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Augmented-by Addition into the IETF-YANG-Library

draft-ietf-netconf-yang-library-augmentedby-05

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

dependencies and the include, import as defined in Section 5.1.1 of

[RFC7950] are both crucial information for understanding all

dependencies of a YANG module. However, currently it is difficult to

obtain the YANG schema tree [RFC8340] without obtaining and parsing

all YAG 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.

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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

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

[RFC8040] for RESTCONF.

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

.

2. Motivation

When using YANG modules, 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 this

information.

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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.

The YANG library only provides the deviation list, without

augmentations. With augmentations being more widely used and

defined, and with use cases to automate network management,

augmentations become essential information for clients to better

understand the network management server 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 work similarly.

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 for a given subscription 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 => from

which YANG-Push publisher the subscribed YANG content is ging to be received is not known until the first notification is being received.

\* 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 architecture while the other aims at building a data

catalog that makes YANG module information easily accessible.

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3.1. Data Mesh 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.

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

YANG-Push subscription state change notifications so that when 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. As a solution to provide the missing YANG

semantics, 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.

When obtaining the dependency modules of a YANG module, an

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 worst 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 module will

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

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

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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]

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.

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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.

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" and "yang-library/

modules-state". The "yang-library/module-state" is augmented despite

of its "deprecated" state to cope with the situation when container

"modules-state" is used for compatibility reason with ietf-yang-

library defined in [RFC7895]. The name of list "augmented-by"

indicates by which modules that the current module is being directly

augmented.

For the scope 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

4.1. Data Model Overview

4.1.1. Tree View

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

augmentedby.

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module: ietf-yang-library-augmentedby

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

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

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

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

4.1.2. Full Tree View

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

library after adding augmentation from module ietf-yang-library-

augmentedby. The RPCs and notifications are included as well.

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

| | +--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

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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

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

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.

<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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<mailto:benoit.claise@huawei.com>

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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Relating to IETF Documents

(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 2025-05-28 {

description

"Initial revision.";

reference

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

}

grouping augmented-by {

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";

}

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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.";

}

}

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

description

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

augmented-by grouping" ;

uses augmented-by;

}

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

status deprecated;

description

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

augmented-by grouping" ;

uses augmented-by;

}

}

<CODE ENDS>

4.2. Implementation Instructions

4.2.1. The scope of augmented-by

This section defines the scope of augmented-by.

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])

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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).

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.

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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.

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.

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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.

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.

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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.

6.8. draft-ietf-netconf-yang-library-augmentedby: Changes from 02 to 03

Merge review comment from Thomas.

6.9. draft-ietf-netconf-yang-library-augmentedby: Changes from 03 to 04

Update module content ietf-yang-library-augmentedby: Organise the

augmentation content to grouping; Add augmentation to modules-state

container.

Appendix B is deleted.

6.10. draft-ietf-netconf-yang-library-augmentedby: Changes from 04 to

05

Update ietf-yang-library-augmentedby module revision.

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.

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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.

8. IANA Considerations

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

Following the format 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.

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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

<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>

Contributors

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