SRv6 SFC Architecture with SR-aware Functions

draft-watal-spring-srv6-sfc-sr-aware-functions-01

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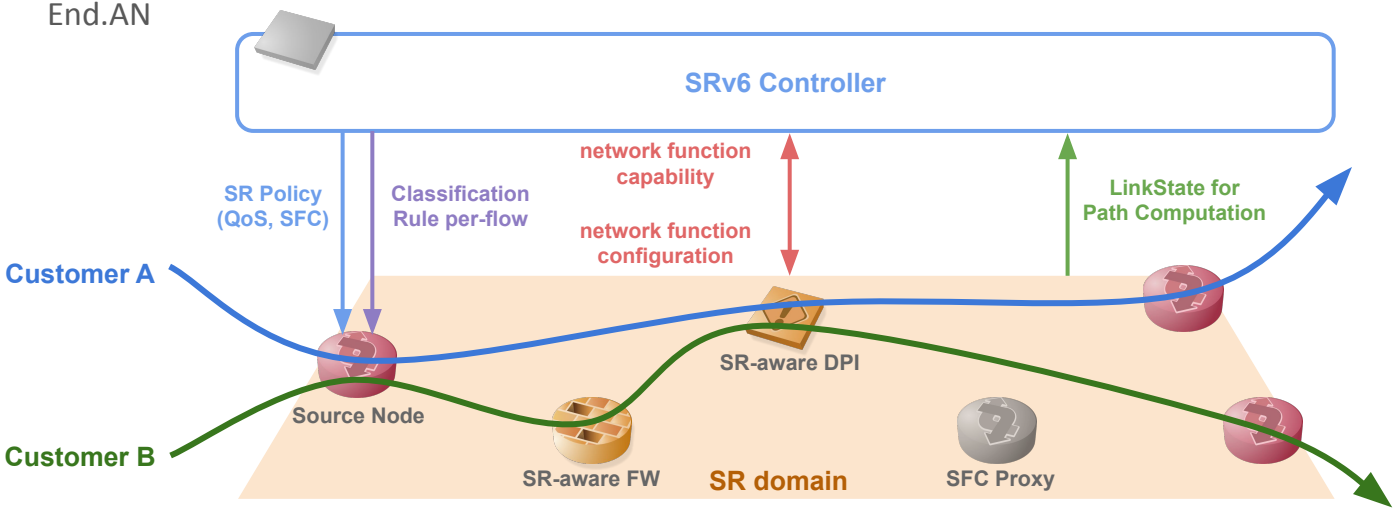
Background

- **SRv6 SFC (Service Function Chaining) realizes traffic steering through various ordered sets of network functions within the SRv6 network.**
  - e.g. FW, IPS/IDS, NAT, DPI, etc.
- **In the current SRv6, SFC proxies like End.AS/AD/AM are necessary to apply network functions.**
- **There are several protocols that have been standardized to manage SRv6 network.**
  - **SR Policy management**: PCEP (RFC 5440), BGP SR Policy (*draft-ietf-idr-segment-routing-te-policy*)
  - **Classification policy management**: BGP Flowspec (*draft-ietf-idr-ts-flowspec-srv6-policy*)
  - **Network function advertisement**: BGP-LS Service Segment (*draft-ietf-idr-bgp-ls-sr-service-segments*)

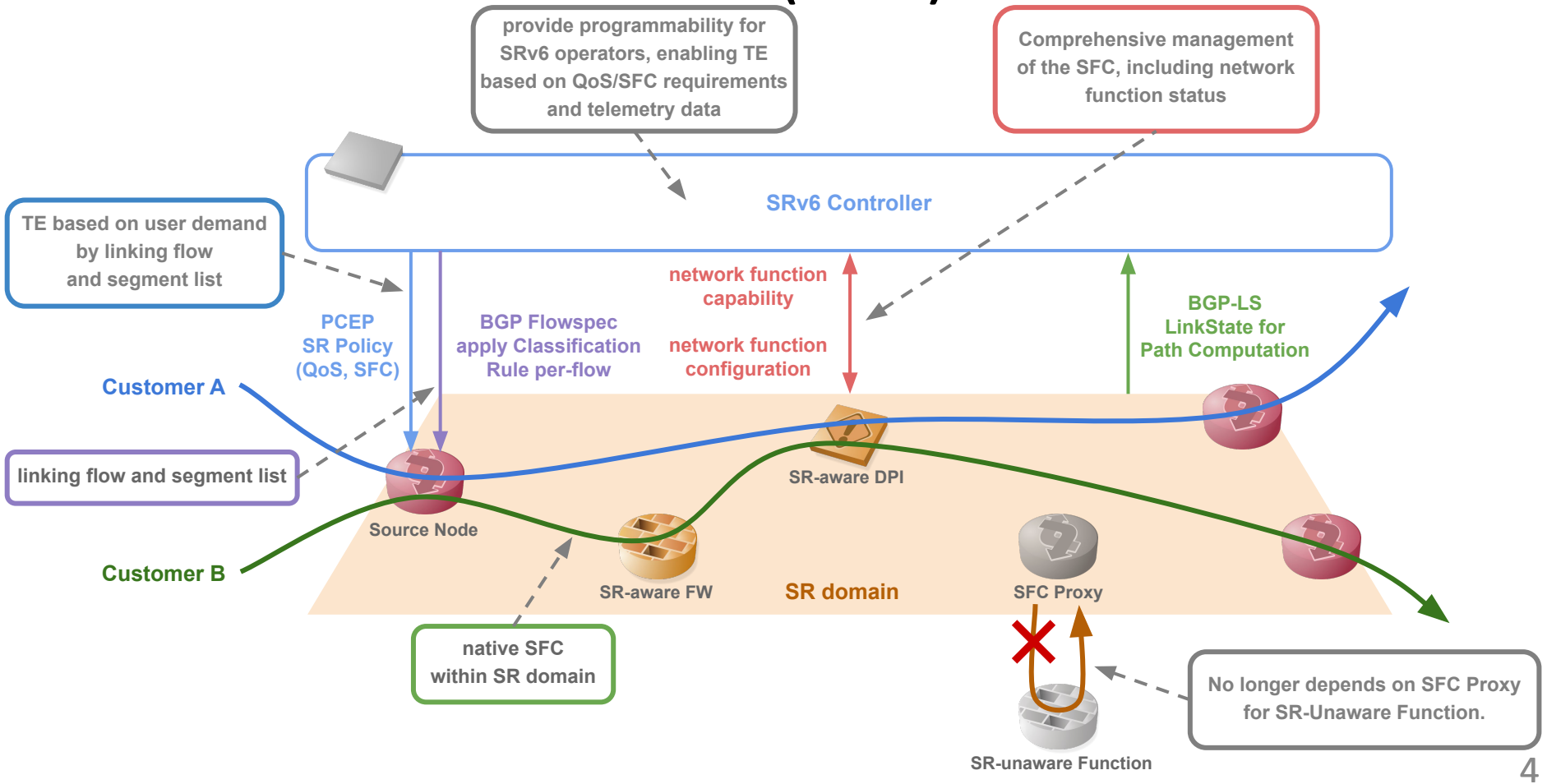
Motivation: SRv6 SFC Architecture

- **Provide Comprehensive management and Simplicity for SRv6 SFC**
  - **Comprehensive management**: a centralized controller for SFC, handling SR Policy, link-state, and network metrics.
    1. apply SR Policy (QoS, SFC) with PCEP
    2. policy application with BGP Flowspec
    3. collects network function information and configure with BGP-LS Extensions
    4. collects Link-State for Path computation with BGP-LS
  - **Simplicity**: no SFC proxies, so that reduces nodes and address resource consumption.

1. End.AN

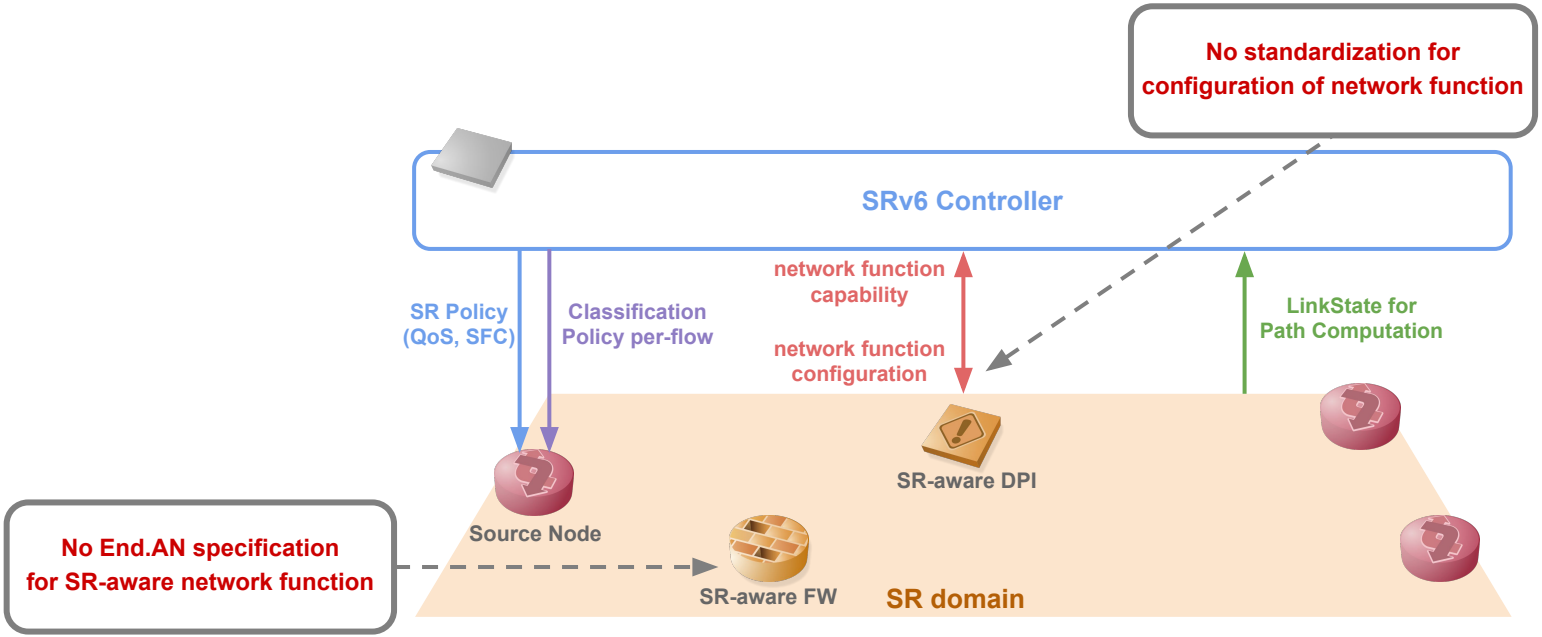


Motivation: SRv6 SFC Architecture (Detail)



Problems

- **To achieve our motivation, the following two points are missing:**
  1. **The ability to control SR-aware network functions from a controller.**
     - The controller can obtain the state of the Service Segments, but there is no protocol to manage them.
  2. **SRv6-aware network functions**
     - End.AN is already defined in *draft-ietf-spring-sr-service-programming*, but there is no specification and implementation.



Conclusion: Required Standardization

To realize SRv6 SFC architecture, the following technologies (standard) are required:

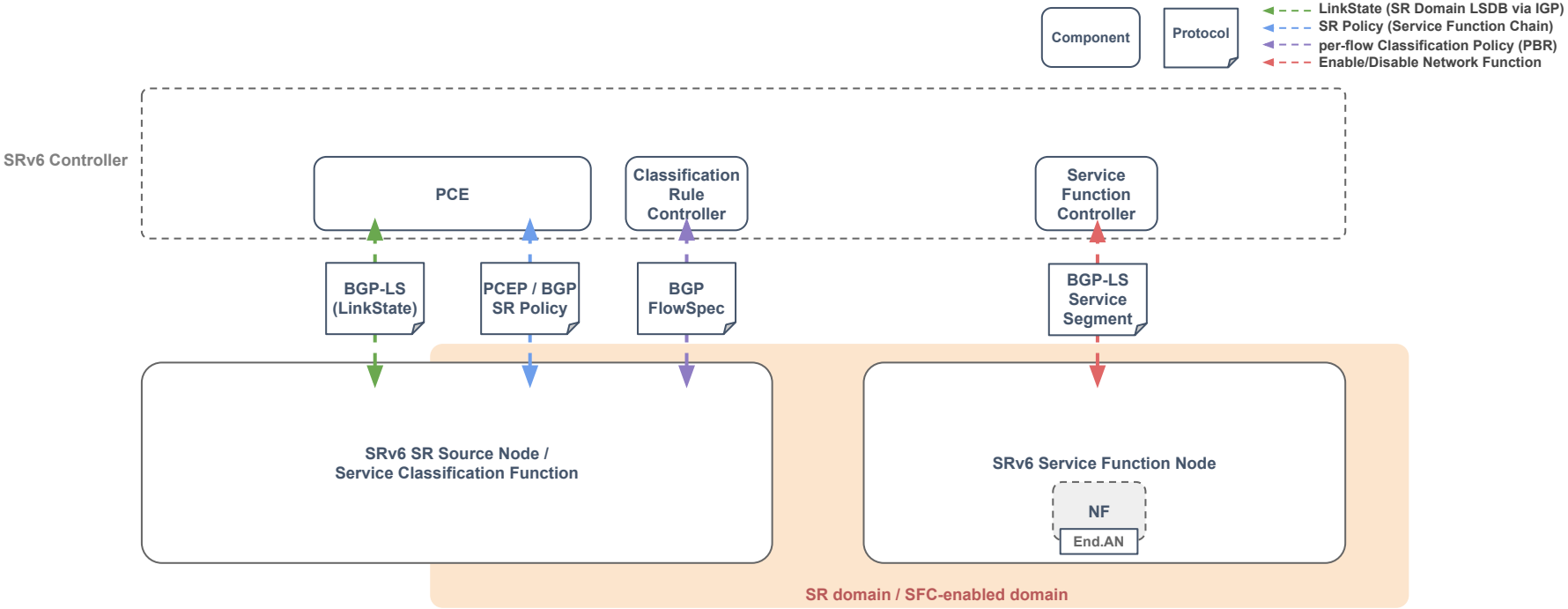
- **D-Plane: SR-aware network functions and SRv6 behaviors to enable SFC within the SRv6 network.**
  - **SR-aware services** are described in **I-D.draft-ietf-spring-sr-service-programming**.
    - **We will propose the details of End.AN.**
- **C-Plane: Standard interfaces and technologies for controlling SRv6 network functions from the controller.**
  - **BGP-LS Service Segments configuration.**
    - **We will propose a new BGP-LS Service Segment extension.**

→ **We plan to submit two I-Ds above.**

This work was partially supported by JST, CRONOS, Japan Grant Number JPMJCS24N9.

SRv6 Controller Overview

- **BGP-LS**: Gathering SR domain's Linkstate (for **SR Policy calculation**)
- **PCEP / BGP SR Policy**: **Establishes service function chains** at the SR Source Node.
- **BGP Flowspec SR Policy**: **Classifies the target flow** at the SR source node.
- **BGP-LS Service Segment**: **Gathering and Activates network functions** at the SR Segment Endpoint.



SRv6 SFC Architecture

The concept that comprehensive controller manages the entire SRv6 SFC network.

The controller collects information about Service Segments and apply SR Policy based on the information about available Network Functions.