NETCONF
Internet-Draft
Intended status: Standards Track
Expires: April 25, 2009

A. Bierman
Netconf Central
B. Lengyel
Ericsson

October 22, 2008

With-defaults capability for NETCONF
draft-bierman-netconf-with-defaults-01

Status of this Memo

By submitting this Internet-Draft, each author represents that any applicable patent or other IPR claims of which he or she is aware have been or will be disclosed, and any of which he or she becomes aware will be disclosed, in accordance with Section 6 of BCP 79.

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF), its areas, and its working groups. Note that other groups may also distribute working documents as Internet-Drafts.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

The list of current Internet-Drafts can be accessed at http://www.ietf.org/ietf/1id-abstracts.txt.

The list of Internet-Draft Shadow Directories can be accessed at http://www.ietf.org/shadow.html.

This Internet-Draft will expire on April 25, 2009.

Copyright Notice

Copyright (C) The IETF Trust (2008).

Abstract

The NETCONF protocol defines ways to read configuration data from a NETCONF agent. Part of this data is not set by the NETCONF manager, but rather a default value is used. In many situations the NETCONF manager has a priori knowledge about default data, so the NETCONF agent does not need to send it to the manager. In other situations the NETCONF manger will need this data as part of the NETCONF rpc reply messages. This document defines a capability-based extension

to the NETCONF protocol that allows the NETCONF manager to control whether default values are part of NETCONF rpc reply messages.

Table of Contents

1. Introduction 3
1.1. Terminology 3
1.1.1. Requirements Notation 3
1.1.2. NETCONF Terms 3
2. With-defaults Capability 4
2.1. Overview 4
2.1.1. Basic handling of default data 4
2.2. Dependencies 5
2.3. Capability Identifier 5
2.4. New Operations 5
2.5. Modifications to Existing Operations 5
3. Interactions with Other Capabilities 6
4. Data Model XSD 7
5. IANA Considerations 7
6. Security Considerations 9
7. Open Issues 10
7.1. Augmenting the base RPCs 10
7.2. Other default handling methods in the real world? 10
8. Normative References 11
Authors' Addresses 12
Intellectual Property and Copyright Statements 13

1. Introduction

The NETCONF protocol defines ways to read configuration data from a NETCONF agent. Part of this data is not set by the NETCONF manager, but rather a default value is used. In many situations the NETCONF manager has a priori knowledge about default data, so the NETCONF agent does not need to send it to the manager. A priori knowledge can be e.g. a document formally describing the data models supported by the NETCONF agent.

A networking device may have a large number of default values. Often the default values are not interesting or specifically defined with a "reasonable" value, so that the management user does not have to handle them. For these reasons it is quite common for networking devices to suppress the output of parameters having the default value.

However there are use-cases when a NETCONF manager will need the default data from the node:

- Documentation about default values can be unreliable or unavailable.
- Some management applications might not have the capabilities to correctly parse and interpret formal data models.
- Human users might want to understand the received data without consultation of the documentation.

In all theses cases the NETCONF manager will need default data as part of the NETCONF rpc reply messages.

This document defines a capability-based extension to the NETCONF protocol that allows the NETCONF manager to control whether default data is part of NETCONF rpc reply messages.

1.1. Terminology

1.1.1. Requirements 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].

1.1.2. NETCONF Terms

- Default data: Data that is set or used by the NETCONF agent whenever the NETCONF manager does not provide a specific value for the relevant data item. In the context of this document only configuration data is considered, state data is excluded.

- Explicitly set default data: Data that is explicitly set by the NETCONF manager to it's default value. Some agents MIGHT treat explicitly set default data as simple default data, as they MIGHT not be able to differentiate between them.

In addition the following terms are defined in RFC 4741 and are not redefined here:

- agent
- application
- manager
- operation
- RPC
- RPC request
- RPC response

2. With-defaults Capability

2.1. Overview

The :with-defaults capability indicates that the NETCONF agent makes it possible for the NETCONF manager to control whether default data is part of NETCONF rpc reply messages. The capability only effects configuration data not state data. Sending of default data is controlled for each individual operation separately. The NETCONF agent MUST also indicate it's basic behavior, whether it sends default data in the absence of any specific request from the NETCONF manager.

This capability effects the <get>, <get-config> and <copy-config> operations. Other operations that MIGHT return configuration data are not effected, unless this is specified in the document defining the respective operation.

2.1.1. Basic handling of default data

It is not defined in [RFC4741], whether default data is part of the datastore/data model, or if it is meta data, that influences the behavior of the NETCONF server, device but is not actually part of the datastore. This document intentionally avoids deciding this question.

As a consequence of this issue, NETCONF servers that do not implement the :with-defaults capability may or may not return default data in NETCONF rpc reply messages.
Management agents report default data in different ways. This document specifies the following three basic methods:

- Report all: All default data is always reported.
- Trim: Values are not reported if they match the default.
- Explicit: Report values if they are explicitly set.

2.2. Dependencies

None

2.3. Capability Identifier

urn:ietf:params:netconf:capability:with-defaults

The identifier MUST have an additional parameter: "basic". This indicates how the agent reports default data in rpc reply messages, in the case the manager does not specify the required behavior in the rpc request. The allowed values of this parameter are report-all, trim, explicit as defined in Section 2.1.1. E.g.:

urn:ietf:params:netconf:capability:with-defaults?basic=report-all

2.4. New Operations

None

2.5. Modifications to Existing Operations

A new 'with-defaults' XML attribute is used to control the reporting of default data. If the 'with-defaults' attribute is present in the <rpc> element of the affected operations, the agent MUST return default data in the NETCONF rpc reply messages according to the value of the attribute.

Allowed values of the with-defaults attribute are:

- false: indicates that default data will be returned as if the manager has omitted the attribute, using its basic handling method for defaults. The basic behavior is indicated by the attribute on the capability. See Section 2.3
- true: indicates that all default data MUST be returned.

The 'with-defaults' attribute is defined in the namespace specified as the 'targetNamespace' in Section 4. However, an agent MUST accept it even if no namespace is used.

Affected operations:

- <get>
- <get-config>

o <copy-config>

The following example shows a <get> operation which is using the 'with-defaults' attribute. The manager is retrieving the 'interfaces' object, defined in the example.com Interfaces data model. (In this simple example, the 'name' field is defined as the key, and the 'mtu' field is the only other data in the <interface> element). The default value of mtu is '1500'. The basic default handling for the agent is "trim". As the 'with-defaults' attribute is set to 'true', the mtu is returned not just for eth0 but also for eth1.

```
<rpc message-id="102" with-defaults="true"
     xmlns="urn:ietf:params:xml:ns:netconf:base:1.0">
  <get>
    <filter type="subtree">
      <interfaces xmlns="http://example.com/interfaces/1.2"/>
    </filter>
  </get>
</rpc>

<rpc-reply message-id="102" with-defaults="true"
     xmlns="urn:ietf:params:xml:ns:netconf:base:1.0">
  <data>
    <interfaces xmlns="http://example.com/interfaces/1.2">
      <interface>
        <name>eth0</name>
        <mtu>8192</mtu>
      </interface>
      <interface>
        <name>eth1</name>
        <mtu>1500</mtu>
      </interface>
    </interfaces>
  </data>
</rpc-reply>
```

Figure 1

3. Interactions with Other Capabilities

None

4. Data Model XSD

This section contains an XML Schema Definition [W3C.REC-xmlschema-2-20041028] which defines the XML syntax associated for the with-defaults XML attribute.

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="urn:ietf:params:xml:ns:netconf:with-defaults:1.0"
  targetNamespace="urn:ietf:params:xml:ns:netconf:with-defaults:1.0"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified" attributeFormDefault="unqualified"
  xml:lang="en">

  <xs:annotation>
    <xs:documentation>
      Schema defining the with-defaults attribute.

      Organization: "IETF NETCONF Working Group"
      Contact Info: balazs.lengyel@ericsson.com
    </xs:documentation>
  </xs:annotation>

  <xs:attribute name="with-defaults"
    type="xs:boolean"/>

</xs:schema>
```

5. IANA Considerations

This document registers two URIs for the NETCONF XML namespace in the IETF XML registry [RFC3688]. Note that the capability URN is compliant to [RFC4741] section 10.3.

Index	Capability Identifier
:with-defaults	urn:ietf:params:netconf:capability:with-defaults:1.0

URI: urn:ietf:params:xml:ns:netconf:with-defaults:1.0

Registrant Contact: The IESG.

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

6. Security Considerations

This document defines a minor extension to existing NETCONF protocol operations. it does not introduce any new or increased security risks into the management system.

The 'with-defaults' capability provides manager controls over the retrieval of particular types of XML data from a configuration database. They only suppress data that can already be retrieved with the standard protocol operations, and do not add any data to the configuration database.

7. Open Issues

7.1. Augmenting the base RPCs

Instead of using an attribute on the RPC element we could "augment" the relevant NETCONF operations with an extra XML element with a similar meaning.

Pro: parameters on RPC are for vendor extensions. We should not put standard stuff there.

Contra: Some people might consider this a violation of [RFC4741] as the XSD does not allow adding new elements. As there is no NETCONF YAM (at least not yet), what do we actually augment? Also there are multiple ways of defining RFC4741 in YANG. The description will be perfectly clear, but it can never be fed into YANG tools.

Conclusion: While augmenting has a certain elegance, we should stick to the attribute based solution.

7.2. Other default handling methods in the real world?

Are there any other basic default handling methods out there we need to include?

8. Normative References

[W3C.REC-xmlschema-2-20041028]
Biron, P. and A. Malhotra, "XML Schema Part 2: Datatypes Second Edition", World Wide Web Consortium Recommendation REC-xmlschema-2-20041028, October 2004, <http://www.w3.org/TR/2004/REC-xmlschema-2-20041028>.

[RFC4741] Enns, R., "NETCONF Configuration Protocol", RFC 4741, December 2006.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

[RFC3688] Mealling, M., "The IETF XML Registry", BCP 81, RFC 3688, January 2004.

Authors' Addresses

Andy Bierman
Netconf Central
Simi Valley, CA
USA

Email: andy@netconfcentral.com

Balazs Lengyel
Ericsson
Budapest,
Hungary

Email: balazs.lengyel@ericsson.com

Full Copyright Statement

Copyright (C) The IETF Trust (2008).

This document is subject to the rights, licenses and restrictions contained in BCP 78, and except as set forth therein, the authors retain all their rights.

This document and the information contained herein are provided on an "AS IS" basis and THE CONTRIBUTOR, THE ORGANIZATION HE/SHE REPRESENTS OR IS SPONSORED BY (IF ANY), THE INTERNET SOCIETY, THE IETF TRUST AND THE INTERNET ENGINEERING TASK FORCE DISCLAIM ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Intellectual Property

The IETF takes no position regarding the validity or scope of any Intellectual Property Rights or other rights that might be claimed to pertain to the implementation or use of the technology described in this document or the extent to which any license under such rights might or might not be available; nor does it represent that it has made any independent effort to identify any such rights. Information on the procedures with respect to rights in RFC documents can be found in BCP 78 and BCP 79.

Copies of IPR disclosures made to the IETF Secretariat and any assurances of licenses to be made available, or the result of an attempt made to obtain a general license or permission for the use of such proprietary rights by implementers or users of this specification can be obtained from the IETF on-line IPR repository at http://www.ietf.org/ipr.

The IETF invites any interested party to bring to its attention any copyrights, patents or patent applications, or other proprietary rights that may cover technology that may be required to implement this standard. Please address the information to the IETF at ietf-ipr@ietf.org.

Acknowledgment

Funding for the RFC Editor function is provided by the IETF Administrative Support Activity (IASA).