Subscribing to datastore push updates draft-netmod-clemm-datastore-push-00.txt

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Motivation

- Many applications require continuous updates to datastore contents
  - Mount clients (peer mount): caching of remote data
  - Service assurance: continuous monitoring
  - Big Data: analyze network state
- Periodic polling has limitations (known from SNMP)
  - Additional load on network and devices
  - Lack of robustness, dealing with missed polling cycles
  - Difficult calibration, synchronization of polling cycles across network (makes polled data difficult to compare)
- Current interactions with datastore are request/response based
  - RFC 6470 defines configuration change notifications
  - YANG datastores contain increasingly operational data

Solution Requirements (1/2)

- Provide push mechanism as alternative to polling
- Configuration and management of subscriptions
  - Create/Delete
  - Subscription scope
    - Operational data
    - Subtrees and filters
  - Subscription policy
    - Periodic
    - On change (with dampening)
  - Optional: subscription monitoring
  - Optional: suspend/resume

Solution Requirements (2/2)

- Negotiation capability
  - Resource limitations: not every subscription may be supported
  - Implementation limitations (on change may be difficult)
  - Negotiate update frequency, size, policy (on change vs periodic)
- Tie-in with security
  - RFC 6536/NACM – receive updates only for authorized data
- Work in conjunction with Netconf/RESTconf/YANG framework
  - Leverage RFC 5277 notification capability
  - Possibility to decouple transport and subscriptions
    Allow for pub/sub, multicast transports at a later point, outside scope

Subscription Model

```
module: ietf-datastore-push
     +--rw datastore-push-subscription
        +--rw stream                        string
        +--rw subscription-id               subscription-identifier
        +--rw (filter)?
        |  +--:(subtree)
        |  |  +--rw subtree-filter
        |  +--:(xpath)
        |     +--rw xpath-filter            yang:xpath1.0
        +--rw (notification-trigger)
        |  +--:(periodic)
        |  |  +--rw period                  yang:timeticks
        |  +--:(on-change)
        |     +--rw (change-policy)
        |        +--:(update-dampening)
        |        |  +--rw period            yang:timeticks
        |        +--:(delta-policy)
        |           +--rw delta            uint32
        +--rw start-time?                   yang:date-and-time
        +--rw stop-time?                    yang:date-and-time
```

(next revision)

Selected discussion items

- RW vs RO and create method (edit vs. <create-subscription>)
- On-change subpolicies options or choices
- “on-change” feature
- Delta policy

Subscription Negotiation

- Leverage RFC 5277 <create-subscription>
- Server may reject a subscription request
  - Implementation limitations (e.g. on-change)
  - Resource limitations
    (e.g. update size, frequency)
- Response to include “acceptable” parameter settings (no guarantee)
- Additional notifications to indicate if server cannot keep “subscription promise)
- Optional: client throttling of subscription via suspend/resume

Selected discussion items

- <create-subscription> vs edit-config
- Subscription throttling via suspend/resume

Push Data Stream and Transport

- Push-update notifications
  - Subscription correlator
    - Ties update to a specific subscription
  - Data node with datastore update
    - Per subscription
    - Filtered per NACM rules
- Leverage <notification> element (per RFC 5277)
- Alternative transport mappings conceivable but outside scope

Conclusion

- There is a need for a mechanism for datastore push updates, and subscribing to such updates
- Drivers
  - Peer Mount
  - Service Assurance
  - Operational data increasingly part of YANG data models
  - Move beyond SNMP-style polling-based management
- Properties of the solution
  - Data model at its core → Netmod
  - Fits in with YANG/Netconf/RESTconf framework
  - Addresses subscription, negotiation, transport
  - Addresses requirements, PoC exists

Ask: Adopt as WG Document