



**Red Hat**



**DELL**Technologies

# DELL APEX CLOUD PLATFORM FOR Red Hat OpenShift AND REDHAT OPENSIFT AI

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# IT organizations face increasingly complex ecosystems

**90%** say their overall **IT environment has become more complex** the past 2 years<sup>1</sup>

**67%** are already **running container-based production applications**, and another 18% expect to be doing so within 12 months<sup>2</sup>

**48%** **deploy AI/ML software in containers**<sup>3</sup>

**60%** of enterprises to explore **re-virtualization**<sup>4</sup>

<sup>1</sup>Enterprise Strategy Group Complete Survey Results, 2024 Technology Spending Intentions Survey, February 2024.

<sup>2</sup>Enterprise Strategy Group Complete Survey Results, Distributed Cloud Series: The State of Infrastructure Modernization Across the Distributed Cloud, August 2023.

<sup>3</sup>Gartner Insights and Pulse - Top Kubernetes Workloads 2023

<sup>4</sup>Gartner: Market Guide for Server Virtualization



Red Hat



DELL Technologies

# A partnership dedicated to your success

Dell Technologies and Red Hat partner to solve the challenges your organization faces

25-year partnership

Since 1999

Red Hat reinvestment in Dell

Resources including solutions experts and joint engineering leads



Co-engineered solutions

Enterprise-ready solutions, ready stacks, white papers

Red Hat premier global partner

Dell holds the highest level of partnership

# OpenShift in the Dell Portfolio

Dell Validated Designs



ACP for Red Hat OpenShift



DIY



Integrated  
Appliance

# Dell Validated Design for Red Hat OpenShift Container Platform 4.14



- Available on Intel powered Dell PowerEdge servers
- Support for advanced OpenShift features including:
  - OpenShift Virtualization
  - Single Node OpenShift
  - Agent Based Installer
  - Assisted Installer
  - Hosted Control Planes
  - OpenShift AI
  - GPU Operators
  - Support for data center and edge use cases

## Key Values:

- Supports 1-node, 3-node, and 6+ node architectures, for both data center and edge applications
- Zero Touch Provisioning (ZTP)
- Flexibility with multiple storage options – including PowerMax, PowerScale, and PowerStore
- OpenShift Virtualization
- Hosted Control Planes
- ObjectScale
- GPUs
- OpenShift AI

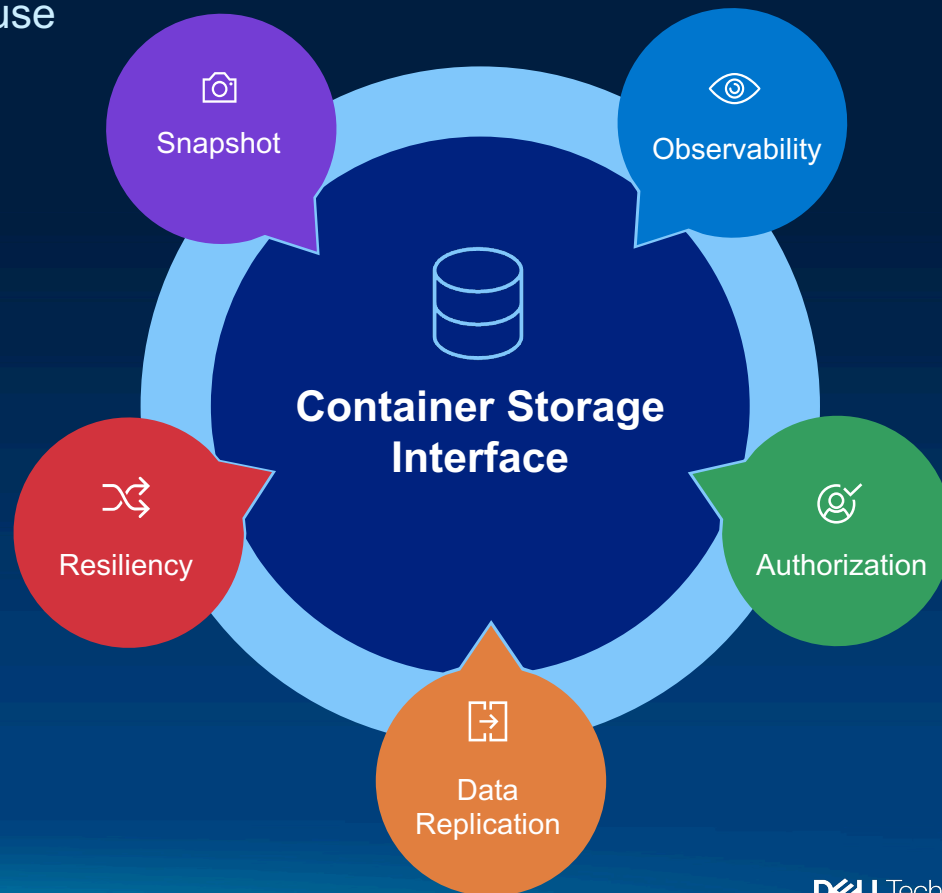
# Container Storage Modules

Select which modules you would like to use

Enrich the standard experience

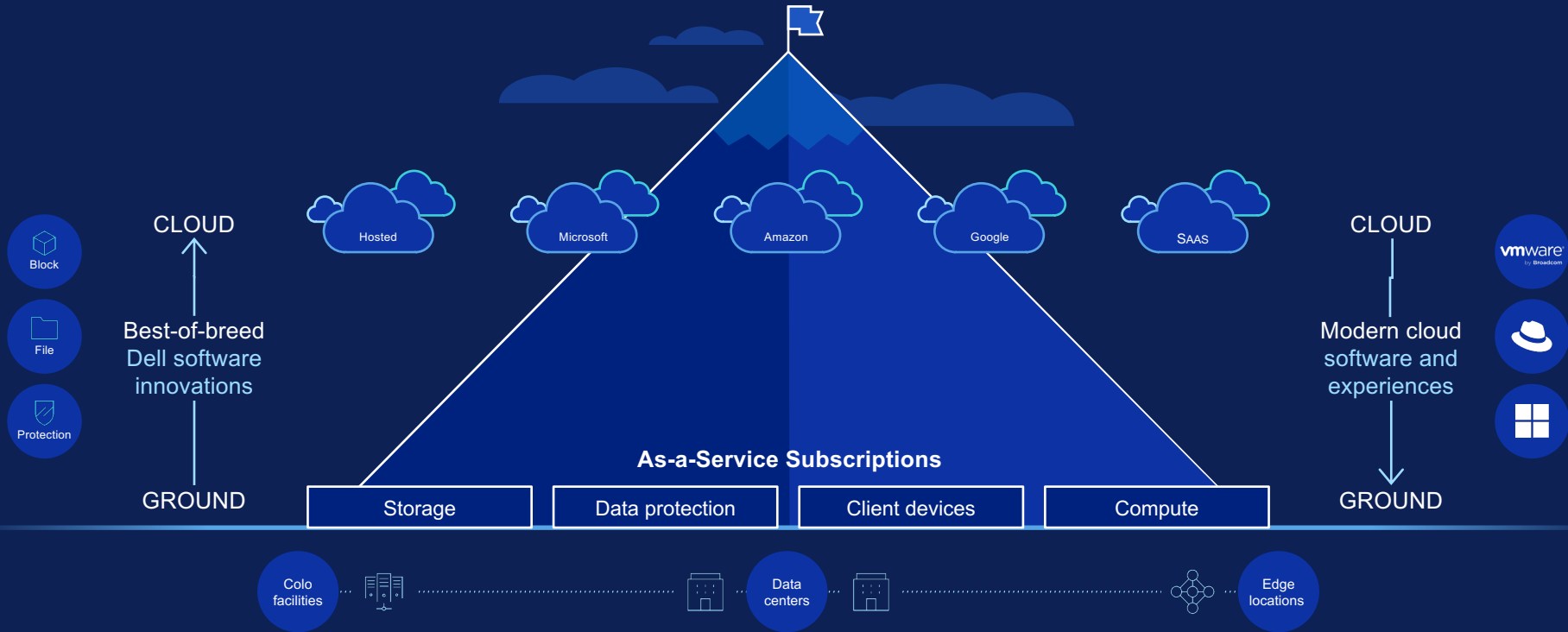
Deployed as modules – deploy only what you plan to use

Provides unique storage features beyond what the CSI specification allows

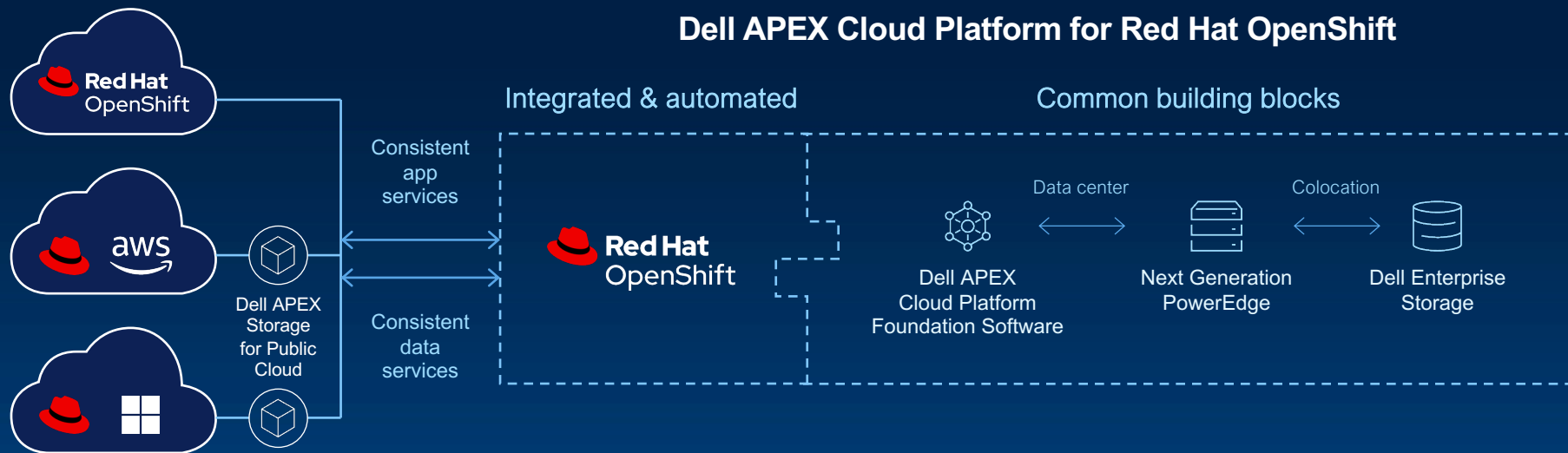


# DELLTechnologies | A P E X

Take advantage of multicloud by design.  
Get simplified cloud experiences with technology you trust.



# Consistent application environments



Consistent application  
services regardless  
of location

Mission-critical storage  
outcomes on-premises and  
in public cloud

Data and application mobility  
on a universal storage layer\*



# APEX on Latest Generation PowerEdge

Based on 4<sup>th</sup> Gen Intel Xeon Scalable Processors

MC-660

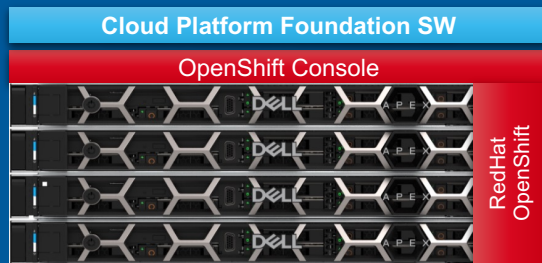


MC-760



- Single or Dual and Intel Xeon Scalable Gen 4 processors
- GPU Support:
  - MC-660: Up to two single-wide GPUs
  - MC-760: Up to six single-wide and two double-wide GPUs
- Built-in Intel accelerators on MC-660 & MC-760:
  - **Intel ® AMX |QAT| DLB| DSA**
- Up to 52 cores per processor
- 50% faster memory with DDR5
- 2x throughput with PCIe Gen5

# APEX Cloud Platform Storage Options



ACP Compute Nodes

## APEX Cloud Platform - Compute Cluster

- ACP common HW (MC-660, MC-760)
- ACP common factory and deploy
- ACP ordering path
- ACP software subscription
- ACP ProSupport and ProDeploy
- ACP phone home
- ACP LCM compute, OpenShift and HW

## + Required Storage (choose 1)

### Mid to Large Scale Block



PowerFlex SDS  
Appliance | Rack | SW

### Small to Medium Scale Block + File



PowerStore - T  
Storage System

### Small Scale Block + File + Object



**Red Hat**  
OpenShift  
Data Foundation

Red Hat  
Software Defined Storage\*

## Supplemental Storage Systems

Connect to additional Dell Storage Systems  
to match different storage needs



PowerMax



PowerScale



UnityXT



# Dell APEX Cloud Platform Foundation Software

Accelerate time to value

**90% faster deployments<sup>1</sup>**

Streamline operations & lifecycle management

**90% faster upgrades<sup>2</sup>**

Bridge the skills gap

Management through familiar ecosystem User Interface

Realize greater cloud and IT automation

Extensibility with APIs

Integrated full stack

Support & services experience

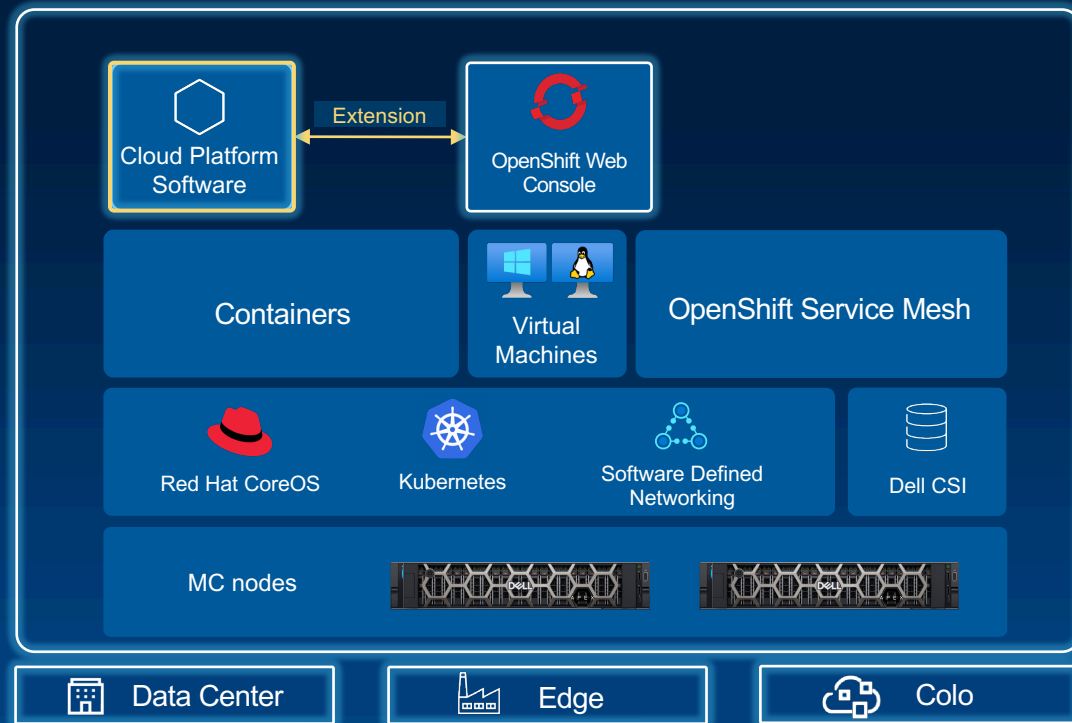
<sup>1</sup>Compared to a manual deployment of OpenShift. Based on internal analysis, August 2023.

<sup>2</sup>Compared to a manually upgrading OpenShift. Based on internal analysis, September 2023.

# Day 1 deployment outcome

Day 1 : What is running after initial installation and configuration?

- OpenShift Deployed
- CSM Operator and CSI Driver is Installed
- ACP Management Software and Web Console Add-in deployed
- Operator Hub Configured
- Service Mesh Configured
- Virtualization Operator



# Dell APEX Cloud Platform Foundation Software

## Day 2 : Drill-down into granular cluster-level detail

### Cloud Platform Foundation Software

- Deployment automation
- Full stack lifecycle management
- Physical hardware monitoring and views
- Intrinsic infrastructure security management
- Serviceability integrations

### Dell APEX Cloud Platform

Overview Inventory Updates Security **Settings** Support

Network

#### Dell Support Portal Access

Enable cluster access to internet update bundle downloads and knowledge base articles by providing your Dell support account credentials.

Support

Support portal access Disabled

Connectivity

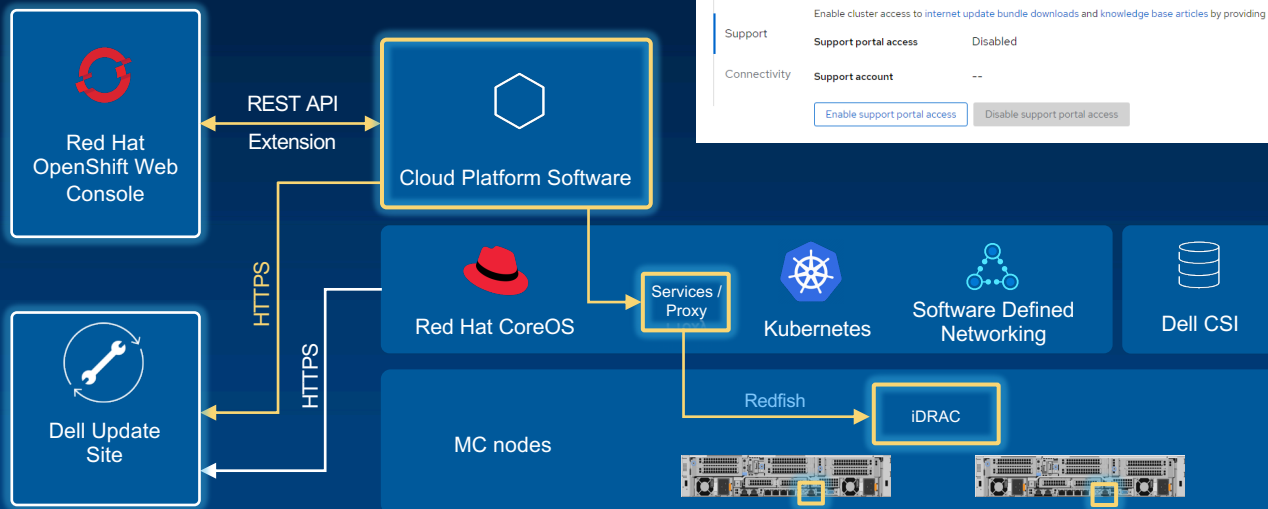
Support account --

Enable support portal access

Disable support portal access

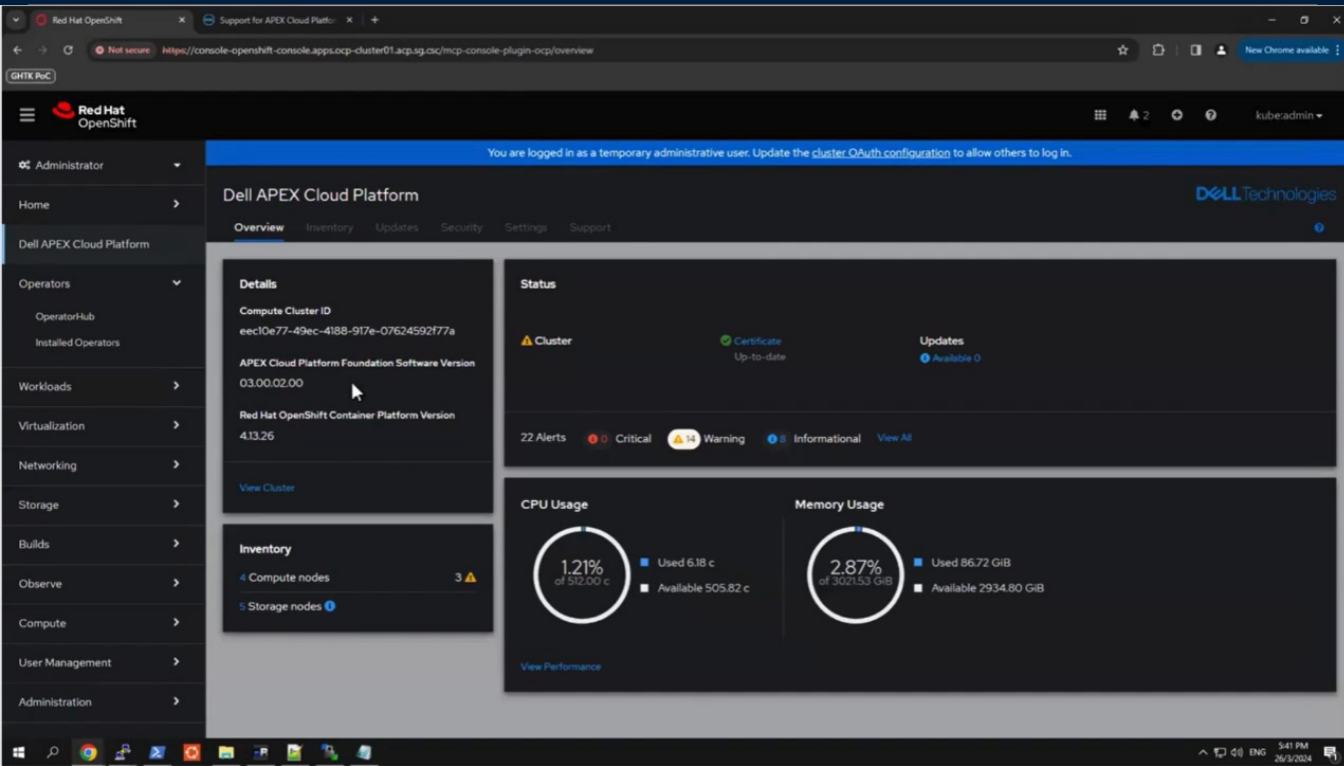
### Update Payload Downloads

- Online only at GA. Offline updates available in the future.
- Orchestrated through APEX Cloud Platform Foundation Software.
- Updates validated collaboratively between Dell and Red Hat.



# Lifecycle management of Dell's Apex Cloud platform for Red Hat OpenShift

Seamless Upgrades for Hardware and Software with Detailed Pre-checks and Reporting



## Benefits

**Simplified upgrade process** for hardware and software components

Offline update capability for **environments without internet access**

**Comprehensive pre-checks** ensure system health before updates

**Detailed reports** provide transparency on upgrade tasks

Enhanced cluster management with **version verification and health monitoring**



# Seamless operations for multiple workloads

On a single platform with APEX Cloud Platform for Red Hat OpenShift



## Red Hat OpenShift

**Bare Metal  
deployment of  
OpenShift Platform  
Plus**

**Constant management** regardless where the platform is installed – on-prem, in the cloud, or at the edge.

**Simplify operations** so your teams can focus on innovation.



## Red Hat OpenShift Serverless

**Deploy and manage  
modern serverless  
workloads**

OpenShift Serverless leverages the **power of Knative** to deliver serverless, event-driven applications **that scale on demand**.



## Red Hat OpenShift Virtualization

**Single platform for  
managing both VMs  
and containers**

**Migration tooling** to support streamlined migration of **virtual machines at scale**.

**Use existing VM roles and responsibilities**, maintain application components that are business critical and modernize skill sets over time.



## Red Hat OpenShift AI

**Enterprise-Ready AI  
application platform**

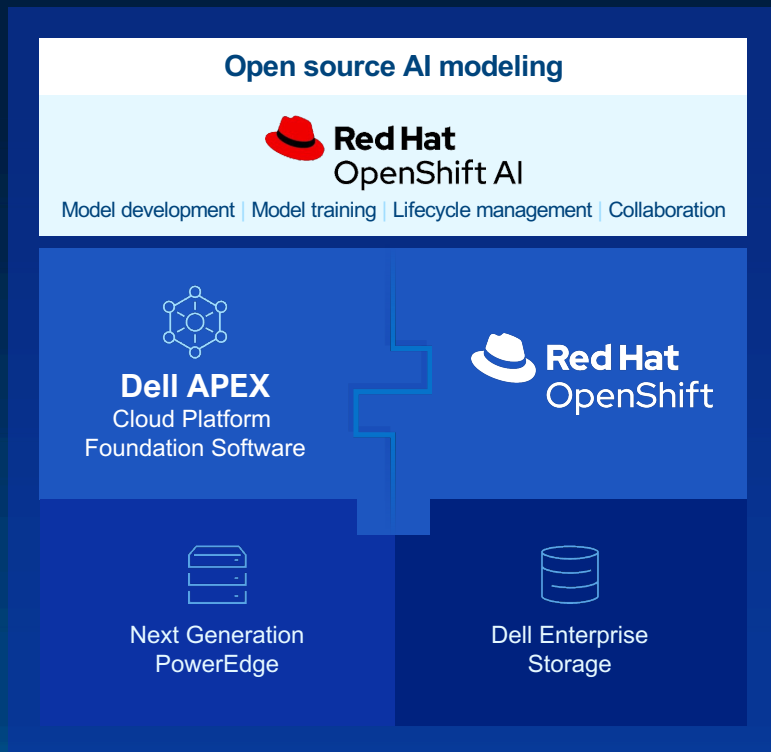
**Develop, train, serve, monitor, and manage the lifecycle** of AI/ML models and applications from experiments to production.

**Red Hat tracks, integrates, tests, and supports** common AI/ML tooling and model serving.



# Red Hat OpenShift AI

Deliver AI outcomes at scale across hybrid cloud environments



## Model development

Bring your own models or customize Granite models to your use case with your data. Supports integration of multiple AI/ML libraries, frameworks, and runtimes.



## Model serving and monitoring

Deploy models across any OpenShift footprint and centrally monitor their performance



## Lifecycle management

Expand DevOps practices to MLOps to manage the entire AI/ML lifecycle



## Resource optimization and management

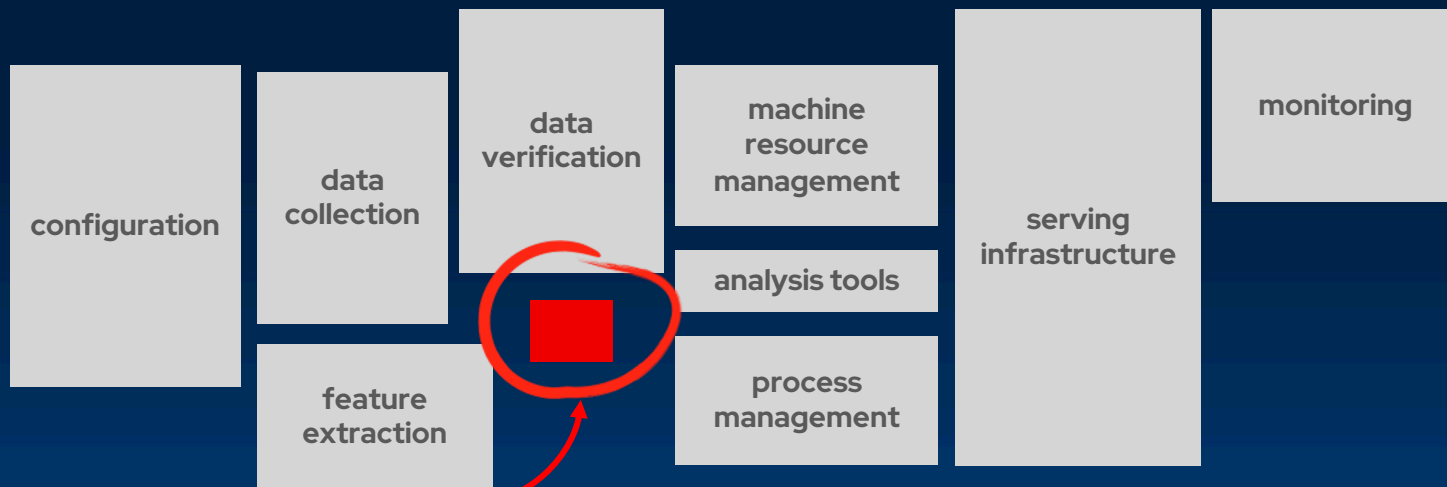
Scale to meet workload demand and share resources, projects, and models across environments



# Building Intelligent Applications



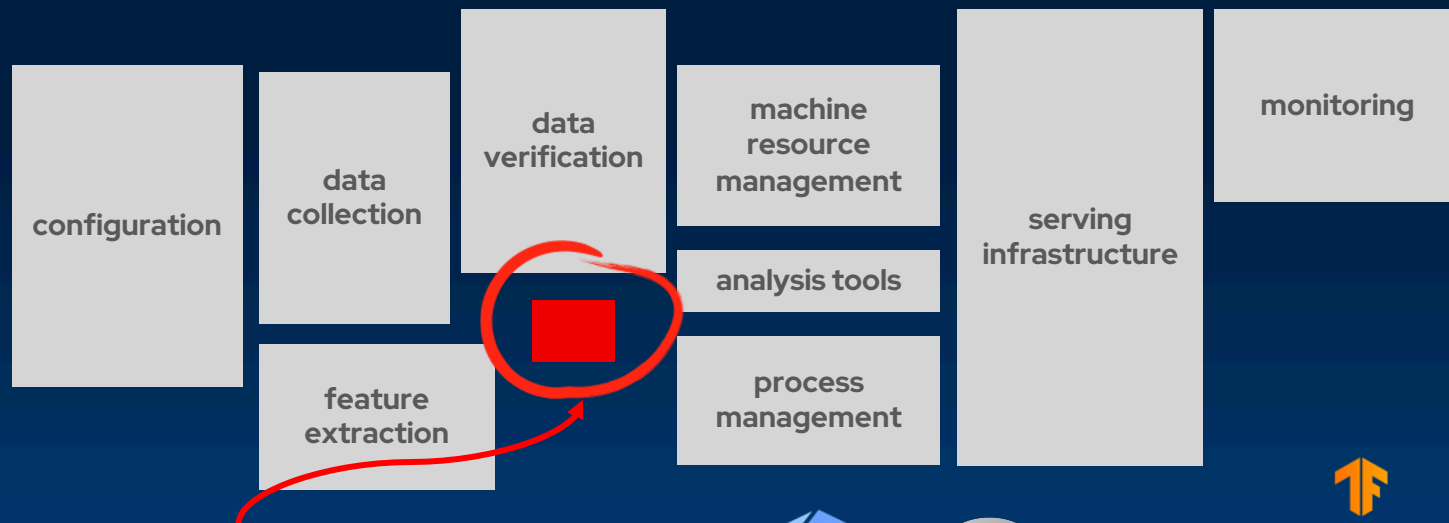
# Building Intelligent Applications



(Adapted from Sculley et al., "Hidden Technical Debt in Machine Learning Systems." NIPS 2015)

Your AI model

# Building Intelligent Applications



Your AI model

PyTorch



TensorFlow



CodeFlare



TrustyAI



Dell Technologies

# Building Intelligent Applications



- Multi-tenant data science platform
- Self-service workbenches



- Preinstalled machine learning libraries
- Custom stack can be integrated



- Distributed model training
- Parallelize workloads across nodes and GPUs



- Explainable AI toolkit
- Provides monitoring for bias, data drift



## Kubeflow Pipelines

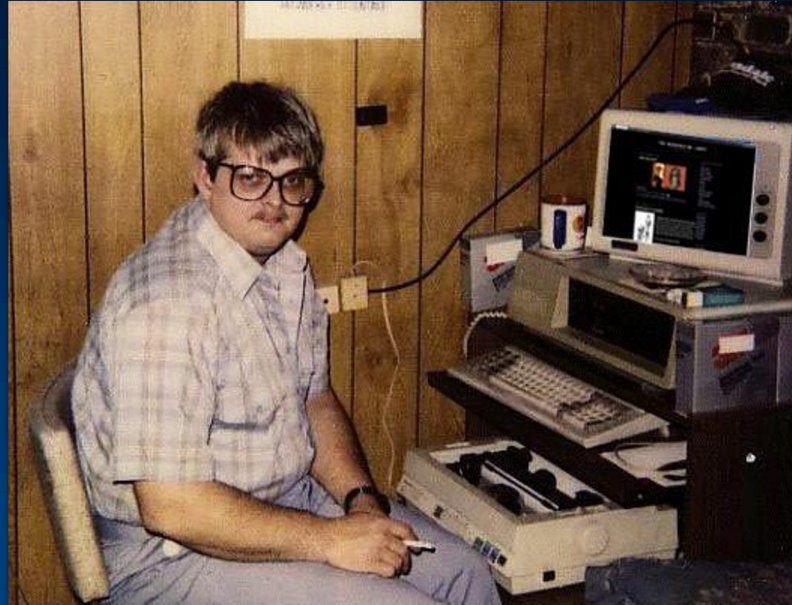
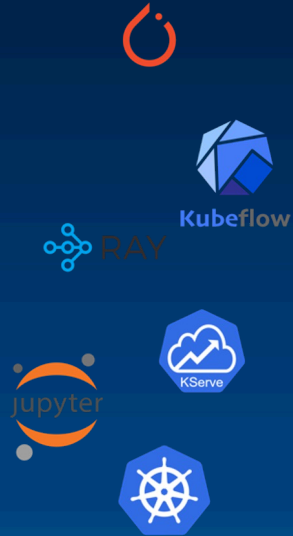
- Machine learning workflow orchestration
- Experiment tracking



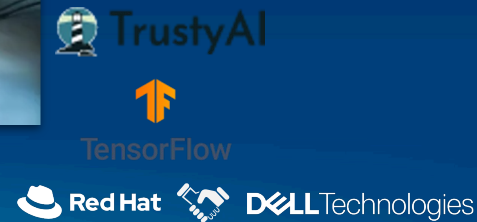
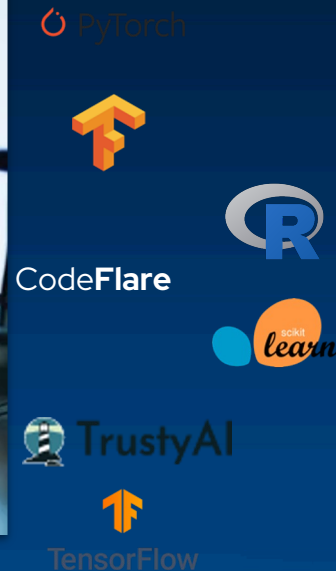
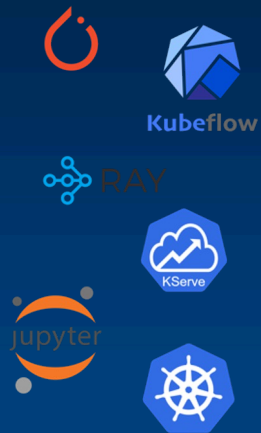
## Kserve ModelMesh

- Deploying machine learning models as micro-services
- Pre-built inference servers

# Red Hat and Open Source



# Red Hat and Open Source



# Enterprise Open Source AI/ML platform

## Upstream projects



CodeFlare

ModelMesh



Kubeflow

PyTorch



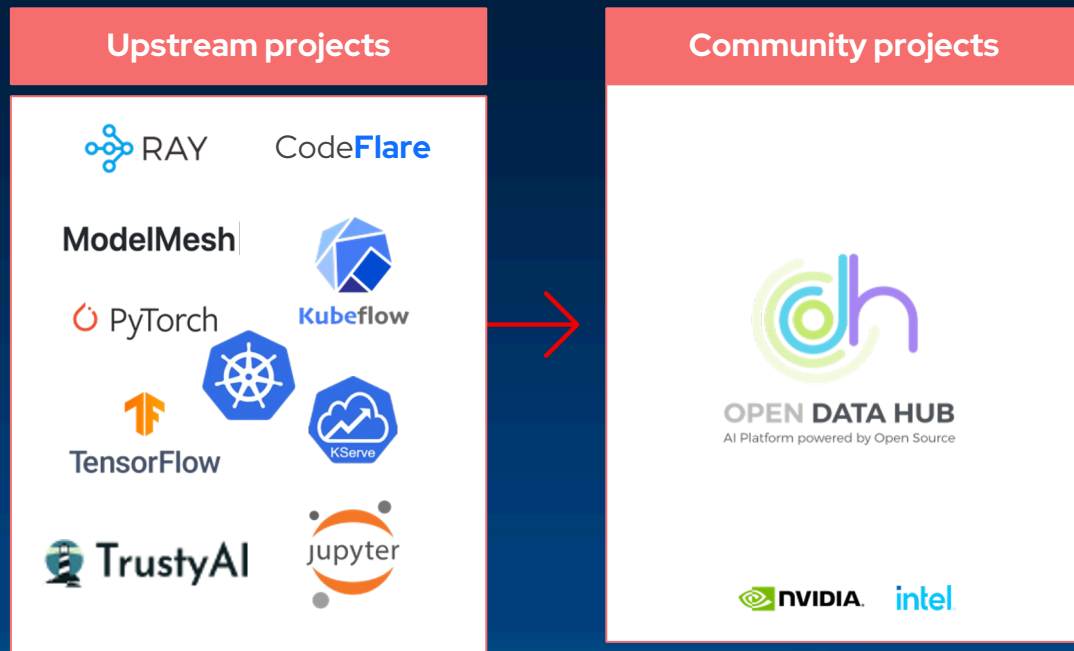
TensorFlow



TrustyAI

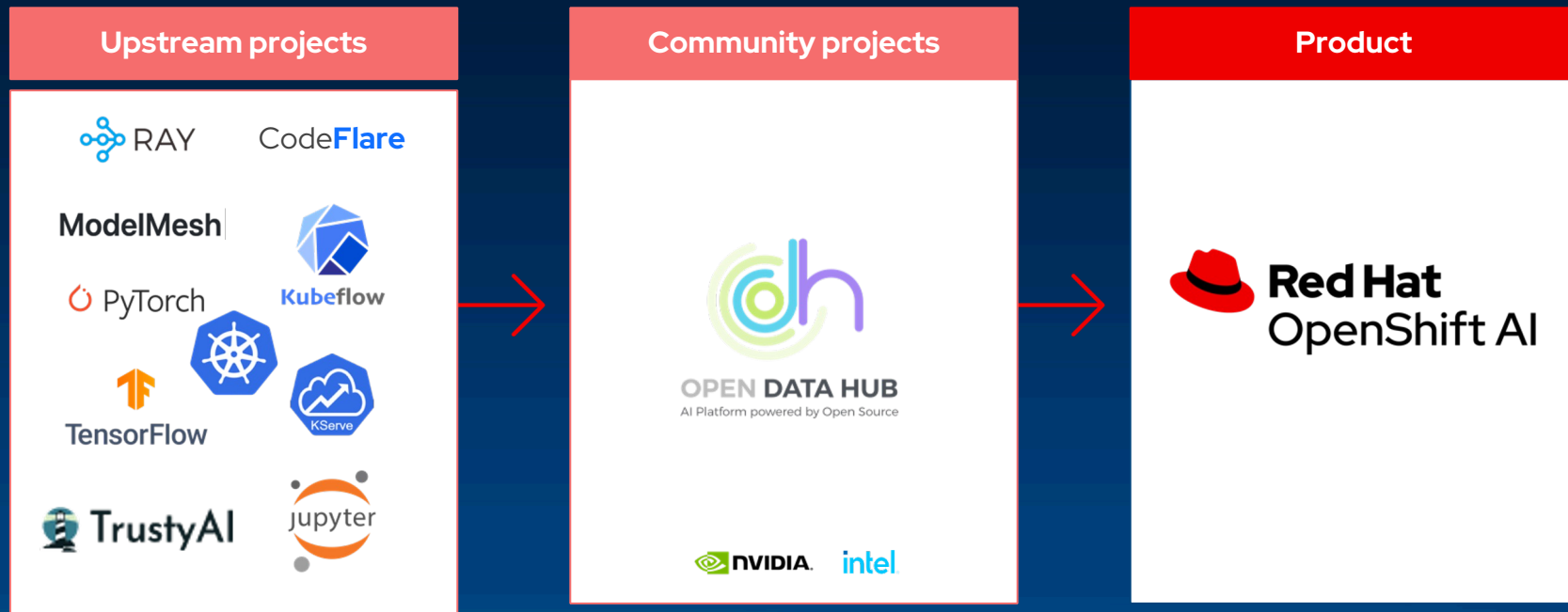
jupyter

# Enterprise Open Source AI/ML platform

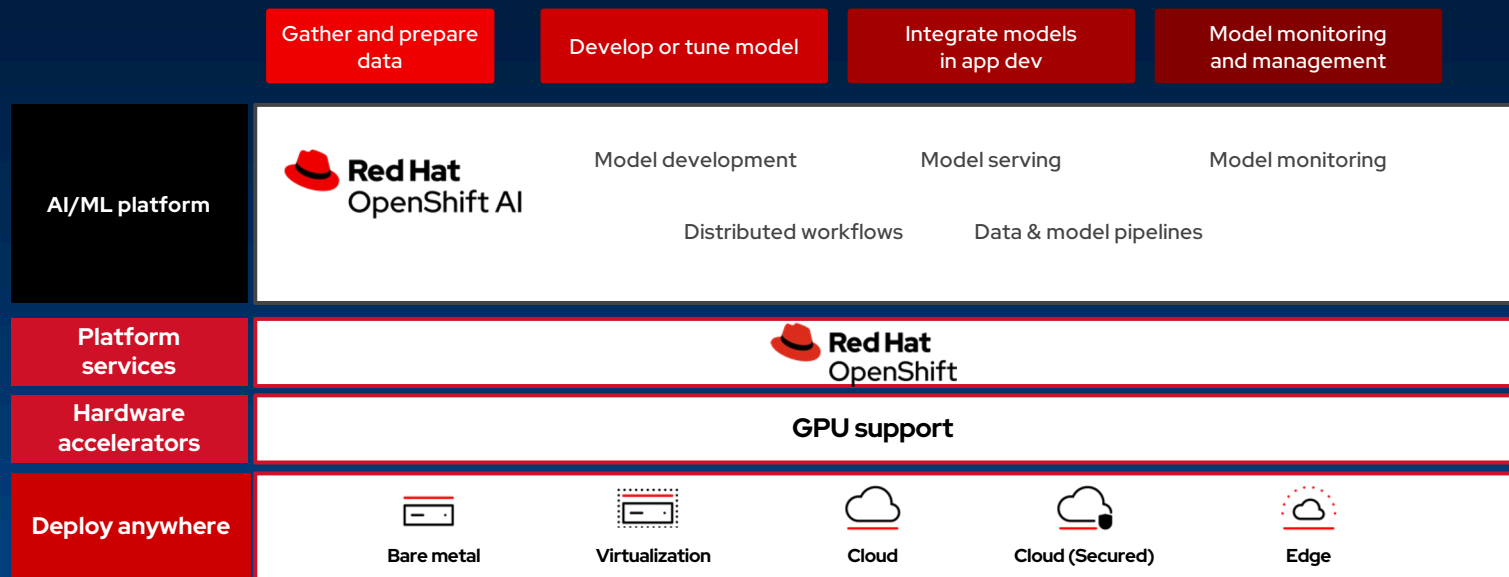




# Enterprise Open Source AI/ML platform



# Red Hat OpenShift AI





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Want to know more?  
Register for our test drive of ACP and  
Visit us at our booth

Ruud Zwakenberg - RedHat  
Thibaut Perrin - Dell Technologies

