YANG Schema Mount

draft-ietf-schema-mount-02

Martin Björklund
⟨mbj@tail-f.com⟩

Ladislav Lhotka
⟨lhotka@nic.cz⟩

18 July 2016
Objectives

Provide a data modelling mechanism for defining compound schemas: a schema is embedded at a specific location of another schema.

+---rw if:interfaces
    +---rw if:interface* [name]
        ...  
        +---rw ip:ipv4  
        +---rw ip:ipv6  
        ...  
    +---rw logical-device* [name]
        +---rw name  
        ...  
        +---rw if:interfaces
            +---rw if:interface* [name]
                ...  
                +---rw ip:ipv4  
                +---rw ip:ipv6  
                ...  
            + ...  

- subschemas are self-contained and isolated from the top-level schema and other subschemas,
- arbitrary number of nesting levels,
- same modules may be used repeatedly in the top-level schema and/or subschemas.
Components of the Solution

1. YANG library specifies all modules in the top-level schema **including** the module *ietf-yang-schema-mount*.

```json
"module": [
  {
    "name": "example-logical-devices",
    "revision": "2016-07-18",
    "namespace": "urn:example:logical-devices",
    "conformance-type": "implement"
  },
  {
    "name": "ietf-interfaces",
    "revision": "2014-05-08",
    "conformance-type": "implement"
  },
  ...
  {
    "name": "ietf-yang-schema-mount",
    "revision": "2016-07-01",
    "conformance-type": "implement"
  }
]
```
2. **anydata node(s) containing the mount-point extension statement.**

```yang
module example-logical-devices {
  yang-version 1.1;
  namespace "urn:example:logical-devices";
  prefix exld;

  import ietf-yang-schema-mount {
    prefix yangmnt;
  }

  container logical-devices {
    list logical-device {
      key name;
      leaf name {
        type string;
      }
      yangmnt:mount-point logical-device;
    }
  }
}
```
3. state data specifying the subschema for each mount point

   a. in place, schema analogous to yang library, or

   b. by referring to a YANG library instance that is mounted under the mount point.

```json
{
   "ietf-yang-schema-mount:mount-points": {
     "mount-point": [
       {
         "module": "example-logical-devices",
         "name": "logical-device",
         "modules": {
           "module": [
             {
               "name": "ietf-interface",
               "revision": "2014-05-08",
               "conformance-type": "implement"
             },
             ...,
           ]
         }
       }
     }
   }
}
```
**Extension Statement** `mount-point`
Mount Points Only Under **anydata**

Advantages:

- compatible with old clients that don’t understand schema mount,
- unique context in which the `mount-point` extension can be used.

Drawbacks:

- adds extra level of schema hierarchy,
- makes the schema less strict – *any* data may be present.

**Proposal:** Define a capability serving as conformance statement – the server advertising it will accept only data defined by a mounted schema inside an `anydata` instance containing the `mount-point` extension.
Is It What We Want?

The current mechanism should work fine for implementing servers with ad hoc compound schemas, including use cases like peer mount.

However, *it is not a data modelling tool*: the overall schema has to be constructed in an iterative way.

It is unclear how a compound schema involving schema mount could be published, especially with multiple levels of embedding.
DSDL Inspiration

1. External reference pattern in RELAX NG:

   element logical-devices {
       external "logical-device.rnc" *
   }

   Embedded grammars in RELAX NG aren’t completely isolated, they can refer to definitions in the parent grammar.

   Providing a similar mechanism in YANG would require a new statement.
2. Namespace-based Validation Dispatching Language (NVDL)

A separate meta-schema language is used for splitting the schema of a compound document into fragments based on namespaces, and assigning a schema to each fragment.

Advantages:

- more flexible and modular, existing schemas can be combined in different way,
- schemas expressed in different schema languages can be used in the same compound schema.

YSDL (draft-lhotka-netmod-ysdl-00, expired) tried to adapt this approach to YANG.