System-defined Configuration

draft-ma-netmod-with-system-00

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Recap

- Presented in NETCONF/NETMOD WGs 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>

```
<interfaces>
  <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

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

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

```
<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>
```

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

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