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Constrained YANG Module Library  
draft-veillette-core-cool-library-00

## Abstract

This document describes a library, which provides information about all YANG modules implemented by a CoOL server endpoint. A simple caching mechanism is provided to minimize retrieval of this information by CoOL clients.

## Status of This Memo

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## Table of Contents

<a href="#">1.</a>	Introduction . . . . .	<a href="#">2</a>
<a href="#">2.</a>	Terminology and Notation . . . . .	<a href="#">2</a>
<a href="#">3.</a>	Overview . . . . .	<a href="#">3</a>
<a href="#">3.1.</a>	Tree diagram . . . . .	<a href="#">3</a>
<a href="#">3.2.</a>	Description . . . . .	<a href="#">4</a>
<a href="#">3.2.1.</a>	modules-state . . . . .	<a href="#">4</a>
<a href="#">3.2.2.</a>	modules-state/module-set-id . . . . .	<a href="#">4</a>
<a href="#">3.2.3.</a>	modules-state/module . . . . .	<a href="#">4</a>
<a href="#">4.</a>	YANG Module "ietf-cool-library" . . . . .	<a href="#">5</a>
<a href="#">5.</a>	IANA Considerations . . . . .	<a href="#">10</a>
<a href="#">5.1.</a>	YANG Module Registry . . . . .	<a href="#">10</a>
<a href="#">6.</a>	Security Considerations . . . . .	<a href="#">10</a>
<a href="#">7.</a>	Acknowledgments . . . . .	<a href="#">11</a>
<a href="#">8.</a>	References . . . . .	<a href="#">11</a>
<a href="#">8.1.</a>	Normative References . . . . .	<a href="#">11</a>
<a href="#">8.2.</a>	Informative References . . . . .	<a href="#">11</a>
	Author's Address . . . . .	<a href="#">12</a>

[1.](#) Introduction

The YANG module defined in this memo is available to CoOL clients to discover the different YANG data models supported by a CoOL server endpoint. The following YANG module information is needed by client applications to fully utilize the YANG data modeling language:

- o module list: The list of YANG modules implemented by the CoOL server endpoint, each module is identified by its SID and revision.
- o submodule list: The list of YANG submodules included by each module, each submodule is identified by its SID and revision.
- o feature list: The list of features supported by each YANG module, each feature is identified by its SID.
- o deviation list: The list of YANG modules used for deviation statements associated with each YANG module, each module is identified by its SID and revision.

[2.](#) Terminology and Notation

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [[RFC2119](#)].

The following terms are defined in [[I-D.ietf-netmod-rfc6020bis](#)]:

Veillette

Expires February 24, 2017

[Page 2]

---

Internet-Draft

Constrained YANG Module Library

August 2016

- o module
- o submodule
- o feature
- o deviation

The following terms are defined in [[I-D.somaraju-core-sid](#)]:

- o Structured Identifier (SID)

The following terms are defined in [[I-D.veillette-core-cool](#)]:

- o CoOL client
- o CoOL server
- o endpoint

The following terms are used within this document:

- o library: a collection of YANG modules used by a server endpoint

### [3.](#) Overview

The "ietf-cool-library" module provides information about the YANG library used by a server endpoint. This module is defined using YANG version 1, but it supports the description of YANG modules written in any revision of YANG.

#### [3.1.](#) Tree diagram

A simplified graphical representation of the YANG module specified in this document (ietf-cool-library) is provided below. The meaning of the symbols in this diagram is as follows:

- o Brackets "[" and "]" enclose list keys.
- o Abbreviations before data node names: "rw" means configuration data (read-write) and "ro" state data (read-only).
- o Symbols after data node names: "?" means an optional node, "!" means a presence container, and "\*" denotes a list and leaf-list.

```

module: ietf-cool-library
  +--ro modules-state
    +--ro module-set-id      union
    +--ro module* [sid revision]
      +--ro sid              sid
      +--ro revision         revision
      +--ro feature*         sid
      +--ro deviation* [sid revision]
        | +--ro sid          sid
        | +--ro revision     revision
      +--ro conformance-type enumeration
      +--ro submodule* [sid revision]
        +--ro sid            sid
        +--ro revision       revision
  notifications:
    +---n cool-library-change
      +--ro module-set-id    -> /modules-state/module-set-id

```

## [3.2.](#) Description

### [3.2.1.](#) modules-state

This mandatory container holds the module set identifier and the list of modules supported by the server endpoint.

### [3.2.2.](#) modules-state/module-set-id

This mandatory leaf contains an identifier representing the current set of modules and submodules used by a server endpoint. This

identifier is endpoint-specific when implemented as unit32 or shared between multiple endpoints on one or multiple servers when implemented as identityref. The value of this leaf MUST change whenever the set of modules and submodules in the library changes. There is no requirement that the same set always results in the same module-set-id value.

This leaf allows a client to fetch the module list once, cache it, and only re-fetch it if the value of this leaf has been changed.

If the value of this leaf changes, the server also generates a "cool-library-change" notification, with the new value of "module-set-id".

### [3.2.3.](#) modules-state/module

This mandatory list contains one entry for each YANG module supported by the server endpoint. There MUST be an entry in this list for each revision of each YANG module that is used by the server.

## [4.](#) YANG Module "ietf-cool-library"

RFC Ed.: update the date below with the date of RFC publication and remove this note.

```
<CODE BEGINS> file "ietf-cool-library@2016-06-01.yang"
module ietf-cool-library {
  namespace "urn:ietf:params:xml:ns:yang:ietf-cool-library";
  prefix "coollib";

  organization
    "IETF CORE (Constrained RESTful Environments) Working Group";

  contact
    "WG Web:  <http://datatracker.ietf.org/wg/core/>

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

    WG Chair: Carsten Bormann
               <mailto:cabo@tzi.org>

    WG Chair: Jaime Jimenez
```

<mailto:jaime.jimenez@ericsson.com>

Editor: Michel Veillette  
<mailto:michel.veillette@trilliantinc.com>;

description

"This module contains the list of YANG modules and submodules implemented by a CoOL server endpoint.

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This version of this YANG module is part of RFC XXXX; see the RFC itself for full legal notices.";

// RFC Ed.: replace XXXX with actual RFC number and remove  
// this note.

// RFC Ed.: update the date below with the date of the RFC

Veillette

Expires February 24, 2017

[Page 5]

---

Internet-Draft

Constrained YANG Module Library

August 2016

// publication and remove this note.

// RFC Ed.: update [[I-D.somaraju-core-sid](#)] with actual RFC  
// number and remove this note.

```
revision 2016-06-01 {  
  description  
    "Initial revision.";  
  reference  
    "RFC XXXX: Constrained YANG Module Library.";  
}
```

```
/*  
 * Typedefs  
 */
```

```

typedef revision {
    type binary {
        length "4";
    }
    description
        "Revision date encoded as a binary string as follow:
        - First byte = Century
        - Second byte = Year (0 to 99)
        - Third byte = Month (1 = January to 12 = december)
        - Forth byte = Day (1 to 31)";
}

typedef sid {
    type uint32;
    description
        "Unique identifier assigned to different YANG items
        such as data nodes, RPCs and actions, notifications,
        modules, sub-modules, features and deviations. The SID
        registration process is defined in
        [I-D.somaraju-core-sid].";
}

/*
 * Groupings
 */

grouping identification-info {
    description
        "YANG modules and submodules identification information.";

    leaf sid {
        type sid;
    }

```

```

        mandatory true;
        description
            "SID assigned to this module or submodule.";
    }

    leaf revision {
        type revision;
        description

```

```

        "Revision date assigned to this module or submodule.
        A zero-length binary string is used if no revision statement
        is present in the YANG module or submodule.";
    }
}

identity module-set {
    description
        "Base identity from which shared module-set identifiers
        are derived.";
}

/*
 * Operational state data nodes
 */

container modules-state {
    config false;
    description
        "Contain information about the different data models
        implement by a CoOL endpoint.";

    leaf module-set-id {
        type union {
            type uint32;
            type identityref {
                base "coollib:module-set";
            }
        }
        mandatory true;
        description
            "Identifier representing the current set of modules
            and submodules listed in the 'module' list. This
            identifier is endpoint-specific when implemented as
            unit32 or shared between multiple endpoints on one
            or multiple servers when implemented as identityref.
            The server MUST change the value of this leaf each
            time the information represented by the 'module'
            list instance changes.";
    }
}

```

```
list module {
```



```

key "sid revision";
description
    "Each entry represents one revision of one module
    currently supported by the server endpoint.";

uses identification-info;

leaf-list feature {
    type sid;
    description
        "List of YANG features from this module that are
        supported by the server endpoint, regardless whether
        they are defined in the module or any included
        submodule.";
}

list deviation {
    key "sid revision";
    description
        "List of YANG deviation modules used by this server
        endpoint to modify the conformance of the module
        associated with this entry. Note that the same module
        can be used for deviations for multiple modules, so the
        same entry MAY appear within multiple 'module' entries.

        The deviation module MUST be present in the 'module'
        list, with the same sid and revision values.
        The 'conformance-type' value will be 'implement' for
        the deviation module.";

    uses identification-info;
}

leaf conformance-type {
    type enumeration {
        enum implement {
            value 0;
            description
                "Indicates that the server endpoint implements one or
                more protocol-accessible objects defined in the YANG
                module identified in this entry. This includes
                deviation statements defined in the module.

                For YANG version 1.1 modules, there is at most one
                module entry with conformance type 'implement' for a
                particular module, since YANG 1.1 requires that
                at most one revision of a module is implemented.

```

---

```

    For YANG version 1 modules, there SHOULD NOT be more
    than one module entry for a particular module.";
}
enum import {
    value 1;
    description
        "Indicates that the server endpoint imports reusable
        definitions from the specified revision of the module,
        but does not implement any protocol accessible objects
        from this revision.

        Multiple module entries for the same module MAY
        exist. This can occur if multiple modules import the
        same module, but specify different revision-dates in
        the import statements.";
}
mandatory true;
description
    "Indicates the type of conformance the server endpoint is
    claiming for the YANG module identified by this entry.";
}

list submodule {
    key "sid revision";
    description
        "Each entry represents one submodule within the
        parent module.";
    uses identification-info;
}
}

/*
 * Notifications
 */

notification cool-library-change {
    description
        "Generated when the set of modules and submodules supported
        by the server endpoint has changed.";

    leaf module-set-id {
        type leafref {
            path "/coollib:modules-state/coollib:module-set-id";
        }
    }
}
```

mandatory true;  
description

```
        "Contains the module-set-id value representing the
        set of modules and submodules supported at the server
        endpoint at the time the notification is generated.";
    }
}
}
<CODE ENDS>
```

## [5.](#) IANA Considerations

### [5.1.](#) YANG Module Registry

This document registers one YANG module in the YANG Module Names registry [[I-D.ietf-netmod-rfc6020bis](#)].

name: ietf-cool-library

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

prefix: coollib

reference: RFC XXXX

// RFC Ed.: replace XXXX with RFC number and remove this note

## [6.](#) Security Considerations

This YANG module is designed to be accessed via the CoOL protocol [[I-D.veillette-core-cool](#)]. Some of the readable data nodes in this YANG module may be considered sensitive or vulnerable in some network environments. It is thus important to control read access to these data nodes.

Specifically, the 'module' list may help an attacker identify the server capabilities and server implementations with known bugs. Server vulnerabilities may be specific to particular modules, module revisions, module features, or even module deviations. This information is included in each module entry. For example, if a particular operation on a particular data node is known to cause a

server to crash or significantly degrade device performance, then the module list information will help an attacker identify server implementations with such a defect, in order to launch a denial of service attack on the device.

## [7.](#) Acknowledgments

The YANG module defined by this memo have been derived from an already existing YANG module targeting the RESTconf protocol [[I-D.ietf-netconf-restconf](#)]. We will like to thank the authors of this prior work [[I-D.ietf-netconf-yang-library](#)] which have been essential for the development of "ietf-cool-library" targeting the Constrained Objects Language [[I-D.veillette-core-cool](#)] protocol. The authors would also like to thank Andy Bierman for his recommendations and his review of the resulting YANG module.

## [8.](#) References

### [8.1.](#) Normative References

[I-D.ietf-netmod-rfc6020bis]

Bjorklund, M., "The YANG 1.1 Data Modeling Language", [draft-ietf-netmod-rfc6020bis-14](#) (work in progress), June 2016.

[I-D.somaraju-core-sid]

Somaraju, A., Veillette, M., Pelov, A., Turner, R., and A. Minaburo, "Structure Identifier (SID)", [draft-somaraju-core-sid-01](#) (work in progress), July 2016.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), DOI 10.17487/RFC2119, March 1997, <<http://www.rfc-editor.org/info/rfc2119>>.

### [8.2.](#) Informative References

[I-D.ietf-netconf-restconf]

Bierman, A., Bjorklund, M., and K. Watsen, "RESTCONF Protocol", [draft-ietf-netconf-restconf-16](#) (work in progress), August 2016.

[I-D.ietf-netconf-yang-library]

Bierman, A., Bjorklund, M., and K. Watsen, "YANG Module Library", [draft-ietf-netconf-yang-library-06](#) (work in progress), April 2016.

[I-D.veillette-core-cool]

Veillette, M., Pelov, A., Somaraju, A., Turner, R., and A. Minaburo, "Constrained Objects Language", [draft-veillette-core-cool-02](#) (work in progress), July 2016.

Veillette

Expires February 24, 2017

[Page 11]

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Internet-Draft

Constrained YANG Module Library

August 2016

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Veillette

Expires February 24, 2017

[Page 12]