



The bridge to possible

DEVNET-2318 – Why is my Network Automation Tool so Slow?

Discover OpenTelemetry to Analyse Cisco NSO

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@rogaglia

Cisco Webex App

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Webex spaces will be moderated until February 24, 2023.



Agenda



Source: <https://www.monitor.co.ug/uganda/lifestyle/reviews-profiles/why-is-my-internet-connection-so-slow--1555636>

Waiting for your Network as a Service....



Agenda

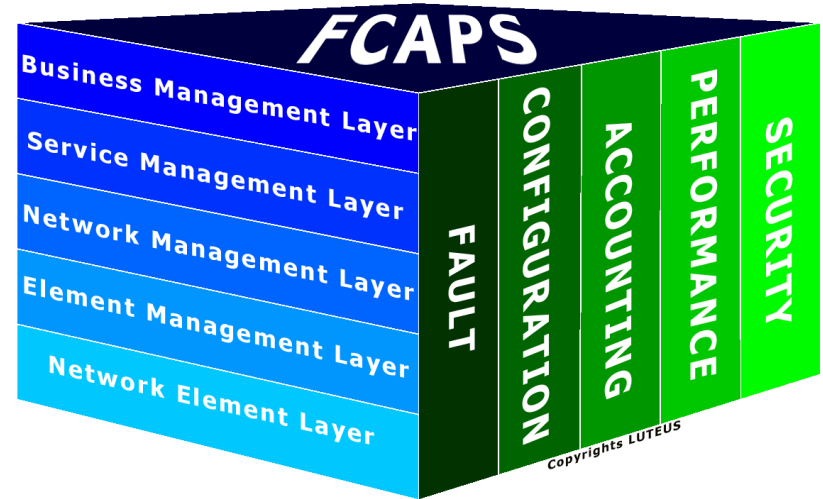
- Managing the Managers
- OpenTelemetry 5min intro
- Cisco NSO 5 min intro
- Getting your answers in a demo
- Conclusion

Special thanks to: Kristian Larsson, Jan Lindblad, Alexander Stoklasa and Severine Neumann

Typical Network Management and Orchestration

What does it take to manage your network?

- When running Traditionally Monolithic EMS/NMS
- There is a single point of blame...



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Most customers manage managers as network devices

Your Network Management Protocols

V X N K D L P A N M E W R F E T X S
Y W Y K Y T M K N X S C Y Q K U Y N
B U O J W L H J B Q Y N K R C M Q M
T R A P S U V K W V S L W K R G U P
S A S X G R P W S U L K H O E E U V
E V P Y T P P H Y Z O U W D S B T N
C M S C Q A F G K F G K E S T S X M
V Q N Z L X C Z I E B Z R J L R R Y
E B K H Q W X A J M F F G F W J K B
K U A Y P F C D C K M U M F J M T U
N N E P E J O U C S B D B Z G C Q X
K H Q N J E U V L Q K U O O S P S R

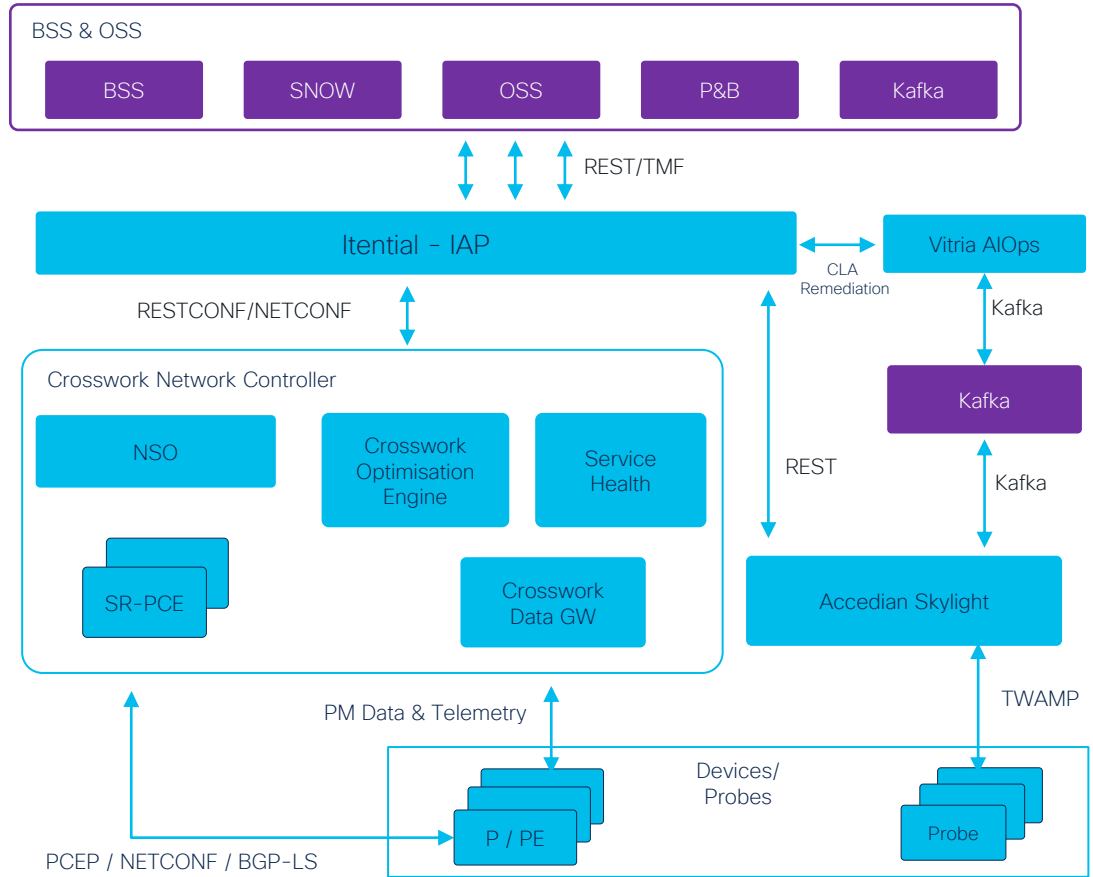
Your Network Management Protocols

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These are not fit for modern, distributed applications

Modern Network Management Stacks can be complex to manage and troubleshoot

Microservices are taking central stage

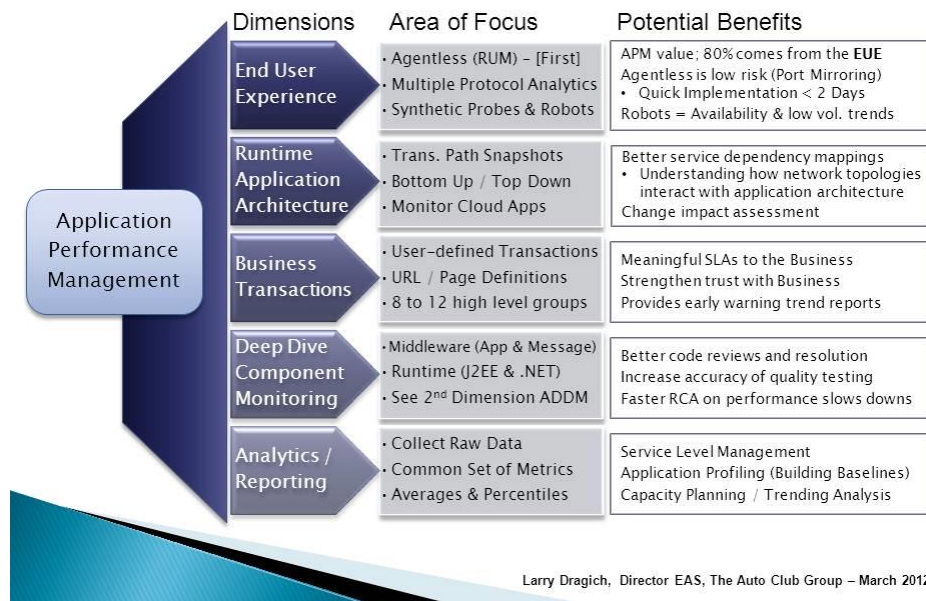


Meantime, the application ecosystem evolves

Application Performance Management (APM)

APM Conceptual Framework

Prioritizing Gartner's APM Model



Large ecosystem



AppDynamics



Grafana



dynatrace



Lightstep

from ServiceNow

By LarryDragich - Created for a Technical Management Counsel meeting Previously published: First published in APM Digest in March, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=107941624>

What is OpenTelemetry (Otel)?



Data
sources



Receive
telemetry in
all kinds of
formats

OpenTelemetry
Collector

OTLP

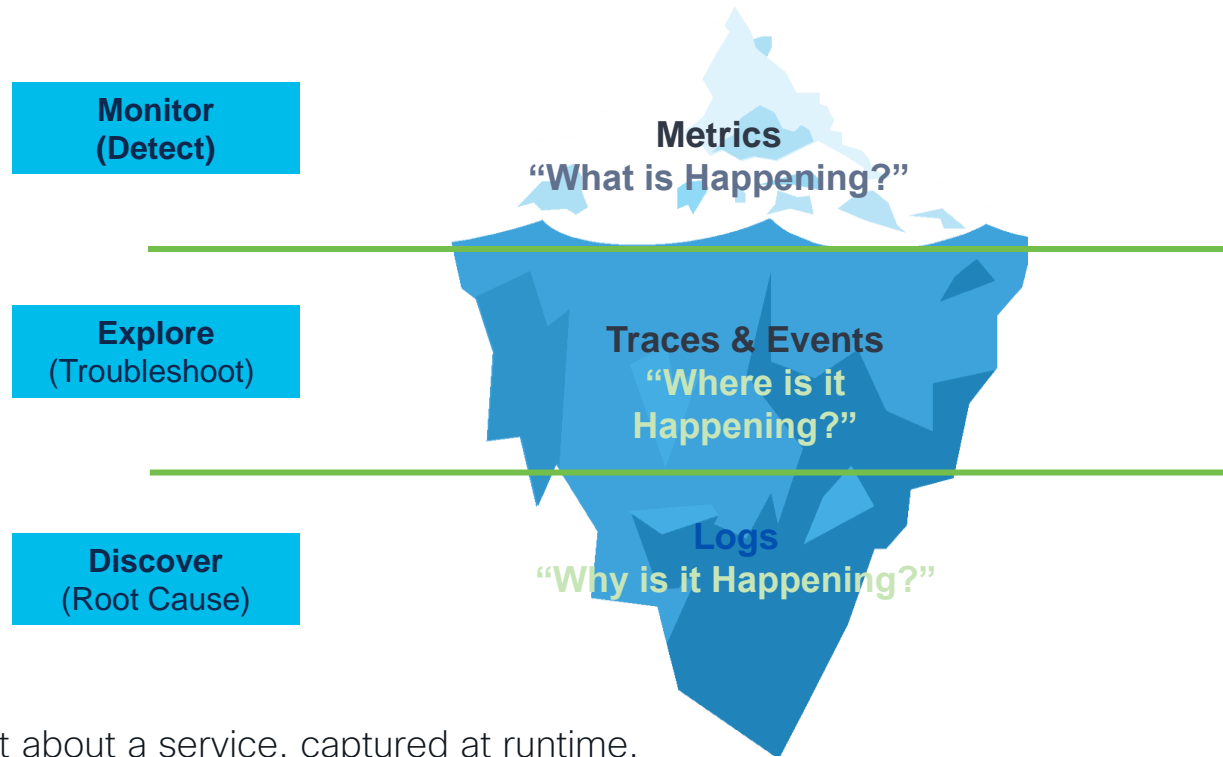
Backend
#1

OTLP

Backend
#2

Think about OpenTelemetry as Lingua Franca:
whatever telemetry **you** generate,
OpenTelemetry will consume it, process it and **correlate** it.

Telemetry roles in Observability



Metric: A [metric](#) is a measurement about a service, captured at runtime.

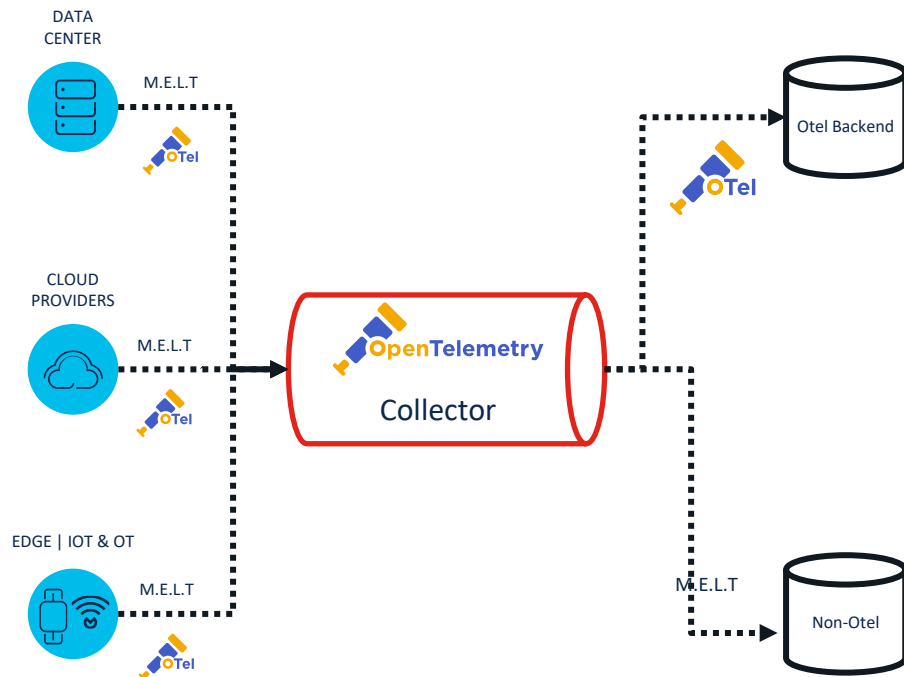
Event: An [event](#) is the occurrence of something meaningful for a resource at a particular time.

Log: A [log](#) is a timestamped text record, either structured (recommended) or unstructured, with metadata.

Trace: [Traces](#) track the progression of a single request, called a **trace**, as it is handled by services that make up an application

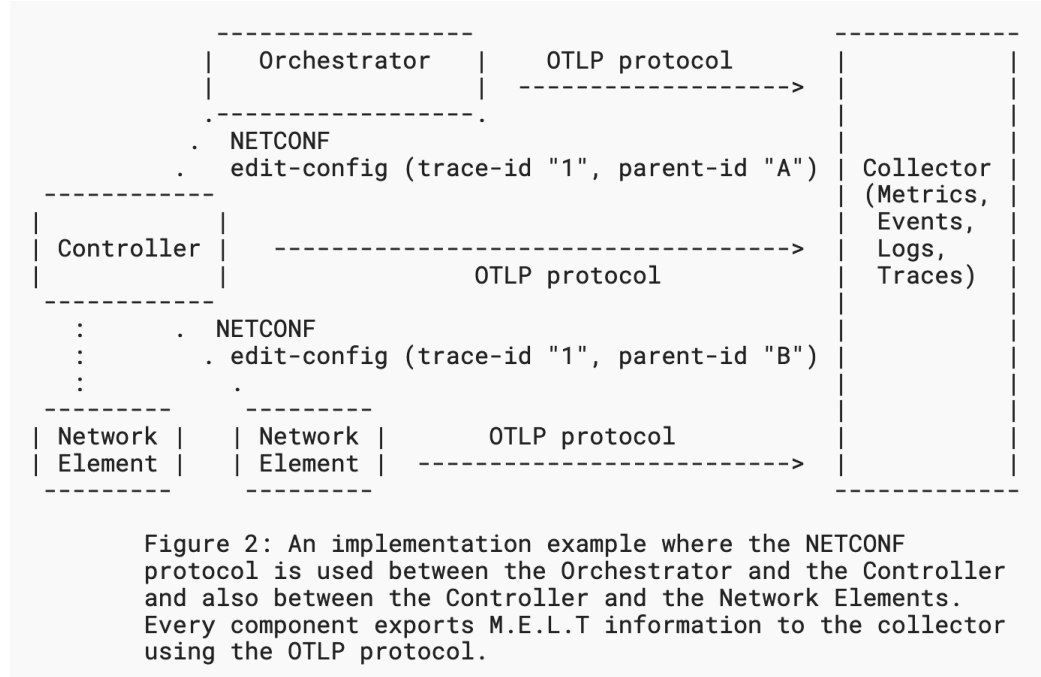
OpenTelemetry Deliveries

1. OTLP protocol running on top of gRPC and HTTPS
2. Common **metamodel** to represent telemetry data
3. Multi-platform, cross-language **SDKs** to support instrumentation and telemetry generation
4. Open Source OpenTelemetry **Collector** project
5. Changes to other standards with concepts as **context-id** and **baggage** (example HTTP W3C or NETCONF)



OTEL impact on a distributed SDN environment

Context propagation will allow to troubleshoot complex deployments



Source: <https://datatracker.ietf.org/doc/draft-rogaglia-netconf-trace-ctx-extension/>

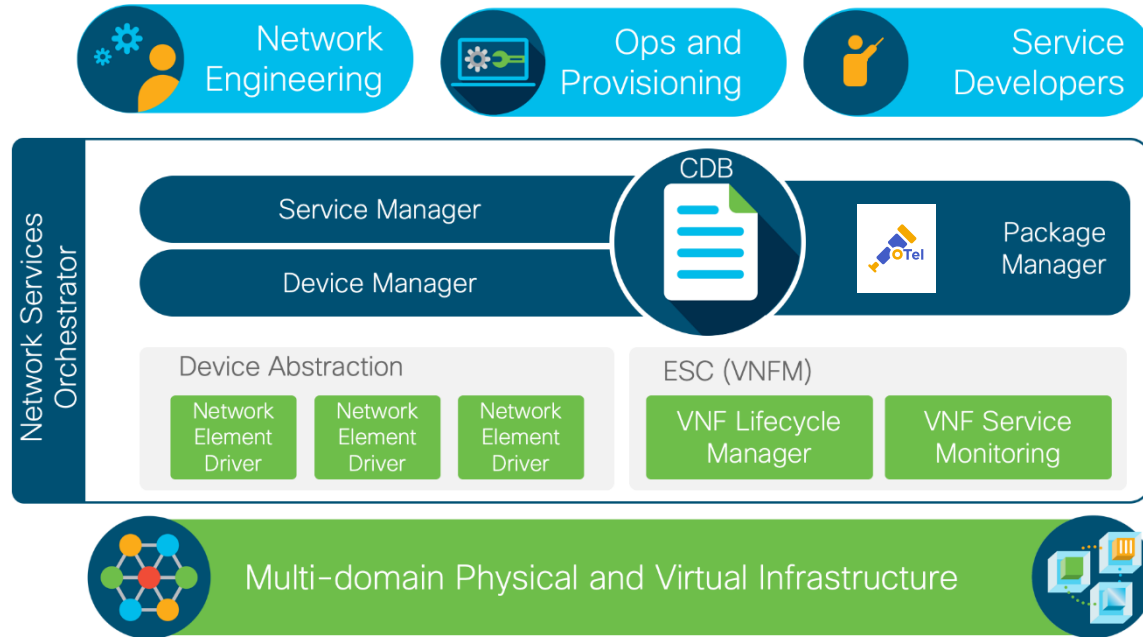
Today:

OpenTelemetry focuses on Applications
OpenConfig/gNMI focuses on Infrastructures



Tomorrow: BLANK

NSO Architecture



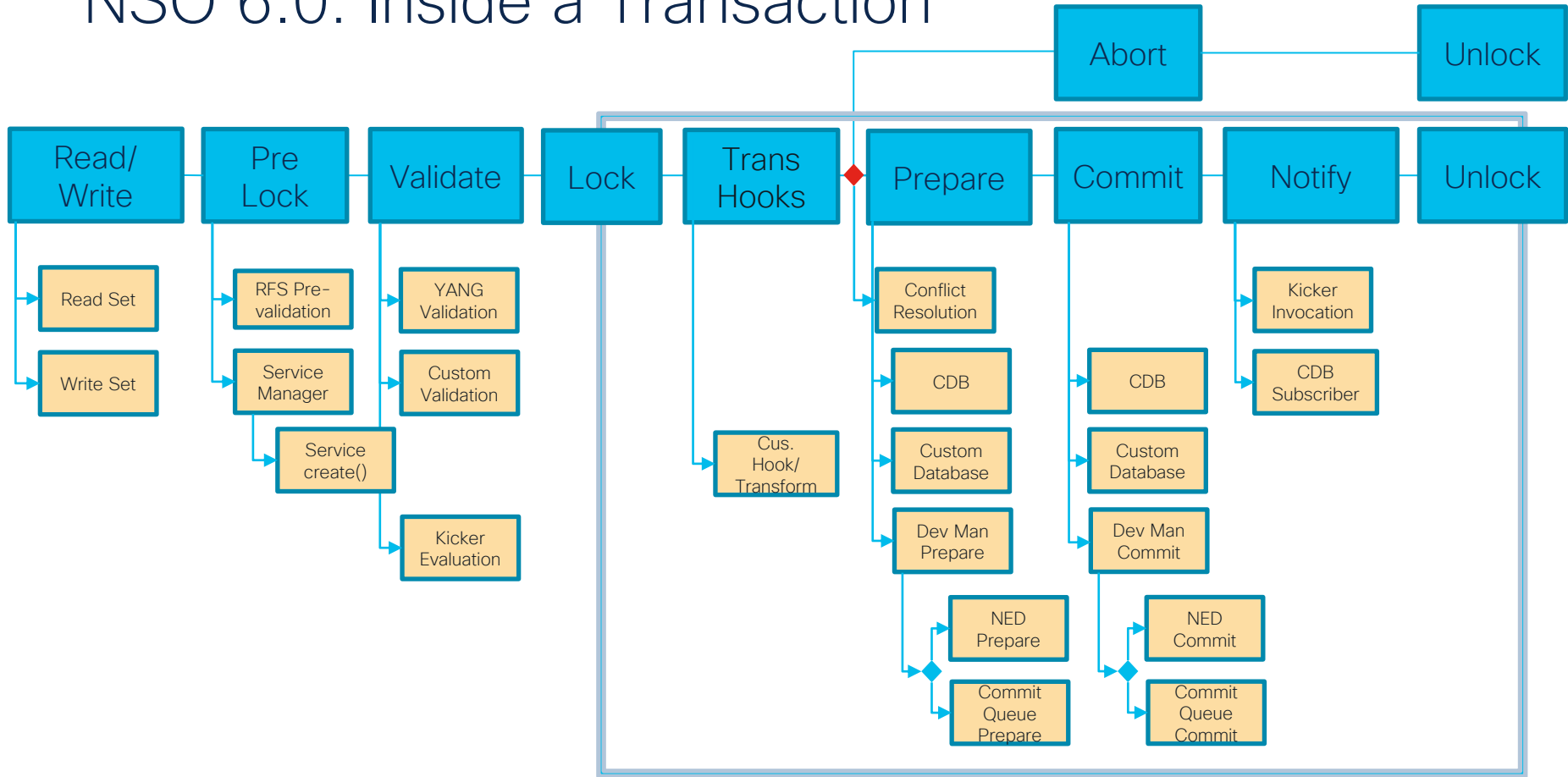
Model-driven, end-to-end service lifecycle and customer experience focused

Seamless integration with northbound tooling

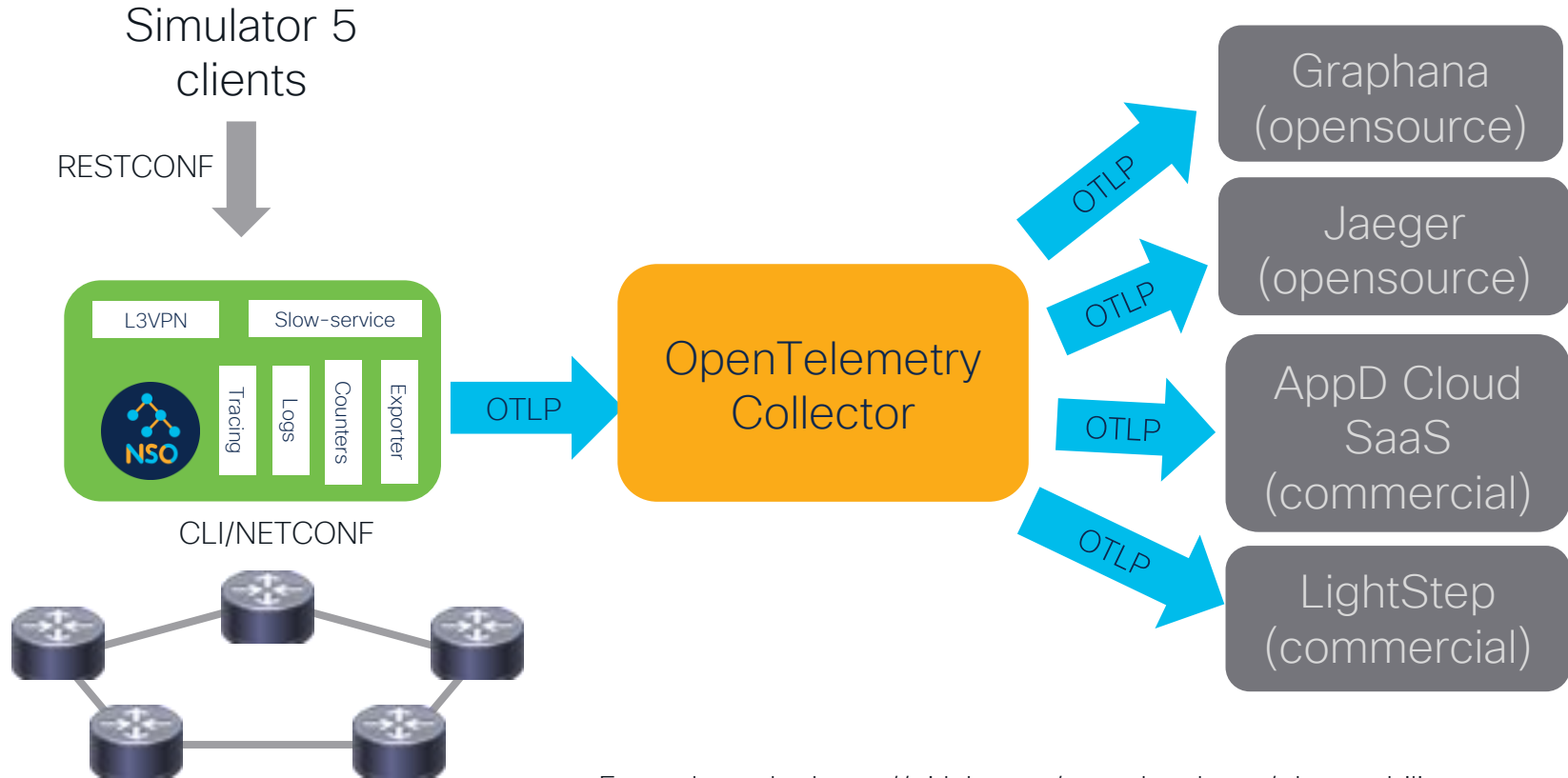
Loosely-coupled and modular architecture leveraging open APIs and standard protocols

Orchestration across multi-domain and multi-layer for network-wide, centralized policy and services

NSO 6.0: Inside a Transaction



Demo time! (all in containers or SaaS)



Example code: <https://gitlab.com/nso-developer/observability-exporter>

Bonus track! Configuring traces with NSO

You can add your own content to OpenTelemetry Spans

```
@contextmanager
def ptrace_service(service, message, verbosity=ncs.VERBOSITY_NORMAL):
    t = ncs.maagic.get_trans(service)
    progress = t.\
    .....report_service_progress_start(verbosity, message, service._path, '')
    .....try:
    .....yield
    .....finally:
    .....t.report_service_progress_stop(progress)

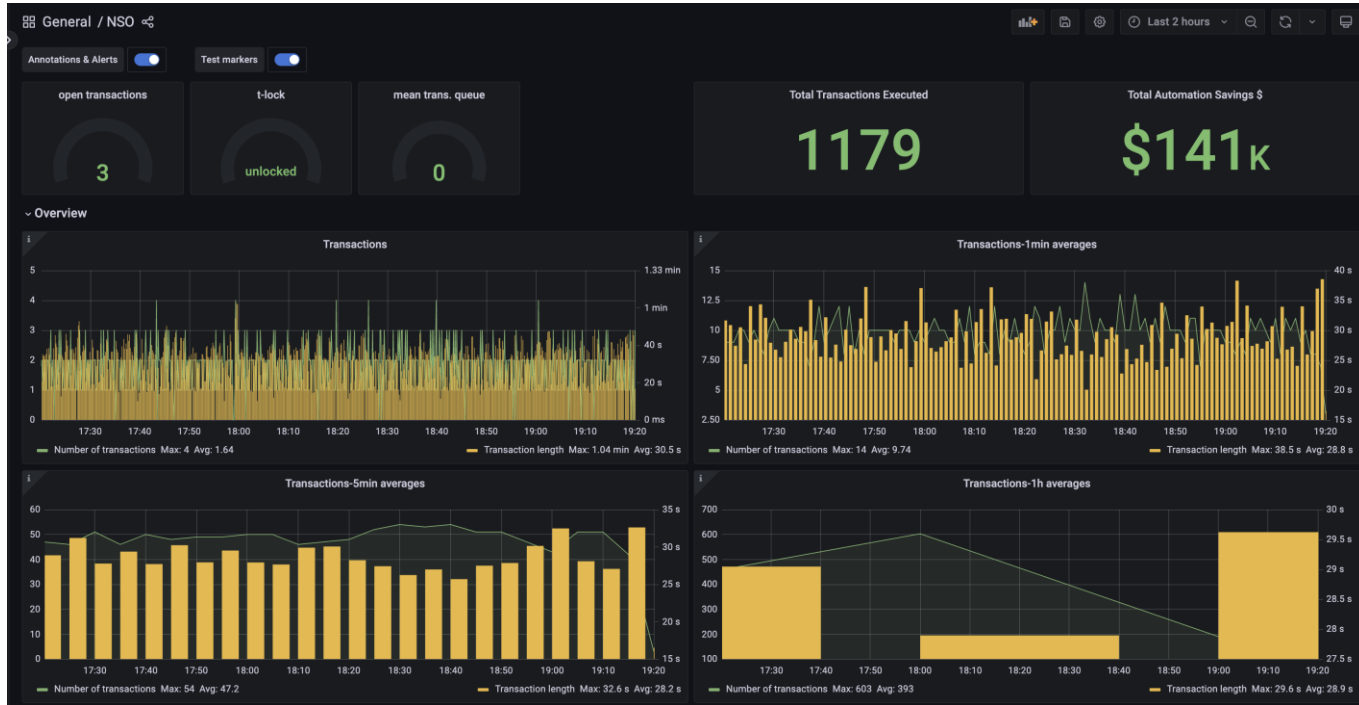
class ServiceCallbacks(Service):
    .....@Service.create
    .....def cb_create(self, tctx, root, service, proplist):
    .....    with ptrace_service(service, 'sleep configured time'):
    .....        time.sleep(float(service.create_slowness))
    .....        rand_max = float(service.random_create_slowness) * 1000
    .....        if rand_max > 0:
    .....            with ptrace_service(service, 'nested random sleep'):
    .....                time.sleep(random.randrange(0, int(rand_max)) / 1000)
```

Check the NSO DEVNET Developer Guide:

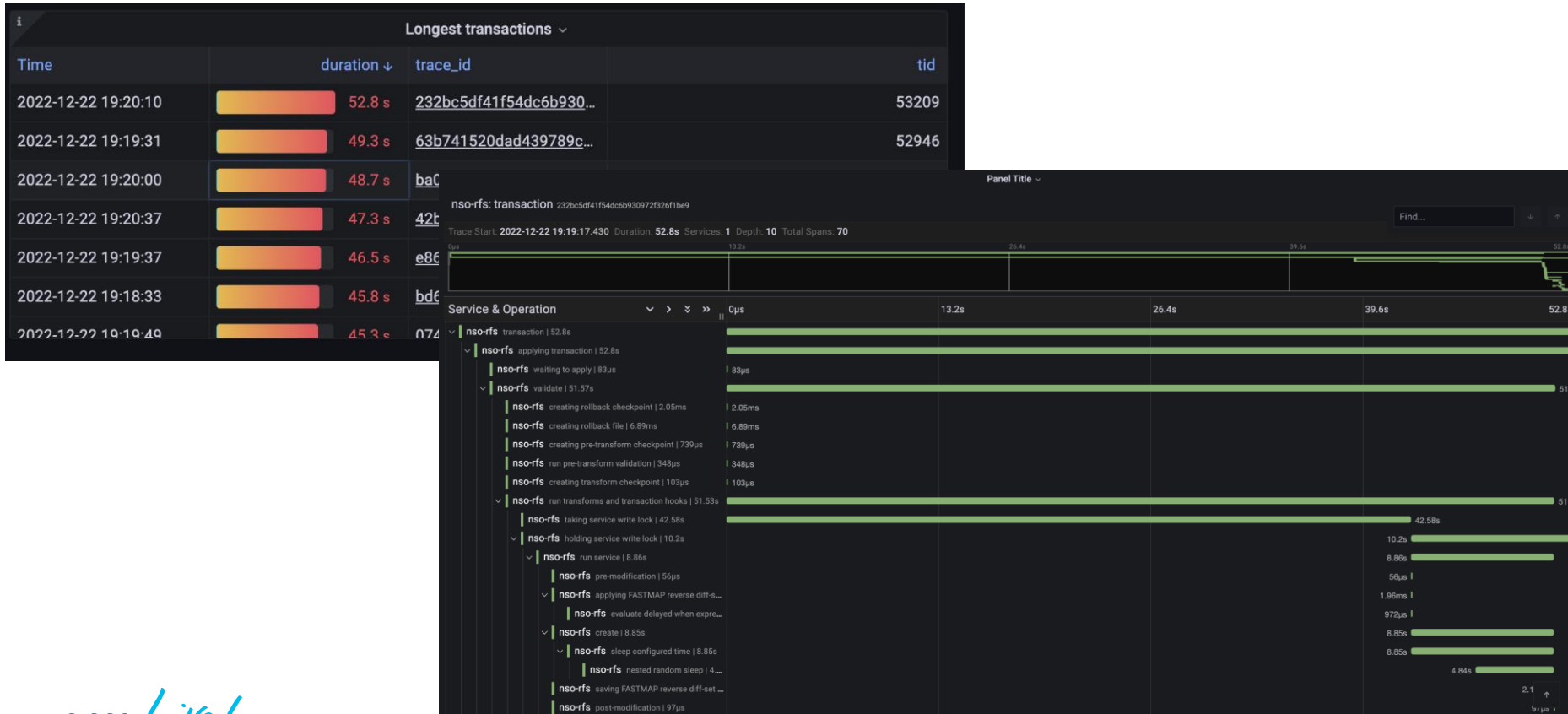
<https://developer.cisco.com/docs/nso/api/#!ncs-maapi>

Example code by Kristian Larsson

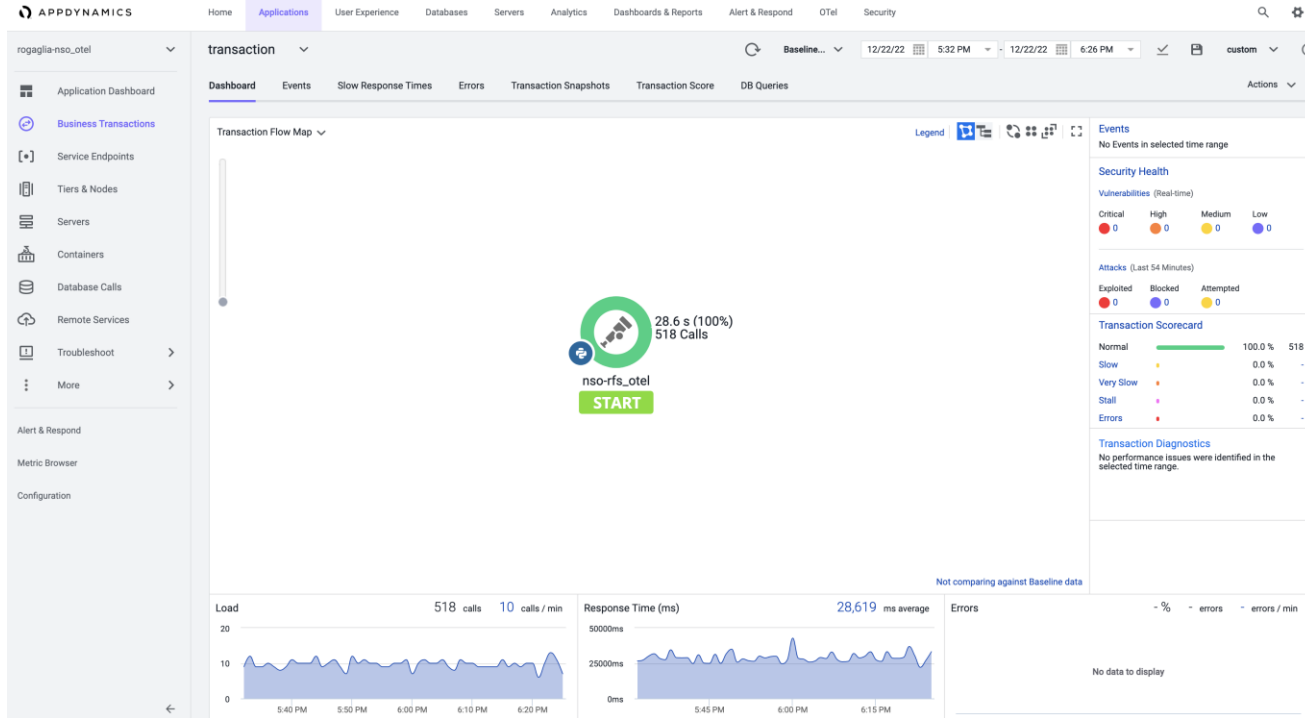
Grafana view



Grafana view



Appd View



Take Aways

- OpenTelemetry is changing the way we can monitor applications
- Network Management applications can tap into this ecosystem
- Cisco NSO officially supports an opentelemetry-exporter package since version 5.7

We now know why my network automation tool was so slow

Complete your Session Survey

- Please complete your session survey after each session. Your feedback is very important.
- Complete a minimum of 4 session surveys and the Overall Conference survey (open from Thursday) to receive your Cisco Live t-shirt.
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Thank you

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ALL IN