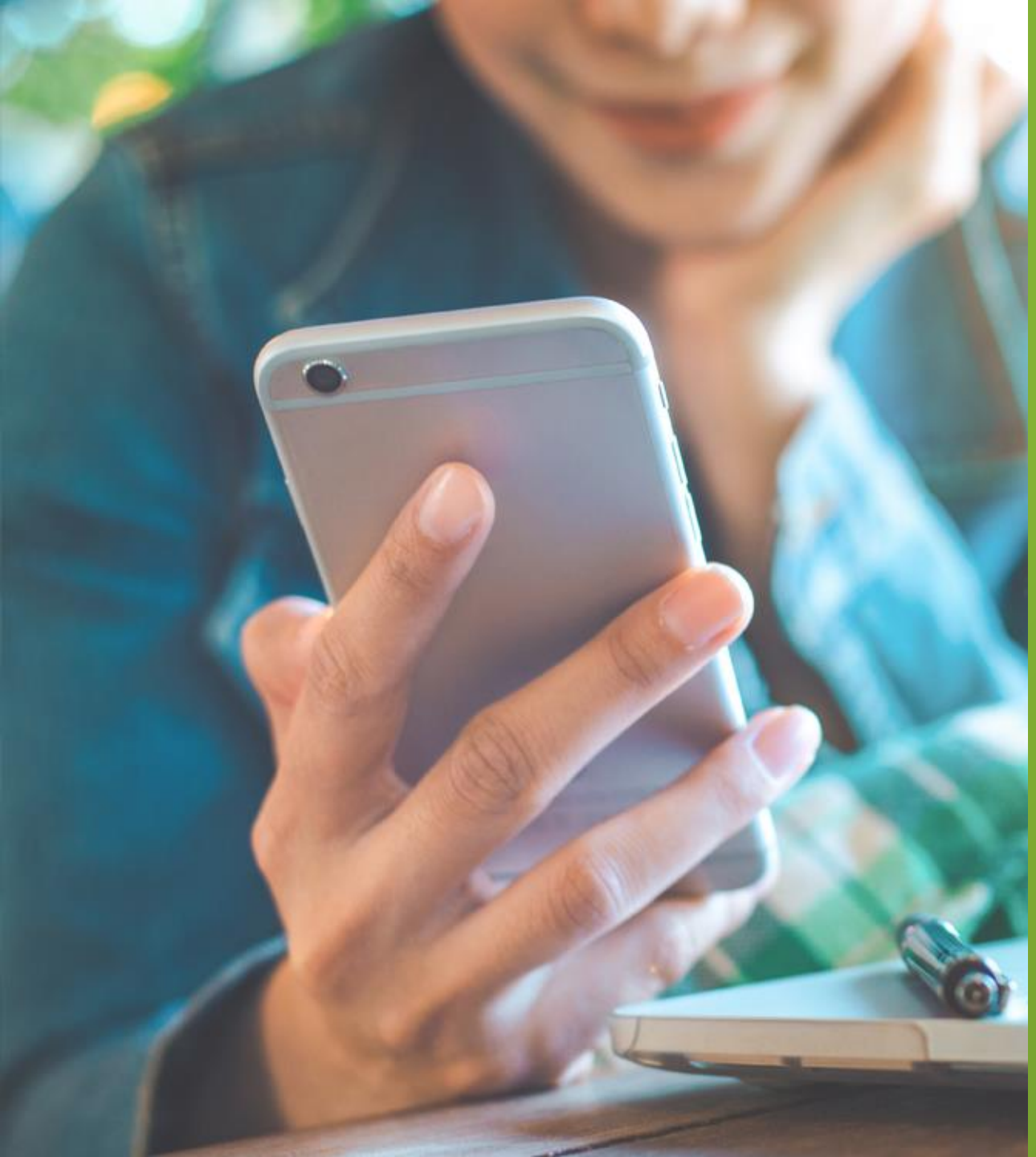
SRv6 – Beyond the Hype

Aditya Kaul, Principal Solution Architect, Juniper APAC PS

28 July 2022

Agenda

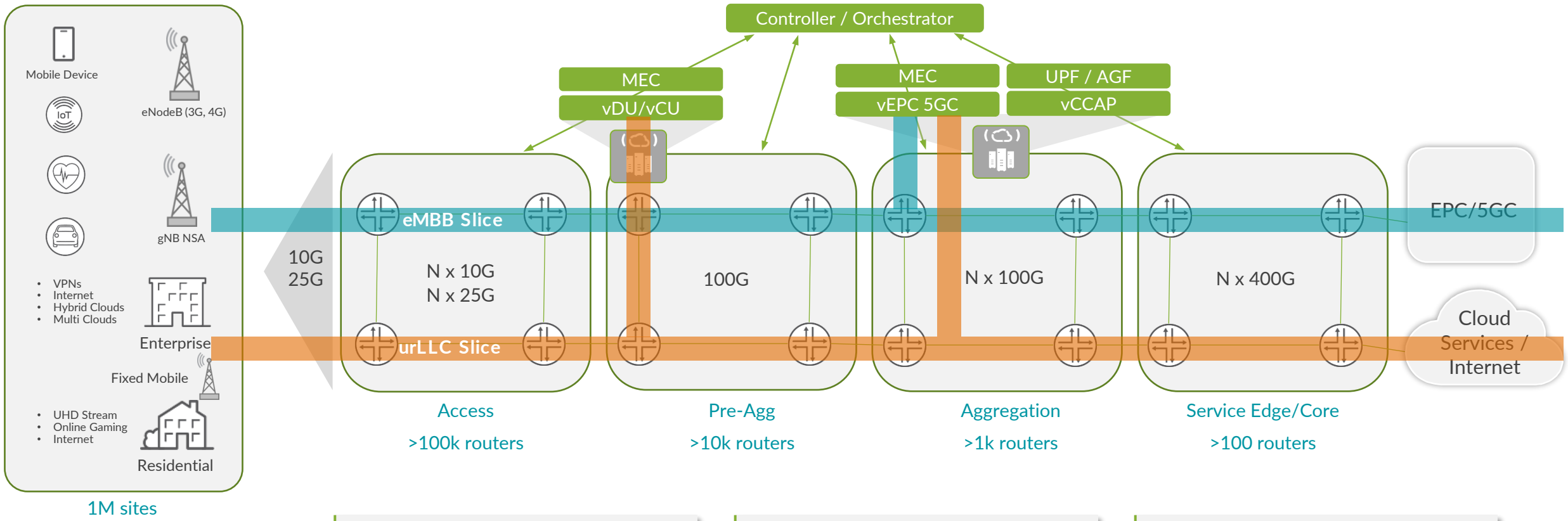
- SRv6 Industry Outlook
- SRv6 implementation experience & challenges



SRv6 Industry Outlook

Network scale for 5G and beyond

Simplification is the key



- Very large transport networks (100k+ routers)
- Inter-domain routing for end-to-end connectivity
- Simplified network resilience
- Service differentiation with Network Slicing
- Seamless integration between WAN and Telco Cloud
- Brown-field network migration

SRv6: What's all the hype about?

Operational Simplicity: Stateless, Programmable, Single data plane

High Availability: Reliable link/node protection with TI-LFA, Load-balancing with flow label

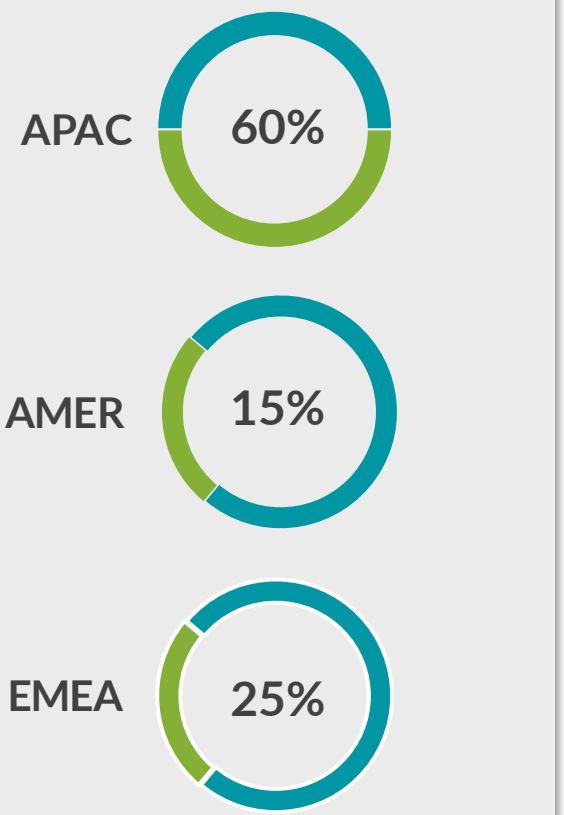
Scalability and Efficiency: IPv6 scale, Locator summarization, Longest Prefix Match (LPM)

Seamless Integration: IPv6 data plane, Non-SRH routers, Leverage 6PE MPLS

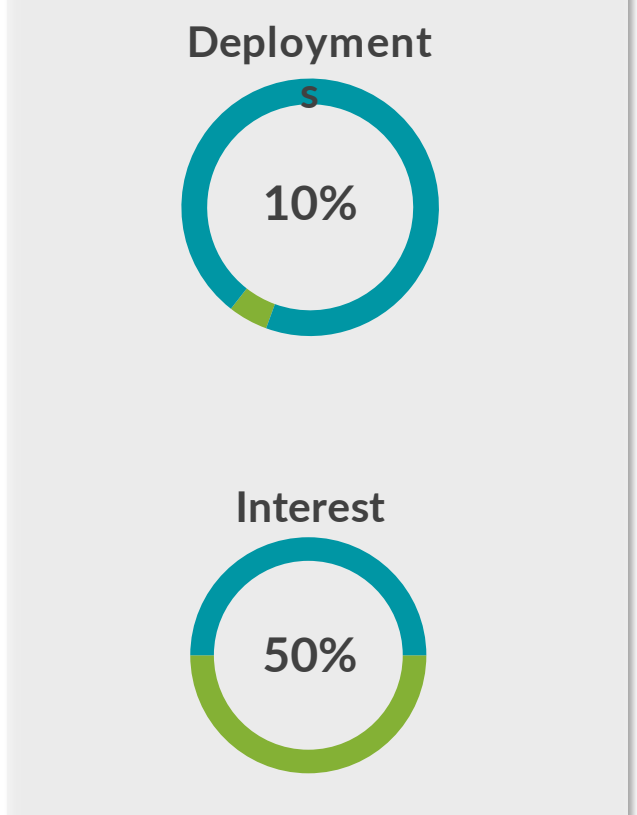
Application-aware routing: Applications can program SRH and define constraints

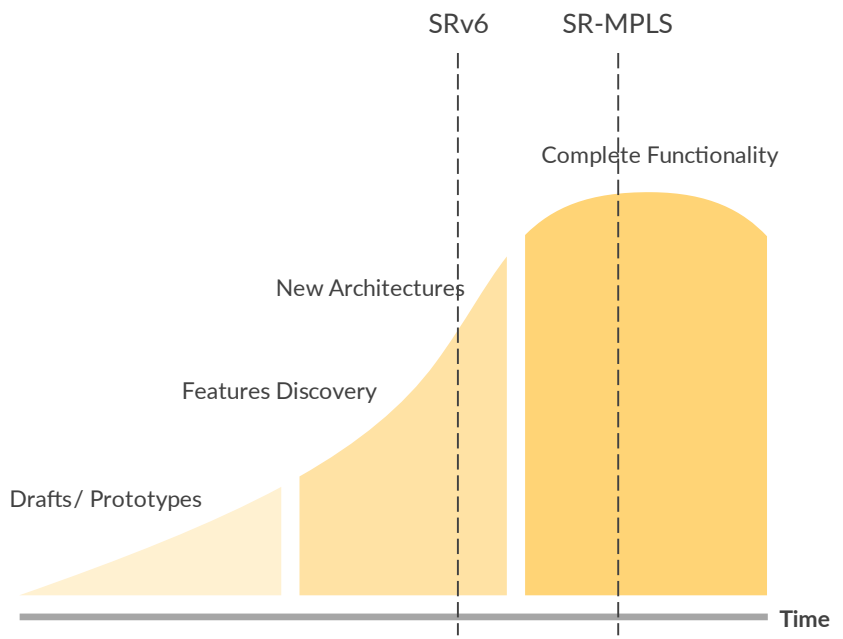
SR-MPLS and SRv6 Adoption

Overall SR deployment



SRv6 vs SR-MPLS





SR-MPLS SRv6

SRv6: Standards & Evolution

Ready to consume

TI-LFA	VPN services	SRv6-MPLS Interworking
Prefix Summarization	SR Policy	
Flexible Algorithm	OAM	

Still cooking

SRH Compression:

Multicast: BIERin6 SR-P2MP BGP-Multicast

SRv6
Implementation experience
&
Challenges

EANTC Multi-vendor Interop

Arista	Cisco	Microchip	ZTE
Arrcus	Huawei	Nokia	
Calnex	**Juniper**	Ribbon	
Ciena	Keysight	Spirent	

2020

EVPN + SR + SRv6 + SDN + Clocking

- TI-LFA over SRv6
- EVPN & L3VPN over SRv6 data plane
- SRv6 TE

2021

2020 + Flex Algo

- SRv6 VPN services
  - EVPN VPWS
  - EVPN Type 5
  - IPv4/IPv6 global routing table
- SRv6 w/ Flex-Algo

2022

2021 + SRv6 Domain interworking

- SRv6 Locator summarization
- Domain interworking:
  - SRv6-MPLS interworking
  - IPVPN over SRv6 & EVPN Type 5 over SR-MPLS
  - EVPN over VXLAN & EVPN over SRv6
- Seamless BFD over IPv6

Juniper participation

2020		2021		2022	
ACX5448-D	QFX10002-72Q	ACX5448-M	PTX10004	ACX5448-M	PTX10001-36MR
cRPD	QFX5110-48S	ACX710	QFX10002-72Q	ACX710	PTX10004
MX204	QFX5120-32C	ACX71000-48L	QFX5110-48S	ACX71000-32C	QFX10002-72Q
Paragon Insights	QFX5120-48Y	MX10008	QFX5120-32C	ACX71000-48L	QFX5110-48S
Paragon Pathfinder		MX204	QFX5120-48Y	MX10008	QFX5120-32C
		MX480-MPC10E	QFX5210-64C	MX204	QFX5120-48Y
		Paragon Insights		MX240-MPC10E	QFX5120-48YM
		Paragon Pathfinder		Paragon Insights	QFX5130-32CD
				Paragon Pathfinder	

XL Axiata: SRv6 RFP Requirements and Juniper Strategy

Challenge

- Multi-vendor, Brown-field network fragmented due to geographical reasons.
- Some of their existing equipment lacked SRv6 capability.
- Ongoing 5G rollout plan and deadlines.

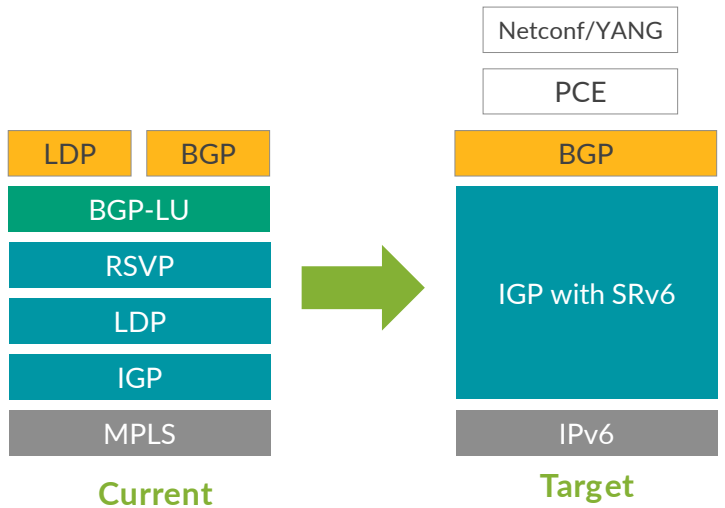
Approach

Pragmatic

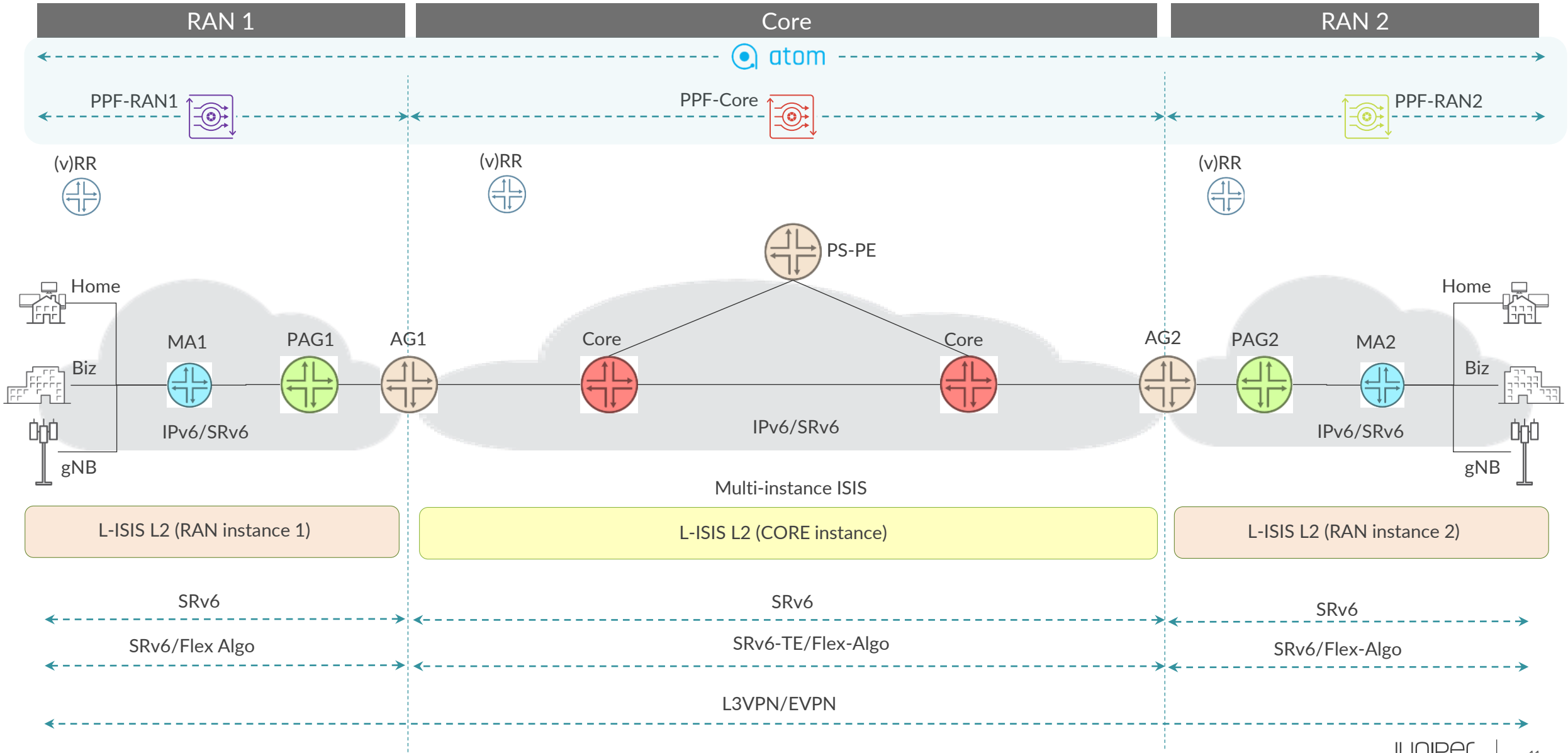
- Leverage existing install base. Co-existence of old and new.
- Dual-stack (IPv6) first, enable SRv6 where possible and interwork with MPLS for service and business continuity
- Focus on the network first, SDN later

Outcomes

- Architecture simplification using SRv6
- SRv6 scales the network for 5G expansion
- Future use-cases: Network slicing, Dynamic traffic engineering



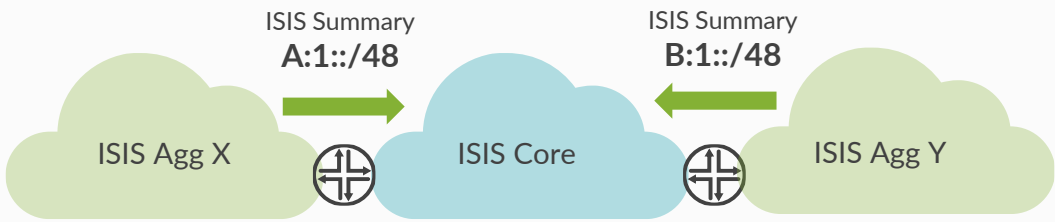
XL Axiata: High-level Transport Architecture



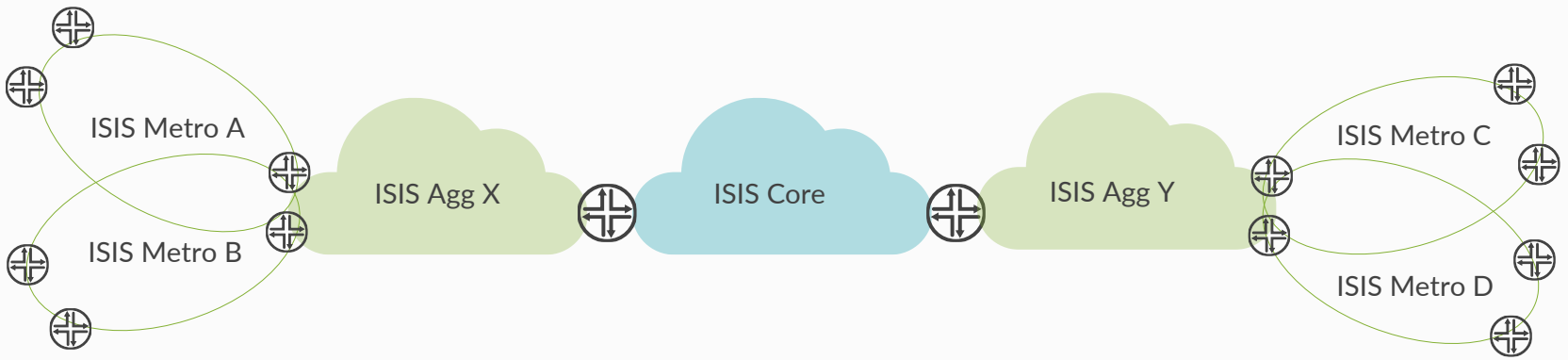
PPF: Paragon Path Finder WAN SDN Controller

XL Axiata: Key architecture enablers

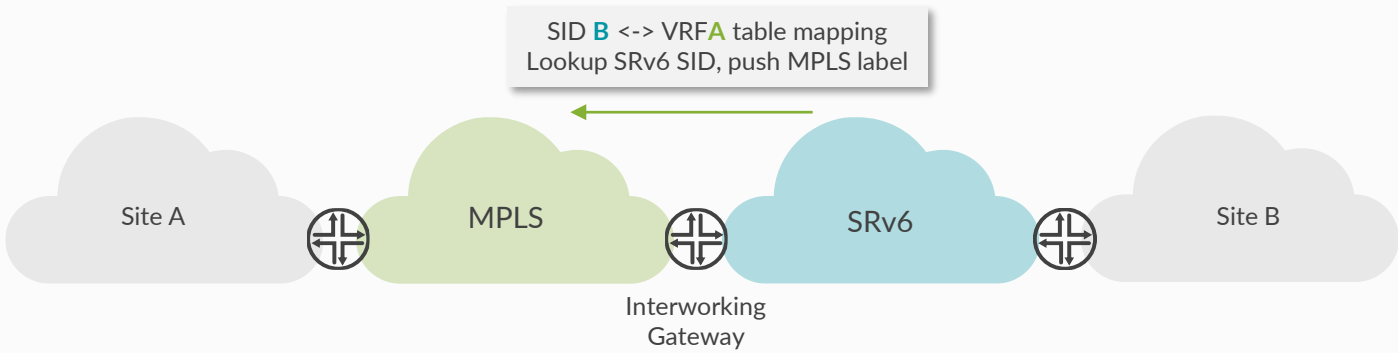
Locator Summarization



Multi-instance ISIS

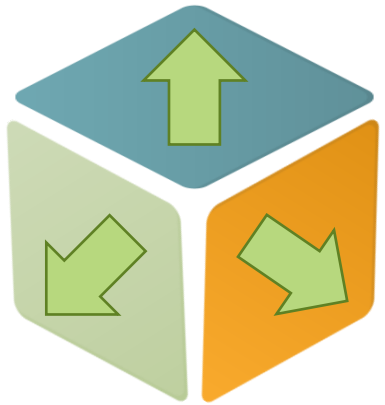


SRv6-MPLS Interworking



Multi Vendor SRv6 IOT

Key *"considerations"* for a successful multi-vendor SRv6 deployment



3 "P" Approach

1 ***Locator Addressing***

- Plan Addressing based on GUA or ULA – Design Pre-requisite
  - Infrastructure (GUA) vs Services (ULA) is a potential option
- SRv6 Locator Block Length – Plan ahead based on the vendor mix
  - Vendor might have preference due to compressed SID
  - Next-C-SID prefers 16, 32 and 48
  - Replace-C-SID prefers 48, 56, 64, 72 and 80

2 ***Services***

- Global Internet, L3VPN and EVPN services over SRv6 transport (SRv6 BGP based Overlay services draft)
  - SRv6 SID Structure sub-sub-TLV
    - Plan, verify and validate the use of sub-sub TLV for L3 services
- SRv6 OAM – Plan for Standardized OAM toolkit which'll work across vendors

3 ***Interworking with MPLS***

- Plan for Seamless Interworking with existing MPLS Transport & Services
  - Co-Existence with MPLS or the use of single IPv6 data plane
  - SRv6 <> MPLS L3VPN Interworking Gateway functionality
  - SRv6 <> MPLS Interdomain Solution

Summary

1 SRv6 Evolution

Standards are evolving fast

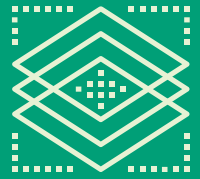
Join the standardization efforts

2 Deployment experience

Inter-op testing is key

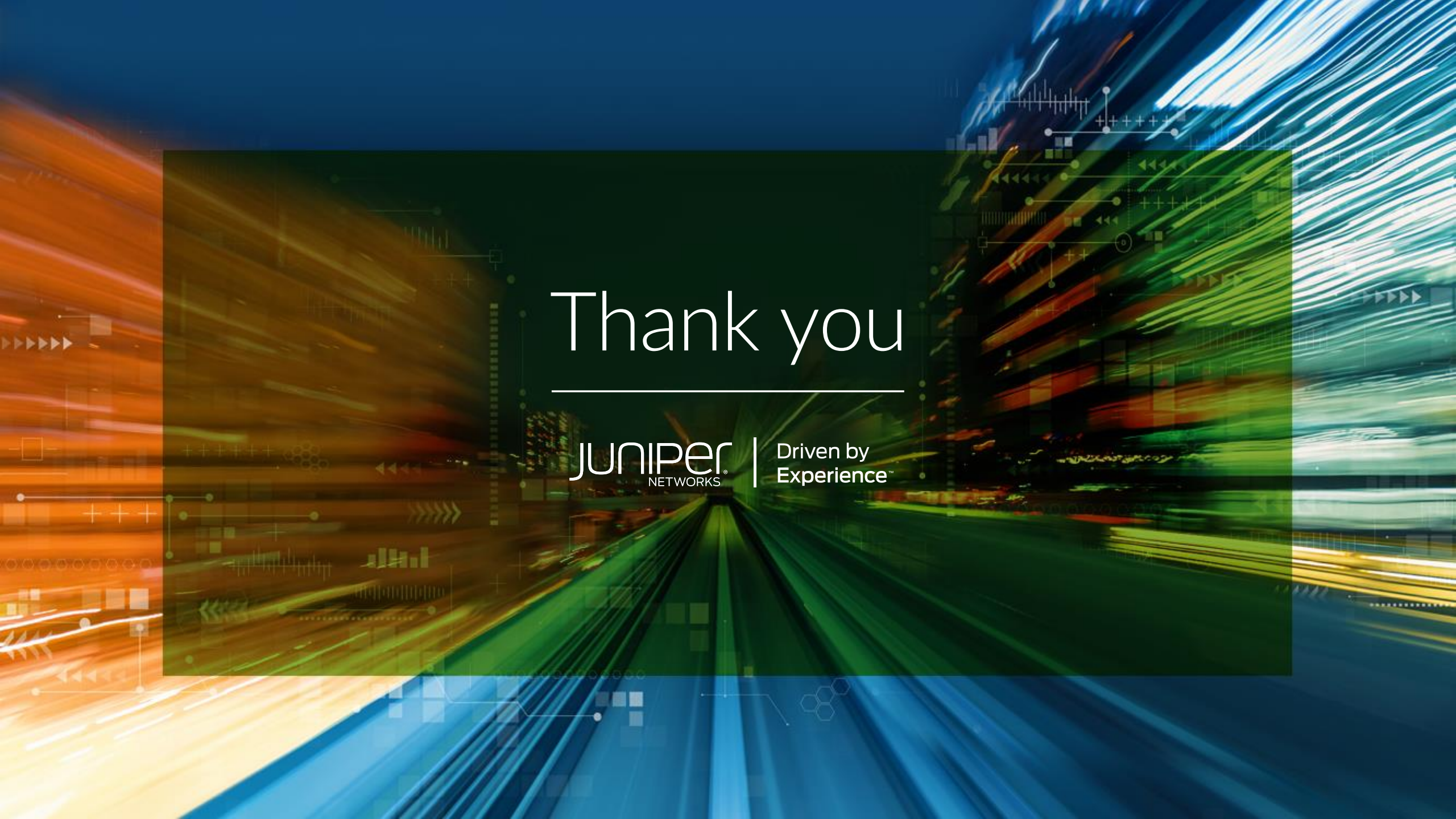
Plan, Test and Validate

3 Future Use-case



NW Slicing, DC and more …

Bring Your Own Use-case


Thank you
JUNIPER NETWORKS
Driven by Experience™