NEBIUS

SRv6 End-to-End DC Frontend and WAN

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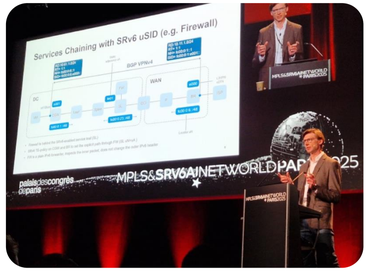
The Nebius SRv6 story

October 2024

First meeting with the Cisco SRv6 team, in Nice. Start designing the solution.

March 2025

Presenting solution at MPLS and SRv6 WC, Paris.



April 2025

SRv6 End-to-End DC Frontend and WAN.

July 2025

Nebius conducts internal SRv6 proof-of-concept testing.

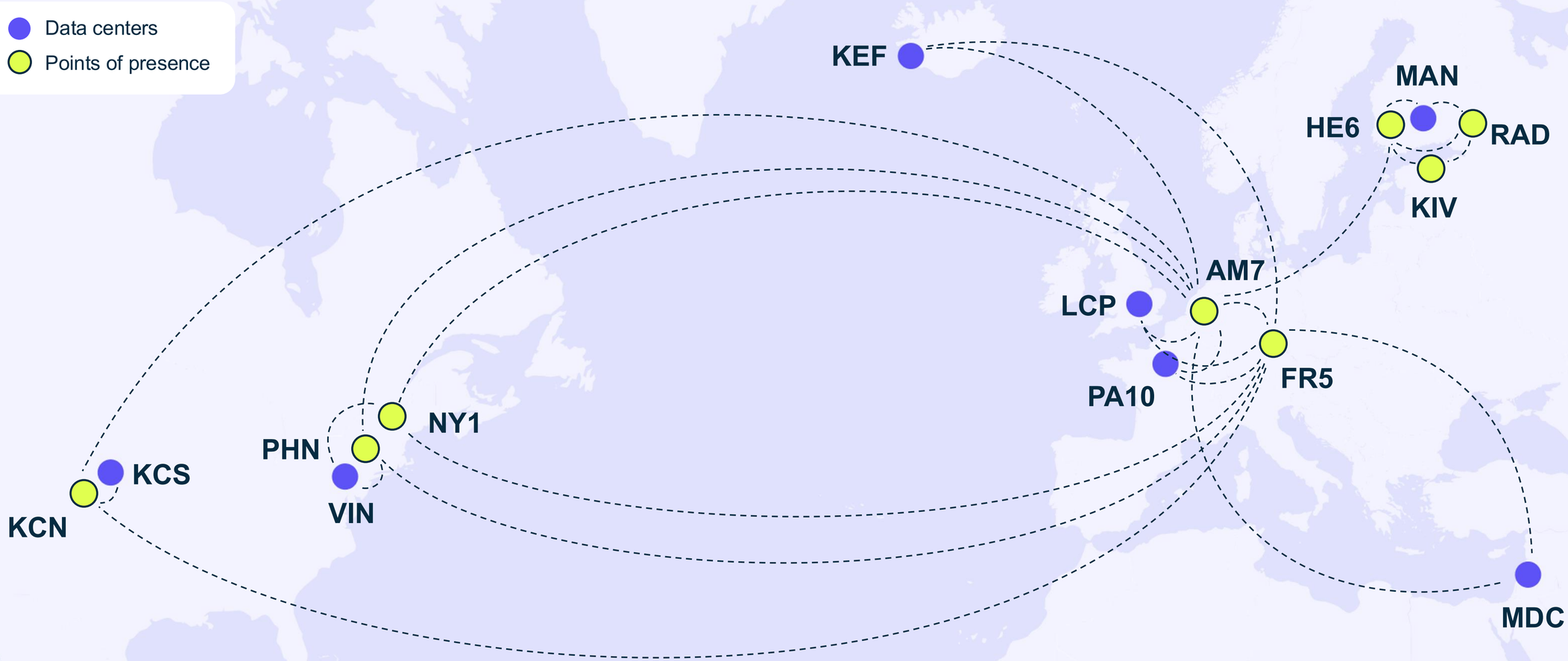
November 2025

SRv6-enabled cloud gateway is developed.

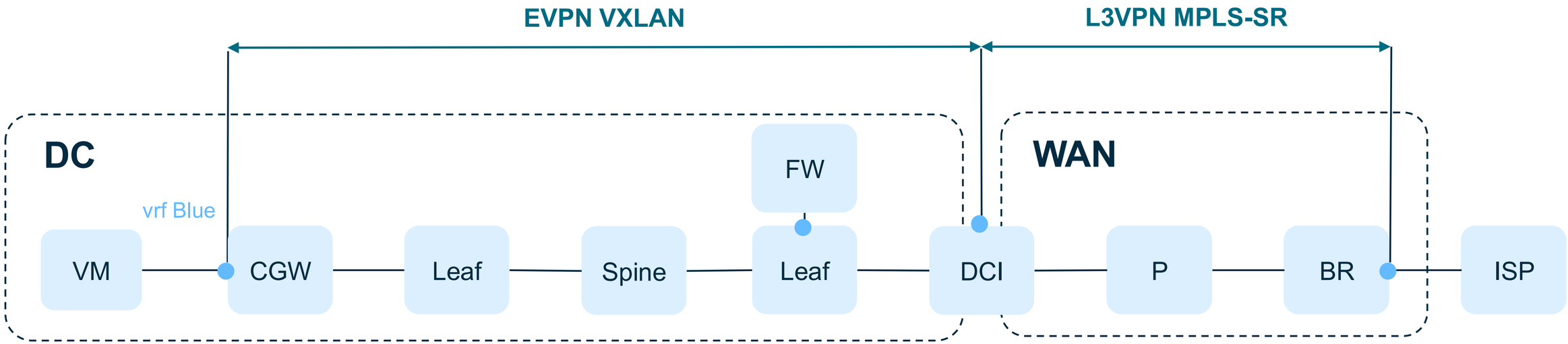
1H2026

Deployment phase

Nebius global network



Current architecture of the frontend network



- IPv6 only infrastructure in the data center.
- Multivendor data center and WAN networks approach.
- Cloud gateway and firewalls are NFVs running on hosts. Nebius develops them.

- VXLAN based overlay between the cloud gateway and DCI.
- DCI does “stitching” between EVPN VXLAN and L3VPN MPLS-SR.

Current architecture: Evaluation

Pros

- VXLAN EVPN has wide industry support and adoption.
- The data center fabric is overlay agnostic, and thus scalable, simple and efficient.
- EVPN provides a rich variety of network services.
- MPLS-SR is a mature technology with good multivendor support. Proven for VPN and TE applications.

Cons

- No traffic engineering capabilities inside the data center.
- Service chaining with VXLAN requires specific routing design (PBR, default gateway, VRF/VLAN hand-off, etc.)
- Majority vendor implementations of VXLAN still require IPv4 loopbacks in the underlay.
- MPLS-SR lacks native data center optimizations and is not applicable in the data center domain.
- Requires “stitching” gateway functionality at the DCI routers to interconnect WAN and data center domains.

SRv6 addresses all of these issues!

Transition to SRv6

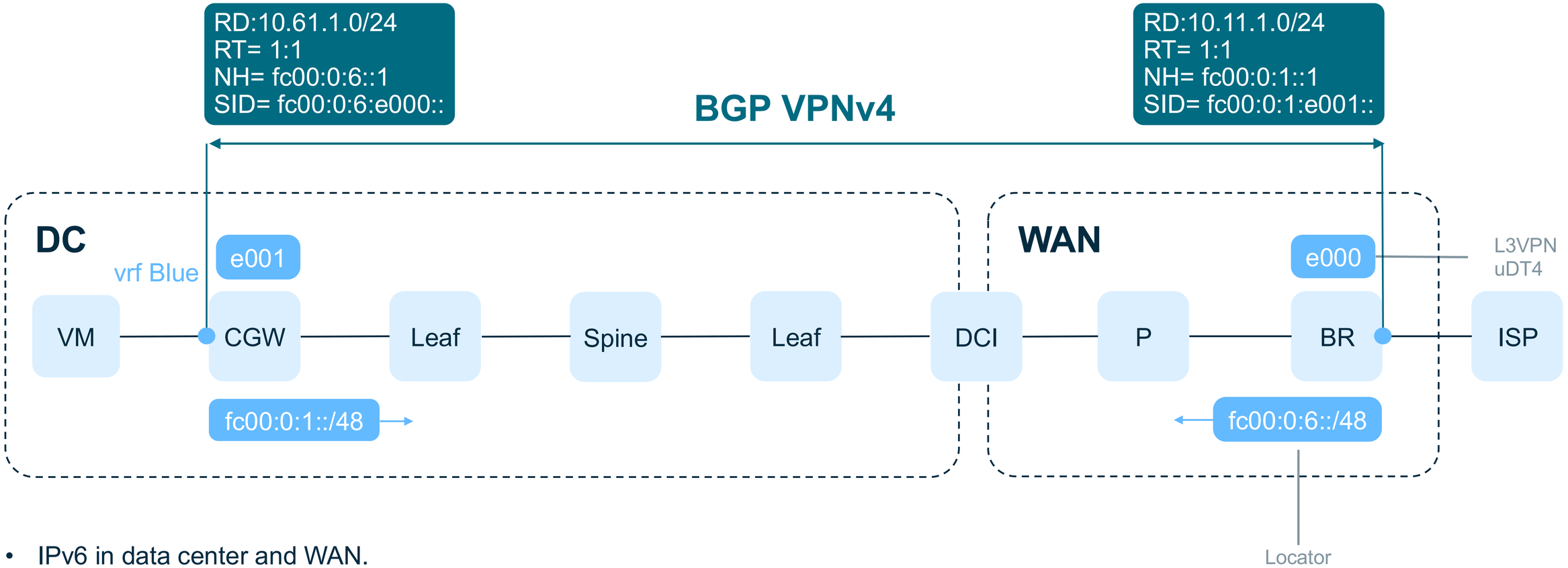
Creates a bridge between the data center and WAN domains, in an efficient and simple way.

Creates a unified data plane, based on the IPv6 protocol only.

Allows building an end-to-end overlay service across data centers and WAN, without stitching functionality on the intermidiate devices.

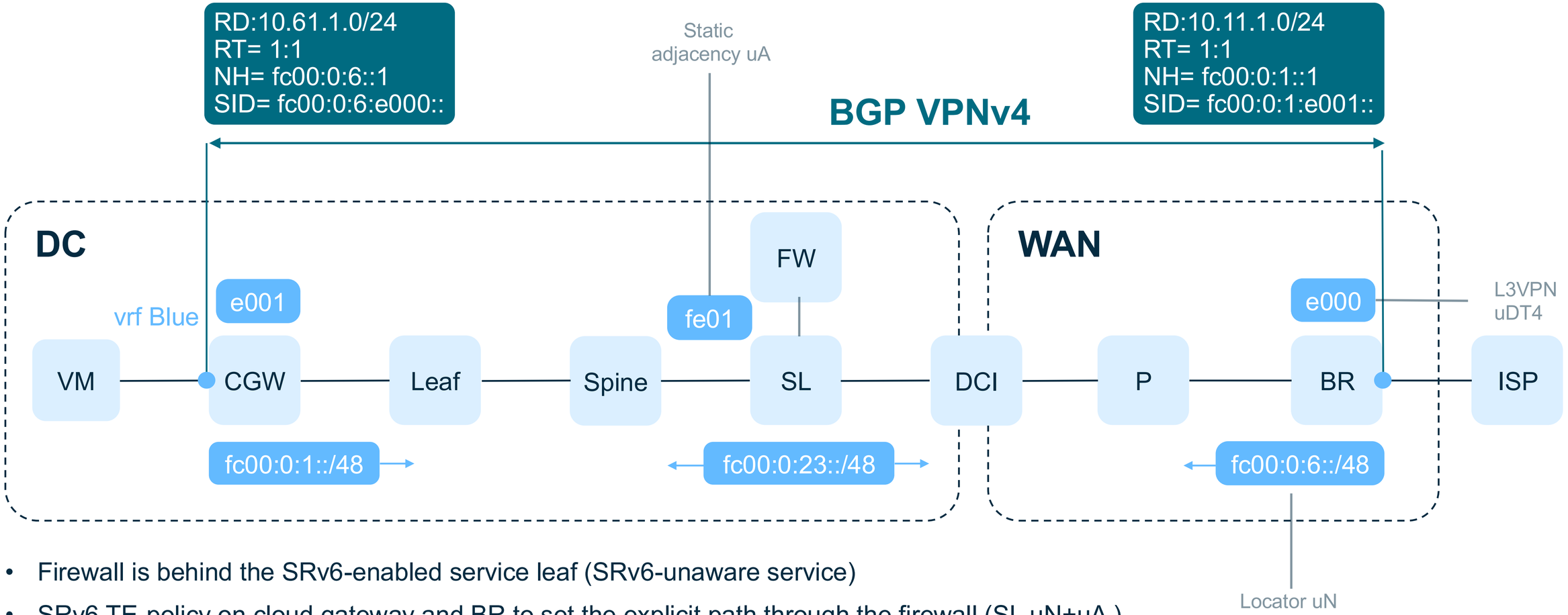
Offers true traffic engineering capabilities initiated from the source of an application, allowing the creation of efficient service chainings.

Overlay with SRv6 uSID



- IPv6 in data center and WAN.
- SRv6 only required on cloud gateway and BR.
- Cloud gateway and BR act as SRv6 L3VPN Pes.

Services chaining with SRv6 uSID (e.g., firewall)



- Firewall is behind the SRv6-enabled service leaf (SRv6-unaware service)
- SRv6 TE-policy on cloud gateway and BR to set the explicit path through the firewall (SL uN+uA).
- The firewall is a plain IPv6 forwarder, inspects the inner packet, does not change the outer IPv6 header
- SRv6-aware firewall – future goal

Deployment and integration experience

Key findings

- Successful SRv6 uSID interoperability was confirmed between Cisco, Juniper platforms
- VPP supports full SRv6 network programming implementation
- ISISv4 with SR-MPLS and ISISv6 with SRv6 extensions in the WAN – dual stack coexistence
- Minimal reconfiguration and impact on legacy infrastructure

Considerations

- RFC8950 compliance
- SRv6 locator attribute set at redistribution point
- No full feature parity for different stitching gateways scenarios (SRv6 to SR-MPLS, VXLAN to SRv6, etc.)
- Using of open-source components require customization and in-house development

SRv6 benefits:
Simplicity and unification

Unified solution across all domains

Operational and configuration simplicity

Gain scalability

Acknowledgements

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Thank you!

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