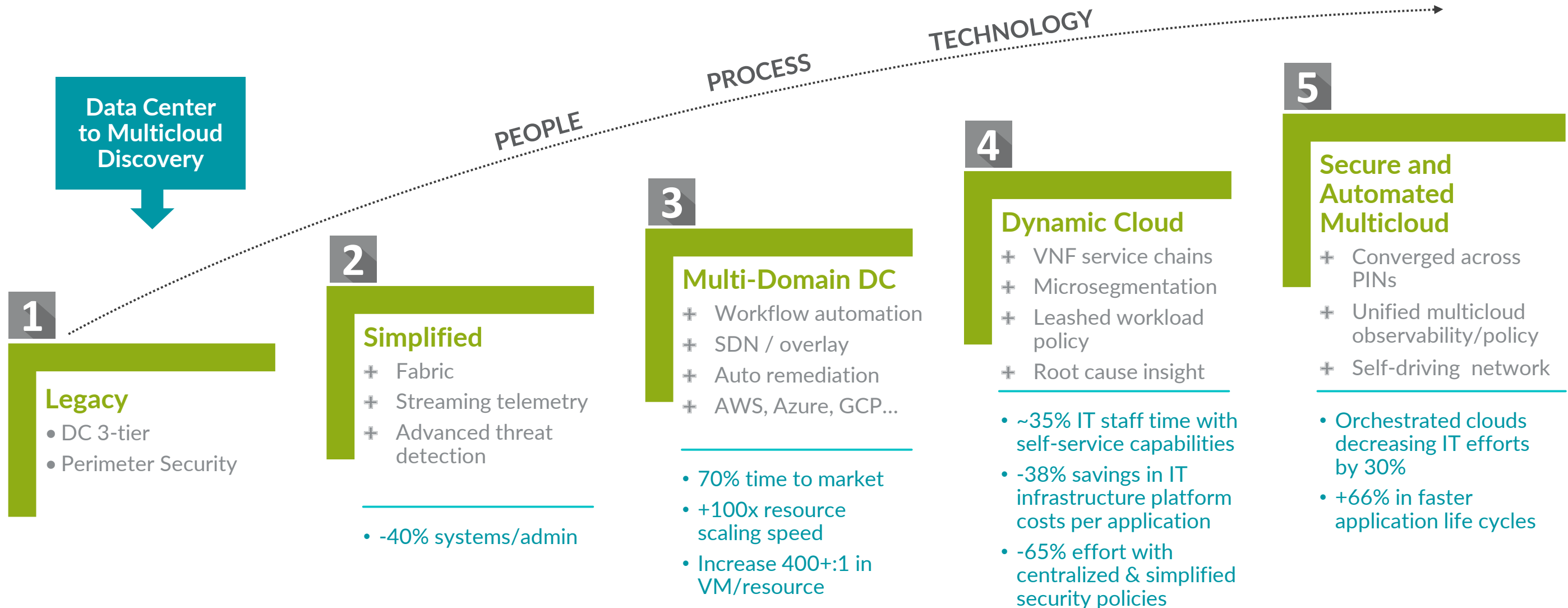
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JUNIPER NETWORKS NAMED A LEADER BY GARTNER



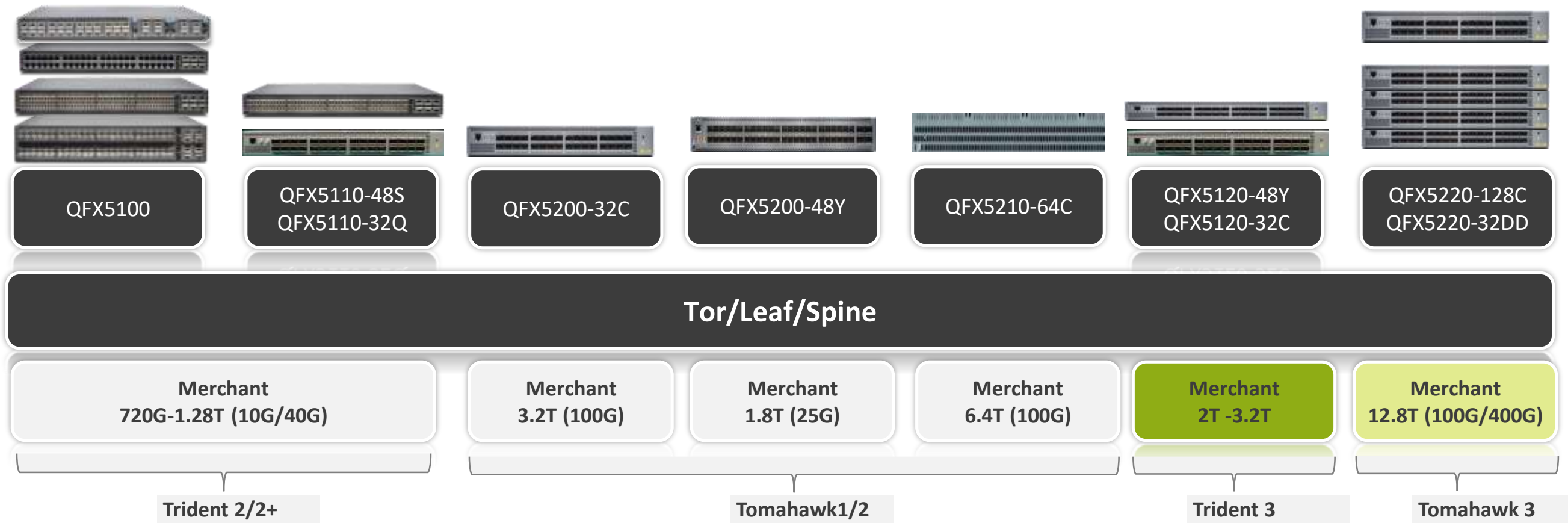
DATA CENTER TO MULTI-CLOUD

Five Step Framework to the Long Term Vision



QFX UPDATE

QFX5K – DC SWITCHING PORTFOLIO



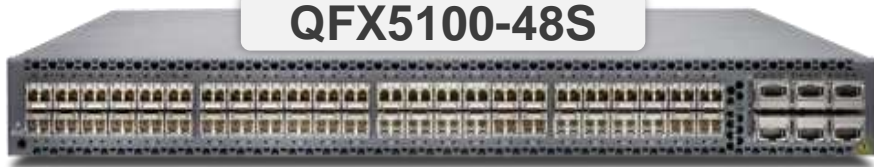
2H 2018

1H 2019

QFX5100 SERIES – 10G/40G TOR (720 GBPS – 1.2 TBPS)

Trident 2

QFX5100-48S



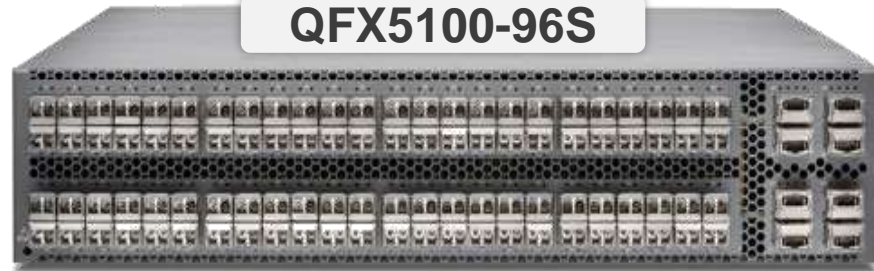
48 x 10GbE / 1GbE + 6 x 40GbE
Typical Server Connectivity with
SFP 1/10GE DAC (1M, 3M)

QFX5100-48T



48 x 10GT + 6 x 40GbE
Typical Server Connectivity with
RJ45 (100Mb, 1G, 10G)

QFX5100-96S



96 x 10GbE / 1GbE + 8 x 40GbE
Middle of Row or High Density TOR
SFP+ (1M, 3M, AOC)

QFX5100-24Q



24x40G (optional module to make it 32x40G)
High Density TOR in 4x10G model
QSFP DACBO (1M, 3M break out option)

Trident 2+

QFX5110-48S



4x 40/100G ports

10G TOR for Edge Routed
EVPN – VXLAN FABRIC

QFX5110-32Q



4x 40/100G ports

QFX5120-48Y – NATIVE 10/25G TOR

Product Specs

- 48x25G SFP28 and 8x100G QSFP28
- 2 Tbps throughput
- 1.31 Bpps – forwarding capacity
- Low latency – 550 nS
- IP fabric and Overlay options
- 1 RU chassis (19" x 22" x 1.7")
- Front-Back / Back-Front cooling



Features supported

- Zero Touch Provisioning, Secure boot
- VXLAN L2 & L3 Gateway support
- EVPN VXLAN
- MPLS, L2VPN, L3VPN

QFX5200 SERIES – 25G/100G (1.8TBPS – 6.4 TBPS) (L3 FABRIC USE CASE)

QFX5200-32C: Tomahawk (3.2Tbps)
 25G consortium
 16MB buffer
 UFT: 128K



QFX5210-64C: Tomahawk2 (6.4Tbps)
 42MB buffer
 UFT: 256K



QFX5200-48Y: Tomahawk + (1.8T)
 25G per IEEE 802.3by
 22MB buffer
 UFT: 128K



Features	Tomahawk	Tomahawk2
IPv4	160K	320K
IPv6 (64b)	84K	160K
ECMP(groups/members)	2K/16K	4K/32K
MPLS Labels pushed	3	8
MPLS entries	16K	32K

QFX10K: NEXT GEN SPINE WITH MULTI-VECTOR SCALING



QFX10002-36Q
Fixed

36 x 40GE
12 x 100 GE
144 x 10GE



QFX10002-72Q
Fixed

72 x 40GE
24 x 100 GE
288 x 10GE



QFX10002-60C
Fixed

60 x 100GE
60 x 40 GE
192 x 10GE



QFX10008
8-slot modular

30 x 100GE per slot
or 30 x 40 GE or 120 x 10GE

36 x 40GE per slot
or 12 x 100 GE or 144 x 10GE

60 x 10GE + 2 x 100 GE per slot
or 60 x 10 GE + 6 x 40 GE or 68 x 10 GE



QFX10016
16-slot modular

Industry Leading 100G Density
at 480 100G ports

Multi-Vector Scaling on all dimensions (Buffer, IP etc.)

COHERENT AND MACSEC LINE CARD FOR THE QFX10008/16

Packet Optical



6 DWDM line interfaces (on-board optics) with 1.2T packet forwarding.
Tunable across the C band

Each port independently configurable as

- 100G QPSK – 4000km
- 150G 8QAM – 2000km
- 200G 16QAM – 800km

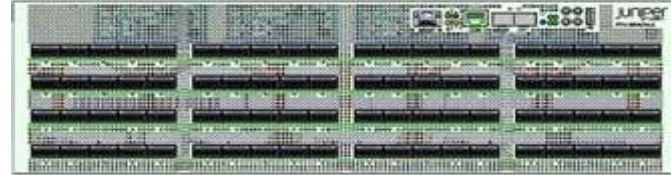
6x100GbE MACsec 256-bit encryption

MACsec



- 30 QSFP28 MACsec Interfaces
- Flexible port speed:100G,40G,10G
- Interfaces per line card
- AES 256 encryption
- Scale & Performance similar to other QFX10000 Line Cards

QFX10003



QFX10003-160C

Fixed Spine/DCI

3 RU

160x100GE

32x400GE + 32x100GE

BO to 25G/50G

QSFP+, QSFP28, QSFP28DD
QSFP56DD

Target
Typical - 2.8 KW

QFX10003-80C

Fixed Spine/DCI

3 RU

80x100GE

16x400GE + 16x100GE

BO to 25G/50G

QSFP+, QSFP28, QSFP28DD
QSFP56DD

Target
Typical - 1.7 KW

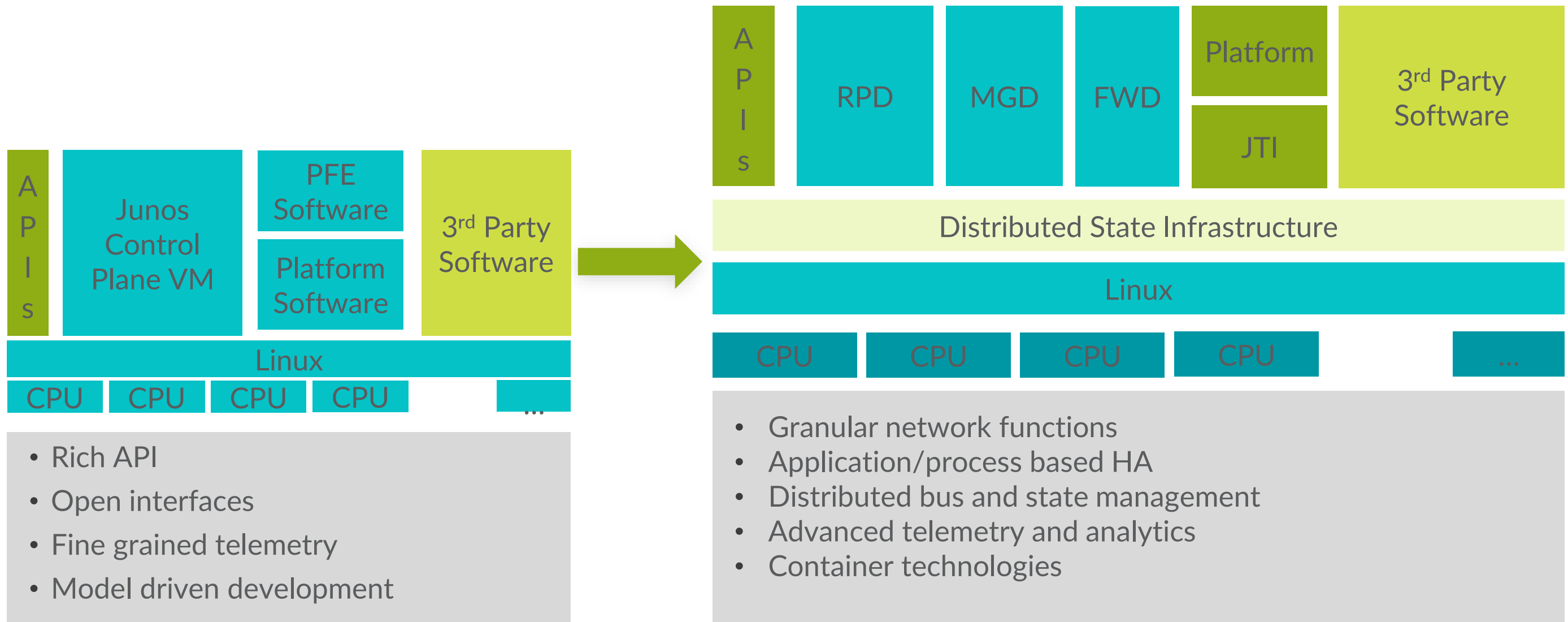
Optics

Power

	QFX10003-160C	QFX10003-80C
Physical QSFP cages	80	40
25G using QSFP28 BO	320	160
25G using QSFP28DD BO	640	320
100G using QSFP28	80	40
100G using QSFP28DD	160	80
100G using QSFP56DD BO	128 + 32	64 + 16
400G using QSFP56DD	32	16

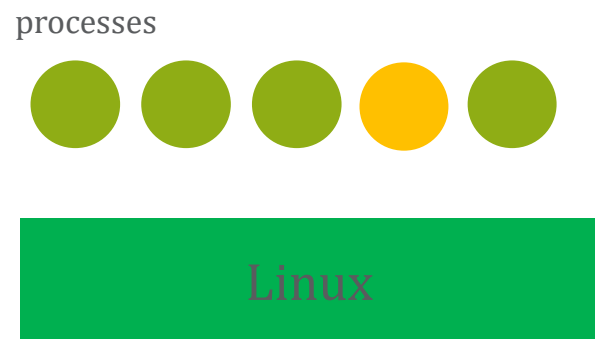
JUNOS EVOLUTION FOR DC

JUNOS-EVO - MICRO-SERVICES, CONTAINERIZATION



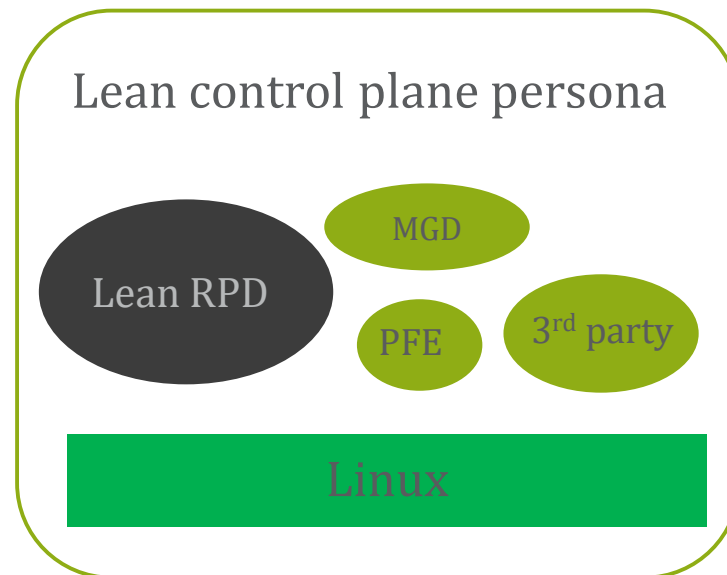
JUNOS-EVO - MODULARITY & PACKAGING

Component upgrade



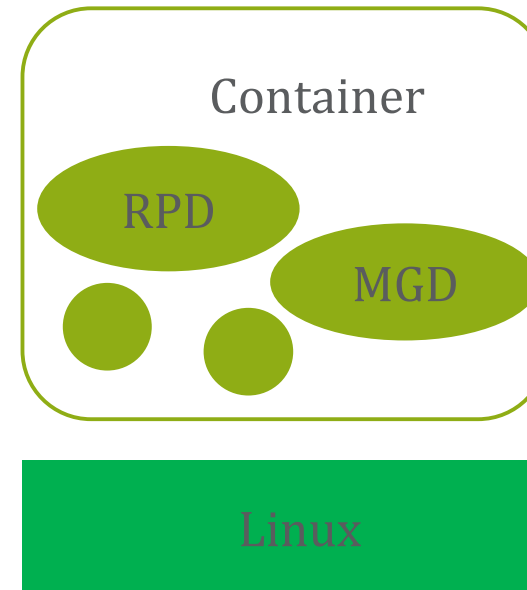
- Hot-fix
- Component level upgrade

Lean Control Plane



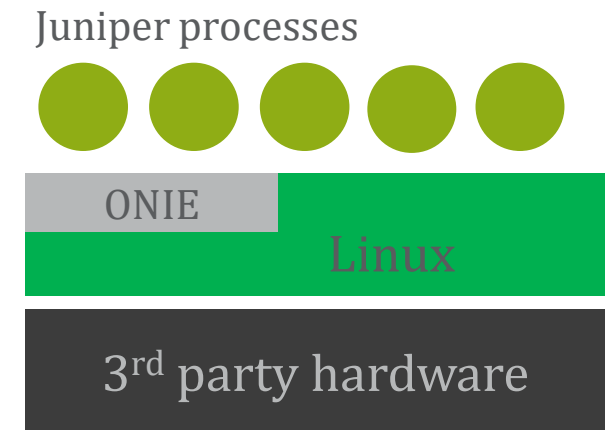
- Include only the necessary protocols in the control plane
- Example:- BGP, OSPF, IS-IS for L3 DC Fabric

Container packaging



- Lower footprint & faster boot
- cRR (containerized RR)
- vMGD - Config (CLI/YANG) validation
- vLNS

3rd party hardware



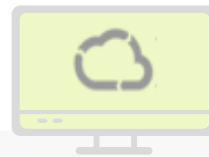
- EVO on 3rd party hardware

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CONTRAIL ENTERPRISE MULTI-CLOUD



CONTRAIL ENTERPRISE MULTI-CLOUD



Contrail Enterprise Multicloud



Any Cloud

Private cloud data centers, public cloud and VMware private clouds



Any Workload

Bare metal servers, public cloud instances, virtual machines, containers and physical networking devices



Any Deployment

Greenfield or brownfield, single- or multi-vendor

Open alternative to ACI and NSX

One, open platform for end to end policy and control with analytics

CONTRAIL ENTERPRISE MULTICLOUD PRODUCTS



Contrail Enterprise Multicloud
(includes Contrail Networking, Contrail Security & Appformix)

Contrail Security - Policy Orchestration & Enforcement across multiple clouds

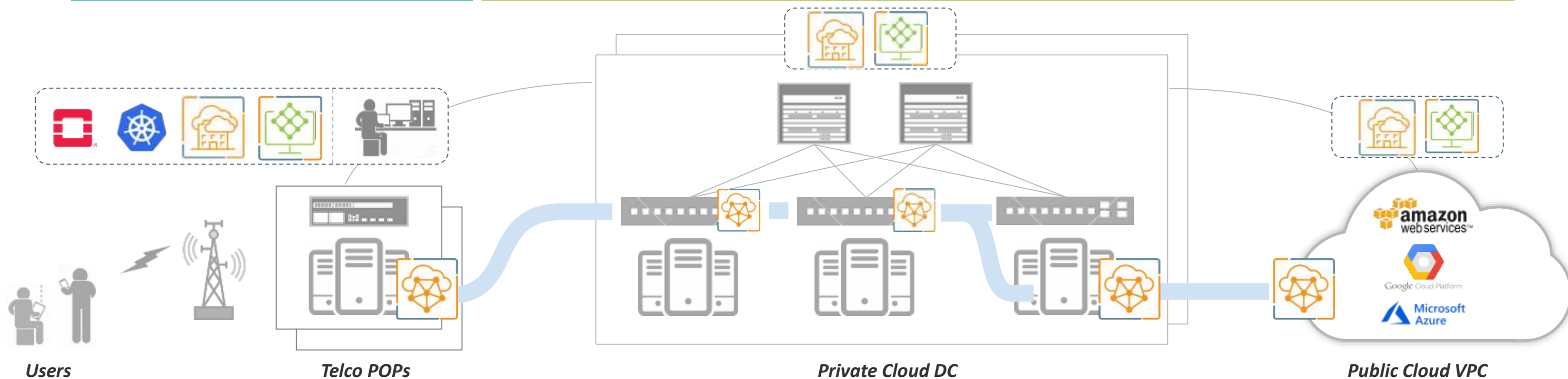
Appformix - Monitor & Operate Cloud

Contrail Networking

Virtual Networking: Virtual Networking / Overlay software for connectivity for VM/Containers

Fabric Automation: Management of DC devices and servers/BMS (underlay and overlay automation) to extend connectivity (i.e. virtual networking) to physical workloads (BMS, CE)

Multicloud Automation: Extension of virtual networking across Data Centers/Private clouds and to Public Cloud

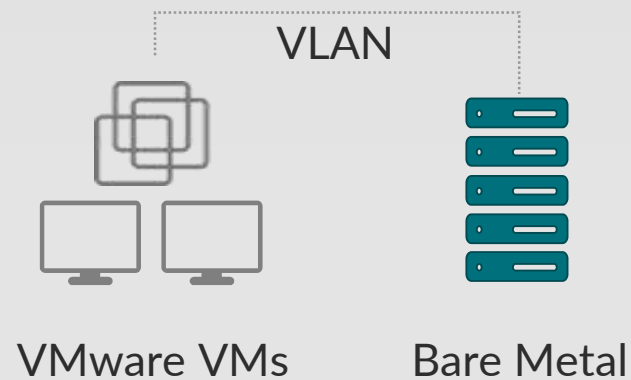


ORCHESTRATE

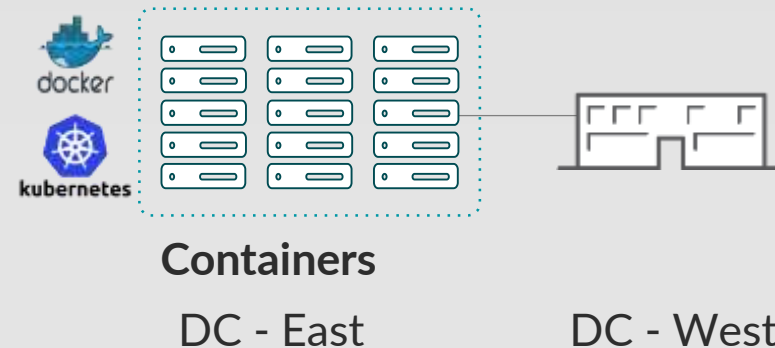


Contrail Enterprise Multicloud

TRADITIONAL



MULTI-SITE DC / PRIVATE CLOUDS



PUBLIC CLOUD



Build multicloud by applying policy to heterogeneous compute environments

USE CASE: PRIVATE TO PUBLIC CLOUD

Multi-vendor
Orchestration
& Management

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openstack

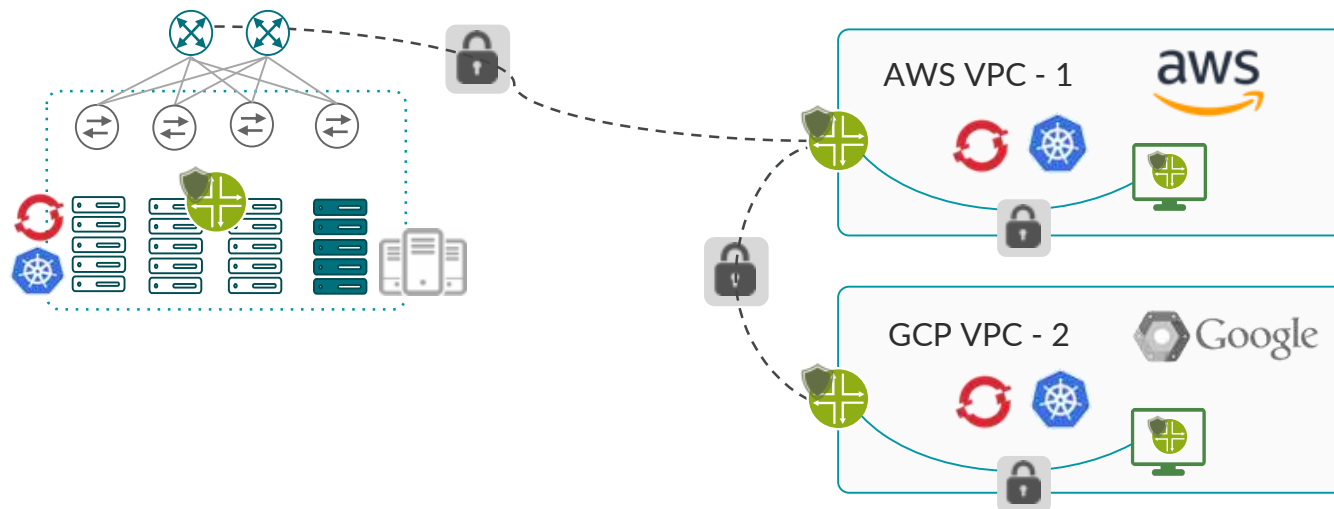
kubernetes

vmware

MESOS



Contrail Enterprise Multicloud



One Platform for All Clouds

- Connect multiple virtual networks across data centers and public clouds
- Monitor and control network and security policy for workloads anywhere on the network
- Securely connect bare metal servers with VMs and containers across private and public clouds
- Overlay networking services between cloud instances
- Supports distributed application architectures

Manage workloads in multiple clouds as though they were in one

USE CASE: BARE METAL SERVER

Multi-vendor
Orchestration
& Management

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NETWORKS



openstack



kubernetes



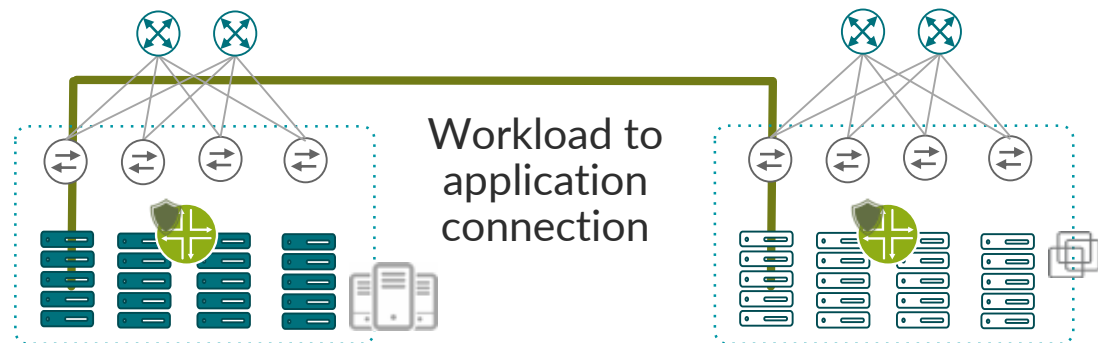
vmware



MESOS



Contrail Enterprise Multicloud

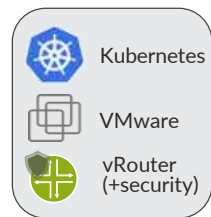


Bare Metal Servers

Virtualized Servers

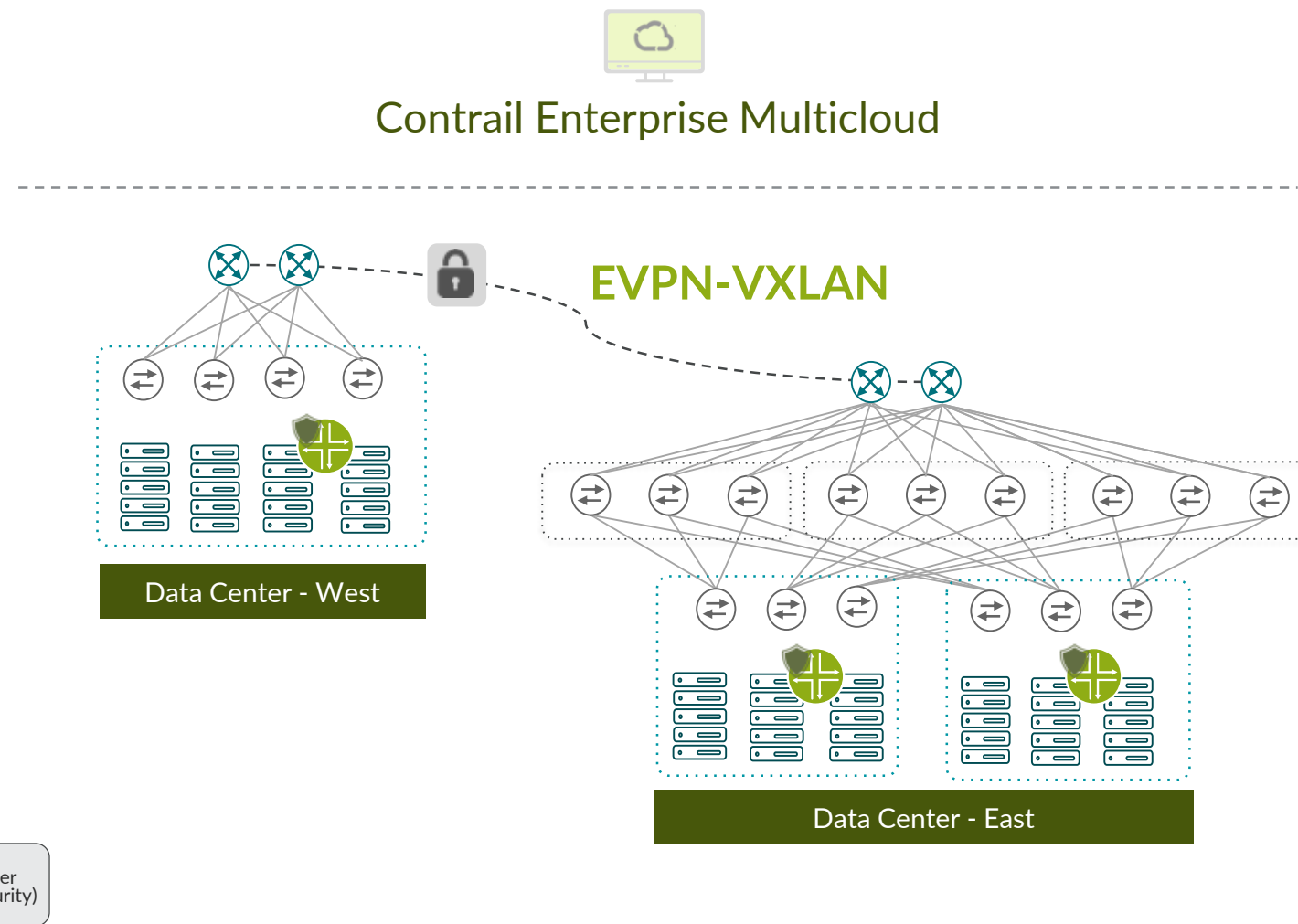
Deliver BMSaaS

- Launch with one-click automation
- Meet SLAs by workload
- Manage the lifecycle of physical workloads
- Independent but consistent views of service status
- Automate connection of traditional and cloud-native workloads



Manage software on bare metal servers with the same tools as virtualized servers

USE CASE: UNDERLAY AND OVERLAY



Automate Fabrics

- Automate operations lifecycle: day 0, scale-out, maintenance, assurance, etc.
- Manage policies to control traffic within and across virtual networks
- Multi-vendor environments
- Telemetry to predict, remediate and alert issues in real-time
- Integrated device management

One tool to manage both the underlay and the overlay

SEE



Contrail Enterprise Multicloud

APPLICATION & SERVICES



CLOUD INFRASTRUCTURE



SOFTWARE DEFINED INFRASTRUCTURE



PHYSICAL INFRASTRUCTURE



Single operations platform to monitor all layers of the infrastructure

PROBLEM

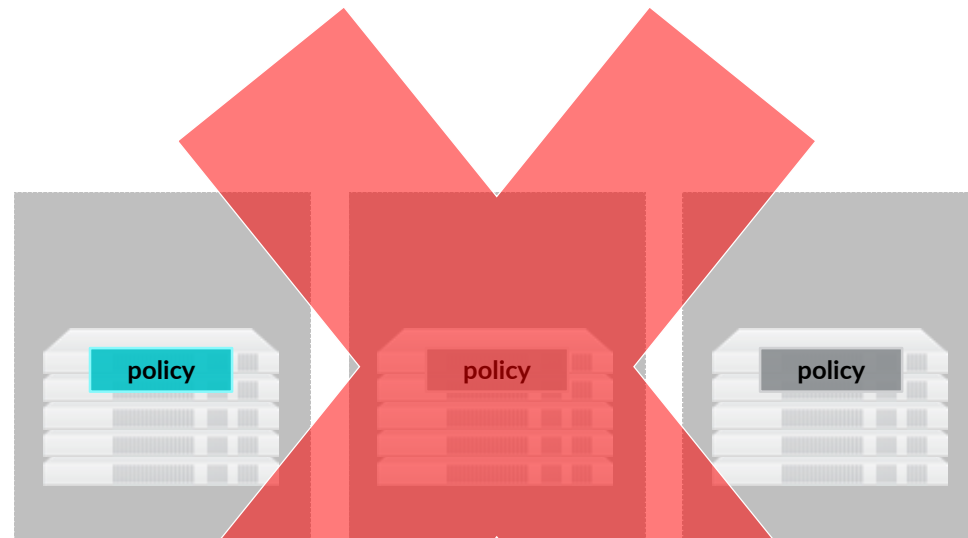
Monitoring technologies are SLOW! INNEFICIENT! INEFECTIVE!

INEFFICIENT
REQUEST-RESPONSE



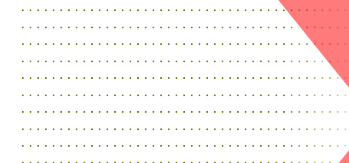
Compute & Storage
Infrastructure

Metrics



Hadoop Cluster for storing & analyzing metrics

THE MONITORING INFRASTRUCTURE
IS MORE COMPLEX THAN THE INFRASTRUCTURE
THAT
IS BEING MONITORED



Signals

6

MINUTES

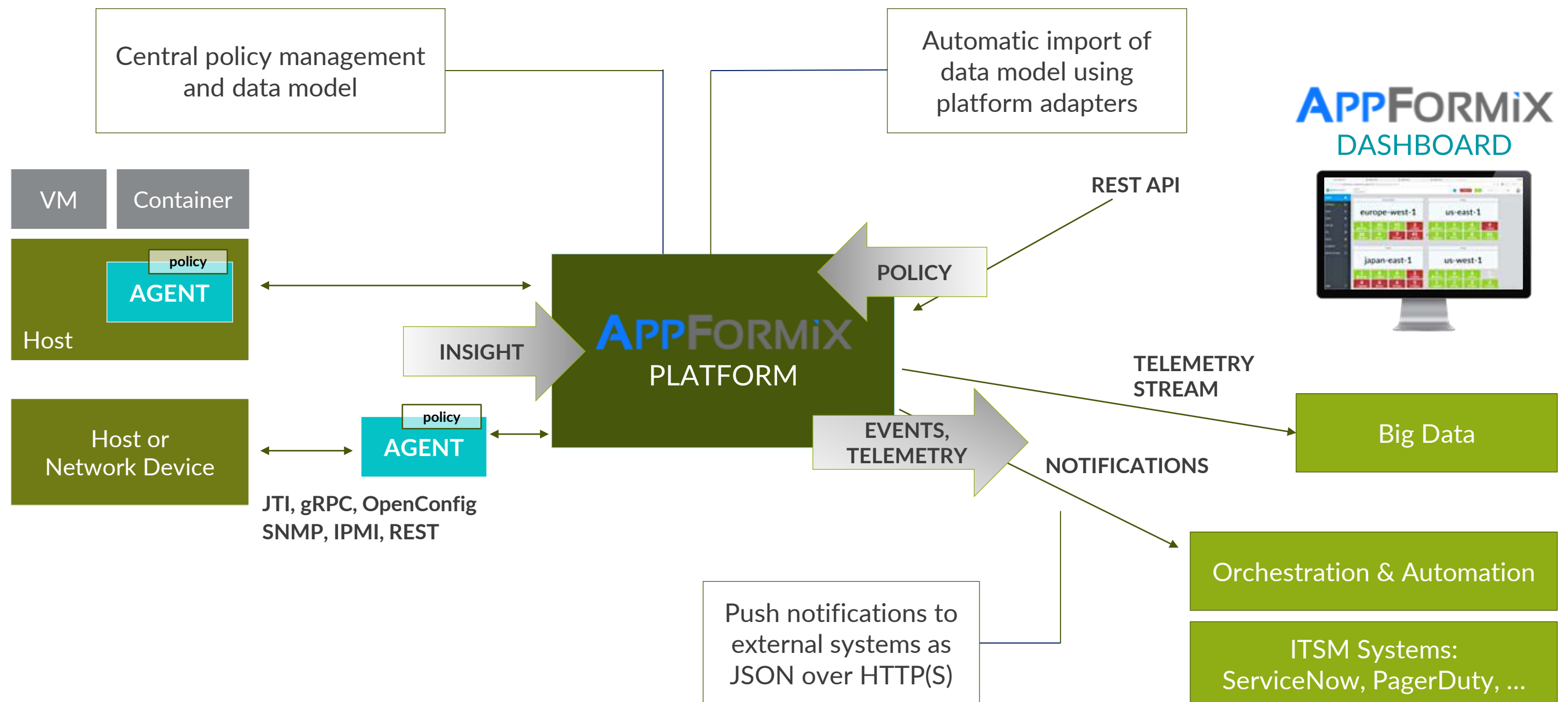
Consumed by humans for
after-the-fact analysis

Your OpenStack/Kubernetes

NEED REAL TIME

TOO SLOW TO INFLUENCE
ORCHESTRATION

APPFORMIX ARCHITECTURE



OPEN SOURCE INTEGRATION

- Distributed, real-time analysis of fine-grained data at or near the edge.
- Essential for operations.
- Aggregation and summarization to coarser timescale to reduce data rate for upstream layers.
- Telemetry management for devices

- Integration into telemetry architecture
- Offline analysis and user-driven data mining
- Data exposure to larger set of users with various use cases
- Long-term storage



SECURE



Contrail Enterprise Multicloud

openstack®
vmware®
CUSTOM

kubernetes
MESOS
CUSTOM

amazon
web services
Google
Cloud Platform
IBM
Windows Azure



Single SDN / Security Deployment

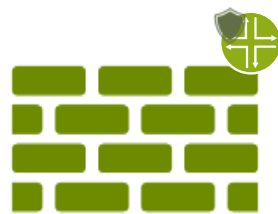
Consistent security for multiple environments

USE CASE: APPLICATION SECURITY W/ MICROSEGMENTATION

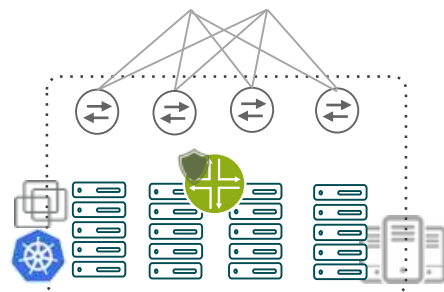
Multi-vendor
Orchestration
& Management



Contrail Enterprise Multicloud



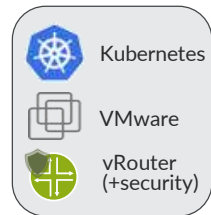
Host Based
L7 Firewall



VMs, Containers
Bare Metal Servers



Public Clouds



Secure Applications

- Configure and apply fine-grained security policy to workloads on any compute
- Enforce security policy with distributed L4 firewalls
- Isolate workloads and tenants while sharing the cloud resources
- Redirect traffic to a L7 firewall for extra protection

Consistent security for multiple environments

USE CASE: KUBERNETES

Multi-vendor
Orchestration
& Management

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openstack

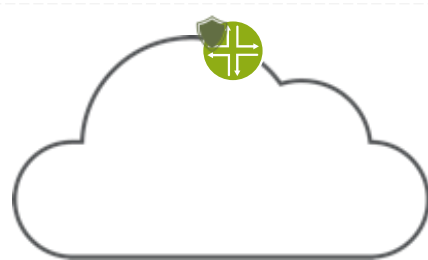
kubernetes

vmware

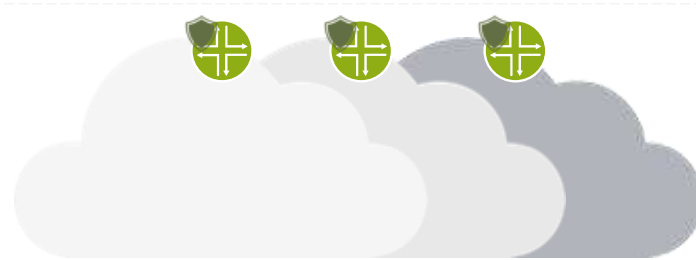
MESOS



Contrail Enterprise Multicloud



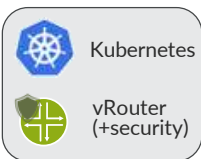
Private
Cloud



AWS

GPC

Azure...



Implement Kubernetes

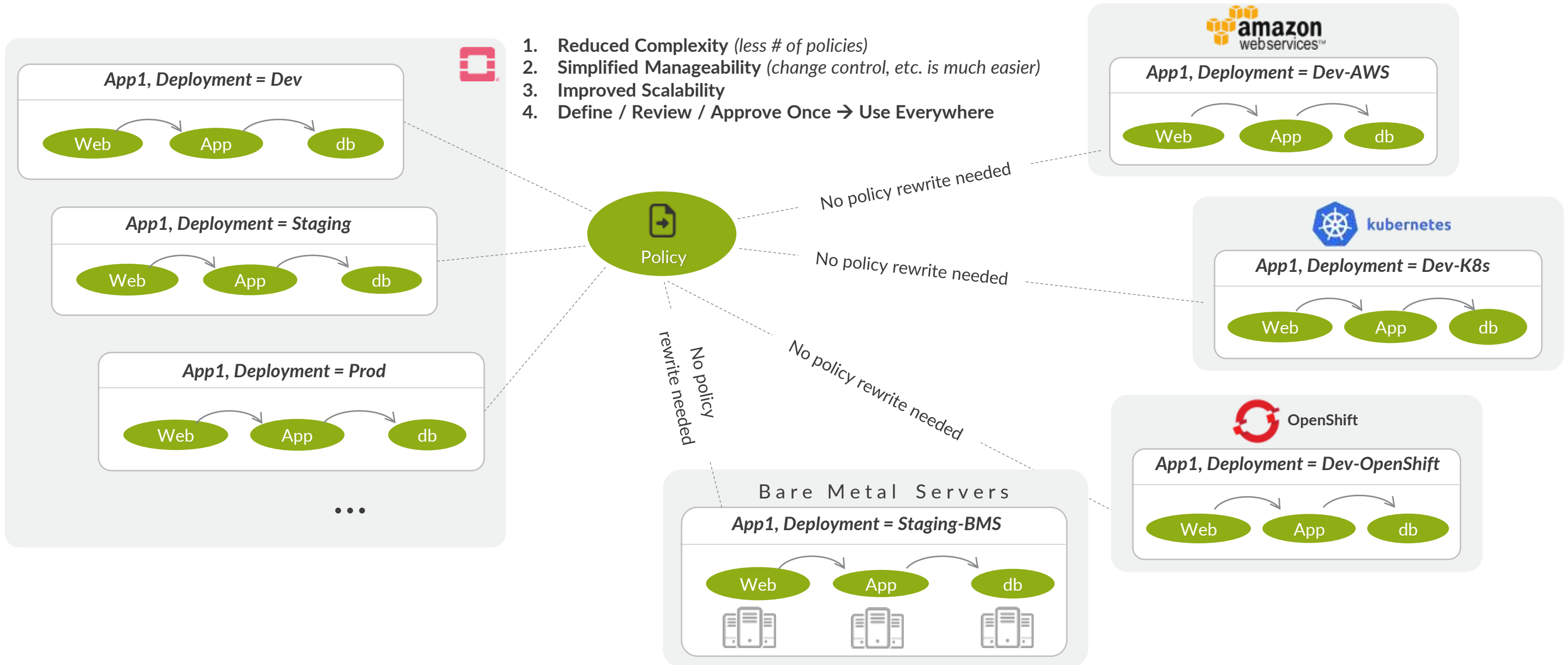
- Control and security for Kubernetes is particularly painful
- Isolate K8s Pods/containers to provide segmentation and security
- Enhance K8s networking service to provide high performance connectivity
- Apply and re-use policies from any environments including K8s
- Support multiple K8s deployment types - K8s on BMS, OpenStack, Public Clouds

One platform to connect, secure, and monitor Kubernetes environment

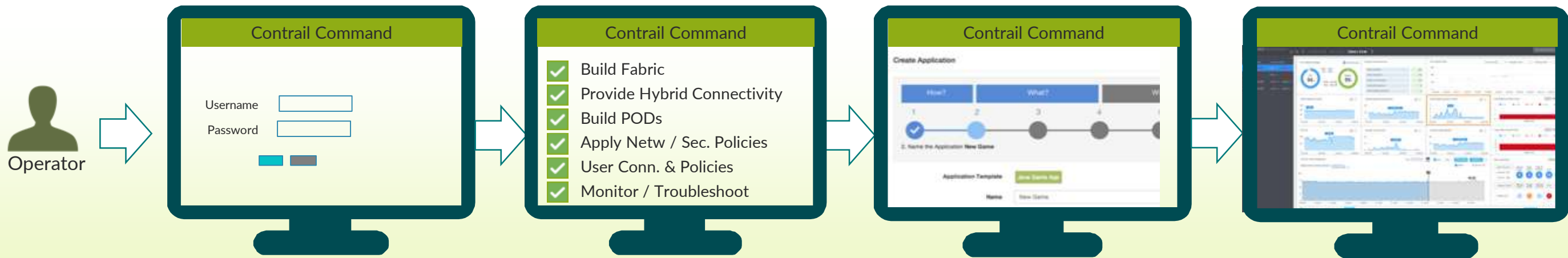
POLICY OPTIMIZATION

WRITE ONCE – DEPLOY MANY

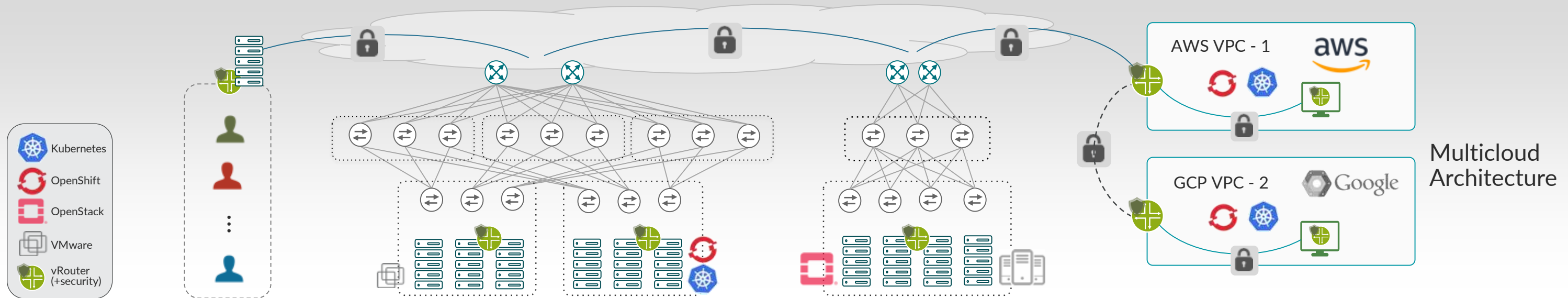
Once a set of policies are defined for a particular OpenStack environment, they can easily be re-used for other environments?



CONTRAIL ENTERPRISE MULTICLOUD



Shifting multi location complexity into one interface.



THANK YOU
juniper.net/cloud