Service Assurance for Intent-based Networking Architecture & YANG Modules for Service Assurance

HACKATHON
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IETF 108, Virtual
Hackathon

• Initial objectives:
  – a VPP assurance sending service assurance via YANG
  – SAIN architecture and YANG module
  – with pmacct/telegraf as a collectors + InfluxDB/Grafana/Chronograf

• Participants
  – Korian Edeline
  – Alexandre Leonardi
  – Kannan Jayaraman
  – Jean Quilbeuf
  – Benoit Claise
  – Eric Vyncke
  – Walter Cerroni
An open-source SAIN agent

dxtop

Console App (GUI)

Shared Memory

dxweb

Web App

gNMI Exporter

rules

Apply rules on normalized data & compute health scores

metrics

Normalize input data. Discover subservices and dependencies

inputs

Discover data sources and gather data

Example rules:
- e.g., "Receive Errors Peak",1min(delta(rx_error))>100
- e.g., rx_bytes,Net/Rate/Rx,/if/rx-bytes => rx_bytes

Example inputs:
- XPCOM
- /proc
- netlink
- gNMI
- shmem
- ...

https://github.com/ekorian/dxagent
An open-source SAIN agent

https://github.com/ekorian/dxagent
Rule Engine : Highlighting symptoms

- Subservice expertise for anomaly-highlighting rules
- Variables (metrics), basic operators and more (temporality, selection, has_changed, ...)

```
"Interface Flapping", /node/bm/net/if, Red, 1min(dynamicity(changes_count))>=6
"Low Buffer Availability", /node/kb/mem, Orange, (buffer_free/buffer_total)<0.1
"DPDK Buffer Alloc Errors", /node/kb/net/if, Orange, dynamicity(dpdk_alloc_errors)>0
"Sensor reached critical temperature", /node/bm/sensors/sensor,Red, input_temp>=critical_temp
"Non-standard Ethernet MTU", /node/bm/net/if, Red, (mtu!=1500) and (type=="ether")
```
An open-source SAIN agent

• Client service monitoring by concatenating assurance trees
• From failing component, find impacted subservices
• Monitor multiple subservices or components
SAIN Hackaton: Open Architecture with YANG Models

[Diagram with YANG annotations]
SAIN Hackaton: Open Architecture with YANG Models

- Service
  - Configuration
  - Orchestrator

- Network
  - Service
  - Instance
  - Configuration

- Feedback
  - Loop

- SAIN
  - Orchestrator

- SAIN
  - Collector
  - pmacct

- dxagent

- telgraf

- influxdb
  - +grafana/
  - chronograf

- Metric Collection
  - VPP/virtual machine/container

- Configuration
  - (assurance graph)
SAIN Hackaton: Open Architecture with YANG Model (Example)

- Monitor a VPP-in-VM instance
SAIN Hackaton: Open Architecture with YANG Model (Example)

- Health score decreases
SAIN Hackaton : Open Architecture with YANG Model (Example)

```
$ ./dxweb -t 1.2.3.4:50051
```

```
$ ssh "dxtop"
```

```
CPU | Memory | Processes | Networking | Virtual Machines | VPP | Health

Symptoms

DPDK Buffer Allocation Error: /node[name=ko]/vb/nets[0]/vt/100021
No free hugepage: /node[name=ko]/vb/nets[0]/vt/100021

Metrics

/node[name=ko]/vb/cpus/cpu health:100

cpu0-cpu7

table_time

system_time

user_time

guest_time

rx_packets

vboxnet1 health:100
```

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Interoperability

- Dxagent exporting to the Cisco SAIN PoC collector (pipeline)
Next Steps

- More complete rule engine
- Add end-to-end probing as input
- Multi-node architecture
- gNMI support in pmacct (Kannan Jayaraman)
- White paper on specific use case
- More input, more rules

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