Robust Configuration Management <draft-cole-netconf-robust-config-00.txt>

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Objectives and Benefits

Objective is to develop a Verify and Validate capability tied to <commit> and <edit-config> NETCONF operations.

- Verification - checking against a set of rules.
- Validation - measuring behavior against expectations.

Benefits include:

- Minimize faulty configuration,
- Minimize disconnects in networks with no 'out-of-band' access, e.g., MANETs or DTNs.
- Provide opportunity for device modelers to associate/recommend tests tied to specific configuration items.

Background - NETCONF and YANG Capabilities

- NETCONF :confirmed-commit capability allows the agent (not server) to run a set of Validation tests prior to issuing a 'confirming commit' to the server.
- NETCONF <edit-config> operation allows for for some Verification (and maybe Validation) checking.
- The YANG 'must' statement extends the :validate capability for improved Verification checking through constraint definitions.

Background - Related OAM Capabilities

- RMON provides for general specification of active network tests, see 'protocolID', AppLocalIndex (APM-MIB) [3], SSPM-MIB [4], TPM-MIB [5].
- Operations and Management (OAM) capabilities for Carrier Class Ethernet [6-9] and MPLS-based services [10-13] will provide for automatic Validation testing.
  - I.e.,continuity, fault, isolation and performance tests and SLA monitoring [6-9].

Proposal - Enhance V&V

Enhance/develop the NETCONF Verification and Validation capability for <commit> and <edit-config> operations:

- Specify a set of tests associated with proposed configuration.
- Move Validation testing from the agent to the server, i.e., the remote managed device.
- Define capability to specify pass/fail criteria.
- One specific class of tests would be network tests (network test imply a set of active measurement probes injected into the network).
- Better flesh out relationship of Verification versus Validation within the context of configuration management and explore protocol implications.

Proposal - Enhance V&V

Potential test specification options:

- Local or remote script specifications, i.e., <commit> passes an URL pointing to the script and passes a specification of 'success'
- Tests separately specified via a modeling language, similar to SSPM-MIB (for network test specification) but using YANG, and passed with the <commit> operation.
- Tests are associated with specific configuration objects within the device's (YANG) model.
  - Success criteria, but not specific value, defined in module.

Questions

- How to specify specific tests and their benefits?
- Should specific tests be tied to specific configuration parameters within the device's data model?
- Do we limit Validation testing to the <commit> and limit Verification testing to the <copy-config> or allow Validation testing to <copy-config> through the 'writable-running' capability?
- Is there interest in pursuing this objective?
- If yes, then next steps might be:
  - Continue to flesh out this draft and protocol implications,
  - Investigate YANG model to define (or point to) active tests or
  - Investigate YANG model which embeds active tests within a YANG device model,
  - Investigate means to specify pass/fail criteria.
  - Investigate security implications and solutions.

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