A NRP YANG Module
draft-wd-teas-nrp-yang-01

TEAS WG
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NRP modelling requirements

• **NRP definition in the NS framework**
  • **Purpose**
    • To support provisioning, operating and monitoring the IETF Network Slices
    • To provide SLOs and SLEs for one or more connectivity constructs from one or more slices
  • **Key components**
    • **Topology**: entire underlay network or filter topology (optional)
    • **Resource** in the underlay network

• **Other key components of NRP in IP/MPLS network**
  • **draft-ietf-teas-ns-ip-mpls**
    • **Network Resource Partition Mode**: Control plane, data plane, both
    • **NRP control plane**: NRP-TE - routing protocols, or by the ingress router / PCE
    • **NRP data plane**: NRP Data Plane Selector, Network Resource Partition Per Hop Behavior (PHB)
  • **draft-ietf-teas-nrp-scalability**
    • **NRP control plane**: Distributed Control Plane, Centralized Control Plane
    • **NRP data plane**: NRP-ID
NRP Model Usage

• NRP model is network configure data model, per RFC 8309 definition.
  • NRP provides a useful way to **plan resources** to meet the SLO and SLE requirements of the slice service
  • Depending the NS service, NRP instantiation can be pre-built or dynamic along with a NS service request
NRP topology modelling

- Two categories:
  - Underlay network topology
  - Filter topology
    - Well known topologies: Flex-Algo, Multi-Topology (MT), TE topology, etc.
    - Customized: Select specific links from the underlay network
    - Filtered: New filter rules

IETF Network Topology
RFC 8345

The Native Topology

Entire underlay network or Customized Topology

Group of links:

```
+--rw npr-topology-group* [group-id]
    +--rw group-id        string
    +--rw base-topology-ref
    |    +--rw network-ref? ->leafref
    |    +--rw links* [link-ref]
    |    |    +--rw link-ref leafref
    |    ...
    +--rw bandwidth-reservation ...
```
NRP model components Summary

• NRP configuration
  • Partition-type: control plane partition, data plane partition, hybrid partition
  • Topology
  • Resource reservation: network-wide and link-specific
  • NRP control plane: NRP TE or NRP distributed control plane (Flexalgo, MT, etc.)
  • NRP data plane ID: The data plane encapsulation and identifier used in data packets to map to the NRP resource

• NRP monitoring
Next Step

• Solicit comments and reviews from WG
• Request for WG adoption
backup

module: ietf-nrp

augment /nw:networks/nw:network/nw:network-types:
  +++-rw nrp!

augment /nw:networks/nw:network:
  +++-rw nrp
     |+++rw nrp-id?         uint32
     |+++rw nrp-name?       string
     |+++rw partition-type? identityref
     |+++rw bandwidth-reservation
     |     |+++-(bandwidth-type)?
     |     |     |+++-(bandwidth-value)
     |     |     |     |+++rw bandwidth-value? uint64
     |     |+++-(bandwidth-percentage)
     |     |     |+++rw bandwidth-percent? rt-types:percentage
  +++-rw control-plane
     |+++rw topology-ref
     |     |+++rw network-ref?
     |     |     |+++rw multi-topology-id? uint32
     |     |+++rw flex-algo-id? uint32
     |+++rw te-topology-identifier
     |     |+++rw provider-id? te-global-id
     |     |+++rw client-id? te-global-id
     |+++rw topology-id? te-topology-id
  +++-rw data-plane
     |+++rw global-resource-identifier
     |     |+++rw nrp-dataplane-ipv6-type
     |     |     |+++rw nrp-dataplane-ipv6-type
     |     |+++rw nrp-dataplane-ipv6-address
     |     |+++rw nrp-dataplane-mpls-type
     |     |     |+++rw nrp-dataplane-mpls-type
     |     |+++rw nrp-dataplane-mpls-value? uint32
     |+++rw nrp-aware-dp
     |+++rw nrp-aware-srv6-type!
     |+++rw nrp-aware-ssr-mpls-type!
  +++-rw steering-policy
     |+++rw color-id* uint32
     |+++rw acl-ref* => /acl:acls/acl/name

++-rw nrp-topology-group* [group-id]
  +++-rw group-id string
  +++-rw base-topology-ref
  +++-rw links* [link-ref]
  |+++rw link-ref
  |+++rw link-attributes-override
  |     |+++rw bandwidth-reservation
  |     |     |+++-(bandwidth-type)?
  |     |     |     |+++-(bandwidth-value)
  |     |     |     |     |+++rw bandwidth-value? uint64
  |     |+++-(bandwidth-percentage)
  |     |     |+++rw bandwidth-percent? rt-types:percentage
  +++-rw bandwidth-reservation
  |+++rw bandwidth-percentage?
  |     |+++-(bandwidth-percentage)
  |     |     |+++rw bandwidth-percent? rt-types:percentage