TELEMETRY REPORTS & CLOSED LOOP AUTOMATION

OPNFV Virtual Event

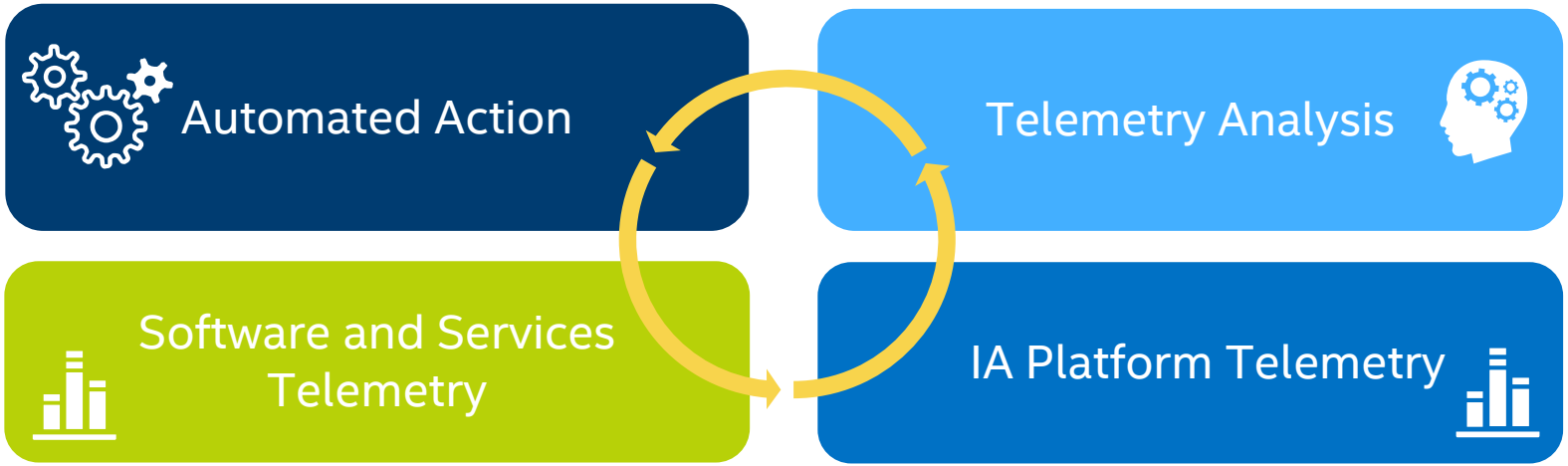
April 2020

Agenda

- Intel Telemetry
- Telemetry Insights
- Platform Resiliency Demo

SCALE EFFICIENCY WITH DATA-DRIVEN, CLOSED LOOP AUTOMATION

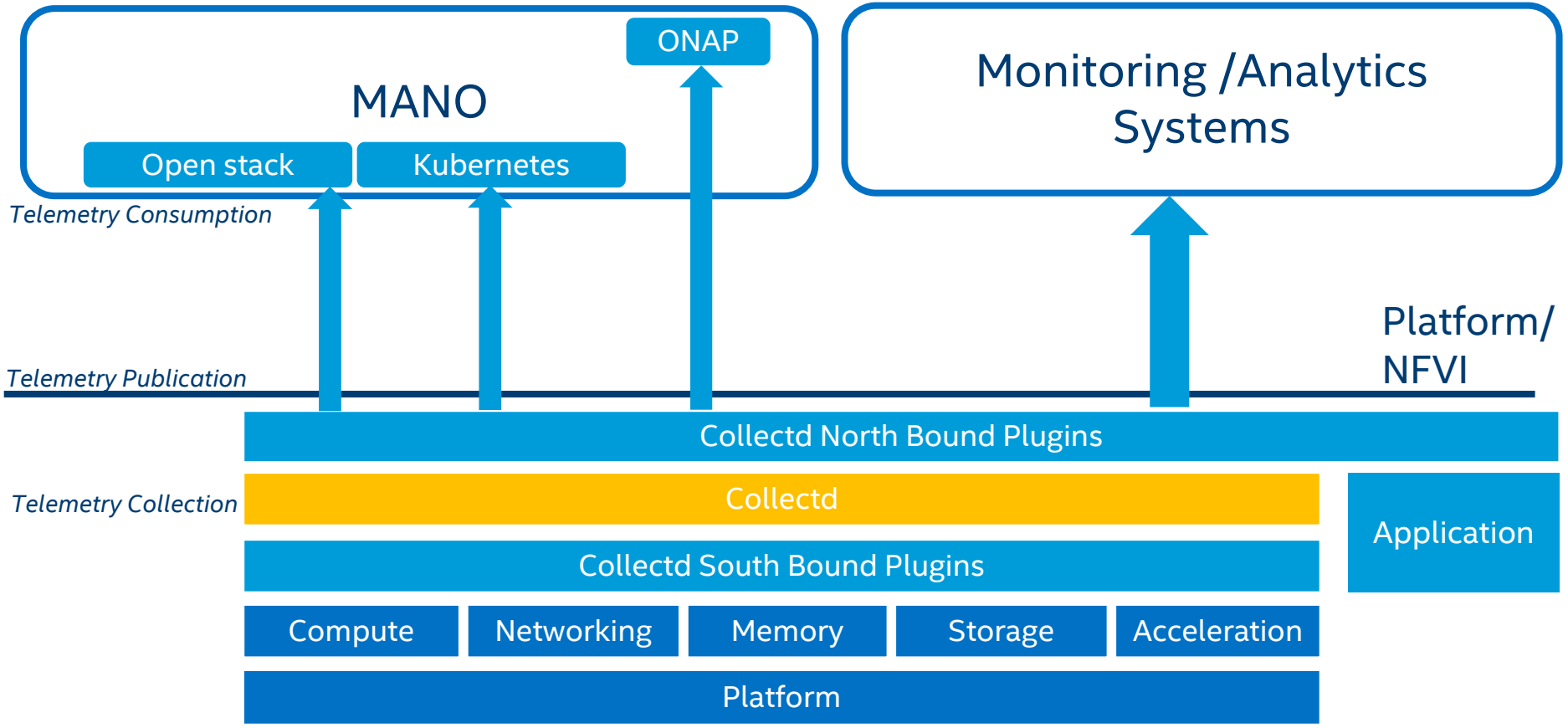
Intel Platform Telemetry as part of intelligent, closed loop solutions that are reactive, proactive and predictive, delivering new levels of efficiency for IT and network infrastructure.



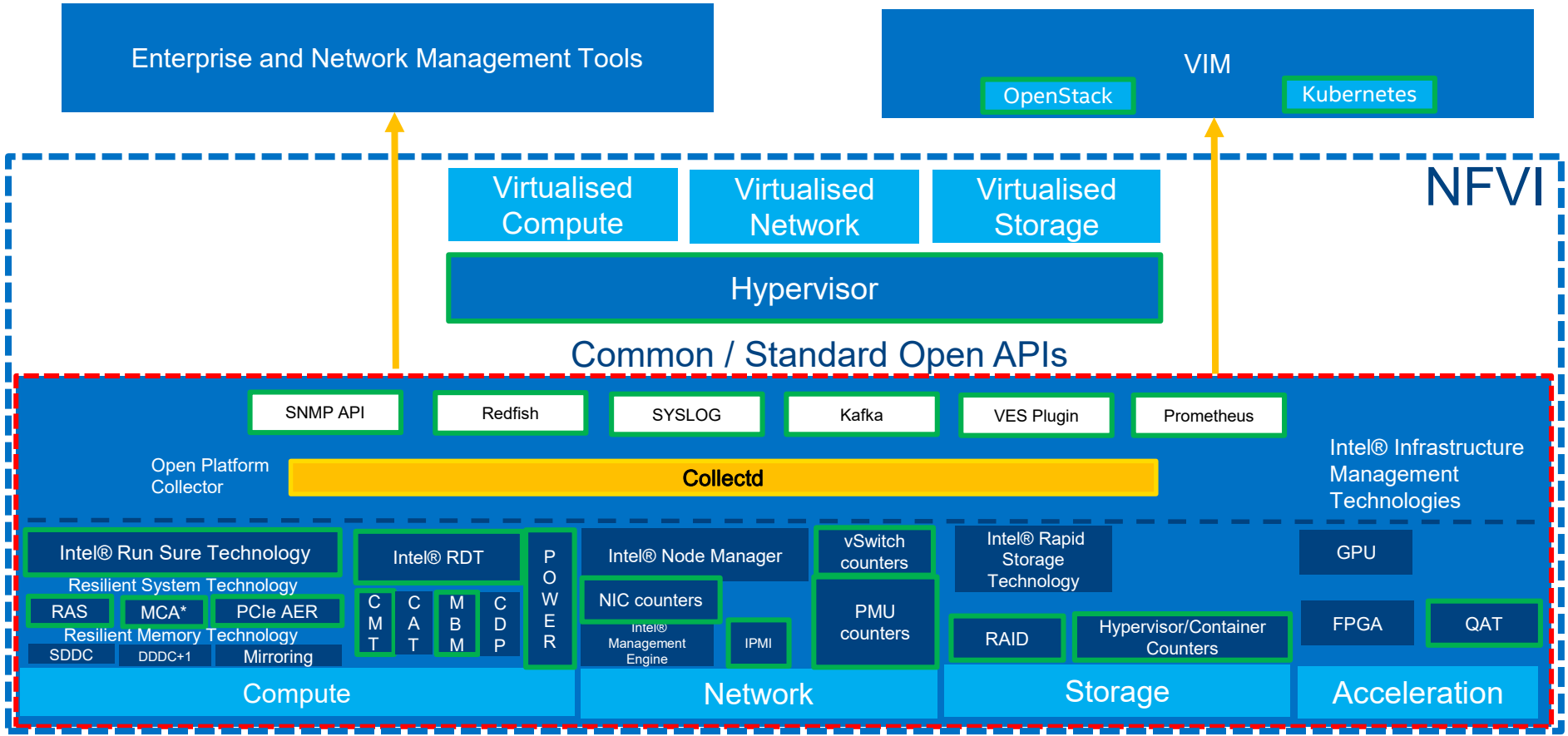
Fine-grained Hardware, software and network insights feeding operational intelligence and automation

INTEL TELEMETRY OVERVIEW

INTEL TELEMETRY COLLECTION AND PUBLICATION



INTEL TELEMETRY COVERAGE



USE CASE OVERVIEW

Platform Feature Telemetry

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	• Optimum resource sharing in a multi-tenant environment • Improve SLA management

Using IA Platform Telemetry to Address Business Use Cases

PLATFORM TELEMETRY REPORTS

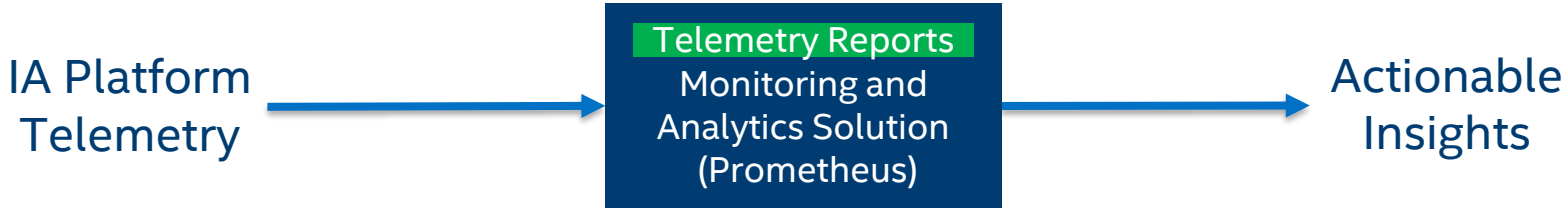
Q1 2020

Platform Metrics - Challenge

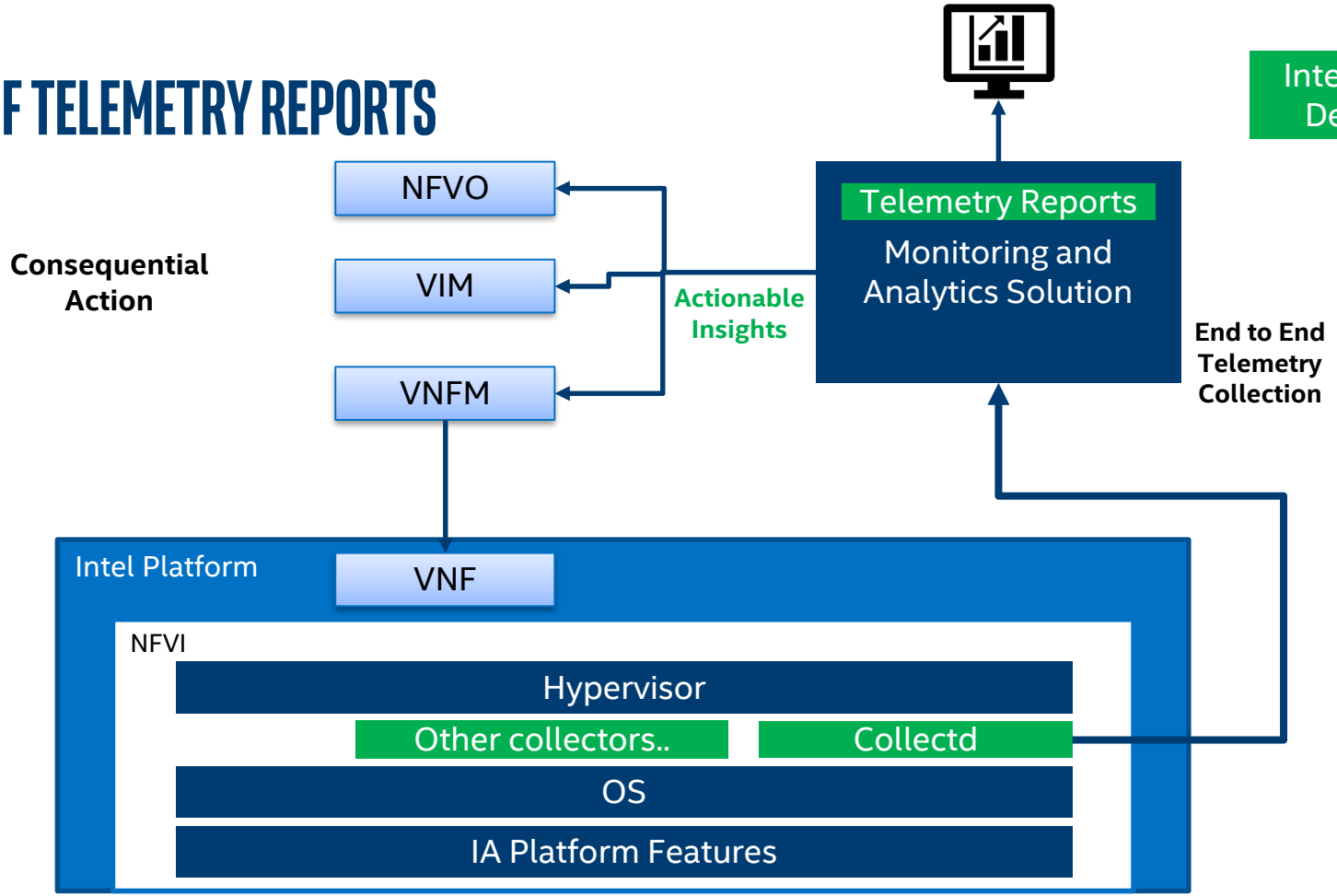
- How can we up-level platform metrics to help networks run more efficiently? i.e., “what does a high number of cache misses infer for the platform?”
- Difficult for analytics solutions to derive what action to take when monitoring platform metrics due their fine grained nature
- Show value of Intel Platform metrics, what are the actionable insights that MANO/VNFM/SDN controller can act on?
- Solution needs to be easily consumed into existing environments/deployments

SOLUTION – AUTOMATION TELEMETRY REPORTS

- ✓ Provide the capability to easily decipher platform metrics
- ✓ Provide ‘actionable data’/insights that management/orchestration systems can make decisions on
- ✓ Show the value of IA platform in a monitored environment



USE OF TELEMETRY REPORTS



ETSI NFV & Telemetry Reports

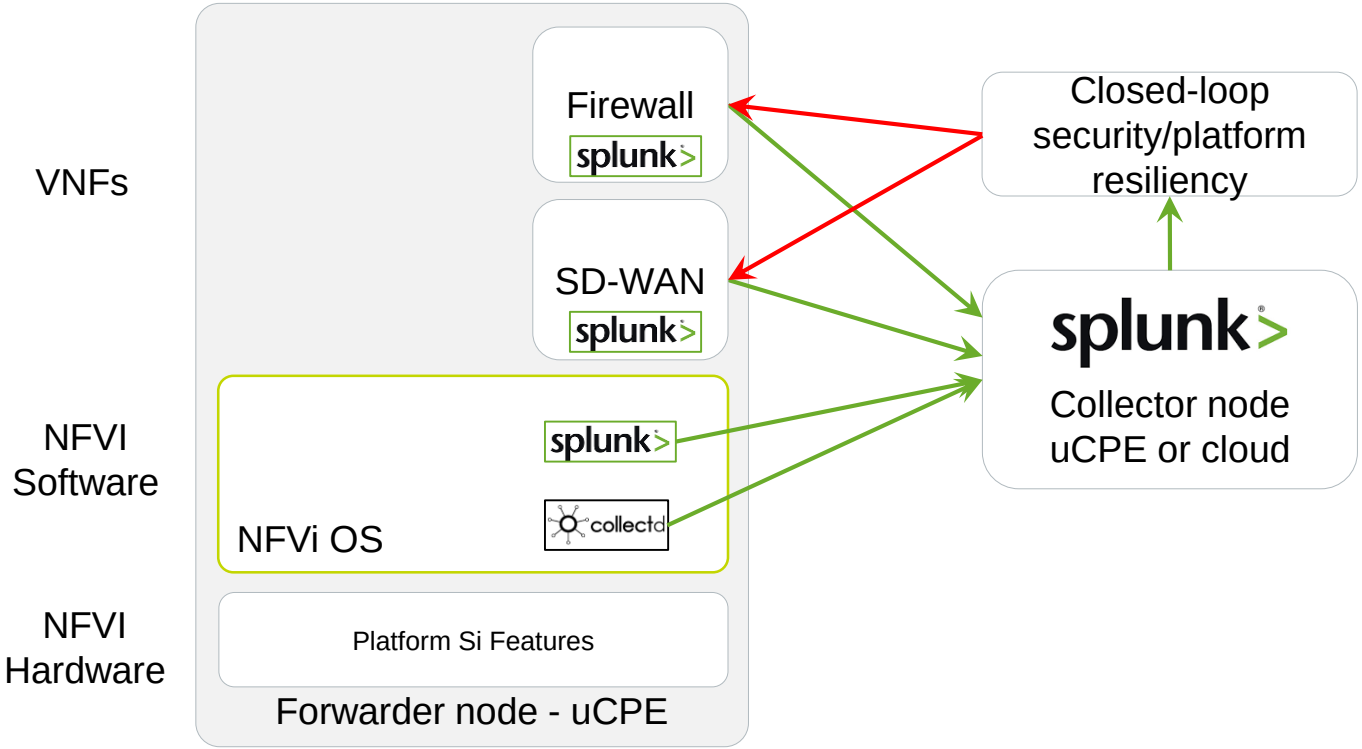
- ETSI NFV TST specifications provide infrastructure metrics essential for testing the NFV infrastructure
  - Metrics provided by TST001 help evaluate infrastructure characteristics
  - Metrics listed by TST008 provide key operational metrics at various NFVI layers
  - However not all metrics could be obtained out of the box
- Additional derivation necessary to leverage hardware metrics in a meaningful way
  - Derived metrics need to be calculated to match metrics from TST specs
- Telemetry reports help derive metrics that align with TST spec

Telemetry Reports - Examples

Report Type	Value to the customer	IA Specific Features	Report Options
Platform Health Reports	Used as inputs to drive corrective actions taken in management layers including VNFM/Kubernetes/SDN controller/ NFVO including failover and other service reliability related actions.	RAS, QPI, Intel® QuickAssist Technology Intel® QAT, NVME	Processor, Memory, Accelerator, Non-volatile Storage, Network Availability
Platform Utilization Reports	Used by management system/VIM for work-load placement decisions	Intel® QAT, Intel® RDT, SST	Processor, Power, Memory BW and Cache, Network interface, Open vSwitch Utilisation
Platform Configuration Check Reports	Used by management system/VIM detect misconfigured platforms	QPI, NUMA	Cross Socket Balance, NUMA alignment, Port Config checks
Platform Congestion Report	Used by management system/VIM detect overloaded platforms	Intel® QAT, Intel® RDT	CPU, IO, Intel® QuickAssist Technology (Intel® QAT), Open vSwitch congestion

SPLUNK DEMO

Splunk Demo - Deployment Architecture



PLATFORM RESILIENCY DEMO

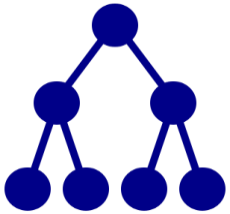
Intel Platform Resiliency Prototype

Showing how Intel Platform Telemetry can *augment* a Platform Resiliency Solution

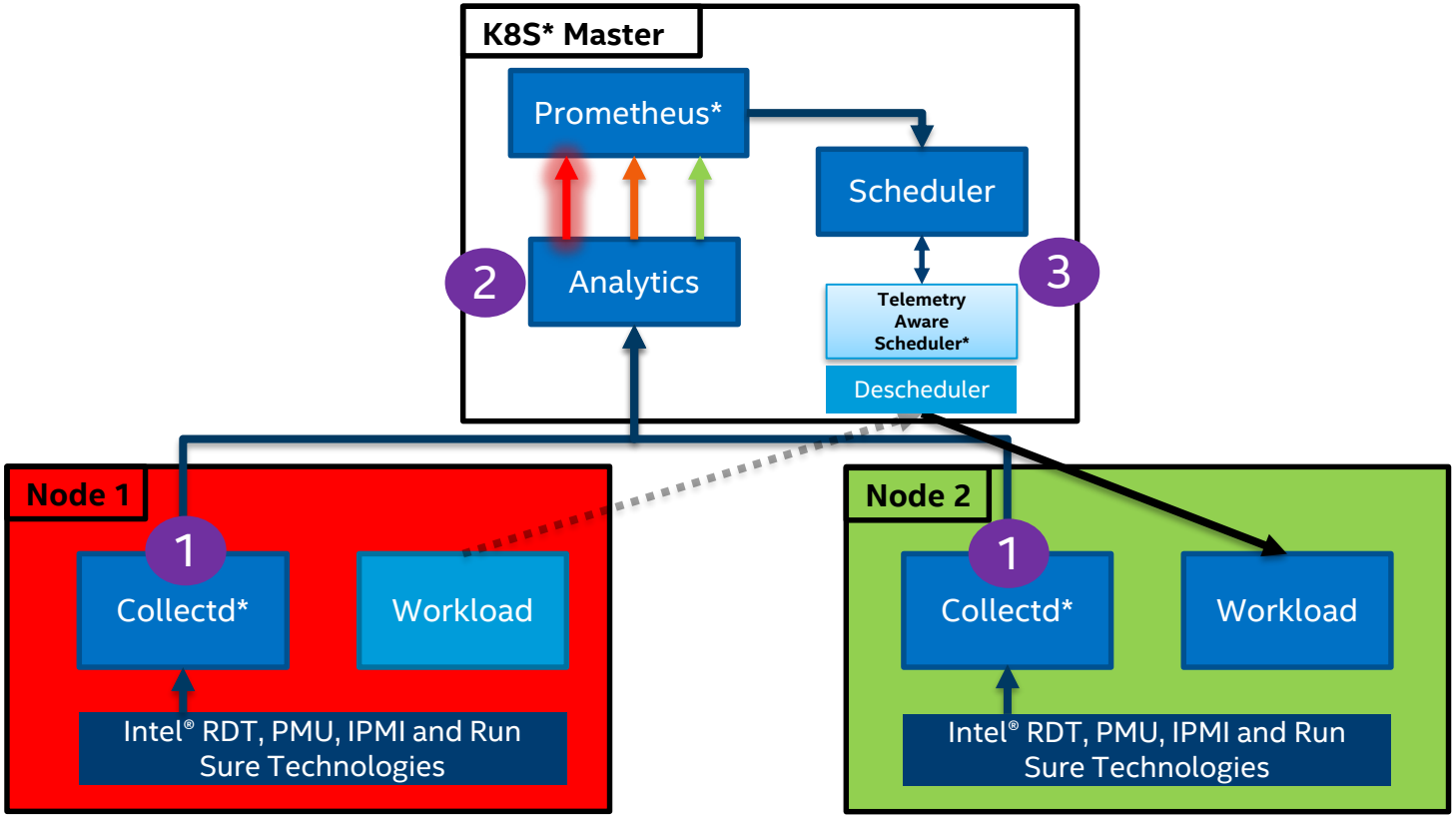
A “Host Health Indicator” is determined from multiple Intel Platform Telemetry metrics

Host Health Indicator triggers Intelligent Scheduling decisions using Kubernetes Telemetry Aware Scheduler

Remediation actions taken at the VIM layer that have Service impacts will be indicated



Platform Resiliency Prototype – Critical Scenario



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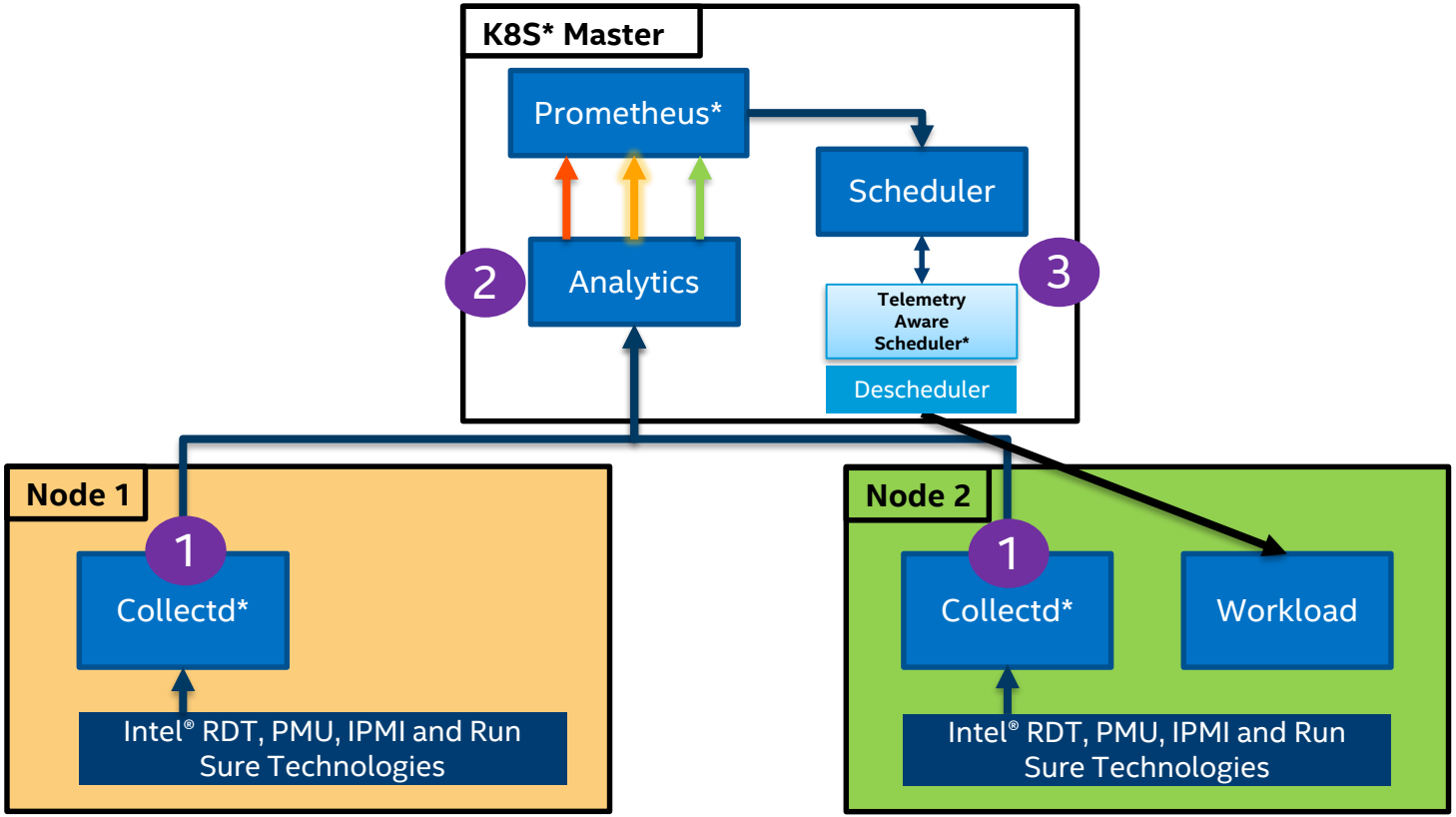
Platform Resiliency Prototype – Minor alert Scenario



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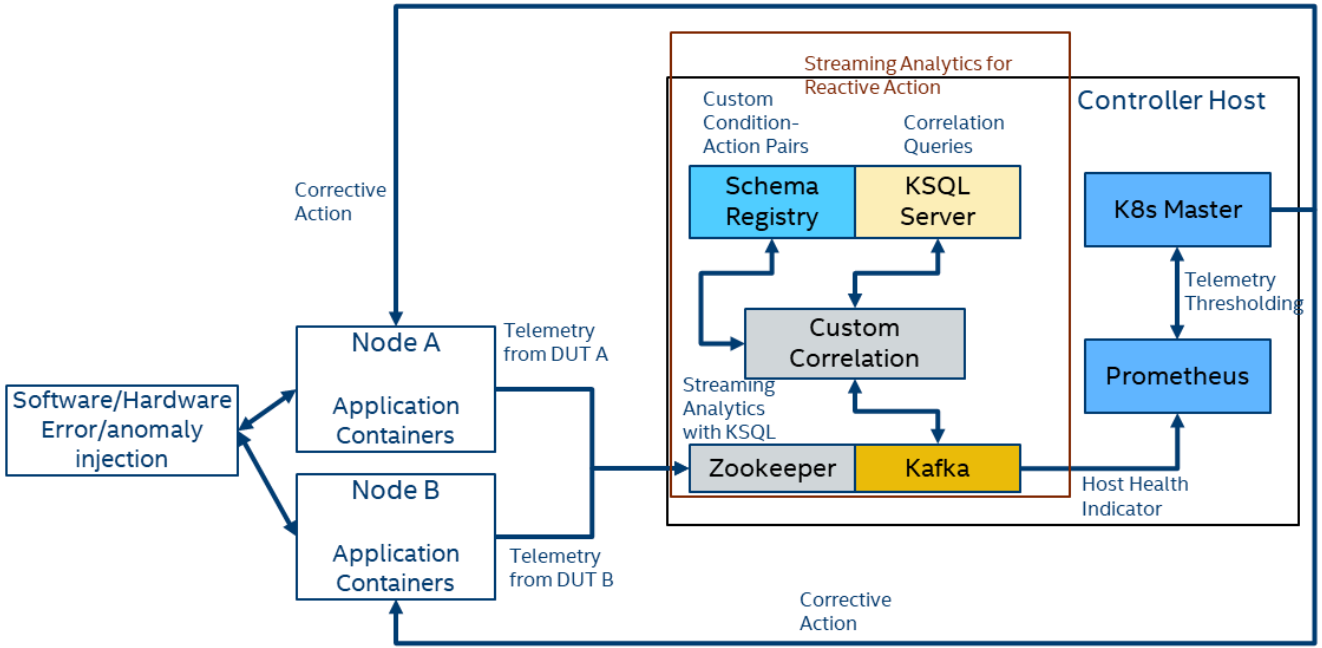
Streaming Analytics w/ Kafka



CHALLENGE

- Ability to provide near real-time closed loop based on streaming telemetry

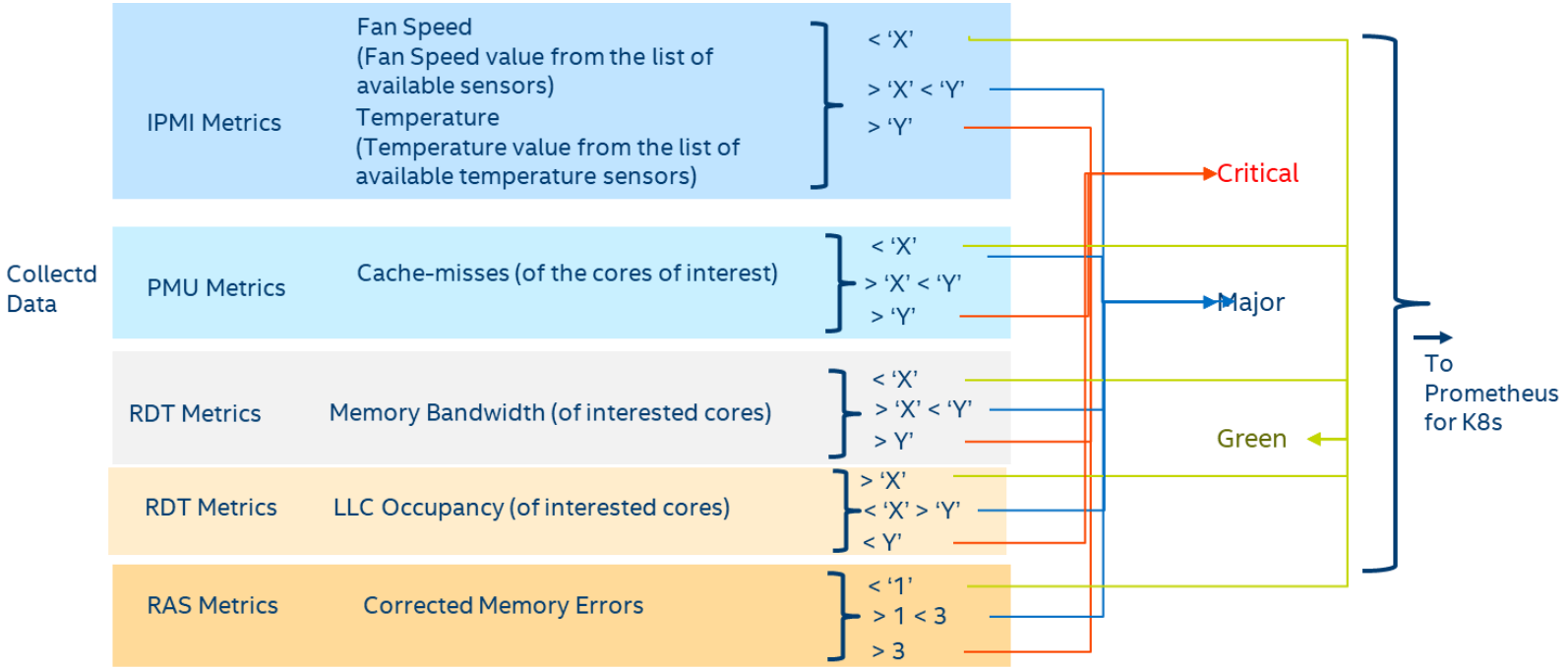
RESOLUTION

- Streaming analytics calculates host health indicator based on streaming telemetry
- Streaming analytics provides live analysis of data even before storing in a time series database.

APPLICATION

- Kafka and KSQL provides analytics outcome using customized schema registry

Host Health Indicator Calculation



PMU: Performance Monitoring Unit

RDT: Intel Resource Director Technology

RAS: Reliability Availability Serviceability

IPMI: Intelligent Platform Management Interface

FURTHER INFORMATION

OPNFV BAROMETER

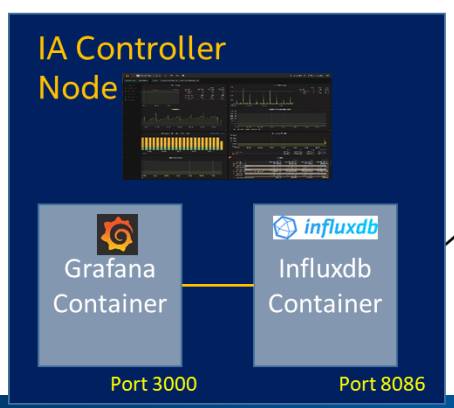
Barometer Strategy:

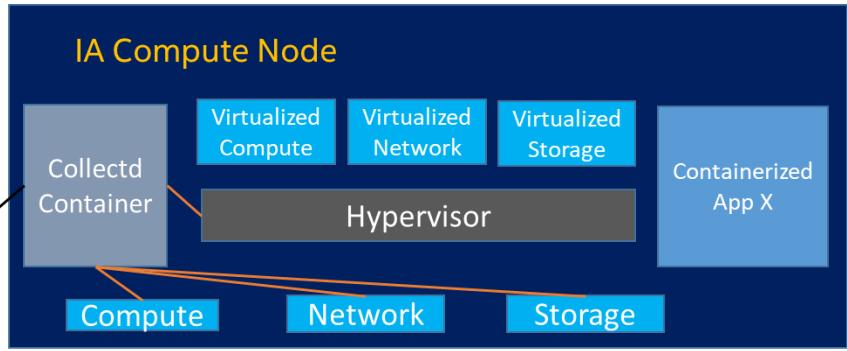
- Ensure platform metrics/events are accessible through open industry standard interfaces.
- Demonstrate platform & network technologies can be monitored, consumed and actioned in real time

- Three container approach for Collectd:
  - *Stable Container*: latest stable branch
  - *Master Container*: up to date with master
  - *Experimental Container*: cherry pick features of interest

One Click Install:

- Easy install/configuration for customers
- One command to install Collectd/Influxdb/Grafana





BAROMETER LINKS

Barometer Home: https://wiki.opnfv.org/display/fastpath/Barometer+Home

Metrics/Events through Barometer (not on Collectd site): https://wiki.opnfv.org/display/fastpath/Collectd+Metrics+and+Events#CollectdMetricsandEvents-Metrics

Barometer “One-click” install:

https://wiki.opnfv.org/display/fastpath/One+Click+Install+of+Barometer+Containers

Further Demo Resources

Visit our "**Network Transformation**" page at https://networkbuilders.intel.com/network-technologies/network-transformation-exp-kits

Under Automation section you will find:

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

Host Health/Platform Resiliency white paper: https://builders.intel.com/docs/networkbuilders/closed-loop-platform-automation-service-healing-and-platform-resilience.pdf

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

Some background information on the work we are doing around managing resources (cache and memory bandwidth in this case) to provide optimum VNF performance:

https://builders.intel.com/docs/networkbuilders/intel-platform-service-assurance-platform-policy-enabling-resource-management-white-paper.pdf

Further Resources

Learn more from these helpful sites:

https://networkbuilders.intel.com/network-technologies/serviceassurance

https://wiki.opnfv.org/display/fastpath/Barometer+Home

https://wiki.openstack.org/wiki/Telemetry

https://01.org/openstack/blogs/2015/openstack-enhanced-platform-awareness-white-paper

TST001: https://www.etsi.org/deliver/etsi_gs/NFV-TST/001_099/001/01.01.01_60/gs_NFV-TST001v010101p.pdf

TST008: https://www.etsi.org/deliver/etsi_gs/NFV-TST/001_099/008/02.04.01_60/gs_nfv-tst008v020401p.pdf

COLLECTD 101 MATERIALS

- Collectd 101
  - https://wiki.opnfv.org/display/fastpath/Collectd+101
- Write simple read plugin
  - https://wiki.opnfv.org/display/fastpath/Collectd+how+to+implement+a+simple+plugin