



# Augmented-by Addition into the ietf-yang-library

draft-lincla-netconf-yang-library-augmentdeby-01

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# Overview

## Background:

Augment the ietf-yang-library to provide the augmented-by list that tells the module is augmented by which other modules(refer to Fig.1).

## Use Case: (draft-ietf-nmop-yang-message-broker-integration)

Improve YANG-Push receiver solution by reducing the amount of time taken to find subscribed module relationship. Integrated in libyangpush.

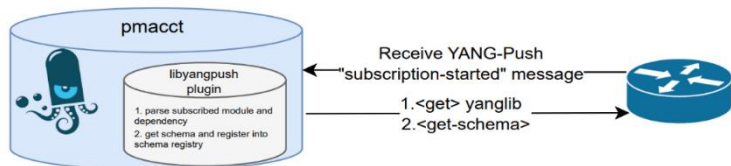


Figure 1. YANG-Push receiver diagram

```
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
```

Figure 1. ietf-yang-library-augmentedby tree view

# Hackathon Plan

- <What problem we are working on?>
  - The implementation for draft-lincla-netconf-yang-library-augmentdeby
  - Provide a light weight solution for finding reverse dependency (from potentially minutes to near seconds)
    - This is required for closed-loop
- <How do we planned to solve it?>
  - Create an docker image for netopeer2 with the augmented-by feature
  - Implement find-dependency solution with augmented-by list

# Hackathon Plan

- <What we have improved?>
  - IETF119 Hackathon:
    - Augmentedby feature implemented with libyang and sysrepo and tested with netopeer2
  - IETF120 Hackathon:
    - Netopeer2 and related library upgraded and tested with the newest version
    - The feature implementation is wrapped using Docker
    - Integrate libyangpush find-dependency solution with augmented-by feature

# What got done

## Netopeer2 Docker

- To facilitate people who are interested in this feature to run and test it, a Docker for running netopeer2 and libyangpush is created.
- The augmented-by feature is integrated in the [libyang](#) and [sysrepo](#)
- By connecting to the netopeer2-server in this docker, user can query yanglib and get the augmented-by list.

# What got done

## Netopeer2 Docker

```
libyangpush / docker_jetf120 / Dockerfile
z50031928 feat: get and parse yanglib 6dcaebb · 2 hours ago History
Code Blame 95 lines (71 loc) · 4.49 KB Raw Download Edit History
1 FROM ubuntu:20.04
2
3 ENV GIT_SSL_NO_VERIFY=1
4
5 RUN apt update && DEBIAN_FRONTEND=noninteractive TZ=Etc/UTC apt install git g++ wget libtool libpython3-dev libjansson-dev libyang-dev python3 pkgconf cmake libz-dev
6
7 RUN apt install libpam0g-dev
8
9 # Install openssl@3.3.1
10 RUN git clone https://github.com/openssl/openssl.git openssl
11 RUN cd openssl && ./configure && make && make install
12
13 # Install m4@1.4.19
14 RUN wget --no-check-certificate https://ftp.gnu.org/gnu/m4/m4-1.4.19.tar.gz
15 RUN tar xvf m4-1.4.19.tar.gz
16 RUN cd m4-1.4.19 && ./configure && make install
17
18 # Install autoconf@2.71
19 RUN wget --no-check-certificate https://ftp.gnu.org/gnu/autoconf/autoconf-2.71.tar.gz
20 RUN tar xvf autoconf-2.71.tar.gz
21 RUN cd autoconf-2.71 && ./configure && make install
22
23 # Install automake@1.16.5
24 RUN wget --no-check-certificate https://ftp.gnu.org/gnu/automake/automake-1.16.5.tar.gz
25 RUN tar xvf automake-1.16.5.tar.gz
26 RUN cd automake-1.16.5 && ./configure && make install
27
28 # Install libtool@2.4.7
29 RUN wget --no-check-certificate https://ftp.gnu.org/gnu/libtool/libtool-2.4.7.tar.gz
30 RUN tar xvf libtool-2.4.7.tar.gz
31 RUN cd libtool-2.4.7 && ./configure && make install
32
33 # Install pkgconf@1.9.5
34 RUN git clone --depth 1 --branch pkgconf-1.9.5 https://github.com/pkgconf/pkgconf.git pkgconf
35 RUN cd pkgconf && ./autogen.sh && ./configure && make install
```

# What got done

## Netopeer2 Docker

```
> get --filter-xpath /ietf-yang-library:yang-library/module-set/module[name='ietf-interfaces']/*
DATA
<data xmlns="urn:ietf:params:xml:ns:netconf:base:1.0">
  <yang-library xmlns="urn:ietf:params:xml:ns:yang:ietf-yang-library">
    <module-set>
      <name>complete</name>
      <module>
        <name>ietf-interfaces</name>
        <revision>2018-02-20</revision>
        <namespace>urn:ietf:params:xml:ns:yang:ietf-interfaces</namespace>
        <location>file:///sysrepo/build/repository/yang/ietf-interfaces@2018-02-20.yang</location>
        <augmented-by xmlns="urn:ietf:params:xml:ns:yang:ietf-yang-library-augmentedby">ietf-ip</augmented-by>
        <augmented-by xmlns="urn:ietf:params:xml:ns:yang:ietf-yang-library-augmentedby">ietf-network-instance</augmented-by>
      </module>
    </module-set>
  </yang-library>
</data>
```

# What got done

## Libyangpush find-dependency

- The find-dependency solution of libyangpush is implemented to use the yanglib content to find reverse dependency
- Compared to the previous get-all-schemas solution, it can help collector reduce the time to process and get required module and dependency



# What got done

## Libyangpush find-dependency

```
<notification xmlns="urn:ietf:params:xml:ns:netconf:notification:1.0">
  <eventTime>2022-09-02T10:59:55.32Z</eventTime>
  <sysName xmlns="urn:ietf:params:xml:ns:yang:ietf-notification-sequencing">example-router</sysName>
  <sequenceNumber xmlns="urn:ietf:params:xml:ns:yang:ietf-notification-sequencing">187653</sequenceNumber>
  <subscription-started xmlns="urn:ietf:params:xml:ns:yang:ietf-subscribed-notifications">
    <id>2222</id>
    <datastore xmlns="urn:ietf:params:xml:ns:yang:ietf-yang-push"
      xmlns:ds="urn:ietf:params:xml:ns:yang:ietf-datastores">ds:operational</datastore>
    <datastore-xpath-filter xmlns="urn:ietf:params:xml:ns:yang:ietf-yang-push"
      xmlns:sn="urn:ietf:params:xml:ns:yang:ietf-subscribed-notifications"/>ietf-interfaces:interfaces</datastore-x
    <module-version xmlns="urn:ietf:params:xml:ns:yang:ietf-yang-push-revision">
      <module-name>ietf-interfaces</module-name>
      <revision>2014-05-08</revision>
      <revision-label/>
    </module-version>
    <transport>ietf-udp-notif-transport:udp-notif</transport>
    <encoding>encode-json</encoding>
    <periodic xmlns="urn:ietf:params:xml:ns:yang:ietf-yang-push">
      <period xmlns="urn:ietf:params:xml:ns:yang:ietf-yang-push">100</period>
    </periodic>
  </subscription-started>
</notification>
```

# What got done

## Libyangpush find-dependency

```
<get xmlns="urn:ietf:params:xml:ns:netconf:base:1.0">
  <data>
    <yang-library xmlns="urn:ietf:params:xml:ns:yang:ietf-yang-library">
      <module-set>
        <name>complete</name>
        <module>
          <name>ietf-interfaces</name>
          <revision>2018-02-20</revision>
          <namespace>urn:ietf:params:xml:ns:yang:ietf-interfaces</namespace>
          <location>file:///sysrepo/build/repository/yang/ietf-interfaces@2018-02-20.yang</location>
          <augmented-by xmlns="urn:ietf:params:xml:ns:yang:ietf-yang-library-augmentedby">ietf-ip</augmented-by>
          <augmented-by xmlns="urn:ietf:params:xml:ns:yang:ietf-yang-library-augmentedby">ietf-network-instance</augmented-by>
        </module>
      </module-set>
    </yang-library>
  </data>
</get>
```

```
augmentation list size 2
deviation list size 0
augmented-by module:
ietf-ip
ietf-network-instance
```

# What got done

## Libyangpush find-dependency

- This avoid getting all modules to find reverse dependency.
- Get all modules is usually a heavy task. According to Cisco XR published YANG module(more than 1k)
- With this solution we shrink the processing time from minutes to milliseconds.

Greg-Brown-1 Upload of Cisco IOS XR 7.11.2 Yang Models (#1549) ✓

Name	Last commit message
..	
2411	Upload of Cisco IOS XR 24.1.1 Yang Models (#1544)
530	Moved capabilities files to the top; removed empty categories. (#858)
531	Moved capabilities files to the top; removed empty categories. (#858)
532	Moved capabilities files to the top; removed empty categories. (#858)
533	Moved capabilities files to the top; removed empty categories. (#858)
534	Moved capabilities files to the top; removed empty categories. (#858)
600	Moved capabilities files to the top; removed empty categories. (#858)
601	Moved capabilities files to the top; removed empty categories. (#858)
602	Moved capabilities files to the top; removed empty categories. (#858)
611	Moved capabilities files to the top; removed empty categories. (#858)
612	Moved capabilities files to the top; removed empty categories. (#858)
613	Moved capabilities files to the top; removed empty categories. (#858)

# 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/>
- [https://github.com/network-analytics/libyangpush/tree/feature/draft\\_augmentedby](https://github.com/network-analytics/libyangpush/tree/feature/draft_augmentedby)
- <https://github.com/Zephyre777/sysrepo>
- <https://github.com/Zephyre777/libyang>

## Reference:

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