

Road towards SRv6

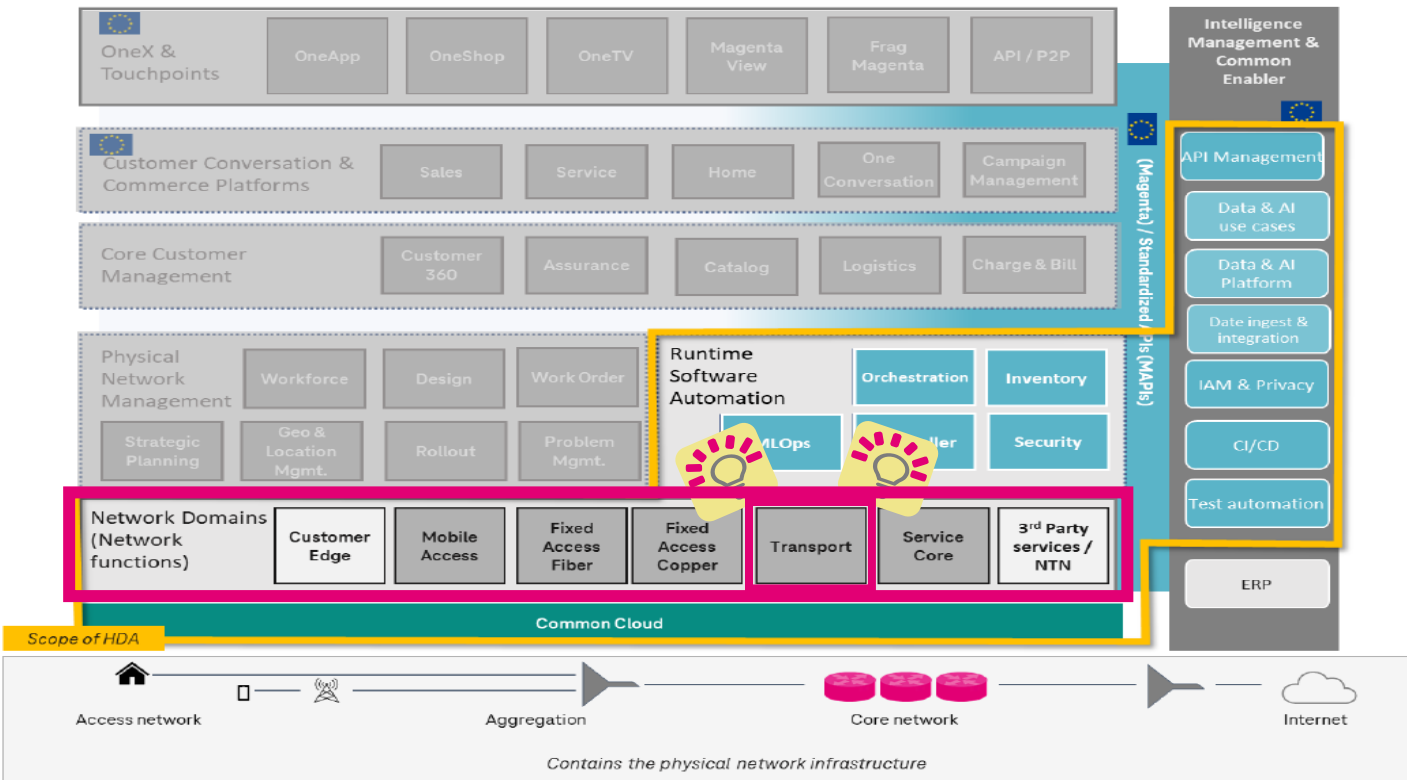
Nicolai Leymann, Senior Network Architect

Deutsche Telekom



Context & Motivation for SRv6

DT STRATEGY: Horizontal Digital Architecture



Why ?

Single and simplified end-to-end IP transport across domain borders

+

Unified Technology and Provisioning. Reduction of transport protocols in Core and Data Centers.

+

Future proof strategy: new feature released only or first for SRv6. In-line with DT's IPv6 strategy.

Why Now?

SRv6 gaining a lot of momentum as new technology for operator networks

Simplification of network management and higher network reliability and performance. Convergence towards single forwarding paradigm (single FIB).

New features only with SRv6 available

Vendors start to prefer SRv6 over MPLS, new features being implemented on SRv6 first (e.g., path tracing). PLE benefits a lot from SRv6 uSID compared to MPLS approach).

Ready for End-to-End deployments

MPLS proven to complex for end-to-end deployments (Seamless MPLS, MPLS-to-the-Data Center). High scalability (e.g. to include 50.000+ edge devices) and seamless integration of access and (virtualized) cloud environments.

Goal is a future proof, stable and highly scalable network architecture.

Supports easy migration/roll-out

SRv6 allows a seamless migration from MPLS based network without any service interruption. Existing services such as L3VPN can be migrated step by step.

Take a holistic approach across all network domains.

Setup

- **Group wide activity to align on SRv6 across DTs European footprint**
 - Addressing, features, standards, ...
- **Architecture blueprint with the intention to develop a harmonized IP transport architecture**
 - Migration mid- to long-term approach, comes with life cycle process of existing network elements
- **Wide variety of different network architectures and topologies**
 - historically grown, every network is different
- **Looking into a cross-domain concept to be able to (seamlessly) interconnect different service providers**
 - Harmonized services across several domains (countries)
 - Also assumes, that we do not need to renumber networks (avoid mistake made with IPv4 and/or RFC1918 addresses)



Observations & Use Cases

Full SID vs. uSID

- Many scenarios will work with full SID, but decision to go with uSID for all networks
- Most of existing deployments are uSID, vendors are also recommending uSID
- Use uSID to be future proof and to avoid migration from full SID



End-to-End SRv6/DC Integration

- Initially started with focus on Backbone deployments
- Extended activities to include data center scenarios



SRv6 as Enabler/Basis for new Network Designs

- (New) Network extensions such as Router Virtualization in Cloud (SDBH) via SRv6 connectivity
- SRv6 as technology of choice for extension



SRv6 as GTP-U Replacement

- Pushed into 3GPP for better convergence/integration into SRv6 network design

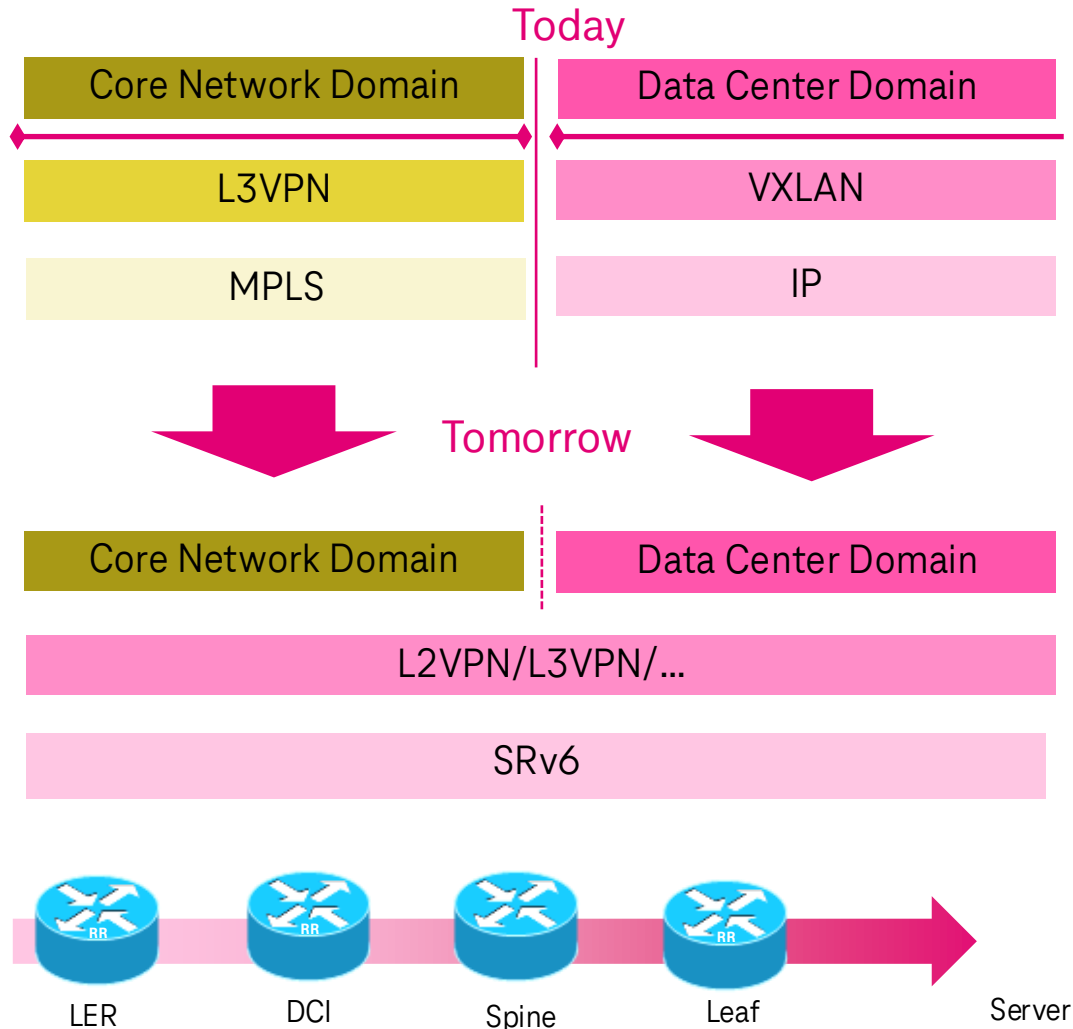
Multivendor/Standards are Key

- Starting point are about 10 Core Networks with different architectures and vendors
- Open Standards (e.g., IETF) and interoperability are mandatory
- Harmonizes feature set across countries/NatCos (at least 99%)

PoCs across different NatCos/Countries

- NGMA - Next Generation Mobile Access
- SDBH – Software Defined Business HUB
- PLE with SRv6 –Private Line Emulation
- Deployment in Poland

Use Case: Datacenter Integration

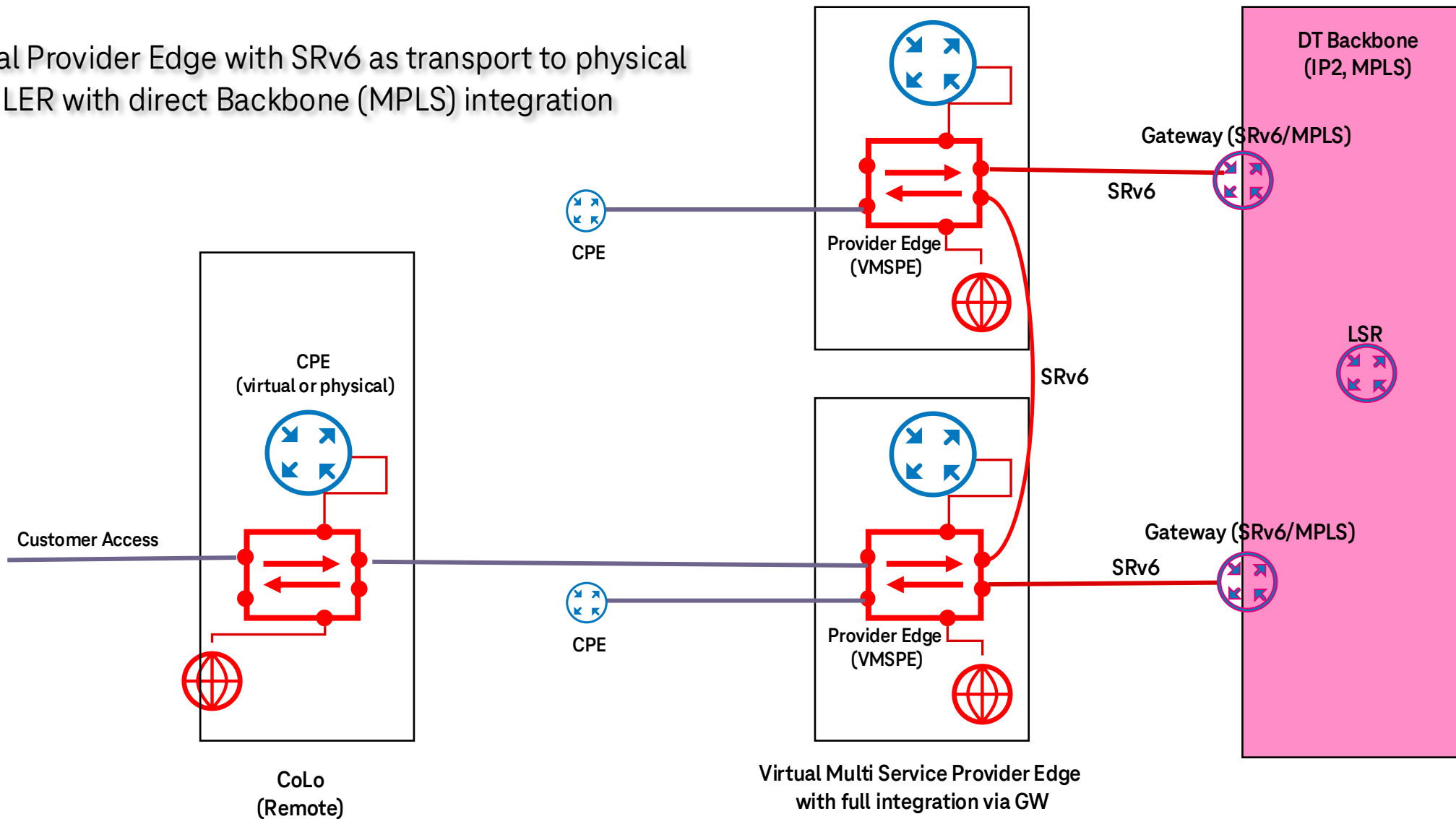


Datacenter Integration with SRv6

- **We need to define “Datacenter Integration”**
- **Different understandings of “Integration”**
 - Underlay?
 - Overlay/Service?
 - Both?
 - Integration of Underlay/Overlay/Services?
- **Simplified deployment**
 - How far do we go with SRv6?
 - Same technologies for all domains + convergence towards single protocol (SRv6)
 - Role of DCI, Spine & ”LER” in End-to-End Scenarios

Extending the Network

Virtual Provider Edge with SRv6 as transport to physical LER with direct Backbone (MPLS) integration



Summary

Harmonized Strategy

Convergence on a single forwarding paradigm.

Well defined standards and interoperable implementations.

SRv6 already in deployment.

- SRv6 as key technology for evolution of all networks across DT group
 - Future proof, extremely flexible and feature rich – simplifying today's network architectures
-
- Common forwarding and control plane across network domains (including DC, Access/Aggregation and Backbone, Mobile/Fixed Backhaul).
 - Simplification due to removal of network protocols (LDP, NSH, ...).
-
- SRv6 base standards are available as RFCs. Work on extensions like Header Compression and uSID has a lot of momentum.
 - Large number of interoperable implementations including Open Source.
-
- Evolution from existing MPLS based networks. Ideal migration concept as mixture of SR- and non-SR-capable routers possible.
 - SRv6 as driver for 5G networks (e.g., Network Slicing).
 - Several large deployments.