

# Service/Application Aware Networking

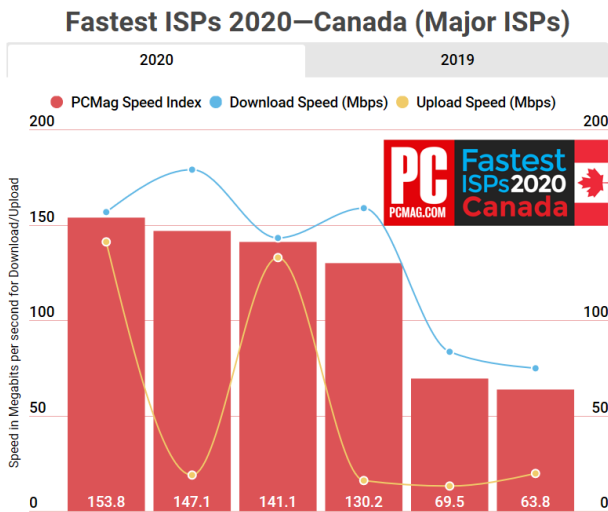
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IETF 108



# Background

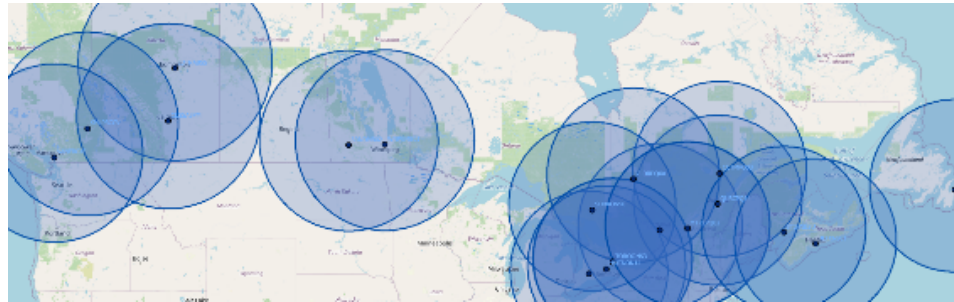
- Factors Influencing the need for tight coupling between applications and underlying network

## QoE for Broadband Services



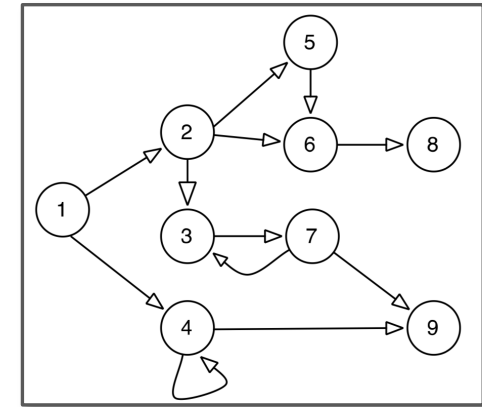
- Cloud Gaming Performance
- E2E Latency
- Speed

## Decentralization and Edge Computing



- Distributed processing to support tighter latencies (AR/VR, URLLC, etc.)
- Data localization / Peering / Caching
- ...

## Non-Linear Traffic Patterns

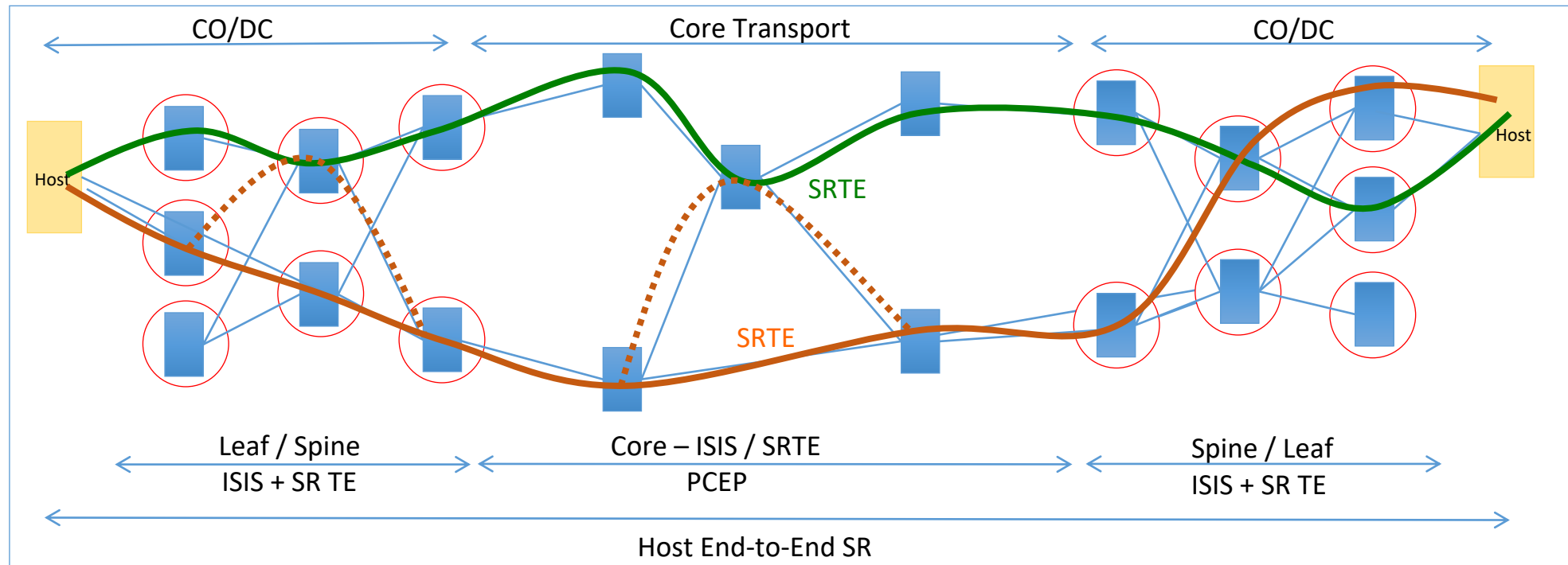


- Evolution towards fine grained application policies (SD-WAN)
- Mobility / IoT GiLAN
- Fixed Mobile Convergence

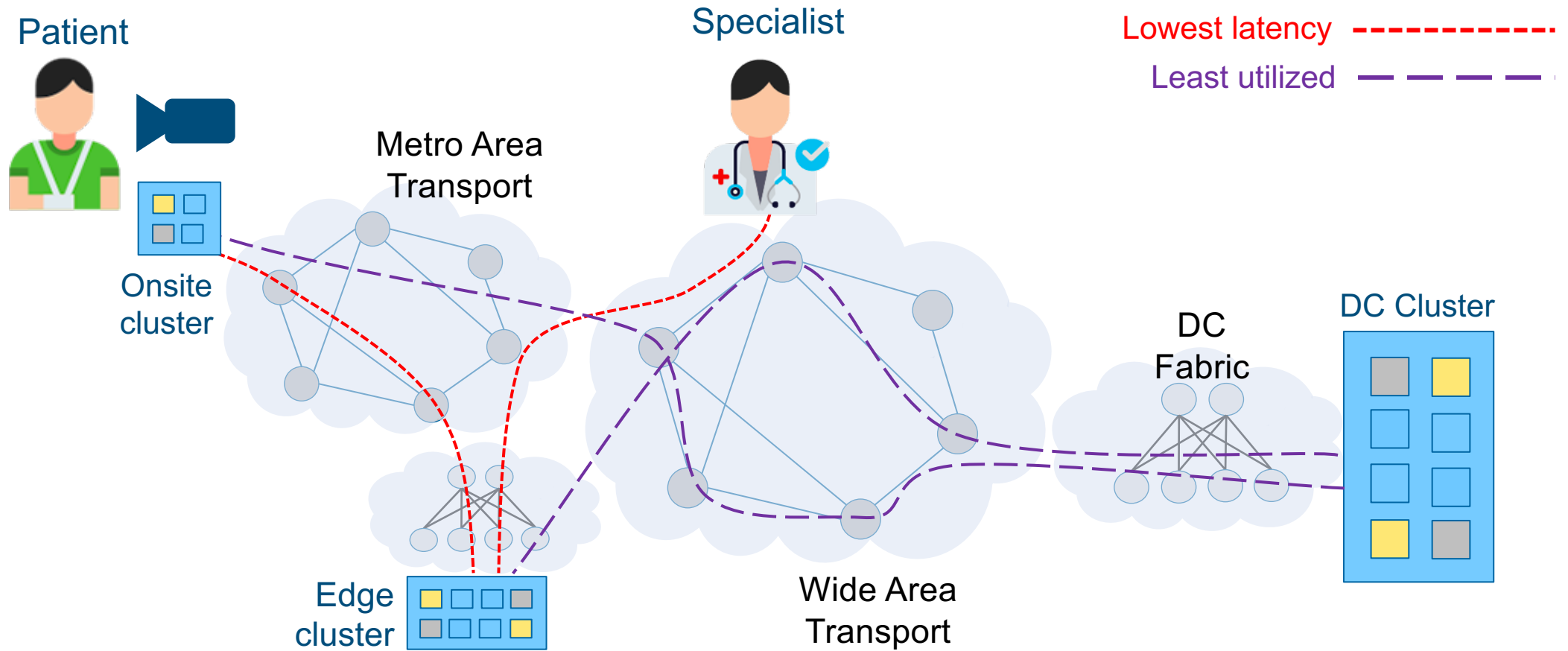
... not Forgetting Support for Exponential BW Growth and Network Simplification

# Next Evolution in Network Simplification

- Unified Forwarding Plane between across CORE, CO/DCs and Edge
- Flatten protocol stack through SRv6/uSID
- Leverage SRTE, TI-LFA for optimized routing/recovery
- Extend SR to the host (hypervisor, kernel, VNF) → Moving the Edge Further
- Leverage *Network Programming* to enhance network behaviours



# For Example

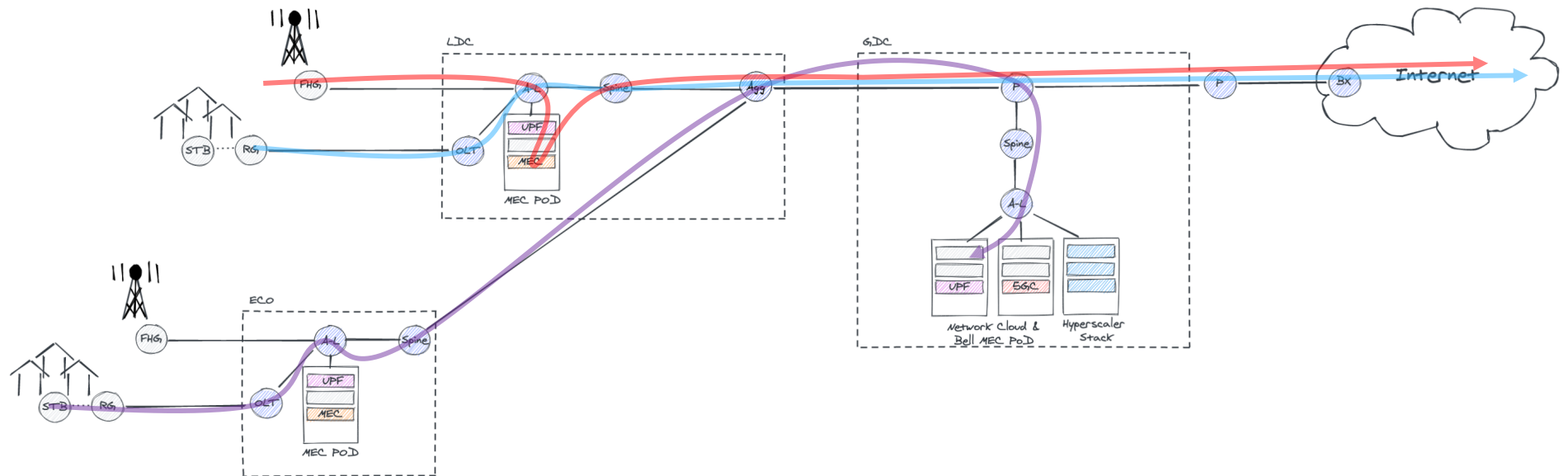


# Towards an End Result

- Make the underlay **stateless**
  - Avoid tunnels and « decap/encap » middle boxes
- **Distribute** function processing
  - Push state to the edges
  - 100s instances of a function scales better than a few big ones
- **Abstract** complexity of network constructs through policies
  - App owners do not need to know the subtleties of the network.
- Service chains are now a more specialized set of segments in a **Network Policy**

**Network Policies** are made of

- Service Functions
- TE Behaviors
- ... SRv6 END functions



# Our Challenge on Path Awareness

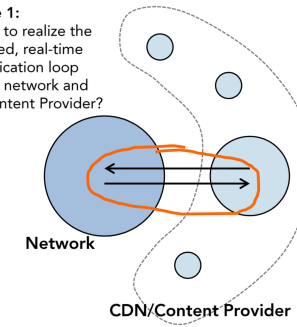
- We Are Getting Good At Telling the Edge How to Talk with the Network
  - From BGP extended communities to Binding SID and PvdDs.
  - From SRTE in the control-plane to configuration via management plane (NC/gRPC).
- There is also progress on how to exchange network behaviors between providers
  - Use of ALTO to exchange network capabilities and requirements (<https://telecominfraproject.facebook.com/notes/tip-greenfield-networks-app-aware-networking/application-aware-networking-a-first-step-towards-intent-based-networking/1941364519455351/>)

How about a "Path Awareness" Intent ?

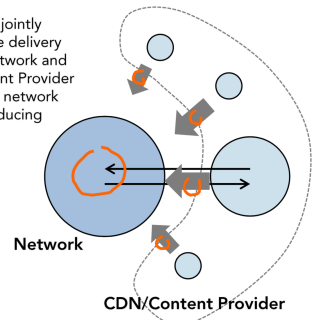
- There is a need for a simple mechanism to ask (express) a network path based on need.
- We need to **abstract network complexity** from the app owners ... and make it automated.
  - Developer Centric
  - Abstract the network plumbing details

## Use cases description:

**Use case 1:**  
We want to realize the automated, real-time communication loop between network and CDN/Content Provider?



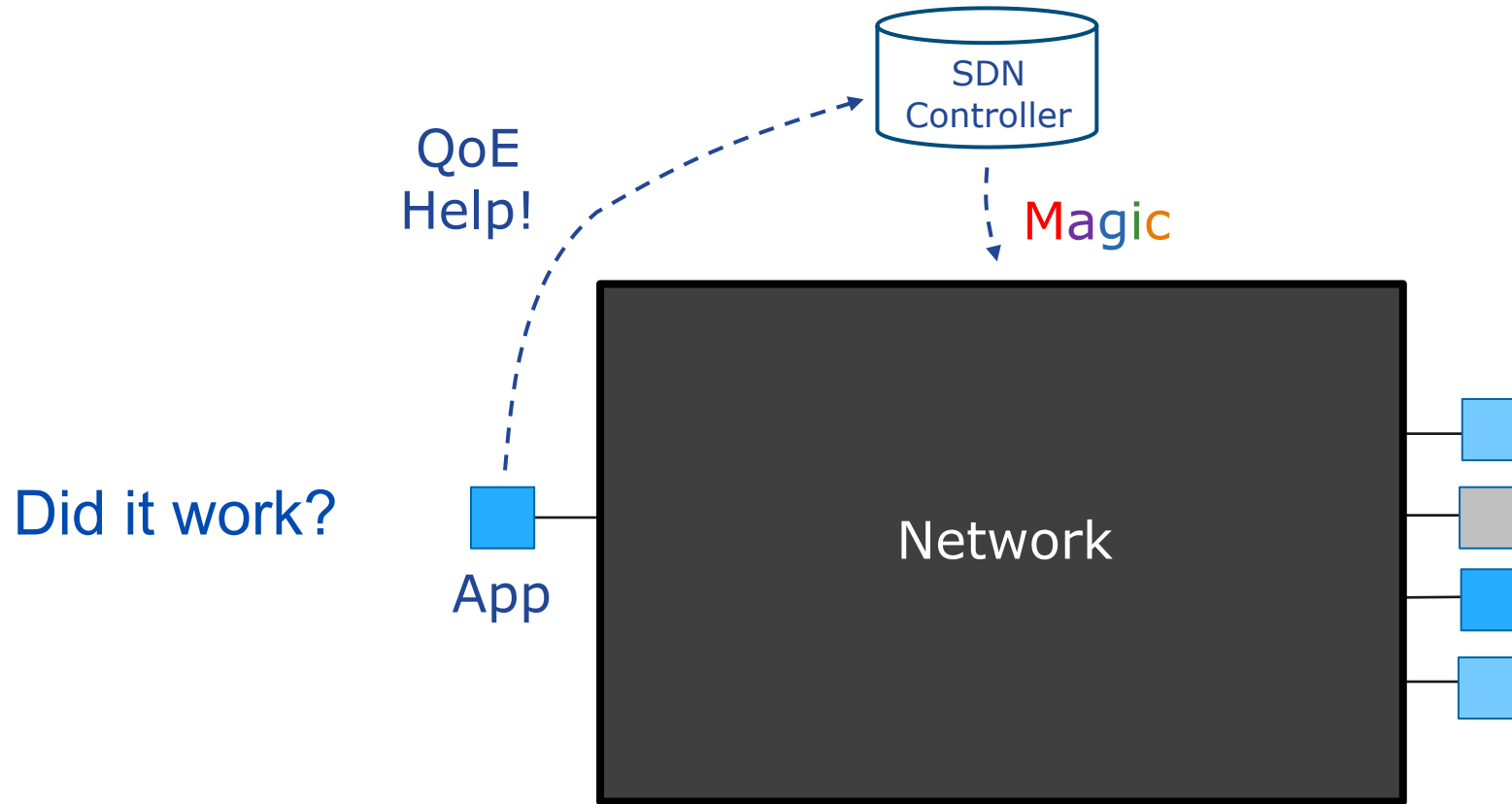
**Use case 2:**  
We want to jointly optimize the delivery between network and CDN/Content Provider – improving network load and reducing latencies.



# SDN Traffic Engineering Problem Statement

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This is a network diagram from the application's perspective



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Thank You