



SRv6 Deployment

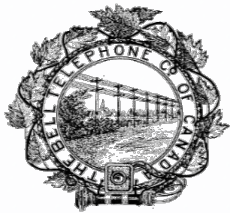
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Bell has been connecting Canadians since 1880



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Bell Domains and services



Bell Network 3.0 is a journey to...

Transform how Bell delivers the best customer experience with seamless access to a software-driven, cloud-based ecosystem

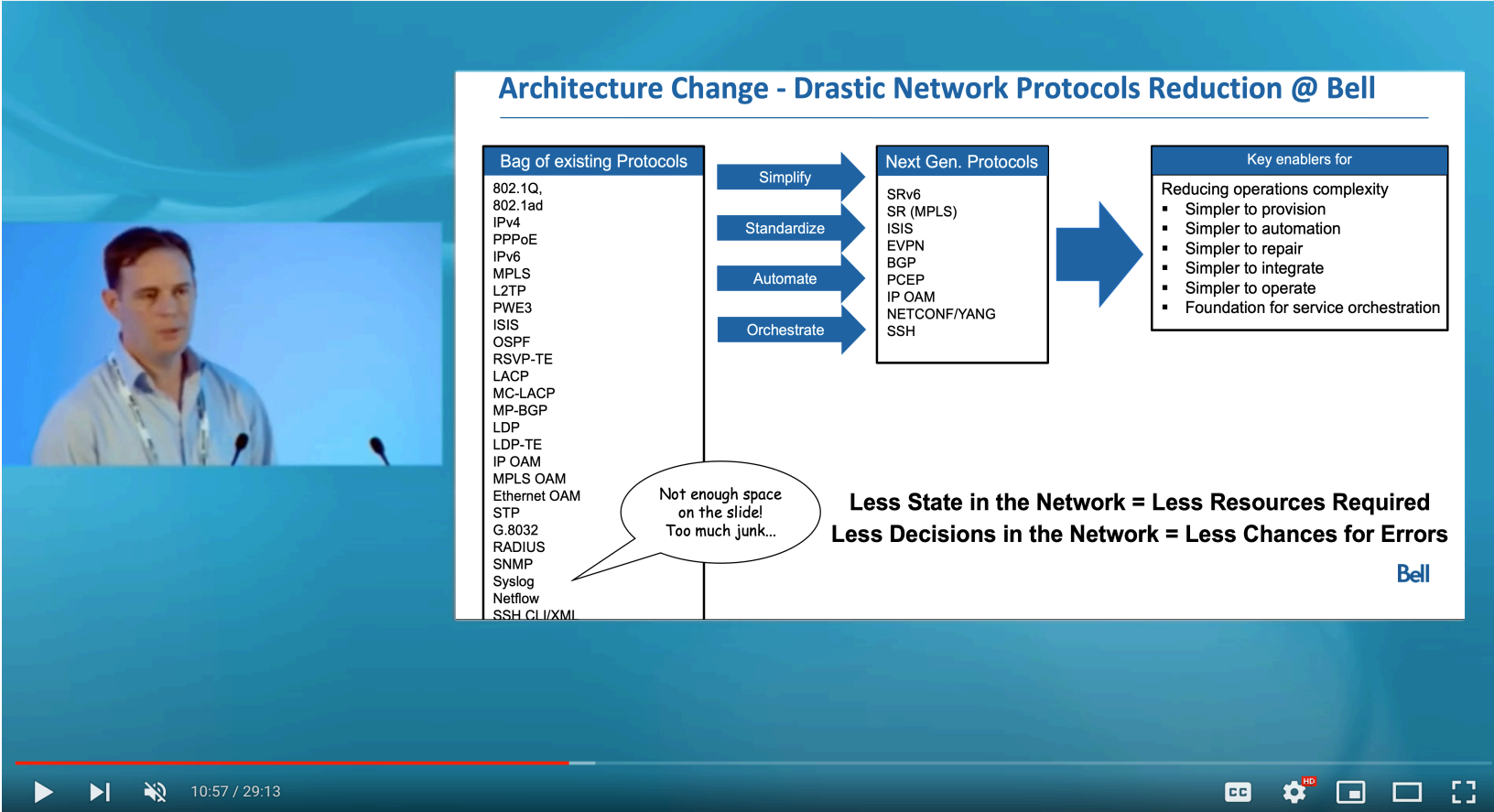


Bell deployed one of the first SR-MPLS networks

- One of the first SR-MPLS deployments
- Deployment went very well (positive tone) TI-LFA was the first benefits collected
- But then why shifting to SRv6 so quickly?
- Answer: “the power of SRv6 uSID’s”.
- Let’s review this

Unified End-to-End SRv6 uSID Dataplane

- Remove the complexity of getting MPLS to the host/socket/container
- Remove SR-MPLS/LDP /SRv6 GW at the DC & Network edge
- Simplification



Architecture Change - Drastic Network Protocols Reduction @ Bell

Bag of existing Protocols	Transformations	Next Gen. Protocols	Key enablers for
802.1Q, 802.1ad IPv4 PPPoE IPv6 MPLS L2TP PWE3 ISIS OSPF RSVP-TE LACP MC-LACP MP-BGP LDP LDP-TE IP OAM MPLS OAM Ethernet OAM STP G.8032 RADIUS SNMP Syslog Netflow SSH CLI/XML	Simplify Standardize Automate Orchestrate	SRv6 SR (MPLS) ISIS EVPN BGP PCEP IP OAM NETCONF/YANG SSH	Reducing operations complexity <ul style="list-style-type: none">▪ Simpler to provision▪ Simpler to automation▪ Simpler to repair▪ Simpler to integrate▪ Simpler to operate▪ Foundation for service orchestration

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Too much junk...

Less State in the Network = Less Resources Required
Less Decisions in the Network = Less Chances for Errors

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Economical gains

- Summary of the gains from Dan B's session
- + other OPEX gains,
- Not having MPLS
- Not having BGP3107 – simpler interconnect
- Not having vXLAN/MPLS gateways
- Having summarization

Reduce carrier network services costs by up to 90%
footprint by 75%
power consumption by as much as 66%



Daniel Bernier
Technical Director, Bell Canada



Jesper Eriksson,
VP Product Management, NoviFlow inc

Routing Scale

	SRv6 uSID	MPLS
Unique Nodes in the SR domain	15M-240M	0.8M
Unique Services per node	512k	0.2M
ISIS Summarization	Yes	No
BGP3107 complexity tax to scale ISIS Host Routes	No	Yes

- Available functionalities: 256 blocks (/32's). For each block, we have 16 bits space for uSID ID's. 8k are reserved for the LIB, 57k for GIB.
 - 256*57k Global ID = 15M Global ID. In the future we could go up to 4096 blocks
- If more than 8k for LIB, then 8 Wide-LIB spaces could be added for a total of $8*64K = 512k$ services
- More information on segment-routing.net

HW Scale

	SRv6 uSID	MPLS
Linerate steering into SR Policy of N SID's	N=26	N=~12
Number of counters associated to a remote ISIS node	1	4
Number of dataplane entries associated to remote ISIS node	1	4

- Blog: <https://www.segment-routing.net/demos/26-usid-push-linerate/> with NCS5700 – Jericho2
- 1 vs 4: ip2ip, ip2mpls, mpls2ip, mpls2mpls

Other Benefits

	SRv6 uSID	MPLS
SR Domain Security	Same	Same
Optimal Load balancing	yes	no

SRv6: 20-bit rich flow entropy at fixed offset within outer IPv6 header (Flow Label)

MPLS: DPI to random location without guaranteed outcome:

- label stack walk to inner IP header fields
- label stack to Entropy Label (plus additional label stack overhead and PE complexity)

A few notes on our deployment

- We deploy SRv6 uSID with a negligible sub-space of FD/8
 - 0.0015% of FD/8 private space ($/24$ out of $/8 = 2^{(-16)}$)
- We will report our SRv6 uSID Interoperability study in Spring 2022
 - Arrcus, Cisco, FD.IO, Intel, Nokia, Noviflow, Linux

Thank You