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NetDevOps – Closed-Loop operations with Streaming Telemetry

DEVNET-2199

Faisal Chaudhry (Principal Architect)
@fchaudhr
Lei Tian (Snr Solution Architect)

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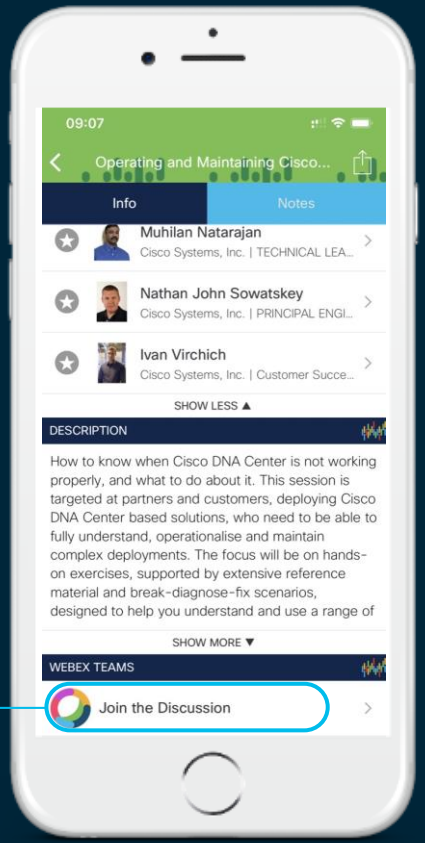
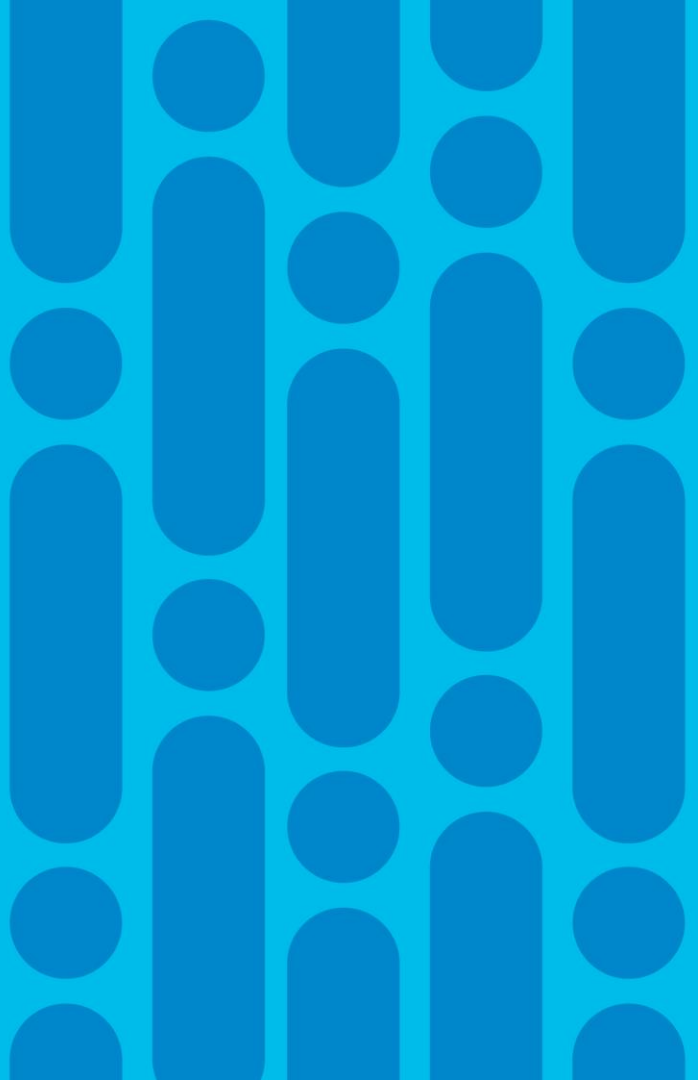


Agenda

- What is NetDevOps and Closed-Loop?
- Streaming Telemetry overview
- How can you achieve closed-Loop operations?
  - Open Source
  - Cisco components
- Demo
- Conclusion

NetDevOps & Closed Loop



NetDevOps

Less human work
Avoid repetition
Prevent errors

Development

+

Operations

=

NetDevOps

Breaking human silos

Network as Code
Continuous Feedback
End to end automation

The tooling, culture, best practices of DevOps to Networking

Closed Loop: What?

Continuously **monitor** the network *behavior*

Faults *Congestion*

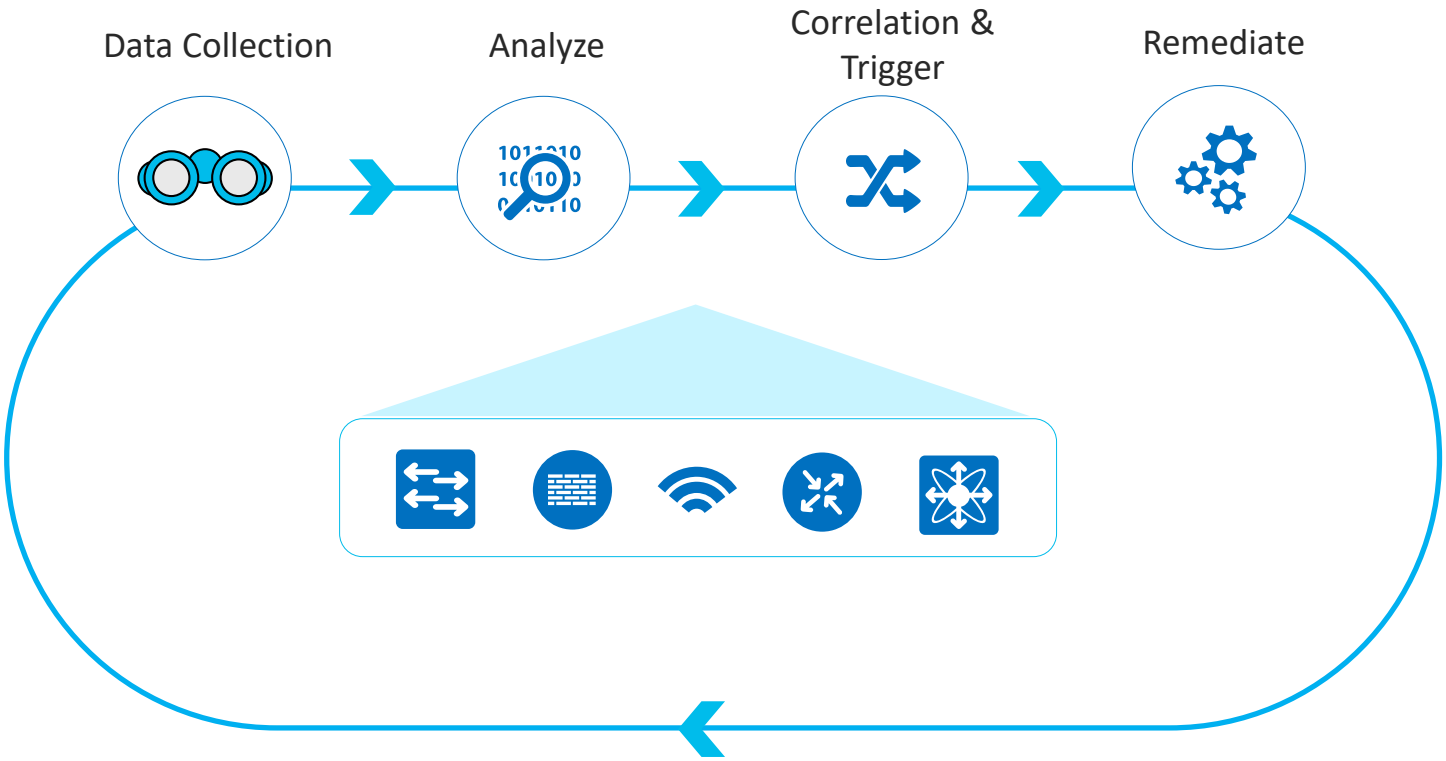
Remediate *problems* **automatically**

Optimization

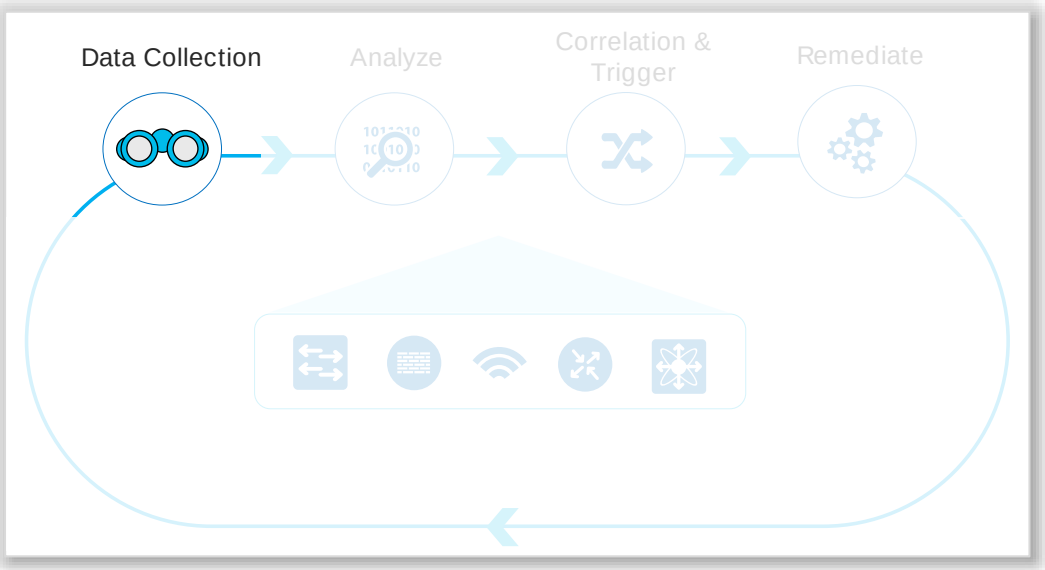
validate the network *again* after remediations

Loop!

Closed Loop

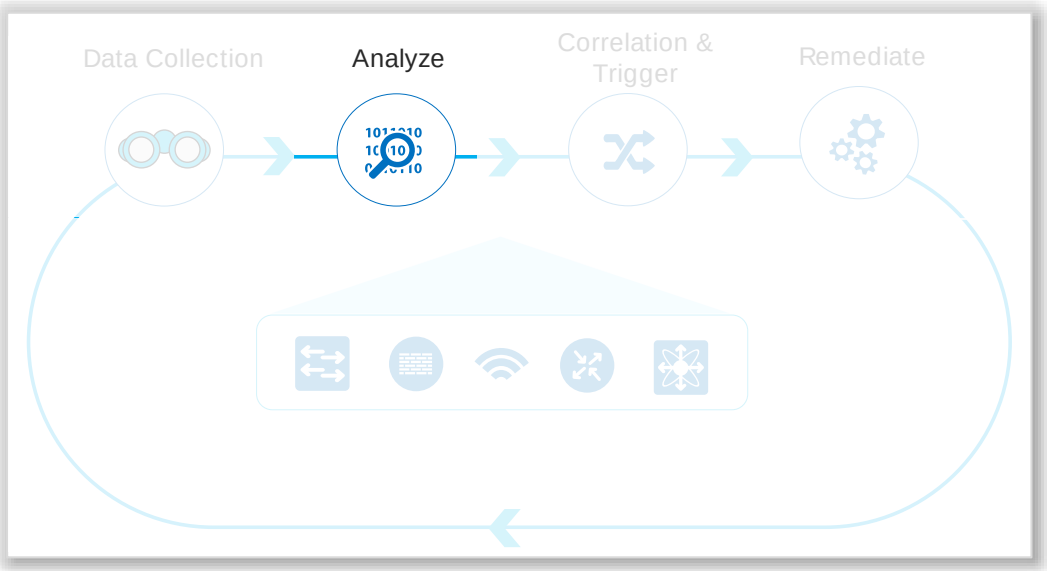


Closed Loop – Data Collection



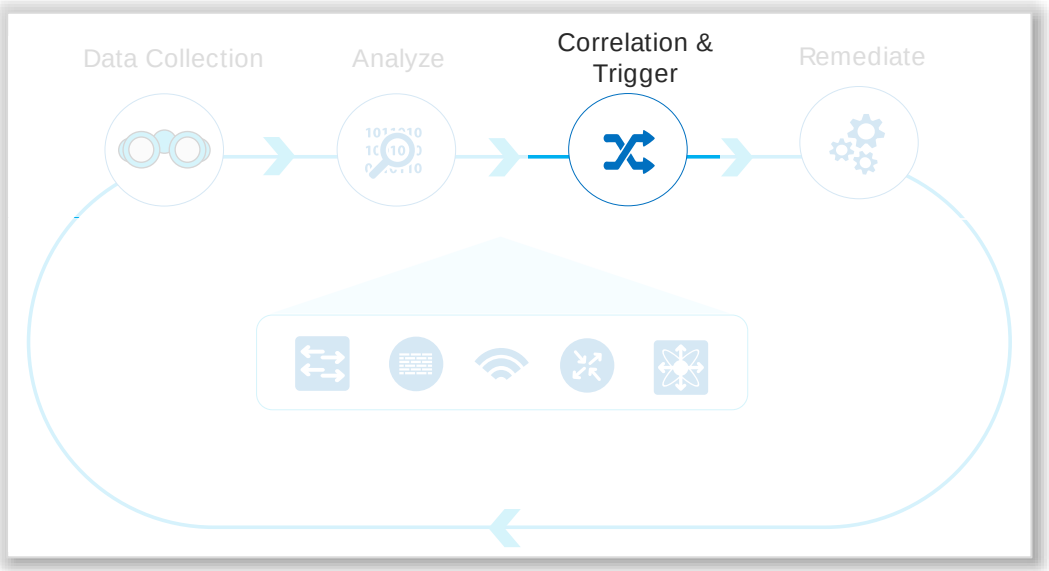
- What data to collect?
- Collection from one or multiple devices?
- How to collect this data?
  - SNMP, Model Driven Telemetry, gRPC …
- Storage of data

Closed Loop – Analyze



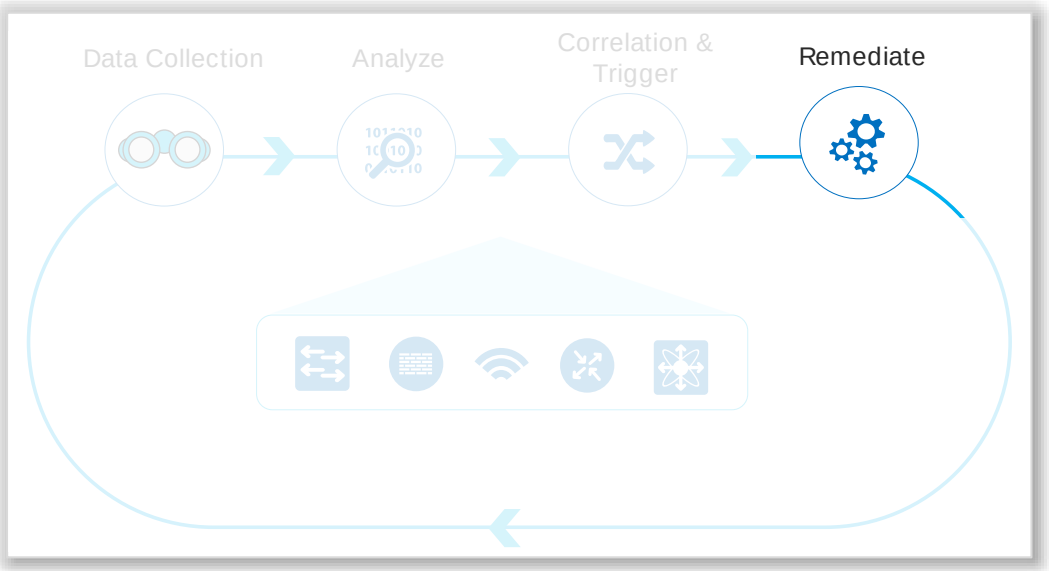
- Analysis of *relevant* data
  - Tons of data from singe device or multiple devices
- Is that data providing actual meaningful insights?
  - Are other steps such as Traffic Engineering (TE) required?

Closed Loop – Correlation & Trigger



- Compare with baseline behavior
  - Queue Depth > x
  - Interface flaps (more than 5 times in 1 min)
- Trigger alerts to other systems
  - Alarm #1 may just be an alarm
  - Alarm #2 may trigger an action

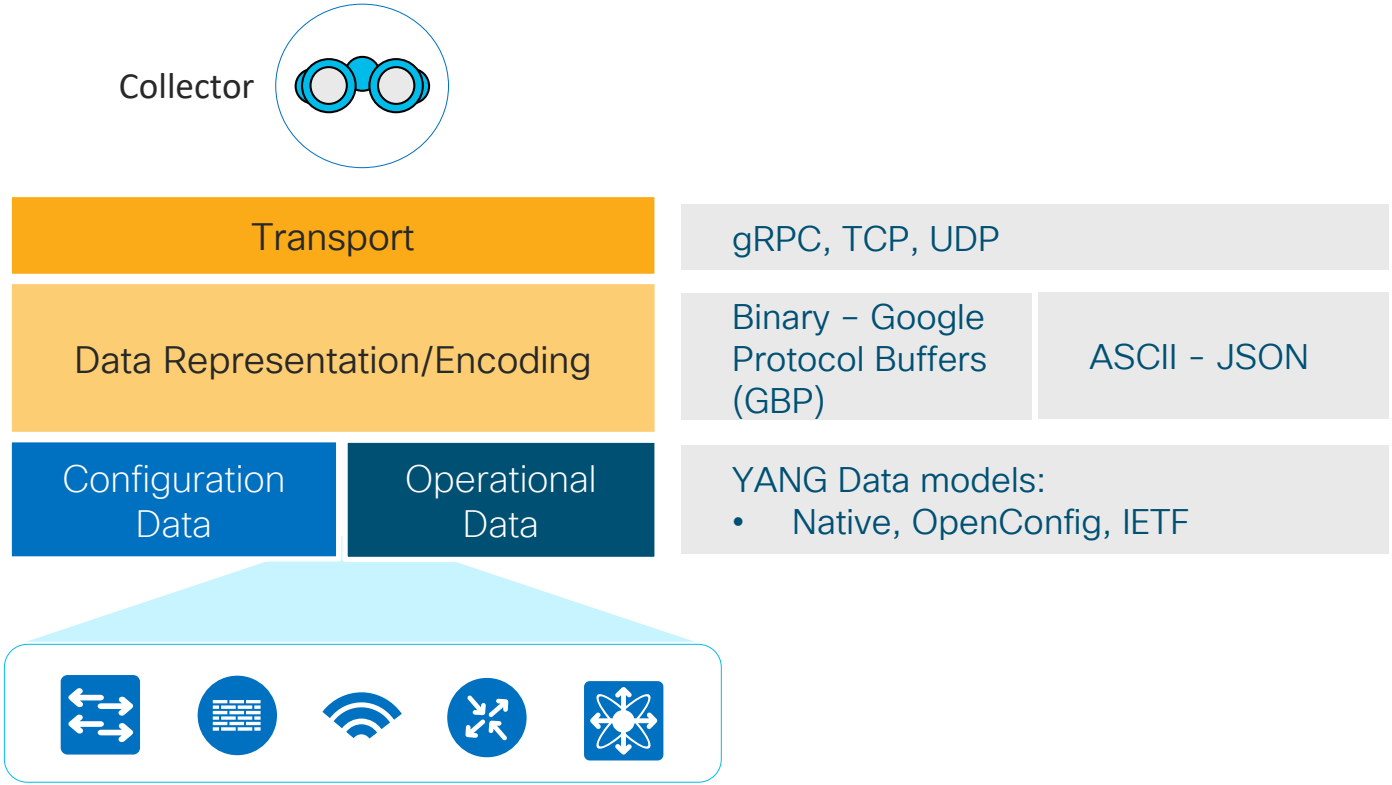
Closed Loop – Remediation



- Invoke steps to take corrective action based upon trigger condition
- How to take the corrective step?
  - Basic scripting
  - Open source config management tools (Ansible)
  - Commercial tools such as Cisco NSO (Network Services Orchestrator)

Streaming Telemetry

Streaming Telemetry

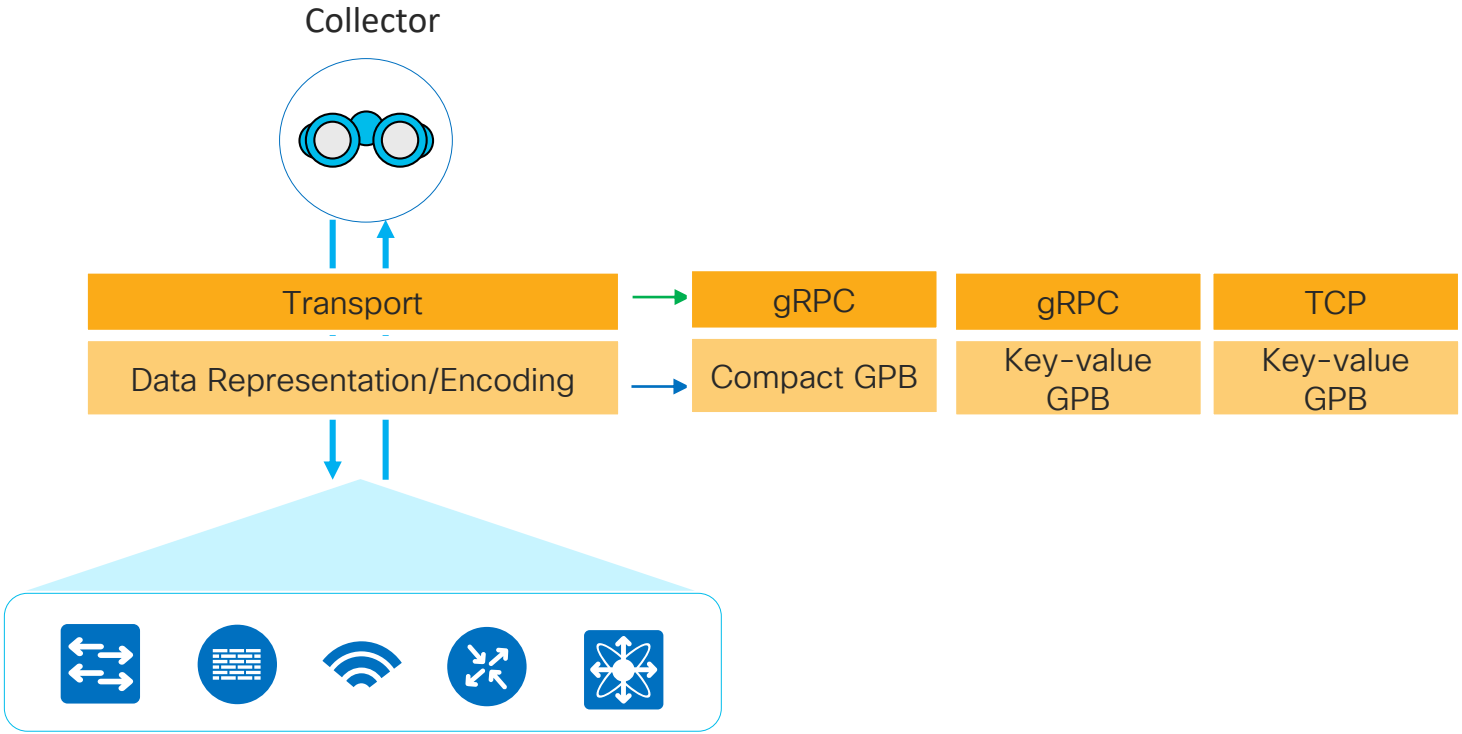


Streaming Telemetry

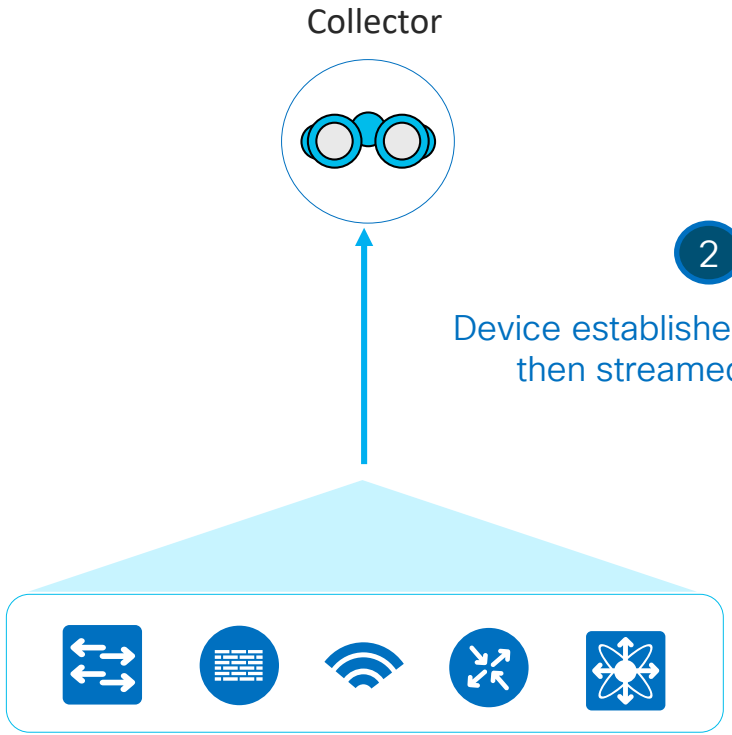
- Configuration and Operational Data collected from a device using Streaming Telemetry (aka Model Driven Telemetry – MDT)
- Platform receiving the data is referred to as Collector
- Collection can be periodic, or on a certain trigger/change for Monitoring & Analytics
- Monitored Devices implement IETF or vendor-specific YANG data model
  - Encoding for data being captured can be Binary using Google Protocol Buffer (GBP), or ASCII using JSON
- Telemetry is based upon SUBSCRIBE-PUBLISH model
  - Collector subscribes to data updates from set of YANG data stores
- No need for periodic polling of the device!
  - Instead requested info is delivered to collector/subscriber by end-device

Streaming Telemetry

cGBP v KV



Streaming Telemetry – Dial Out mode



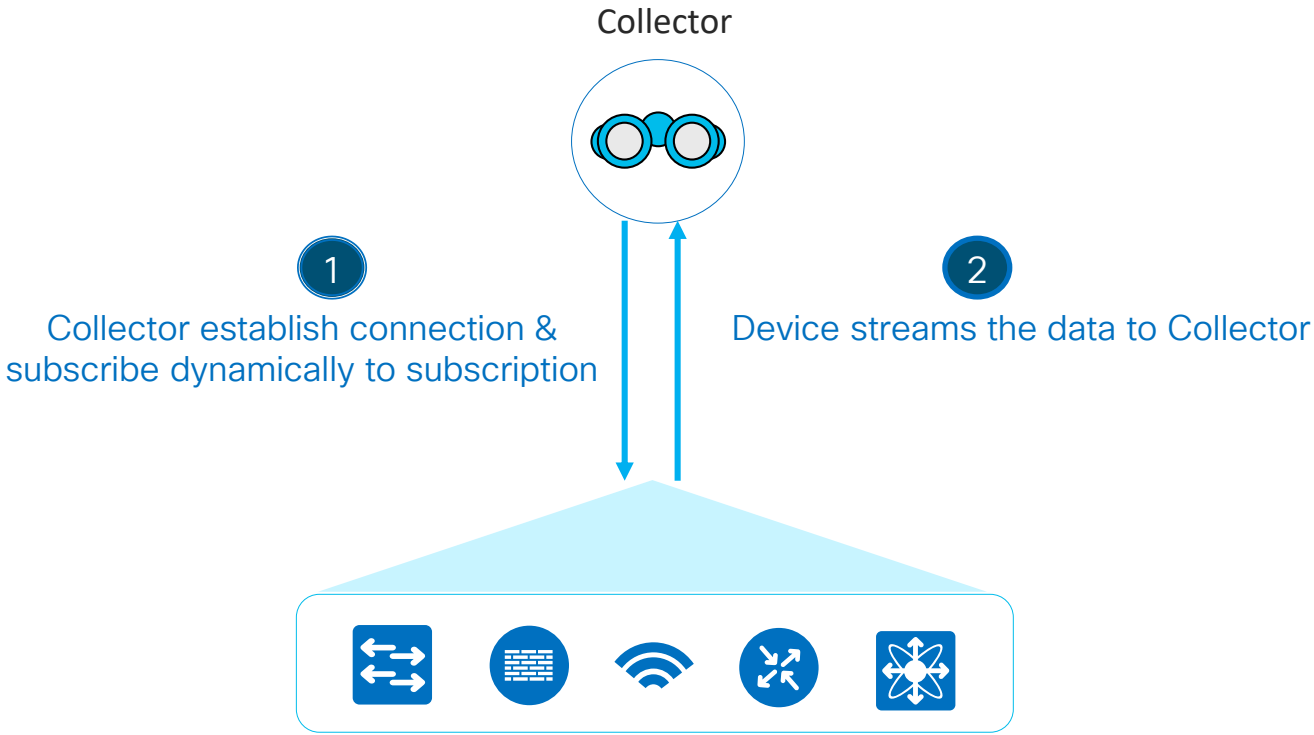
2

Device establishes a session, & data is then streamed out to Collector

1

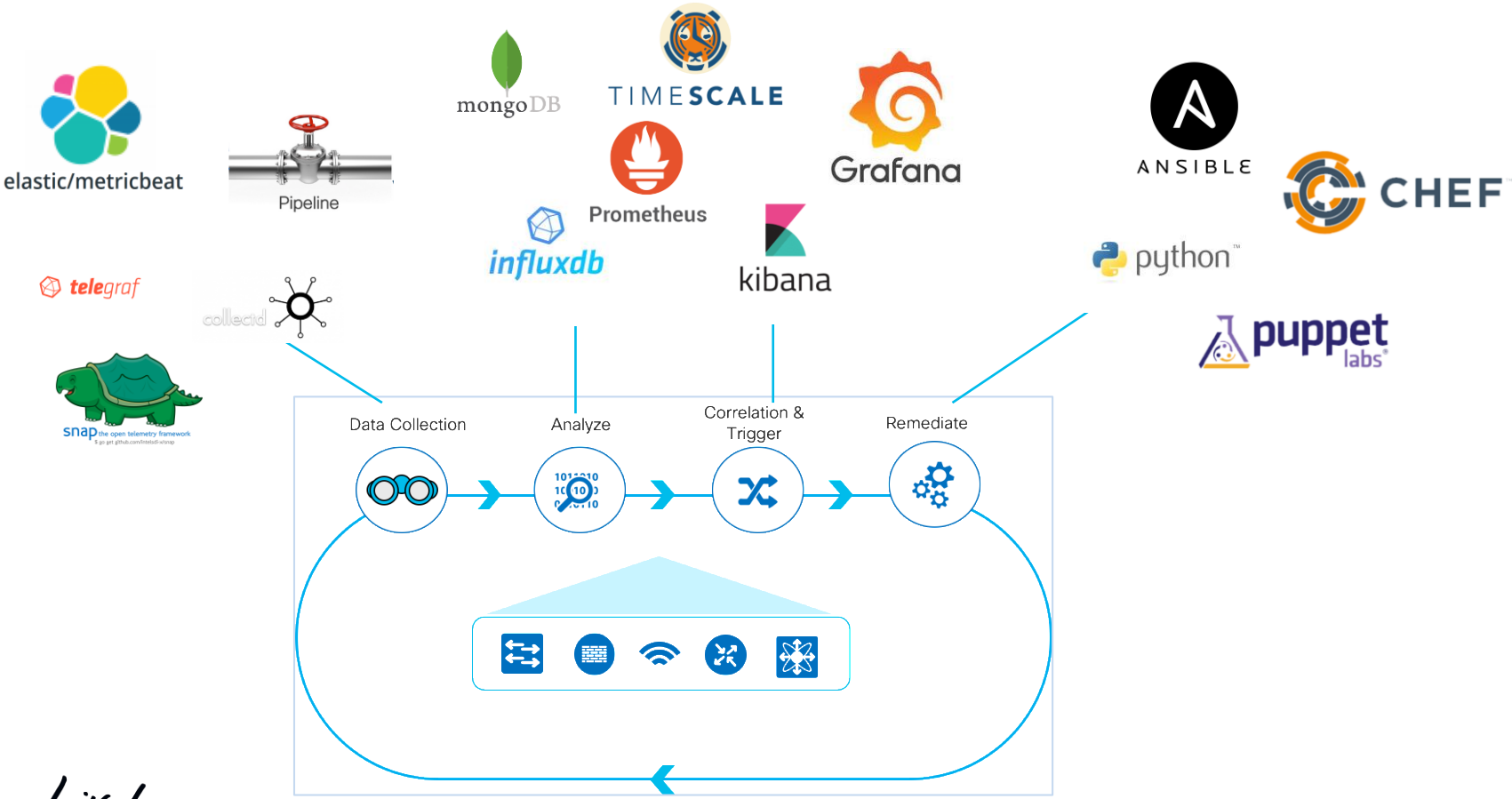
Sensor paths, destinations are configured. And attached to telemetry subscriptions

Streaming Telemetry – Dial In mode

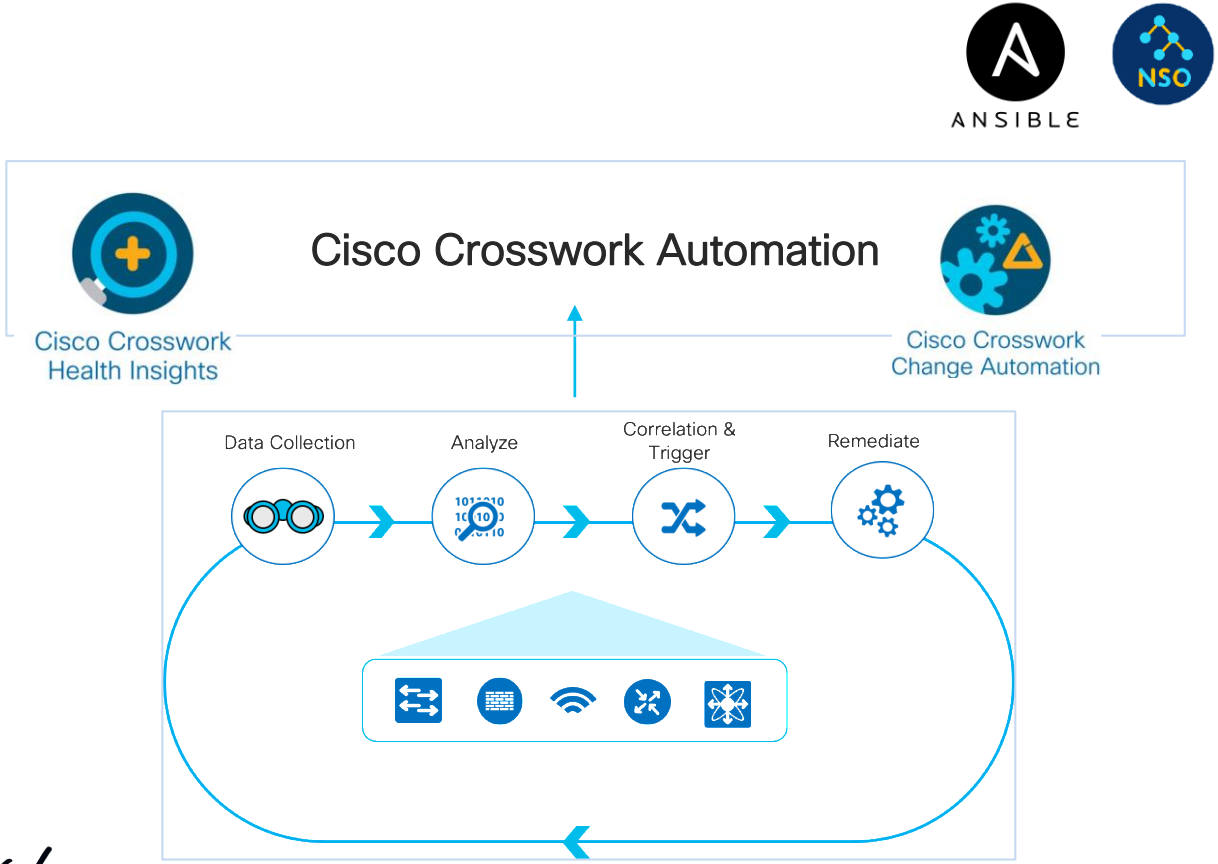


How to achieve Closed-Loop operations

Open Source based solution



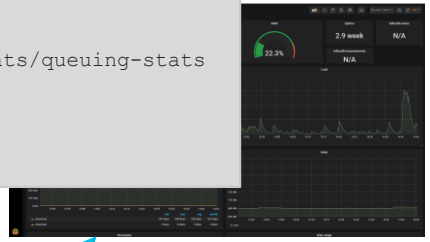
Cisco Platform

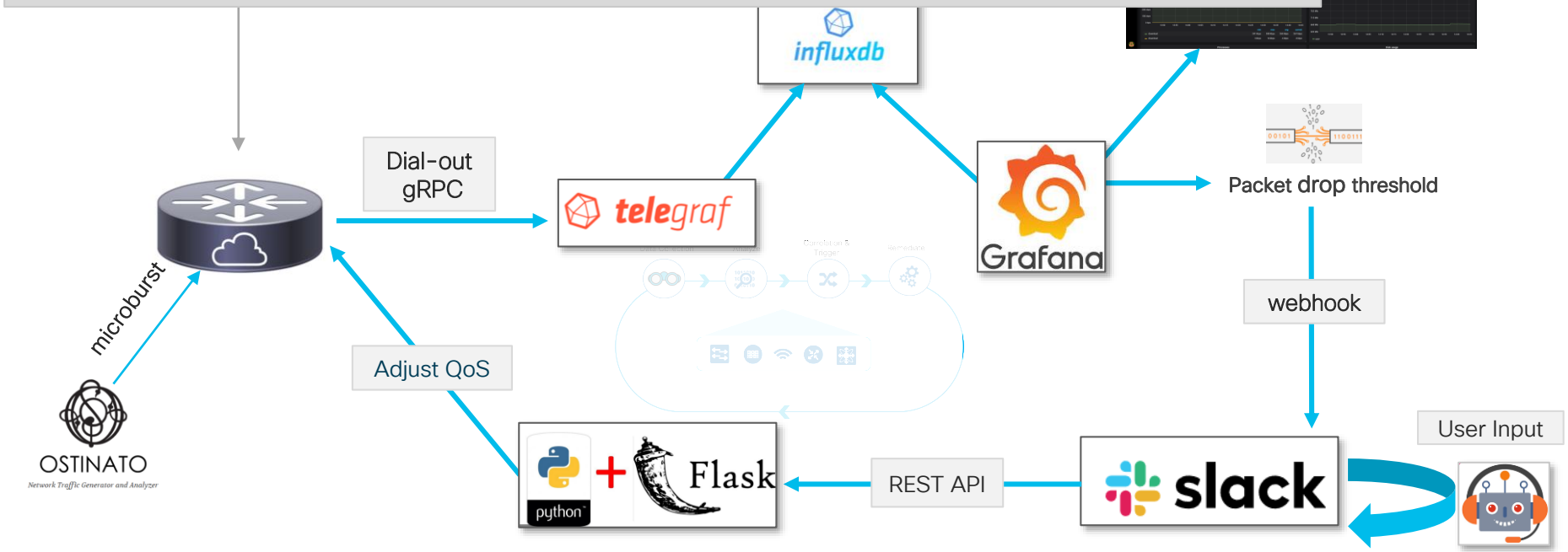


Demo 1
open source

Demo Topology

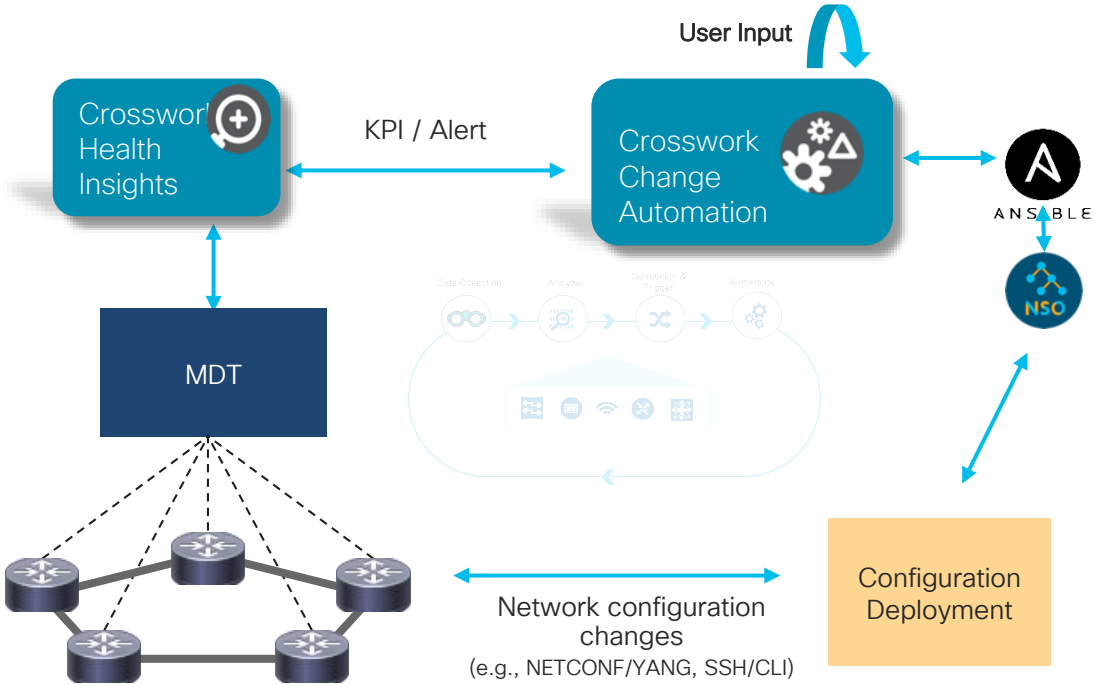
```
telemetry ietf subscription 4
 encoding encode-kvgpb
 filter xpath /interfaces-ios-xe-oper:interfaces/interface/diffserv-info/diffserv-target-classifier-stats/queuing-stats
 source-address 10.87.3.205
 stream yang-push
 update-policy periodic 100
 receiver ip address 10.87.3.197 57001 protocol grpc-tcp
```





Demo 2
CrossWork Automation

Demo Topology



Related Sessions

- DEVWKS-2624 – DevNet Workshop: Streaming Telemetry with NX-OS
- DEVWKS-1389 – DevNet Workshop: From Zero to Model-Driven Telemetry Hero
- DEVWKS-1444 – DevNet Workshop: API driven closed-loop remediation with Crosswork Health Insights and Change AUtomation
- DEVNET-2722 – API driven Internet route monitoring with Crosswork Network Insights

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