YANG DATA MODEL FOR NETWORK RESOURCE PARTITION POLICY

draft-bestbar-teas-yang-nrp-policy-00

Replaces draft-bestbar-teas-yang-slice-policy-02

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INTRODUCTION

- A Network Resource Partition (NRP) [I-D.ietf-teas-ietf-network-slices] is a collection of resources identified in the underlay network to support the IETF Network Slice service (or any other service that needs logical network structures with required characteristics to be created).

- An NRP Policy [I-D.bestbar-teas-ns-packet] is a policy construct that enables instantiation of mechanisms in support of service specific control and data plane behaviors on select topological elements associated with the NRP.

- Draft defines a YANG data model for the management of NRP policies on NRP capable nodes and controllers in IP/MPLS networks.
  - The latest (renamed) version is aligned with the terminology used in [I-D.ietf-teas-ietf-network-slices] and [I-D.bestbar-teas-ns-packet]
An NRP policy specifies the rules for determining the topology associated with the NRP and dictates how an NRP can be realized in IP/MPLS networks using one of three modes.

- Partitioning of the shared network resources can be achieved in:
  - a) just the data plane or in
  - b) just the control plane or in
  - c) both the control and data planes.

- The NRP policy modes (a) and (c):
  - Require the forwarding engine on each NRP capable node to identify the traffic belonging to a specific flow aggregate and to apply the corresponding Per-Hop Behavior (PHB).
    - Identification of the flow aggregate that the packet belongs to and the corresponding forwarding treatment that needs to be applied to the packet is dictated by the NRP policy.

- The NRP policy modes (b) and (c):
  - Require the distributed/centralized resource reservation manager in the control plane to manage NRP resource reservation.
    - The provisions for enabling NRP state aware traffic engineering (NRP-TE) [I-D.bestbar-teas-ns-packet] are dictated by the NRP policy.

- The data model discussed in this document caters to all three NRP Policy modes.
The top-level 'networks' container [RFC8435] is augmented with a set of NRP policies.
The ‘nrp-policies' container carries a list of NRP policies.

Each 'nrp-policy' entry is identified by a name and holds the set of attributes needed to instantiate the NRP.

Each entry also carries an 'nrp-id' leaf which uniquely identifies the NRP created by the enforcement of this policy.

Key elements of an NRP policy:
- Resource Reservation
- Flow-Aggregate Selector
- Per-Hop-Behavior
- Topology Filters
- The 'resource-reservation' container carries data nodes that are used to support NRP state aware bandwidth engineering.
- The data nodes in this container facilitate preference-based preemption of NRP state aware TE paths, sharing of resources amongst a group of NRPs and backup path bandwidth protection.

```Yang
+--rw resource-reservation
  | +--rw preference?       uint16
  | +--rw (max-bw-type)?
  |  | +--:(bw-value)
  |  | +--rw maximum-bandwidth? uint64
  |  | +--:(bw-percentage)
  |  | +--rw maximum-bandwidth-percent?
  |  | rt-types:percentage
  | +--rw shared-resource-groups* uint32
  | +--rw protection
  |  | +--rw backup-nrp-id?    uint32
  |  | +--rw (backup-bw-type)?
  |  |  | +--:(backup-bw-value)
  |  |  | +--rw backup-bandwidth? uint64
  |  |  | +--:(backup-bw-percentage)
  |  |  | +--rw backup-bandwidth-percent?
  |  | rt-types:percentage
```
- The 'flow-agg-selector' container carries data nodes that specify the rules for identifying which packets belong to the flow aggregate that this NRP caters to.
NRP POLICY: PER-HOP-BEHAVIOR

- The 'phb' leaf carries a name of a PHB profile available on the topological element where the policy is being enforced.

```---rw phb? string```
The 'topology' container consists of a list of filters where each entry references a topology filter [I-D.bestbar-teas-yang-topology-filter].

- The resultant topology from the union of these filters is referred to as the NRP topology.

- The topological elements that satisfy the membership criteria can optionally override the default resource-reservation, flow-agg-selector and phb specific leaves.

```
  +--rw topology
    +--rw filters
      +--rw filter* [filter-ref]
        +--rw filter-ref
          |  nrp-policy-topo-filter-ref
          +--rw resource-reservation
            |  + ............
          +--rw flow-agg-selector
            |  + ............
        +--rw phb?  string
```
**NEXT STEPS**

- In the next revision, the 'topology' container will be augmented to include a reference to the resultant NRP topology state.
- Request review and feedback.
THANK YOU

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