

A NRP YANG Module

[draft-wd-teas-nrp-yang-01](#)

TEAS WG

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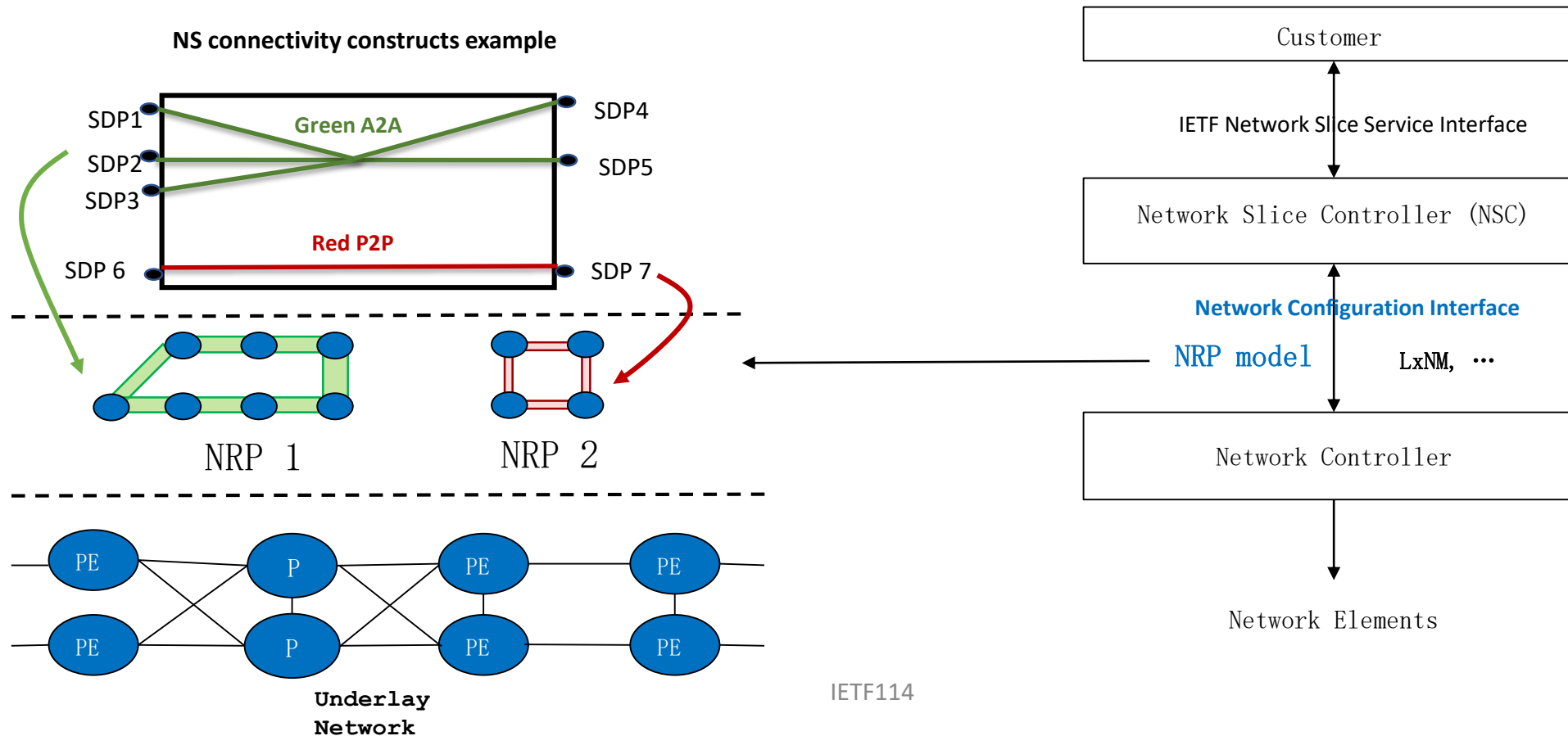


NRP modelling requirements

- **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

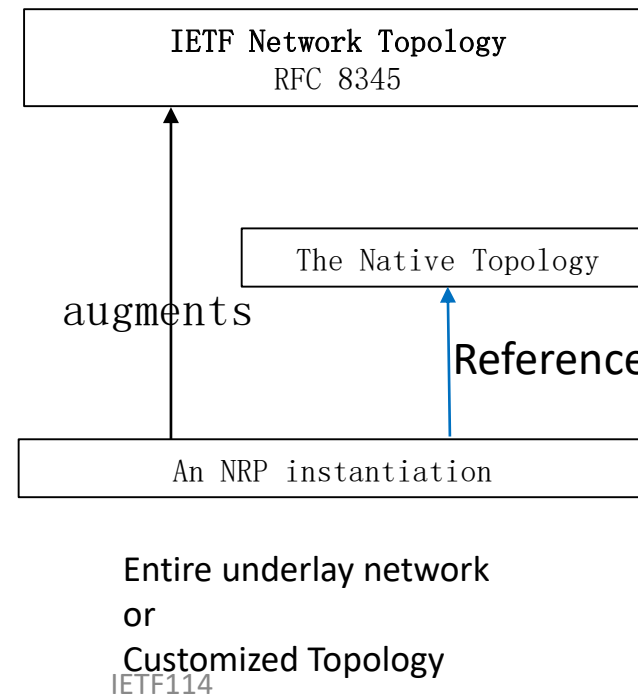
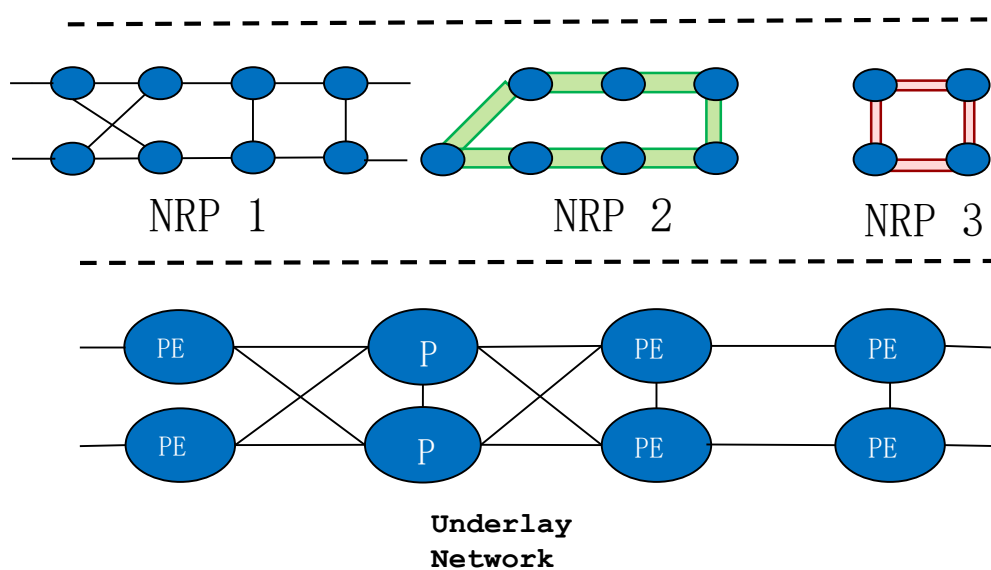
NRP Model Usage

- 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

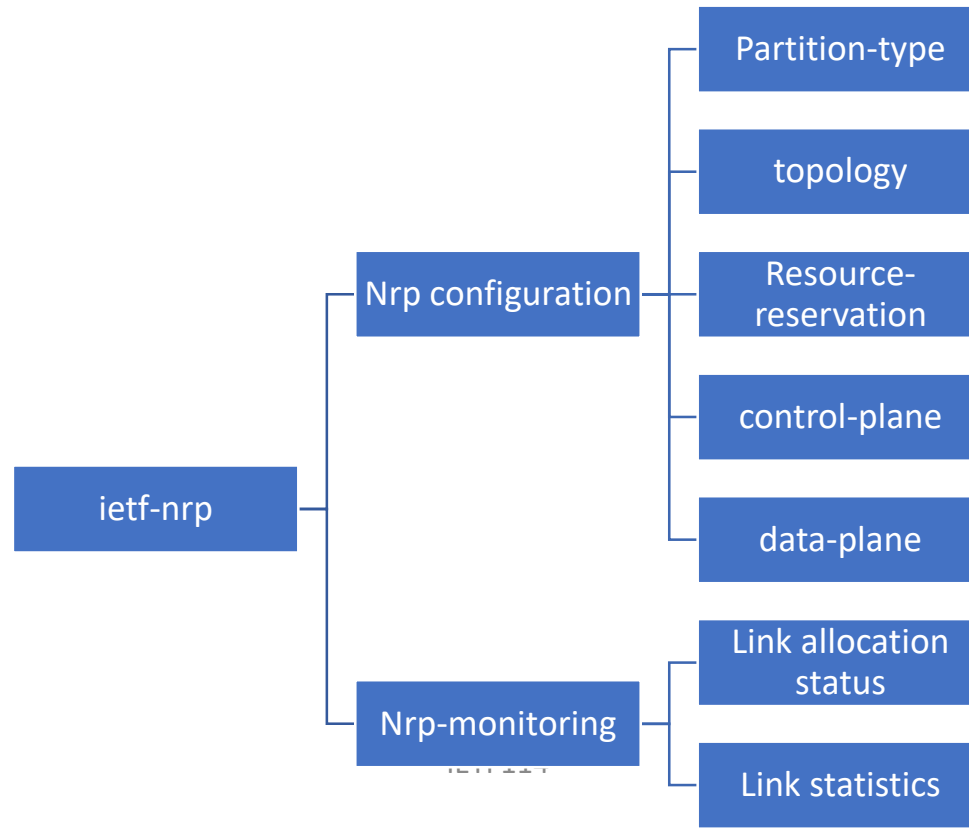


Group of links:

```
+--rw nrp-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
      | +--rw (bandwidth-type)?
      |   +--:(bandwidth-value)
      |   | +--rw bandwidth-value?      uint64
      |   +--:(bandwidth-percentage)
      |   +--rw bandwidth-percent?      rt-types:percentage
    +--rw control-plane
      | +--rw topology-ref
      |   +--rw igp-topology-ref
      |   | +--rw network-ref?
      |   | | -> /nw:networks/network/network-id
      |   | +--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-dp-value?  inet:ipv6-address
      | | +--rw nrp-dataplane-mpls-type
      | | | +--rw nrp-dp-value?  uint32
      | +--rw nrp-aware-dp
      |   +--rw nrp-aware-srv6-type!
      |   +--rw nrp-aware-sr-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 network-ref?    -> /nw:networks/network/network-id
+--rw links* [link-ref]
  | +--rw link-ref        leafref
  | +--rw link-attributes-override
  |   +--rw bandwidth-reservation
  |     +--rw (bandwidth-type)?
  |     +--:(bandwidth-value)
  |     | +--rw bandwidth-value?      uint64
  |     +--:(bandwidth-percentage)
  |     +--rw bandwidth-percent?
  |     rt-types:percentage
+--rw bandwidth-reservation
  +--rw (bandwidth-type)?
  +--:(bandwidth-value)
  | +--rw bandwidth-value?      uint64
  +--:(bandwidth-percentage)
  +--rw bandwidth-percent?      rt-types:percentage
```

```
augment /nw:networks/nw:network/nw:node:
  +--ro nrp
    +--ro nrp-aware-dp-id
    +--ro nrp-dp-srv6?      srv6-types:srv6-sid
    +--ro nrp-dp-sr-mpls?   rt-types:mpls-label
augment /nw:networks/nw:network/nt:link:
  +--rw nrp
    +--rw bandwidth-reservation
      | +--rw (bandwidth-type)?
      |   +--:(bandwidth-value)
      |   | +--rw bandwidth-value?      uint64
      |   +--:(bandwidth-percentage)
      |   +--rw bandwidth-percent?      rt-types:percentage
    +--rw partition-type?    identityref
    +--ro nrp-aware-dp-id
    +--ro nrp-dp-srv6?      srv6-types:srv6-sid
    +--ro nrp-dp-sr-mpls?   rt-types:mpls-label
    +--ro statistics
      +--ro admin-status?
      | te-types:te-admin-status
      +--ro oper-status?
      | te-types:te-oper-status
      +--ro one-way-available-bandwidth?
      | rt-types:bandwidth-ieee-float32
      +--ro one-way-utilized-bandwidth?
      | rt-types:bandwidth-ieee-float32
      +--ro one-way-min-delay?      uint32
      +--ro one-way-max-delay?      uint32
```