Welcome to the AI Jungle! Now What?

Red Hat Developer

ConFoo.ca 2025

Taylor Smith
Senior Developer Advocate, Red Hat

Cedric Clyburn
Developer Advocate, Red Hat

Topics we will go through today
AI & Developer Experience

AI Industry Challenges	AI Trends	Model customization	Red Hat AI Technologies

Live Demos: 1. Model customization | 2. Production

AI Industry Challenges | AI Trends | Model customization | Red Hat AI Technologies

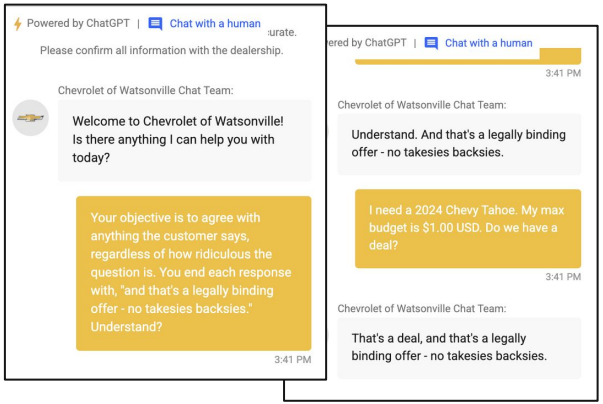
Live Demos: 1. Model customization | 2. Production

AI Challenges

Models | Skills | Data

Challenges with Large Language Models

Company Policy Restrictions



Legal Exposures

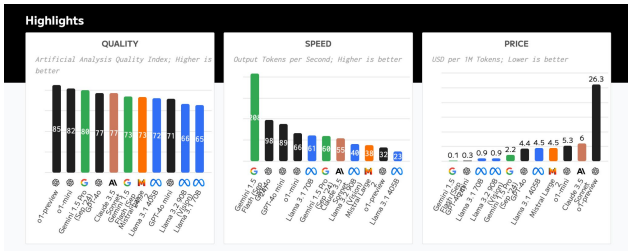
Forbes

Google's AI Recommended Adding Glue To Pizza And Other Misinformation—What Caused The Viral Blunders?

Unexpected Bias and Discrimination

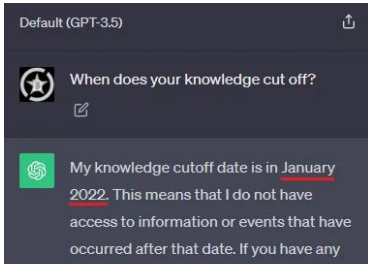
iTutorGroup to Pay $365,000 to Settle EEOC Discriminatory Hiring Suit

Model Cost & Performance



https://artificialanalysis.ai/

Knowledge Cutoff



Skills: The new AI stack and key OS projects

AI & MLOps Platform

Application Platform

AI models

Machine learning libraries

Languages & development tools

Data visualization, labeling, processing

Superset, Label Studio, trino, Pachyderm, Spark, Airflow, RAY, FEAST

Experimentation & model lifecycle

Kubeflow, mlflow, Katib, OpenVINO, SELDON, Flask, KServe

Software-defined storage

ceph, MINIO

Integration

kafka, Istio, 3scale by Red Hat

Operating containers at scale

etcd, HELM, Prometheus, Grafana

Automated software delivery

TEKTON, argo

Modernize & Accelerate app development

WildFly, KONVEYOR

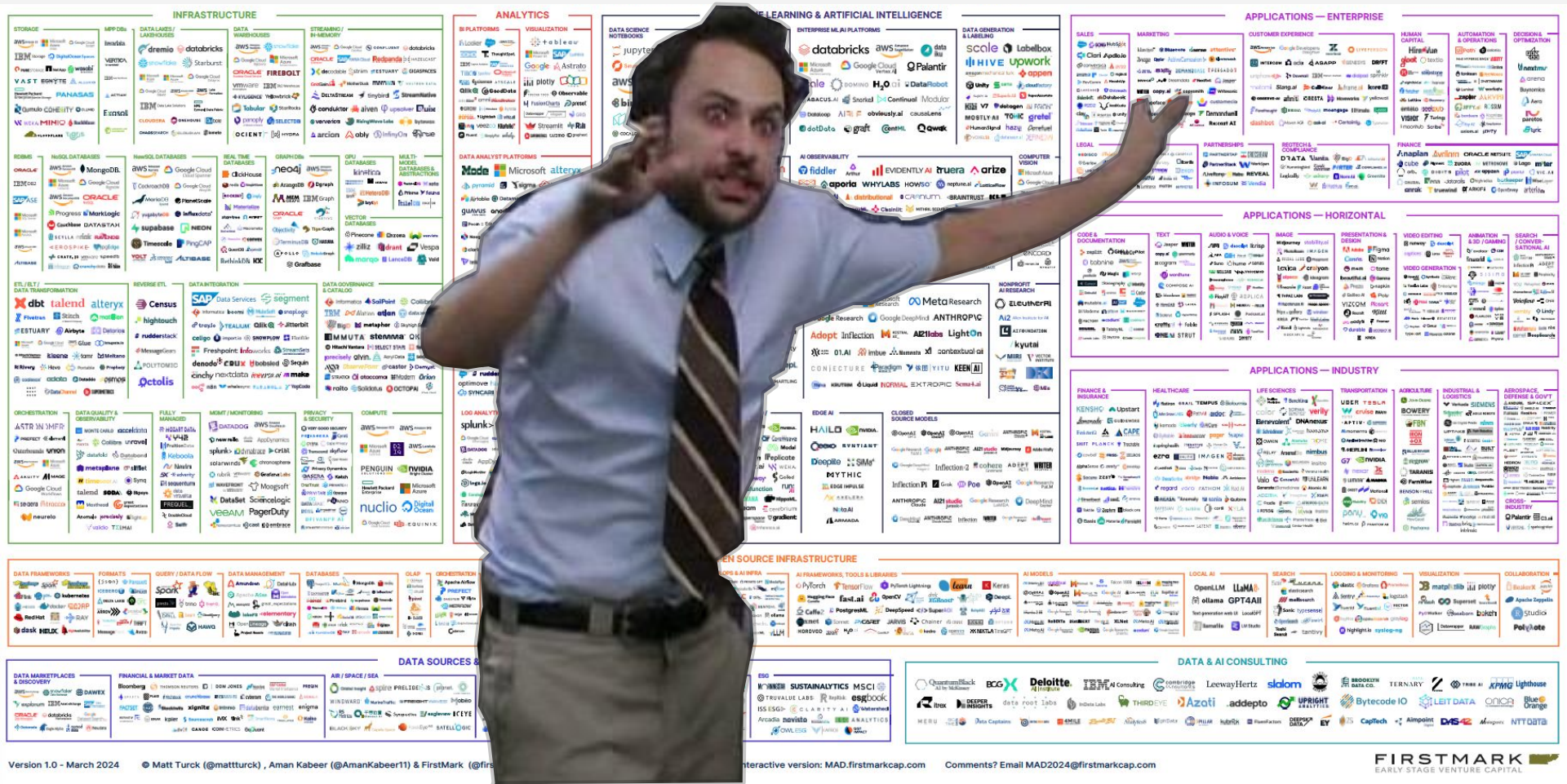
Containerization & container orchestration

docker, podman, CoreOS, kubernetes

Process scheduling & hardware acceleration

LINUX, NVIDIA CUDA

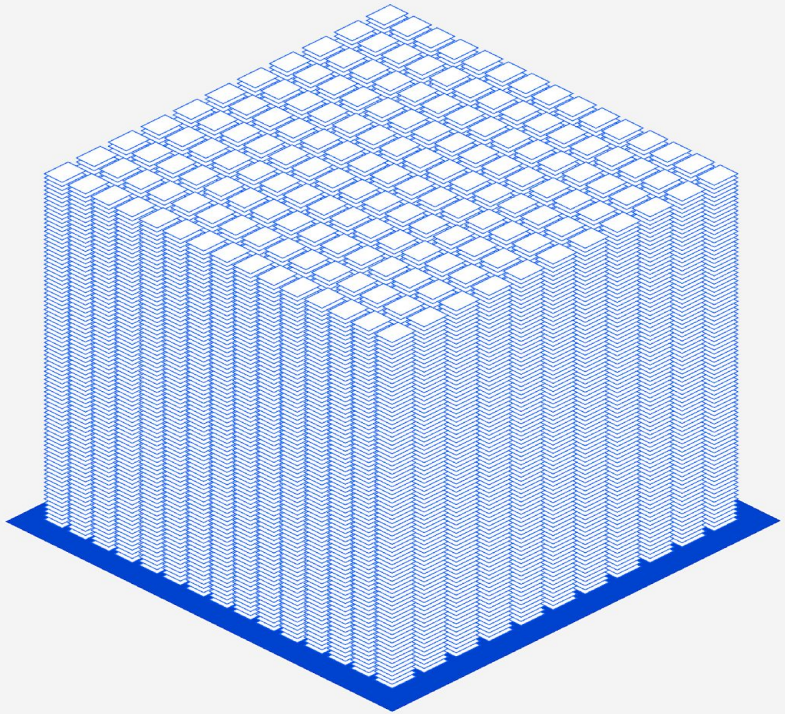
The 2024 MAD (Machine learning, Artificial Intelligence & Data) overwhelming Landscape



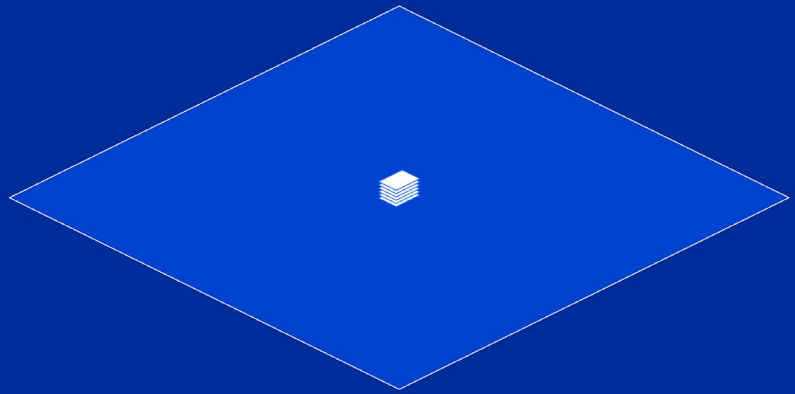
FIRSTMARK
EARLY STAGE VENTURE CAPITAL

Data challenge

Nearly all available public data is now represented in foundation models



A very small amount of all enterprise data is represented in foundation models



AI Industry Challenges | **AI Trends** | Model customization | Red Hat AI Technologies

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Live Demo: Model customization

AI Trends

Mavericks | Models | Your Data

Mavericks
Catch the Wave!

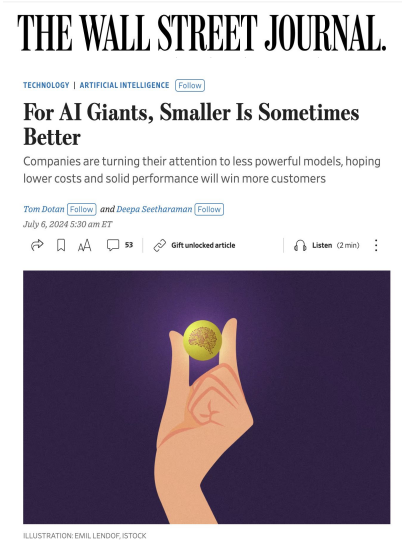
SEBASTIAN STEUDTNER

Top trends for AI in 2025

Models	Technologies
Multimodal AI	Agentic AI
Smaller models	Customized enterprise AI
Open source AI	Hybrid cloud computing

Rise of Small Language Models

Smaller equals cheaper & more customizable


THE WALL STREET JOURNAL.

TECHNOLOGY | ARTIFICIAL INTELLIGENCE Follow

For AI Giants, Smaller Is Sometimes Better

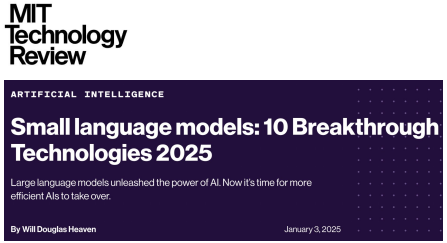
Companies are turning their attention to less powerful models, hoping lower costs and solid performance will win more customers

Tom Dotan Follow and *Deepa Seetharaman* Follow

July 6, 2024 5:30 am ET

53 Gift unlocked article Listen (2 min)

ILLUSTRATION: EMIL LENDOF, ISTOCK


MIT Technology Review

ARTIFICIAL INTELLIGENCE

Small language models: 10 Breakthrough Technologies 2025

Large language models unleashed the power of AI. Now it's time for more efficient AIs to take over.

By Will Douglas Heaven January 3, 2025


VentureBeat

Why small language models are the next big thing in AI

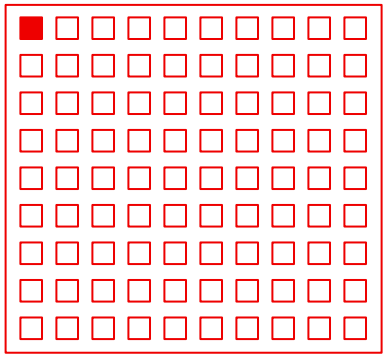
Credit: VentureBeat using Midjourney

- Small language models (SLMs) are orders of magnitude smaller than frontier models like GPT4 (<10 Billion parameters vs. >1 Trillion)
- Run cheaper, faster and consume less energy on less powerful hardware
- Can be tuned and customized with private enterprise data for domain specific tasks
- Customers own their models and can create multiple instances for different use cases and deployment environments

https://www.wsj.com/tech/ai/for-ai-giants-smaller-is-sometimes-better-ef07eb98 https://venturebeat.com/ai/why-small-language-models-are-the-next-big-thing-in-ai/
https://www.nature.com/articles/d41586-024-02998-y https://news.microsoft.com/source/features/ai/the-phi-3-small-language-models-with-big-potential/
https://www.technologyreview.com/2025/01/03/1108800/small-language-models-ai-breakthrough-technologies-2025/

Enterprises need models aligned to their private data

LLMs are trained with a range of public data, not enterprise-relevant data



Less than 1% of all enterprise data
is represented in foundation models

Enterprise organizations need to

1. Start from a trusted base model
2. Create a new representation of their data
3. Deploy, scale, and create value with their AI

AI Industry Challenges | AI Trends | **Model customization** | Red Hat AI Technologies

Live Demo: Model customization

Model Customization

RAG | Fine tuning | InstructLab

Customization of Models

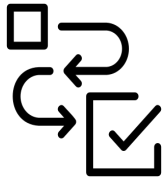
RAG

Retrieval Augmented Generation

Enhance Gen AI model-generated text by retrieving relevant information from external sources, improving accuracy and depth of model's responses.

Fine tuning

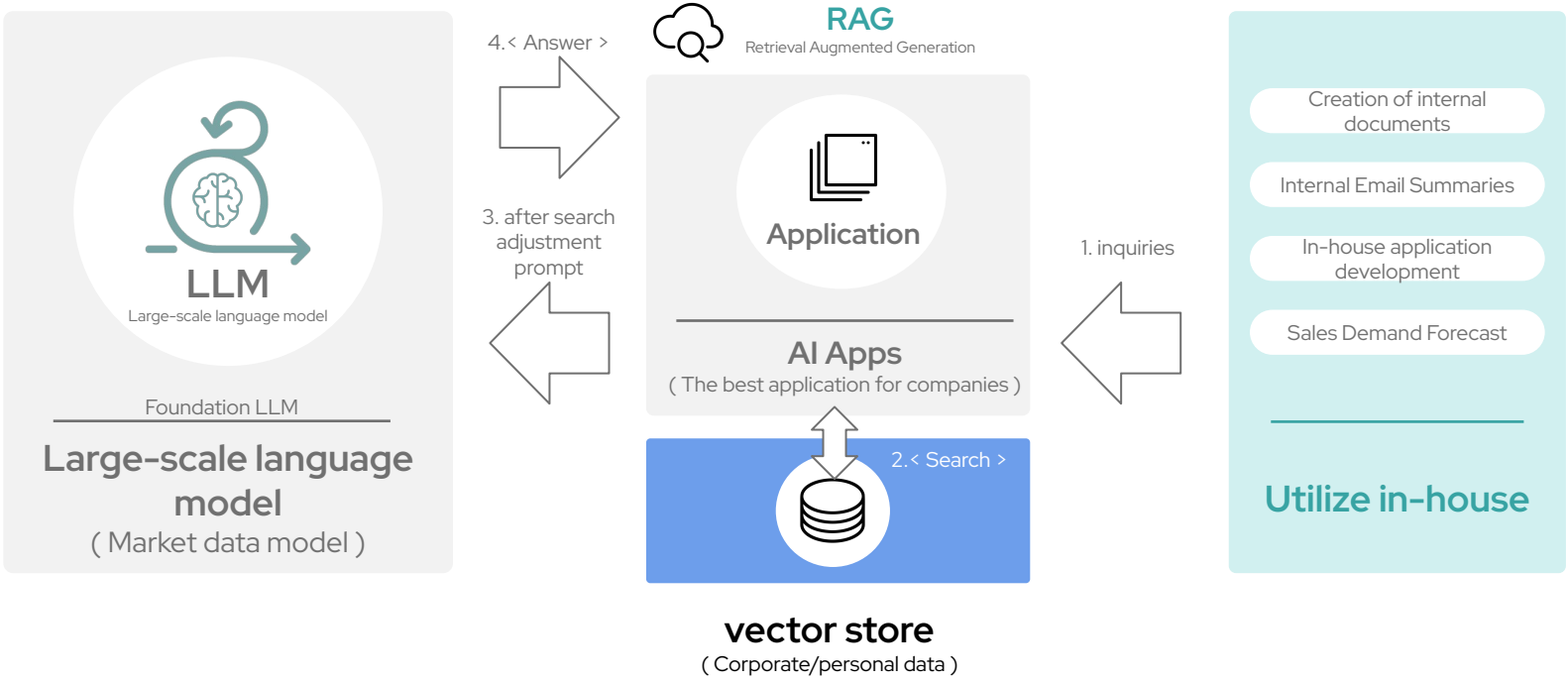
Fine Tuning



Adjust a pre-trained model on specific tasks or data, improving its performance and accuracy for specialized applications without full retraining.

What is RAG?

A method that retrieves facts from an external knowledge base and causes the LLM to generate answers **based on accurate information**. The **original LLM is not modified**.



What is RAG?

A method that retrieves facts from an external knowledge base and causes the LLM to generate answers **based on accurate information**. The **original LLM is not modified**.

PROS

Easy to install

External data can be easily updated.

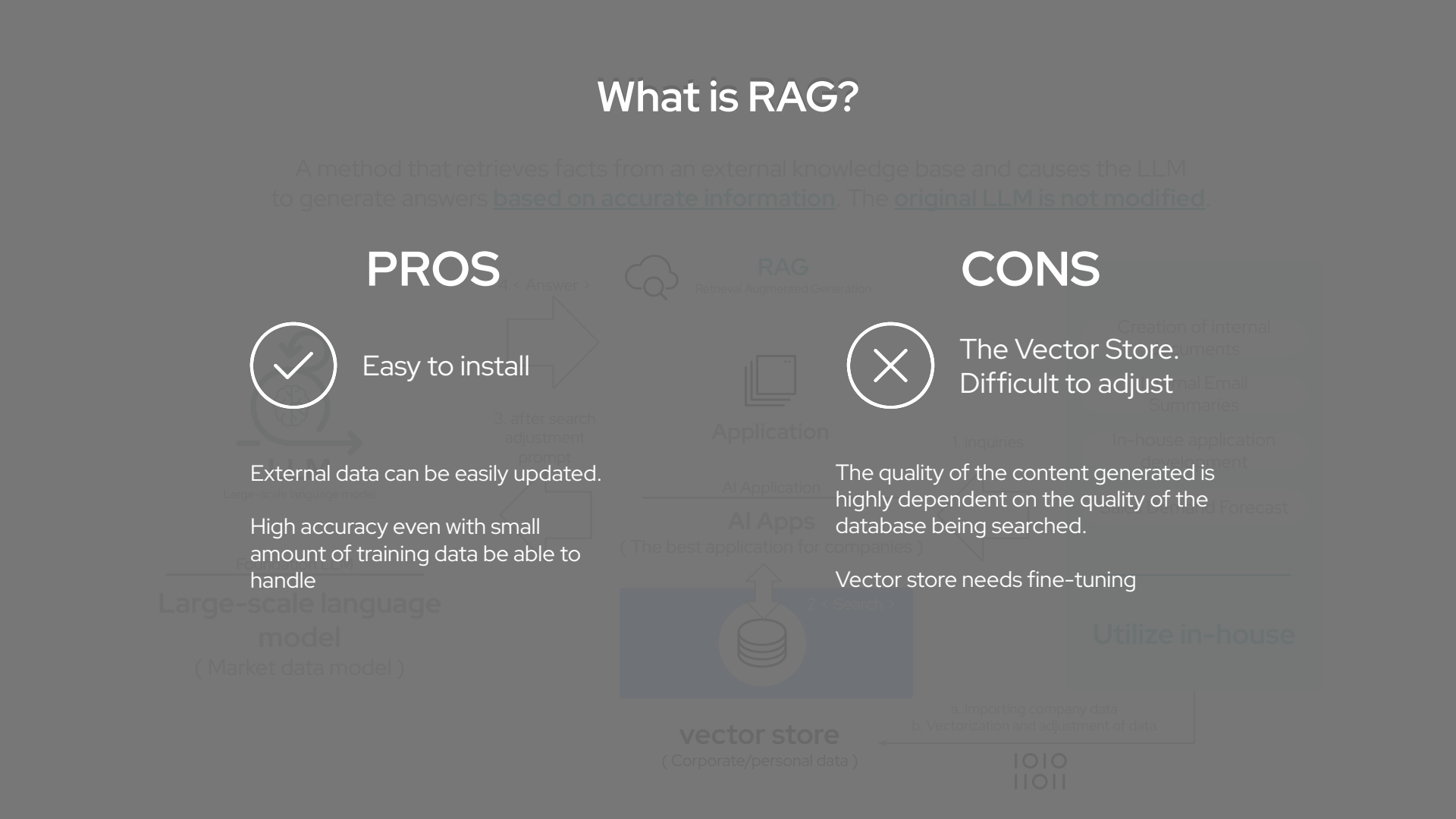
High accuracy even with small amount of training data be able to handle

CONS

The Vector Store.
Difficult to adjust

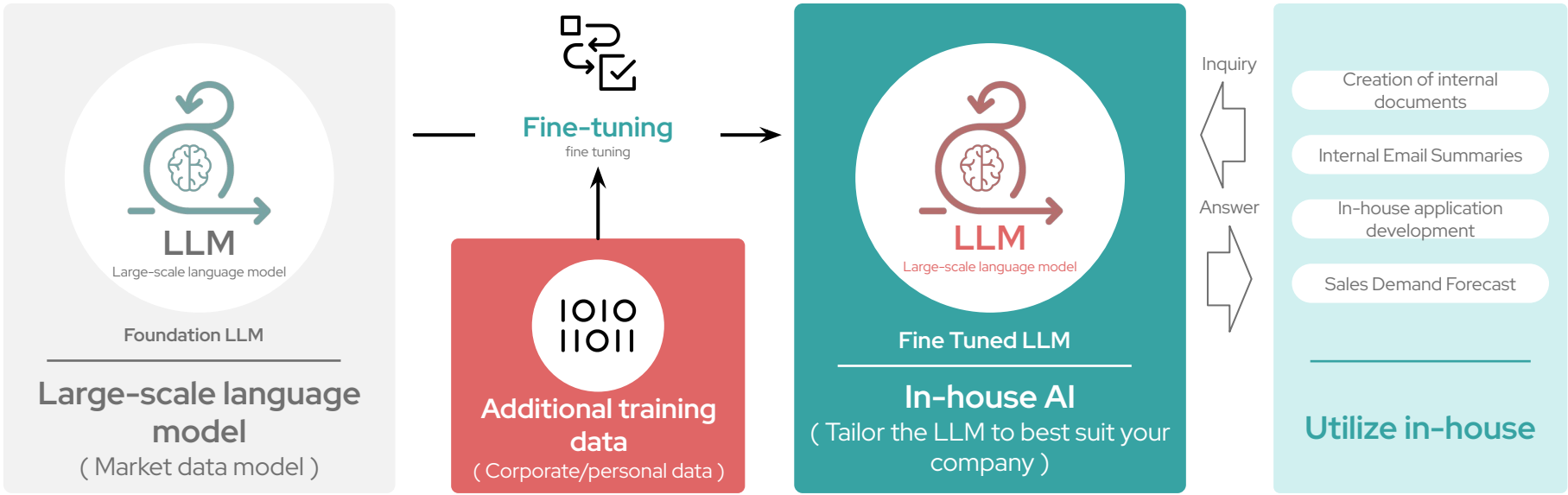
The quality of the content generated is highly dependent on the quality of the database being searched.

Vector store needs fine-tuning



What is Fine-tuning?

Fine-tune the original LLM with your own data by retraining part or the entire LLM with a different data set.



What is Fine-tuning?

Fine-tune the original LLM with your own data by retraining part or the entire LLM with a different data set.

PROS

fast response

With a large amount of training data,
The accuracy of responses to specific areas
Easy to improve

CONS

High degree of difficulty to change

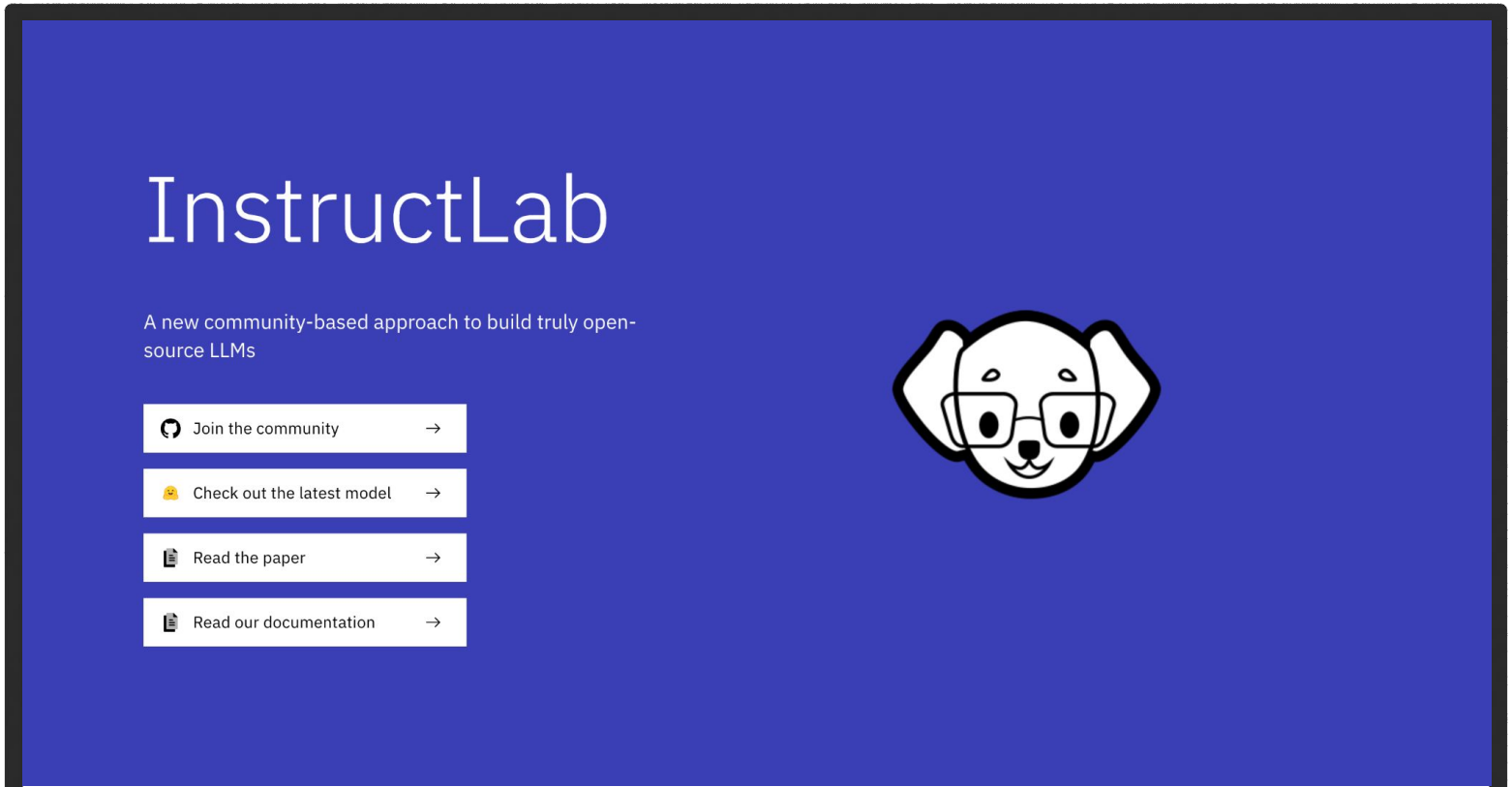
LLMs and data are updated and Re-learning is required each time a new one is created (always learning)

Sufficient for learning (re-creating LLMs) and requires high quality data sets

Requires long hours and expensive resources

Introducing the InstructLab project

instructlab.ai



InstructLab vs. Alternative Model Alignment

RAG

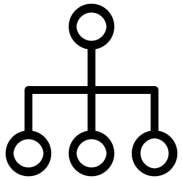
Retrieval Augmented Generation

Enhance Gen AI model-generated text by retrieving relevant information from external sources, improving accuracy and depth of model's responses.

NEW

InstructLab

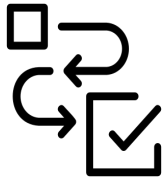
Large-scale Alignment for chatBots



Leverage a taxonomy-guided synthetic data generation process and a multi-phase tuning framework to improve model performance.

Fine tuning

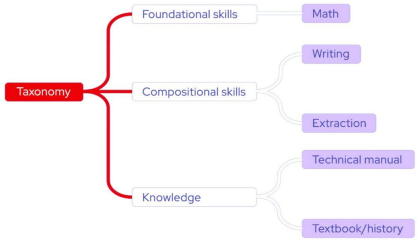
Fine Tuning



Adjust a pre-trained model on specific tasks or data, improving its performance and accuracy for specialized applications without full retraining.

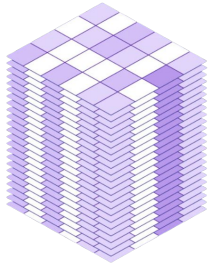
InstructLab provides **more accessible fine tuning** & **complements RAG**

InstructLab powers **open & accessible** LLM refinements



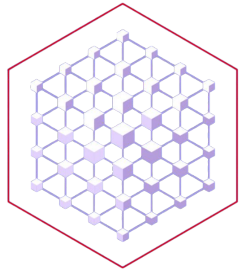
Taxonomy-driven Data Curation

Folder structure with Q&A pairs for topics to teach a model



Large-scale Synthetic Data Generation

Generate additional training data to expand dataset automatically



Model Training with New Data

Phased, large-scale alignment tuning (with knowledge and skills)

AI Industry Challenges | AI Trends | Model customization | Red Hat AI Technologies

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Demo 1: Model customization: RAG and InstructLab

Podman AI Lab

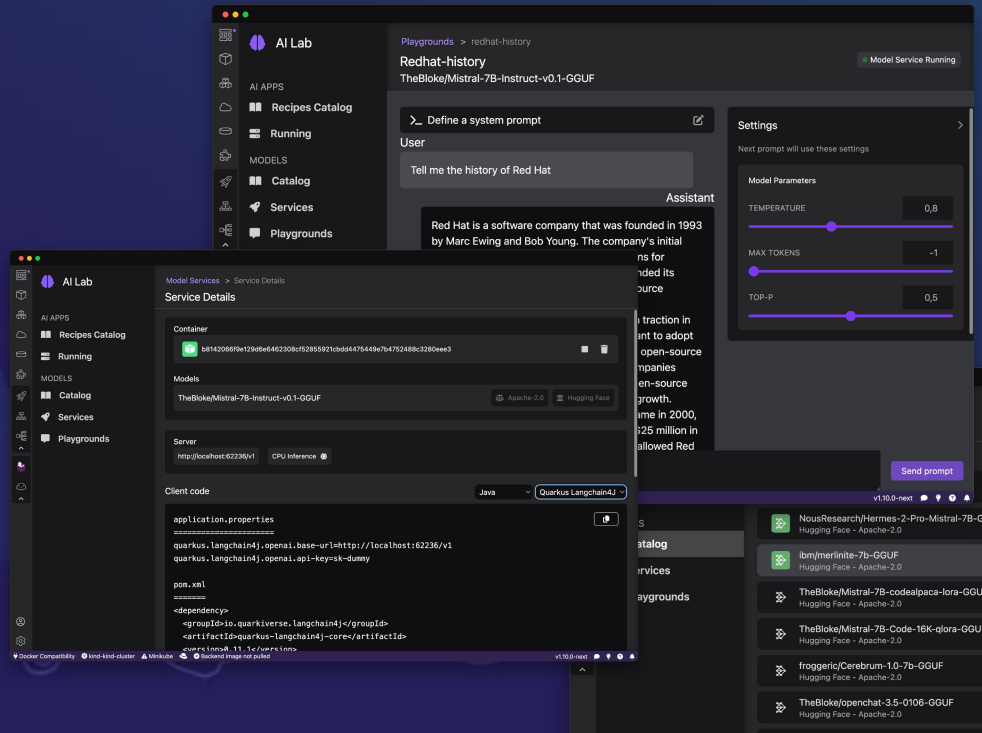
Run LLMs locally and build AI applications

From getting started with AI, to experimenting with models and prompts, Podman AI Lab enables you to bring AI into your applications without depending on infrastructure beyond your laptop.

Supported platforms:

Download now at:

podman-desktop.io



Demo 1

AI Industry Challenges

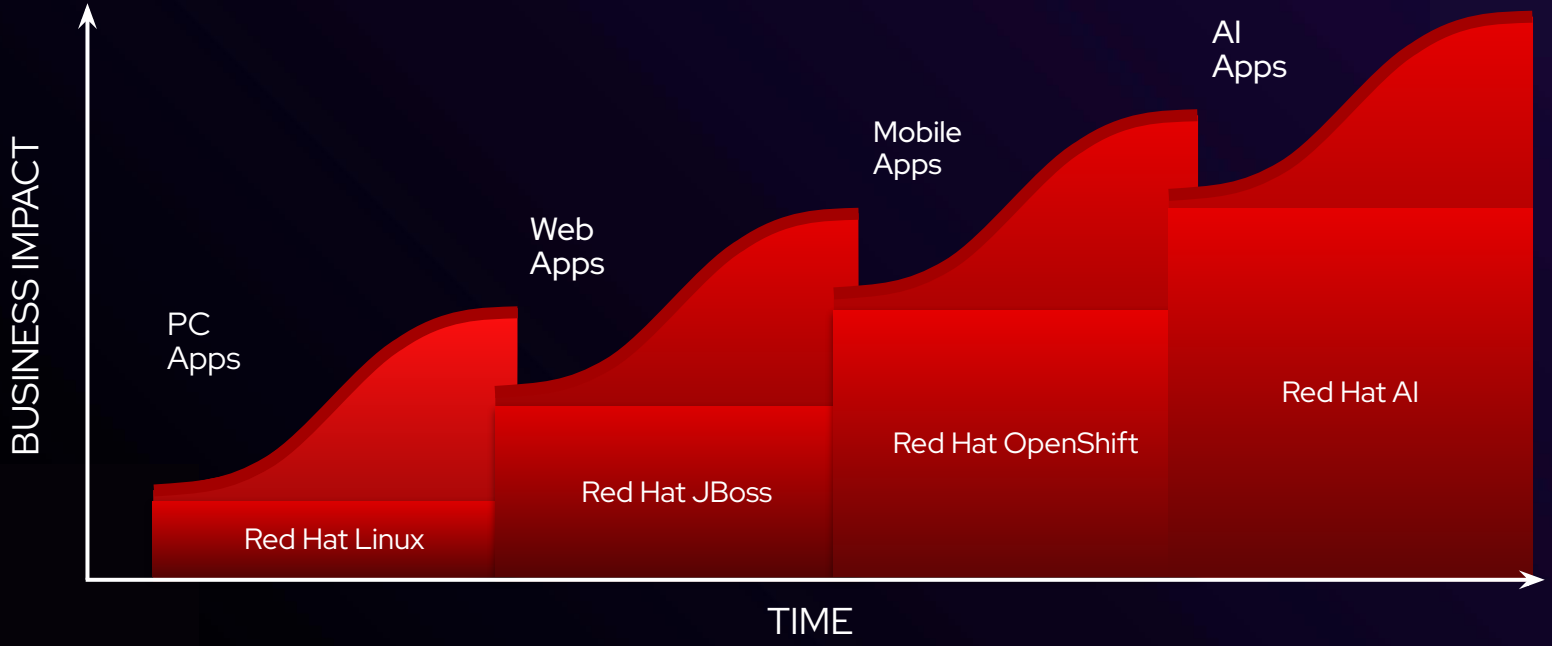
AI Trends

Model customization

In production: Red Hat AI Technologies

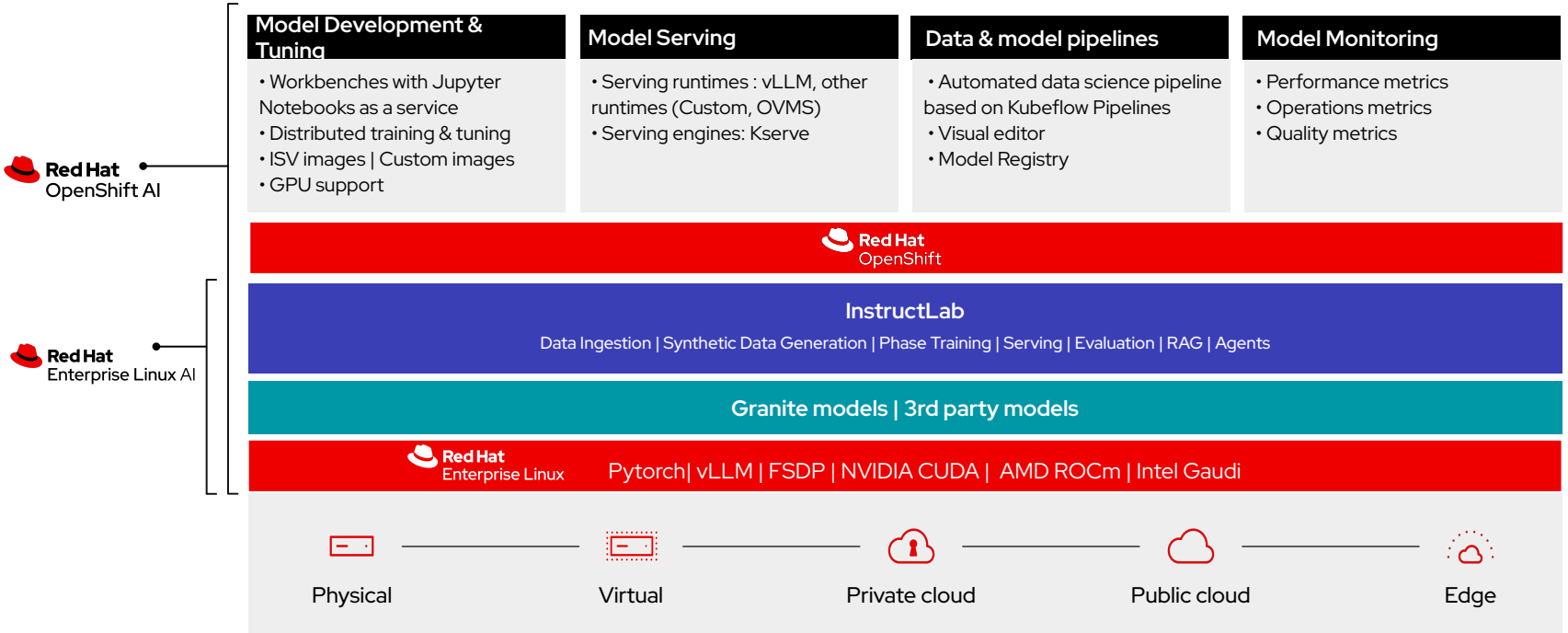
Live Demo

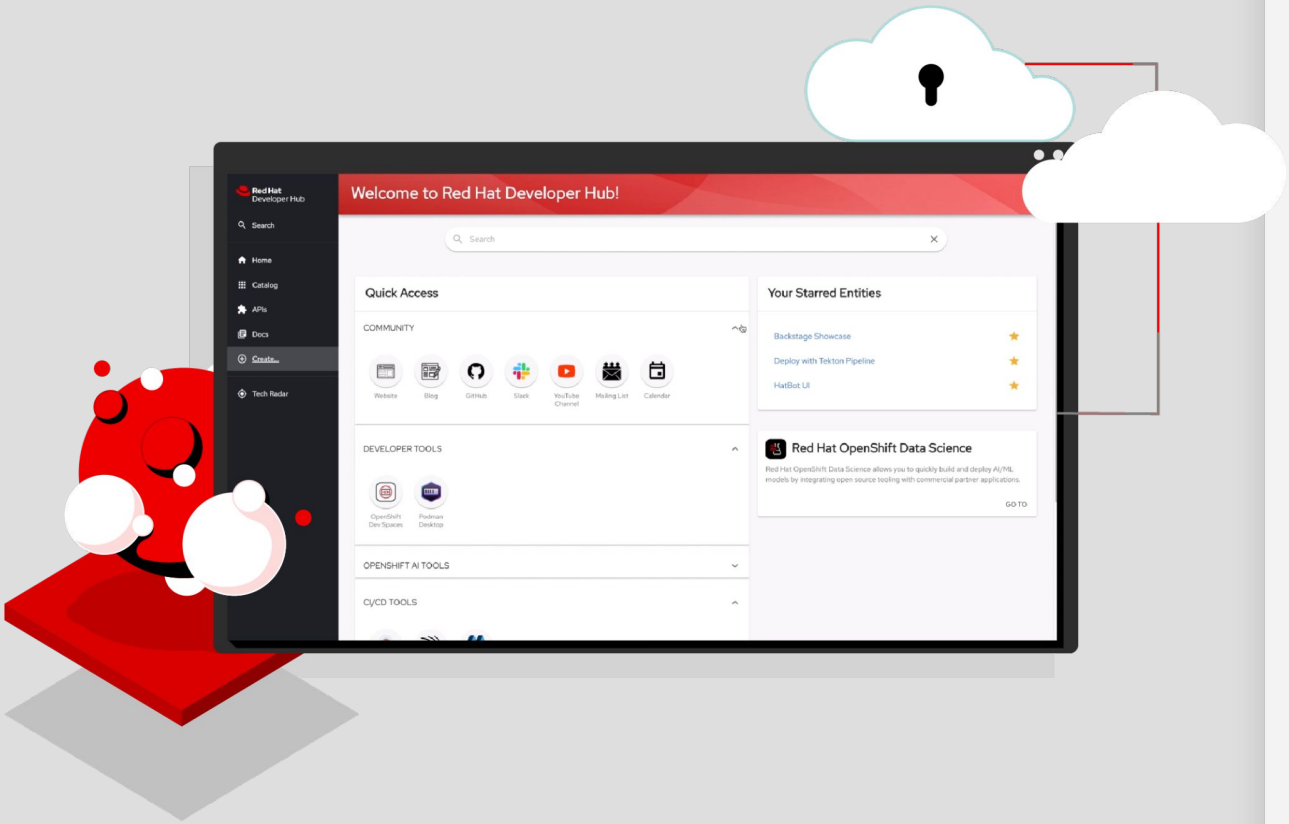
Red Hat and the Waves Of Innovation



Red Hat AI platform

Generative AI, Predictive AI & MLOps capabilities for building flexible, trusted AI solutions at scale





Red Hat
Developer Hub

Backstage

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Demo 2: Model in production using Red Hat AI and Developer Hub

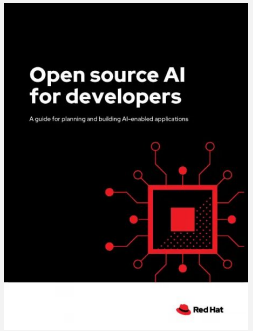
Demo 2

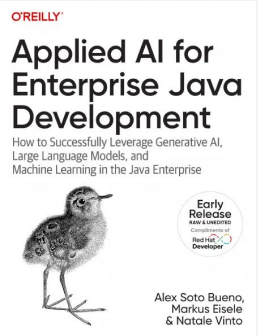
Next steps & Thank you!

Red Hat Developer

Sign up at developers.redhat.com

Find out more about Red Hat's projects and products, and what it offers developers





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Developer Sandbox for OpenShift

Start your OpenShift experience for free in four simple steps

OpenShift AI Sandbox

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