Subscription Drafts
IETF #100 - NETCONF WG
Eric Voit & Alexander Clemm
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With Thanks to...

Authors on at least 1 WG draft
Andy Bierman
Alexander Clemm
Tim Jenkins
Balazs Lengyel
Einar Nilsen-Nygaard
Alberto Gonzalez Prieto
Ambika Prasad Tripathy
Eric Voit

+ Dezign Team 1
Sharon Chisholm
Yan Gang
Peipei Guo
Susan Hares
Michael Scharf
Hector Trevino
Kent Watsen
Guangying Zheng (Walker)

+ new with Dezign Team 2
Henk Birkholz
Igor Bryskin
Xufeng Liu
Tianran Zhou
Hackathon 100 Results
SACM + Telemetry via YANG Push

Winner: Best Cross WG collaboration

Device discovery
Topology maintenance
Security events

On Change subscription
L2 link neighbors
Hardware/software inventory

Open Source

SACM
NETCONF
CoRE

Guidance Repository
Topology Repository

XMPP Broker

Query

Register & Subscribe

Register & Publish

Guidance
Query

YANG Push

Endpoint Discovery

TE

SACM Collector

NETCONF

YANG Push
NETCONF WG Subscription Drafts

8. Custom Subscription to Event Streams
draft-ietf-netconf-subscribed-notifications

9. YANG Datastore Subscription
draft-ietf-netconf-yang-push

10. NETCONF Support for Event Notifications
draft-ietf-netconf-netconf-event-notifications

11. RESTCONF & HTTP Transport for Event Notifications
draft-ietf-netconf-restconf-notif

12. Notification Message Headers and Bundles
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13. UDP based Publication Channel for Streaming Telemetry
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14. Subscription to Multiple Stream Originators
draft-zhou-netconf-multi-stream-originators

15. YANG PUSH Based Generalized Network Control Automation Problem Stmt.
draft-bryskin-netconf-automation-framework

16. Coap Transfer
draft-birkholz-yang-push-coap-problemstatement

17. Smart filters for Push Updates - Problem Statement
draft-clemm-netconf-push-smart-filters-ps

Overview (covered in this presentation)
draft-voit-netconf-subscription-and-notif-overview
Adopted Drafts in Layered Framework

Application

Publisher

Subscriber

Receiver

Subscription Management

Dynamic Configured State Change
Admission Control
OAM Negotiation
Stream Discovery

Transport

TCP TLS UDP SSH HTTP2 HTTP1.1 gRPC RESTCONF NETCONF

Notification Message Encoding

XML JSON CBOR GPB YANG YANG Notification Common Headers Bundling

Event Record Generation

Filtering Access Control On-Change Periodic

Subscribable Information

Operational Running Config Startup Config Candidate Config Intended Config NETCONF Stream Custom Stream

Legend

draft-ietf-netconf-yang-push
draft-ietf-netconf-subscribed-notifications
draft-ietf-netconf-notification-messages
draft-ietf-netconf-udp-pub-channel
draft-ietf-netconf-netconf-event-notifications
draft-ietf-netconf-restconf-notif
Updates since IETF #99

• v07, based on review comments
  – Model returns to string for stream
  – Model returns to explicit filter subtyping
  – RFC5277 exclusively used for one-way notifications (i.e., defer new encoding to draft-ietf-netconf-notification-messages)
  – SYSLOG identity removed
  – JSON & XML become optional features
  – Xpath and Subtree filtering become optional features
  – Added explicit state-machine for configured subscriptions
  – Cleaned up examples and terminology

• Issue SN#6 closed. Configured subscription key as integer
Can Transport vary across different receivers of a single configured subscription?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>
| • Fewer subscriptions (scale benefit)  
• Can convert transport without requiring an application to learn a multiple subscription ids  
• No duplication of content during transport conversion.  
• Potential confusion in allowing transport to vary, but encoding not to vary? | • Simpler model  
• But applications may need to create and track multiple subscription-ids for the same content.  
• Temporary duplication of content streams during transport change. |
### Issue SN #5

How to represent Source VRF of configured subscription?

<table>
<thead>
<tr>
<th>String</th>
<th>Leafref</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Would populate with exact same name as would be in the leafref</em></td>
<td><em>Leafref to “ietf-network-instance”</em></td>
</tr>
<tr>
<td><em>Possible to name VRF which doesn’t exist</em></td>
<td><em>/network-instances/network-instance/name</em></td>
</tr>
</tbody>
</table>

- Creates dependency on schema mount for subscriptions.
- Source VRF is an optional capability, but publishers that don’t care about VRFs must still import.
- Establishes model dependency to draft-ietf-rtgwg-ni-model.
### SN#6 - String or Integer for Subscription ID

<table>
<thead>
<tr>
<th>Integer for all contexts</th>
<th>Use string for configuration, integer for updates</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Need to partition integer space to avoid collisions/reuse.</td>
<td>• Receiver must match context from subscription-started state change notification as id is different from what was configured.</td>
</tr>
<tr>
<td></td>
<td>• Receiver app must be able to force transport reconnect if subscription state is lost.</td>
</tr>
<tr>
<td></td>
<td>• Configured subscription correlation across multiple receivers is more complex (automatically assigned integer won't be the same across publishers.)</td>
</tr>
<tr>
<td></td>
<td>• String must be human readable, and also act as a key.</td>
</tr>
<tr>
<td></td>
<td>• Larger model</td>
</tr>
</tbody>
</table>

- Note: there were *many* other option variations considered beyond these two (including an elegant but more complex proposal from Rob Wilton.) For slide brevity, the two most different are shown.
Updates since IETF #99

- v11, based on review comments
  - Integrated draft-ietf-netmod-revised-datastores (as this work as caught up)
  - Returned to explicit filter subtyping of v00-v05
  - Scrubbed the examples
  - Resynch on-change RPC
  - Deferred the multi-line card issue to draft-zhou-netconf-multi-stream-originators

- Open Issue: YP#11: Shift to NMDA compliant structure
  - Recommendation: authors will release NMDA compliant model versions (allowing side-by-side comparison) once all pre-WGLC issues are closed.
Updates since IETF #99 based on Comments

-06 revision
  - Normative text placed up front (pages 2-4)
  - Removed all JSON text
  - Clarifications in call home text for retries
  - All examples move to Appendix
  - Scrubbed the examples (there were many fixes / changes)
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Recommendation: Start WGLC

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Updates Needed (none posted since IETF #99)

• A new -04 revision must address the following:
  1. What does an ‘ok’ mean when sent after subscription-started for a configured subscription over HTTP2?
     Which one-way notification encoding to use for a receiver? 5277, or draft-ietf-netconf-notification-messages?
  - Still need guidance on transparency of GRPC mapping to RESTCONF (e.g., RESTCONF uses GET, not POST.)
  - Interactions with the YANG Push for CoAP transfer problem stmt?
  - Doc scrubbing (move normative text up front, extract examples to Appendices JSON only examples)

• No implementations yet.
• Recommend deferring WGLC until there is concurrent support of draft-ietf-netconf-notification-messages to solve (1).
Updates since IETF #99

-v00 to -v02

- Alternative to 5277 one-way notification added
- Storage of default headers by notification type
- Backwards compatibility

- Discovering Receiver Support
  - Issue NM#1: Alternatives to use of client based capabilities discovery for NETCONF?
- Headers for module and notification-type
- yang-data encapsulation containers

- Upcoming: dialogs on specific headers
  - Signatures, attestation, others
Thank you!