

NETCONF

W3C Context Trace

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IETF 115

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draft-rogaglia-netconf-trace-ctx-extension-00

Presented for the first time here at IETF 115

- This work brings W3C Context Trace REST headers into NETCONF
- W3C Context Trace headers already directly usable in RESTCONF, we are planning to document this in future work

Note 1: related to OpenTelemetry work under development at CloudNative Foundation, particularly the OTLP protocol

<https://github.com/open-telemetry/opentelemetry-specification/blob/main/specification/protocol/otlp.md>

Note 2: Although both are named “telemetry”, OpenTelemetry is not directly related to YANG-PUSH or gNMI

Format Defined by W3C

W3C Recommendation on Trace Context

- <https://www.w3.org/TR/2021/REC-trace-context-1-20211123/>
- Defines REST headers for tracing HTTP request propagation through software layers

Headers directly usable in RESTCONF:

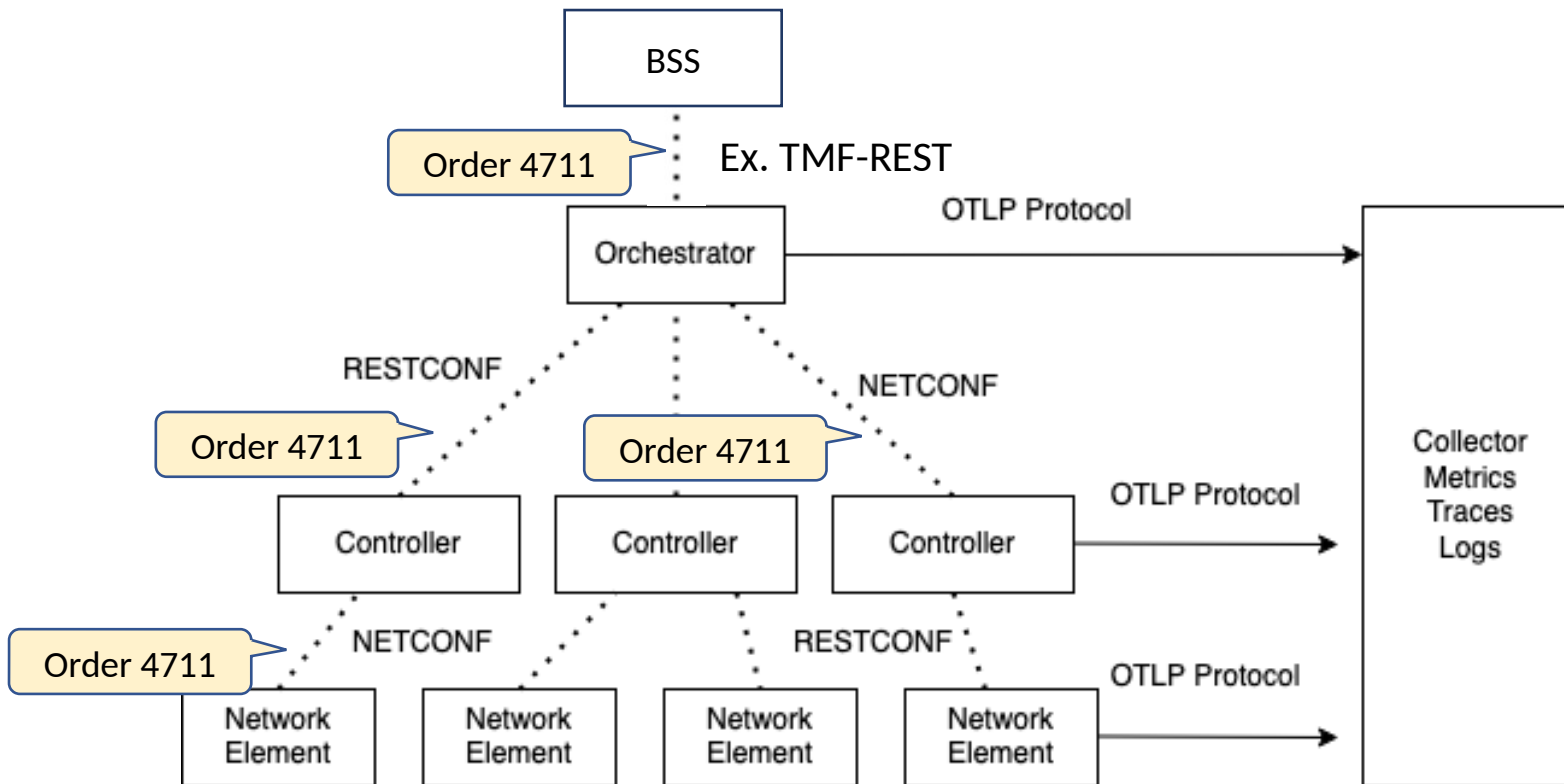
Traceparent: 00-4bf92f3577b34da6a3ce929d0e0e4736-00f067aa0ba902b7-01
Tracestate: rojo=00f067aa0ba902b7,congo=t61rcWkgMzE

- Traceparent is quite similar to a UUID
- Tracestate (optional) is comma separated opaque application specific state data

Decorating RPCs with Trace IDs

Collector apps can:

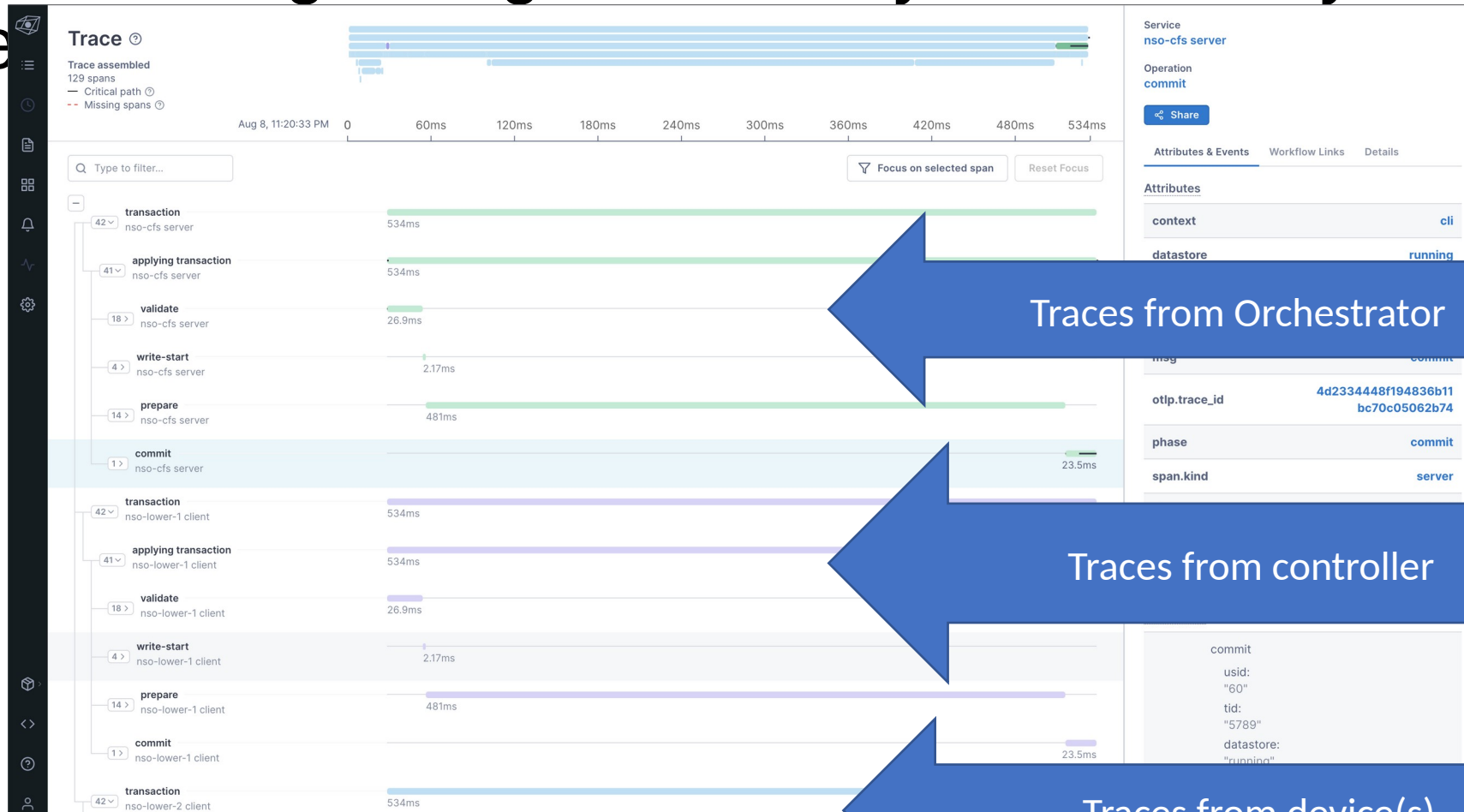
- Correlate resource usage on all levels to individual customers and orders
- Trace the effects of service input through all layers, for billing, debugging or forensic purposes



How does it look like in a backend system

When creating a single context, you can easily track trace

Single Context for all Systems
Traces thanks to this extension



Traces from Orchestrator

Traces from controller

Traces from device(s)

W3C Format Adapted to NETCONF

A client might send this:

```
<rpc xmlns="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="1"
  xmlns:w3ctc="urn:ietf:params:xml:ns:netconf:w3ctc:1.0"
  w3ctc:traceparent=
    "00-4bf92f3577b34da6a3ce929d0e0e4736-00f067aa0ba902b7-01">
  <get-config/>
</rpc>
```

Or this:

```
<rpc xmlns="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="1"
  xmlns:w3ctc="urn:ietf:params:xml:ns:netconf:w3ctc:1.0"
  w3ctc:tracestate="rojo=00f067aa0ba902b7, congo=t61rcWkgMzE"
  w3ctc:traceparent=
    "00-4bf92f3577b34da6a3ce929d0e0e4736-00f067aa0ba902b7-01">
  <edit-config>...</edit-config>
</rpc>
```

Considerations

- Allows additional use cases around billing, sustainability, debugging, forensics
- Separated from transaction-id (which used to have similar functionality)
- Separated from SAIN work
- Leans on established W3C internet recommendation and adoption across CloudNative foundation ecosystem for IT tool management

Encode trace-id as XML attributes or as augmented YANG leafs?

- Literal alignment with W3C: attr
- Same encoding in NETCONF and RESTCONF: attr
- Single definition for all RPCs: attr
- Possible to augment: leaf
- Possible to deviate: leaf

To Do list, please send us your inputs

- Capabilities to discover the W3C trace-context version (today a single version available but in future that may change)
- Document adoption for RESTCONF
- Track evolution of W3C Baggage extension (still draft):
<https://www.w3.org/TR/baggage/>
- Error handling and Security sections

Thank you