Monitoring Networks Using Model-driven Telemetry (MDT)

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Agenda

Introducing the TIG stack
- Telegraf
- Influxdb
- Grafana

YANG "oper" models

gRPC-based telemetry on IOS-XE

Building Grafana dashboards

Day 2-N Operations

Long term network management which includes operation, administration, and maintenance tasks (OAM).

Introducing the TIG Stack

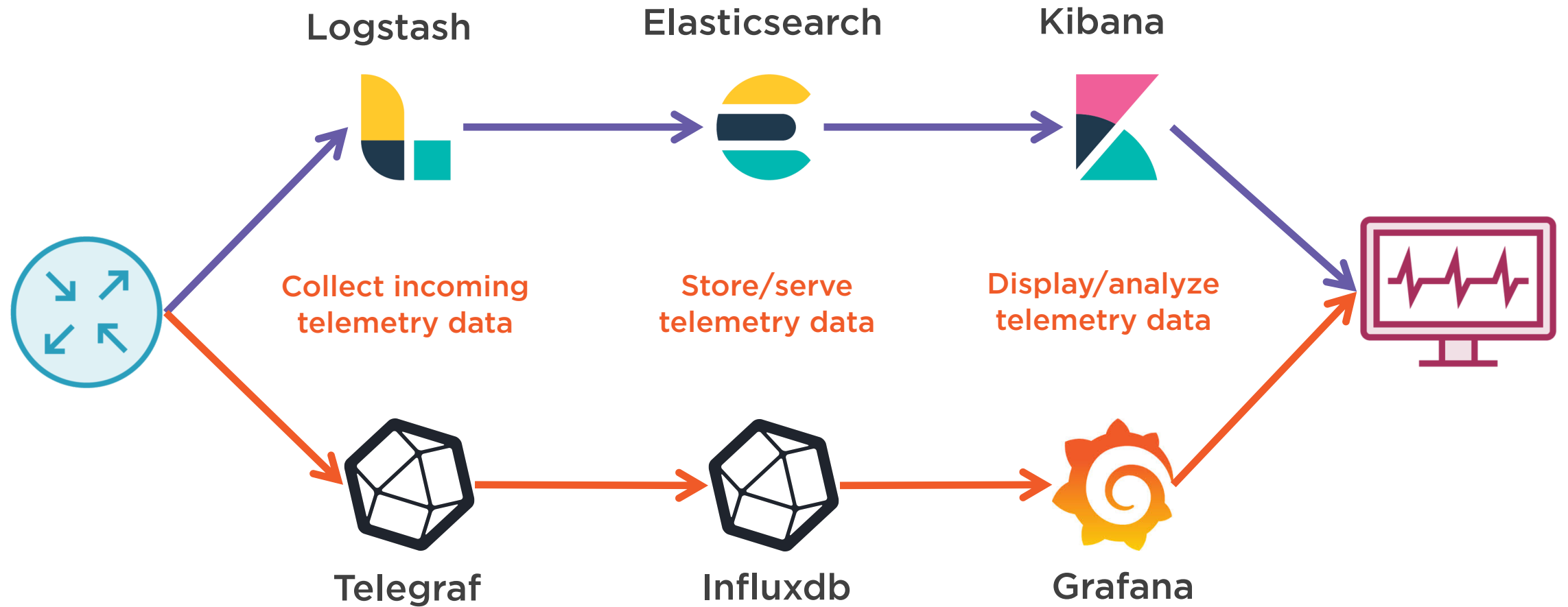**Telegraf: plugin-driven server agent for collecting metrics**

Influxdb: time-series database optimized for fast storage/retrieval

Grafana: analytics and monitoring/visualization solution

How the Pieces Fit (and Compare)

Logstash

Elasticsearch

Kibana

Collect incoming
telemetry data

Store/serve
telemetry data

Display/analyze
telemetry data

Telegraf

Influxdb

Grafana

Different Approaches to MDT

Dial-in	Dial-out

TCP SYN →

← TCP SYN

Dynamically initiated by manager

Manager re-establishes if session breaks

No polling!

Statically configured on device

Device re-establishes if session breaks

No polling!

Demo

Building and deploying the TIG stack

Demo

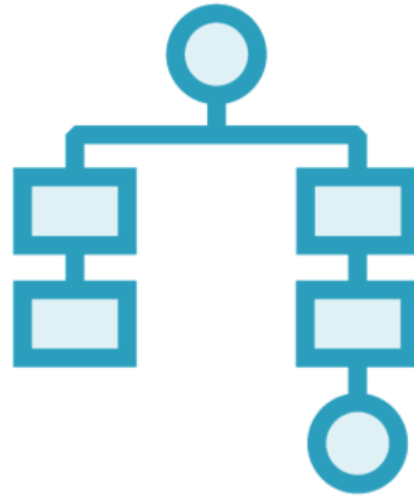**Exploring operational state YANG models**

– CPU utilization

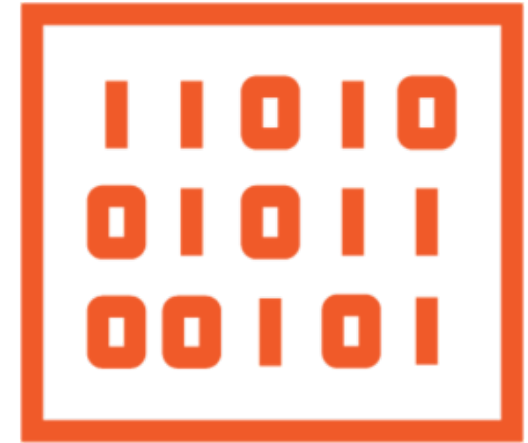– Memory consumption

– Cisco Discovery Protocol (CDP) details

Introducing gRPC

Google RPC built on HTTP/2

Interface Definition Language (IDL) via protocol buffers

Protobufs are very fast/efficient

More on gRPC Encodings

Compact GPB

```
1: Processor
10: 16777216
11: 12501953
12: 4275263
```

```
// Conceptual protobuf
message memstat {
    string intf_name = 1;
    uint64 total_mem = 10;
    uint64 used_mem = 11;
    uint64 free_mem = 12;
}
```

KV-GPB

```
intf_name: Processor
total_mem: 16777216
used_mem: 12501953
free_mem: 4275263
```

JSON

```
{
    "intf_name": "Processor"
    "total_mem": 16777216
    "used_mem": 12501953
    "free_mem": 4275263
}
```

Performance

Ease of use

Demo

Configuring telemetry subscriptions

Demo

Creating a new Grafana dashboard

Summary

Unifies management and monitoring

Many implementations
- "Deploying Network Configuration Management and Telemetry Solutions"

Challenge:
- Add visualizations for OSPF/DMVPN
- Netmiko and RESTCONF MDT scripts

Thank you!