Network Resource Partition Identifier (NRP-ID) in SRv6 segment

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Network slicing partition a physical network into multiple isolated logical networks.

A network slice associates specific network resource, which is called Network Resource Partition (NRP) in [I-D.draft-ietf-teas-ietf-network-slices]

NRP-ID is used to identify the NRP during packet forwarding.

NRP-ID can be carried in the packet

Router can use NRP-ID to determine the NRP, and forward the packet using the resources associated with the NRP.

This draft proposes a method to carry NRP-ID with packet, when SRv6 network provides network slicing service.
**Encoding NRP-ID in SRv6 Segment**

- As defined in RFC[8986], An SRv6 segment consists of three parts, LOC:FUNCT:ARG.

- In the SRv6 TE mode, the segments of intermediate endpoint are usually End or End.X segment. NRP-ID can be encoded in ARG field of these segments.

- Segments in SRH can carry the same or different NRP-IDs, which is arranged by the controller or operator by CLI according to the actual requirement.
When creating locator, the SRv6 node need to determine the encoding position of NRP-ID in the segment. And the encoding position information should be advertised to controller or other network nodes.

**Static configuration mode**

- **slice prefixes** (locator encoding information) are configured on:
  - Controller
  - Network nodes (Including SRv6 nodes and IPv6-Only nodes)

**Dynamic advertising mode**

- slice prefix can be advertised by:
  - BGP-LS to controller
  - IGP to SRv6 nodes in the domain

Note: IPv6-only nodes still need static configuration.

A slice prefix include:

- prefix
- Encoding position in Segment

The Protocol extensions will be provided in future versions...
Network nodes will create a local slice prefix table (LSPT) on the forwarding plane.

Through LSPT

- **Headend**: Writes NRP-ID into segment
- **Intermediate Nodes**: extract NRP-ID from destination address

**Local slice prefix table**

- **Slice-Prefix1**: 2001:1:1:0:110::/80 (locator for P1)
  - NRP-ID Position: [112..127]
- **Slice-Prefix2**: 2001:1:1:0:130::/80 (locator for P3)
  - NRP-ID Position: [96..112] in segment

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**IPv6-only**

```
+-----+-----+-----+-----+-----+-----+-----+
 | PE1 | P1  | P2  | P3  | PE2 |     |     |
 +-----+-----+-----+-----+-----+-----+-----+
SRv6-node     SRv6-node
```

**common Prefix**: 2001:1:1::/64

**locator**

- **P1**: 2001:1:1:0:110::/80 for End/End.x
- **P3**: 2001:1:1:0:130::/80 for End/End.x
**Example**

**Preset conditions:**

- 2 NRPs are created, NRP1(NRP-ID1) and NRP2(NRP-ID2), NRP1 guarantees 100Mbps and NRP2 guarantees 200Mbps bandwidth
- Dedicated queues with guaranteed bandwidth for NRP1 and NRP2
- SRv6 Policy on PE1, including segment list: <P1.End, P3.End>

**Forwarding behavior:**

**PE1 as Headend:**
- Determines the NRP
- Encapsulates SRH and IPv6
- Writes NRP-ID based on LSPT

**P1 & P3 as Endpoint:**
- Extracts NRP-ID from segment
- Updates destination address
- Forwards packet with queue of NRP2

**P2 as transit node:**
- Lookups LSPT with destination address
- Extracts NRP-ID from destination address based on lookup result
- Forwards packet with queue of NRP2
Next Steps

• Questions or comments are Welcome
• Seeking for feedback