YANG Modeled Telemetry over CoAP

(and how-to bootstrap drop-shipped pledges in unknown territory)

5 min version (includes speed-talking presenter)

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First, some terms…

- YANG: A modeling language for datastore a data model
- NETCONF: XML binding for YANG
- RESTCONG: JSON binding for YANG
- COMI: CBOR binding for YANG
  - Comments by the presenter here
- Telemetry: Catch all phrase for (un-)solicited pushed notifications
- CoAP: Constrained Application Protocol
  - Even more comments by the presenter here

The Story: Wouldn’t it be nice, if…

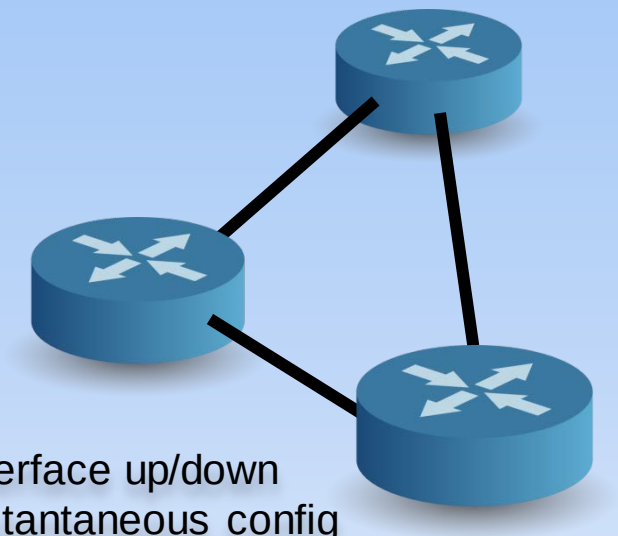
- a thing that was just un-boxed in an unknown administrative domain,
- would be able to find its home to call home,
- thereby discover appropriate management/security functions, and
- push well defined telemetry to a management system,
  - “well defined” meaning semantic self-descriptiveness of data in motion that facilitates unsolicited pushed information
- in a concise way with efficient footprints in respect to data in motion, computation requirements, and memory/stack consumption?

Why would we want this?

- Distribution of responsibility (i.e. processing load, distribution of imperative and declarative guidance
- Convergence of management interfaces (including notification types)
- Event Streams vs. Consecutive Polling
- Management Telemetry vs. Security Telemetry
- Improved freshness

Streaming Telemetry Requirements

Where Data Is Created



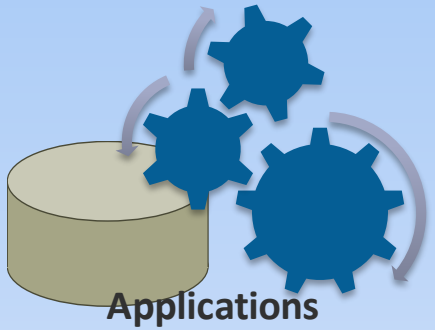
- Interface up/down
- Instantaneous config
- Instantaneous topology
- Flow fingerprints
- Routes

Complete representation
Self describing
Structured & filterable
Static subscriptions
Customized object push
Multiple destinations
Non-repudiation
Low latency

? ? ?

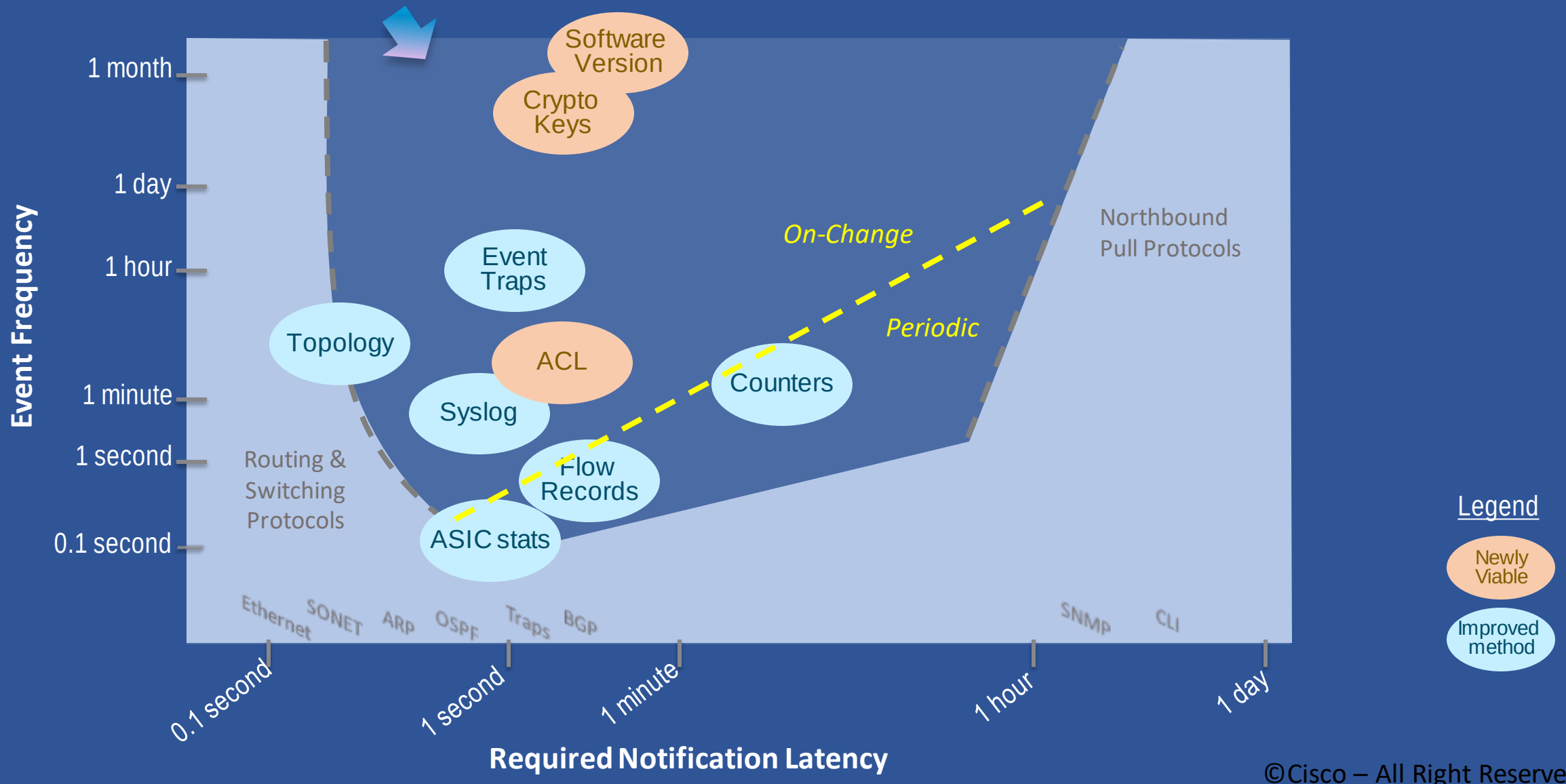
High volume
Dynamic subscriptions
Admission Control
Per-object security
Transport options
Standards track
Burst Dampening
Prioritized Push
Domain push synch

Where Data Is Useful



NMS	Controller	Network Element

The "Push Zone"



Well, almost every building-block have drafts...

- IETF CORE WG
  - COAP, COMI/SID, CoAP Pub/Sub
  - EST CoAP, BRSKI
- IETF NETCONF WG
  - YANG Push, YANG Subscribed Notifications, YANF notification msgs & bundles
- And two RFC
  - 7950 (The YANG 1.1 Data Modeling Language)
  - 8071 (NETCONF Call Home and RESTCONF Call Home)

Current Document Version

- The current editor's version of the problem statement:
  - https://henkbirkholz.github.io/draft-birkholz-yang-push-coap-problemstatement/draft-birkholz-yang-push-coap-problemstatement
- The current submitted problem statement I-D:
  - https://datatracker.ietf.org/doc/draft-birkholz-yang-push-coap-problemstatement/

So, what's missing?

- no CoAP Subscribe procedures that…
  - are able to convey a filter expression and potentially other metadata required in the context of a YANG Subscribed Notifications application association (i.e. FETCH + body + observe),
  - support dynamic YANG subscribed notifications (i.e. CoAP ~~pub~~/sub + filter expressions) , and
  - support configured YANG subscribed notifications (i.e. BRSKI powered CoAP ~~pub~~/sub).
- Visibility
  - COMI is not very visible in NETCONF
  - This endeavor is starting to improve this lack of visibility

Last Slide

- Questions?