SRv6 Practice in China Telecom

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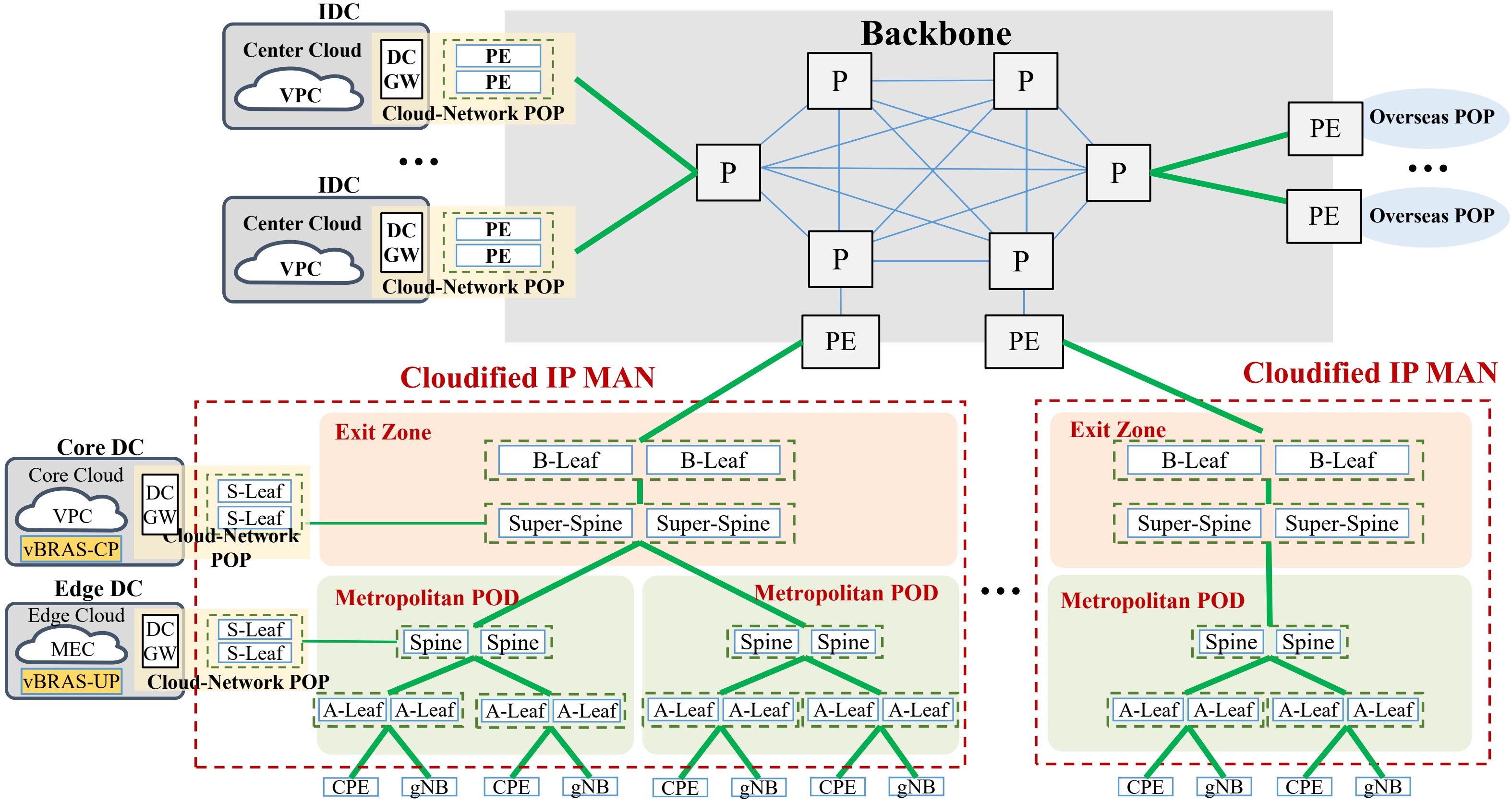
Overview of China Telecom SRv6-enabled Network

Motivation

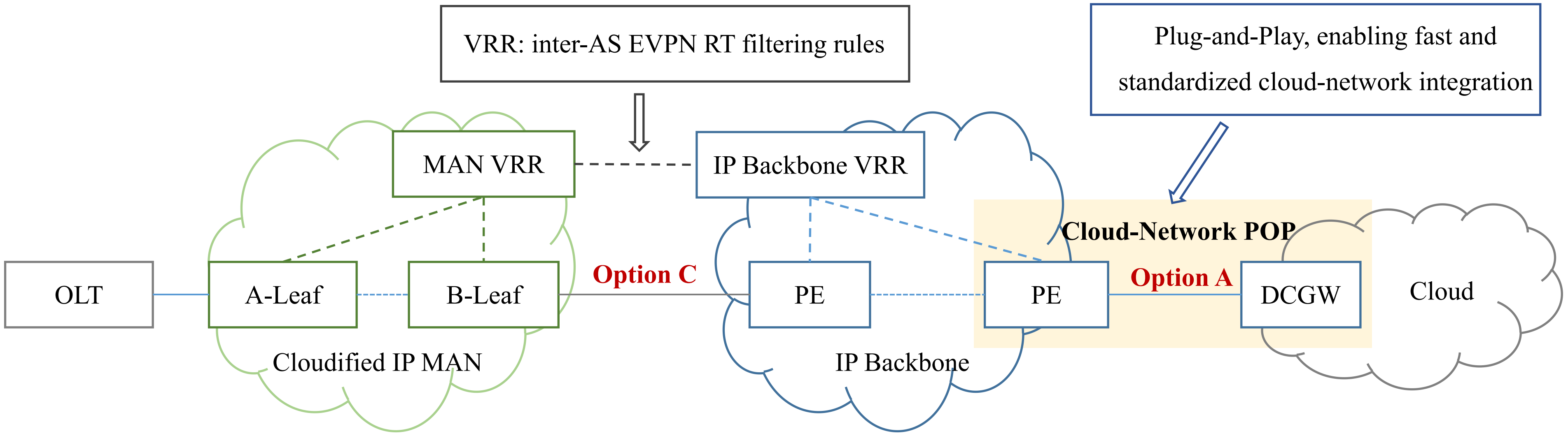
- Achieving unified (2B/2H/2C) services carrying via simplified protocol stacks (SRv6/EVPN)
- Flexibly steering traffic via network programmability
- Enhancing network reliability via fast recovery technologies such as SRv6 TI-LFA



- **Deploying E2E SRv6-based services in IP network**
  - **Cloudified IP MAN:** uniformly carrying 2B/2H/2C services, as well as cloud services
  - **IP Backbone:** providing E2E connection among MANs, IDCs and overseas POPs based on SRv6

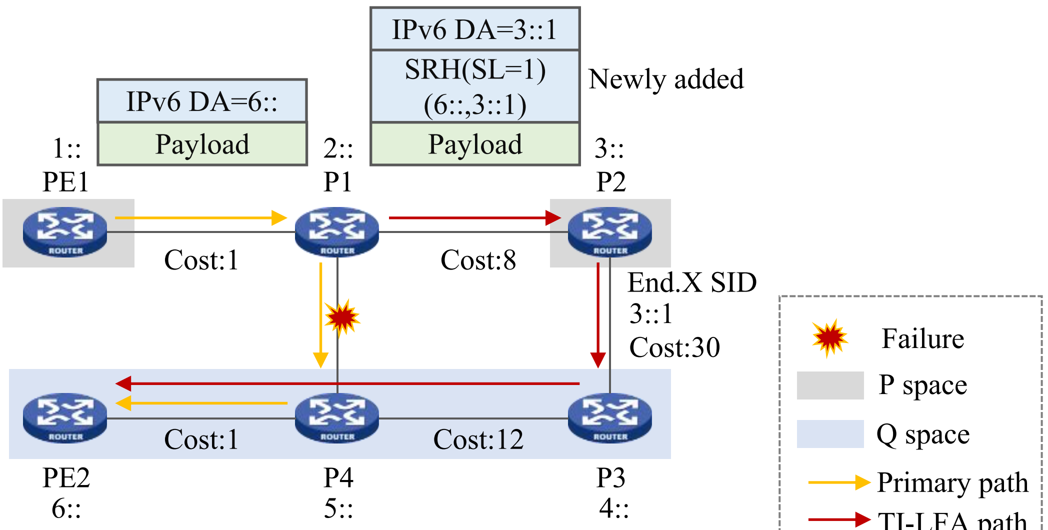
Inter-AS Deployment Solution

- **Utilizing inter-AS solution to provide E2E SRv6-based services across AS**
  - **IP MAN-IP Backbone interconnection scenario:** using Option C to alleviate the routing burden of border routers and better leverage the scalability of BGP to transport routing policies
  - **Cloud- IP network interconnection scenario:** using Option A to realize fast and easy deployment of services

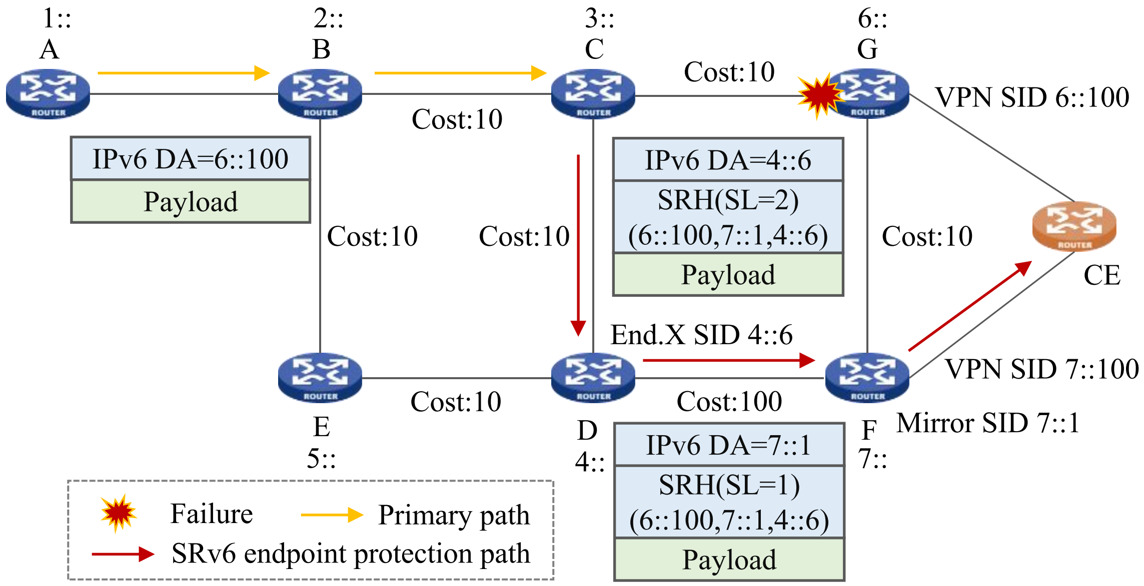


Reliability Solution

- **Main solutions to meet the SLAs of SRv6-based services:**
  - SRv6 Path redundancy protection: using Hot-Standby to provide the E2E SRv6 backup path
  - SRv6 fast reroute: utilizing TI-LFA to reduce the packet loss druing the period of route convergence
  - SRv6 endpoint protection: using Mirror SID for the backup node of the endpoint to achieve fast traffic switchover



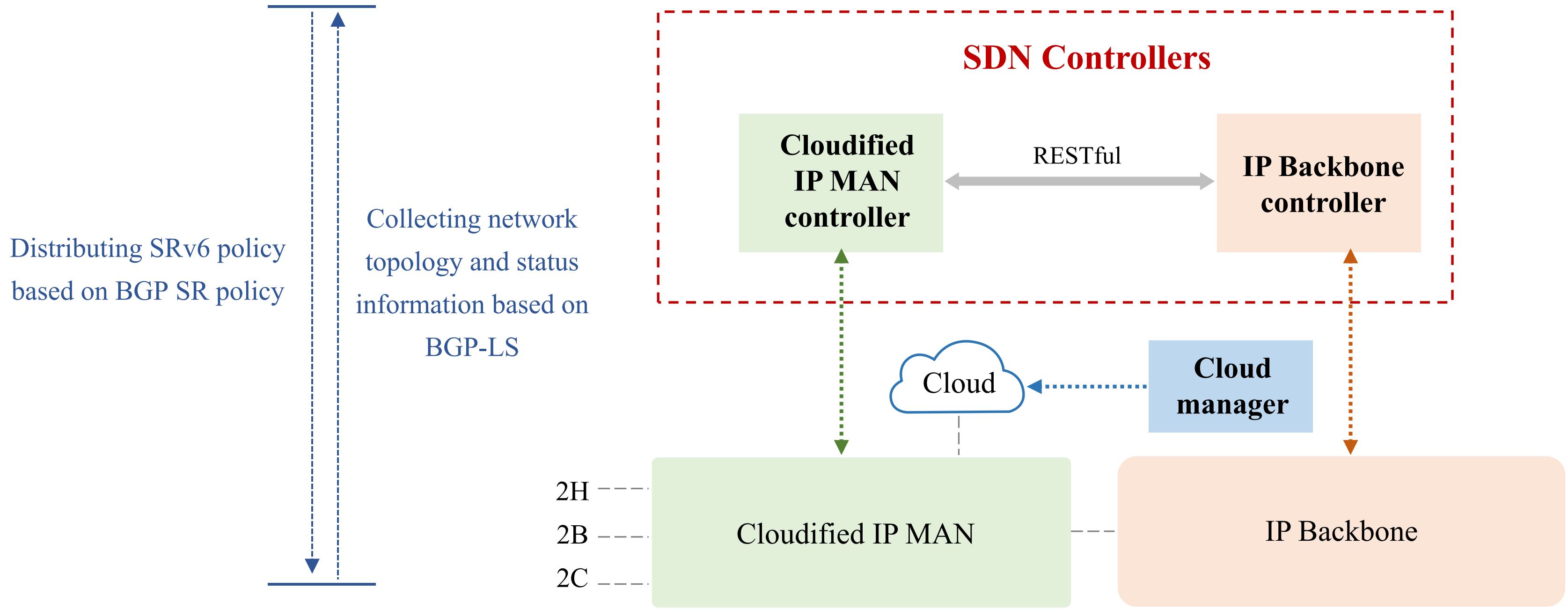
TI-LFA



SRv6 endpoint protection

SDN Controller for SRv6-enabled Network

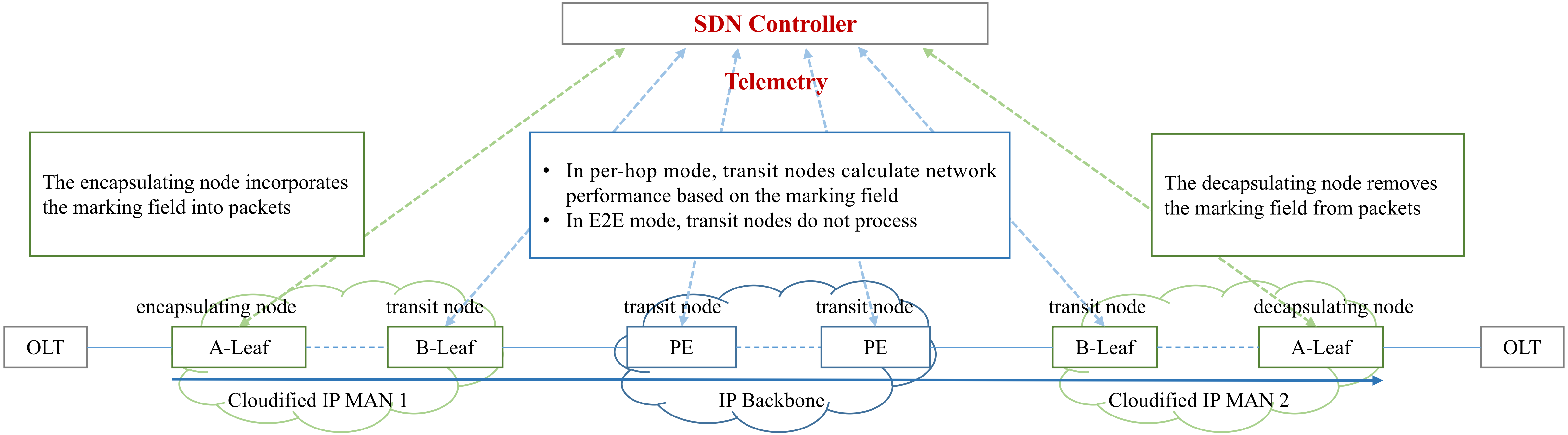
- **SDN controller: realizing unified resource management and service scheduling for SRv6-based services**
  - BGP SR policy: flexibly deploying and dynamically adjusting service path
  - BGP-LS for SRv6: collecting network topology and status information



Network Operation and Management for SRv6-enabled Network

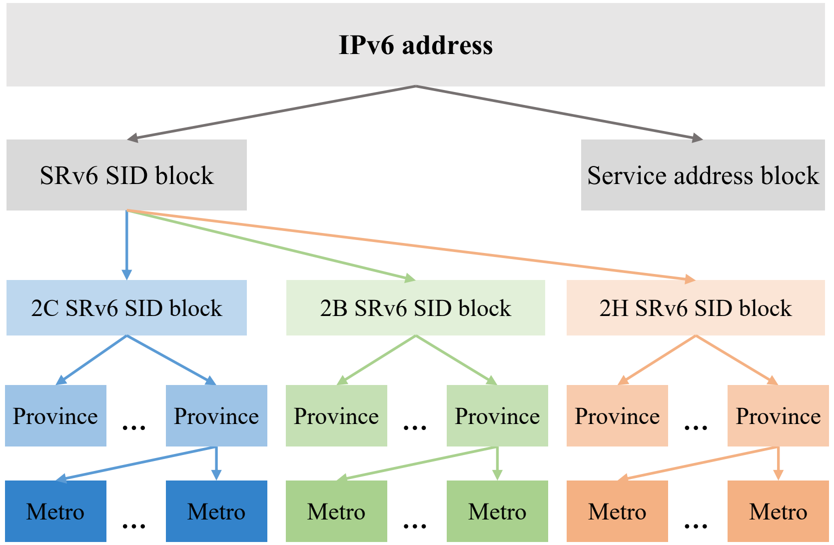
Main technologies to achieve effective network operation and management

- Besides the traditional OAM tool, utilizing Network Telemetry to collect detailed information of network and devices on demand
- Using Alternate Marking to achieve precise in-band measurement of packet loss, latency, and jitter



SRv6 SID Block Allocation

- **Independent of service address block allocation, SRv6 SID blocks are allocated separately**
  - Allocating /48 SRv6 SID blocks in unit of province (each province furtherly allocates SRv6 SID blocks in unit of IP MAN/ Metro POD)
  - Within IP MAN/ Metro POD, assigning Locator according to network devices and FlexE slices
  - SRv6 header compression is also taken into considerations



SRv6 SID encoding format

Bits	Fields	Description
1th-48th bits	Locator	**Service indicators**: indicating 2C/2B/2H services
49th-64th bits		**Reserved**: indicating home terminals, etc.
65th-80th bits		**Device indicators**
81th-84th bits		**Slicing indicators**
85th-96th bits	Function	**Compressed function**: used as function field for SRv6 header compression, otherwise set zero
97th-112th bits		**Non-compressed function**: used as function field when SRv6 header compression is not utilized, otherwise set zero
113th-128th bits	Argument	**Argument**: used as argument field, indicating SID index (SI) when header compression is utilized

Example

Service	SID encoding format
2C	240E:XXXX:00YY::/48 ~ 240E:XXXX:00ZZ::/48
2B	240E:XXXX:10YY:/48 ~ 240E:XXXX:10ZZ::/48
2H	240E:XXXX:20YY::/48 ~ 240E:XXXX:20ZZ::/48

Takeaway

- **Using SRv6 technologies, we can achieve easy deployment & reliable carrying of services**
  - Deploying inter-AS services for different scenarios via Option A and Option C
  - Adopting new reliability technologies such as TI-LFA (not supported by MPLS) to meet SLAs of services
  - Enhancing network operation and management via Network Telemetry, Alternate Marking, etc.
  - Allocating SRv6 SID blocks according to regional division and service category

There is a long way to go, let's push it forward together

Questions and Feedback are Welcome

Thanks!