

NETCONF  
Internet-Draft  
Updates: 8525 (if approved)  
Intended status: Standards Track  
Expires: 22 June 2026

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19 December 2025

Augmented-by Addition to the YANG Library  
draft-ietf-netconf-yang-library-augmentedby-13

## 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-linclanetconf-yang-library-augmentation>.

## Status of This Memo

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## 1. Introduction

The YANG library [RFC8525] provides information about the data model supported by the server. This is presented as an inventory of YANG modules. It helps a client with 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], augment defines additional nodes to the module while deviations change (add, modify, delete) properties (sub-statements) to other module's schema nodes. They provide crucial information about the YANG data model composition, and is referred to as reverse dependency in this document: this means the behavior of a schema node depends on external modifications, creating flow backward from the augmenting/deviation module to the base module.

Currently, it is difficult to obtain the YANG schema tree (defined in Section 3 in [RFC7950]) without obtaining and parsing all the 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.

One specific limitation with the implementation of this augmented-by YANG module specification is, the modules and the augmented-by modules require now to be listed in the same module-set. Note that a similar restriction already applies for the YANG deviations.

### 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.

The term "YANG schema tree" is used as defined in the terminology in [RFC7950]

The term 'NMDA' which is defined as the title of [RFC8342] is used in this document.

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

This document defines the following term:

- \* **Reverse Dependency:** is the dependency YANG modules that provide external modification to the behavior of a base YANG module, by inserting additional nodes (augment) or deviating existing nodes (deviation).

## 2. Motivation

When using YANG modules, it is necessary to make sure that all its dependencies are present. [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.
- \* **Augment:** the augmentation 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.

According to the definition of the module ietf-yang-library defined in [RFC8525], the "deviation" list describes that a module is deviated by which other modules. Since deviations and augmentations work similarly, if the YANG library could directly report all reverse dependencies, including augmentations, it would provide a much easier and light-weight solution to find module all dependencies, compared to obtaining and parsing all modules. In addition, to avoid causing problems in devices, for instance, falsely referring to modules in the wrong module-set, this document requires that the base modules and the augmentations be listed in the same module-set.

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.

### 3. Use Cases

#### 3.1. Data Mesh Architecture

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.

Some YANG-Push receivers will collect the information in advance of the telemetry collection, storing the entire module set for every single server who could be streaming data. However, this approach is not always practical in case of Configured Subscriptions [RFC8639] where the YANG-Push receiver is not configuring the subscriptions itself and in case of UDP transport [I-D.ietf-netconf-udp-notif]. See figure 1 in An Architecture for YANG-Push to Message Broker Integration [I-D.ietf-nmop-yang-message-broker-integration] for more details.

This architecture relies on the information of YANG dependencies in this specification to solve the problem of missing YANG semantics when notifications are transformed or indexed in Time Series Database.

Prior to the implementation of this specification, the method used for obtaining modules and finding module dependencies is to retrieve the full set of supported YANG modules from the network device, triggered by parsing the <subscription-started> message for each new YANG-Push subscription, because the YANG-push receiver would not know which YANG-Push publisher sends the subscribed YANG content until the first notification is received.

By using the provided the augmentedby information in this specification, the YANG-Push receiver can directly obtain the YANG reverse dependencies for the specific YANG module(s) in the subscription by querying the server, saving collection and processing time at the YANG-Push receiver, by querying dependencies only for the required modules, and therefore helping with the real-time aspects of network observability.

Following is an example YANG-Push message of this use case received from within a subscription to YANG module ietf-interfaces:

```
"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  
        }  
      }  
    }  
  ]  
}
```

To correctly interpret the semantics of this message, both the ietf-interfaces and ietf-ip YANG modules are required. Knowing only that the subscribed YANG module is ietf-interfaces is therefore insufficient, but that is currently the only dependency information exposed by the subscription information. In this case, a lightweight mechanism is needed to discover all relevant dependency modules, especially reverse dependencies (refer to ietf-ip in this example) so that every YANG module referenced in the pushed data can be reliably identified.

### 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 this 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 this 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, similarly 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 leaf-list in the "yang-library/module-set" and "yang-library/modules-state". The name of list "augmented-by" indicates by which modules that the current module is being directly augmented.

The "yang-library/module-state" is augmented despite its "deprecated" state to cope with the situation when container "modules-state" is used for compatibility reason with ietf-yang-library defined in [RFC7895]. Both the NMDA[RFC8342] and non-NMDA compliant additions are defined in the same YANG module for simplicity for users and implementors.

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, is out of the scope of this draft. Section 4.2 has given the implementation instructions.

#### 4.1. Data Model Overview

##### 4.1.1. YANG ietf-yang-library-augmentedby 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
augment /yanglib:modules-state/yanglib:module:
  +--ro augmented-by*   -> ../../yanglib:module/name
```

##### 4.1.2. YANG ietf-yang-library-augmentedby Module

This YANG modules imports and augments the modules ietf-yang-library [RFC8525].

```
<CODE BEGINS> file "ietf-yang-library-augmentedby@2025-05-28.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
```

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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) (RFC 8174) when, and only when, they appear in all capitals, as shown here.

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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: Augmented-by Addition to the YANG Library";  
}
```

```
grouping augmented-by {  
  description  
    "Augment the augmented-by leaf-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."
}
}

augment "/yanglib:yang-library/yanglib:module-set/yanglib:module" {
  description
    "Augments the augmented-by leaf-list from module info with the
    augmented-by grouping.

    The 'augmented-by' leaf-list should only consider those YANG
    modules that directly augment the YANG module associated
    with this entry, and the augmenting and augmented modules
    must be defined in the same module-set.

    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 the 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)
    ";
  uses augmented-by;
}

augment "/yanglib:modules-state/yanglib:module" {
  status deprecated;
  description
    "Augments the augmented-by leaf-list from module info with the
    augmented-by grouping.

    The 'augmented-by' leaf-list should only consider those YANG
    modules that directly augment the YANG module associated
```

with this entry, and the augmenting and augmented modules must be defined in the same module-set.

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 the 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)

```
    ";  
    uses augmented-by;  
  }  
}  
<CODE ENDS>
```

## 4.2. Implementation Instructions

### 4.2.1. The scope of augmented-by

This section explains the scope of augmented-by.

The "augmented-by" leaf-list should only consider those YANG modules that directly augment the YANG module in question in the ietf-yang-library, and the augmenting and augmented modules must be defined in the same module-set.

The "direct 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 the 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

This section provides a module-set to explain the definition of "direct augment" stated in Section 4.2.1.

There are Modules A, B, C, 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"

In this example, while the XPath that Module C augments to contains container "foo-a" defined in Module A, the actual target node it directly augments to is "foo-b" in Module B. Therefore, Module C is not an augmentation for Module A and does not appear in the "augmented-by" leaf-list of Module A. Only Module B, which is directly augmenting to "foo-a", is an "augmented-by" for Module A.

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

```
<CODE BEGINS>
file "example_augmentedby_result.xml"
<yang-library xmlns="urn:ietf:params:xml:ns:yang:ietf-yang-library">
  <content-id>1</content-id>
  <module-set>
    <name>module-set1</name>
    <module>
      <name>a-module</name>
      <revision>2025-06-18</revision>
      <namespace>urn:ietf:params:xml:ns:yang:a-module</namespace>
      <augmented-by
        xmlns="urn:ietf:params:xml:ns:yang:
        ietf-yang-library-augmentedby">b-module</augmented-by>
      </module>
    <module>
      <name>b-module</name>
      <revision>2025-06-18</revision>
      <namespace>urn:ietf:params:xml:ns:yang:b-module</namespace>
      <augmented-by
        xmlns="urn:ietf:params:xml:ns:yang:
        ietf-yang-library-augmentedby">c-module</augmented-by>
      </module>
    <module>
      <name>c-module</name>
      <revision>2025-06-18</revision>
      <namespace>urn:ietf:params:xml:ns:yang:c-module</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>
```

## 5. Operational Considerations

With the implementation of augmented-by, the modules and the augmented-by modules require now to be listed in the same module-set.

## 6. Implementation Status

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

### 6.1. 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.

### 6.2. Netopeer2 at IETF120 Hackathon

Zhuoyao Lin did a docker image of netopeer2 that integrates the augmented-by feature in sysrepo and libyang. The result is presented at IETF 120 hackathon.

The source code can be obtained here: [NP24]

### 6.3. 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]

### 6.4. Device Implementations

This section introduced the device implementations status [NA25] of this document from vendors like Huawei, Cisco, 6Wind.

The list of Router Images supporting (upcoming and already implemented) the ietf-yang-library-augmentedby YANG module proposed in this document is following:

- \* Huawei VRP R025C00 for NE8000 and NE40 (2025-10-15).  
<https://support.huawei.com/>
- \* Cisco IOS XR 25.3.1 (2025-08-31). <https://software.cisco.com/>
- \* Huawei VRP R024C10 for MA5800T-X17 (2025-06-30).  
<https://support.huawei.com/>
- \* 6WIND VSR 3.10. <https://www.6wind.com/>

## 7. Changes

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

### 7.1. 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 B shows that this path can work as expected.

Section 5 Implementation and section 6 Changes has been added.

### 7.2. 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.

### 7.3. 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.

#### 7.4. 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.

#### 7.5. 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

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

Correct the yanglint validation invalid example.

Updated the explanation 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.

#### 7.7. 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.

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

Merge review comment from Thomas.

## 7.9. 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.

## 7.10. draft-ietf-netconf-yang-library-augmentedby: Changes from 04 to 05

Update ietf-yang-library-augmentedby module revision.

## 7.11. draft-ietf-netconf-yang-library-augmentedby: Changes from 05 to 06

Merged Jean, Thomas and Alex's editorial feedback.

Merged Andy's review.

Changed contents are listed following:

- \* Section 1: Rewrite introduction. Added definition for 'reverse dependency'. Avoid possible misleading expression about reverse dependency and external dependency.
- \* Section 2: Editorial Changes.
- \* Section 3: Merged editorial feedback from Alex, mainly for Section 3.1.
- \* Section 4: Move the full tree diagram to appendix A; Correct the YANG file date; Update the description statement in YANG module to provide implementation instructions information; Improve the text of implementation instruction and the direct augment example.
- \* Appendix: For Appendix A: The ietf-yang-library full tree view has been moved to Appendix A. For Appendix B: The yanglint validation example has been moved from Appendix A to Appendix B. The invalid yanglint example has been removed. Set up texted has been added before the validation example.

7.12. draft-ietf-netconf-yang-library-augmentedby: Changes from 06 to 07

Change the reference in IANA Consideration to 'RFC-to-be'.

7.13. draft-ietf-netconf-yang-library-augmentedby: Changes from 07 to 08

Merged Per's review and comments.

7.14. draft-ietf-netconf-yang-library-augmentedby: Changes from 08 to 09

Updated YANG module's line length and spacing. Corrected the "author" to "authors".

Corrected typo.

Added section 5 Operational Considerations to explain that the base and augmentedby modules should be in the same module-set.

7.15. draft-ietf-netconf-yang-library-augmentedby: Changes from 09 to 10

Corrected the typo of 'requires'.

Moved RFC8525 reference to Normative References section.

7.16. draft-ietf-netconf-yang-library-augmentedby: Changes from 10 to 11

Mentioned in the title that this document updates RFC8525.

7.17. draft-ietf-netconf-yang-library-augmentedby: Changes from 12 to 13

Updated draft according to the AD review.

## 8. Security Considerations

This section follows the guidelines in Section 3.7 of [I-D.ietf-netmod-rfc8407bis].

The "ietf-yang-library-augmentedby" YANG module defines a data model that is designed to be accessed via YANG-based management protocols, such as NETCONF [RFC6241] and RESTCONF [RFC8040]. These YANG-based management protocols require the use of a secure transport layer (e.g., SSH [RFC4252], TLS [RFC8446], and QUIC [RFC9000]) and require mutual authentication.

The Network Configuration Access Control Model (NACM) [RFC8341] provides a means to restrict access for particular NETCONF or RESTCONF users to a preconfigured subset of all available NETCONF or RESTCONF protocol operations and content.

There are no writable ("config true") data nodes defined in this YANG module.

This YANG module defines only readable ("config false") data nodes. Some of these readable data nodes may be considered sensitive or vulnerable in some network environments. It is important to control read access (e.g., via get, get-config, or notification) to these data nodes.

Specifically, the following readable data nodes contain potentially sensitive information:

- \* /yang-library/module-set/module/augmented-by
- \* /modules-state/module/augmented-by (modules-state is deprecated)

These nodes expose the augmentation relationships among modules implemented by a server. Unauthorized read access could help an attacker identify implementation structure, optional features, or software components present on a server, which might then be used to target known platform vulnerabilities. Therefore, access control policies SHOULD restrict read access to authorized users only.

There are no RPCs or action operations defined in this module. Therefore, there are no particularly sensitive RPC or action operations.

This module uses groupings from the YANG Library defined in [RFC8525]. The reusable groupings originate from a module that contains readable schema information. Readers should refer to the Security Considerations section of [RFC8525] for additional information about the sensitivity of schema-related information.

Other than the considerations described above, this module does not introduce additional security risks beyond those described in the referenced RFCs.

## 9. 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 IESG.

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: RFC-to-be

Maintained by IANA: N

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#### Appendix A. Full Tree View of ietf-yang-library

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
  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

```

## Appendix B. YANG module validation with yanglint

This section gives an example of the yang-library content that the user can try themselves with yanglint. This is created to demonstrate and validate the correct syntax. The example should be compiled with YANG modules ietf-yang-library and ietf-yang-library-augmentedby as schemas.

The examples provided are ietf-yang-library 'yang-library' data XML file containing the augmented-by field.

### B.1. An ietf-yang-library yang-library data XML example

The yang-library XML example concerns the following module-set:

There are module1, module2, module3, which have the following relationships:

- \* Module 1 is the base module with container "foo1"
- \* Module 2 augments "/module1:foo1" with container "foo2"
- \* Module 3 augments "/module1:foo1" with leaf "leaf3"

All three YANG modules are defined in the same module-set name 'ms1' to be able to augment or be augmented by the others. Otherwise, the yanglint validation should fail.

The example is following:

```
<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>
```

## Acknowledgments

The author would like to thank Jan Lindblad and Jean Quilbeuf for their help during the design of the YANG module, and Thomas Graf, Rob Wilton, Andy Bierman, Jean Quilbeuf, Alex Huang Feng, Per Andersson, Mahesh Jethanandani for their valuable review and comments.

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