System-defined Configuration

draft-ma-netmod-with-system-00

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Recap

• Presented in NETCONF/NETMOD WG for two times before
  • Inspired a lot of good discussion, thanks for Jason, Balazs, Rob and Kent.

• Since IETF 111
  • A lot of discussion on mailing list (40+ number of messages)
  • A 2-hour NETMOD virtual interim meeting was held in October on this work
    • ~15 participants
    • Reached a lot of agreement with the objectives, scope and solution of the work
  • A new draft has been proposed to document the outcome in the interim meeting
    • Rewrite the previous draft-ma-netconf-with-system-02 based on the input
    • Rename as a NETMOD I-D based on chairs’ suggestion.
Motivation and Goal

- **Visibility:** Enable a server to better document the system configuration

- **Convenient:** Avoid or reduce having to copy the entire contents of system configuration into `<running>` when possible

- **Configurable:** Configure descendant nodes of system defined configuration

- **Client-Control:** configurations controlled by the client
  - i.e., a read-back of `<running>` should contain what was explicitly set by the clients
Solution Overview

Complete solution consists of two parts:

• A mandatory “with-system” parameter
  • When present, <running> and system-defined config combined should be returned.
  • Defined as a “empty” type currently (enumerated values may be desired)
  • Both RFC 6241 (<get>, <get-config>) and RFC 8040 (GET, HEAD) are updated

• An optional <system> datastore
  • Read-only, MAY change, has no impact to <operational>
  • MAY be overwritten/extended by <running> to create <intended>
    • See conceptual model section (section 4.1) for more details
Example: Configuring Descendant Nodes of a System-defined Node

Suppose the system provides a loopback interface (named "lo0") with a default IPv4 address of "127.0.0.1" and a default IPv6 address of "::1".

1. The configuration of "lo0" interface in <system>

```xml
<interfaces>
  <interface>
    <name>lo0</name>
    <ip-address>127.0.0.1</ip-address>
    <ip-address>::1</ip-address>
  </interface>
</interfaces>
```

2. The configuration of "lo0" interface in <operational>

```xml
<interfaces xmlns:or="urn:ietf:params:xml:ns:yang:ietf-origin" or:origin="or:system">
  <interface>
    <name>lo0</name>
    <ip-address>127.0.0.1</ip-address>
    <ip-address>::1</ip-address>
  </interface>
</interfaces>
```

3. The client further configures the description node of a "lo0" interface

```xml
<interfaces>
  <interface>
    <name>lo0</name>
    <description>loopback</description>
  </interface>
</interfaces>
```

4. The configuration of interface "lo0" is present in <operational>

```xml
<interfaces xmlns:or="urn:ietf:params:xml:ns:yang:ietf-origin" or:origin="or:intended">
  <interface>
    <name>lo0</name>
    <description>loopback</description>
    <ip-address>127.0.0.1</ip-address>
    <ip-address>::1</ip-address>
  </interface>
</interfaces>
```
Open Issues: Valid `<running>` & Backward Compatibility

• Question: Whether we want `<running>` always be valid?

  • Both [RFC7950] and [RFC8342] define that `<running>` MUST always be a valid configuration data tree.
    • Offline validation for legacy client will break unless all leafref-ed system config is copied into `<running>`.

• If the referenced system object is not in `<running>`
  
  ◆ **Online validation**: The server accepts the system-defined config, thus validation passes.
Open Issues: Valid <running> & Backward Compatibility (Cont.)

• If the referenced system object is not in <running> (cont.)
  ◆ Offline validation:
    1. Clients offline-merge <running> into <system>
       ▪ Necessitates clients being able to access <system>
       ▪ For NMDA clients: easily achieved.
       ▪ For non-NMDA clients: no solution.
    2. Client’s copy/paste *referenced* system config into <running>
       ▪ Copy/paste must already be done when configuring descendant nodes (see previous slide), the only question is must it be done for leafrefs too?
    3. Clients use “with-system” to get a merged view
       ▪ Debatable if this is really “offline” validation...
Other Open Issues

• Should we define an “Immutable” flag?
  • Indicate to the client which system config is read-only or which is not
  • The server will return an error if the clients attempt to configure a value for a read-only system config.
    • What if configuring one with the same value as found in <system>?
  • To be carried only when the client retrieves <running> with “with-system”?
    • <factory-default> defines those that are deletable, thus modifiable.
    • <system> itself is read-only already

• Should the “with-origin” parameter be supported for <intended>(i.e., update RFC 8342 too)?)

• Should the origin=“system” be required for system config copied/pasted into <running>(similar to the “default” attribute defined in RFC 6243)?
Comments, Questions, Concerns?