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Internet-Draft B. Claise

Intended status: Standards Track Huawei

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3 March 2025

Augmented-by Addition into the IETF-YANG-Library

draft-ietf-netconf-yang-library-augmentedby-02

Abstract

This document augments the ietf-yang-library to provide the

augmented-by list. It facilitates the process of obtaining all dependencies between YANG modules, by querying the

network management server's YANG library.

Discussion Venues

This note is to be removed before publishing as an RFC.

Source for this draft and an issue tracker can be found at

https://github.com/Zephyre777/draft-lincla-netconf-yang-library-

augmentation.

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1. Introduction

The YANG library [RFC8525] specifies a YANG module that provides

module information such as submodule list and deviation list to help

a client listing all datastores supported by a network

management server and the schema that is used by each of these

datastores.

According to Section 4.2.8 and 5.6.3 in [RFC7950], both augmentations and deviations

define additional nodes internal or external to the module, which are the reverse dependencies of a YANG module. Reverse and dependencies and import as in Section 5.1.1 of RFC 7950 are both crucial informations to

understand all dependencies of a YANG module,. However, currently it is

difficult to obtain the YANG schema tree RFC 8340 without obtaining and

parsing all YANG modules from a management server. The deviation list defined in YANG

library enables client to obtain the module reverse dependency

without having to get and parse all YANG modules. However, the

augmentation list is not defined in it.

Since both augmentation and deviation work as YANG module

dependencies, it is reasonable to document them the same way in the

YANG library. Having both augmentation and

deviation directly available in the YANG library provides an easy and

light-weight solution for determining the reverse dependencies.

Therefore, this document proposes a YANG module that augments the YANG

library to include the YANG module augmentation information.

1.1. Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT",

"SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and

"OPTIONAL" in this document are to be interpreted as described in BCP

14 [RFC2119] [RFC8174] when, and only when, they appear in all

capitals, as shown here.

The terminology from [RFC8525] is used in this document

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Tree diagrams in this document use the notation defined in [RFC8340]

The terms "client" is used as defined in [RFC6241] for NETCONF and

[RFC8040] for RESTCONF. .

2. Motivation

When using a YANG module, it is necessary to make sure that all its

dependencies are presented. [RFC7950] identifies four types of

dependencies between YANG modules:

\* Import: the "import" statement allows a module or submodule to

reference definitions defined in other modules.

\* Include: the "include" statement is used in a module to identify

each submodule that belongs to it.

\* Augmentation: the "augment" statement defines the location in the

data model hierarchy where additional nodes are inserted.

\* Deviation: the "deviation" statement defines a fragment of a

module that the server does not implement.

The import and include are direct dependencies which can be obtained

by parsing the YANG module source code, while the augmentation and

deviation are reverse dependencies which are defined in another

module.

For the reverse dependencies, since they are defined externally, it

is not possible to discover them by parsing the YANG module. The

current way to discover the reverse dependencies is to query all YANG

modules from the server and parse them. This is a lengthy process,

which must be repeated for each client that requires these

information.

According to the definition of module ietf-yang-library defined in

[RFC8525], in the schema content of a module in container yang-

library, the deviation is provided to describe that a module is deviated by

which other modules. If the YANG library could directly report all reverse

dependencies, it would provide a much easier and light-weight

solution to find module all dependencies, compared to obtaining and

parsing all modules.

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The YANG library only provides the deviation list without augmentations. With augmentation being more widely used and

defined, and with use cases to automate

network management, augmentations becomes essential information for clients to better understand the network management servers module relationships. Thus, the

YANG library should be extended to also provide the augmentation

information.

From the perspective of implementation difficulty, it is easy to

adapt the device implementation to include augmentation, since

augmentation and deviation have similar way of working.

3. Use Cases

As the demand for YANG-based telemetry [RFC8641] arises, there is a

need for real-time knowledge of a specific YANG module's dependency

list when a specific YANG-Push notification is received.

The alternative for a YANG-Push receiver is to collect and store the

entire module set for every single server who could be streaming

data. This approach is not always practical due to the following

reasons:

\* For a YANG-Push receiver => we never know in advance which or

from which YANG-Push publisher the subscriber YANG content will be received from.

\* Querying all the YANG modules is time consuming and overhead considering that only a subset of YANG nodes of management server are subscribed.

This section introduces two use cases that reflect the motivation for

extending YANG library. One targets solving dependency problems in a

data mesh data architecture while the other aims at building a data

catalog that makes YANG module information easily accessible.

3.1. Data Mesh Data Architecture

A network analytics architecture that integrates YANG-Push and Kafka

is proposed and is continuously growing and gaining influence, refer

to the draft: An Architecture for YANG-Push to Apache Kafka

Integration [I-D.ietf-nmop-yang-message-broker-integration]. This

open-source project encompasses contributions such as Support of

Versioning in YANG Notifications Subscription

[I-D.ietf-netconf-yang-notifications-versioning] or Support of

Network Observation Timestamping in YANG Notifications

[I-D.

netana-netconf-notif-envelope

], among others.

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The purpose of this project is to provide adequate information to the

YANG-Push subscription state change notifications so that the module and

its dependencies can be parsed and retrieved automatically from the vantage

point. The architecture relies on the information of YANG dependencies to realize to solve the

problem of missing YANG semantics when notifications are transformed or indexed in Time

Series Database. To solve the problem, a schema registry

is introduced to store YANG modules and all their relationships

(Direct and reverse dependencies). The schema is obtained by

NETCONF <get-schema> of the subscribed YANG schema tree, which is obtained

by parsing the <subscription-started> message of each YANG-Push

subscription.

Therefore, an

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independent process containing multiple <get-schema> operations is

launched after each new YANG-Push subscription module has been known.

However, the complexity remains at:

\* How dependencies of YANG modules are found (so that

the YANG-Push subscription message has the complete set of module

dependencies for its subscribed YANG schema tree)?

\* How do we conduct <get-schema>?

Currently, the method used for obtaining modules and finding module

dependencies is "get-all-schemas", where the YANG client retrieves

all YANG modules from the network device to enable later the client

can fully understand and utilize all modules and module dependencies

of device. This process is very heavy because in a real situation,

each device may implement hundreds of YANG modules, requiring up to

several minutes to complete in the worse case. Besides, the need

of parsing all YANG modules and finding all the dependencies adds a

small extra delay. Applying this method to obtain YANG modules will

make the operation very costly, since after each subscribed module is

learned, "get-all-schemas" needs to be re-performed.

Therefore, considering the Network Observability real-time aspects, this extra

delay in collecting (and processing) the dependencies through a get-

all-schemas approach is not realistic.

It's more efficient to get dependencies only for the required modules

.

By using the provided the augmentation information in ietf-yang-

library, the YANG-Push receiver can directly obtain the YANG reverse

dependencies by obtaining the contents of the YANG library, saving

collection (and processing time) at the YANG-Push receiver and therefore

helping with the near real-time aspects of Network Observability and enabling closed loop actions.

3.2. Data Catalog

Finding the YANG modules implemented by a network management server is paramount

for configuring and monitoring the status of a network. However,

since the inception of YANG the network industry has experienced a

tsunami of YANG modules developed by SDOs, open-source communities,

and network vendors. This heterogeneity of YANG modules, that vary

from one network device model to another, makes the management of a

multi-vendor network a big challenge for operators.

[Martinez-Casanueva2023]

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In this regard, a data catalog provides a registry of the datasets

exposed by remote data sources for consumers to discover data of

interest. Besides the location of the dataset (i.e., the data

source), the data catalog registers additional metadata such as the

data model (or schema) followed in the dataset or even related terms

defined in a business glossary.

Data catalog solutions typically implement collectors that ingest

metadata from the data sources themselves and external metadata

sources. For example, a Kafka Schema Registry is a metadata source

that provides metadata about the data models followed by some data

stored in a Kafka topic.

In this sense, a YANG-enabled network device can be considered as

another kind of data source, which the Data Catalog can pull metadata

from. For instance, the data catalog can include a connector that

fetches metadata about the YANG modules implemented by the network

device. Combining these metadata with other such as the business

concept "interface", would enable data consumers to discover which

datasets related to the concept "interface" are exposed by the

network device.

Network devices that implement YANG library expose metadata about

which YANG modules are implemented, and which are only imported.

However, what a data consumer needs at the end are the YANG modules

implemented by the device, hence, the combination of implemented YANG

modules with other YANG modules that might deviate or augment the

formers.

Coming back to the example of datasets related to the "interface"

concept, say we have a network device that implements the ietf-

interfaces module [RFC8343] and the ietf-ip module [RFC8344], where

the latter augments the former. For a data catalog to collect these

metadata, a connector would retrieve YANG library data from the

target device. However, the current version of YANG library would

not satisfy the use case as it would tell that the device implements

both ietf-interfaces and ietf-ip modules, but will miss the augment

dependency between them.

The current workaround is in combination with

the YANG library data to additionally obtain both YANG modules and

process them to discover that there is an augment dependency. This

adds extra burden on the connector, which is forced to combine

multiple metadata collection mechanisms. This process could be

softened by extending YANG library to also capture augment

dependencies, in a similar fashion to deviation dependencies.

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4. The "ietf-yang-library-augmentedby" YANG module

This YANG module augments the ietf-yang-library module by adding the

augmented-by list in the "yang-library/module-set". The name

"augmented-by" indicates the modules by which the current module is

being directly augmented. For the definition of "augmented-by", this

draft only considers the direct augmentation relationship. The

recursive result of augmentation or transitive dependency for module

specified along the xpath, are out of the scope of this draft.

Section 4.2 has given the implementation instructions.

Note that this module only augments the ietf-yang-library defined in

[RFC8525]. At the time of writing this document, most vendors

support [RFC7895], a previous revision of the ietf-yang-library YANG

module. The module that augments [RFC7895] is provided in the

Appendix B.

4.1. Data Model Overview

4.1.1. Tree View

The following is the YANG tree diagram for model ietf-yang-library-

augmentedby.

module: ietf-yang-library-augmentedby

augment /yanglib:yang-library/yanglib:module-set/yanglib:module:

+--ro augmented-by\* -> ../../yanglib:module/name

4.1.2. Full Tree View

The following is the YANG tree diagram[RFC8340] for the ietf-yang-

library with the augmentation defined in module ietf-yang-library-

augmentedby, including the RPCs and notifications.

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

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| | | +--ro feature\* yang:yang-identifier

| | | +--ro deviation\* -> ../../module/name

| | | +--ro yanglib-aug:augmented-by\*

-> ../../yanglib: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 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

x--ro modules-state

x--ro module-set-id string

x--ro module\* [name revision]

x--ro name yang:yang-identifier

x--ro revision union

+--ro schema? inet:uri

x--ro namespace inet:uri

x--ro feature\* yang:yang-identifier

x--ro deviation\* [name revision]

| x--ro name yang:yang-identifier

| x--ro revision union

x--ro conformance-type enumeration

x--ro submodule\* [name revision]

x--ro name yang:yang-identifier

x--ro revision union

+--ro schema? inet:uri

notifications:

+---n yang-library-update

| +--ro content-id -> /yang-library/content-id

x---n yang-library-change

x--ro module-set-id -> /modules-state/module-set-id

4.1.3. YANG Module

The YANG module source code of ietf-yang-library-augmentedby in which

augmentation to the ietf-yang-library of [RFC8525] is defined.

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<CODE BEGINS> file "ietf-yang-library-augmentedby@2023-10-27.yang"

module ietf-yang-library-augmentedby {

yang-version 1.1;

namespace "urn:ietf:params:xml:ns:yang:ietf-yang-library-augmentedby";

prefix yanglib-aug;

import ietf-yang-library {

prefix yanglib;

reference

"RFC 8525: YANG Library";

}

organization

"IETF NETCONF (Network Configuration) Working Group";

contact

"WG Web: <https://datatracker.ietf.org/wg/netconf/>

WG List: <mailto:netconf@ietf.org>

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IGNACIO DOMINGUEZ MARTINEZ-CASANUEVA

<matilto:ignacio.dominguezmartinez@telefonica.com>";

description

"This module augments the ietf-yang-library defined in

[RFC8525] to provide not only the deviation list, but also

the augmented-by list, in order to give sufficient

information about the YANG modules reverse dependency. It

facilitates the process of obtaining the entire

dependencies of YANG module.

The key words 'MUST', 'MUST NOT', 'REQUIRED', 'SHALL',

'SHALL NOT', 'SHOULD', 'SHOULD NOT', 'RECOMMENDED',

'NOT RECOMMENDED', 'MAY', and 'OPTIONAL' in this document

are to be interpreted as described in BCP 14 (RFC 2119)

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(https://trustee.ietf.org/license-info).

This version of this YANG module is part of RFC XXXX; see the

RFC itself for full legal notices. ";

revision 2023-10-27 {

description

"Added list augmented-by in yang-library/module-set/module to

make the module store the entire reverse dependency information

(augmented-by and deviation).";

reference

"RFC XXXX: Support of augmentedby in ietf-yang-library";

}

augment "/yanglib:yang-library/yanglib:module-set/yanglib:module" {

description

"Augment the augmented-by list from module info with the

module-augmented-by grouping" ;

leaf-list augmented-by {

type leafref {

path "../../yanglib:module/yanglib:name";

}

description

"Leaf-list of the augmentation used by this server to

modify the conformance of the module associated with

this entry. Note that the same module can be used for

augmented-by for multiple modules, so the same

entry MAY appear within multiple 'module' entries.

This reference MUST NOT (directly or indirectly)

refer to the module being augmented.

Robust clients may want to make sure that they handle a

situation where a module augments itself (directly or

indirectly) gracefully.";

}

}

}

<CODE ENDS>

4.2. Implementation Instructions

4.2.1. The scope of augmented-by

This section defines the scope of augmented-by.

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The "augmented-by" list should only consider those YANG modules that

directly augment the YANG module in question in the ietf-yang-

library. The "directly augment" is identified by the relationship

between the augment module and the target node's parent module that

it augments to. Only the direct parent module of the target node is

augmented, and the rest of parent modules defined in the schema tree

are only indirect dependencies but not augmented modules. (Refer to

"Target node" definition in Section 7.17 of [RFC7950])

In the case when a YANG application requires recursive dependency or

specific schema tree dependency, the search logic should be

implemented by the application itself.

A YANG example with the expected augmented-by result is provided in

Section 4.2.2.

4.2.2. An example of YANG module augmented-by result

There are module A, B, C, D and E, which have the following

relationships:

\* Module A is the base module with container "foo-a"

\* Module B augments "/a:foo-a" with container "foo-b"

\* Module C augments "/a:foo-a/b:foo-b" with leaf "leaf-c", and it

defines a container "foo-c"

\* Module D augments "/c:foo-c" with container "foo-d"

\* Module E augments "/c:foo-c" with contaienr "foo-e"

The augmented-by result for module A, B and C is the following:

\* Module A is augmented-by: Module B

\* Module B is augmented-by: Module C

\* Module C is augmented-by: Module D, E

Module D, E have no augmented-by result.

5. Implementation Status

Note to the RFC-Editor: Please remove this section before publishing

(This follows the template in RFC7942).

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5.1. Netopeer2 at IETF119 Hackathon

Zhuoyao Lin did the prototype implementation of the augmented-by list

feature of this draft and demonstrated it based on Netopeer2 in IETF

119 Hackathon.

Netopeer2 is a NETCONF server & client implementation developed by

CESNET. Source code is here: [NTP17]. The actual feature is

implemented by extending the libyang [LY16] and sysrepo [SR16] which

are the base libraries for Netopeer2 to support populating the

augmented-by list.

5.2. Netopeer2 at IETF120 Hackathon

Zhuoyao Lin did a docker image of netopeer2 that integrates the

augmented-by feauture in sysrepo and libyang. The result is

presented at IETF 120 hackathon.

The source code can be obtained here: [NP24]

5.3. Libyangpush Find-dependency

Zhuoyao Lin did an implementation of find-dependency based on the

ietf-yang-library with augmented-by feature in the YANG-Push message

parser library libyangpush. The result is presented in IETF 120

hackathon.

The source code can be obtained here: [NP24]

6. Changes

6.1. draft-lincla-netconf-yang-library-augmentation: Changes from 00 to

01

The list name has been updated from "augmentation" to "augmented-by",

in order to represent the usage clearly.

The leafref has been changed from absolute path "/yanglib:yang-

libraray/yanglib:module-set/yanglib:module/yanglib:name" to relative

path "../../yanglib:module/yanglib:name". The YANG validation in the

appendix A shows that this path can work as expected.

Section 5 Implementation and section 6 Changes has been added.

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6.2. draft-lincla-netconf-yang-library-augmentedby version 00

Updated the Use case content in Section 3.1. Add explanation: the

scope of use case "Data Mesh Architecture" is limited to configured

subscription.

Updated Implementation status content.

6.3. draft-lincla-netconf-yang-library-augmentedby: Changes from 00 to

01

Updated affiliations

Update content of Section 3.1 Data Mesh use case. Explain the

limitation of applying get-all-schemas solution under the background

of using UDP-notif of configured subscription, and how the feature

proposed in the draft can improve the solution.

Full review of document. Nits and refinement of sections.

6.4. draft-lincla-netconf-yang-library-augmentedby: Changes from 01 to

02

Rewrite Section 2 Motivation.

Update Section 6 Changes's subsection title.

Update the Section 7 security consideration and section 8 IANA

Considerations.

Added in the appendix the Impact Analysis of ietf-yang-library and

proposal for the RFC8525bis draft.

6.5. draft-ietf-netconf-yang-library-augmentedby version 00

Resubmitted the draft name from:

draft-lincla-netconf-yang-library-augmentedby-02

to:

draft-ietf-netconf-yang-library-augmentedby-00

6.6. draft-ietf-netconf-yang-library-augmentedby: Changes from 00 to 01

Correct the yanglint validation invalid example.

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Updated the explaination to the yanglint validation example

principle.

Delete Section "ietf-yang-library Impact Analysis, as an evaluation

for RFC8525bis". The idea of updating the RFC8525 is paused.

6.7. draft-ietf-netconf-yang-library-augmentedby: Changes from 01 to 02

Update and rephrase the Introduction section.

Add Section 4.2 Implementation Instructions. Address in

Section 4.2.1 that the definition of "augmented-by" only consider the

direct augment. A YANG example for explaining this purpose has been

put into Section 4.2.2.

Draft refinement.

Reference update.

7. Security Considerations

The YANG module specified in this document defines a schema for data

that is designed to be accessed via network management protocols such

as NETCONF [RFC6241] or RESTCONF [RFC8040]. The lowest NETCONF layer

is the secure transport layer, and the mandatory-to-implement secure

transport is Secure Shell (SSH) [RFC6242]. The lowest RESTCONF layer

is HTTPS, and the mandatory-to-implement secure transport is TLS

[RFC8446].

The Network Configuration Access Control Model (NACM) [RFC8341]

provides the means to restrict access for particular NETCONF or

RESTCONF users to a preconfigured subset of all available NETCONF or

RESTCONF protocol operations and content.

The readable node defined in this YANG module may be considered

sensitive or vulnerable in some network environments. It is thus

important to control read access(e.g., via get, get-config, or

notification) to this data node. The following is the explanation to

data node's sensitivity/vulnerability:

The "augmented-by" node in this YANG module could reveal all modules

that are augmenting one module. It could help attacker identify the

relationship between modules and server implementations known bugs.

Server vulnerabilities may include but not restricted to: 1. Too

many augmented-by records causes buffer overflow. 2. The augmented-

by node help identify through the inter-relation of modules how to

cause the server to crash or significantly degrade device

performance.

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8. IANA Considerations

This document registers one URI in the "IETF XML Registry" [RFC3688].

Following the formate in [RFC3688], the following registration has

been made.

URI: urn:ietf:params:xml:ns:yang:ietf-yang-library-augmentedby

Registration Contact: The NETCONF WG of the IETF.

XML: N/A, the requested URI is an XML namespace.

This document registers one YANG module in the "YANG Module Names"

registry [RFC6020]

name: ietf-yang-library-augmentedby

namespace: urn:ietf:params:xml:ns:yang:ietf-yang-library-augmentedby

prefix: yanglib-aug

reference: [I-D.ietf-netconf-yang-library-augmentedby]

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Appendix A. YANG module validation with yanglint

This section gives a few examples that the user can try themselves

with yanglint. This is created to prove the syntax correctness. The

examples shoud be used with YANG modules ietf-yang-library and ietf-

yang-libarary-augmentedby as schemas.

The examples provided are ietf-yang-library 'yang-library' data xml

file containing the augmented-by field.

The valid example should pass the validation while the invalid one

will not. The difference is that in the invalid example, the module

in one module-set has augmented module in another module-set, which

is illegal according to the ietf-yang-library definition.

A.1. A valid ietf-yang-library data example

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<CODE BEGINS> file "example\_valid.xml"

<yang-library xmlns="urn:ietf:params:xml:ns:yang:ietf-yang-library">

<content-id>1</content-id>

<module-set>

<name>ms1</name>

<module>

<name>module1</name>

<revision>2024-02-29</revision>

<namespace>urn:ietf:params:xml:ns:yang:module1</namespace>

<augmented-by

xmlns="urn:ietf:params:xml:ns:yang:

ietf-yang-library-augmentedby">module2</augmented-by>

<augmented-by

xmlns="urn:ietf:params:xml:ns:yang:

ietf-yang-library-augmentedby">module3</augmented-by>

</module>

<module>

<name>module2</name>

<revision>2024-02-29</revision>

<namespace>urn:ietf:params:xml:ns:yang:module2</namespace>

</module>

<module>

<name>module3</name>

<revision>2024-02-29</revision>

<namespace>urn:ietf:params:xml:ns:yang:module3</namespace>

</module>

</module-set>

</yang-library>

<modules-state xmlns="urn:ietf:params:xml:ns:yang:ietf-yang-library">

<module-set-id>0</module-set-id>

</modules-state>

<CODE ENDS>

A.2. An invalid ietf-yang-library data example

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<CODE BEGINS> file "example\_invalid.xml"

<yang-library xmlns="urn:ietf:params:xml:ns:yang:ietf-yang-library">

<content-id>1</content-id>

<module-set>

<name>ms1</name>

<module>

<name>module1</name>

<revision>2024-02-29</revision>

<namespace>urn:ietf:params:xml:ns:yang:module1</namespace>

<augmented-by

xmlns="urn:ietf:params:xml:ns:yang:

ietf-yang-library-augmentedby">module3</augmented-by>

<augmented-by

xmlns="urn:ietf:params:xml:ns:yang:

ietf-yang-library-augmentedby">module2</augmented-by>

</module>

<module>

<name>module3</name>

<revision>2024-02-29</revision>

<namespace>urn:ietf:params:xml:ns:yang:module3</namespace>

</module>

</module-set>

<module-set>

<name>ms2</name>

<module>

<name>module2</name>

<revision>2024-02-29</revision>

<namespace>urn:ietf:params:xml:ns:yang:module2</namespace>

</module>

</module-set>

</yang-library>

<modules-state xmlns="urn:ietf:params:xml:ns:yang:ietf-yang-library">

<module-set-id>0</module-set-id>

</modules-state>

<CODE ENDS>

Appendix B. YANG Module augmenting RFC7895

This section defines the ietf-yang-library-rfc7895-augmentedby that

augments the ietf-yang-library defined in [RFC7895]. The module-

state/module list of this YANG module version is also defined in the

[RFC8525] version though deprecated.

B.1. Tree View for YANG module augmenting RFC7895

The following is the YANG tree diagram for ietf-yang-library-

rfc7895-augmentedby augmenting RFC7895.

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module: ietf-yang-library-rfc7895-augmentedby

augment /yanglib:modules-state/yanglib:module:

x--ro augmentedby\* [name revision]

+--ro name -> /yanglib:modules-state/module/name

+--ro revision -> /yanglib:modules-state/module/revision

B.2. Full Tree View for ietf-yang-library with augmentation to RFC7895

The following is the full YANG tree diagram of ietf-yang-library-

rfc7895-augmentedby augmenting ietf-yang-library defined in RFC7895.

module: ietf-yang-library

+--ro modules-state

+--ro module-set-id string

+--ro module\* [name revision]

+--ro name yang:yang-identifier

+--ro revision union

+--ro schema? inet:uri

+--ro namespace inet:uri

+--ro feature\* yang:yang-identifier

+--ro deviation\* [name revision]

| +--ro name yang:yang-identifier

| +--ro revision union

+--ro conformance-type enumeration

+--ro submodule\* [name revision]

| +--ro name yang:yang-identifier

| +--ro revision union

| +--ro schema? inet:uri

x--ro yanglib-aug:augmented-by\* [name revision]

+--ro yanglib-aug:name

-> /yanglib:modules-state/module/name

+--ro yanglib-aug:revision

-> /yanglib:modules-state/module/revision

notifications:

+---n yang-library-change

+--ro module-set-id -> /modules-state/module-set-id

B.3. YANG module augmenting RFC7895

The YANG module that augments the ietf-yang-library RFC7895.

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<CODE BEGINS>

file "ietf-yang-library-rfc7895-augmentedby@2023-10-27.yang"

module ietf-yang-library-rfc7895-augmentedby {

yang-version 1.1;

namespace "urn:ietf:params:xml:ns:yang:ietf-yang-library-rfc7895-augmentedby";

prefix yanglib-aug;

import ietf-yang-library {

prefix yanglib;

revision-date 2016-06-21;

reference

"RFC 7895: YANG Module Library.";

}

organization

"IETF NETCONF (Network Configuration) Working Group";

contact

"WG Web: <https://datatracker.ietf.org/wg/netconf/>

WG List: <mailto:netconf@ietf.org>

Author: Zhuoyao Lin

<mailto:zhuoyao.lin1@huawei-partners.com>

Author: Benoit Claise

<mailto:benoit.claise@huawei.com>

Author: IGNACIO DOMINGUEZ MARTINEZ-CASANUEVA

<matilto:ignacio.dominguezmartinez@telefonica.com>";

description

"This document augments the ietf-yang-library to provide the

augmented-by list. It facilitates the process of obtaining

the entire dependencies between YANG modules, by directly

querying the server's YANG module.

The key words 'MUST', 'MUST NOT', 'REQUIRED', 'SHALL',

'SHALL NOT', 'SHOULD', 'SHOULD NOT', 'RECOMMENDED',

'NOT RECOMMENDED', 'MAY', and 'OPTIONAL' in this document

are to be interpreted as described in BCP 14 (RFC 2119)

(RFC 8174) when, and only when, they appear in all

capitals, as shown here.

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Relating to IETF Documents

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(https://trustee.ietf.org/license-info).

This version of this YANG module is part of RFC XXXX; see the

RFC itself for full legal notices. ";

revision 2023-10-27 {

description

"Added list augmentedby in yang-library/modules-state/module to

make the module store the entire reverse dependency information

(augmentedby and deviation).";

reference

"RFC XXXX: Support of augmentedby in ietf-yang-library

defined in RFC7895";

}

augment "/yanglib:modules-state/yanglib:module" {

description

"Augment the augmentedby from module info with the

module-augmented-by grouping" ;

uses yanglib-aug:module-state-augmented-by;

}

/\*

\* Groupings

\*/

grouping module-state-augmented-by {

description

"This grouping defines a list with keys being the module

name and revison. The list contains the augmented-by list.";

list augmented-by {

key "name revision";

status deprecated;

description

"List of YANG augmented-by module names and revisions

used by this server to modify the conformance of

the module associated with this entry. Note that

the same module can be used for augmented-by for

multiple modules, so the same entry MAY appear

within multiple 'module' entries.

The augment module MUST be present in the 'module'

list, with the same name and revision values.

The 'conformance-type' value will be 'implement' for

the augment module.";

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leaf name {

type leafref {

path "/yanglib:modules-state/yanglib:module/yanglib:name";

}

description

"Identifies a given module in the YANG Library by

its name.";

}

leaf revision {

type leafref {

path "/yanglib:modules-state/yanglib:module/yanglib:revision";

}

description

"Revision of the module";

}

}

}

}

<CODE ENDS>

Contributors

The following people all contributed to creating this document:

Acknowledgements

The author would like to thank Jan Lindblad and Jean Quilbeuf for

their help during the design of the YANG module, and Rob Wilton,

Thomas Graf for their valuable comments.

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Internet-Draft Augmented-by Addition into the IETF-YANG March 2025

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