Factory Default Setting
draft-ietf-netmod-factory-default-05

Abstract

This document defines a method to reset a server to its factory-default content. The reset operation may be used e.g. during initial zero-touch configuration or when the existing configuration has major errors, so re-starting the configuration process from scratch is the best option.

A new factory-reset RPC is defined. Several methods of documenting the factory-default content are specified.

Optionally a new "factory-default" read-only datastore is defined, that contains the data that will be copied over to the running datastore at reset.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at https://datatracker.ietf.org/drafts/current/.

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."

This Internet-Draft will expire on May 2, 2020.
This document defines a method to reset a server to its factory-default content. The reset operation may be used e.g. during initial zero-touch configuration [RFC8572] or when the existing configuration has major errors, so re-starting the configuration process from scratch is the best option. When resetting a datastore all previous configuration settings will be lost and replaced by the factory-default content.

A new factory-reset RPC is defined. Several methods of documenting the factory-default content are specified.
Optionally a new "factory-default" read-only datastore is defined, that contains the data that will be copied over to all read-write configuration datastores at reset. This datastore can also be used in <get-data> or <get-config> operations.

NETCONF defines the <delete> operation that allows resetting the <startup> datastore and the <discard-changes> operation that copies the content of the <running> datastore into the <candidate> datastore. However it is not possible to reset the running datastore, to reset the candidate datastore without changing the running datastore or to reset any dynamic datastore.

A RESTCONF server MAY implement the above NETCONF operations, but that would still not allow it to reset the running configuration.

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 following terms are defined in [RFC8342] and are not redefined here:

- server
- startup configuration datastore
- candidate configuration datastore
- running configuration datastore
- intended configuration datastore
- operational state datastore

The following terms are defined in this document as follows:

- factory-default datastore: A read-only datastore holding a preconfigured minimal initial configuration that can be used to initialize the configuration of a server. The content of the datastore is usually static, but MAY depend on external factors like available HW.
2. Factory-Reset RPC

A new "factory-reset" RPC is introduced. Upon receiving the RPC the server resets the content of all read-write configuration datastores (e.g., <running> and <startup>) to their factory-default content. Read-only datastores receive their content from other datastores (e.g. <intended> gets its content from <running>).

Factory-default content SHALL be specified by one of the following means in descending order of precedence:

1. For the <running>,<candidate> and <startup> datastores as the content of the <factory-default> datastore, if it exists;
2. by vendors using YANG Instance Data [I-D.ietf-netmod-yang-instance-file-format] file format in vendor’s website or other places where off-line document is kept;
3. In some implementation specific manner;
4. For dynamic datastores unless otherwise specified the factory-default content is empty.

For the server supporting zero touch bootstrapping mechanisms, the factory default configuration causes the bootstrapping process to execute, e.g., the server might reset configuration to device’s factory default configuration, for the version of operating system software it is running. In addition, the "factory-reset" RPC might also be used to trigger some other restoring and resetting tasks such as files cleanup, restarting the node or some of the software processes, setting some security data/passwords to the default value, removing logs, or removing any temporary data (from datastore or elsewhere), etc. When and why these tasks are triggered is not the scope of this document.

3. Factory-Default Datastore

Following guidelines for defining Datastores in the appendix A of [RFC8342], this document introduces a new datastore resource named ‘Factory-Default’ that represents a preconfigured minimal initial configuration that can be used to initialize the configuration of a server.

- Name: "factory-default"
- YANG modules: all
- YANG nodes: all "config true" data nodes
Management operations: The content of the datastore is set by the server in an implementation dependent manner. The content can not be changed by management operations via NETCONF, RESTCONF, the CLI etc. unless specialized, dedicated operations are provided. The contents of the datastore can be read using NETCONF, RESTCONF <get-data> and <get-config> operations. The operation <factory-reset> can be used to copy the factory default content to a set of read-write configuration datastores and then the content of these datastores is propagated automatically to any other read only datastores, e.g., <intended> and <operational>.

Origin: This document does not define a new origin identity as it does not interact with <operational> datastore.

Protocols: RESTCONF, NETCONF and other management protocol.

Defining YANG module: "ietf-factory-default".

The datastore content is usually defined by the device vendor. It is usually static, but MAY change e.g., depending on external factors like HW available or during device upgrade.

On devices that support non-volatile storage, the contents of <factory> MUST persist across restarts.

4. YANG Module

<CODE BEGINS> file "ietf-factory-default.yang"
module ietf-factory-default {
  yang-version 1.1;
  prefix fd;

  import ietf-netconf { prefix nc ; }
  import ietf-datastores { prefix ds ; }

  organization
    "IETF NETMOD (Network Modeling) Working Group";
  contact
    "WG Web:  <https://tools.ietf.org/wg/netconf/>"
    "WG List:  <mailto:netconf@ietf.org>"
    "Editor:  Balazs Lengyel  <mailto:balazs.lengyel@ericsson.com>"
    "Editor:  Qin Wu  <mailto:bill.wu@huawei.com>"
    "Editor:  Ye Niu  <mailto:niuye@huawei.com>";

<CODE ENDS>
This module defines the
- factory-reset RPC
- factory-default datastore
- an extension to the NETCONF <get-config> operation to
  allow it to operate on the factory-default datastore.

It provides functionality to reset a server to its
factory-default content.

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.

Copyright (c) 2019 IETF Trust and the persons identified as
authors of the code. All rights reserved.

Redistribution and use in source and binary forms, with or
without modification, is permitted pursuant to, and subject
to the license terms contained in, the Simplified BSD License
set forth in Section 4.c of the IETF Trust’s Legal Provisions
Relating to IETF Documents
(http://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 2019-05-03 {
  description
    "Initial revision.";
  reference "RFC XXXX: Factory default Setting";
}

feature factory-default-as-datastore {
  description "Indicates that the factory default configuration is
               also available as a separate datastore";
}

rpc factory-reset {
  description "The server resets the content of all read-write
              configuration datastores (e.g.,<running> and <startup>) to
              their factory default content.";
}

identity factory-default {
  base ds:datastore;
if-feature factory-default-as-datastore;
description "The read-only datastore contains the configuration that
will be copied into e.g., the running datastore by the
factory-reset operation if the target is the running
datastore.";
}
augment /nc:get-config/nc:input/nc:source/nc:config-source {
  if-feature factory-default-as-datastore;
  description "Allows the get-config operation to use the
  factory-default datastore as a source";
  leaf factory-default {
    type empty;
    description
      "The factory-default datastore is the source.";
  }
}

5. IANA Considerations

This document registers one URI in the IETF XML Registry [RFC3688]. The following registration has been made:


    Registrant 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]. The following registration has been made:

    name: ietf-factory-default
    prefix: fd
    RFC: xxxx

6. Security Considerations

The YANG module defined in this document extends the base operations for NETCONF [RFC6241] and 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 `<factory-reset>` RPC operation may be considered sensitive in some network environments, e.g., remote access to reset the device or overwrite security sensitive information in one of the other datastores, e.g. running, therefore it is important to restrict access to this RPC using the standard access control methods. [RFC8341]

The NETCONF Access Control Model (NACM) [RFC8341] provides the means to restrict access for particular users to a pre-configured subset of all available protocol operations and content.

7. Acknowledgements

Thanks to Juergen Schoenwaelder, Ladislav Lhotka, Alex Campbell, Joe Clark, Robert Wilton, Kent Watsen, Joel Jaeggli, Lou Berger, Andy Berman, Susan Hares to review this draft and provide important input to this document.

8. Contributors

Rohit R Ranade  
Huawei  
Email: rohitrranade@huawei.com

9. References

9.1. Normative References


9.2. Informative References

[I-D.ietf-netmod-yang-instance-file-format]


Appendix A. Difference between <startup> datastore and <factory-default> datastore

When the device first boots up, the content of the <startup> and <factory-default> will be identical. The content of <startup> can be subsequently changed by using <startup> as a target in a <copy-config> operation. The <factory-default> is a read-only datastore and it is usually static as described in earlier sections.

Appendix B. Changes between revisions

v03 - 04
o Additional text to clarify factory-reset RPC usage.

v02 - 03
o Update security consideration section.

v01 - v02
o Address security issue in the security consideration section.
o Remove an extension to the NETCONF <copy-config> operation which allows it to operate on the factory-default datastore.
o Add an extension to the NETCONF <get-config> operation which allows it to operate on the factory-default datastore.

v00 - v01
o Change YANG server into server defined in NMDA architecture based on discussion.

o Allow reset the content of all read-write configuraton datastores to its factory-default content except <candidate>.

o Add clarification text on factory-reset protocol operation behavior.

v03 - v00

o Change draft name from draft-wu to draft-ietf-netmod-factory-default-00 without content changes.

v02 - v03

o Change reset-datastore RPC into factory-reset RPC to allow reset the whole device with factory default content.

o Remove target datastore parameter from factory-reset RPC.

o Other editorial changes.

v01 - v02

o Add copy-config based on Rob’s comment.

o Reference Update.

v03 - v00 - v01

o Changed name from draft-wu-netconf-restconf-factory-restore to draft-wu-netmod-factory-default

o Removed copy-config ; reset-datastore is enough

v02 - v03

o Restructured

o Made new datastore optional

o Removed Netconf capability

o Listed Open issues

v01 - v02
v00 - v01

Authors' Addresses

Qin Wu
Huawei
101 Software Avenue, Yuhua District
Nanjing, Jiangsu 210012
China

Email: bill.wu@huawei.com

Balazs Lengyel
Ericsson Hungary
Magyar Tudosok korutja 11
1117 Budapest
Hungary

Phone: +36-70-330-7909
Email: balazs.lengyel@ericsson.com

Ye Niu
Huawei

Email: niuye@huawei.com