Do you really see what’s happening on your NFV infrastructure?

(and what can you do about it?)

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Agenda

- Intro
- Barometer
- Collectd
- Back to Barometer
- Use cases
- Plans and upcoming features
- Questions

Why do I need to know what's going on in my infrastructure?

Data Centres are powering our everyday lives. Organizations lose an average of $5,600 per minute of downtime. [1].

Telco and Enterprise alike are asking how they get and provide Service Assurance, QoS and provide SLA's on the platform and services when deploying NFV.

It is vital to monitor systems for malfunctions or misbehaviours that could lead to service disruption and promptly react to these faults/events to minimize service disruption/downtime.

What is Barometer?

What is OPNFV?

- The mission of OPNFV(1) is to drive the evolution of Network Function Virtualization (NFV) by
  - Developing an integrated and tested open software platform
  - Contributing changes to and influencing upstream projects
  - Building new open source components where needed
  - Leveraging open implementations to drive an open standards and open-source-based ecosystem for NFV solutions

(1) See OPNFV charter

What does Barometer do?

- Testing
- Integration
- Deployment
- Development
- Metrics collection

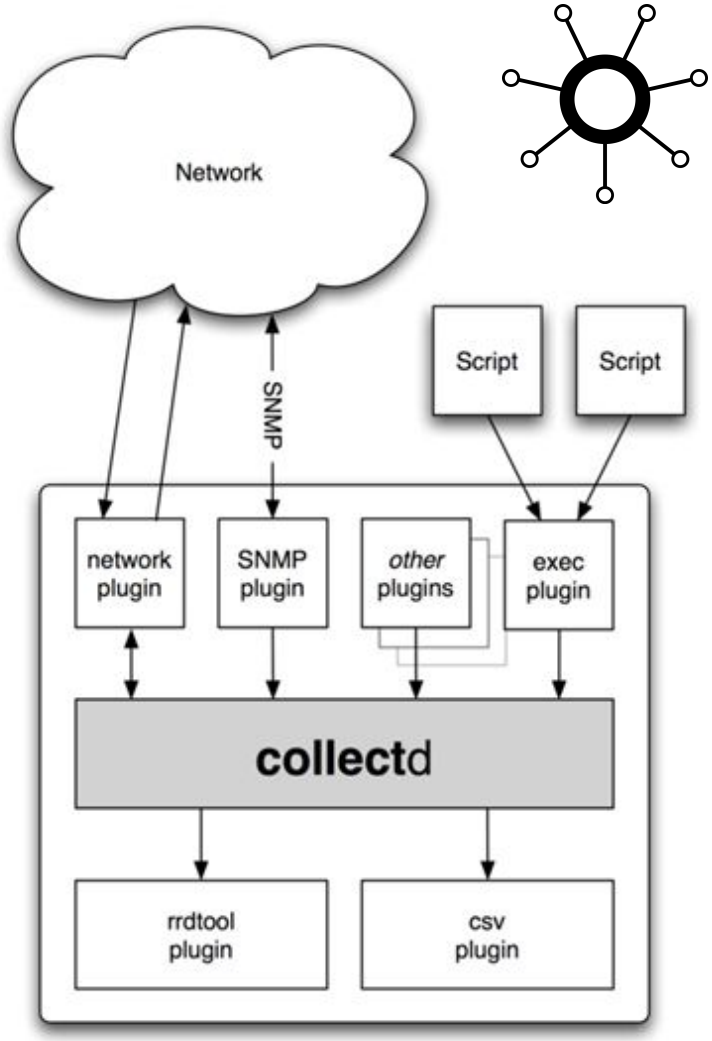
Support the monitoring of the NFVI by gathering network, platform and applications metrics, and exposing them to higher level monitoring and fault management systems.

So what upstream project(s) does Barometer contribute to?

Basically **A** **R**ather **O**ld **MET**rics collect**ER**

Collectd

- Statistics collection daemon
- Has been around since 2004, written in c
- Built for small footprint
- Open source (MIT, GPLv2)
- Runs on Linux, BSD, Solaris, MacOS, Windows
- Metrics and events
- Over 140 plugins (c) of various types
  - Read and write plugins
  - Binding plugins (python, java, perl, ...)
  - Logging plugins
  - Notification plugins
  - Others, such as network, aggregation, threshold

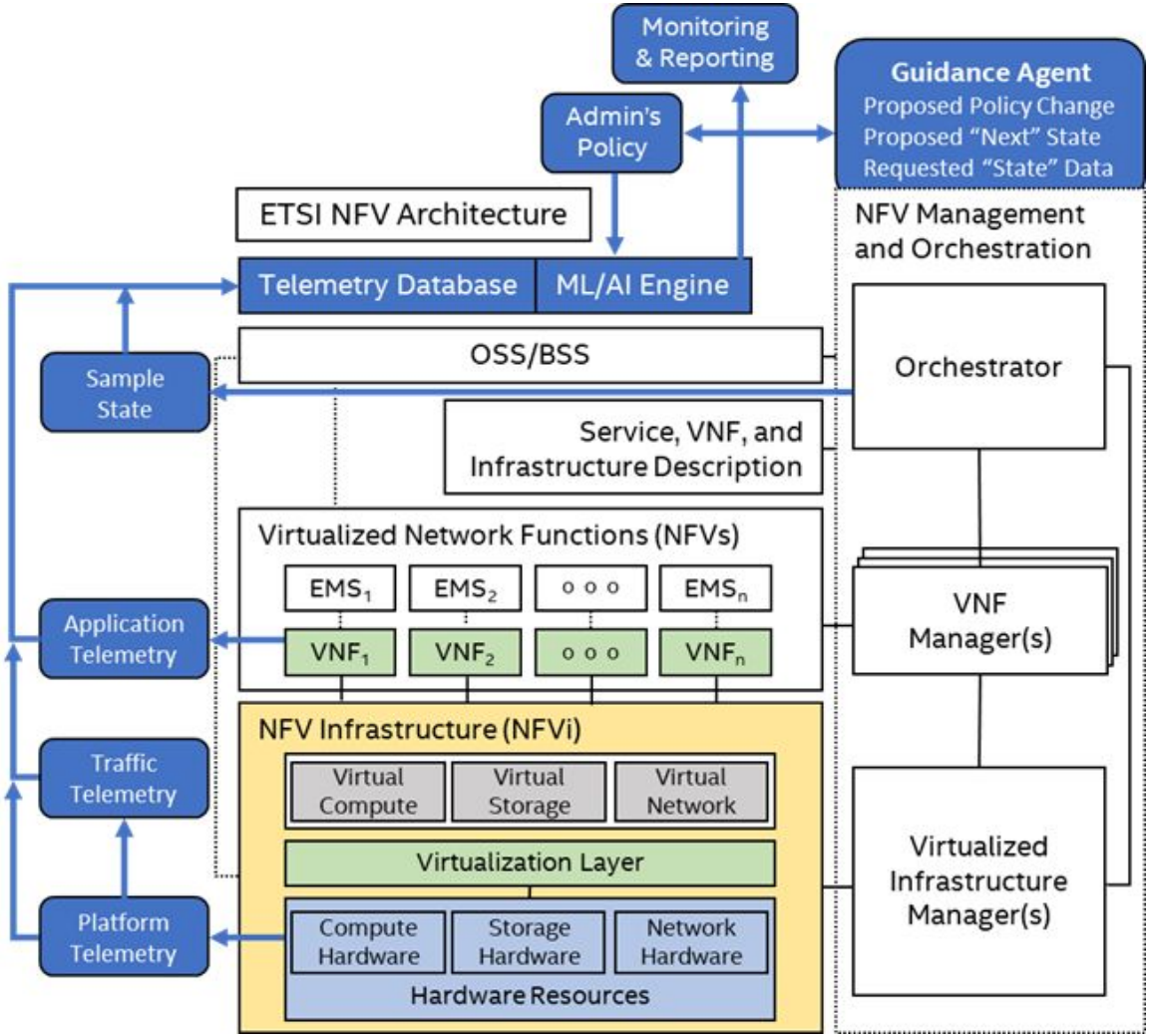


Collectd provides the metrics collection, but what can you actually do with these?

Existing standards

CNTT Ref Model Chapter 4

ETSI NFV-TST 008 Spec



What is available in collectd to monitor NFVi?

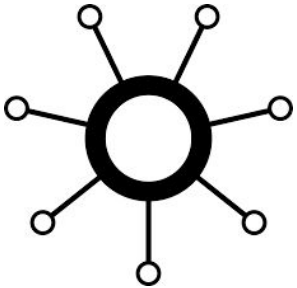
Plugin Domain	Description
Intel® Run Sure Technology/ RAS	Mcelog, PCIe AER, logparser: Metrics & notifications pertaining to Intel Run Sure Technology
Intel® RDT	Intel® Resource Director Technologies (CMT, MBM) related metrics
Virt	Libvirt related metrics
OVS	Ovs_stats, ovs_events: Metrics related to Open Virtual Switch
DPDK	Dpdk_stats, dpdk_events, hugepages: DPDK related metrics
OpenStack*	Gnocchi, Aodh: Integration in OpenStack projects
Cloud	Write_Kafka, Write_Prometheus, VES: Integration in to various cloud platforms
Storage	RAID, SMART, NVMe*: Storage related Metrics
Power/Energy	CPUFreq, Turbostat: Frequency & power related metrics
Platform	IPMI, RedFish, PMU: Out of Band metrics & platform counters

**Not a comprehensive list

How does Barometer relate to collectd?

- Collectd helps us collect metrics!
- How has Barometer given back to the collectd community?
- How can I install Barometer/collectd?
- How are the collectd metrics consumed?
  - Consumed via influx
  - Consumed via vanilla prometheus
  - SAF (current)

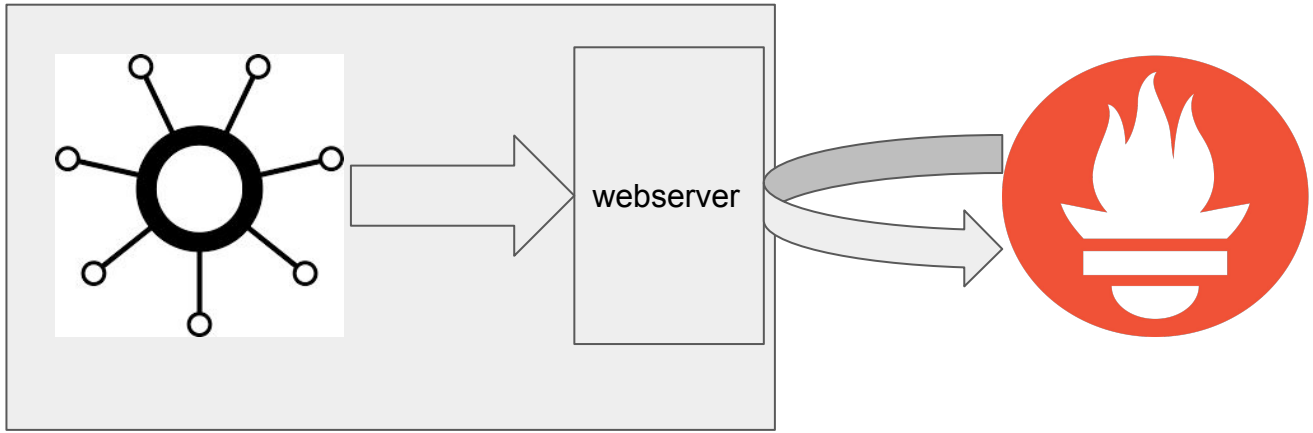
InfluxDB and Grafana



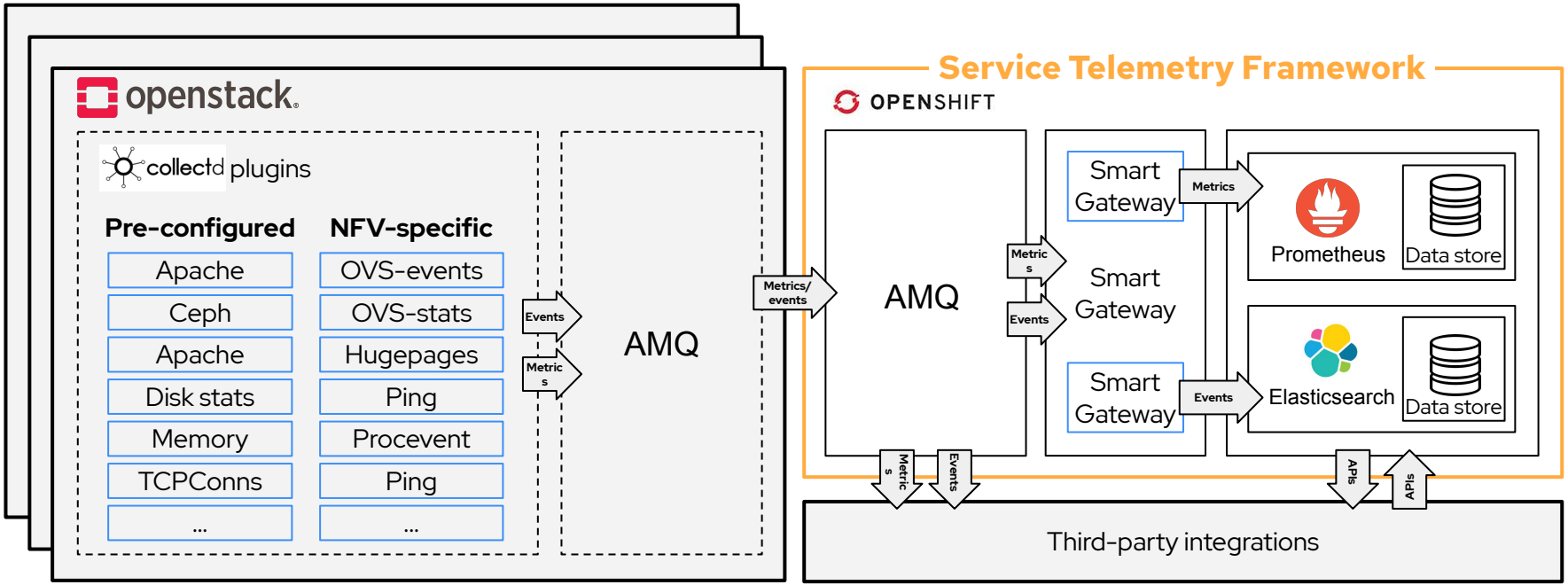
Network plugin

influxdb

Prometheus



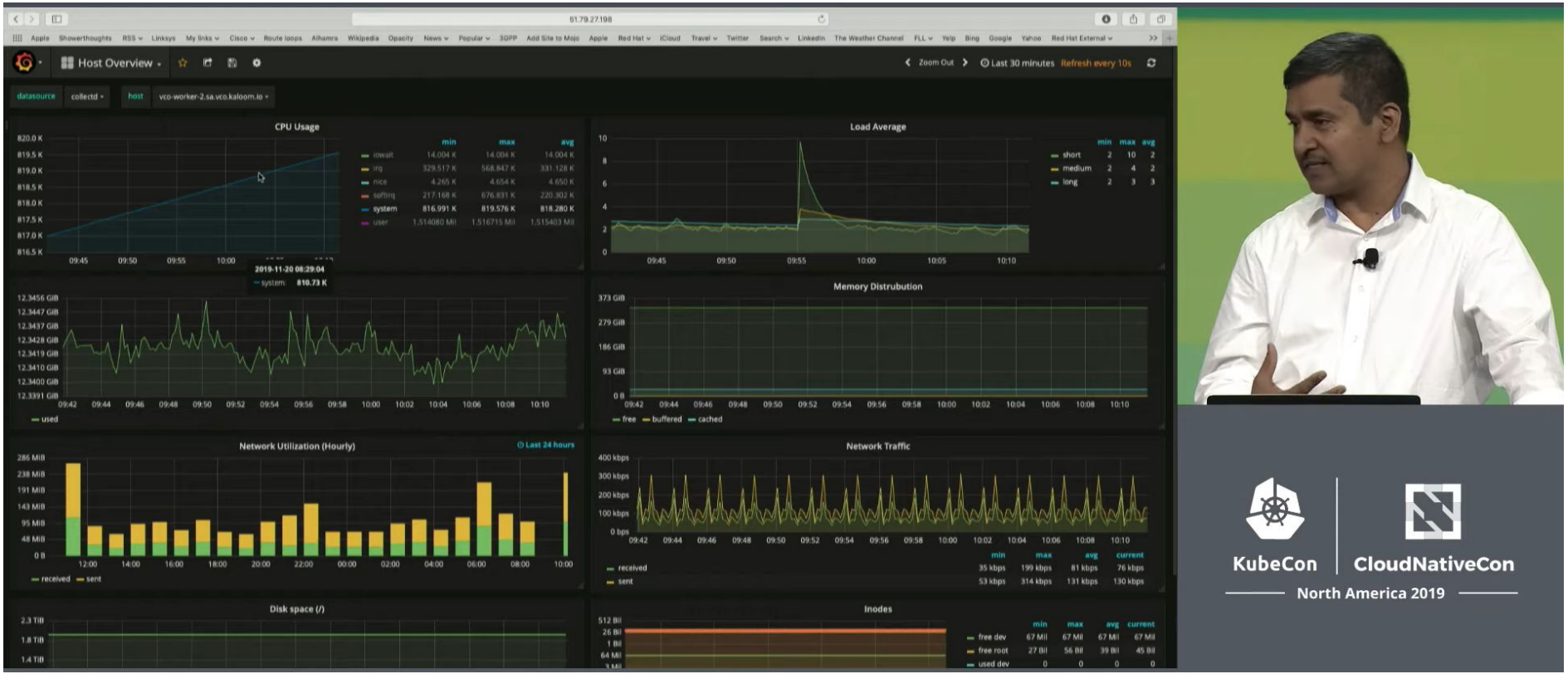
Service Telemetry Framework



A full list of plugins is available at https://redhat-service-assurance.github.io/saf-documentation/#appe-saf-collectd-plugins

What are all these metrics used for?

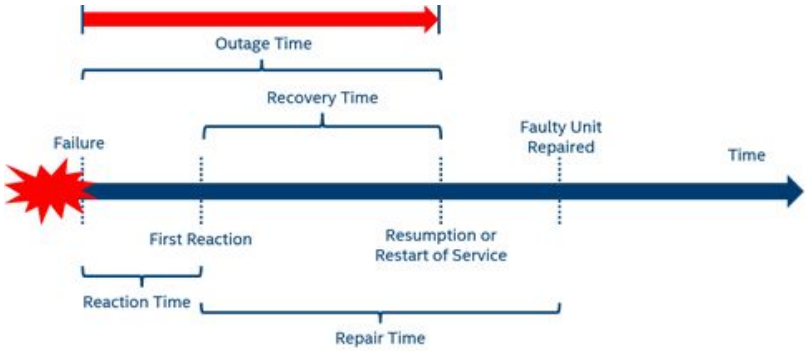
First Proof-of-Concept of live, end-to-end, open source 5G network

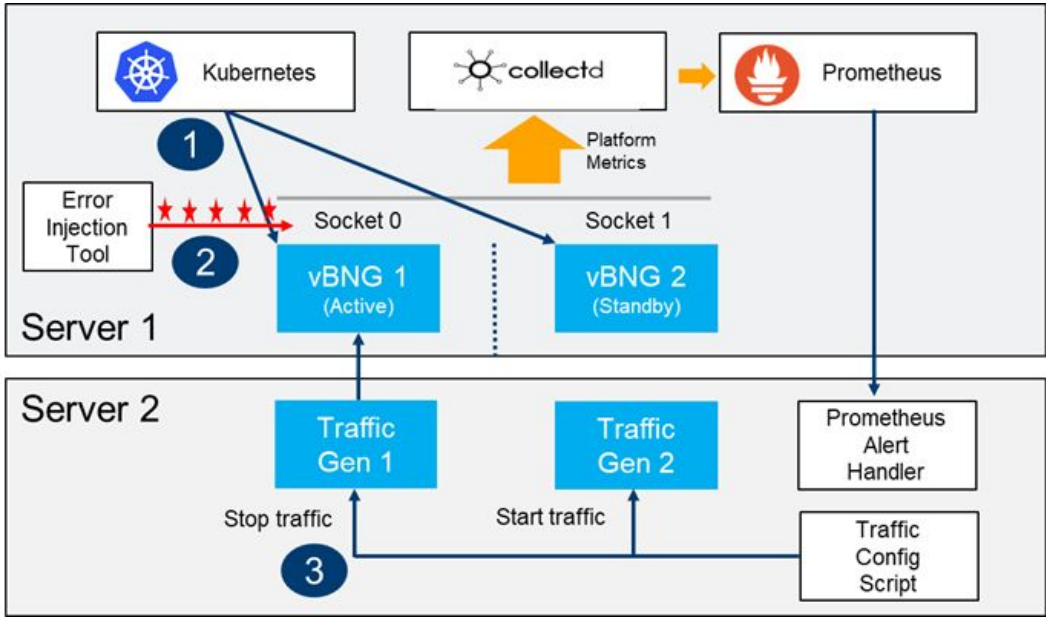


https://www.youtube.com/watch?v=IL4nxbmUIX8

Closed Loop Resiliency

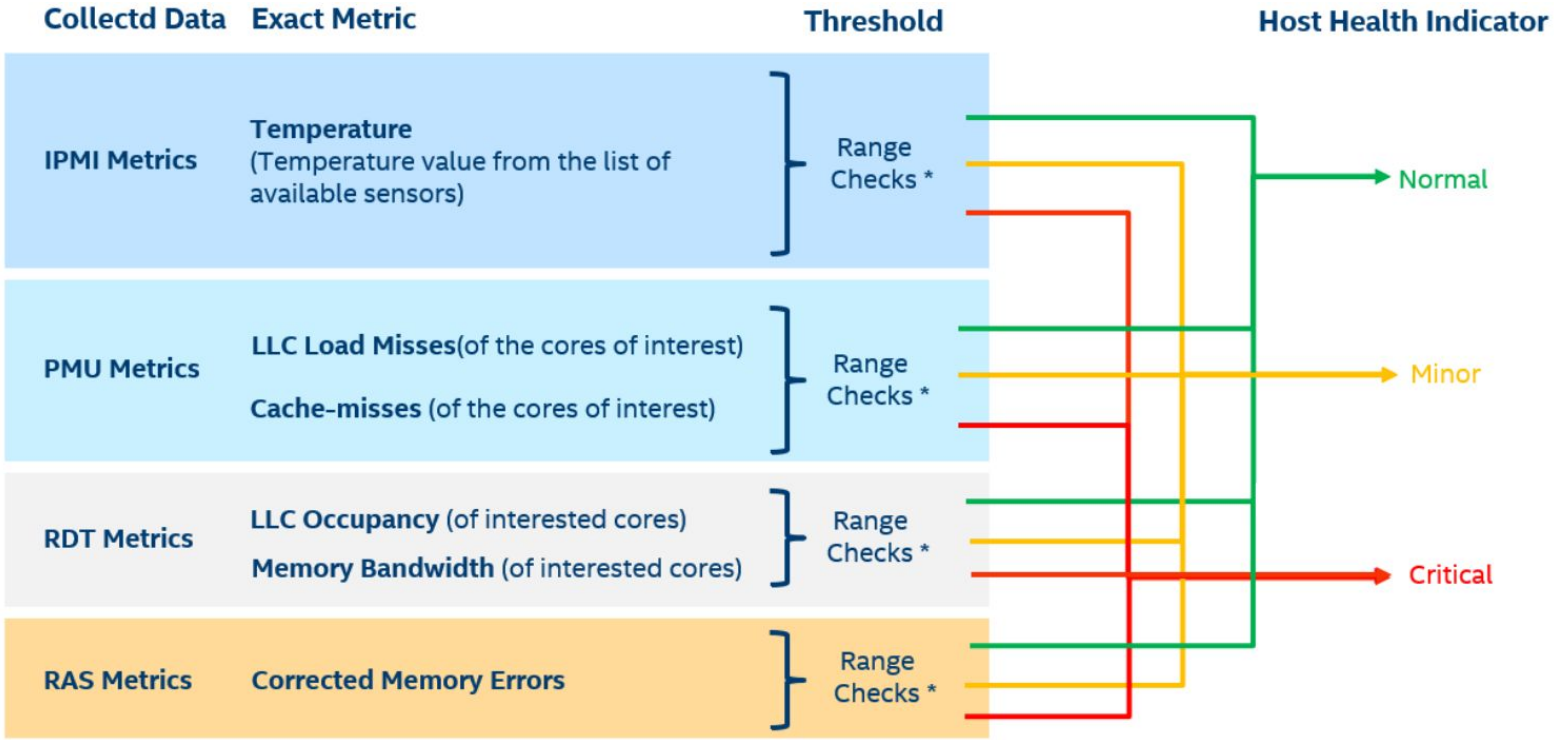
Goal: Maximize Service Availability of Virtual Border Network Gateway (vBNG) in memory corruption scenario





https://builders.intel.com/docs/networkbuilders/closed-loop-platform-automation-workload-resiliency.pdf

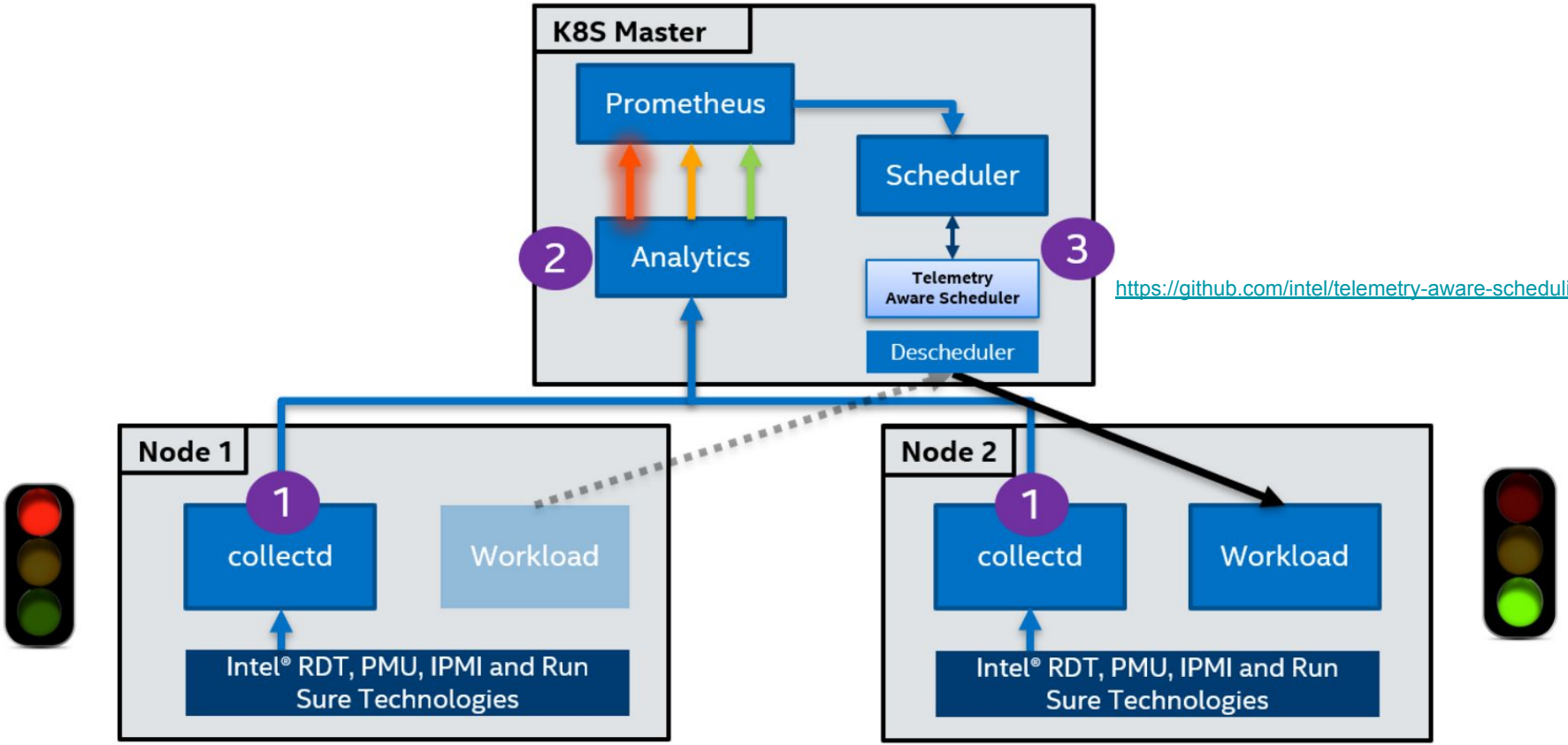
Combine metrics



* = Check each metric value against expected values and generate appropriate alert when outside range

https://builders.intel.com/docs/networkbuilders/closed-loop-platform-automation-service-healing-and-platform-resilience.pdf

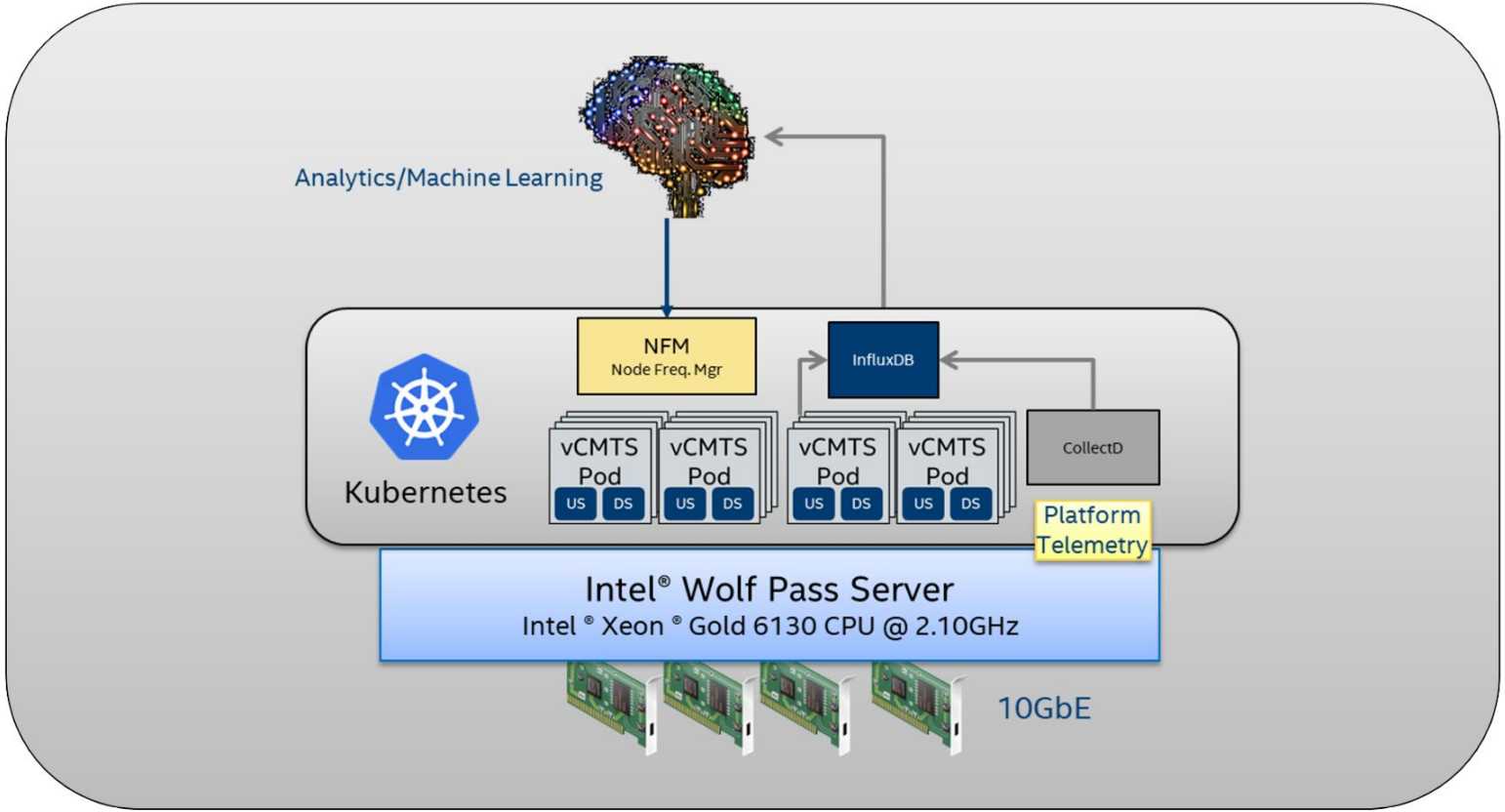
Service Healing and Platform Resiliency with Telemetry Aware Scheduler



https://github.com/intel/telemetry-aware-scheduling

https://networkbuilders.intel.com/closed-loop-automation-telemetry-aware-scheduler-for-service-healing-and-platform-resilience-demo

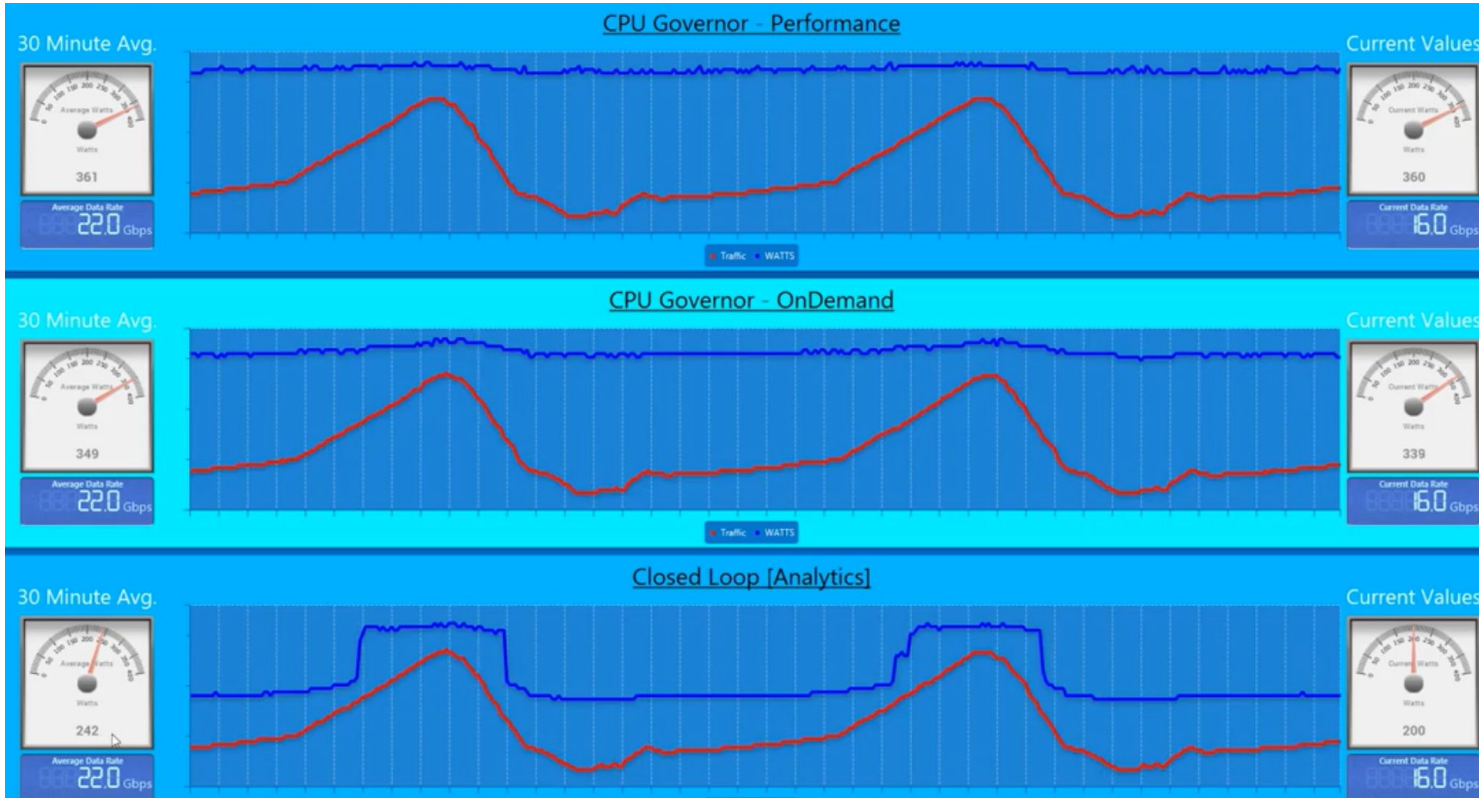
Power saving



Setup Info:
2x Intel Xeon Gold 6130
HyperThread Enabled
Turbo Enabled
RAM 192Gb DDR4
2x Intel Corporation Ethernet Controller XL710 40GbE
Network speed 10GbE

https://networkbuilders.intel.com/closed-loop-platform-automation-power-savings-demo

Power saving



https://networkbuilders.intel.com/closed-loop-platform-automation-power-savings-demo

Category	Use Case
Service Healing	Reliability Aware Workload Placement * • Improved Placement decisions using Platform Reliability Counters • Ensures reliable platform selection
	Predictive Fault Detection * • Improves reliability by detecting recoverable faults • Move workload and traffic before outage
	Reliability Aware Auto-Scaling [Scale Out] * • Improved Scaling decisions using Platform Reliability Counters • Ensures reliable platform resource selection
Energy Optimisation	Green Story/Energy Efficiency • Improved IDLE power consumption • Electricity OPEX • Runtime power management based on policy
	Performance/Watt Improved • Improved Performance in same Power Envelope CLX
	Power Aware Workload Placement
Application QoS	Noisy Neighbour/Priority App QoS • Resource Sharing • Guarantee/Improve SLA management
Security	Help runtime discovery of security threats using Intel® TDT

More?

- Barometer usage in other OPNFV projects:
  - VSPerf - performance optimization and benchmarking in lab environment (TST010)
  - Bottlenecks and Yardstick - collect performance data during VNF testing executions for characterization and fault detection
- And still grows...

What’s next for Barometer?

- Collectd release - 5.11
  - DPDK telemetry plugin
  - Capabilities plugin
  - Redfish plugin
  - mdevents - RAID events
- Collectd CI
- Documentation updates
- vsperf requests
- MANO API conformance testing collaboration
- CNTT collab

Get in touch!

Barometer weekly meeting

Tuesdays @ 5pm UTC

opnfv-tech-discuss@lists.opnfv.org

Collectd bi-weekly

Mondays @ 3pm UTC

collectd@verplant.org

Try it out!

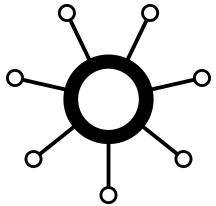
https://github.com/opnfv/barometer
https://github.com/collectd/collectd
https://github.com/redhat-service-assurance/service-assurance-operator

https://collectd.org/wiki/index.php/Main_Page
How to create a simple collectd plugin:
https://wiki.opnfv.org/display/fastpath/Collectd+how+to+implement+a+simple+plugin
https://wiki.opnfv.org/display/fastpath/Monitoring%2C+Metrics+and+Events+Requirements+High+Level+List

Would like contribute to collectd ?

- Code contribution
  - Clone repo from github
  - Make your changes
  - Create PR (and add Changelog)
  - Check upstream CI and collaborate on any code review feedback
  - More on https://github.com/collectd/collectd/blob/master/docs/CONTRIBUTING.md
- Other contributions
  - Ask a question under pending PR's if you are unsure or just curious about something
    - Yes, doing code reviews helps you to learn
  - Come, keep calm and have chat, user feedback is always appreciated
    - Let us know how collectd helped you or may help

Join us!



2020 Collectd meet up

Munich, Feb 17-18, 2020

https://etherpad.openstack.org/p/collectd-meetup-2020

https://mailman.verplant.org/pipermail/collectd/2020-January/007298.html

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Killian Muldoon

Leif Madsen

Questions?

Thank you!