## WHAT YOU WILL LEARN IN THIS SESSION

| Introduction | The power of our portfolio  
Red Hat Openstack Platform Benefits |
|--------------|--------------------------------------------------------------------------------|
| Red Hat Openstack | NFV, Edge, AI/ML  
OpenShift on OpenStack |
| Product Roadmap | New Lifecycle  
The road ahead with OpenStack  
Platform next releases |
RED HAT OPENSTACK PLATFORM: THE ON-PREM FOUNDATION FOR HYBRID CLOUD

PRIVATE CLOUD
IT agility | Operational efficiency

EXISTING WORKLOADS

PROVEN
Scaling performance | Security

CLOUD-NATIVE WORKLOADS

INTEGRATED
Extensive partner ecosystem

DELIVERING TRANSFORMATIVE AND DIFFERENTIATED BUSINESS VALUE
RED HAT OPENSTACK PLATFORM
A strategic part of our portfolio

- INTEGRAL PART OF OUR OPEN HYBRID CLOUD VISION
  Proven on-premises cloud platform

- DELIVERING INNOVATIONS FOR MULTIPLE USE CASES
  Upcoming OSP 15, edge computing capabilities, AI/ML, etc...

- CONTINUED FOCUS ON INCREASING BUSINESS VALUE
  In partnership with our customers to help transform their organizations
IT ALL STARTS WITH OUR LINUX PLATFORM

The intelligent operating system that is the consistent foundation for the enterprise hybrid cloud.

Digital transformation can ONLY be done with Linux.

ONLY Red Hat Enterprise Linux provides an intelligent OS that is the consistent foundation for the enterprise hybrid cloud.

Delivering any application on any footprint at any time giving you Control. Confidence. Freedom.
LINUX IS THE FOUNDATION OF RED HAT OPENSTACK PLATFORM

Support starts with Red Hat OpenStack Platform 15
Continues to offer customers a secure, robust and integrated Linux operating system
Provides top-performing functionality through support for:
- Emerging workloads like AI/ML via GPU/vGPUs support
- Enhanced TCP stack,
- Improved load balancers
- Efficient kernel tracing and monitoring

RHEL 8 guest support for Red Hat OpenStack Platform versions 9, 10, 13, and 14+
HAR DENED SECURITY SERVICES FOR ENTERPRISE WORKLOADS

Red Hat® OpenStack® Platform

- INFRASTRUCTURE SECURITY
  Red Hat OpenStack Platform service hardening and key management

- DATA INTEGRITY
  Data encryption: at rest and on the fly

- FEDRAMP GUIDED REMEDIATIONS
  Moving toward better risk management

FOCUS ON DATA SECURITY IN YOUR ON-PREMISE PRIVATE CLOUD
DIRECTOR: MAKING RED HAT OPENSTACK PLATFORM EASIER TO MANAGE

- FLEXIBLE ARCHITECTURE
- INTEGRATION OF ANSIBLE®
- VALIDATIONS FRAMEWORK
- PLUGIN-BASED SOLUTION
- UPGRADE OPTIONS
DIRECTOR

AREAS OF PRODUCT ENHANCEMENT

- **Scalability**
  From 500 nodes to more than 1K nodes

- **Ease of Use/Operations**
  Increased ansible automation to reduce complexity

- **Bare Metal Management**
  Best On Prem IaaS for Red Hat Openshift
  From Core to Edge
ENABLES A BROAD SET OF USE CASES

Red Hat® OpenStack® Platform
NFV
THE TELCO NETWORK CHALLENGE

WHAT YOUR CUSTOMERS WANT

- **GREAT EXPERIENCES**
  Services that stand out

- **TOTAL ACCESS**
  Anything, anywhere, any time

- **UNLIMITED CAPACITY**
  Ever-increasing demand for more

- **PLATFORM OPPORTUNITIES**
  Enterprise innovation on your assets

HOW RED HAT HELPS

- **SERVICE INNOVATION**
  Enhance customer engagement

- **BUSINESS AGILITY**
  Respond and scale rapidly

- **IMPROVED EFFICIENCY**
  Get more from what you have

- **SPEED TO REVENUE**
  Create customer value faster

Red Hat Summit 2019
Red Hat OpenStack Platform incorporates enhanced platform awareness (EPA) to expose hardware acceleration features in OpenStack.

vCPU PINNING  
NUMA-AWARE SCHEDULING*  
HUGEPAGE SUPPORT FOR VMs  
ACCELERATED PACKET PROCESSING*  
RESOURCE-AWARE SCHEDULING  
OPEN VIRTUAL NETWORKING*
Enable OpenShift 4 on OpenStack

Once OpenShift can manage the bare metal, we can then have each workload running on bare metal

Providing our customers and partners choice: A mature OpenStack Platform or a Next Generation Platform based on Kubernetes
AI/ML & Analytics
Analytics pipelines, from training to inference

Computational power, parallelism

Throughput

Latency

Manage data

Data center

Training

Evaluate

Data preparation

Model training

Visualization

Run

Inference

Regional DC

Edge/IoT
GPU passthrough

Implemented by OpenStack Compute since Havana

Supported by Red Hat OpenStack Platform since ages

Pros:
- Full compatibility on the guest
- Maximum performance on the guest

Caveats:
- Device exposure to the guest
- PCI-E lanes limitations per CPU
- Guest UEFI firmware is recommended
- Capacity management challenges
Machine Learning with GPU passthrough

### CPU

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<thead>
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<th>Img/sec</th>
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**total images/sec: 2.6**

### GPU

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<td>images/sec: 158.2 +/- 0.3 (jitter = 0.5)</td>
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<td>20</td>
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...  

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**total images/sec: 157.85**

Code: [https://github.com/tensorflow/benchmarks](https://github.com/tensorflow/benchmarks)

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TensorFlow: 1.13  
Model: resnet50  
Dataset: imagenet  
Mode: training
Virtual GPU (vGPU)

Tech Preview in Red Hat OpenStack Platform 15

Pros:
- Manageable host API for allocating resources on demand
- Device management only on the host
- Introspectable hardware on the host

Caveats:
- Vendor-specific driver
- Product lines specific
- Guest driver limitations
The Foundation for Data Analytics Cloud

<table>
<thead>
<tr>
<th>IN-MEMORY (DATA GRID)</th>
<th>ELASTIC COMPUTE RESOURCE POOL</th>
<th>INTERACTIVE QUERY</th>
<th>BATCH QUERY &amp; JOINS</th>
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<tbody>
<tr>
<td>INGEST</td>
<td>ETL</td>
<td>plunge instances</td>
<td>Spark/Hadoop</td>
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<td>Kafka</td>
<td>Hive/Map Reduce</td>
<td>Presto compute</td>
<td>Rad analytics</td>
</tr>
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<td>AMQ Streams</td>
<td>Cloudera compute instances</td>
<td>instances</td>
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<td>compute instances</td>
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<td>Platinum SLA</td>
<td>Silver SLA</td>
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<td>Gold SLA</td>
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<tr>
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<td>Bronze SLA</td>
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</tbody>
</table>

Multi-tenant workload isolation with shared data context
MLaaS on OpenShift: Ministry of Defense Israel use case

Day/Time: Tuesday, May 7, 3:45 p.m.-4:30 p.m.
Speaker(s): Menny Tsarfati, Red Hat; Miki Kenneth
Session type: Breakout
Abstract: In this session you'll learn about AutoML, an open source framework that lets you turn any data set into a prediction model without

Transforming Cloudera analytics agility in a fast-moving world

Day/Time: Thursday, May 9, 11:00 a.m.-11:45 a.m.
Speaker(s): Brent Compton, Red Hat
Session type: Breakout
Abstract: A Government of Israel (Gol) agency recently launched a "cloudoop" service, transforming their data analytics environment. Cloudoop is their Spark-as-a-Service offering, with Spark provided by Cloudera, multitenant workload isolation provided by OpenStack, and a shared data context provided by Ceph/S3 object storage.
WHAT IS EDGE COMPUTING?

Centralize where you can, distribute where you must
THERE ARE MANY EDGES
OpenStack at the Edge

Standalone Cluster(s)

Distributed Compute Nodes

Single Node
(All-in-One)

Red Hat OpenStack Platform with distributed compute nodes (DCN)

Bringing compute power to the edge

- Scale while minimizing operational complexity with centrally managed edge sites
- Reduce hardware footprint and cost at the edge.
- Process, analyze, and distribute data close to real time.
- Enhanced security with an edge-adopted risk management framework.
CONTAINERS
RED HAT OPENSTACK PLATFORM
AND RED HAT OPENSSHIFT

Consumption of resources
Provides the container platform layer
Define and share applications

Provisioning of resources
Elastic availability of the infrastructure layer
VMs, BM, IaaS+ services
TIGHT INTEGRATION OF RED HAT OPENS SHIFT CONTAINER PLATFORM AND OPENSTACK

Containers, virtual machines, and bare metal

OPENSHIFT CONTAINER PLATFORM

Containers

CONTAINERS

CNS

KURYR

Networking

RED HAT OPENS SHIFT PLATFORM

VM

VM

VM

KVM

Ironic (Bare Metal)

Cinder

COMPUTE

CEPH

Networking

SHARED MANAGEMENT TOOLING

Red Hat CloudForms

Red Hat Satellite

Red Hat OpenStack Platform Director

Red Hat Ansible Automation

STANDARD HARDWARE
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OUR INVESTMENT PRIORITIES

EDGE

On Prem best IaaS to run Containers

Day 2 Mgmt

Scalability
Service Assurance Framework (SAF) Overview

Dispatch Routing Message Distribution Bus (AMQP 1.0)

Prometheus Operator
MGMT
Cluster

3rd Party Integrations

Application Components
(VM, Container);

Controller, Compute, Ceph, RHEL, RHHI-V,
OpenShift Nodes (All Infrastructure Nodes)

Metrics

Events
Red Hat OpenStack - What’s New

**NOW IN RHOSP 13**

1. Based on Upstream Queens release
2. Long-life release (based on RHEL 7.5)
3. Enhanced Day2 Mgmt (SAF)
4. FFU Enhancements
5. Availability of Distributed Compute Nodes (DCN) for edge computing architectures

**UPCOMING RHOSP 15**

1. Based on Upstream Stein release
2. Short-life release
3. First release based on RHEL8
4. Openshift 4.2 Integration
5. Introduce Edge additional capabilities
   a. DCN with persistent storage
   b. Flexible and scalable deployment
6. Service Assurance Tech-Preview
# RED HAT OPENSTACK ROADMAP

## Releases Lifecycle

<table>
<thead>
<tr>
<th>Year</th>
<th>Long Life Releases</th>
<th>Interim Releases</th>
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<tbody>
<tr>
<td>2018</td>
<td></td>
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- **Red Hat OpenStack Platform 13**
- **RHOSP 14**
- **RHOSP 15**
- **Red Hat OpenStack Platform 16**
- **Red Hat OpenStack Platform 17**

- **Long Life Releases**:
  - OSP 13, 16, 17

- **Interim Releases**:
  - 11, 12, 14, 15
Red Hat OpenStack Platform - 15 Highlights

**Compute**
1. NVIDIA vGPU Full Support
2. Cells v2

**Networking**
1. OVN
2. QoS Management

**Storage**
1. DCN with persistent storage (TP)

**Others**
1. Director: Edge Enhancements
2. Security: HSM for
# Red Hat OpenStack Platform - 16 Highlights

## Compute
1. Live Migration for Pinned VM
2. SR-IOV Warm Migration
3. Basic FPGA support

## Storage
1. Storage at the edge productization
2. Dynamic Storage Provisioning for OpenShift

## Networking
1. IPv6 Full Support (Prov. included)
2. Octavia OVN driver

## Others
1. Enhanced Day2 Mgmt (Automated Back-up/restore), Logging, Event Mgmt
THANK YOU

linkedin.com/company/Red-Hat
youtube.com/user/RedHatVideos
facebook.com/RedHatInc
twitter.com/RedHat

@smazziotta
@SeanCohen_RH