SRv6 in Verizon

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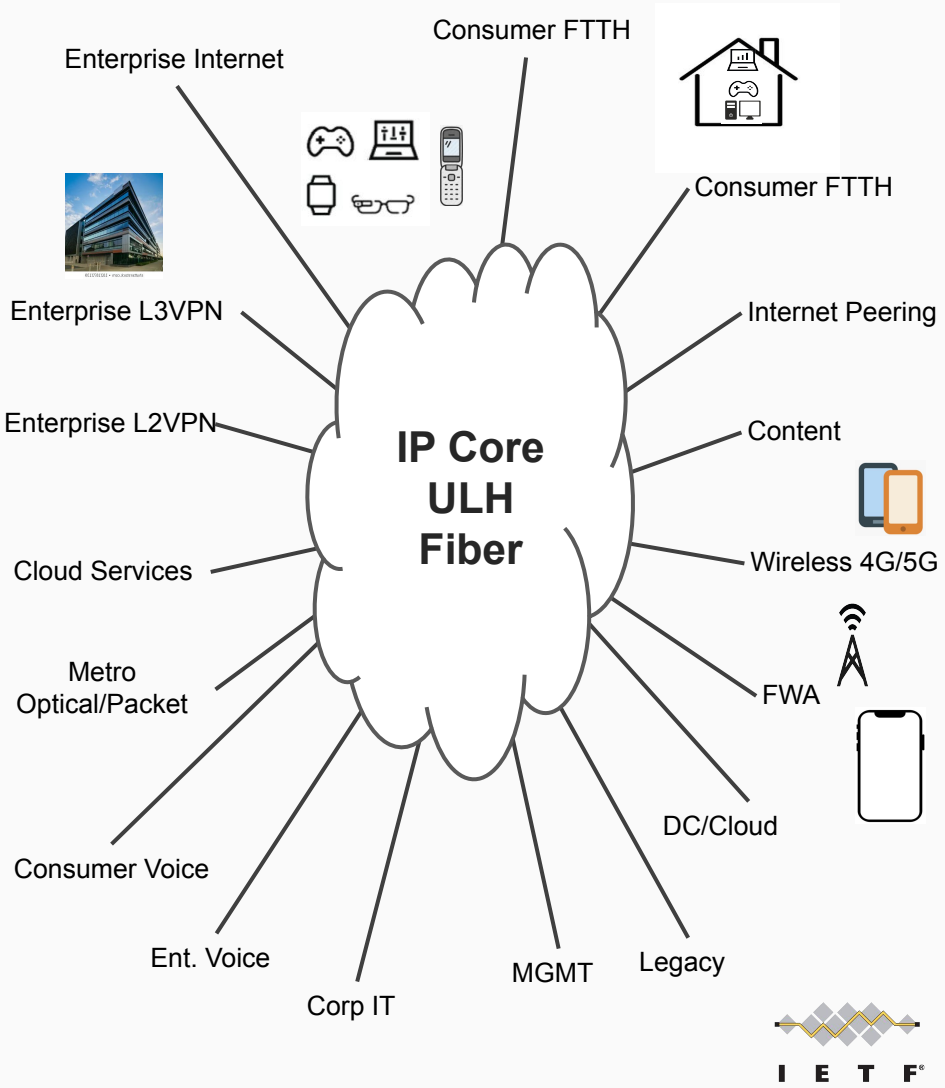
Verizon Networks

- **Verizon comprises numerous large and small networks, each with its own administrative domain**
- **These networks are interconnected to deliver a cohesive service offering that meets customer expectations**
- **Utilizes various traffic engineering protocols, including RSVP-TE, SR-MPLS, and SRv6, to manage its network traffic**
- **Caters to consumers, businesses, and government entities, handling both wireless and wireline traffic across a vast range of services**



Motivation

- **Support Current Applications:** Design architecture to meet Verizon's directional requirements, accommodating different Network Functions (xNF), Software Defined Networking (SDN), and general virtualization needs
- **Consolidate and Reduce Footprint:** Consolidate network equipment to minimize the physical footprint
- **Enhance and Simplify Routing:** Simplify routing architectures to improve efficiency and manageability
- **Application-Aware Routing:** Prepare the network for application-aware routing to optimize performance
- **Improve Service Velocity:** Enhance the speed at which services can be deployed and managed
- **Centralized Controller:** Implement support for a centralized controller that can steer traffic based on multiple variables
- **Optimize Edge Routing:** Optimize edge routing for deterministic flows towards the internet
- **Simplify Protocols:** Reduce the number of protocols to create a simpler, yet configurable, network

SRv6 Overview

- The SRv6 architecture should be capable of meeting the network requirements for all Verizon location types, including:
  - Wireless
  - Data Centers
  - Verizon Cloud Platform
  - FIOS
  - Wireless MSC
  - xRAN
  - Hub
  - Regional Hub
  - International sites

Why SRv6?

- **Simplified Protocol Stack:** Uses IP only, eliminating the need for MPLS
- **Advanced Traffic Engineering:** Enables traffic steering from node to node based on business rules and constraints
- **Seamless End-to-End Connectivity:** Provides consistent connectivity using SR, eliminating the need to change packet encapsulation across different domains
- **Reduce the need for RSVP-TE Tunnels:** Removes the necessity for RSVP-TE tunnels in WAN environments
- **Comprehensive Support:** Facilitates traffic engineering both within the fabric and across the WAN
- **Alignment with Slicing Models:** Matches Verizon and industry network slicing models
- **Selective Device Support:** Only requires network devices to support IPv6 routing, not necessarily SRv6
- **Linux OS Compatibility:** Supported by Linux OS, unlike SR-MPLS
- **Extensibility:** Offers significant extensibility with the Segment Routing Header (SRH)
- **Integrated Compute:** Allows for the integration of compute into the SR domain, providing a unified end-to-end IP transport protocol

Requirements

- **Seamless Transition:** Enable a smooth transition from current technologies such as RSVP-TE and SR-MPLS
    - **Interoperability:** Ensures a smooth evolution without the need for a complete forklift of existing infrastructure
- **Functionality:** Maintain the same capabilities while offering a flexible and scalable network architecture based on directional technologies
- **Multi-scale Architecture:** Design networks that are "right-sized" to meet various demands efficiently
- **Resilience:** Develop a highly resilient architecture to enhance network reliability
- **Open Standards/Open APIs:** Adopt open standards and APIs to foster innovation and integration
- **Risk Mitigation:** Implement measures to mitigate potential risks
- **Security**: Enhance network security to protect against threats
- **Failure Domain Reduction**: Minimize the size of failure domains to enhance network stability
- **Cost Efficiency**: Focus on driving down the cost per bit to optimize operational expenses


verizon