A Fully Automated VNF Performance Benchmarking Solution for RHOSP13 based NFVI

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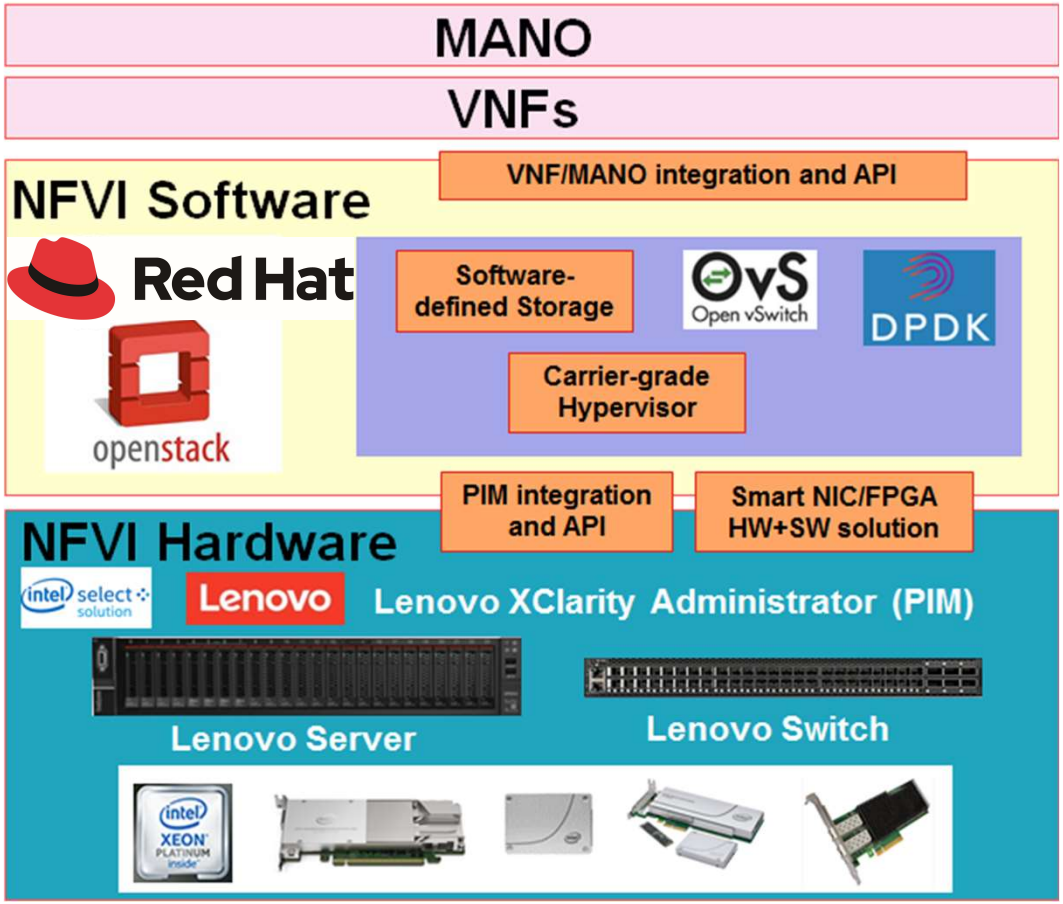
Lenovo Cloud Technology Center

Lenovo Performance Optimized NFVI Solutions



*At Lenovo, we are creating a leading, open, **optimized** and independently **validated** NFV solution platform to deliver high value and performance oriented applications for CoSPs to serve their customers*

What we need from NFV Solutions

Agility

Faster provisioning and time to market
Effortless customer experience

Performance

Optimized VNF networking performance
Guaranteed SLA

Low cost

Reduced cost of hardware, operations, etc
Higher utilization

Dynamic

Network on-demand, increased reliability, flexibility
Analytics “big data”

Why do we need benchmarking the NFV solution

Carrier Grade Conformance

Comprehensive information for CSP to plan, procure and deploy NFV

Performance

quantitative baseline on a specified infrastructure
Comparison of different solutions
NFV workload dimensions and stress vectors

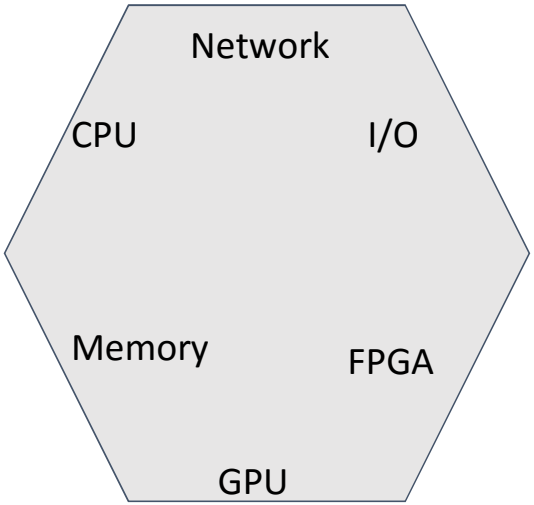
Automation

Setup the NFVI and testing environment
Provide quick validation of a known setup/configuration
Collect various KPIs

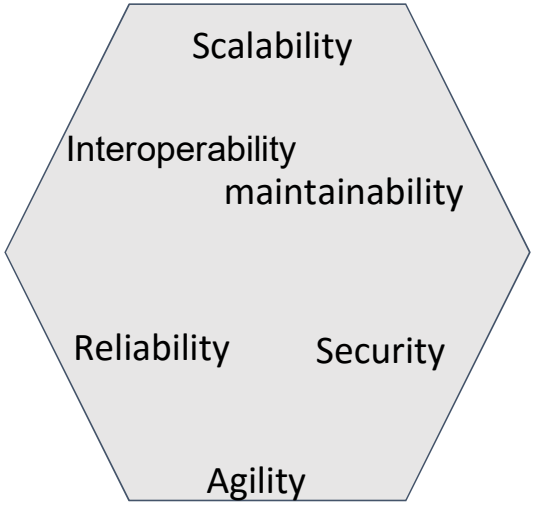
Agility

VNF onboarding
Onboard new HW or SW acerbation solutions

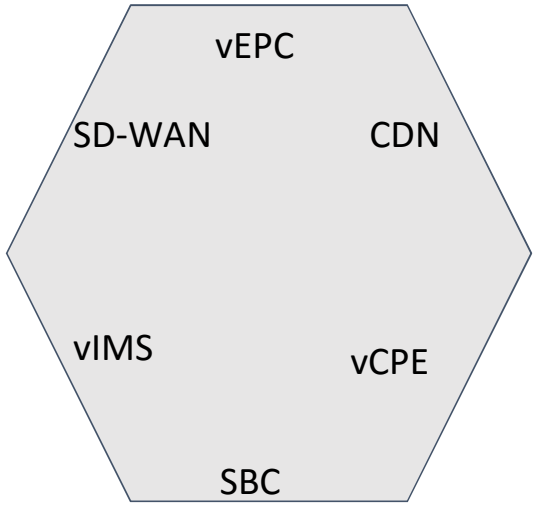
Bare metal



VIM



VNFs



Benchmark Platform Design Strategies

- Reproducible (reusable model-driven deployment & configuration templates)
  - Target environment
  - Testing environment
  - Benchmark results
- Build on Open Source solutions
- Full automation, Launch and validate the VNF solution on demand
- Dev-ops or CI/CD integration
- Store benchmarking data for future analysis
- Dashboard for easy visualization and comparisons

Benchmarking tools

Phoronix Test Suite

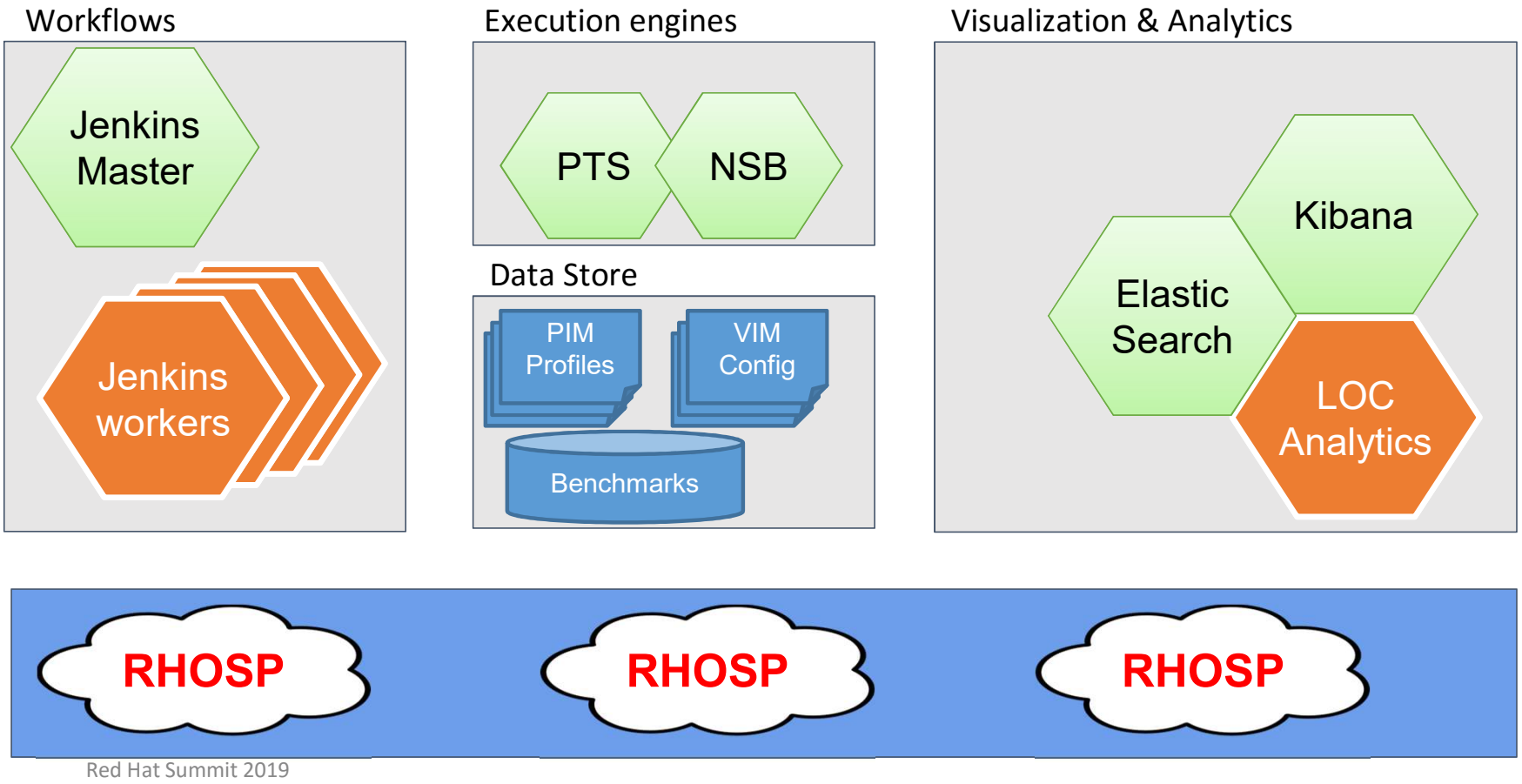
OPNFV Yardstick/NSB
OPNVF QTIP,
OPNFV VSPERF
OPNFV STORPERF

OpenStack Rally
OpenStack Monasca
OpenStack Celometer

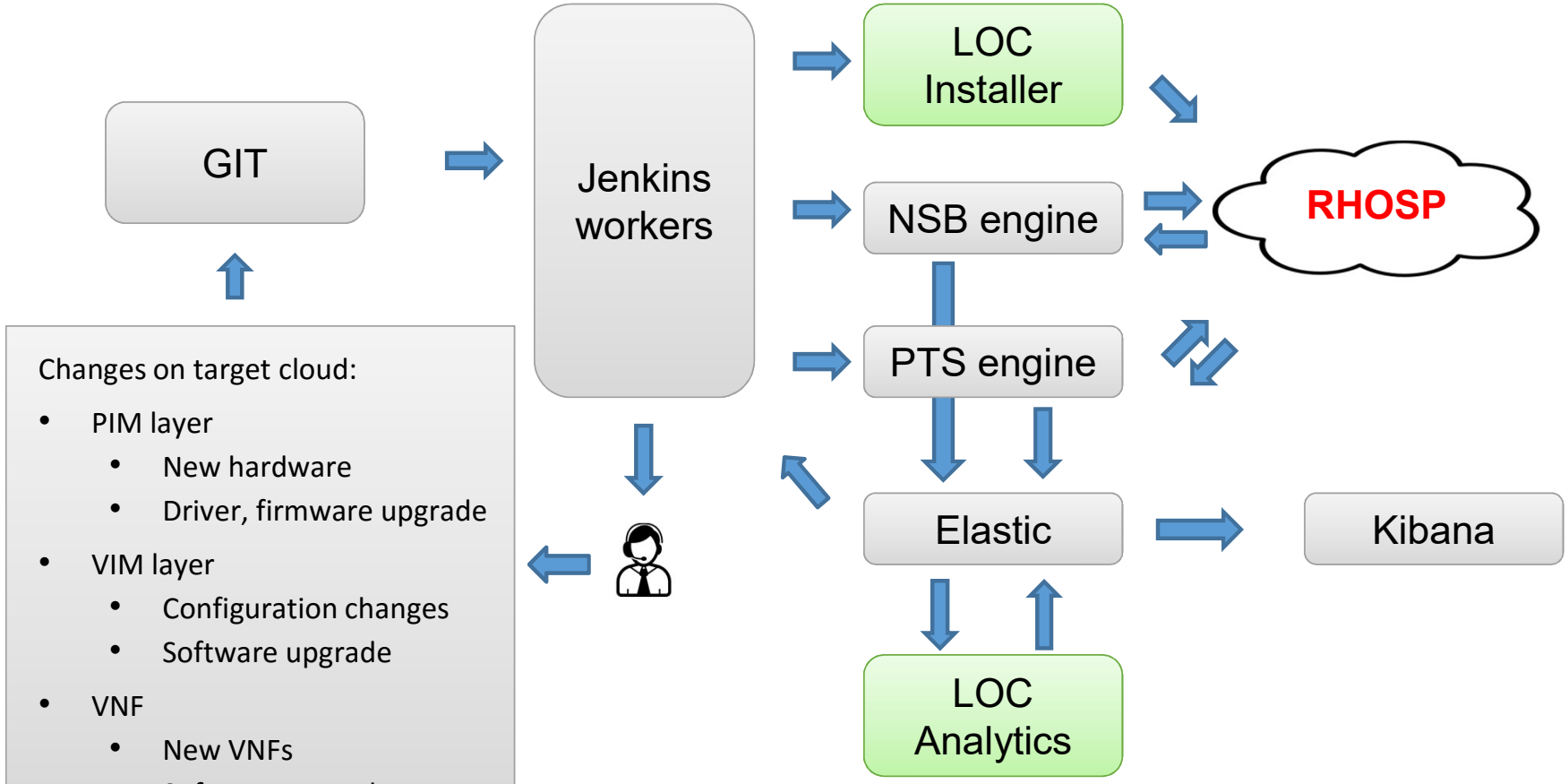
Backed by OpenBenchmarking.org
Framework to manage 300+ test cases and benchmark utilities.
Profiles CPU, memory, storage, networking, and application workloads.
Pre-defined test suites available for sane benchmarking profiles
Extensible for custom test cases and suites
Defines a generic schema for gathering metrics

Backed by OPNFV
Native OpenStack VIM integration
Build-in TG and SUT configurations
Full automation – one click execution, data collection and visualization
Rich metrics – loss rate, throughput…
Integrated with data store and visualization

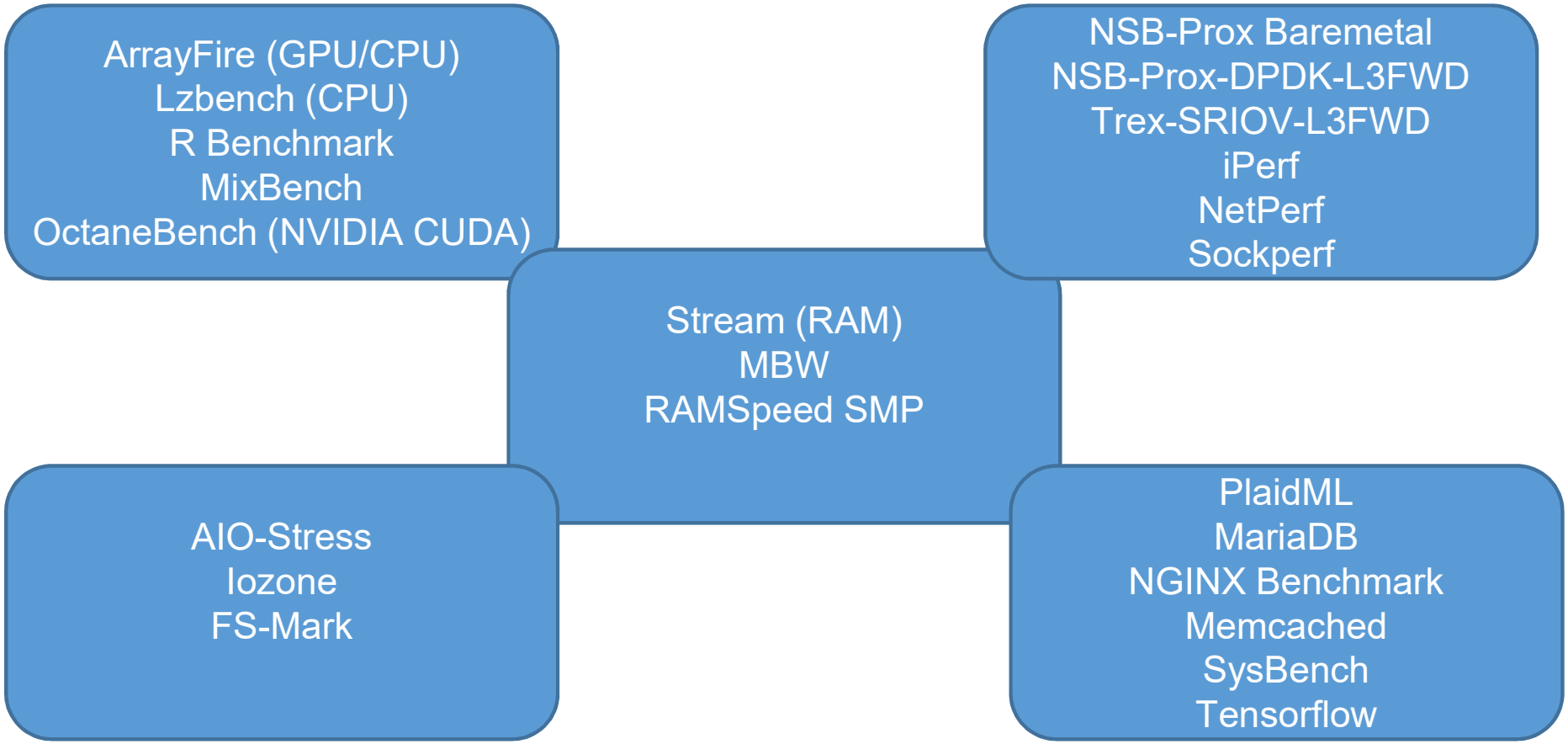
NFVI Benchmarking Platform in a glance



CI/CD Pipeline



Examples of Test Suites



Structured KPI data

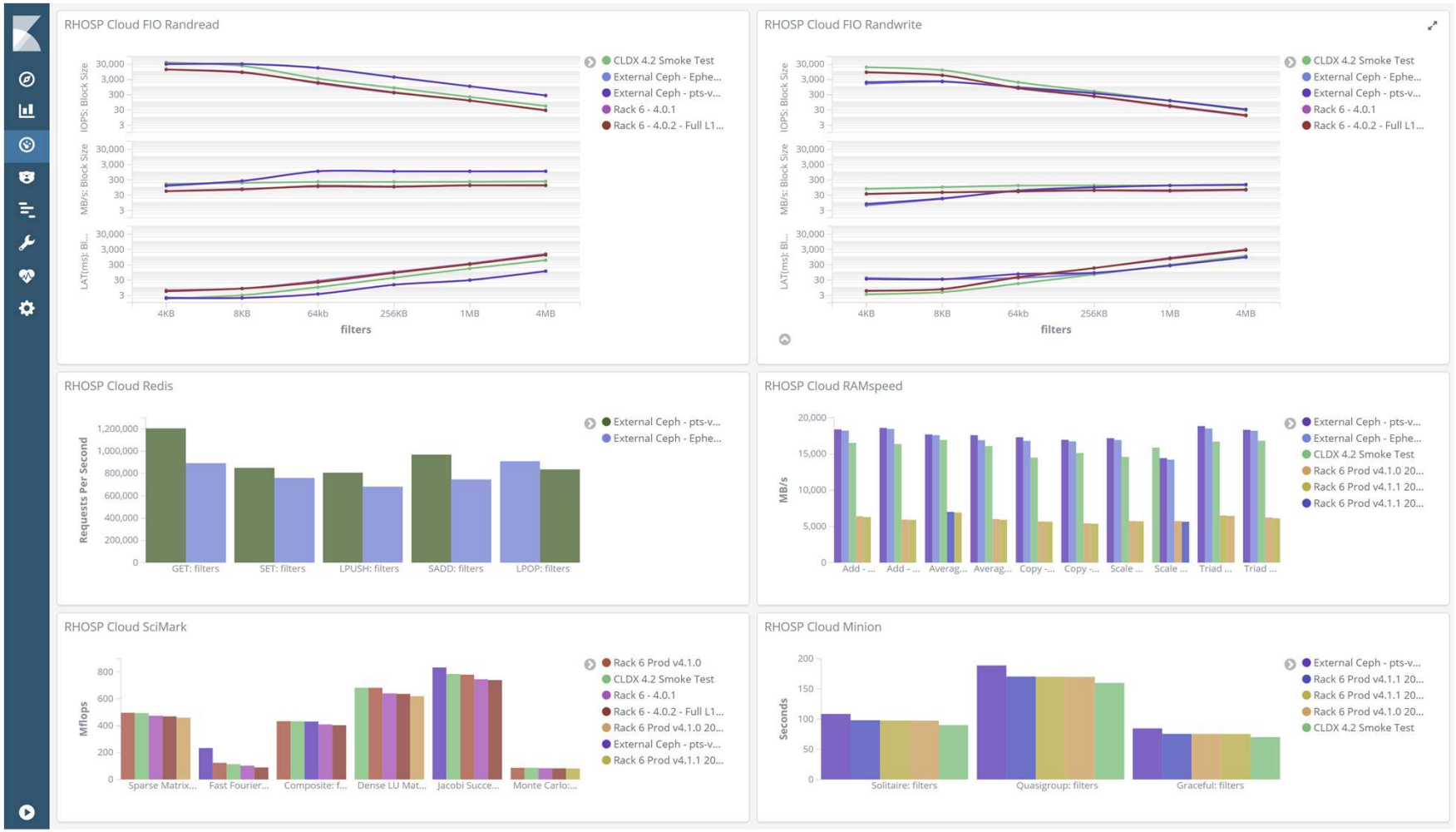
Single Document

doc#g9a8K2oBct0Qic59vEnH

Table | JSON

t	_id	g9a8K2oBct0Qic59vEnH
t	_index	phoronix_test_result
#	_score	1
t	_type	doc
#	data_average	292.05
#	data_max	292.736
#	data_min	291.653
t	data_raw	292.736:291.653:291.761
t	environment	RHOSP External Ceph
t	group_identifier	External Ceph - Ephemeral Volume - 4-17/2019
t	hostname	pts-test-localdomain
t	run_identifier	RHOSP External Ceph Test pts/c-ray Build #283
t	run_identifier_scale	Seconds RHOSP External Ceph Test pts/c-ray Build #283
t	system_hardware	Processor: 4 x Intel Core (Skylake IBRS) @ 2.20GHz (4 Cores), Motherboard: Red Hat OpenStack Compute (1.11.0-2.el7 BIOS), Memory: 1 x 8192 MB RAM, Disk: 23GB, Graphics: cirrusdrmfb
t	system_software	OS: CentOS Linux 7, Kernel: 3.10.0-957.el7.x86_64 (x86_64), Compiler: GCC 4.8.5 20150623, File-System: xfs, Screen Resolution: 1024x768, System Layer: KVM
t	system_timestamp	2019-04-17 10:23:54
t	test_description	Total Time - 4K, 16 Rays Per Pixel
t	test_proportion	LIB
t	test_scale	Seconds
t	test_suite	pts/c-ray-1.2.0
t	test_title	C-Ray
⏲	timestamp	April 17th 2019, 06:23:54.000
#	vm_count	1

Dashboard of benchmarking results



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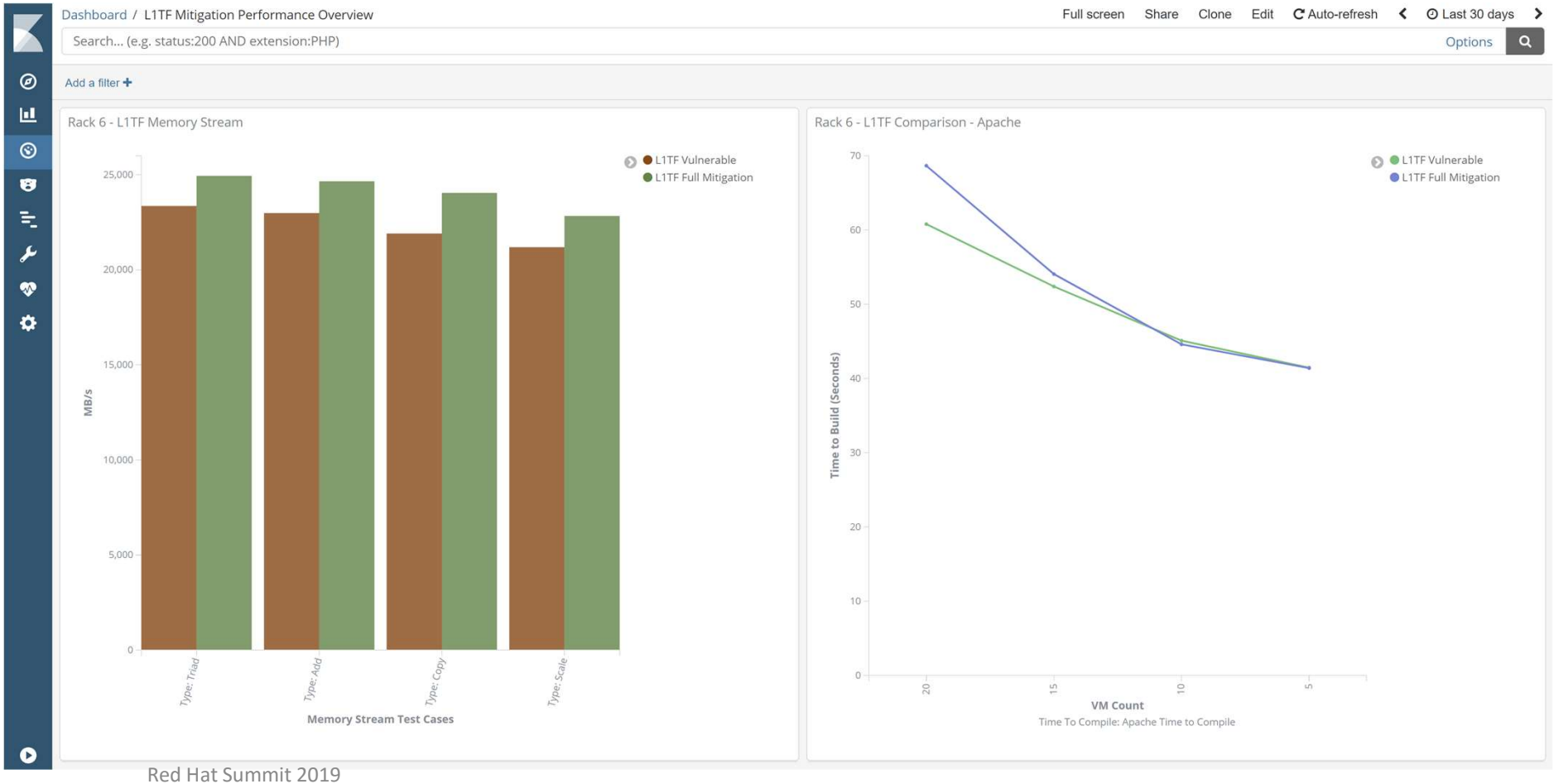

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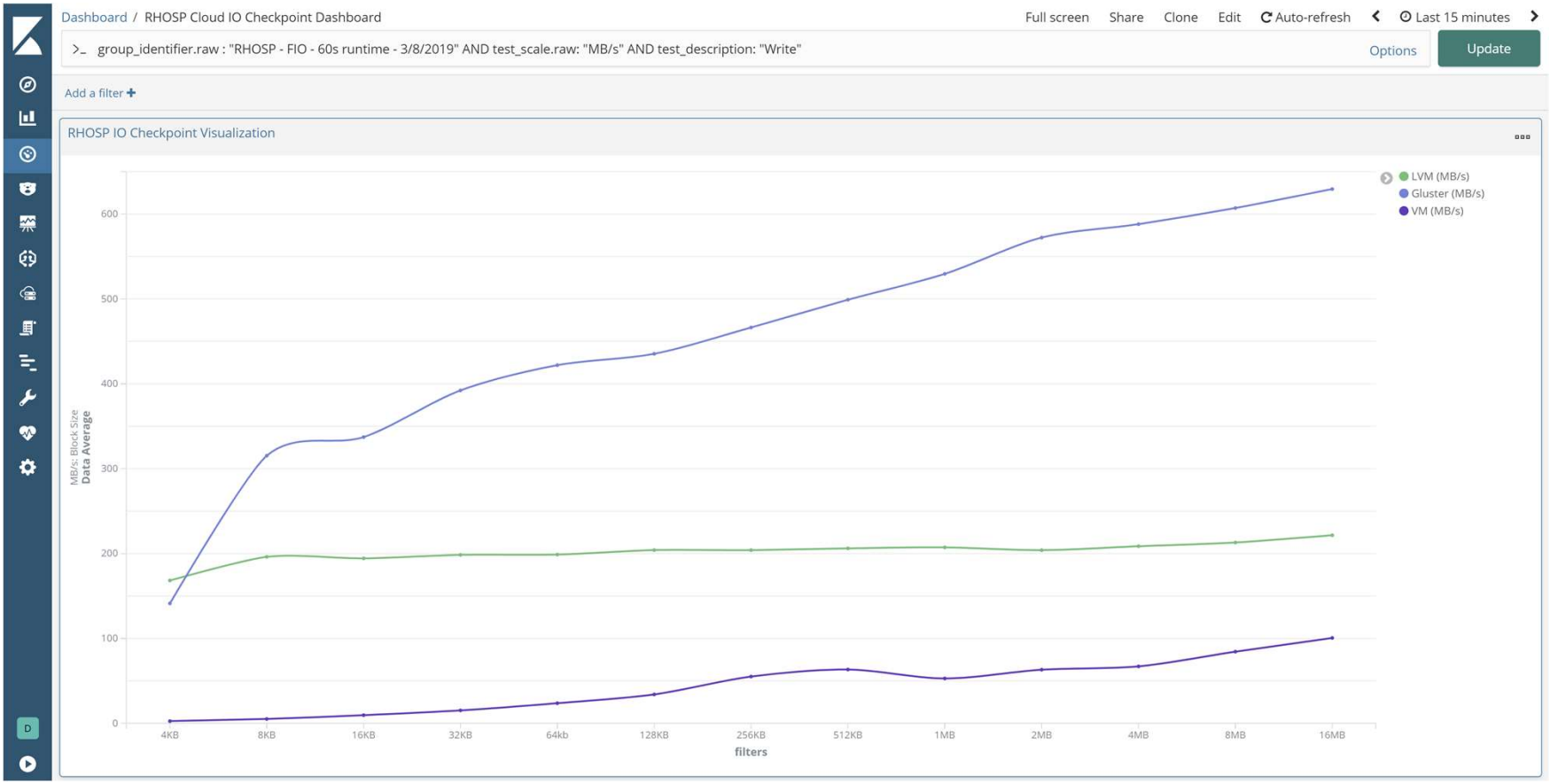
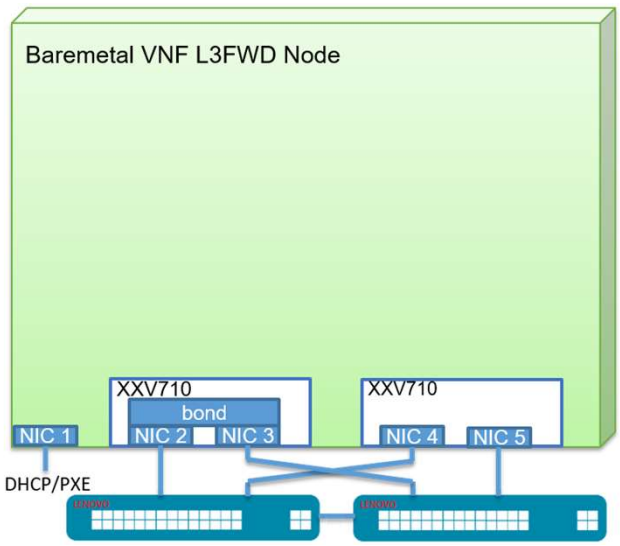
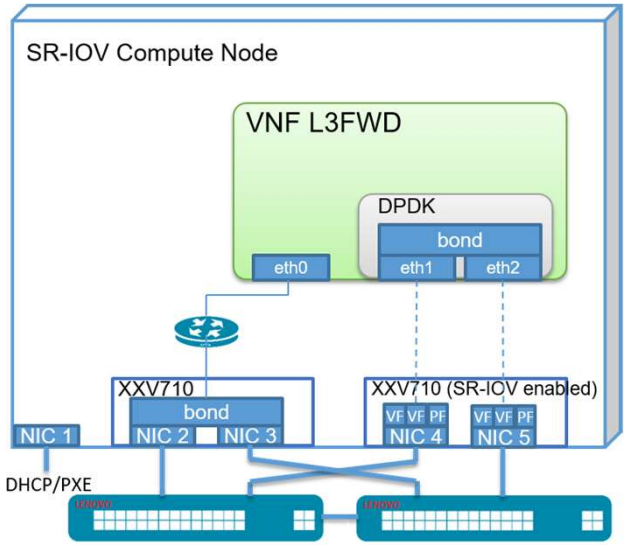
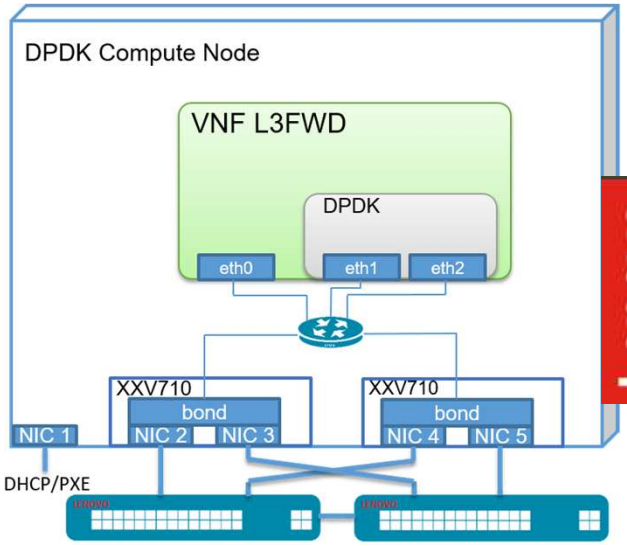


Demo Use Case: VIM configuration SR-IOV vs DPDK vs Bare Metal







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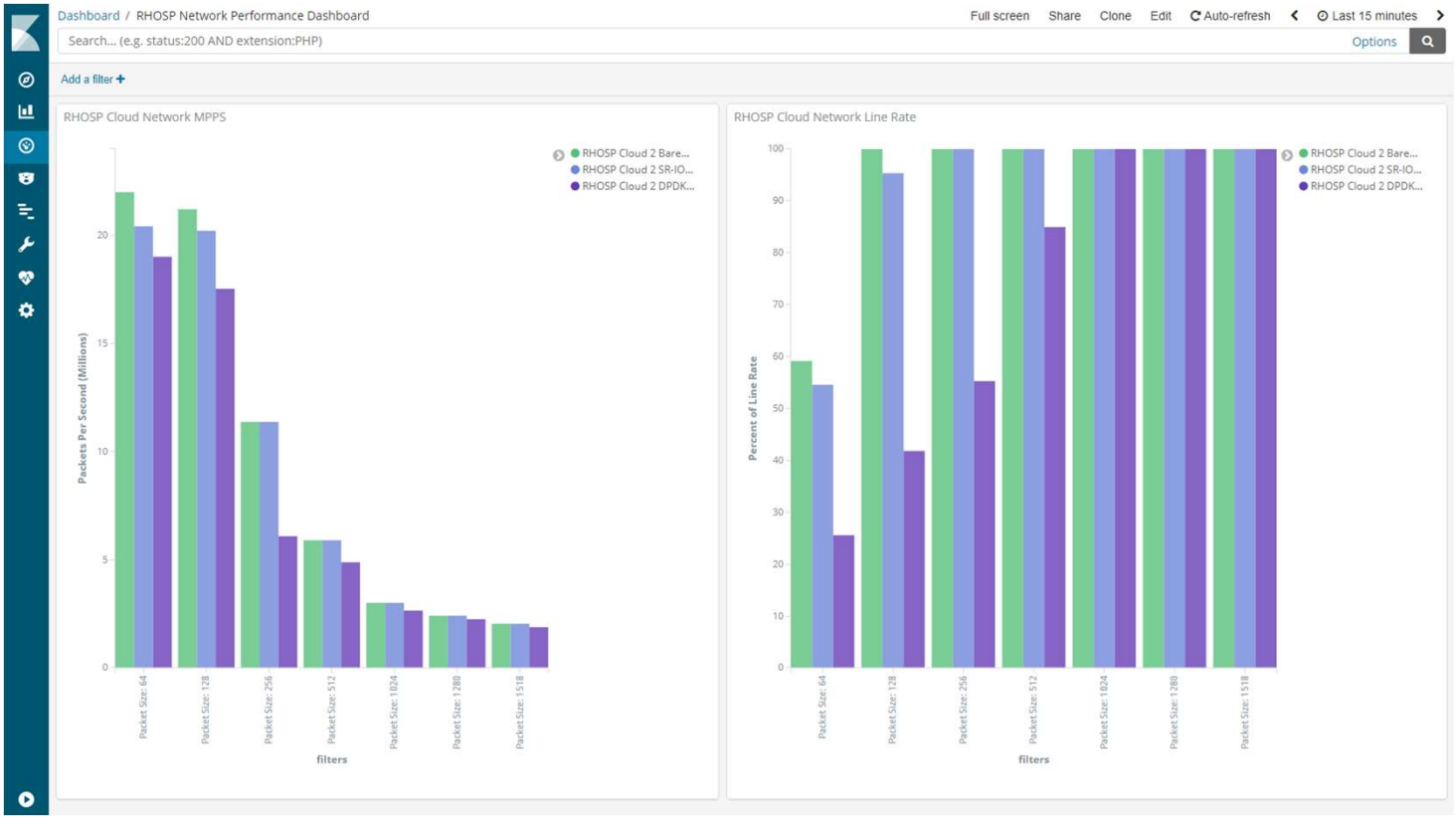

Summary

Performance

Multi-dimensional
Across all layers NFV architecture

Automation

Reproducible anytime, anyplace

CI/CD

Find issue before production deployment

Tool sets

Open Source
PTS + NSB + Rally + …

Thank you!