

# FUNDAMENTALS FOR RELOADED MPLS-VPN CONNECTIVITY

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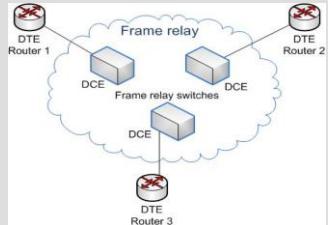
# Agenda

- MPLS-VPN Service Evolution
- SD-WAN Solution Overview
- Demo (<10m)
- Q&A

# Evolution of Business Connectivity Services

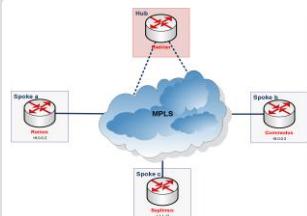
1990s

Leased Lines  
& Frame Relay



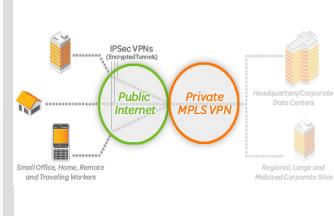
2000s

IP/MPLS VPN  
with L2/L3  
services



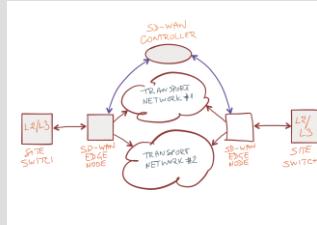
mid-2000

Hybrid WAN &  
IPSec VPN



mid-2010

SD-WAN with  
services



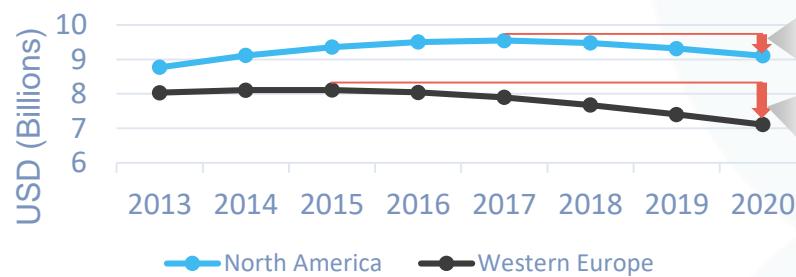
2020+

Cloud  
Connect



# MPLS Challenges & SD-WAN Opportunities

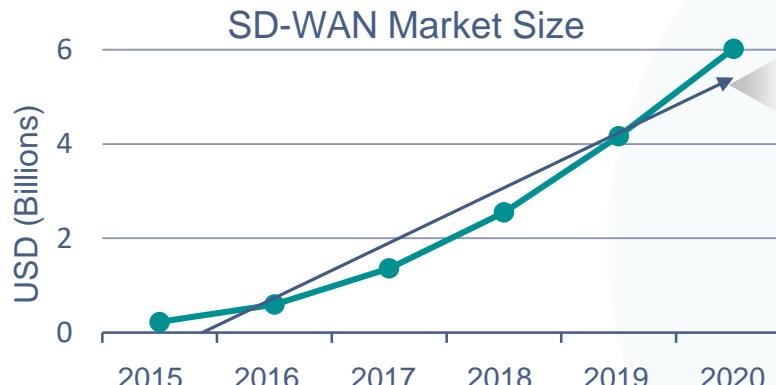
MPLS Revenue (Developed Markets)



5% decline in North America

12% decline in Western Europe

- Global Revenue growth for MPLS is declining
- Price erosion for MPLS means Europe starts to see negative growth rates for MPLS VPN revenues by 2016, with North America following suit by 2018



93% CAGR

- By 2020, SD-WAN market size is projected to grow to \$6B with a CAGR of 93%

Sources:  
OVUM: "IP VPN Services Market Forecast"  
IDC: "Cloud and Drive for WAN Efficiencies Power Move to SD-WAN"

# What are Enterprise WAN Challenges?

- Top 3 WAN Challenges

**38%**  
**Security**

**33%**  
**SaaS / Cloud  
Services**

**32%**  
**Managing  
Branch  
Connectivity**

- **7%** Currently use SD-WAN
- **63%** Plan to adopt SD-WAN in next 18 months

Source: IDC WW SD-WAN Survey Special Report, July 2016

# What do Enterprises want?

- The enterprise application mix is fast leaning towards cloud based applications
- WAN transformation is inevitable for enterprises seeking to optimize for these applications

## SD-WAN Deployment Scenarios:

Internet VPN Access

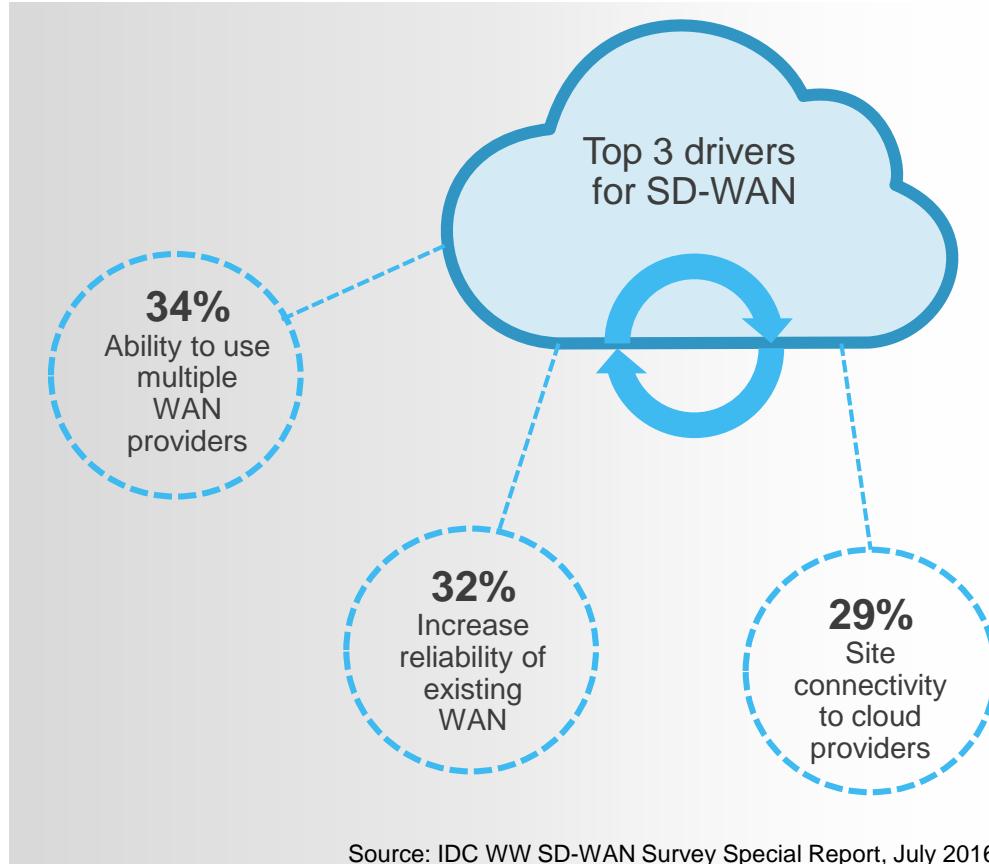
57%

Support for SaaS and public cloud

32%

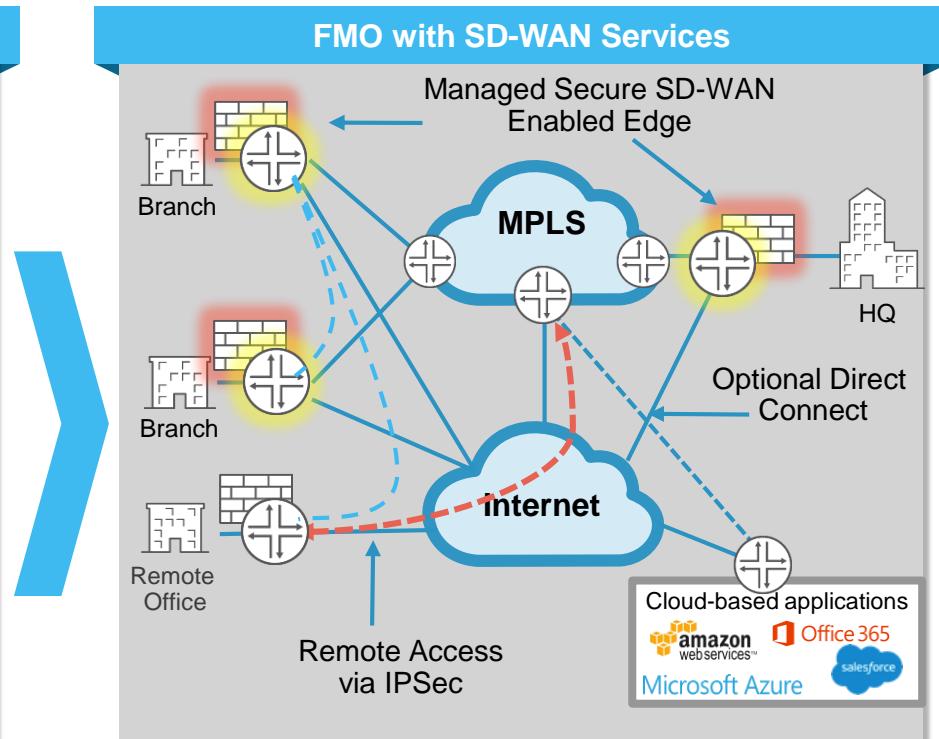
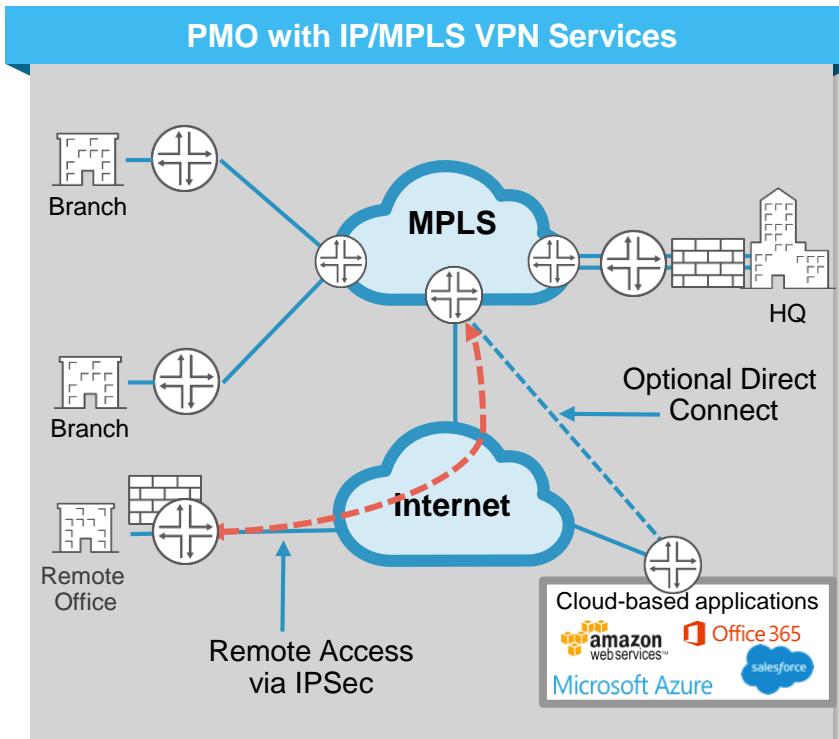
Optimized SaaS/Cloud Offload

31%



Source: IDC WW SD-WAN Survey Special Report, July 2016

# IP/MPLS VPNs Evolution with SD-WAN



# End to End SD-WAN with Transport Independence

## Intelligent Branch

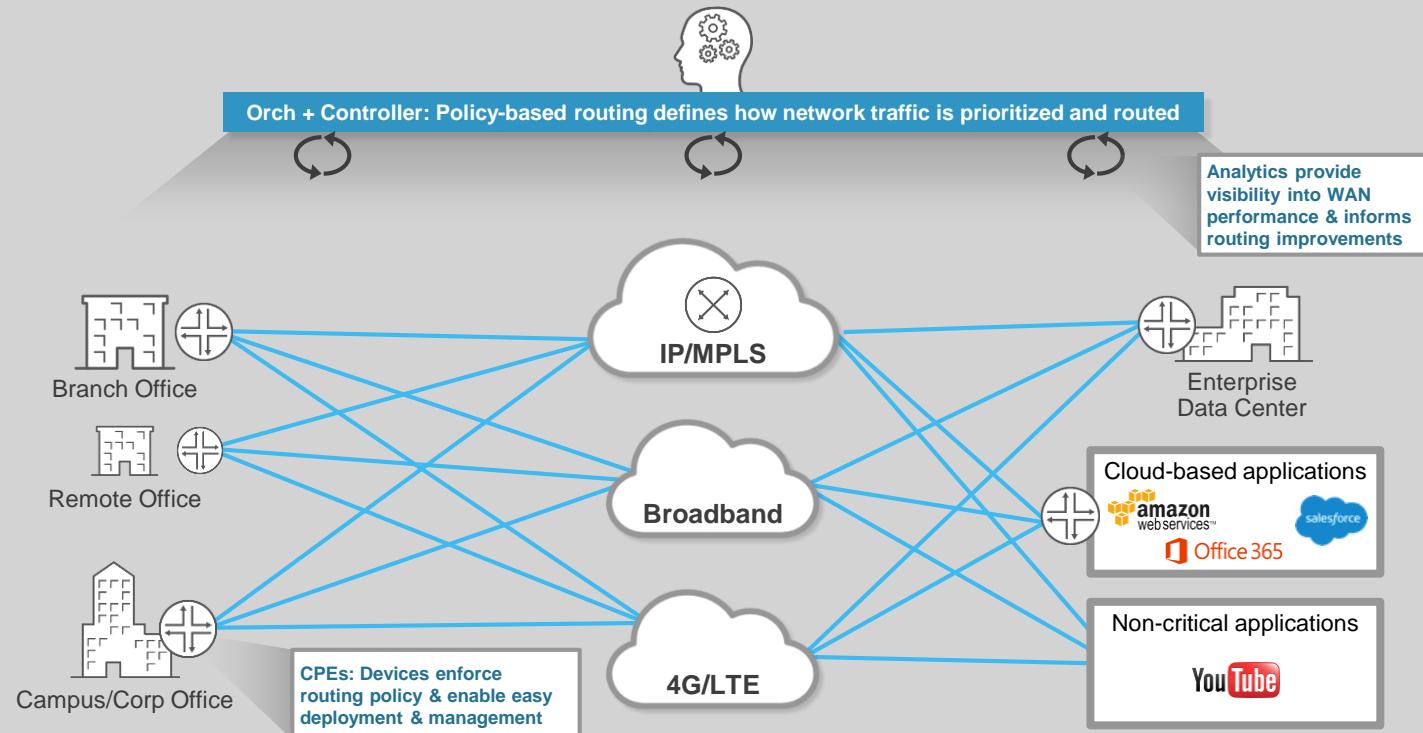
Analytics and Deep Application Inspection

Application-based SLAs

Centralized Policy Management

Secure and Managed VPN

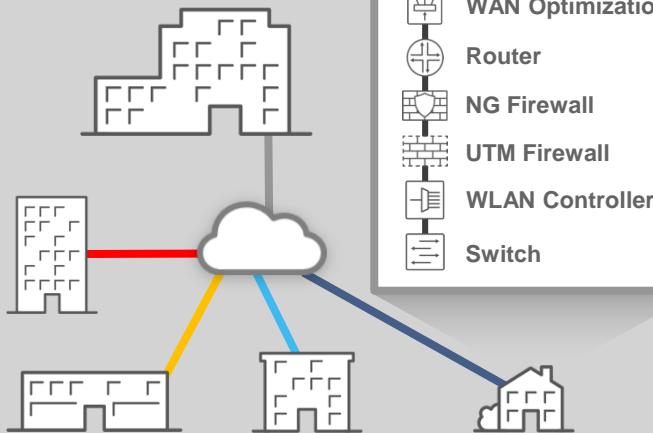
SD-WAN framework allows implementation of more intelligence/logic in software rather than in hardware, enabling increased flexibility and automation



# Branch Consolidation & Evolution to SD-WAN

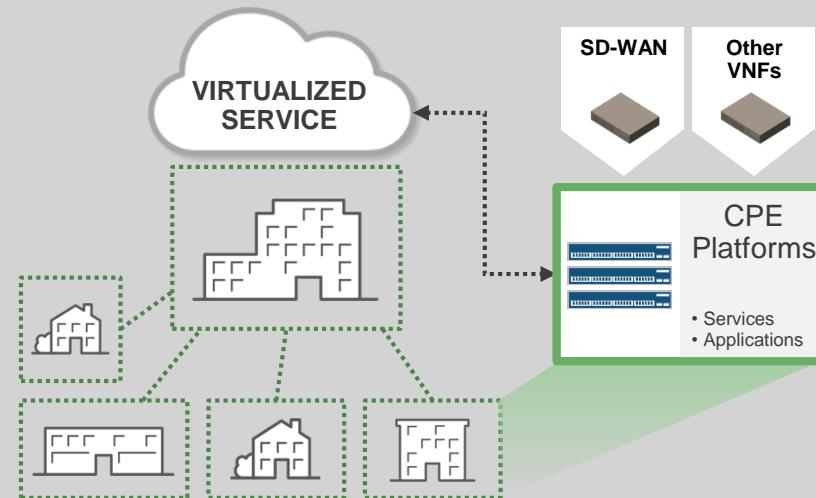
Bring Agility and Enhanced Customer Experience Utilizing Cloud Technology

Legacy Branch (PMO)



Expensive, complex all-in-one box or many vendor inline boxes and cumbersome refresh

Future Branch (FMO) with D-NFV



Simple, customizable and instantaneous refresh

# Juniper SD-WAN Differentiation

## Integrated NG Security



UTM, IPS, Sky ATP,  
Unified Policy, SDSN

## CPE Portfolio Breadth



Fixed and Virtualized  
CPE appliances

## On-prem or Cloud Multi-tenancy



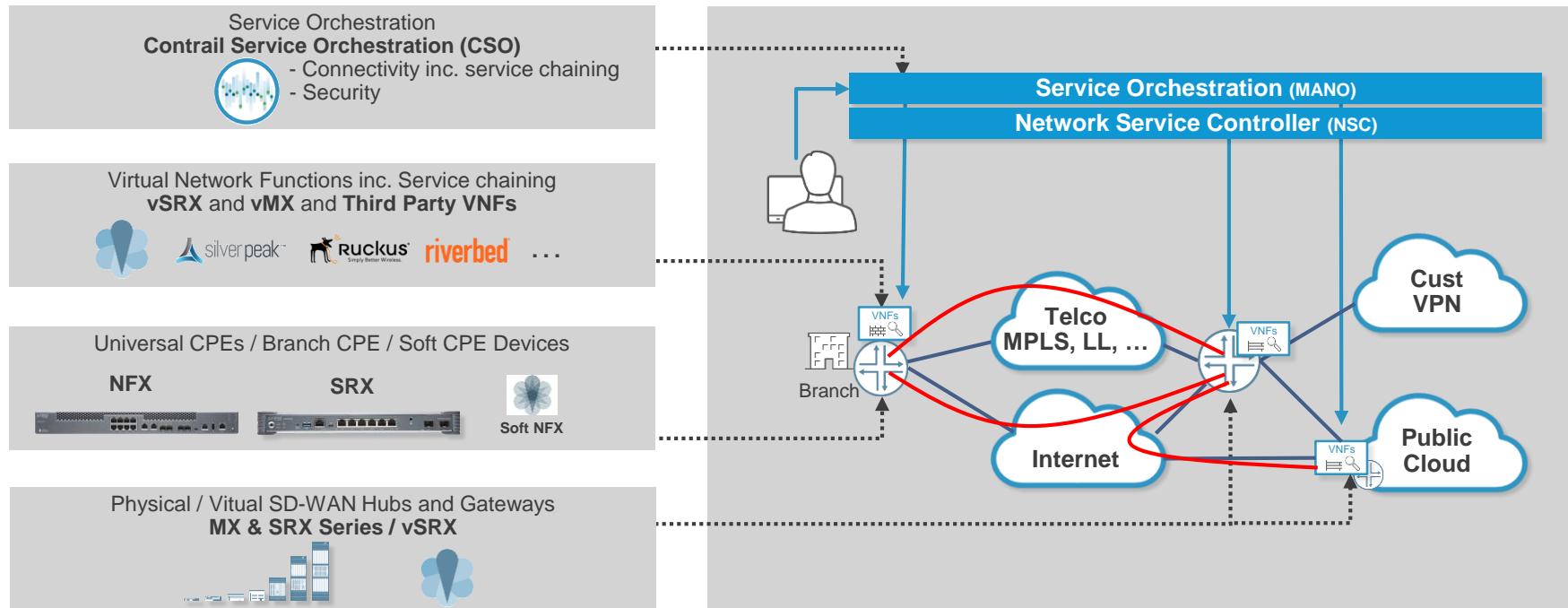
Management &  
Orchestration, VNF  
Orchestration

## Native IP/VPN Integration



Reduce CAPEX with  
Existing PE  
infrastructure

# Juniper SD-WAN Solution Components

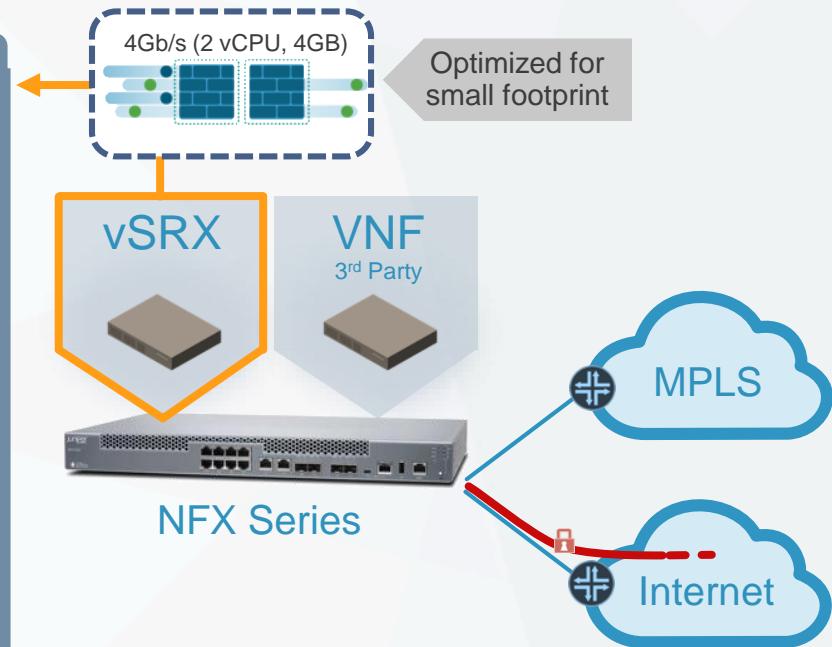


# SD-WAN with Integrated Security

## Secure SD-WAN Building Blocks

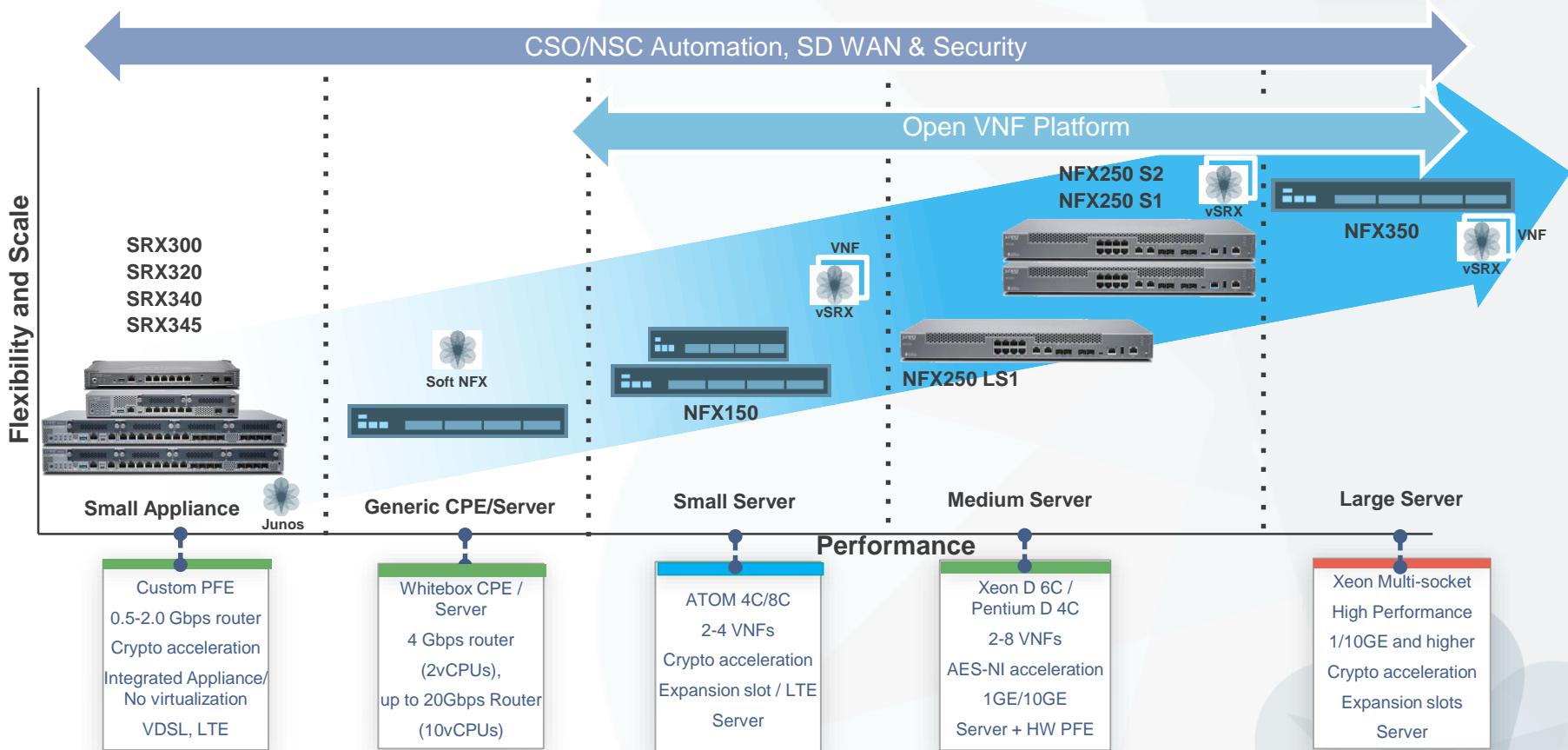
- **Application Awareness**  
Deep Packet Inspection (DPI), App-ID and Meta-Data, 3000+ App Signatures
- **User Awareness**  
Integration with Microsoft Active Directory/LDAP\*
- **Overlays, IPSec/GRE**  
Application and Subscriber-Aware
- **Performance Monitoring and Analytics**  
RPM, IP monitoring, BFD, Ethernet OAM, J-Flow v5 v8 v9, TWAMP
- **Application Based Routing**  
Stateful: Performance monitoring results, App-ID, User-ID\*
- **Full Routing Stack**  
Routing Protocols (BGP, IS-IS, OSPF, RIP, Static)
- **Full Security Stack**  
Firewall, IDP, UTM, ATP, Anti-virus, Anti-spam, Web/Content Filtering

\* Roadmap



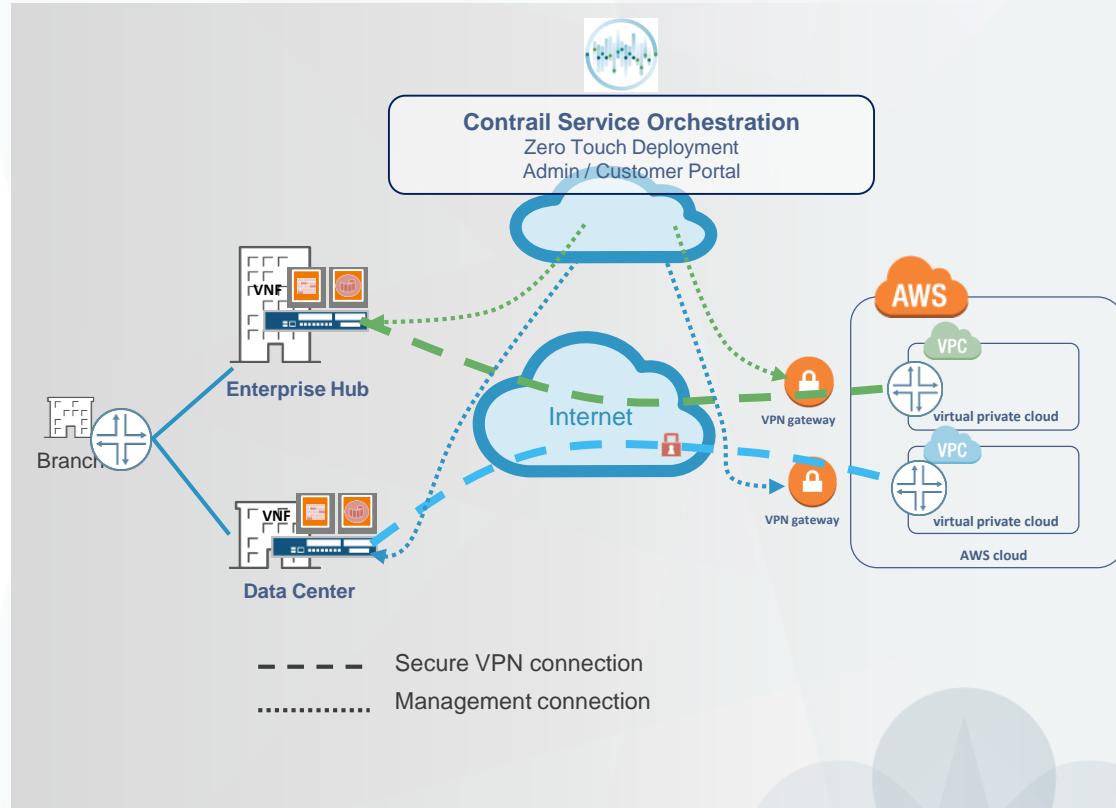
# SD-WAN CPE Product Portfolio

Shipping  
SOPD  
Investigation



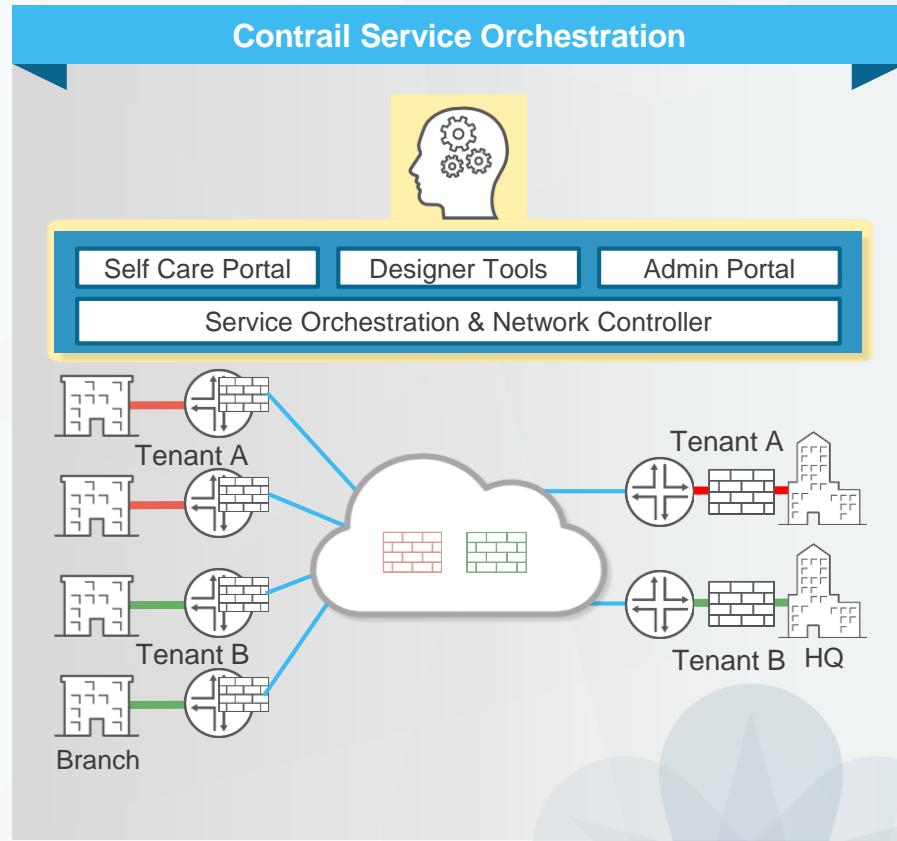
# SD-WAN with Public Cloud Connectivity (AWS)

- Universal SD-WAN Connectivity
  - Fully automated SD-WAN connectivity to vSRX in customer VPC
  - Additional direct connect support in future
- Automated Provisioning
  - vSRX auto provisioned in AWS via CSO
    - Bring-up from defaults
    - Fully security service management
  - Customer access to Self Care Portal for self provisioning of VPC credentials



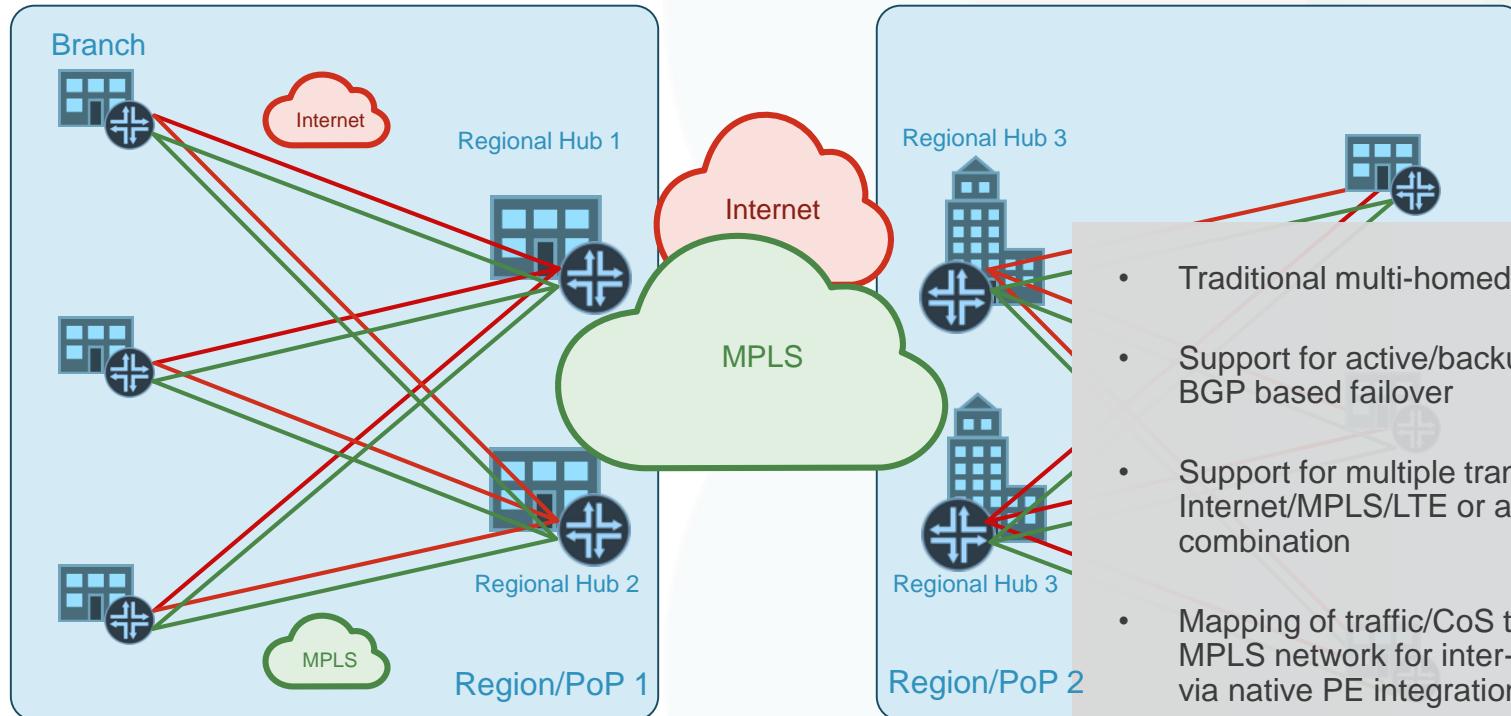
# SD-WAN with Full Multi-Tenancy

- Multi-tenant Management with full Role Based Access Controls (RBAC)
  - Complete management separation between tenants
- Multi-tenant Control plane with Network Services Controller (BGP)
  - Full routing separation between tenants
- SD-WAN endpoints support multiple network segments per tenant
  - i.e. Tenant A can have overlapping network X & Y
- Each tenant supports multiple differing service sets
  - i.e. Tenant A: SD-WAN + Security, Tenant B: SD-WAN + WanOpt
- Deployable as on-premises or hosted (AWS)



# Regional Hub Sites with Hub/Spoke Interworking

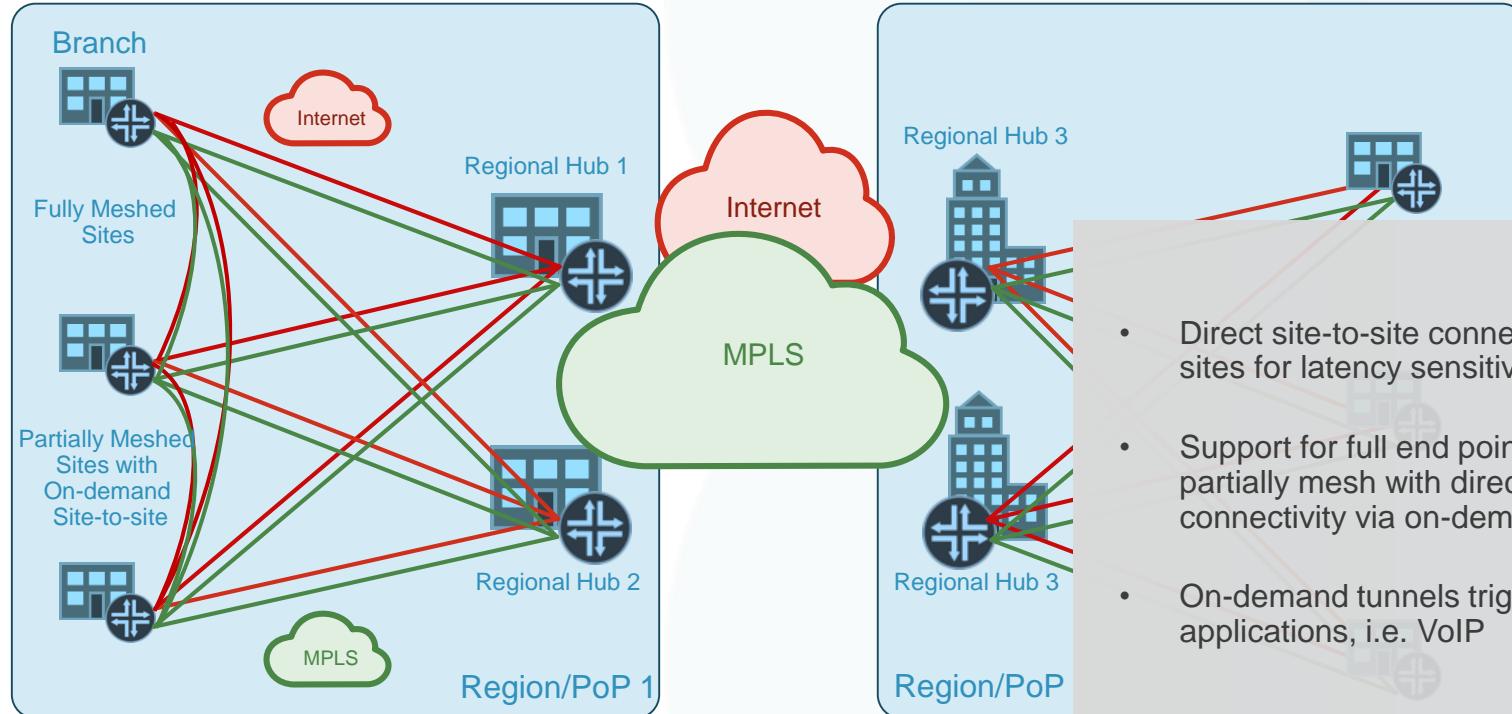
## SD-WAN with MPLS as Transit



- Traditional multi-homed hub/spoke design
- Support for active/backup dual hubs with BGP based failover
- Support for multiple transport types with Internet/MPLS/LTE or any transport combination
- Mapping of traffic/CoS to underlay transit MPLS network for inter-PoP site connectivity via native PE integration

# Regional Hub Sites with Full & Partial Mesh Interworking

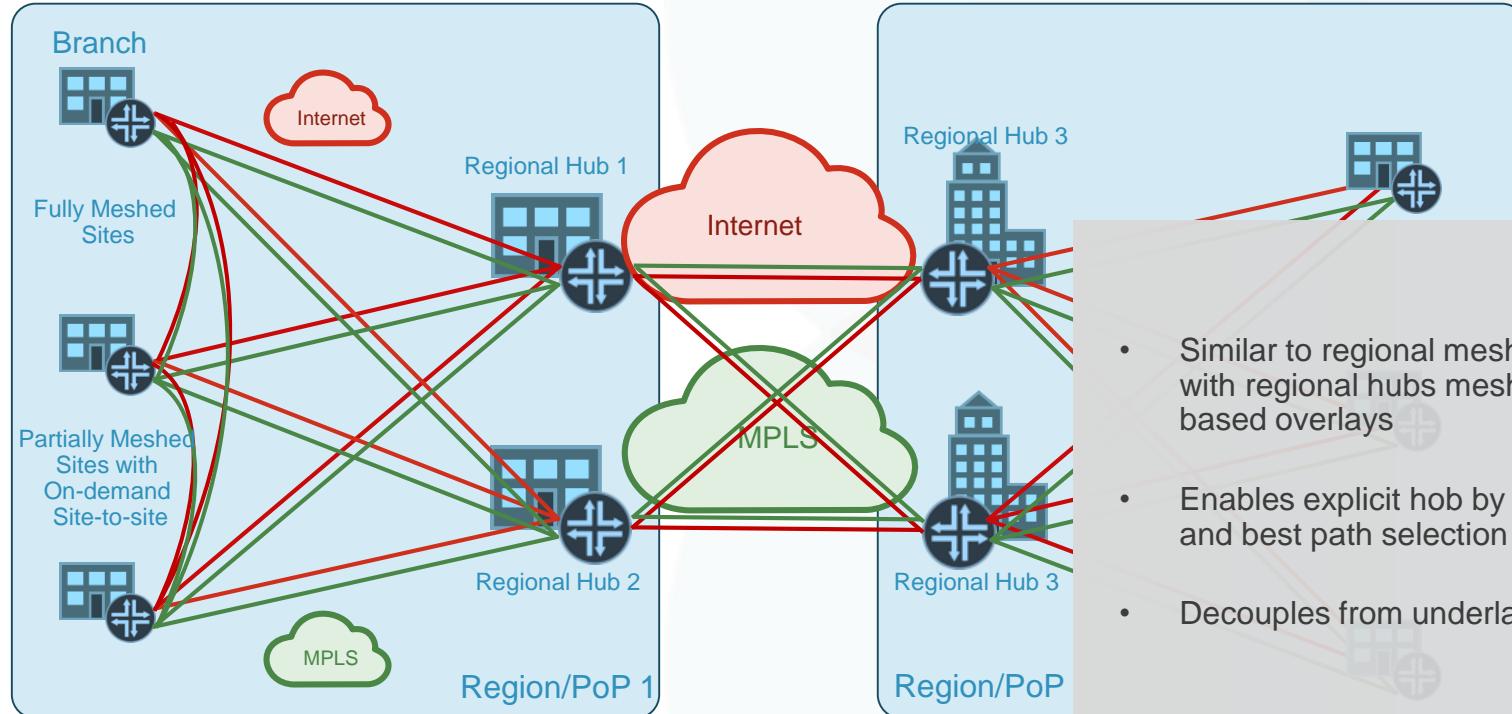
## SD-WAN with MPLS as Transit



- Direct site-to-site connectivity bypassing hub sites for latency sensitive traffic
- Support for full end points to fully mesh or partially mesh with direct site-to-site connectivity via on-demand tunnel setup
- On-demand tunnels triggered by specific applications, i.e. VoIP

# Regional Hub Sites E2E Full Mesh Overlay

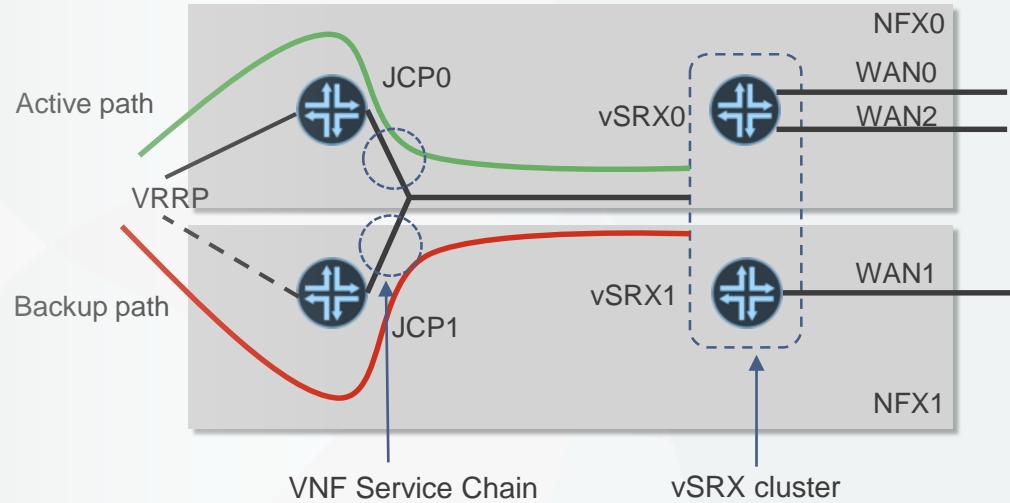
## SD-WAN with E2E Overlay



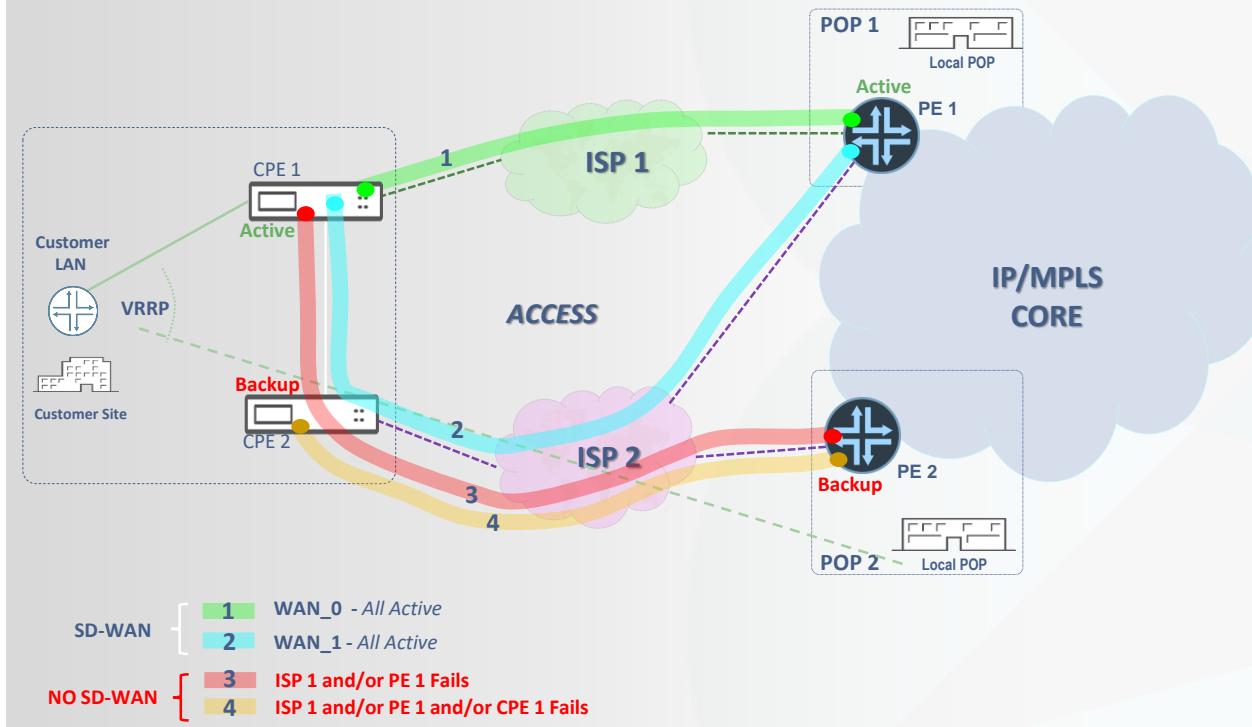
- Similar to regional mesh topology prior but with regional hubs meshed with SD-WAN based overlays
- Enables explicit hop by hop SLA monitoring and best path selection
- Decouples from underlay network entirely

# Highly Available Dual-NFX CPE Support

- Dual NFXs with active/active WAN links across both devices at the branch
- GW vSRX operates in cluster mode with internal synchronization of routing/fib information
- Near hitless failover in case of a NFX or WAN link failure for local LAN traffic



# Gateway High Availability with Dual Hub/PoP Support



- Support for active/backup dual hubs with BGP based failover
- Backup SD-WAN Gateway(PE2) in case of primary gateway/PoP failure
- Dual NFXs with active/active WAN links across both devices
- Near hitless failover in case of a NFX or WAN link failure for local LAN traffic

# Integrated Intuitive Policy Management – New Intent based policy model for SD-WAN

CSO CUSTOMER PORTAL

Configuration / SD-WAN / SD-WAN Policy

SD-WAN Policy

Last update approximately 4 days ago by admin | Total Intents 3 | Undeployed 0 | Deploy

SOURCE APPLICATION

DEPT Sales

APPNS LYNC

MGCP

SIP

SKYPE

Select Source

Select Destination

Create SLA Profile

General Configuration

Path Preference: MPLS

Class of Service: Voice

Metrics Targets

Copy Target Metrics From: None

Throughput: Mbps

Latency: ms

Packet Loss: %

Jitter: ms

Delay: ms

Advanced Configuration

Maximum Upstream Rate: Kbps

Maximum Upstream Burst Size: Bytes

Maximum: Kbps

Cancel Back OK

Last update approximately 4 days ago by admin | Total Intents 3 | Undeployed 0 | Deploy

SD-WAN Policy

SOURCE APPLICATION SLA PROFILE OPTIONS

DEPT Sales APPNS SLA VoIP-policy

MGCP VoIP-SLA

SIP

SKYPE

Select Source

Select Destination

Select SLA Profile

Office

Applications [APPS]

- ADOCES-ONLINE-OFFICE
- FENGOFFICE
- GOOGLE-DOCS-DRAWING
- GOOGLE-DOCS-FORM
- GOOGLE-DOCS-PRESENTATION
- GOOGLE-DOCS-SPREADSHEET
- GOOGLE-DOCS-WORD-DOCUMENT
- GROOVE
- LIVE-MEETING
- LYNC
- MS-COMMUNICATOR
- MS-ONENOTE

View more results

Cancel Save

Social-policy

Cloud-policy

Collab-policy

# Integrated Intuitive Policy Management – New Intent based policy model for NGFW

ADMINISTRATION PORTAL

Configuration / Firewall Policy / Policy

Firewall Policy

Last update 7 minutes ago by orange\_admin | Total Rules 2 | Undeployed 0 | Deploy

SOURCE

DESTINATION

DEPARTMENT  
OrangeFinance

DEPARTMENT  
OrangeRandD

+ Select Source

+ Select Destination

1 LAGR OrangeFinance

2 ADDR Orngaddress1

3 ADDR Orngaddress2

2 items

ADMINISTRATION PORTAL

Firewall Policy

Last update 2 Hours ago by airtel | Total Rules 3 | Undeployed 3 | Deploy

SOURCE

DESTINATION

OPTIONS

Scheduling

Logging

Rule name

Description

Cancel Save

Addresses [ADDR]

- server-lab
- servers
- servers-critical-resources
- Mumbai-resources
- server-finance-idr

SITES [SITE]

- airtelBLR
- Mumbai
- Delhi

SITE GROUPS [STGP]

- Mumbai\_sg

DEPARTMENT [DEPT]

- Engineering
- Marketing
- HR

View More Results

APPS LINKEDIN

STGP Mumbai\_sg SITE Mumbai

STGP Mumbai\_sg ADDR HR-Server

Market\_block

Server\_Lab\_Deny

test

0 of 3 Selected

# SD-WAN Roadmap



SD-WAN with integrated NG Security Services

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# DEMO

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# THANK YOU

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# Q&A

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# REFERENCES & ADDITIONAL INFO

- SD-WAN for Service Providers – Cloud CPE
  - <https://www.juniper.net/us/en/solutions/sd-wan/>
- SD-WAN for Enterprise – Cloud Enabled Branch
  - <https://www.juniper.net/us/en/solutions/cloud-enabled-enterprise/branch/>
- Contrail Service Orchestration
  - <https://www.juniper.net/us/en/products-services/sdn/contrail/contrail-service-orchestration/>
- NFX250 Network Services Platform
  - <https://www.juniper.net/us/en/products-services/sdn/nfx250/>
- SRX/vSRX Gateways
  - <https://www.juniper.net/us/en/products-services/security/srx-series/>