

Simplifying AI/ML Adoption with OpenShift

9/9/20

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What we'll discuss today

“3 billion human lives ended on August 29th, 1997. The survivors of the nuclear fire called the war Judgment Day. They lived only to face a new nightmare: the war against the machines. The computer which controlled the machines, Skynet, sent two Terminators back through time. Their mission: to destroy the leader of the human resistance, John Connor. This is his story.”

--Terminator 2, Judgement Day

What we'll actually discuss today

- ▶ Levelset with the potential of AI/ML
- ▶ Review the challenges of AI/ML
- ▶ Why containers and Kubernetes for AI/ML?
- ▶ Why Red Hat?
- ▶ OpenShift and Open Data Hub
- ▶ Demo - Jupyter Notebooks and OpenDataHub on OpenShift
- ▶ Next Steps

But first....

....a few shameless plugs

A **new virtual** technical enablement series that provides the latest in the Red Hat product strategy and enablement on the newest features to our technical field associates



Red Hat • • • —

Tech Ready

— • • • October & November 2020

- Integrated into the Red Hat OPEN training system
- More communications to come...



Hear the latest from Red Hat Business Unit and Engineering leaders on our product strategies and roadmaps



Gain hands-on experience with new product features through deep dive demos and labs



Session content dropped weekly on Monday's from October 19 through November 9



SmartPage on Red Hat Partner Content Hub for more information (Coming Soon)

Red Hat Tech Ready: Partner Experience

Red Hat Tech Ready is a new virtual, global technical series that provides the latest in the Red Hat product strategy and enablement, exclusively for our Red Hat internal teams and Red Hat Partners.

What are the Goals of RHTR?

Drive more awareness of what's coming, provide the field applicable knowledge and practices, and connect it all to the Red Hat Open Hybrid Cloud Strategy

Who are the Target Attendees?

Red Hat's technical field (SA, Services, CXnO) and
Partners in a technical role

How will partners access content?

Partners will get access to the same on-demand content at the same time as Red Hatters. This content will be made available through Red Hat OPEN training system

What is Happening Each Week?

Each week focuses on a part of Red Hat's Open Hybrid Cloud Strategy. On-demand content will be launched each Monday and live experiences will be scheduled throughout the week.

Week of	Theme of the Week
Oct 19	Hybrid Cloud Infrastructure Week
Oct 26	Cloud Native Development
Nov 2	Management & Automation
Nov 9	Digital Transformation

NA Partner Tech Virtual Office Hours

For North America Red Hat Business Partners technical team members

Office Hour format: "Ask me anything/Open Mic" with remaining time to cover the Product/Technology topics

- See Office Hour schedule here -- <https://www.redhatpartnertech.com>

Virtual Partner Tech Office Hours

- *Meet with Red Hat Solution Architects & SME's to help answer your questions on Red Hat product and technology topics*
- *Dedicated weekly time slot for you to pop in, ask a question, then get back to your schedule*
- *Collaborate/Brainstorm with peers on customer questions, projects, etc.*
- *Build and formulate new relationships*

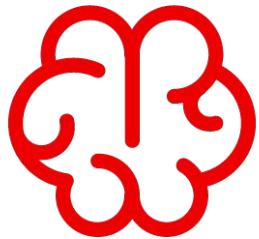
The potential of AI/ML



[Photo Source](#)

Implementing
AI/ML into
your own
business
could have
huge benefits
for you and
your
customers.

Executive summary



AI/ML benefits businesses

AI-powered intelligent software applications help achieve key business goals



But there are challenges

People, process, and technology challenges can delay deployments. This can have a negative business impact.



Red Hat

Red Hat can help

We have capabilities to help speed up AI/ML initiatives, allowing faster delivery of intelligent software applications.

The basics of AI/ML

Artificial Intelligence (AI)

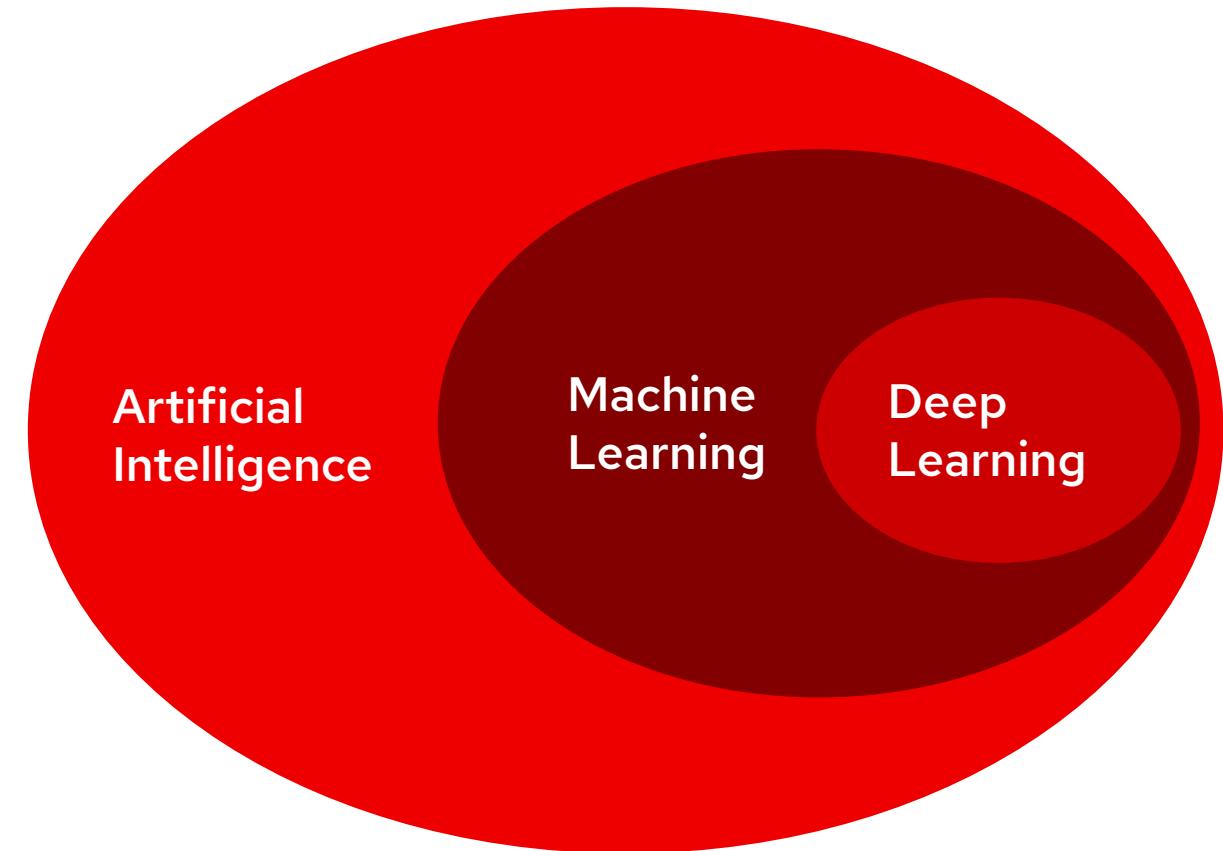
Machines imitating intelligent human behavior. The term AI is primarily used by business community.

Machine Learning (ML)

Subset of AI, gives computers the ability to learn without being explicitly programmed. The term ML is primarily used by technical community.

Deep Learning (DL)

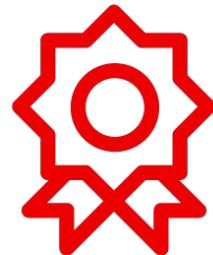
Subset of ML, uses layers to progressively extract higher level features from the raw input. Applications include computer vision, image recognition, etc.



AI/ML powered intelligent software apps can help you
achieve key business goals



Serve your
customers better



Gain a competitive
advantage



Increase your
revenue



Reduce your
costs

How businesses are using AI/ML



Healthcare

- Increased clinical efficiency
- Faster/better diagnosis
- Improved outcomes



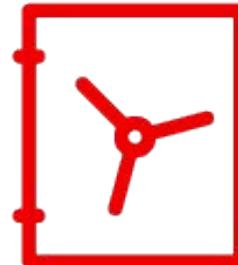
Financial services

- More personalized services
- Improved risk analysis
- Reduced fraud
- Better predictions



Telcos

- Better customer insights/experiences
- Optimized network performance
- Improved threat detection



Insurance

- Automated claims processing and handling
- Usage-based insurance services



Automotive

- Autonomous driving
- Predictive maintenance
- Improved supply chains

Enterprises are investing in platforms for AI/ML

Abundance of computing power, data, and the availability of open source
ML frameworks are helping make AI/ML real

\$13T

AI has the potential to deliver additional global economic activity of around \$13 trillion by 2030.²

48%

of enterprises indicate that their current AI infrastructure will not be able to meet future demands.¹

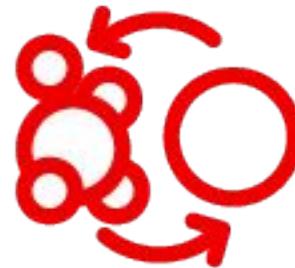
Companies say all phases of AI/ML are demanding on infrastructure



Data preparation and management

39%

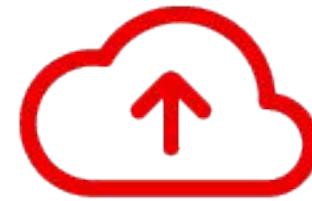
Of companies said this was the most infrastructure-intensive.



AI/ML model training

34%

Of companies said this was the most infrastructure-intensive.

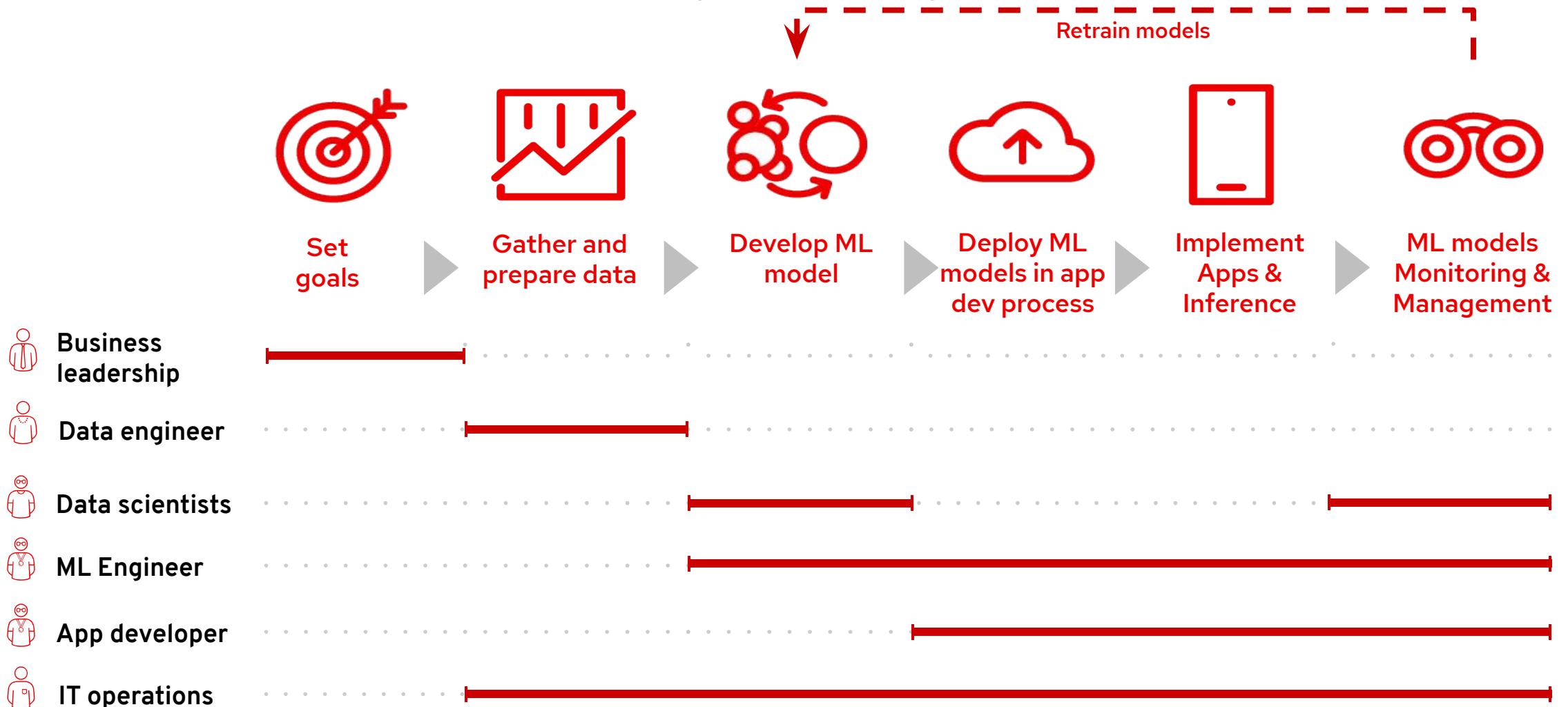


Inferencing

27%

Of companies said this was the most infrastructure-intensive.

AI/ML lifecycle and key personas



Challenges facing key personas



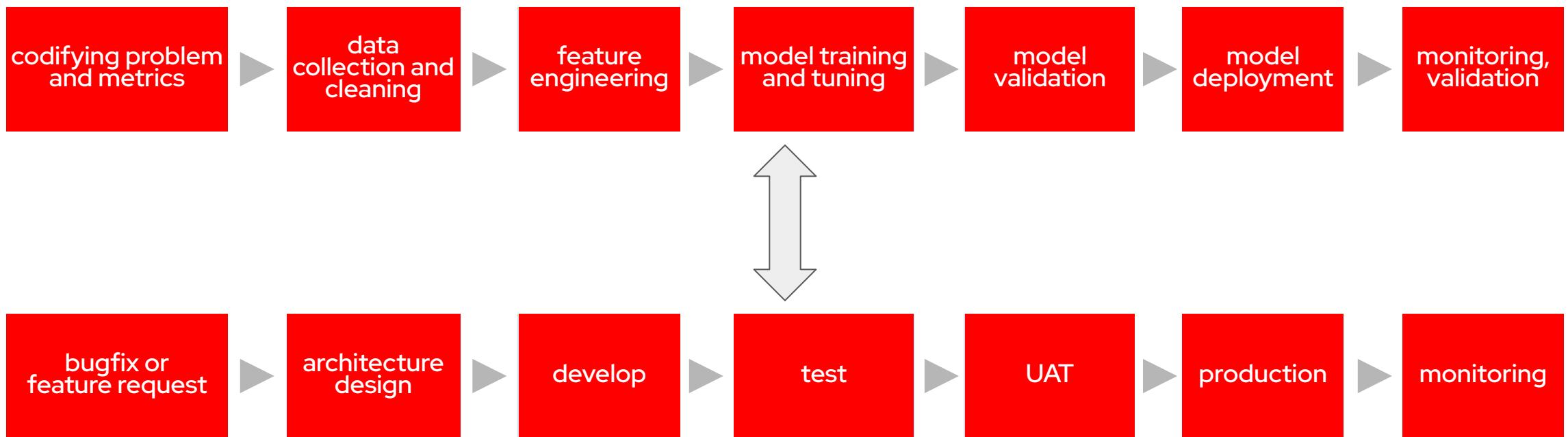
	Gather and prepare data	Develop ML model	Deploy models in app dev process	Implement apps	ML models monitoring & management
	Data acquisition	Duplication of data	Data management architecture		
	Data access/hygiene Collaborating with data engineers and devs	Selecting & deploying the right tools	Dependency on IT ops Poor performing hardware	Deployment in dev processes	Training, testing, and retraining models
		Clashes between models and app code Building APIs	Disjointed ML workflow	Deployment in dev processes	Coordinating retraining and redeployment
	Managing security and performance	Support multiple, incompatible tools	Slow & legacy IT infrastructure and outdated processes		

The ML lifecycle in technical detail

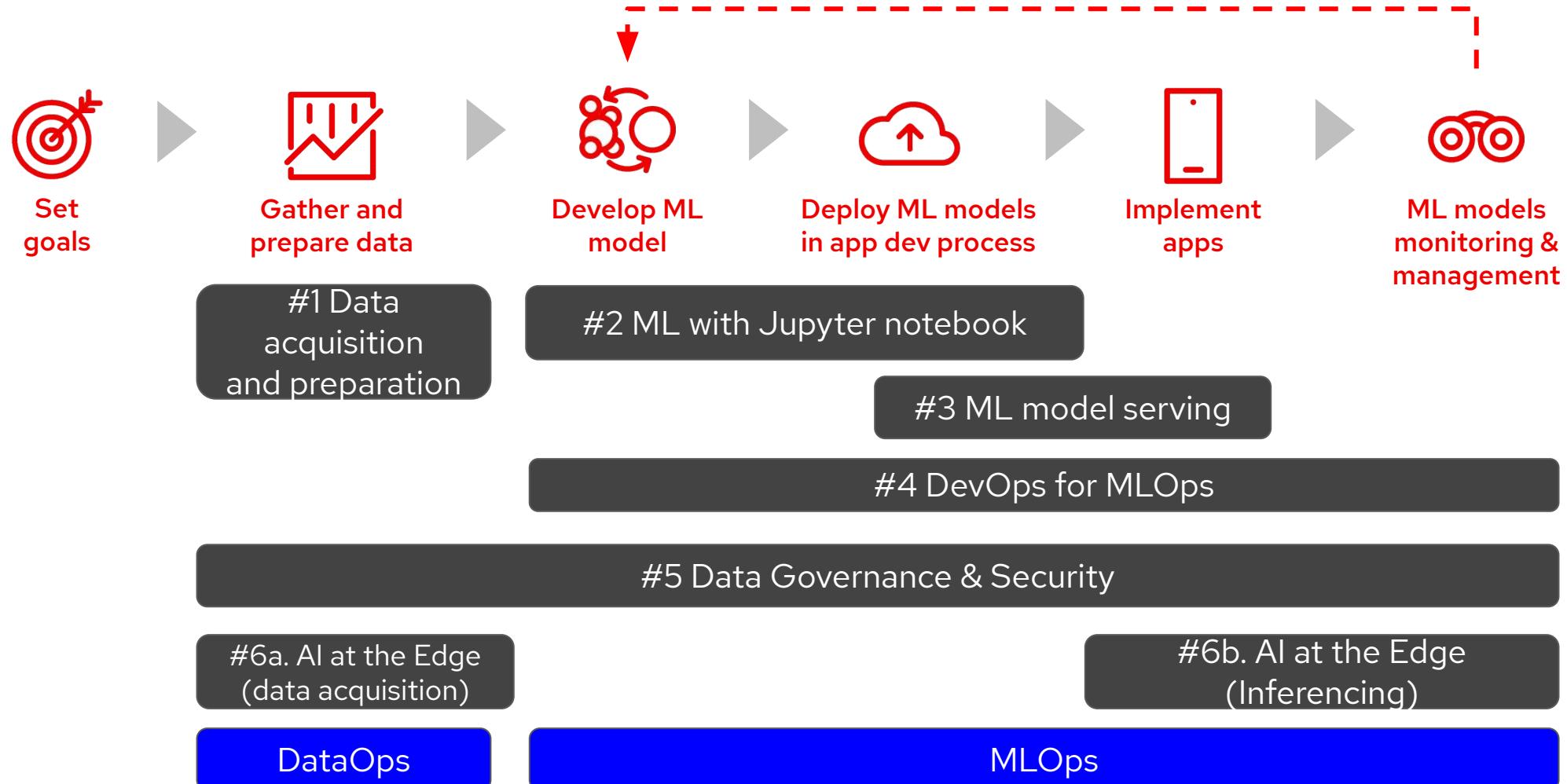


You have seen this before

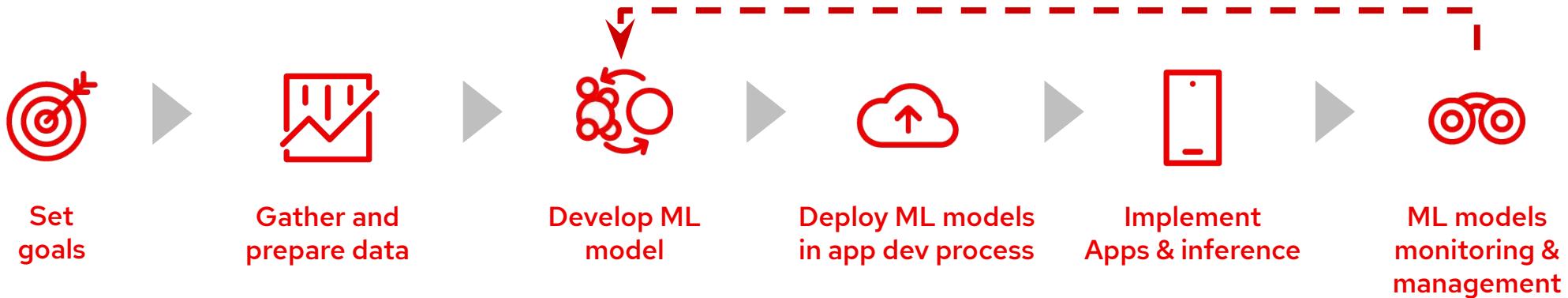
It's just software development



Technical Use Cases enabled by Red Hat portfolio



Desired Conceptual ML Architecture



ML and DevOps Tools (e.g. TensorFlow, Jupyter Notebooks, Python, Seldon, etc.)

ML data pipeline and sources (databases, data lake, etc.)

Hybrid, multi cloud platform with self service capabilities

Compute acceleration (GPU, FPGA, TPU)

Infrastructure



Physical



Virtual



Private



Public



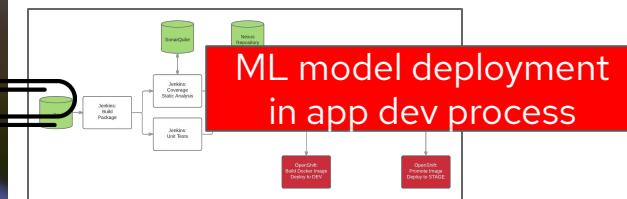
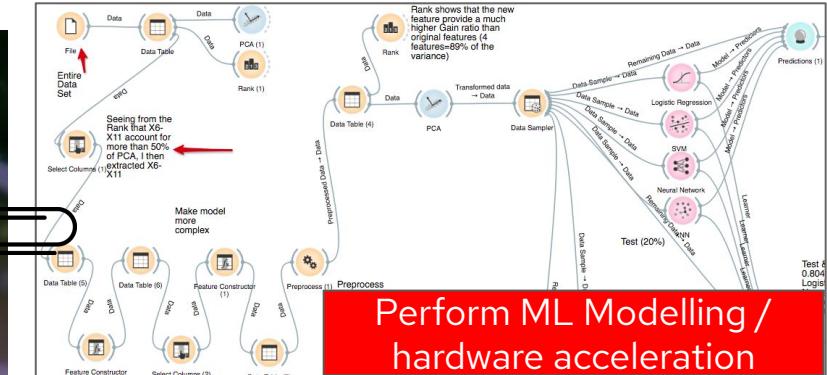
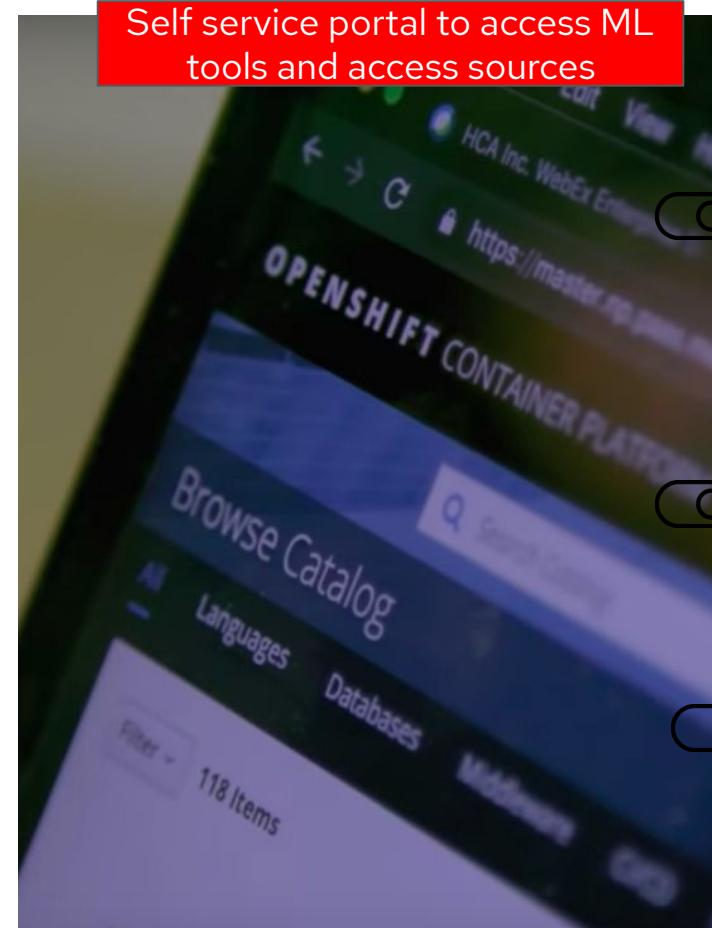
Hybrid



Edge

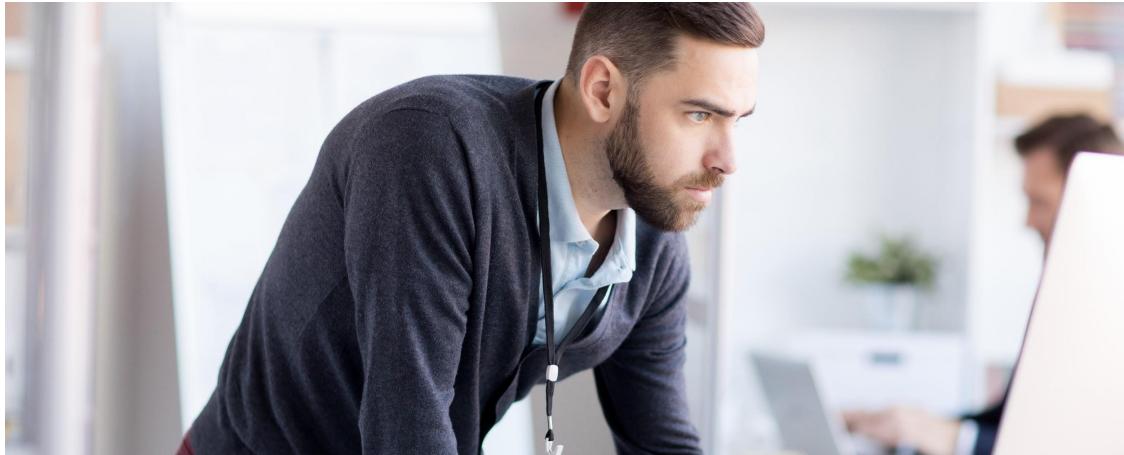
What does a Data Scientist care about?

As a Data Scientist, I want a “self-service cloud like” experience for my Machine Learning projects, where I can access a rich set of modelling tools, data, and computational resources, share and collaborate with colleagues, and deliver my work into production with speed, agility and repeatability to drive business value!



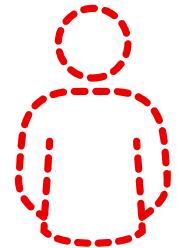
Data Scientists care less about infrastructure platform unless it integrates with their ML tooling, and provides them the agility, flexibility, portability, & scalability.

Challenges of AI/ML



Many businesses are aware of the benefits, but there are a number of challenges delaying their implementation plans.

AI/ML execution challenges



Talent shortage

Lack of key skills make it difficult to find and secure talent to maintain operations.



Readily usable data lacking

Lots of data is collected, but finding and preparing the right data is difficult.



Lack of collaboration across teams

Unable to implement quickly due to slow, manual and siloed operations.

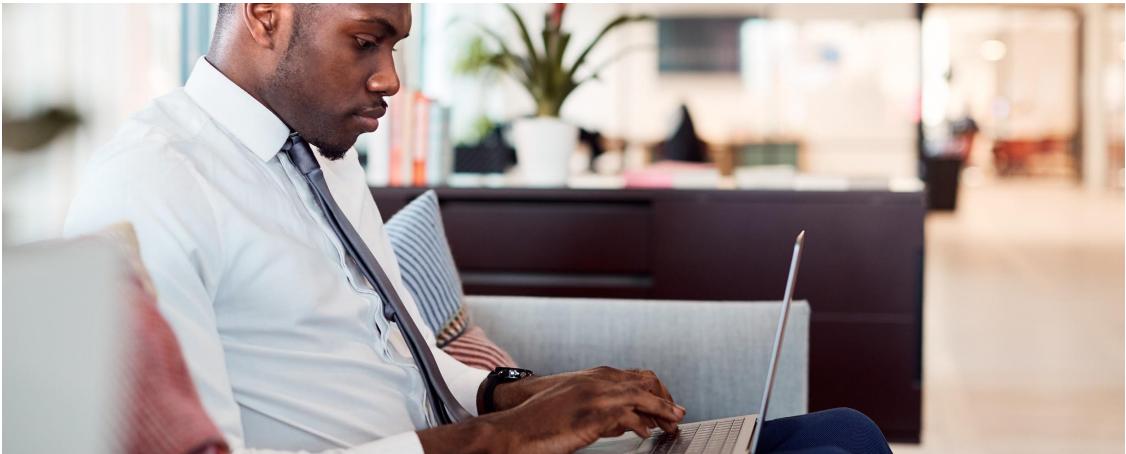


Unavailability of infrastructure & software

No rapid availability of infrastructure and software tools slows data scientists and developers

Red Hat Influence to help solve challenges

Why containers and Kubernetes for AI/ML?



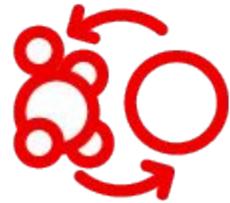
Containers and
Kubernetes help
accelerate your
AI/ML initiatives.

Why containers and Kubernetes for AI/ML?



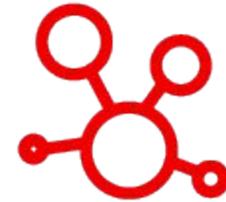
Agility

Respond quickly with automated compute resource management.



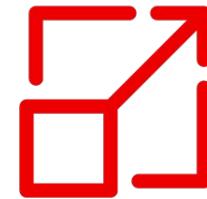
Portability

Develop and deploy ML models consistently across data center, edge, and public clouds.



Flexibility

Provision AI/ML environments as and when you need them.



Scalability

Autoscaling and high availability of the AI/ML solution stack.

Why Red Hat?



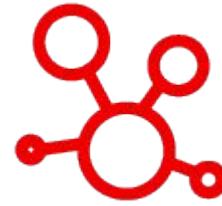
Red Hat's solution, partnerships with key AI/ML ISVs, and proven track record makes us a perfect choice as your strategic partner in this journey.

Why Red Hat for your AI/ML lifecycle



Proven track record

Expertise helping top brands operationalize containers & Kubernetes powered hybrid cloud for AI/ML.



Comprehensive portfolio

Helps complete the AI/ML architecture.



Powerful partnerships

Established strategic partnerships with key AI/ML ISVs.



Open source advocate

A leader and trusted provider in the open source space.

Red Hat OpenShift Container Platform helps accelerate AI/ML lifecycle



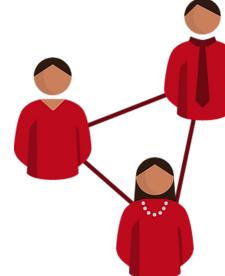
Simplicity

Simplified deployment, scaling, and management of containerized AI/ML tools



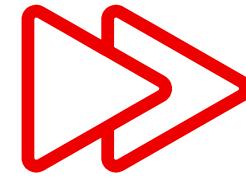
Portability

Self-manage or cloud-hosted options across data center, public cloud, and edge.



Collaboration

Extend DevOps to the entire ML lifecycle, and enable collaboration across teams.

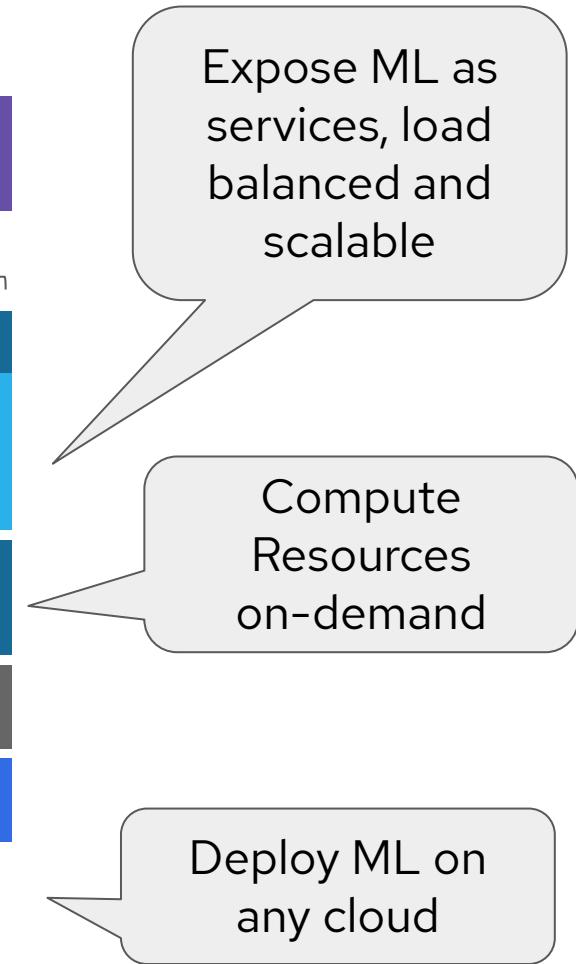
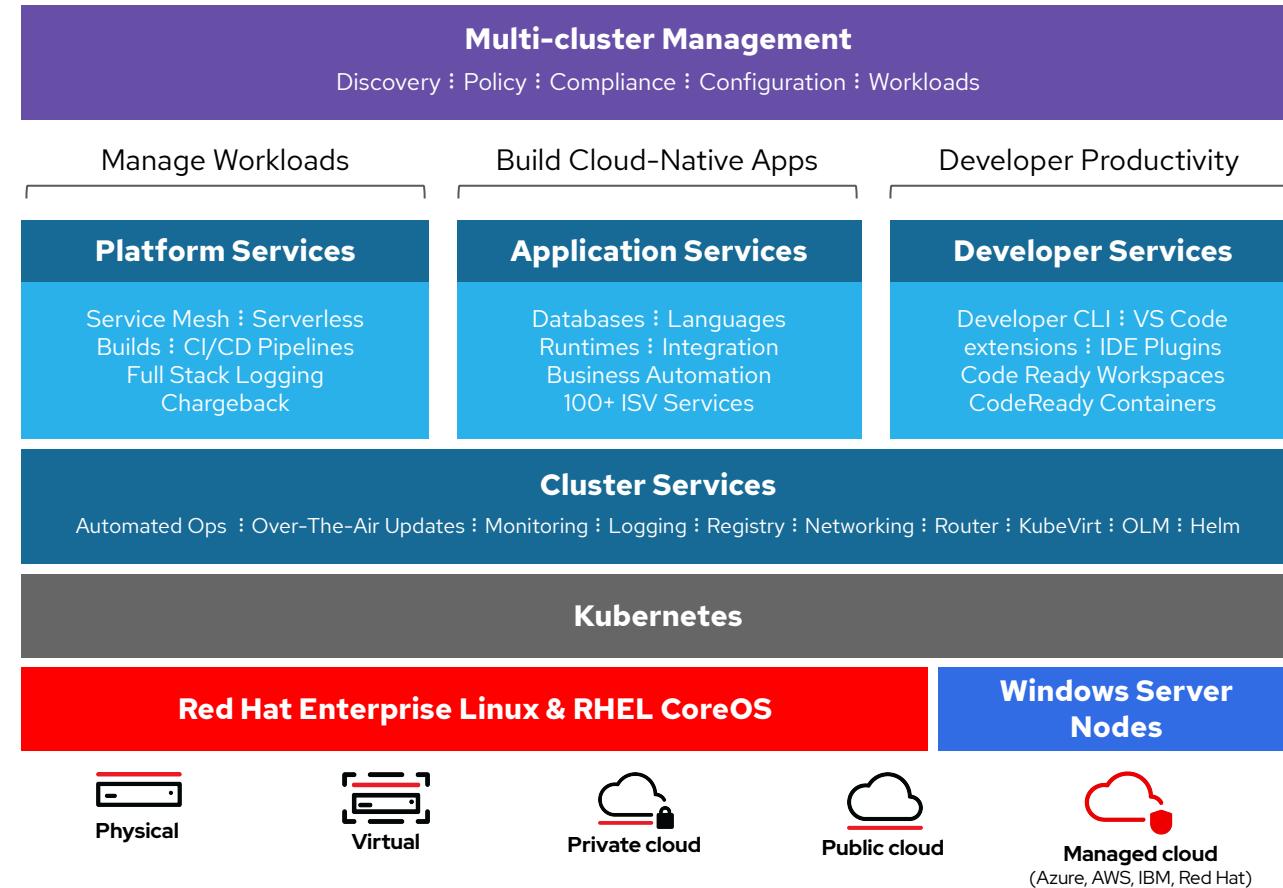
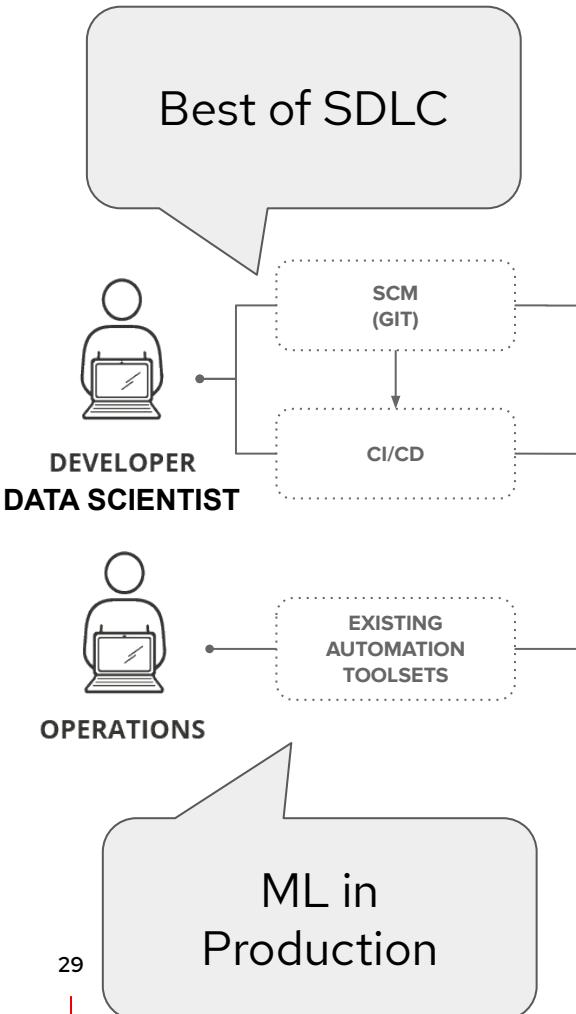


Open source innovation

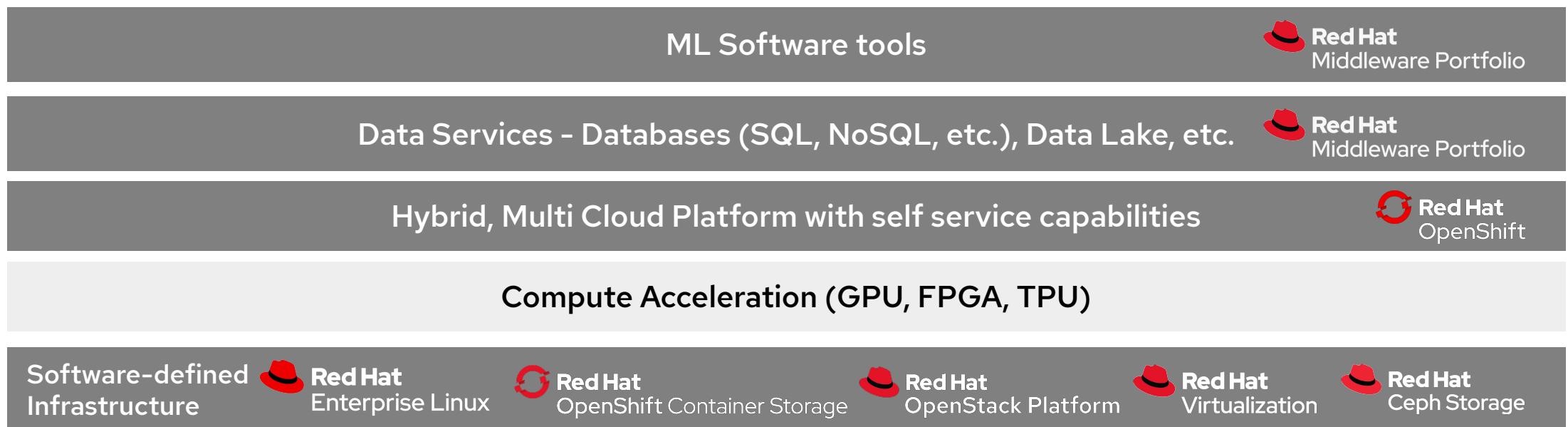
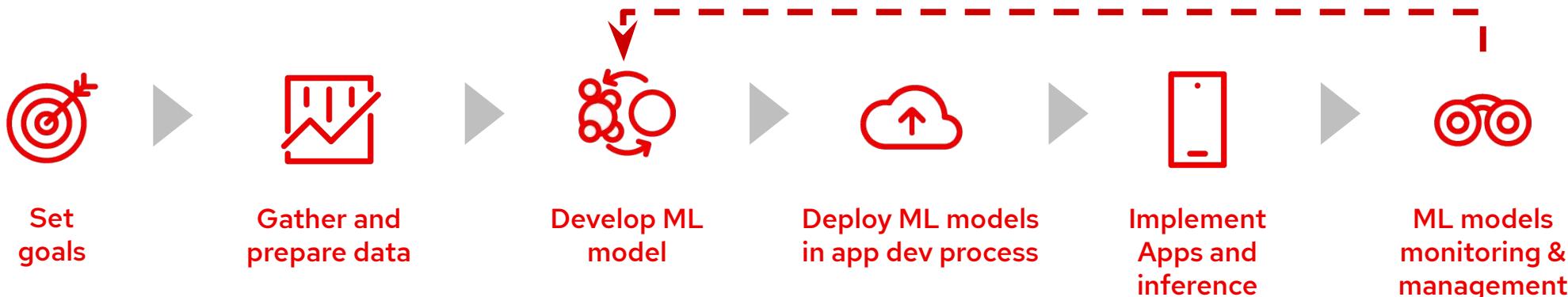
Leverage the power of the open source community.



Red Hat OpenShift Kubernetes Platform



Red Hat portfolio helps complete the ML architecture



Red Hat is a strategic partner for AI/ML solutions across industries

Healthcare and public sector



Data driven diagnosis



Data driven diagnosis

Ministry of Defence (Israel)

Jupyter notebooks as a service

Automotive



Connected Drive &
Autonomous Driving

Financial



RBC Bank

Containerized Apache
Spark

Discover Financial Services

Oil and gas



Democratize data science for oil
and gas exploration



We provide a 5-hour head start in treating sepsis. And in the hands of clinicians, 5 hours saves lives.

Dr. Edmund Jackson
VP & Chief Data
Scientist
HCA Healthcare



HCA Healthcare
Using data insights to save lives



We can localize clusters in different markets if we need to and therefore serve our customers on a worldwide scale.

Dr. Alexander Lenk
Lead Architect Connected Vehicle, Digital Backend, Big Data, Blockchain
BMW Group

BMW Connected Drive

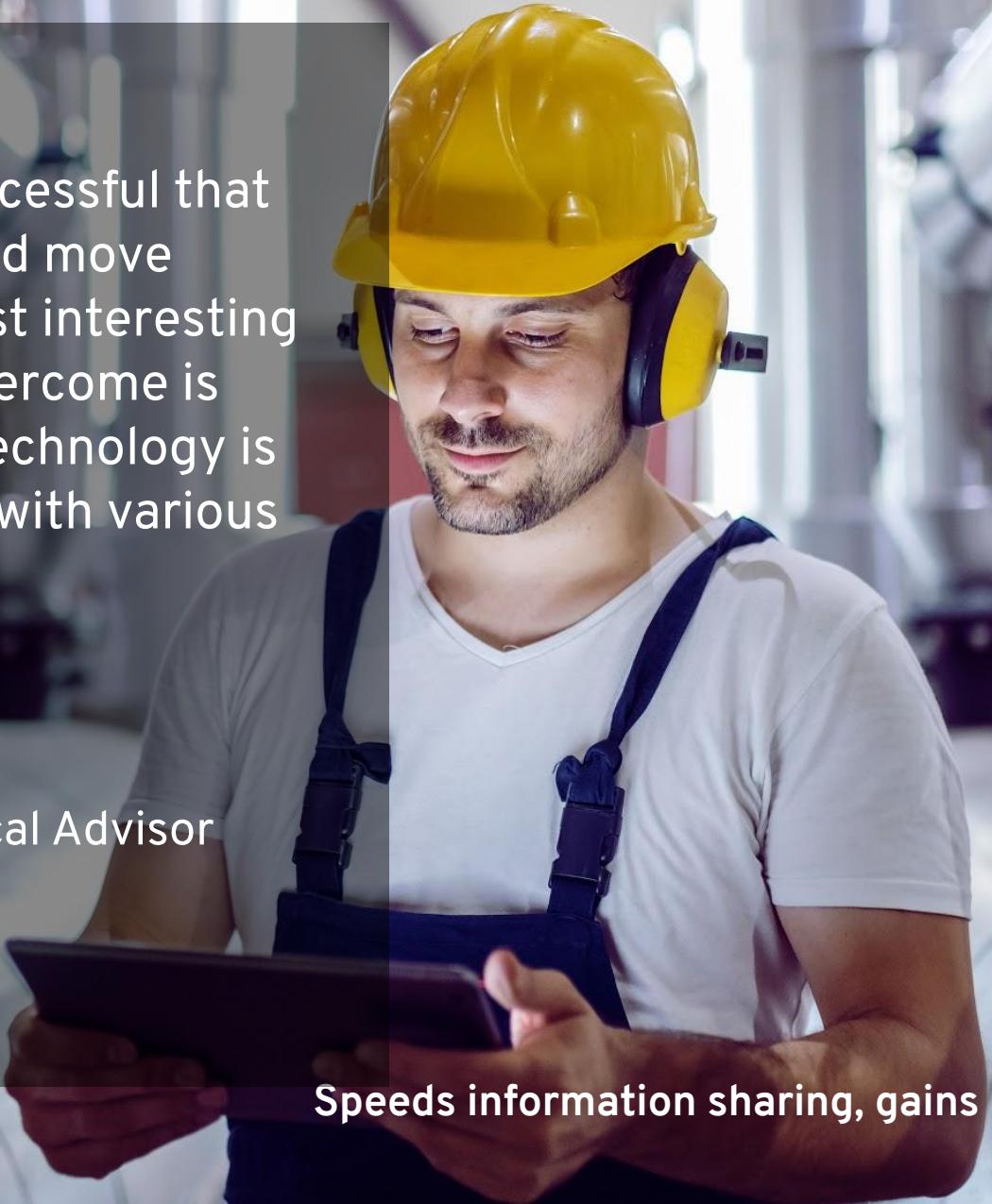




“The proof of concept was so successful that there was no question if we should move forward with the project. The most interesting challenge that we have had to overcome is convincing individuals that this technology is real and can work in conjunction with various public cloud technologies.

“

Audrey Reznik
Data Science & Optimization Technical Advisor
ExxonMobil



ExxonMobil

Speeds information sharing, gains agility and productivity

Strategic Partnerships



Red Hat has integrations and joint solutions with key AI/ML software and hardware ecosystems to ensure customer success.

Strategic partnerships within AI/ML ecosystem

AI/ML Lifecycle



Data Processing



Databases



Infrastructure Partners



Data Governance & Security



Data Analytics



AI Ops



Hardware Acceleration



What our partners say



Through our expanded collaboration, NVIDIA and Red Hat are enabling businesses and organizations worldwide to more effortlessly explore and deploy AI and analytics at scale.

Chris Lamb,
VP, Computing Software, NVIDIA
[May 9th, 2019 Press Release](#)



Combining the flexibility and scalability of SAS' No. 1 AI and advanced analytics platform with the portability of Red Hat OpenShift, the most secure implementation of Kubernetes on the market, moves digital transformation from drawing board to finishing the last mile.

Jim Goodnight,
SAS CEO
[Oct 15th, 2019 Press Release](#)



We are providing the essential tools enterprises need to make their multi-year journey to cloud on common, open standards that can reach across clouds, across applications and across vendors with Red Hat.

Arvind Krishna,
Senior Vice President, Cloud and Cognitive Software, IBM
[Aug 1st, 2019 Press Release](#)

Open source community projects in the AI/ML space



NVIDIA NGC
GPU optimized
and curated



Kubeflow
ML toolkit for
Kubernetes



Tensorflow



P Y TORC H
Others

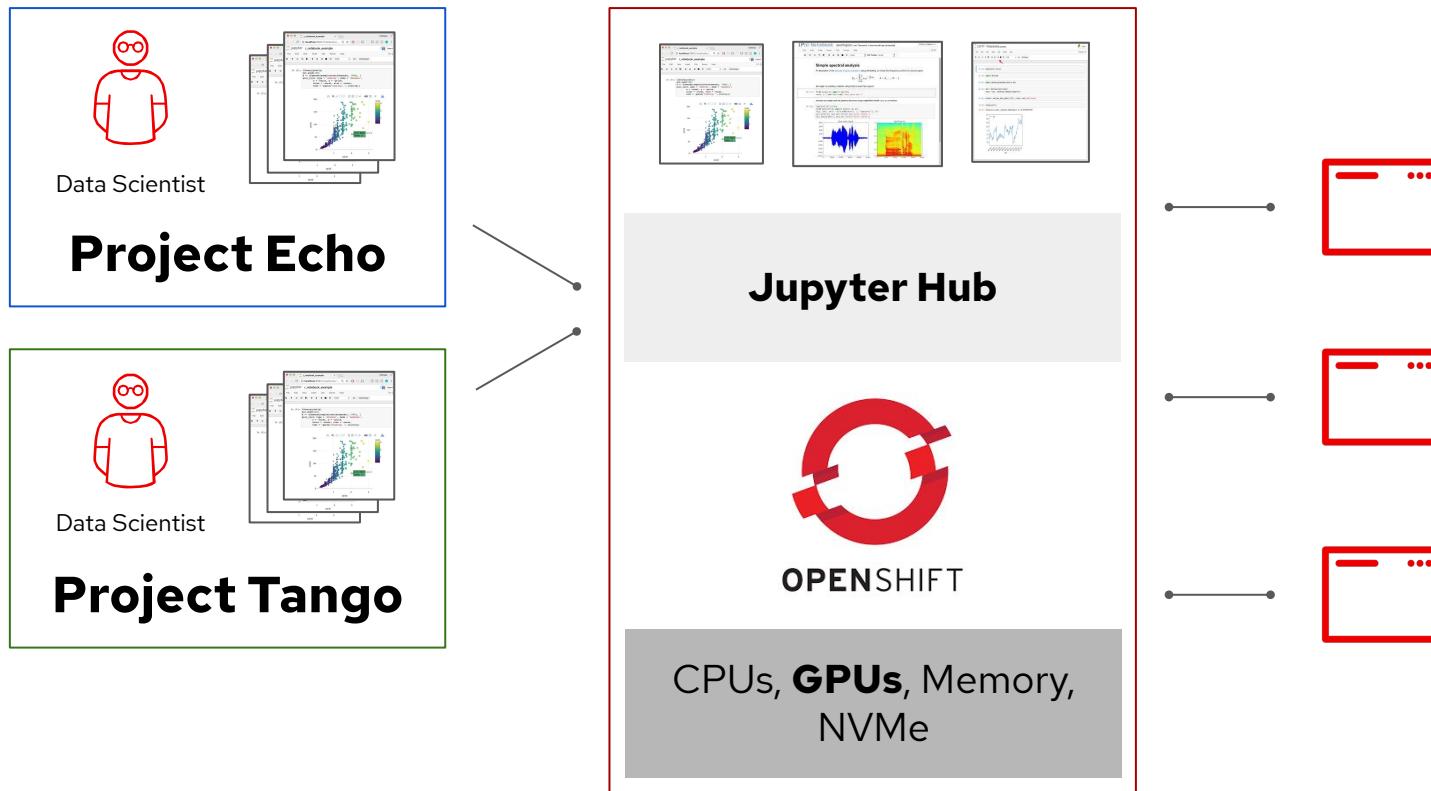


ML-as-a-service platform based on OpenShift,
Ceph storage, Kafka, JupyterHub and Spark



Home for k8s community to share
operators for various apps/tools

ML with Jupyter notebook

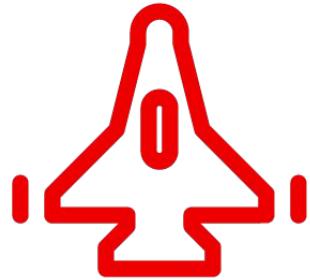


- Identity and RBAC
- Project isolation (data, networks)
- Sharing of resources with protection
- Resource isolation
- Resource quotas
- Priority and pre-emption

All this is possible with OpenShift, and deployable with Open Data Hub Operator

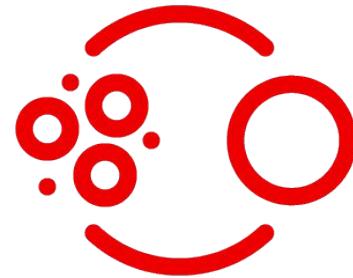
Demo Time!

Deliver intelligent apps faster with Accelerated AI Platform



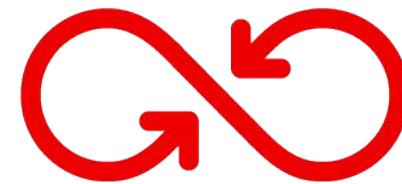
Get faster procurement, deployment, and scaling of trusted, pre-engineered AI infrastructure.

Happy IT operations staff



Accelerate ML modeling with a multi-tenant, self-service cloud for data scientists.

Happy data scientists

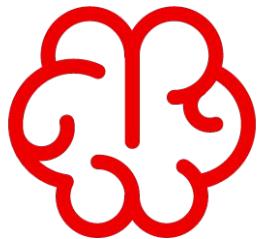


Reduce development time for AI-powered intelligent applications with integrated DevOps capabilities.

Happy developers

Download Reference Architecture [here](#)

Summary



AI/ML benefits businesses

AI-powered intelligent software applications help achieve key business goals



But there are challenges

People, process, and technology challenges can delay deployments. This can have a negative business impact.



Red Hat

Red Hat can help

We have capabilities to help speed up AI/ML initiatives, allowing faster delivery of intelligent software applications.



NEXT STEPS

Technical overview session

Lets meet you data scientists, along with software developers, and IT operations to discuss how Red Hat can accelerate AI/ML workflows & delivery of intelligent apps.

Visit our websites

Learn more about our AI/ML capabilities, and see success stories from existing customers.

openshift.com/ai-ml, opendatahub.io

Watch our videos

Visit our [YouTube channel](#) to discover a wide range of videos answering all your AI/ML questions.

Thank you

Red Hat is the world's leading provider of enterprise open source software solutions. Award-winning support, training, and consulting services make Red Hat a trusted adviser to the Fortune 500.

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twitter.com/RedHat

