Red Hat
OpenShift AI

Realizing value from AI/ML

Increasing velocity and consistency through MLOps

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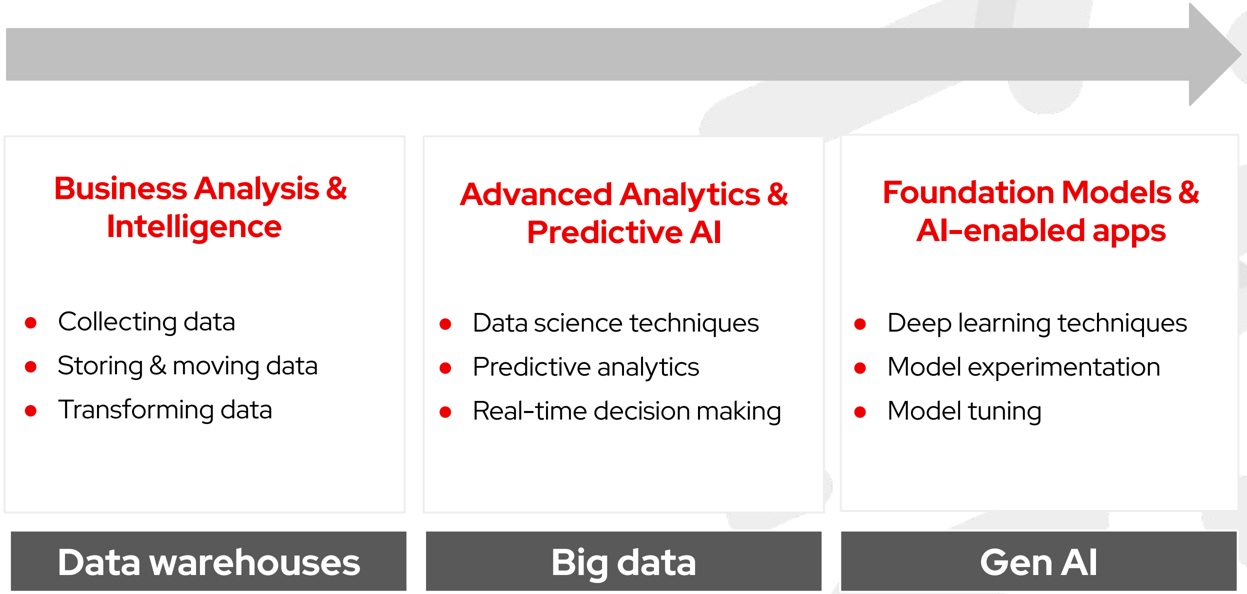
AI has undergone significant evolution

The evolution of AI: from Business Intelligence to Generative AI

- Predictive AI runs businesses today
- Foundation models provide a shortcut for realizing the value of AI



Business Analysis & Intelligence

- Collecting data
- Storing & moving data
- Transforming data

Data warehouses

Advanced Analytics & Predictive AI

- Data science techniques
- Predictive analytics
- Real-time decision making

Big data

Foundation Models & AI-enabled apps

- Deep learning techniques
- Model experimentation
- Model tuning

Gen AI

Every business has a use for 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 & operations
- Improved threat detection

Insurance

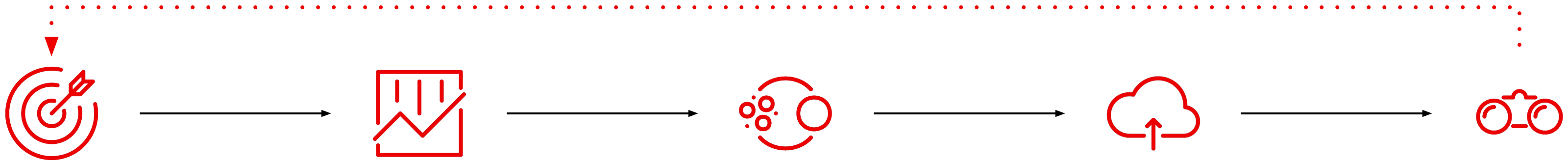
- Automated claims processing and handling
- Usage-based insurance services

Automotive

- Autonomous driving
- Predictive maintenance
- Improved supply chains

Operationalizing AI/ML requires collaboration

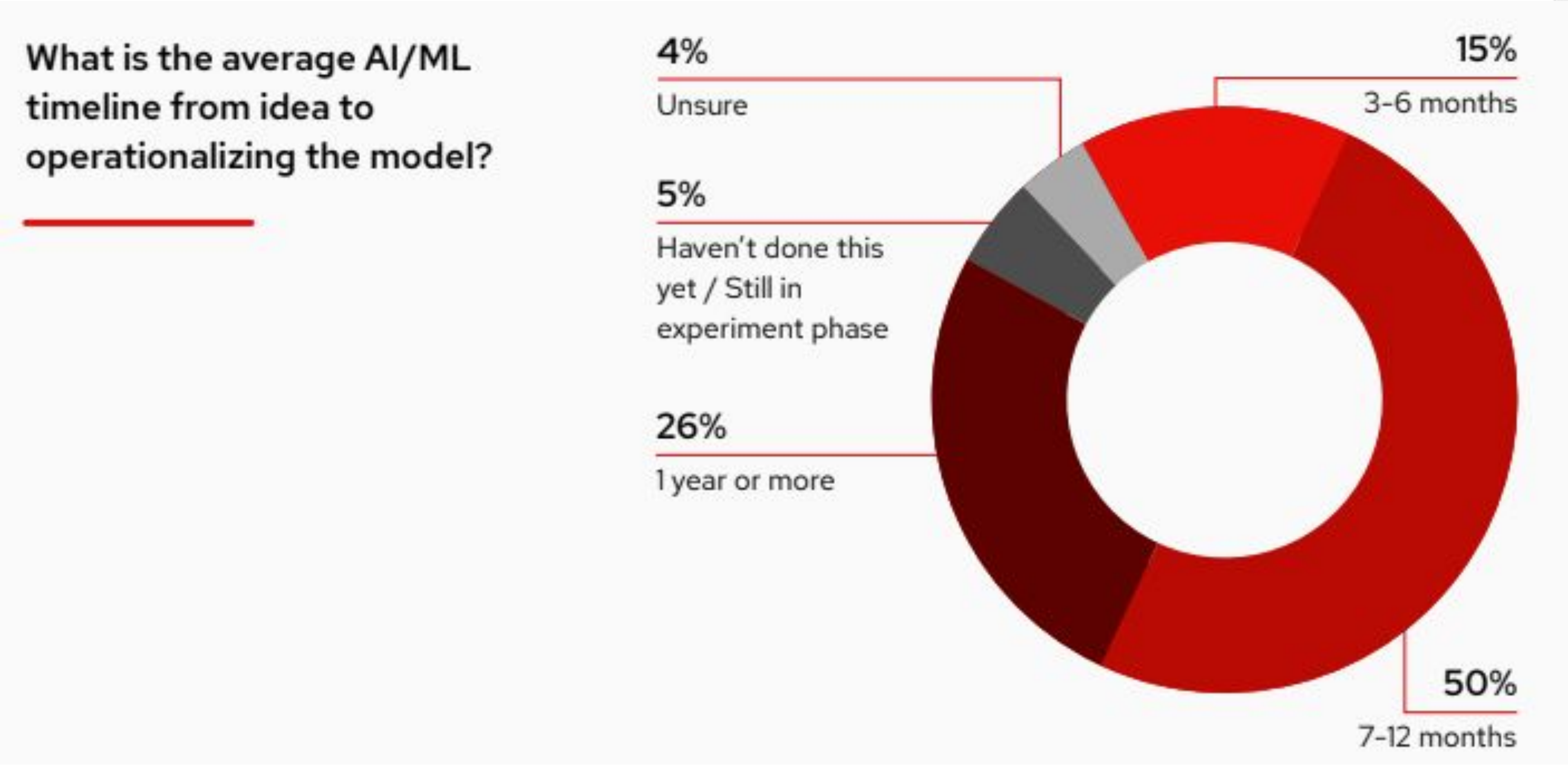
Every member of your team plays a critical role in a complex process



	Set goals	Gather and prepare data	Develop or tune model	Integrate models in app dev	Model monitoring and management
Business leadership	━				
Data engineer		━			
Data scientist			━		━
ML engineer			━	━	━
App developer				━	━
IT operations		━	━	━	━

Operationalizing AI is still a challenging process

Half of respondents (50%) say their average AI/ML timeline from idea to operationalizing the model is 7-12 months.



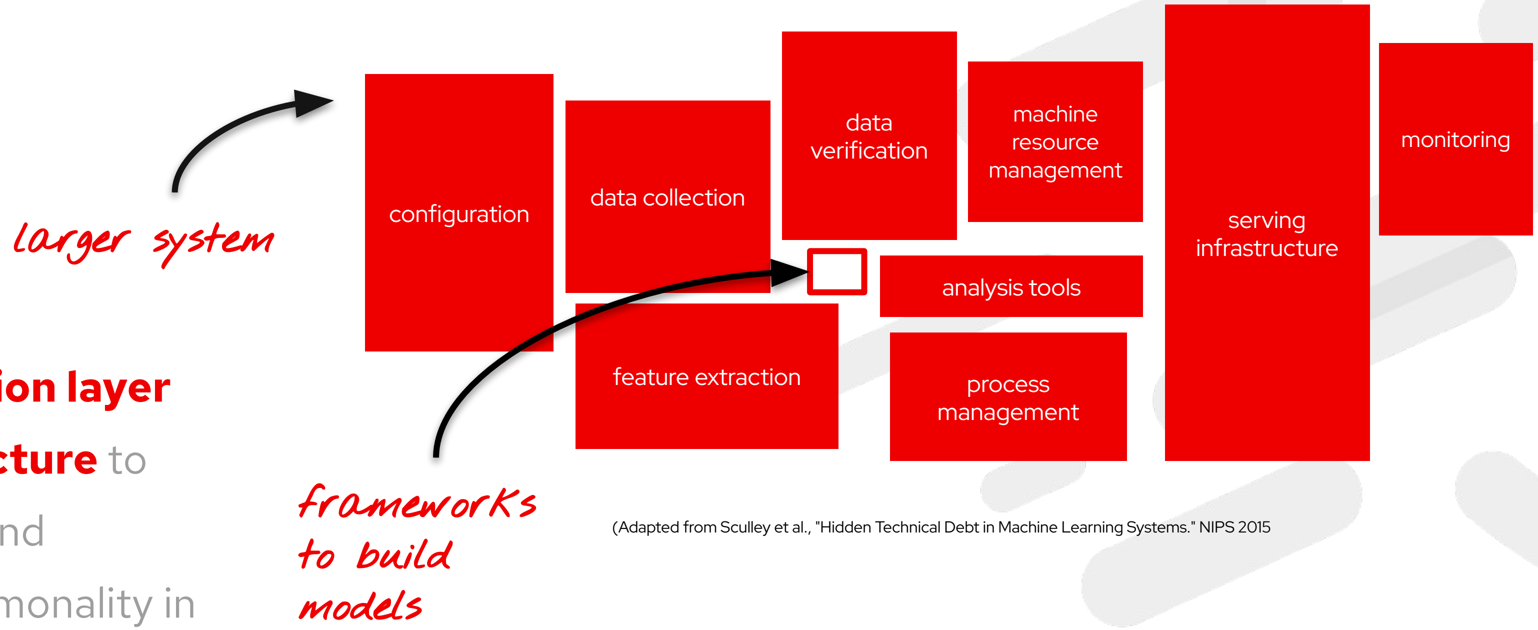
What is the average AI/ML timeline from idea to operationalizing the model?

Source: Gartner Peer Insights, Open Source AI for Enterprise survey, 2023

Complexities of operationalizing models

"a consistent application platform for the management of existing, modernized, and cloud-native applications that runs on any cloud."

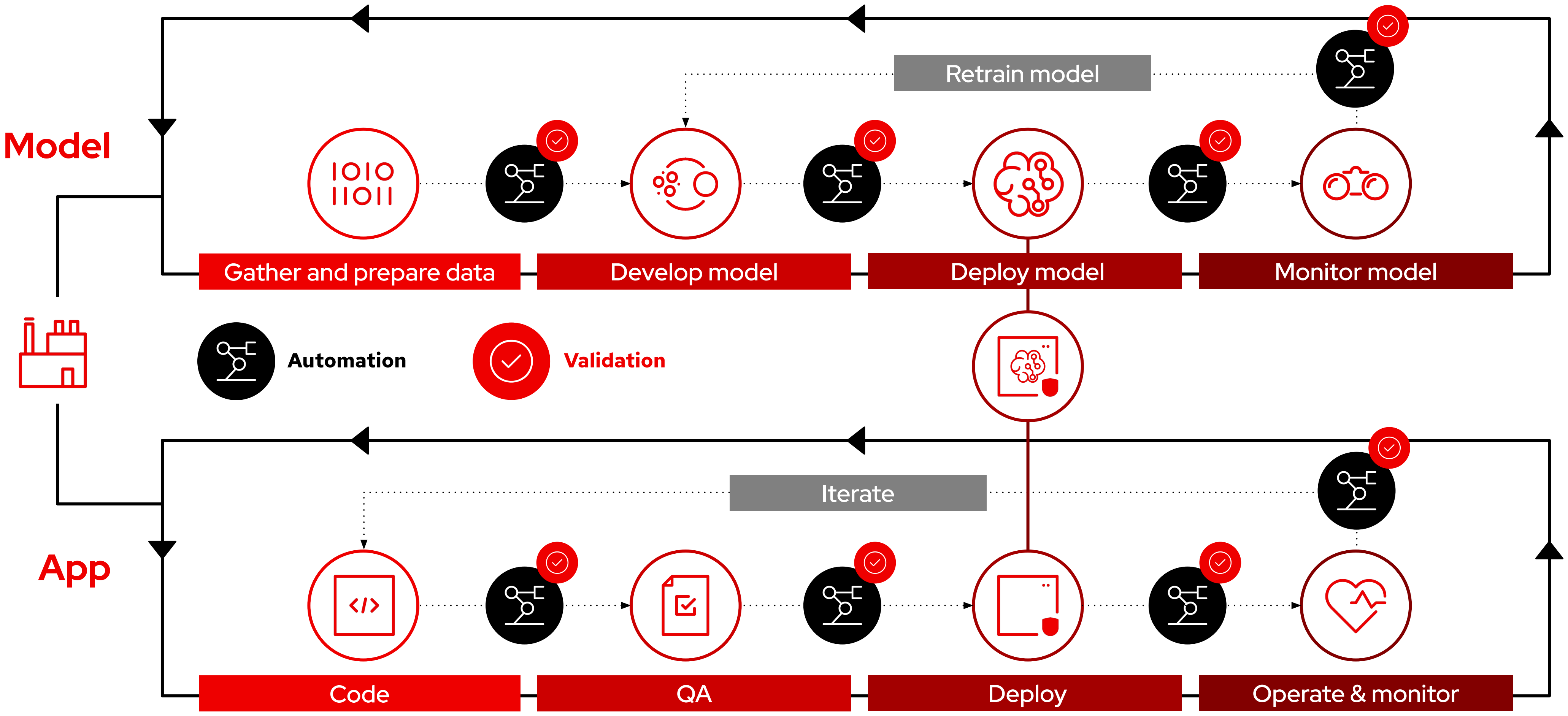
"a common abstraction layer across any infrastructure to give both developers and operations teams commonality in how applications are packaged, deployed, and managed."



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

Source: https://www.redhat.com/en/technologies/cloud-computing/openshift

Lifecycle for operationalizing models



Challenges

Training, Serving & Monitoring

Workload management

Training jobs require variable compute resource requirements with access to accelerators. Serving requires the ability to scale on demand based on inference requests

Orchestration

Consistency in repeatable and secure pipelines for data ingestion and processing through to model build and staging. Deployment across multiple platforms often leads to varying methodologies.

Platform and vendor complexity

Machine learning models typically optimized for specific hardware platforms which vary based on each model and use case. Adopting emerging technologies introduces risk.

Fleet management

Insights into model performance and quality are inconsistent and varied across the enterprise. Lack of model transparency increases risk within deployments.

Challenges

Model Lifecycle

Rollout coordination

Friction in handoffs between data science, application developer, and devops teams leads to high quality experiments never making it into production.

Software supply chain

Multiple orchestration platforms and bespoke build processes introduce risk into the software supply chain through lack of auditability, traceability, and transparency.

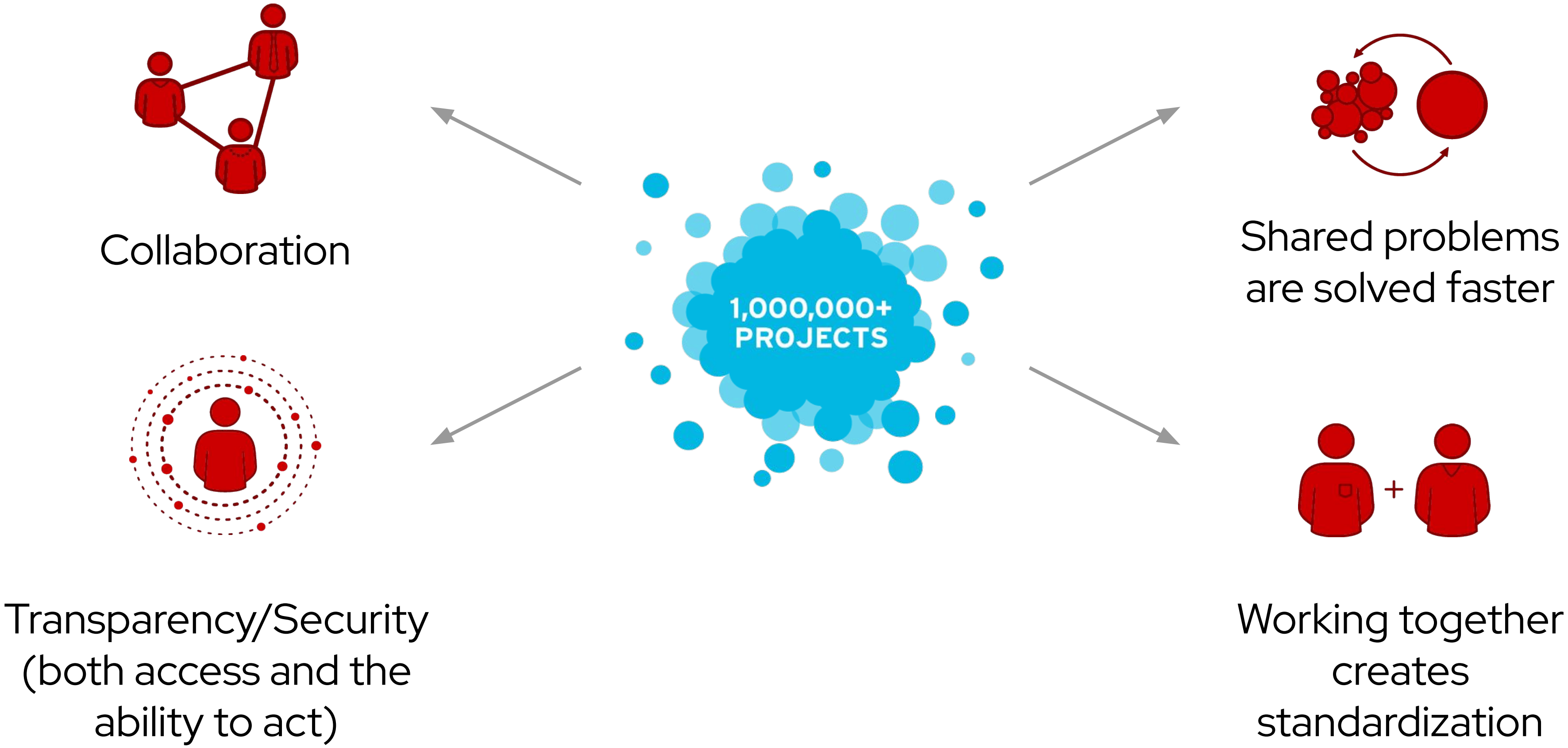
Agility

The ability to maximize value out of AI/ML is driven by more and more experiment iterations. Manual process and interventions reduce overall volume of runs.

Loss of confidence

Repeated failures in model rollout leads to lack of confidence in AI/ML which limits the overall potential of the business.

AI/ML innovation driven by open source



1,000,000+ PROJECTS

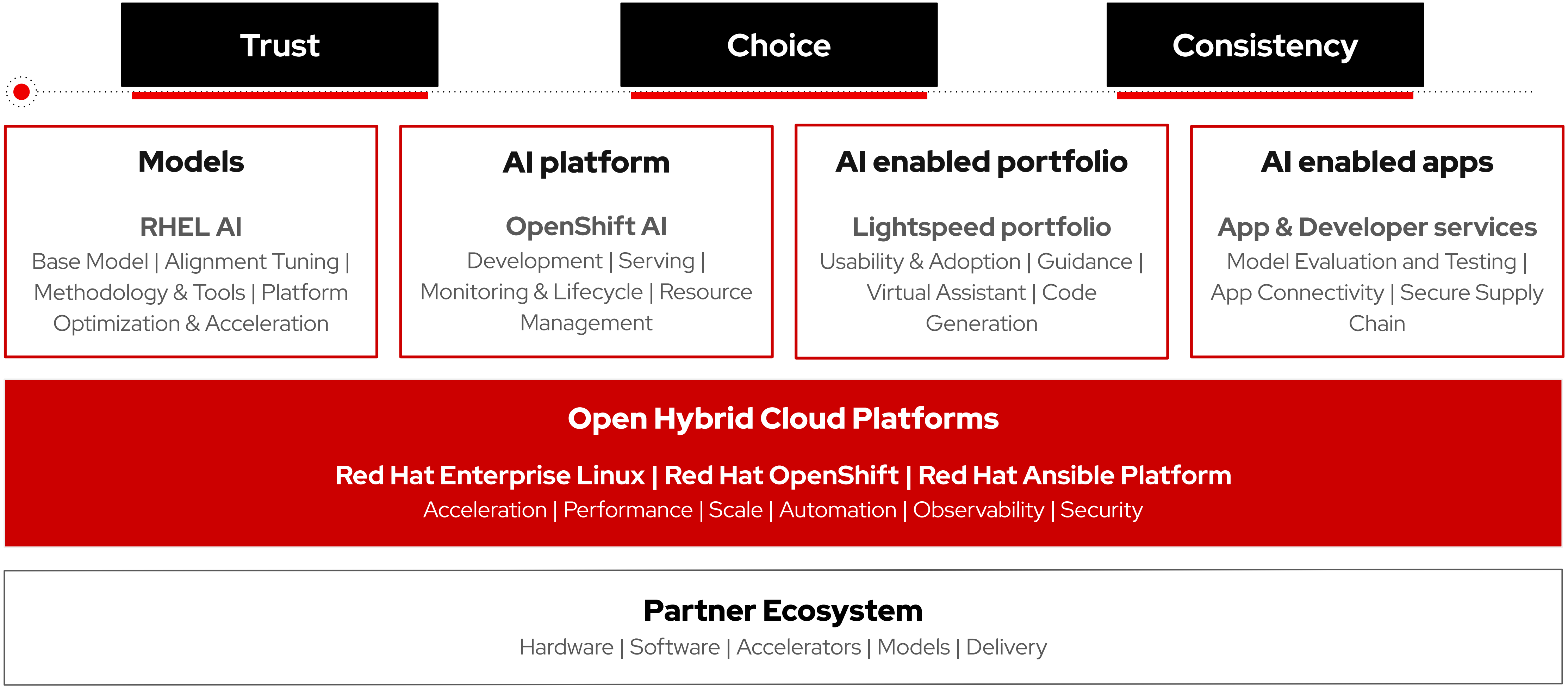
Collaboration

Shared problems are solved faster

Transparency/Security (both access and the ability to act)

Working together creates standardization

Red Hat’s AI portfolio



Trust | **Choice** | **Consistency**

Models

RHEL AI

Base Model | Alignment Tuning | Methodology & Tools | Platform Optimization & Acceleration

AI platform

OpenShift AI

Development | Serving | Monitoring & Lifecycle | Resource Management

AI enabled portfolio

Lightspeed portfolio

Usability & Adoption | Guidance | Virtual Assistant | Code Generation

AI enabled apps

App & Developer services

Model Evaluation and Testing | App Connectivity | Secure Supply Chain

Open Hybrid Cloud Platforms

Red Hat Enterprise Linux | Red Hat OpenShift | Red Hat Ansible Platform

Acceleration | Performance | Scale | Automation | Observability | Security

Partner Ecosystem

Hardware | Software | Accelerators | Models | Delivery

Red Hat Enterprise Linux AI

Foundation Model Platform

Seamlessly develop, test and run best of breed, open source Granite generative AI models to power your enterprise applications.

The model is the new platform.

Open Granite models

Highly performant, fully open source, collaboratively developed Granite language and code models from the community, fully supported & indemnified by Red Hat and IBM.

InstructLab model alignment

Scalable, cost-effective solution for enhancing LLM capabilities efficiently for a wide range of applications, making knowledge & skills contributions accessible to a wide range of users

Optimized bootable model runtime instances

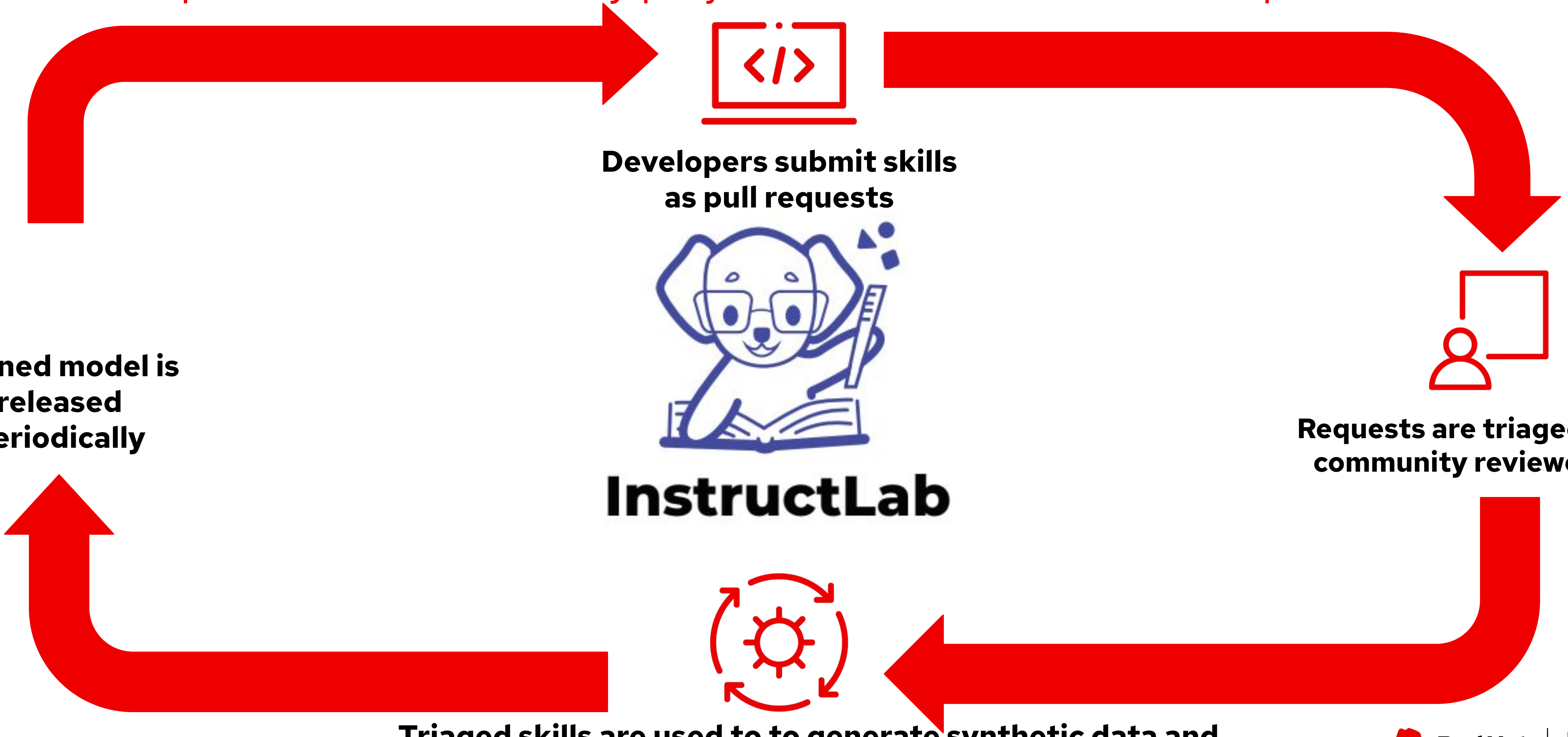
Granite models & InstructLab tooling packaged as a bootable RHEL image, including Pytorch/runtime libraries, hardware optimized inference for Nvidia, Intel and AMD that can run anywhere and provides onramp to OpenShift AI for scale and lifecycle & watsonx for agent integration and governance.

Enterprise support, lifecycle & indemnification

Trusted enterprise platform, 24x7 production support, extended model lifecycle and model IP indemnification

Introducing: **InstructLab**

Open source community project for GenAI model development



Developers submit skills as pull requests

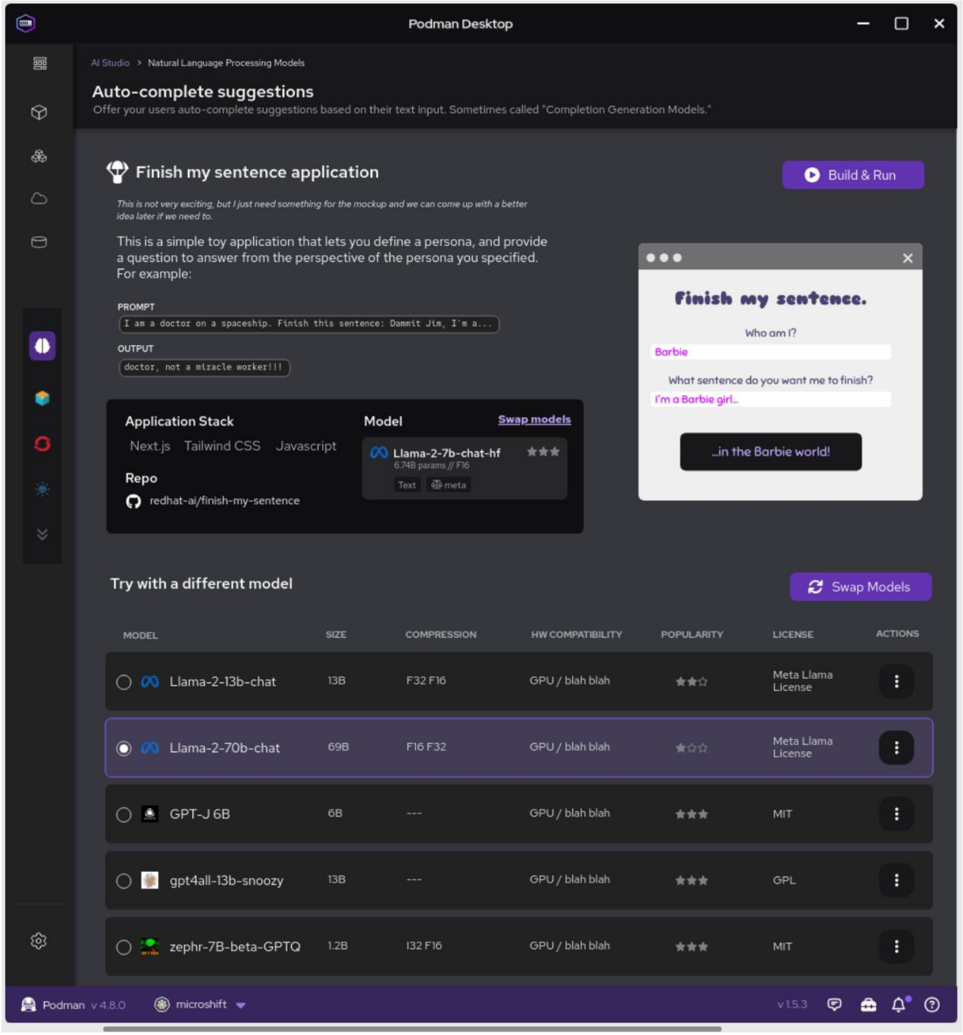
Requests are triaged by community reviewers

Triaged skills are used to to generate synthetic data and train the community model

Trained model is released periodically

Introducing: **Podman AI Lab**

Simple developer access to local containers and AI



Auto-complete suggestions

Offer your users auto-complete suggestions based on their text input. Sometimes called "Completion Generation Models."

Finish my sentence application

This is not very exciting, but I just need something for the mockup and we can come up with a better idea later if we need to.

This is a simple toy application that lets you define a persona, and provide a question to answer from the perspective of the persona you specified. For example:

PROMPT

```
I am a doctor on a spaceship. Finish this sentence: Dammit Jim, I'm a...
```

OUTPUT

```
doctor, not a miracle worker!!!
```

Application Stack: Next.js Tailwind CSS Javascript

Repo: redhat-ai/finish-my-sentence

Model: Llama-2-7b-chat-hf ★★★
6.74B params // F16
Text · meta

Finish my sentence.

Who am I?
Barbie

What sentence do you want me to finish?
I'm a Barbie girl...

Try with a different model

	MODEL	SIZE	COMPRESSION	HW COMPATIBILITY	POPULARITY	LICENSE	ACTIONS
○	Llama-2-13b-chat	13B	F32 F16	GPU / blah blah	★★☆	Meta Llama License	⋮
●	Llama-2-70b-chat	69B	F16 F32	GPU / blah blah	★☆☆	Meta Llama License	⋮
○	GPT-J 6B	6B	---	GPU / blah blah	★★★	MIT	⋮
○	gpt4all-13b-snoozy	13B	---	GPU / blah blah	★★★	GPL	⋮
○	zephr-7B-beta-GPTQ	1.2B	I32 F16	GPU / blah blah	★★★	MIT	⋮

- Run and code against local models quickly on your laptop (Mac, Windows, & Linux)
- Accelerate AI adoption, by easing concerns around data access, data privacy, & security
- Local developer workflow for model fine-tuning
- Path to production - Easy to package and deploy apps and models direct to OpenShift AI all they way down to bare metal
- Simple access to Red Hat developer subscriptions

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OpenShift AI

Model development

Interactive, collaborative UI for exploratory data science, and model training, tuning and serving

Model serving

Model serving routing for deploying models to production environments

Model monitoring

Centralized monitoring for tracking models performance and accuracy

Data & model pipelines

Visual editor for creating and automating data science pipelines

Distributed workloads

Seamless experience for efficient data processing, model training, tuning and serving

Announcing: **Red Hat Lightspeed across Red Hat platforms**

Intelligent, natural language GenAI processing capabilities designed to extend existing IT skills

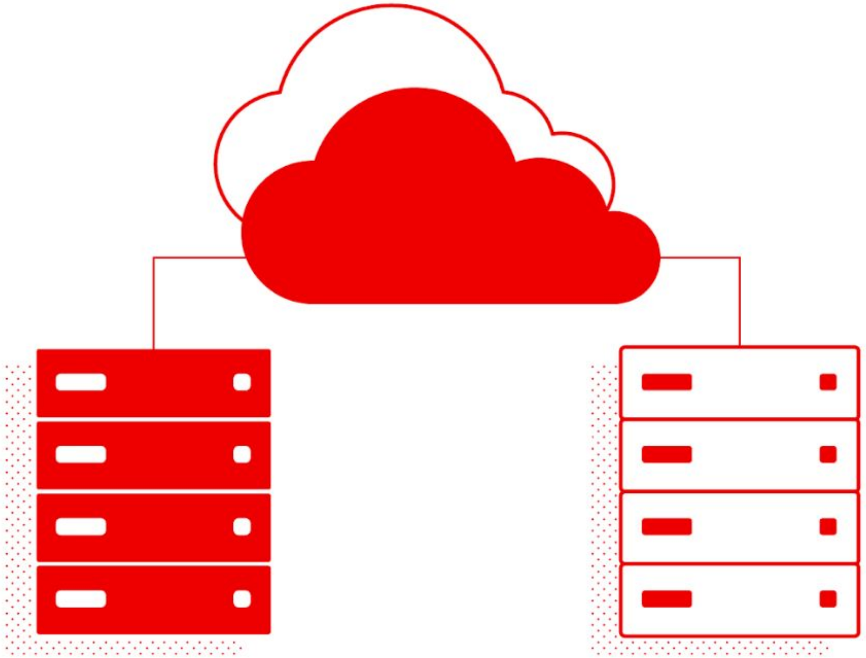
OpenShift Lightspeed will be available in Technology Preview later in 2024

RHEL Lightspeed is currently in the planning stages and availability will be announced

- **Improve the productivity and efficiency** of ops and developers by integrating AI into cluster administration and the operating system
- **Simplify enterprise planning** and administration, improve performance and enhance security
- **More easily navigate** the complexities of enterprise IT in the hybrid cloud

Announcing: **Konveyor GenAI for the Konveyor Community**

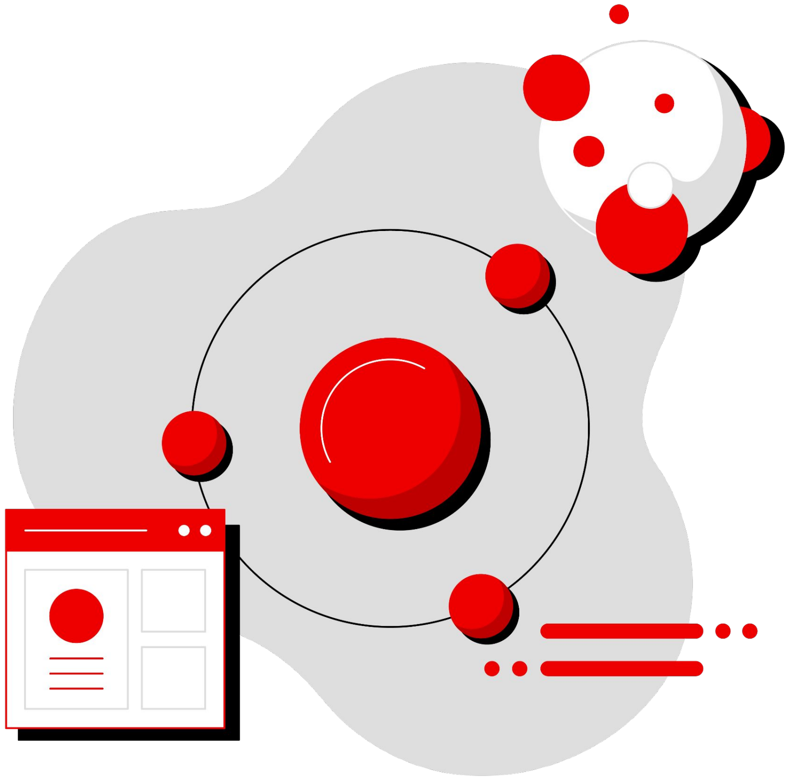
KONVEYOR



- GenAI applied to application modernization efforts
- Workflow-integrated LLMs
- Generated code directly within IDEs
- Successful migrations build strong recommendations
- Roadmap for Red Hat migration toolkit for applications

Use the power of enterprise-ready open source

Set yourself and your teams up for success with a solid foundation



The AI/ML ecosystem is complex

- Technologies are rapidly evolving
- Vendor landscape is constantly changing
- No single vendor can provide everything you need
- Organizations need a supported, secure enterprise version of open source tools and technologies for AI/ML
- Success with AI/ML starts with having a solid foundation to build upon