

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

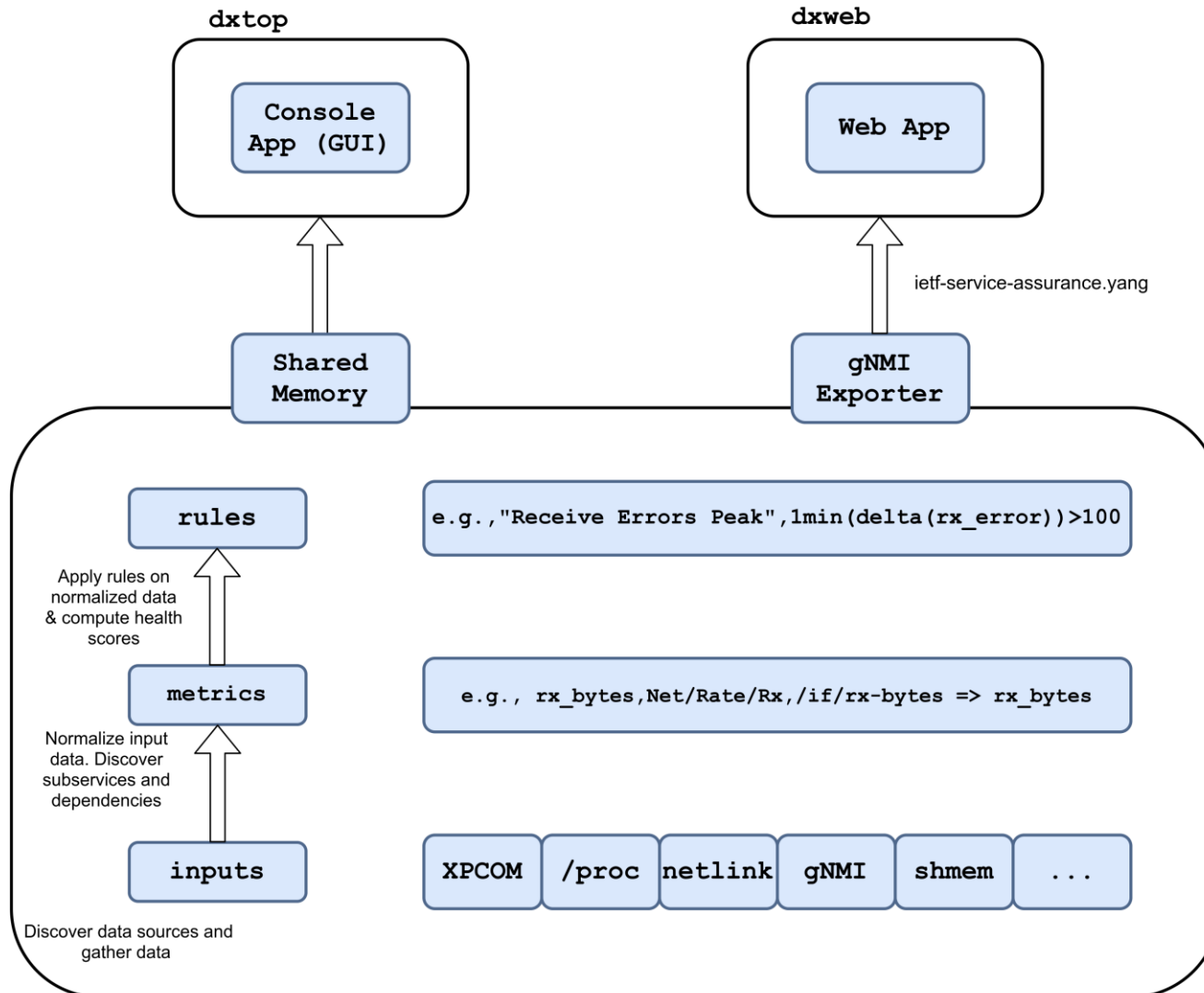
**HACKATHON  
Korian Edeline (Liège University)**

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

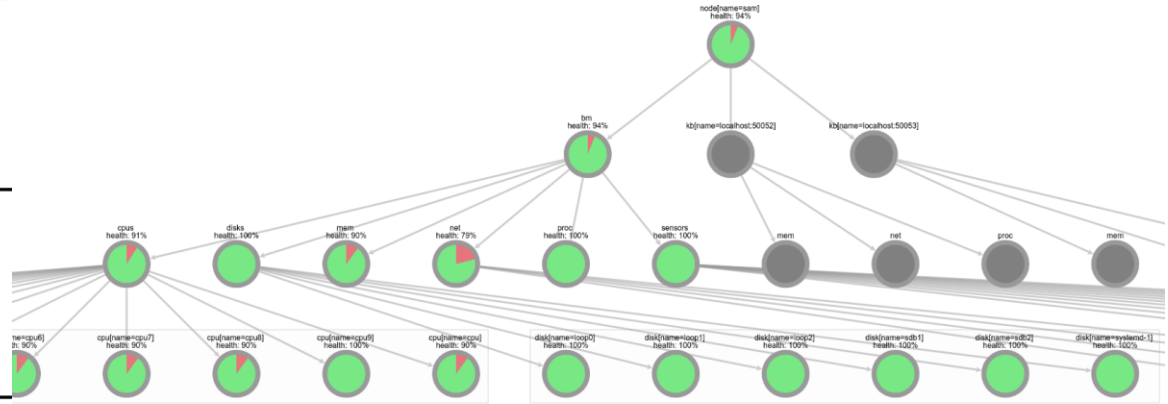


# An open-source SAIN agent

dxtop

CPU   Memory   Processes   Networking   Virtual Machines   VPP   Health		
vm-count: 0 kb-count:0 symptoms-count: 3		
No ARP Entry For Default Gateway: /node[name=san]/bn/net/lf[name=ens0f1] No ARP Entry For Default Gateway: /node[name=san]/bn/net/lf[name=ens0f0]		
Metrics		
/node[name=san]/bn/cpus/cpu health:100		
cpu0-cpu7		
idle_time	100 %	99 %
system_time	0 %	0 %
user_time	0 %	1 %
guest_time	0 %	0 %
cpu8-cpu15		
idle_time	81 %	100 %
system_time	0 %	0 %
user_time	19 %	0 %
guest_time	0 %	0 %
/node[name=san]/bn/net/lf health:79		
rx_packets	en01 health:100	908
rx_bytes	119158855	11908174732 MB
rx_error	0	0
rx_drop	0	0
tx_packets	44076236	996
tx_bytes	19246201603 MB	263184
tx_error	0	0
tx_drop	0	0
up_count	1	0
down_count	1	0
changes_count	2	0
state	up	0
wireless	0	0
rtu	0	1500 B
numa	0	0
cpulist	0-15	0
tx_queue	1000	0
gw_in_arp	1	0
type	ether	0
dns_server	127.0.0.53	0
dhcp_server	0	0
driver	e1000e	0
bus_info	0000:00:19.0	0
tx-checksum-ip-generic	1	0

dxweb



e.g., rx\_bytes, Net/Rate/Rx, /if/rx-bytes => rx\_bytes

Discover subservices and dependencies

inputs

- XPCOM
- /proc
- netlink
- gNMI
- shmem
- ...

Discover data sources and gather data

# Rule Engine : Highlighting symptoms

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

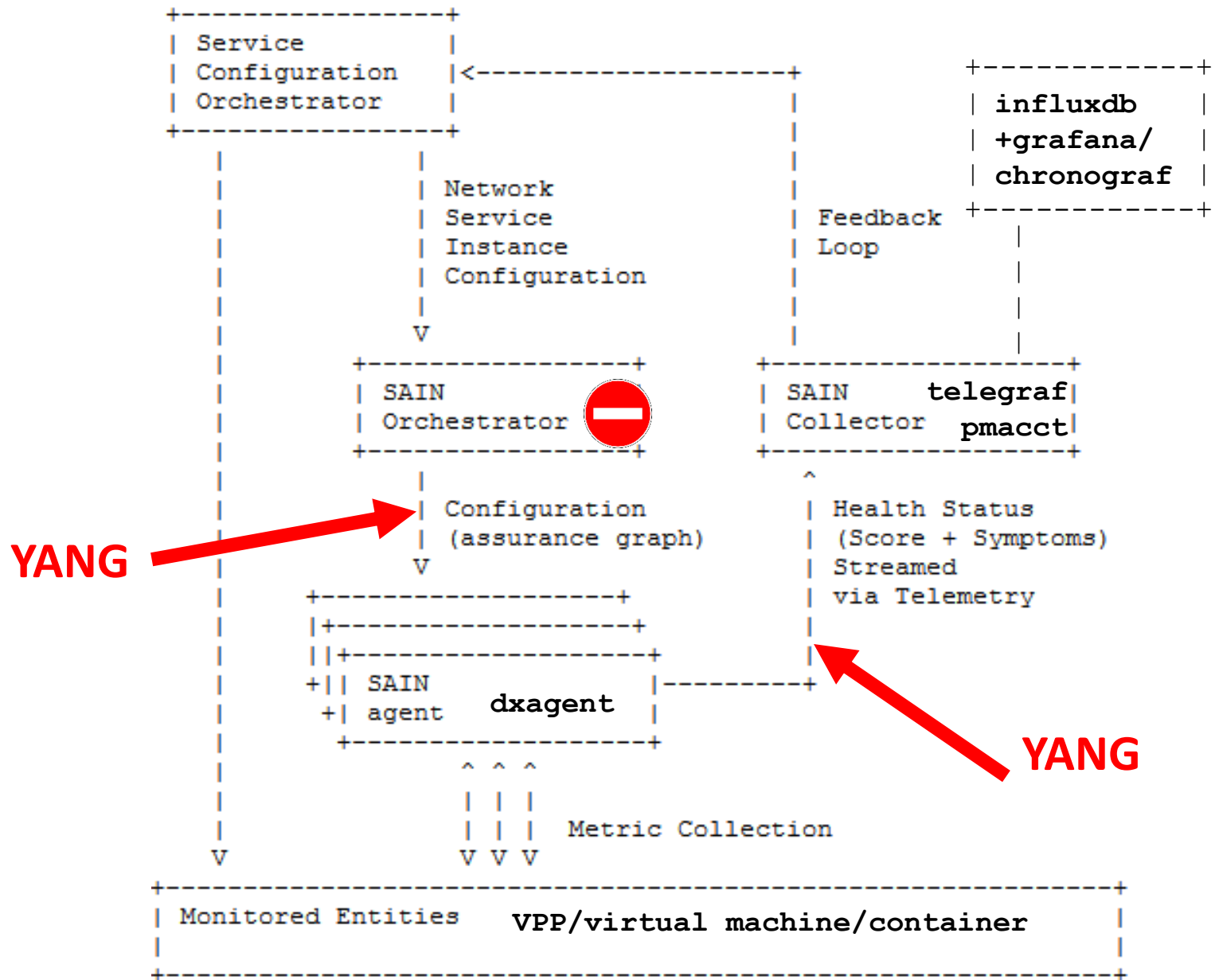
```
"Interface Flapping",           /node/bm/net/if,           Red,      1min(dynamicity(changes_count))>=6
"Low Buffer Availability",       /node/kb/mem,              Orange,   (buffer_free/buffer_total)<0.1
"DPDK Buffer Alloc Errors",     /node/kb/net/if,          Orange,   dynamicity(dpdk_alloc_errors)>0
"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

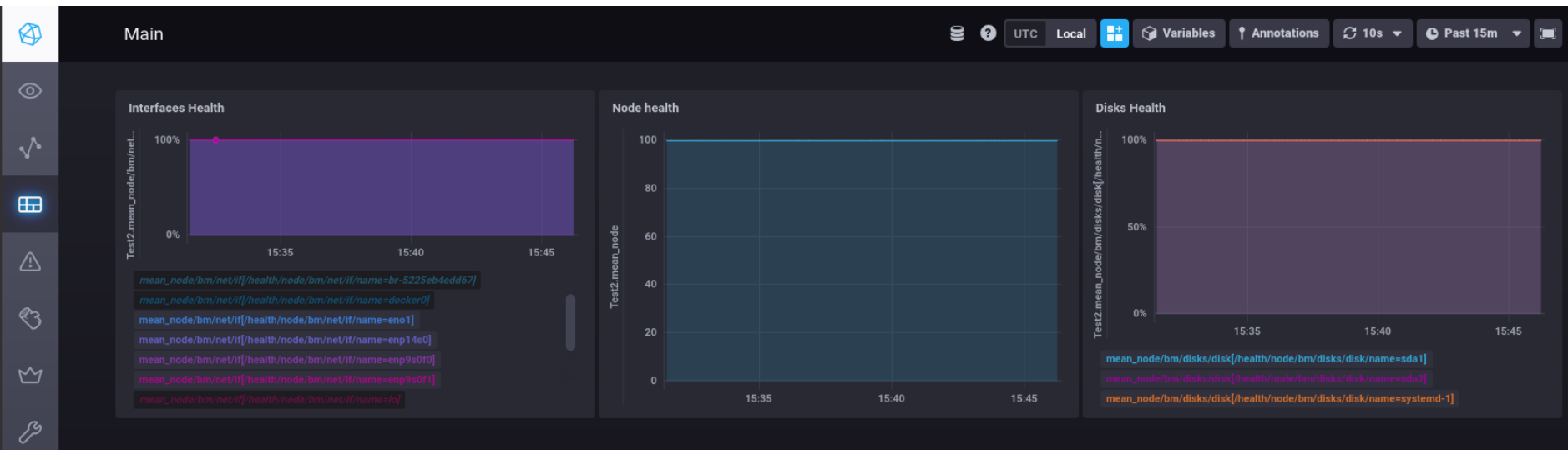


# SAIN Hackaton : Open Architecture with YANG Models



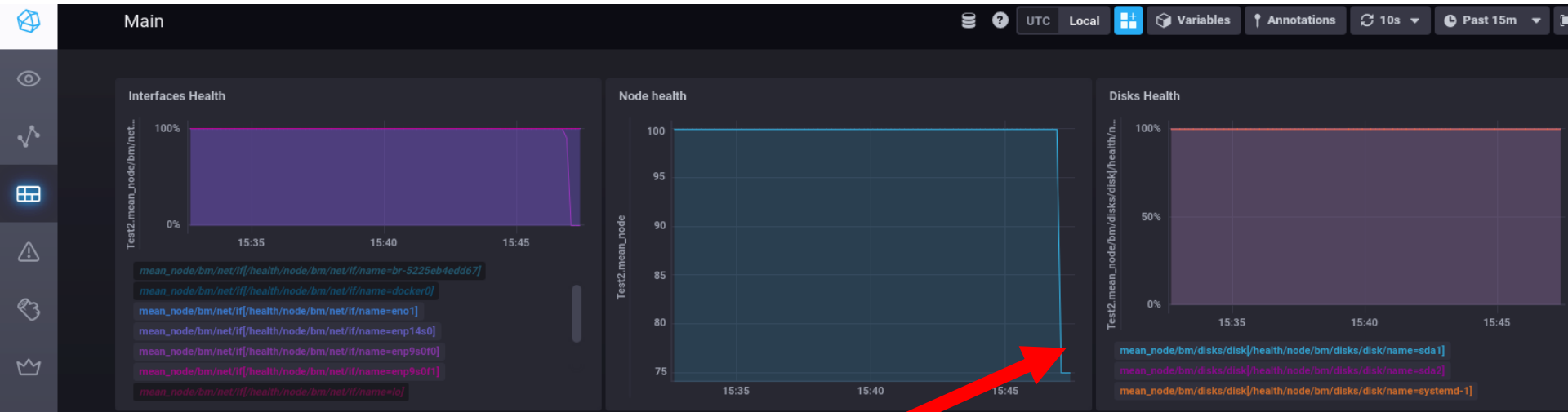


# SAIN Hackaton : Open Architecture with YANG Model (Example)



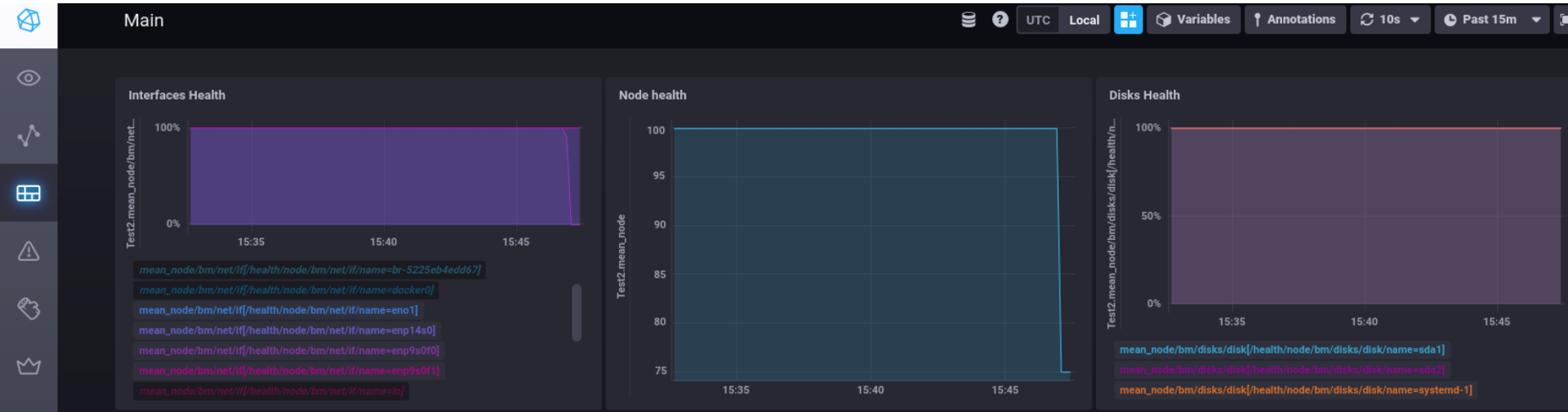
- Monitor a VPP-in-VM instance

# SAIN Hackaton : Open Architecture with YANG Model (Example)

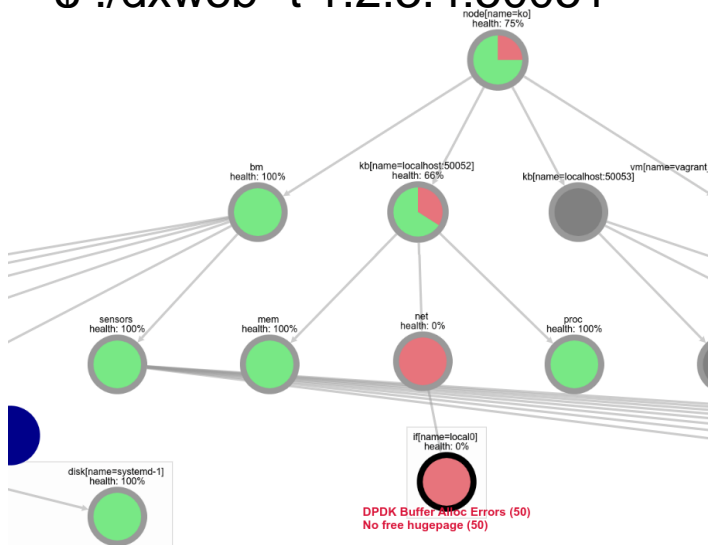


- Health score decreases

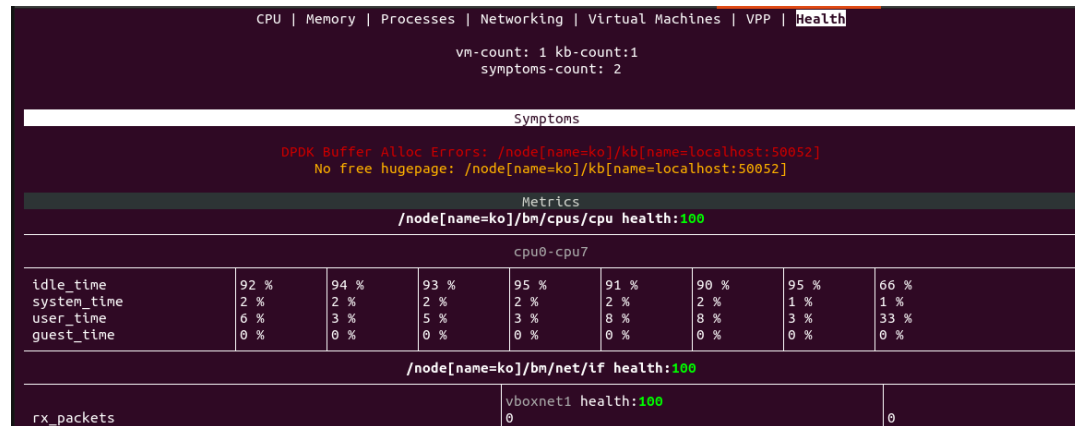
# SAIN Hackaton : Open Architecture with YANG Model (Example)



\$ ./dxweb -t 1.2.3.4:50051



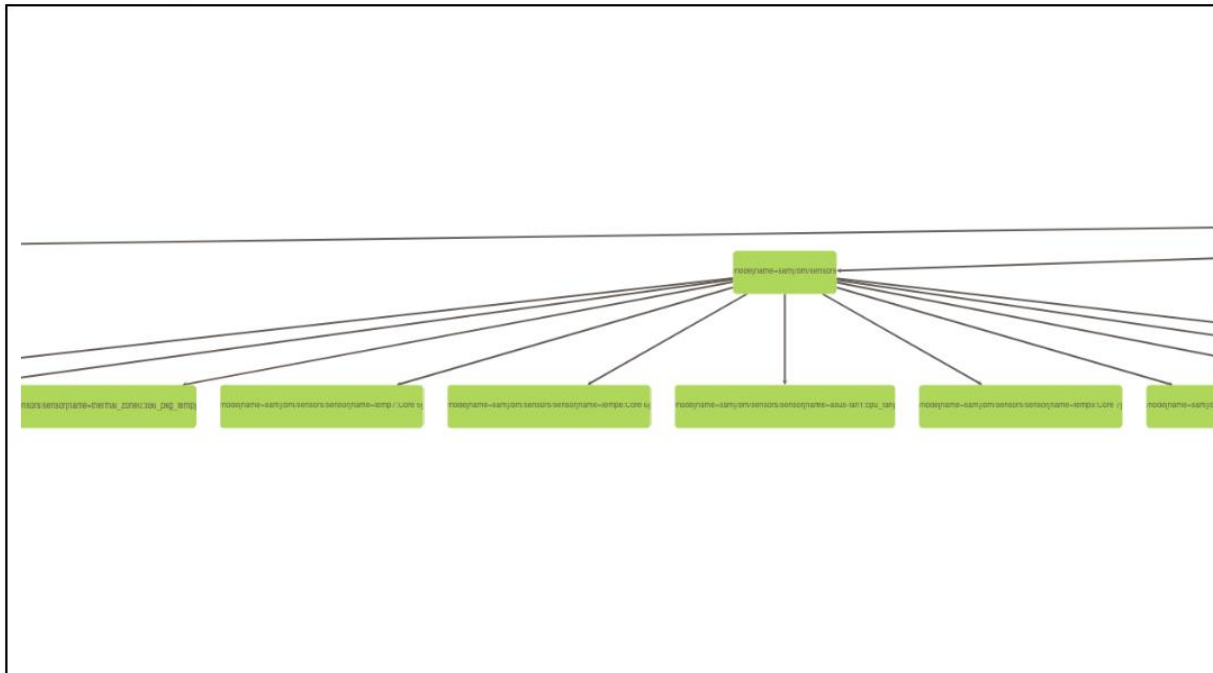
\$ ssh "dxtop"



# Interoperability

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

Service dependencies



# 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

*<https://github.com/ekorian/dxagent>*