



Augmented-by Addition into the ietf-yang-library

draft-ietf-netconf-yang-library-augmentedby-01

IETF 121 CORE

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Background & Motivation

A default action of libnetconf2:

The open-source library we use (libnetconf2) by default get all YANG modules at the beginning to be able to learn module relationship (import, include, augment, deviate). When testing program on router, it takes 10 min before we can send a get.

Reverse-dependency is bottle-neck:

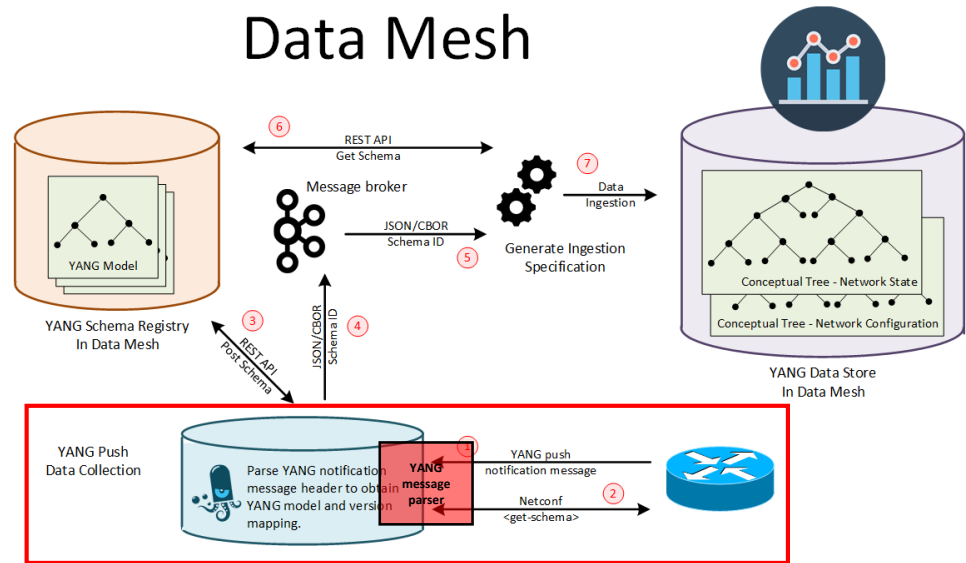
Augment&deviations cannot be parsed from module, how to learn about them is a problem.

Two solutions are proposed:

-> get all modules

-> parse message element header/namespace

YANG-Push Integration into Apache Kafka



Background & Motivation

Get-all-schemas

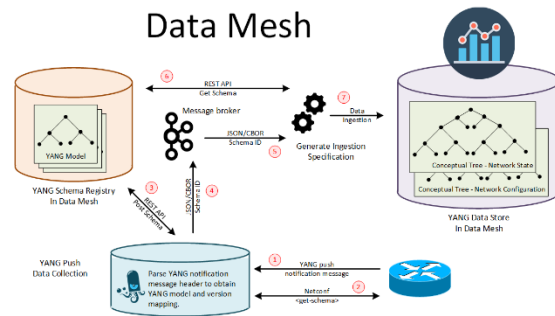
What it is: Fetch **all YANG models** and parse them to fully understand their relationship

Limitation: Time-consuming. Hard to reflect module changes. Require extra procession of all modules.

Performance:

Device 1	Device 2
Around 5 min	Around 3 min

Evaluation: Not ideal in the data real-time ingestion background



Real-time parse message

What it is: Parse prefix in the message to know the augmentation.

Principle: In the received YANG-push message, fields name with prefix(Or element with namespace) are from the augment module.

```
"datastore-contents": {
  "ietf-interfaces:interfaces": [
    {
      "interface": {
        "name": "eth0",
        "type": "iana-if-type:ethernetCsmacd",
        "oper-status": "up",
        "speed": "1000000"
        "ietf-ip:ipv4": {
          "enabled": true,
          "forwarding": true
        }
      }
    }
  ]
}
```

Evaluation: Dependency missing are highly possible, since not all augments will appear in the first message but it may do in the following.

ietf-yang-library-augmentedby

before

```
module: ietf-yang-library
  +--ro yang-library
  | +--ro module-set* [name]
  | | +--ro name          string
  | | +--ro module* [name]
  | | | +--ro name          yang:yang-identifier
  | | | +--ro revision?    revision-identifier
  | | | +--ro namespace    inet:uri
  | | | +--ro location*    inet:uri
  | | | +--ro submodule* [name]
  | | | | +--ro name        yang:yang-identifier
  | | | | +--ro revision?  revision-identifier
  | | | | +--ro location*  inet:uri
  | | | +--ro feature*    yang:yang-identifier
  | | | +--ro deviation*  -> ../../module/name
  | | +--ro import-only-module* [name revision]
  | | | +--ro name          yang:yang-identifier
  | | | +--ro revision      union
  | | | +--ro namespace    inet:uri
  | | | +--ro location*    inet:uri
  | | | +--ro submodule* [name]
  | | | | +--ro name        yang:yang-identifier
  | | | | +--ro revision?  revision-identifier
  | | | | +--ro location*  inet:uri
  | | | +--ro feature*    yang:yang-identifier
  | | | +--ro deviation*  -> ../../module/name
  | | +--ro yanglib-aug:augmented-by* -> ../../yanglib:module/name
  | +--ro schema* [name]
  | | +--ro name          string
  | | +--ro module-set*  -> ../../module-set/name
  | +--ro datastore* [name]
  | | +--ro name          ds:datastore-ref
  | | +--ro schema        -> ../../schema/name
  +--ro content-id      string
```



after

```
module: ietf-yang-library
  +--ro yang-library
  | +--ro module-set* [name]
  | | +--ro name          string
  | | +--ro module* [name]
  | | | +--ro name          yang:yang-identifier
  | | | +--ro revision?    revision-identifier
  | | | +--ro namespace    inet:uri
  | | | +--ro location*    inet:uri
  | | | +--ro submodule* [name]
  | | | | +--ro name        yang:yang-identifier
  | | | | +--ro revision?  revision-identifier
  | | | | +--ro location*  inet:uri
  | | | +--ro feature*    yang:yang-identifier
  | | | +--ro deviation*  -> ../../module/name
  | | | +--ro yanglib-aug:augmented-by* -> ../../yanglib:module/name
```

Implementation Status: Hackathon

YANG-Push receiver design with augmented-by:

- Parse “subscription-started” message to learn the subscribed module ->
- According to the subscribed module, hierarchically find the dependency of module ->
- Perform <get-schema> to the module and its dependency module

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Previous solution: get-all-schemas

Design choice of some implementation and standard library.

Drawback: Time-consuming to do. Not ideal to be used in the Data Mesh Telemetry architecture.

Advantage: Produce an complete understanding of YANG module and their relationship.

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Improved solution: find dependency with ietf-yang-library

By adding the augmented-by list in the ietf-yang-library, the module has the ability to provide reverse dependency List.

Avoiding getting all schemas to know the dependency of module, the solution extracts reverse dependency by sending a <get> request to ietf-yang-library.

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Feature implemented and tested on Huawei test release.

In the new Huawei test release, the augmented-by feature is implemented and able to be exposed in ietf-yang-library.

The libyangpush test program has run on it and tested the find-dependency solution.

Use Case: CORECONF?

Gaps:

=> The module is identified by SID, to learn about the reverse dependency, the client is still required to maintain all YANG file?

⇒ The number of modules in CORECONF device?

```
module: ietf-constrained-yang-library
+--ro yang-library
  +--ro module-set* [index]
    +--ro index          uint8
    +--ro module* [identifier]
      +--ro identifier    sid:sid
      +--ro revision?    revision-identifier
      +--ro namespace?   inet:uri
      +--ro location*    inet:uri
      +--ro submodule* [identifier]
        +--ro identifier    sid:sid
        +--ro revision?    revision-identifier
        +--ro location*    inet:uri
      +--ro feature*     sid:sid
      +--ro deviation*   -> ../../module/identifier
    +--ro import-only-module* [identifier revision]
      +--ro identifier    sid:sid
      +--ro revision      union
      +--ro namespace?   inet:uri
      +--ro location*    inet:uri
      +--ro submodule* [identifier]
        +--ro identifier    sid:sid
        +--ro revision?    revision-identifier
        +--ro location*    inet:uri
  +--ro schema* [index]
    +--ro index          uint8
    +--ro module-set*   -> ../../module-set/index
  +--ro datastore* [identifier]
    +--ro identifier    ds:datastore-ref
    +--ro schema        -> ../../schema/index
  +--ro checksum        binary

notifications:
+---n yang-library-update
  +--ro checksum      -> /yang-library/checksum
```

Wrap Up

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Resources:

<https://github.com/Zephyre777/draft-lincla-netconf-yang-library-augmentation.git>

<https://datatracker.ietf.org/doc/draft-lincla-netconf-yang-library-augmentation/>

Reference:

<https://datatracker.ietf.org/doc/draft-ietf-nmop-yang-message-broker-integration/03/>