Service Function Chaining Use Case for SPRING

draft-xu-spring-sfc-use-case-02

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SFC Background

- **Service Function (SF): A function that is responsible for specific treatment of received packets.**
- **SF ID: A unique identifier that represents a service function within an SFC-enabled domain.**
- **Service Node (SN): A physical or virtual element that hosts one or more service functions and has one or more network locators associated with it for service delivery.**
- **Service Function Chain (SFC): An ordered set of service functions that must be applied to packets and/or frames selected as a result of classification**
- **Service Function Path (SFP): The instantiation of an SFC in the network.**
- **Network Forwarder (NF): SFC network forwarders provide network connectivity for SFF and SF.**
- **Service Function Forwarder (SFF): is responsible for delivering traffic received from the SFC network forwarder to one or more connected service functions via information carried in the SFC encapsulation.**
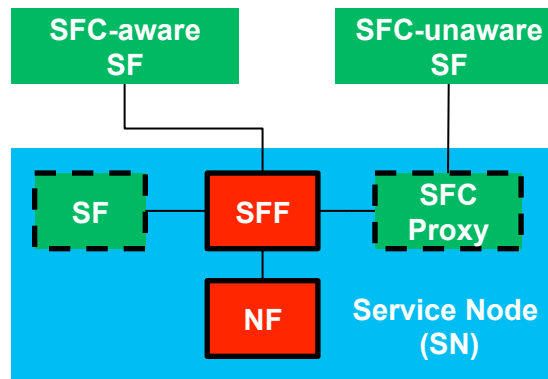
Motivation

- **When applying a particular SFC (e.g., {SF1,SF3}) to the selected traffic, the traffic needs to be steered through the corresponding SFP (e.g.,{SN1, SF1, SN2, SF3}) in the SFC-enabled network.**

- **It's obvious that the SPRING-based source routing mechanism could be leveraged to steer the traffic through a particular SFP.**

  - **The SFP (or the SFC) information could be encoded in the MPLS label stack or the IPv6-SR header. To simplify the illustration, only MPLS-SPRING-based SFC is discussed here.**
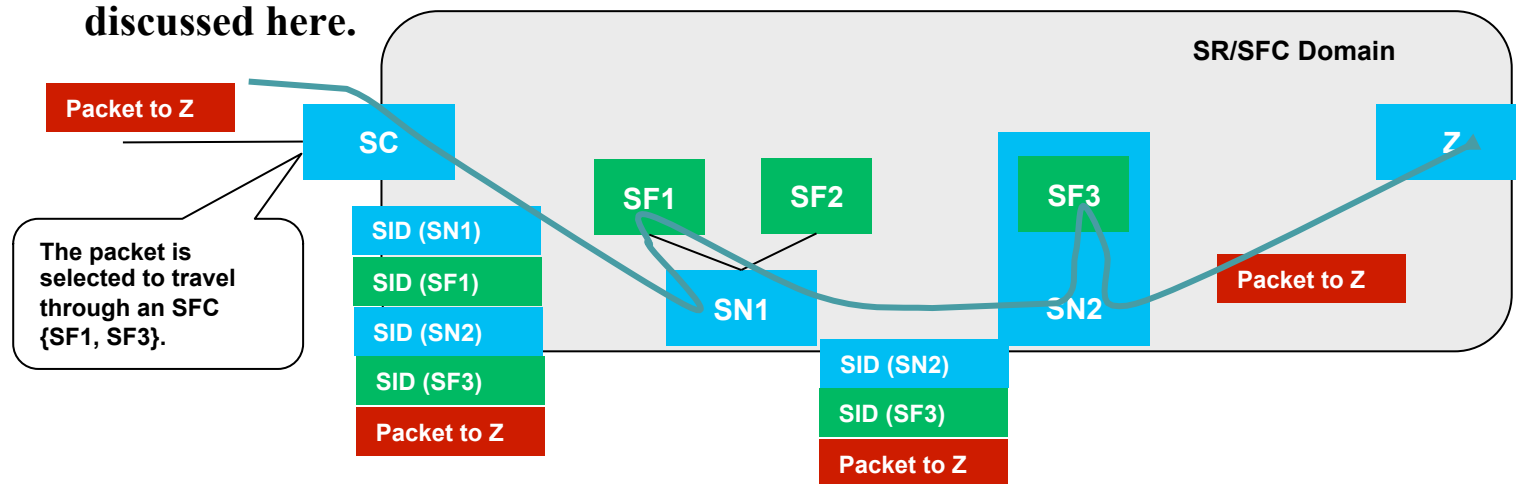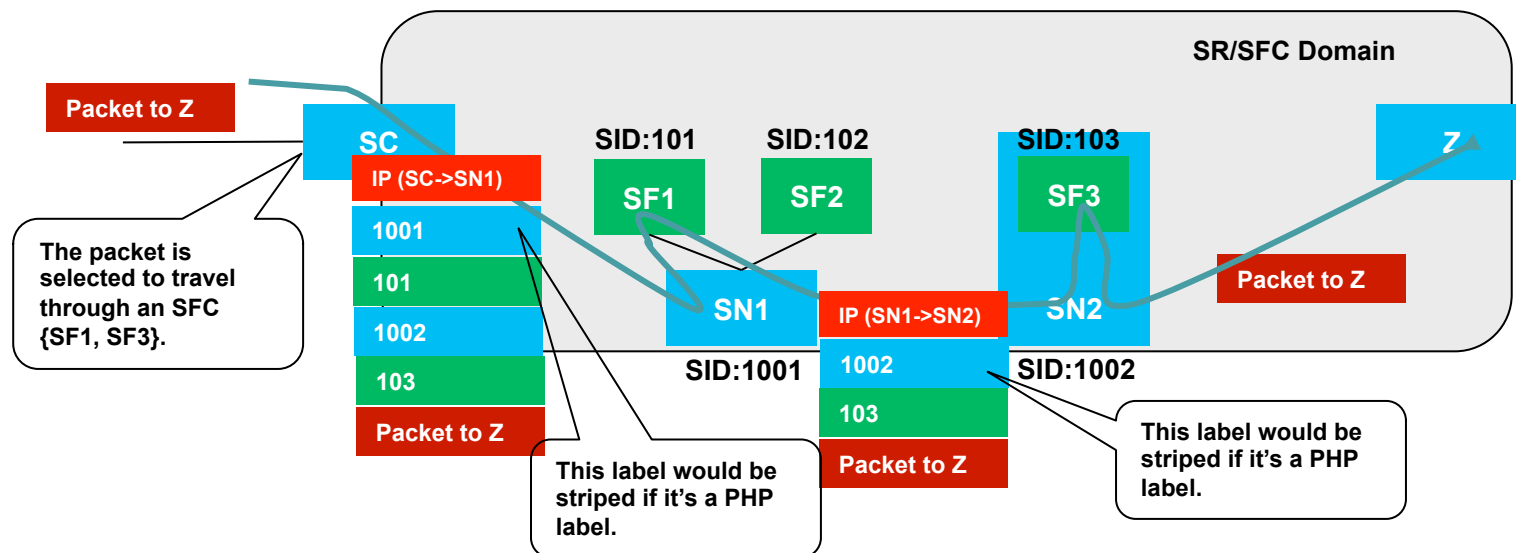
Encoding the SFP as an Label Stack

- Service Nodes (SN) allocate local MPLS labels for their associated SFs.

- An MPLS label stack indicating a particular SFP (i.e., an ordered list of SNs and SFs) to be traversed is imposed on the selected packet by the Classifier.
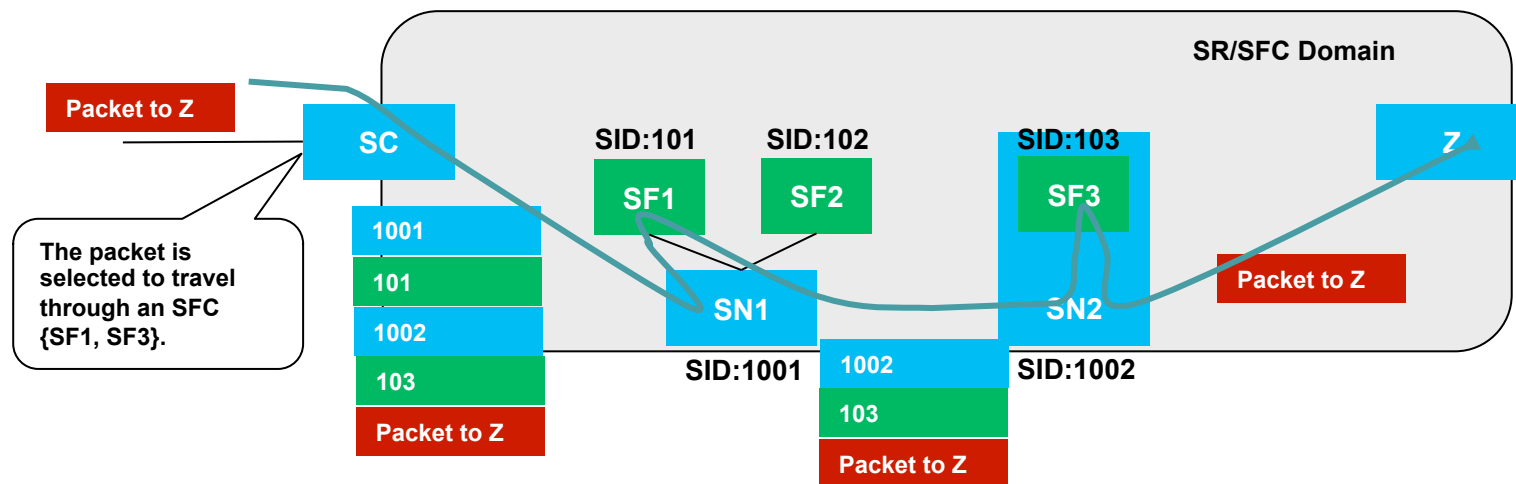
Encoding the SFP as an Label Stack (cont)

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- **An MPLS label stack indicating a particular SFP (i.e., an ordered list of SNs and SFs) to be traversed is imposed on the selected packet by the Classifier.**

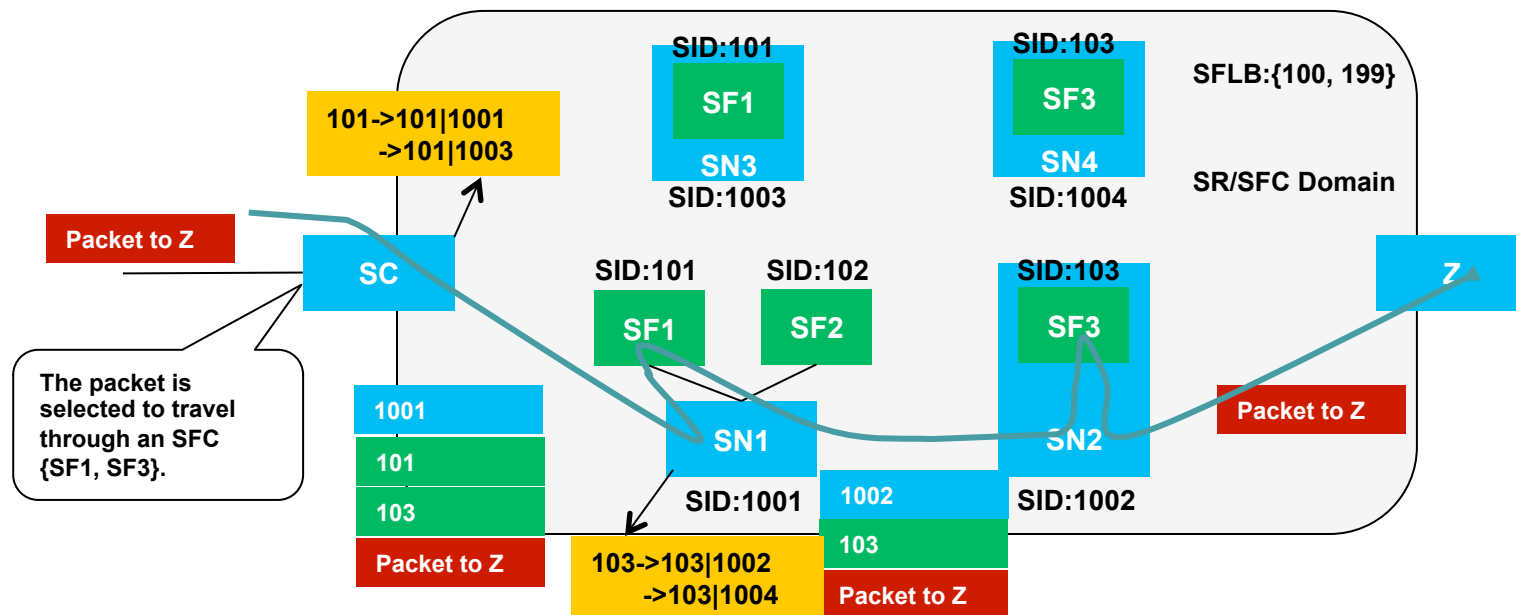- **When SNs are separated by IP networks, IP tunnels (e.g., MPLS-over-GRE) instead of LSPs could be used between SNs.**

Encoding the SFC as a Label Stack

- **Once global labels are allocated for SFs, the Classifier could choose to impose an MPLS label stack just indicating a particular SFC (i.e., an ordered list of SFs),**
  - SNs/Classifiers should be capable of resolving the appropriate SN for the next SF.
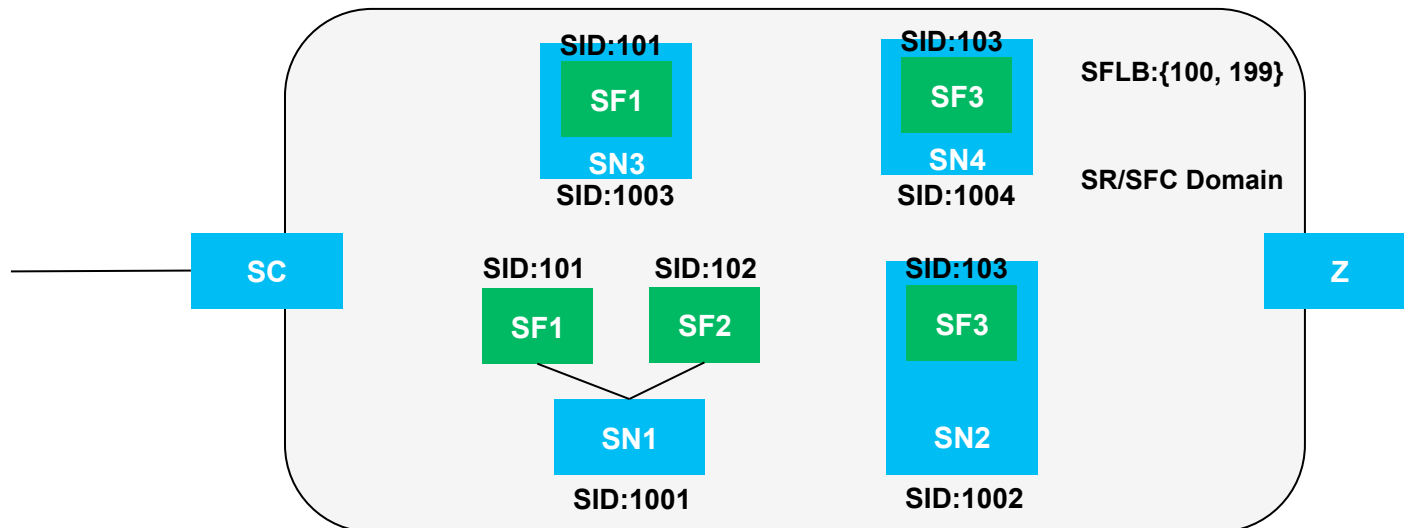
Encoding the SFC as a Label Stack

- **Once global labels are allocated for SFs, the Classifier could choose to impose an MPLS label stack just indicating a particular SFC (i.e., an ordered list of SFs),**
  - SNs/Classifiers should be capable of resolving the appropriate SN for the next SF.
  - When SNs are separated by IP networks, IP tunnels (e.g., MPLS-over-GRE) instead of LSPs could be used between SNs. Furthermore, no need for node SIDs anymore.
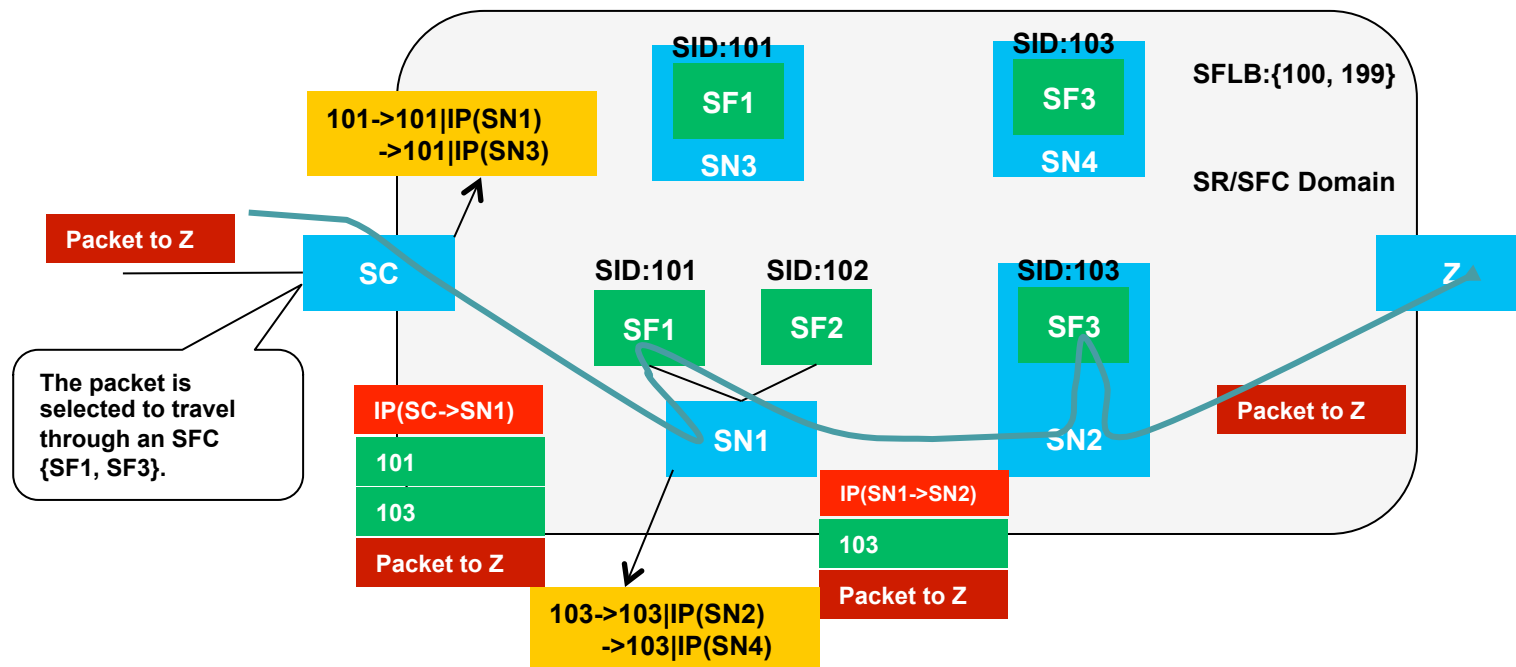
How to Allocate Global Labels for SFs

- **A common label block, referred to as SF Label Block (SFLB) is reserved by all SNs and Classifiers for SF SIDs.**

- **The unique label for a given SF could be automatically determined by adding the SF ID of that SF to the first label value of the above SFLB.**

Next Step

- **WG adoption?**