YANG Data Model for IPv4-in-IPv6 Softwire

draft-sun-softwire-yang

Q. Sun, H. Wang, Y. Cui, I. Farrer (presenter), M. Boucadair

November 2014

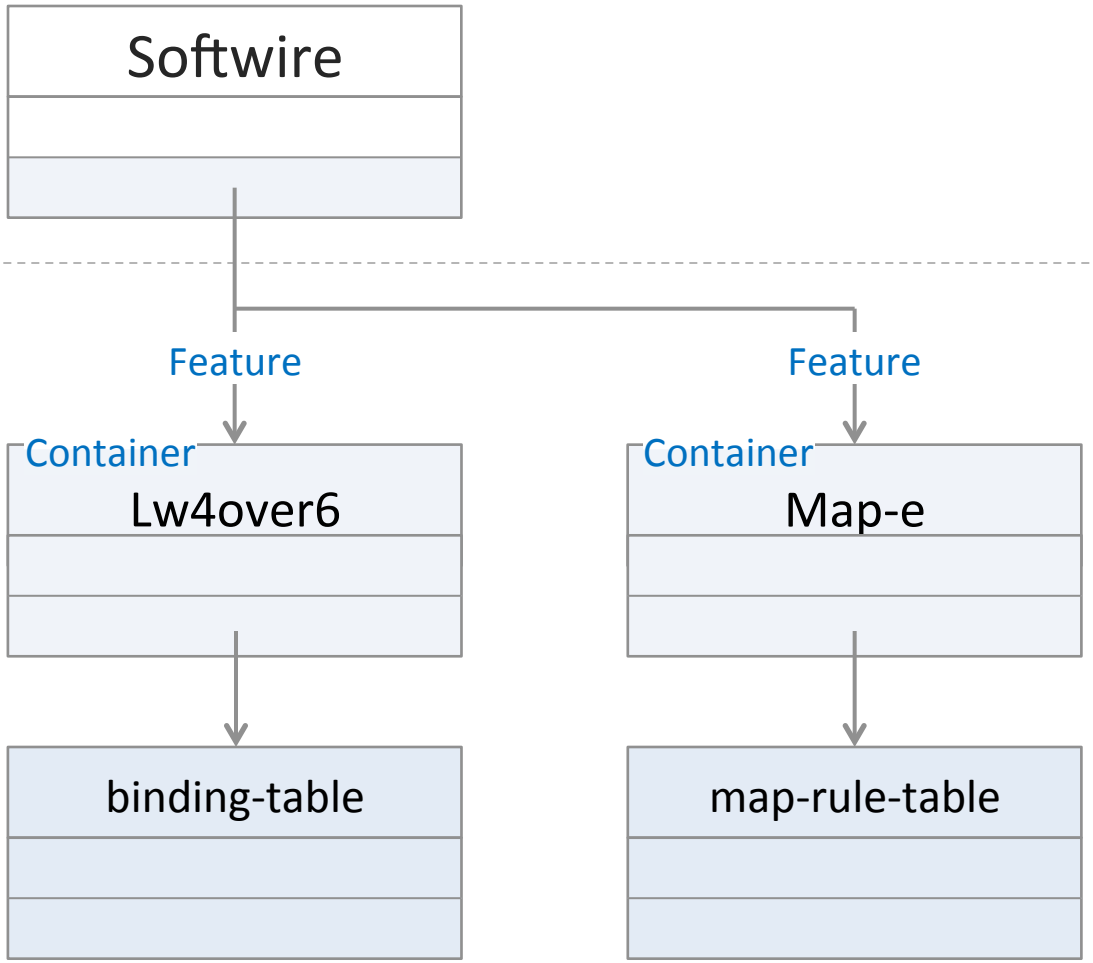
Motivation

- Operational considerations are key for integrating new functions into operational networks
  - e.g., MAP-E Border Router, lwAFTR
- A dedicated means for the configuration and management of these functions is still missing
- This document aims to help bridge this gap
  - : It defines a YANG model for configuring and managing **Softwire BRs/lwAFTRs**
- One common document is proposed, due to:
  - Inherent similarities of data plane forwarding
  - Including two Scenarios: lw4over6 & map-e
    - Both Standards Track
    - Common characteristics: Access network, Encapsulation, A+P

Proposed Structure

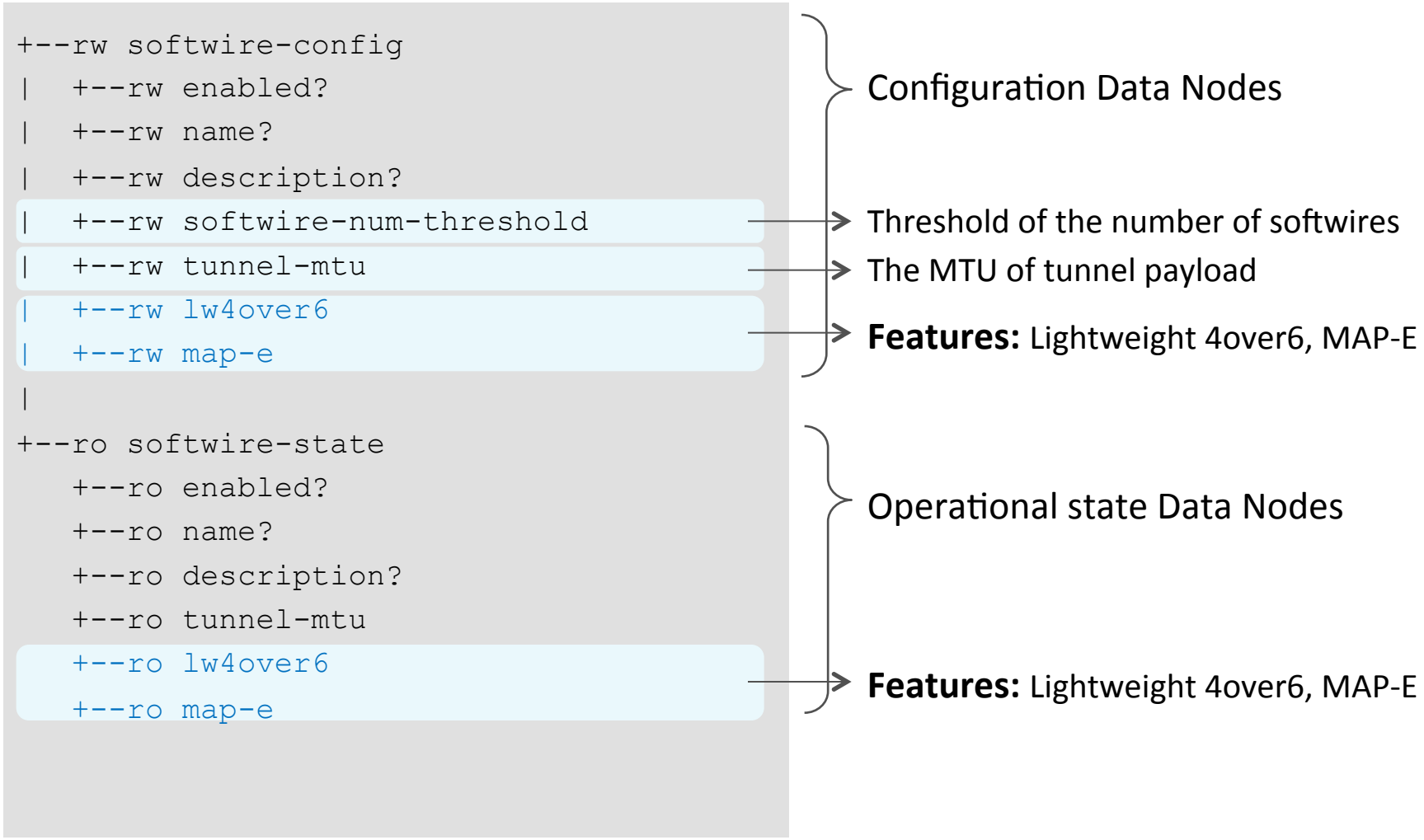
- Some relevant YANG concepts:
  - '**Container**': Group a set of function parameters.
  - '**Feature**': Marks a portion of the model as optional, allowing different devices to support different functions.
- Softwire YANG model includes two logical sections:
  - **Common module:** the common parameters across different scenarios
  - **Scenario module** for each different mechanism
    - Use 'Feature' statement to distinguish devices. For instance, the lw4over6 device only needs to implement lw4over6 function.
    - Use 'Container' statement to group specific parameters of 'lw4over6' and 'map-e'

Softwire YANG Module: An Overview



Conceptual diagram only for specific parameters and mapping to YANG data nodes refer to the draft.

Softwire YANG Module: Common module



Softwire YANG Module: lw4over6

```
+--rw softwire-config
|  +--...
|  +--rw lw4over6
|     +--rw lwaftrs
|        +--rw lwaftr* [id]
|           +--rw id
|           +--rw lwaftr-ipv6-addr
|           +--rw binding-table
|              +--rw binding-entry* [id]
|                 +--rw id
|                 +--rw binding-ipv4-addr
|                 +--rw port-set
|                 |  +--rw offset
|                 |  +--rw psid-len
|                 |  +--rw psid
|                 +--rw binding-ipv6-addr
|                 +--rw active
+--ro softwire-state
   +--...
```

as a **feature**

Container: Lightweight 4over6

IPv6 address of a lwAFTR

Binding table on a lwAFTR

Softwire YANG Module: map-e

```
+--rw softwire-config
|  +--...
|  +--rw map-e
|     +--rw map-brs
|        +--rw map-br* [id]
|           +--rw id
|           +--rw br-ipv6-addr
|           +--rw map-rule-table
|              +--rw map-rule-entry* [id]
|                 +--rw id
|                 +--rw IPv6-prefix
|                 +--rw IPv6-prefix-len
|                 +--rw IPv4-prefix
|                 +--rw IPv4-prefix-len
|                 +--rw port-set
|                 |  +--rw offset
|                 |  +--rw psid-len
|                 |  +--rw psid
|                 +--rw ea-len
|                 +--rw active
+--ro softwire-state
   +--...
```

as a **feature**

Container : MAP-E

IPv6 address of a MAP BR

MAP Rules on a MAP BR

Some Pending Issues

- Current: A+P style, encapsulation based mechanisms:
  - MAP-E BRs
  - Lightweight 4over6 lwAFTRs
- Question for the WG:

  a) Include DS-Lite?
    - CGN YANG model might be complex (and not in scope for the SW WG)
    - **Suggestions:**
      - **NAT-related considerations should be left for a dedicated document**
      - **IPv4-in-IPv6 aspects may be covered in this one as it is similar to lw4over6**

  b) Include MAP-T/4rd?
    - Experimental, not Standard Track
    - **Suggestion: Declare those as out of scope.**

  c) Include configuration and management of CPEs?
    - **Suggestion: ??**

Next Steps

- Agree on the scope
- Define RPC & Notification YANG data model.

- Adopt it as a WG item?
- Request review by NETMOD WG

Backup: Relationship with MIB

- From the view of monitoring, the ‘map-e’ portion of this YANG model is similar to the MAP-MIB.
- YANG/NETCONF provides something more: management AND configuration of devices.