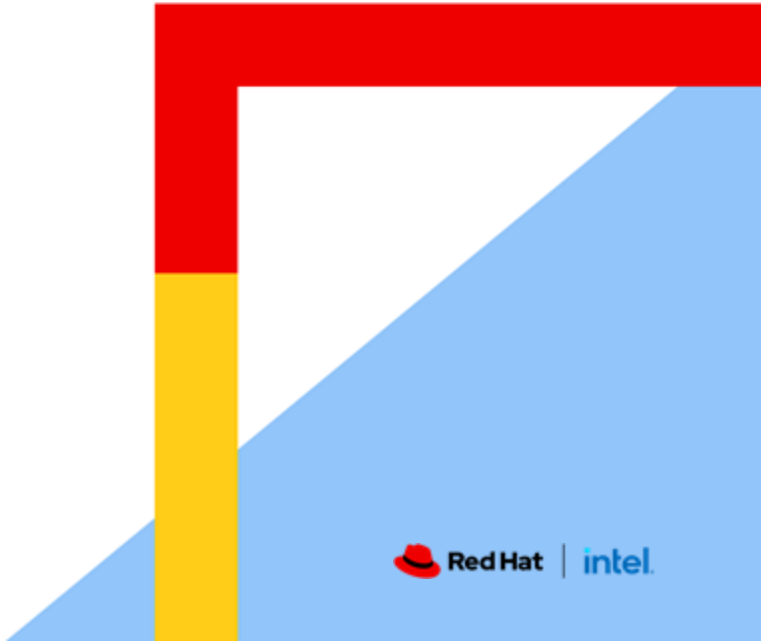
Enhancing Enterprise AI with RAG:

Boost your AI's intelligence by seamlessly merging real-time data with LLMs



Axel Saß

Chief Architect, CTO Organization

Albertano Caruso

Field Application Engineer, SMG

Red Hat + intel.

Over 25 Years of Collaboration

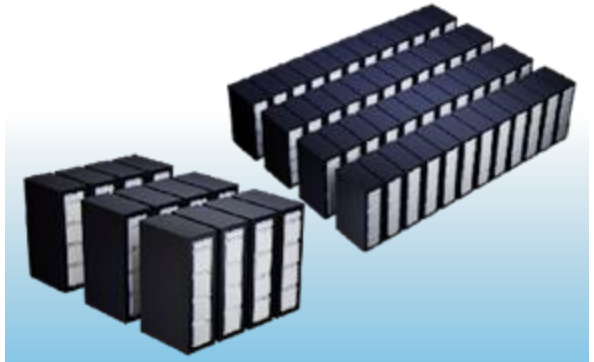
Bringing AI Everywhere

Intel's AI Strategy

AI PC Node
AI Developer Productivity & Light Inference

Node
Fine-tuning, Inference

Cluster
Light Training, Tuning, Peak Inference



Super Cluster
Training, Tuning, Peak Inference

Mega Cluster
Large Scale Training & Inference

AI PC
Broadest AI SW Ecosystem

ENTERPRISE AI & EDGE AI
Open Standard, "Ready to Use"

DATA CENTER AI
AI Open, Scalable Systems & Reference Arch

Red Hat's AI Strategy

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

AI models	AI platform	AI enabled portfolio	AI workload support
RHEL AI Base Model | Alignment Tuning | Methodology & Tools | Platform Optimization & Acceleration	**OpenShift AI** Development | Serving | Monitoring & Lifecycle | MLOps | Resource Management	**Lightspeed portfolio** Usability & Adoption | Guidance | Virtual Assistant | Code Generation	**Optimize AI workloads** Deployment & Run | Compliance | Certification | Models | Open Source Ecosystem

Open Hybrid Cloud Platforms

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

Acceleration | Performance | Scale | Automation | Observability | Security | Developer Productivity | App Connectivity | Secure Supply Chain

Partner Ecosystem

Hardware | Accelerators | Delivery

Intel Enterprise AI with Red Hat® OpenShift® AI

Gather and prepare data	Develop models	Deploy models in an application	Model monitoring and management

Customer managed applications

ISV software and services including INTEL

Starburst, mongoDB., intel oneAPI AI Analytics Toolkit, H2O.ai, run:ai, intel. tiber AI Studio, C3.ai, avanseus, elastic, Pachyderm, crunchydata, ANACONDA, CognitiveScale, SAS, CLOUDERA, redislabs, watsonx, intel OpenVINO

Red Hat Software and cloud services
Hybrid, multi-cloud platform

Red Hat AMQ
Red Hat OpenShift AI
Red Hat Developer Hub
Granite models
Red Hat Enterprise Linux AI
InstructLab

Trusted, cloud-ready platform

Red Hat Enterprise Linux
Red Hat OpenShift

Intel® Core™, Intel® Arc™, Intel® Xeon®, Intel® Gaudi®, Intel® IPU

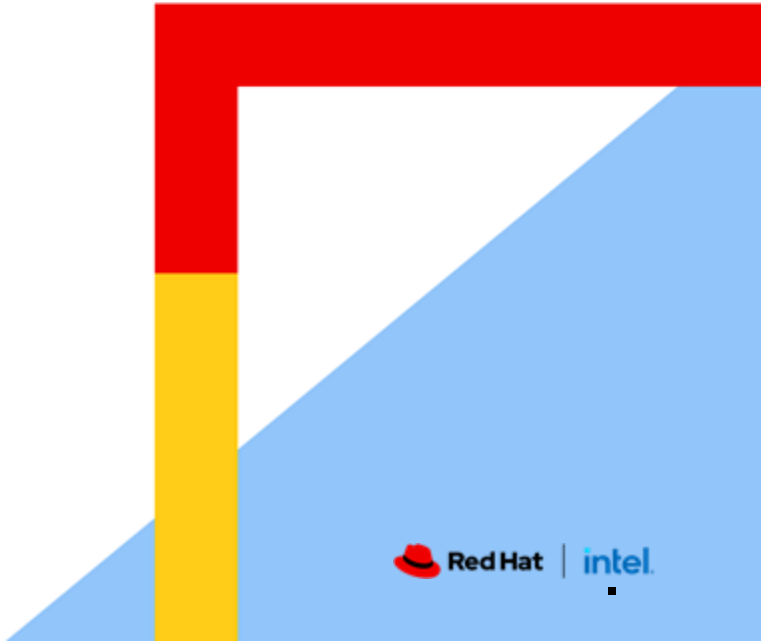
intel CORE ULTRA, intel ARC, intel XEON, intel GAUDI, intel IPU

Deploy anywhere

intel Developer Cloud, aws, Google Cloud, Microsoft Azure, IBM Cloud, DELL, hp, Lenovo

Red Hat | intel.

OPEA – Open Platform for Enterprise AI



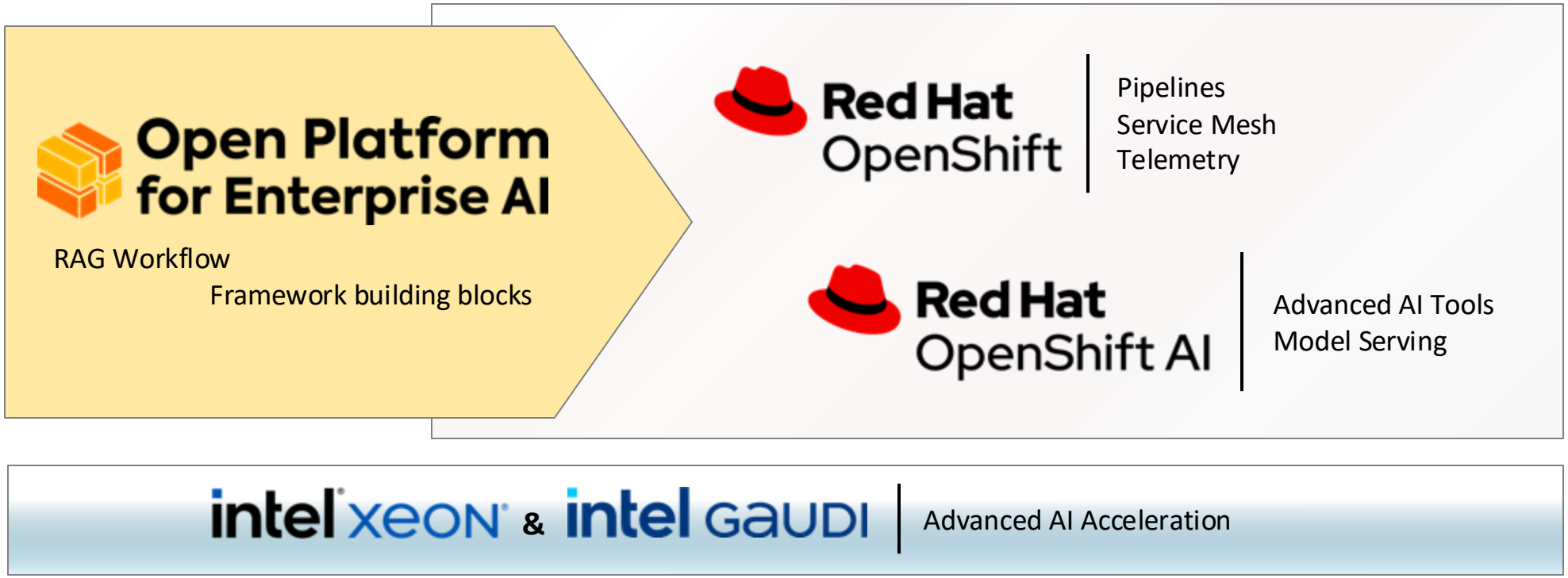
OPEA - Open Platform for Enterprise AI

By The Linux Foundation

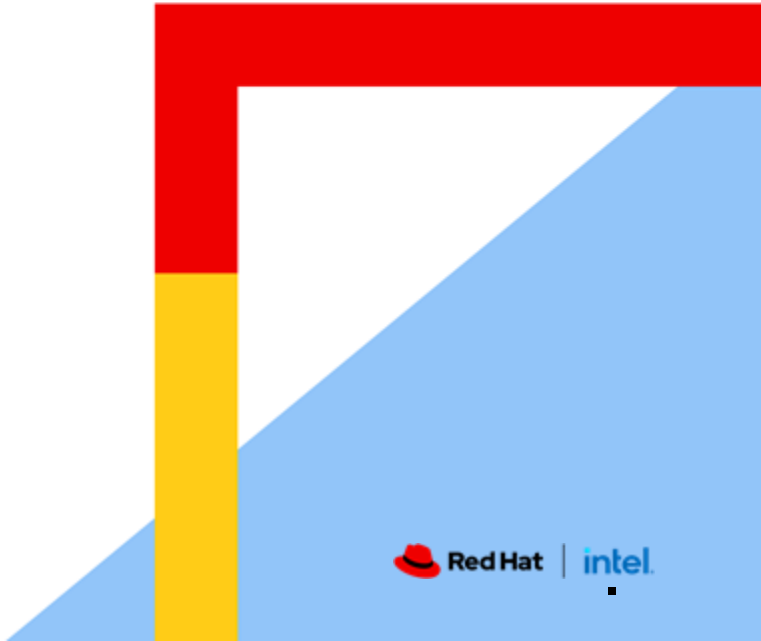
- Ecosystem orchestration framework for GenAI
- OPEA.dev
- GitHub: https://github.com/opea-project
- Contributors:

OPEA with OpenShift AI

OpenShift AI makes OPEA more enterprise ready



Intel Gaudi AI Accelerators



Introducing the Intel® Gaudi® 3 Accelerator

Breaking benchmarks, not budgets

Competitive Gen AI Performance over H100

- Projected **50% faster time to train**[1]
- Projected **50% faster inferencing**[2]
- Projected **40% better power efficiency**[3]

Freedom to Scale without Lock-in

- Open standard ethernet networking vs proprietary InfiniBand
- 24x200 GbE ports of industry-standard RoCE on every Gaudi® [3]
- 33% more I/O peak throughput vs H100 for massive scale-up within the server[4]

Open Development on GenAI platforms

- Integrated open-source PyTorch framework with optimized model library on Hugging Face
- Migrate models on open software from H100 with as few as 3 lines of code

[1] NV H100 comparison based on : https://developer.nvidia.com/deep-learning-performance-training-inference/training, Mar 28th 2024 -> "Large Language Model" tab.
[2] Source: NV H100 comparison based on https://nvidia.github.io/TensorRT-LLM/performance.html#h100-gpus-fp8 , Mar 28th, 2024. Reported numbers are per GPU.
[3] Source: NV comparison based on https://nvidia.github.io/TensorRT-LLM/performance.html#h100-gpus-fp8 , Mar 28th, 2024. Reported numbers are per GPU.
[1-3] Vs Intel® Gaudi® 3 projections for LLAMA2-7B, LLAMA2-70B & Falcon 180B Power efficiency for both Nvidia and Gaudi3 based on internal estimates. Results may vary.
[4] 900 GB/s NVLink connectivity on H100 vs. 1200 GB/s on Gaudi 3

Intel Gaudi AI Accelerators

Broad Application Support with Focus on Multi-Modal, LLM and RAG

AI Applications

AI Functions

3D Generation	Text Generation	Classification
Video Generation	Sentiment	Translation
Image Generation	Summarization	Q&A

Core Capabilities

- Multi-modal Models
- LLM
- RAG

Intel® Gaudi® 3 AI Accelerator

Launch Partners

DELL Technologies

Lenovo

Hewlett Packard Enterprise

SUPERMICRO

ASUS

Inventec

QCT Quanta Cloud Technology

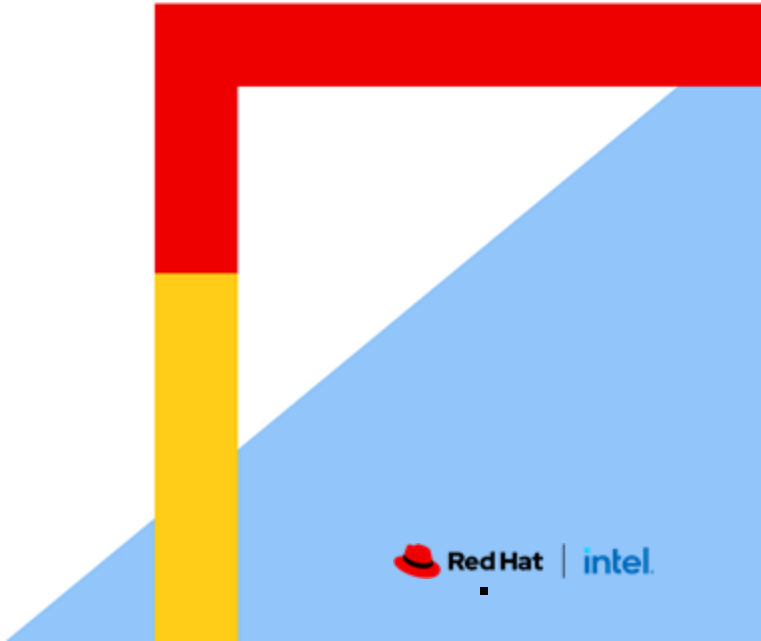
GIGABYTE TECHNOLOGY

ingrasys

wistron

Red Hat | intel.

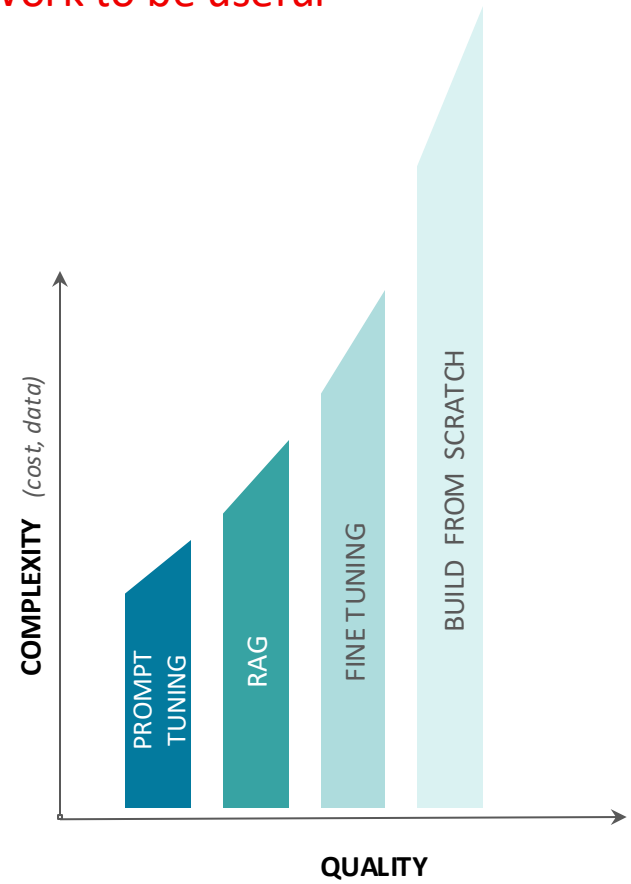
Retrieval Augmented Generation (RAG) Explained



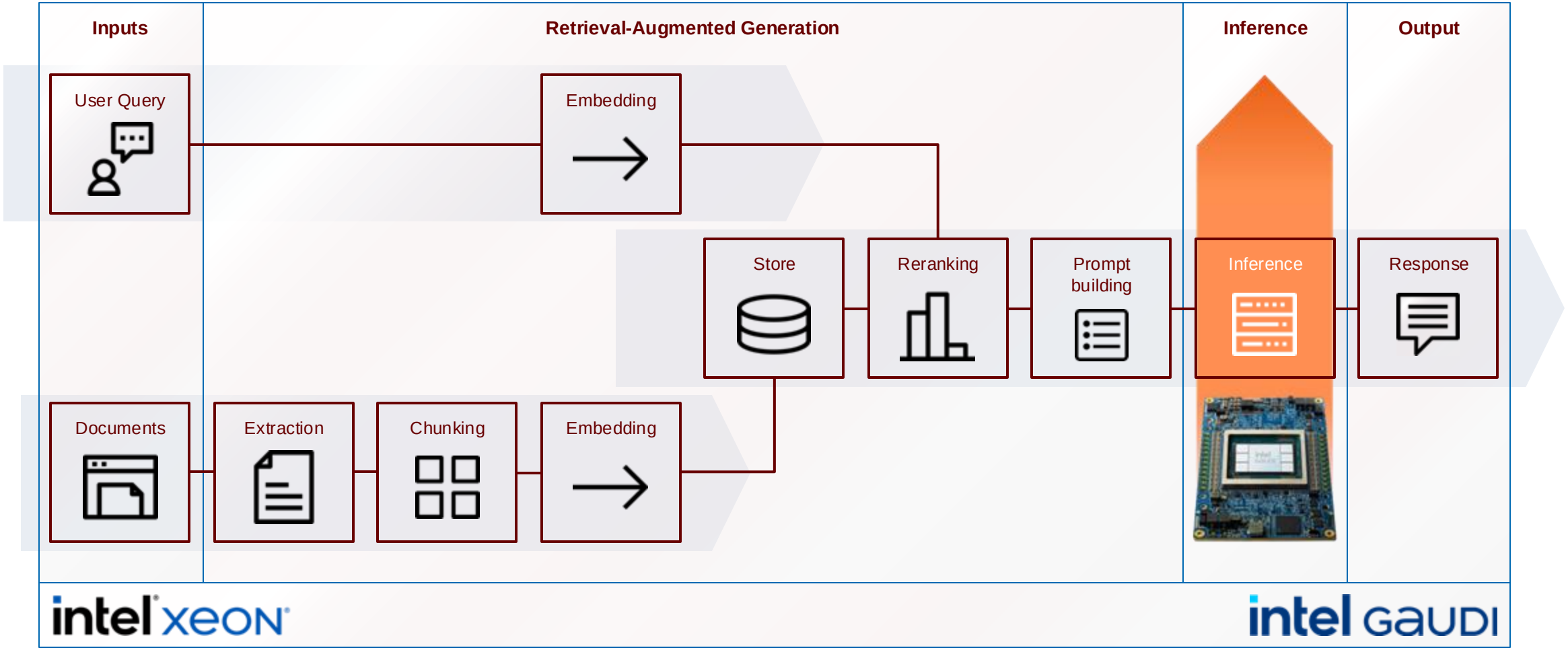
The balancing act of using foundation models

Foundation models will still need more work to be useful

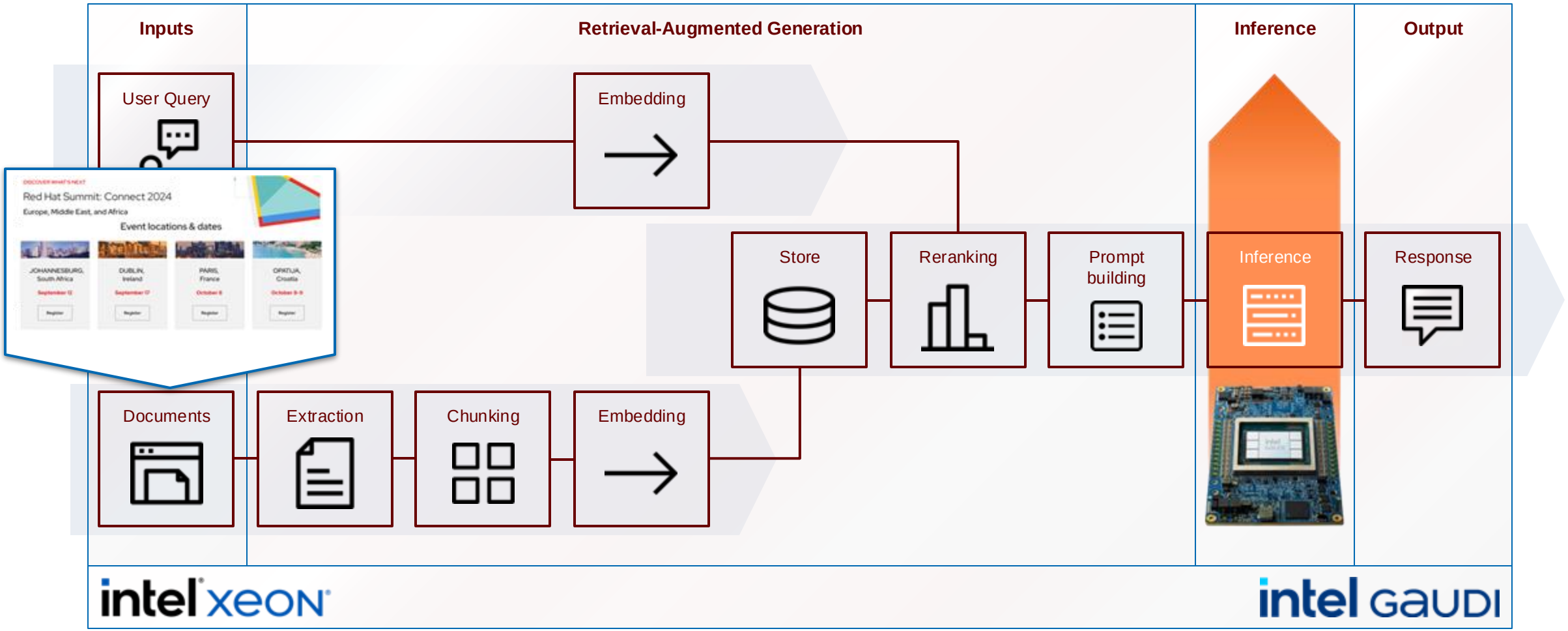
- Prompt tuning
- Retrieval-Augmented Generation (RAG)
- Fine tuning foundation models
- Training a Foundation Model from scratch



Retrieval Augmented Generation (RAG)



Retrieval Augmented Generation (RAG)



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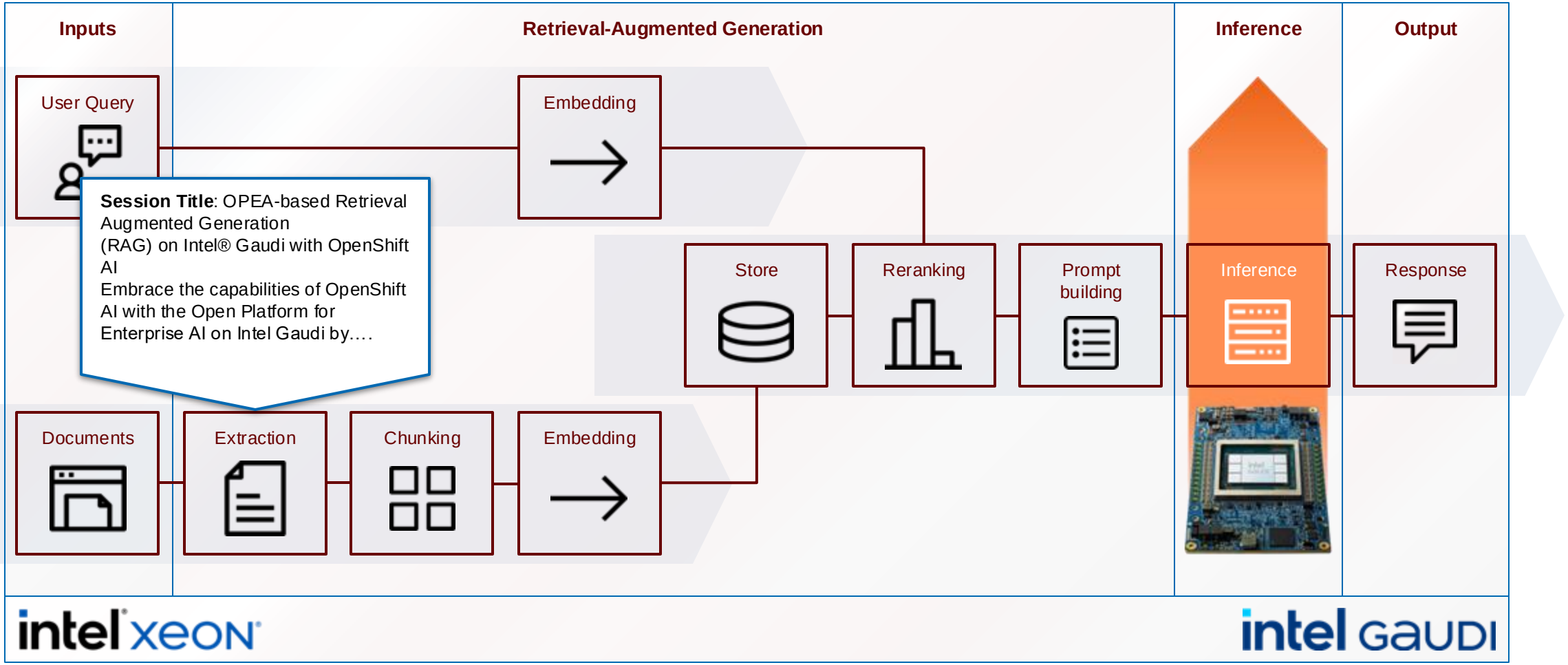
Retrieval Augmented Generation (RAG)



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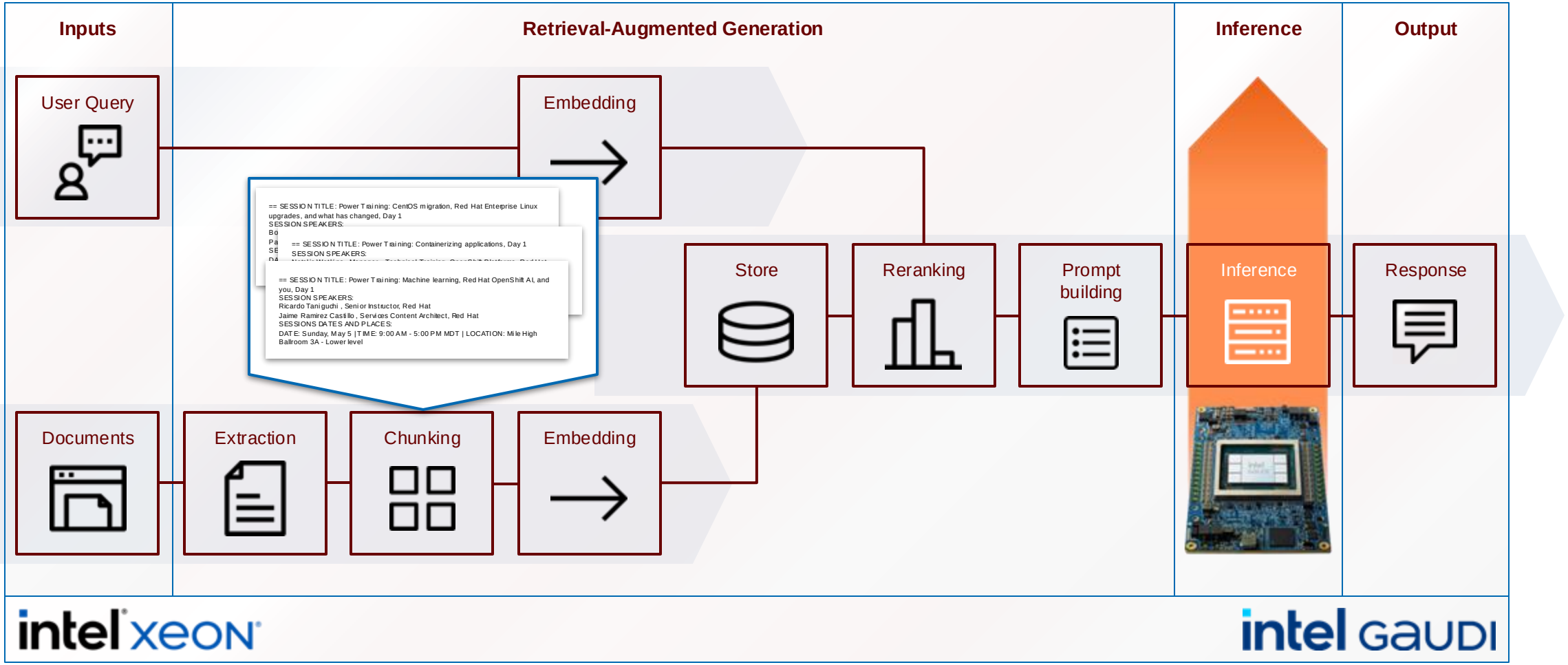
Retrieval Augmented Generation (RAG)



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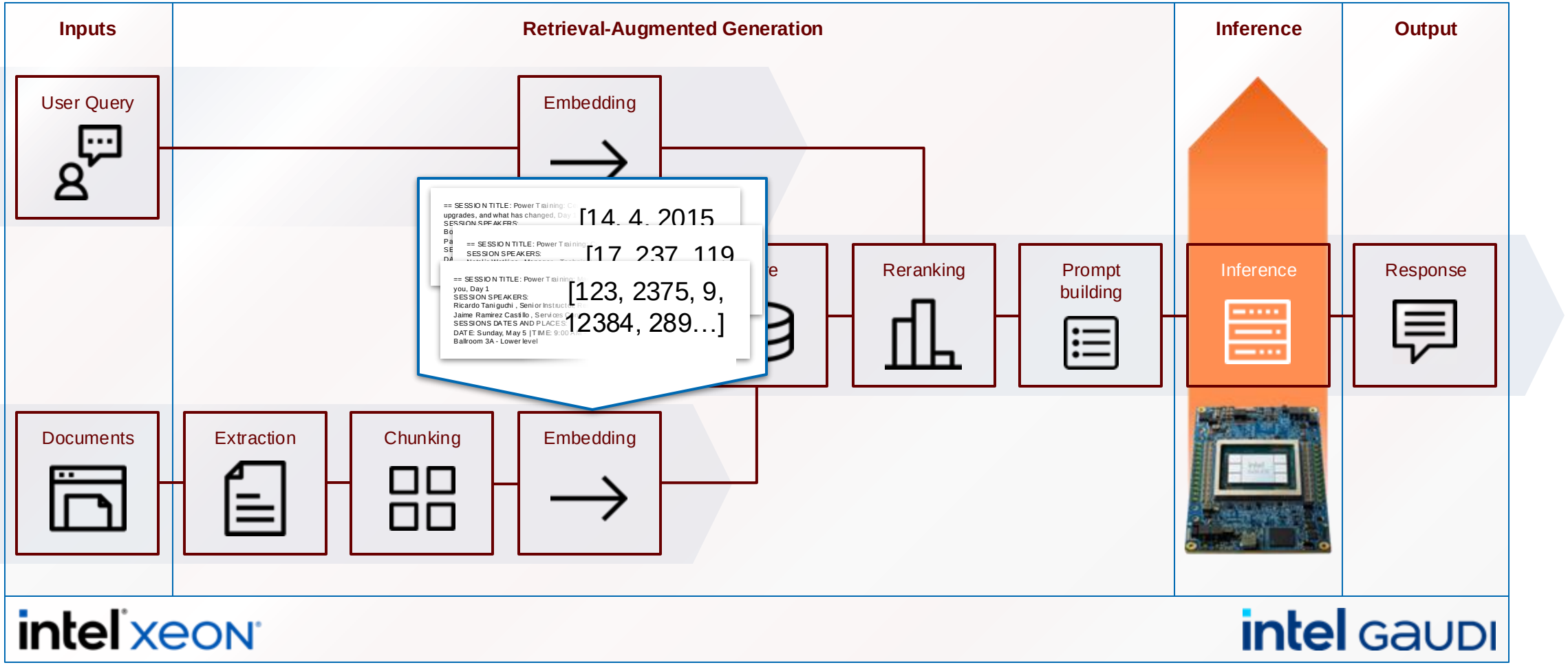
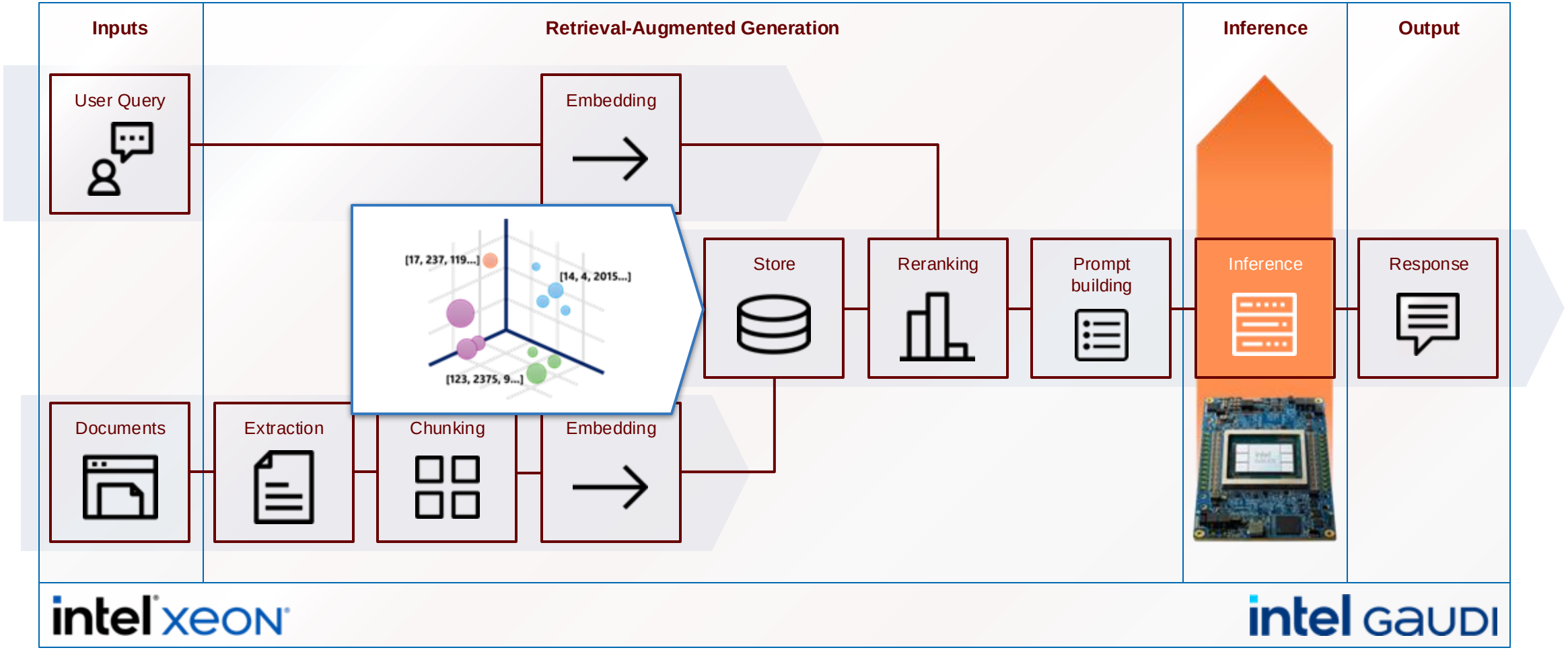
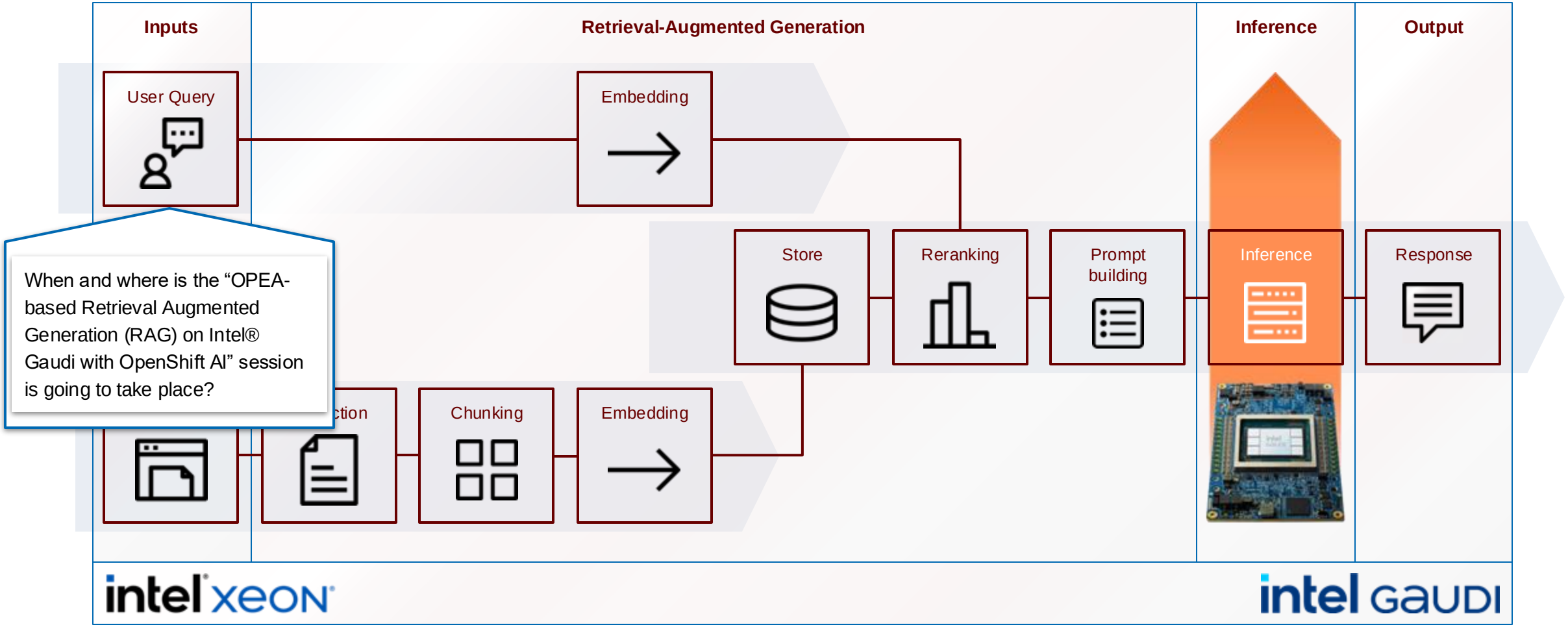


Red Hat | intel.

Retrieval Augmented Generation (RAG)



Retrieval Augmented Generation (RAG)



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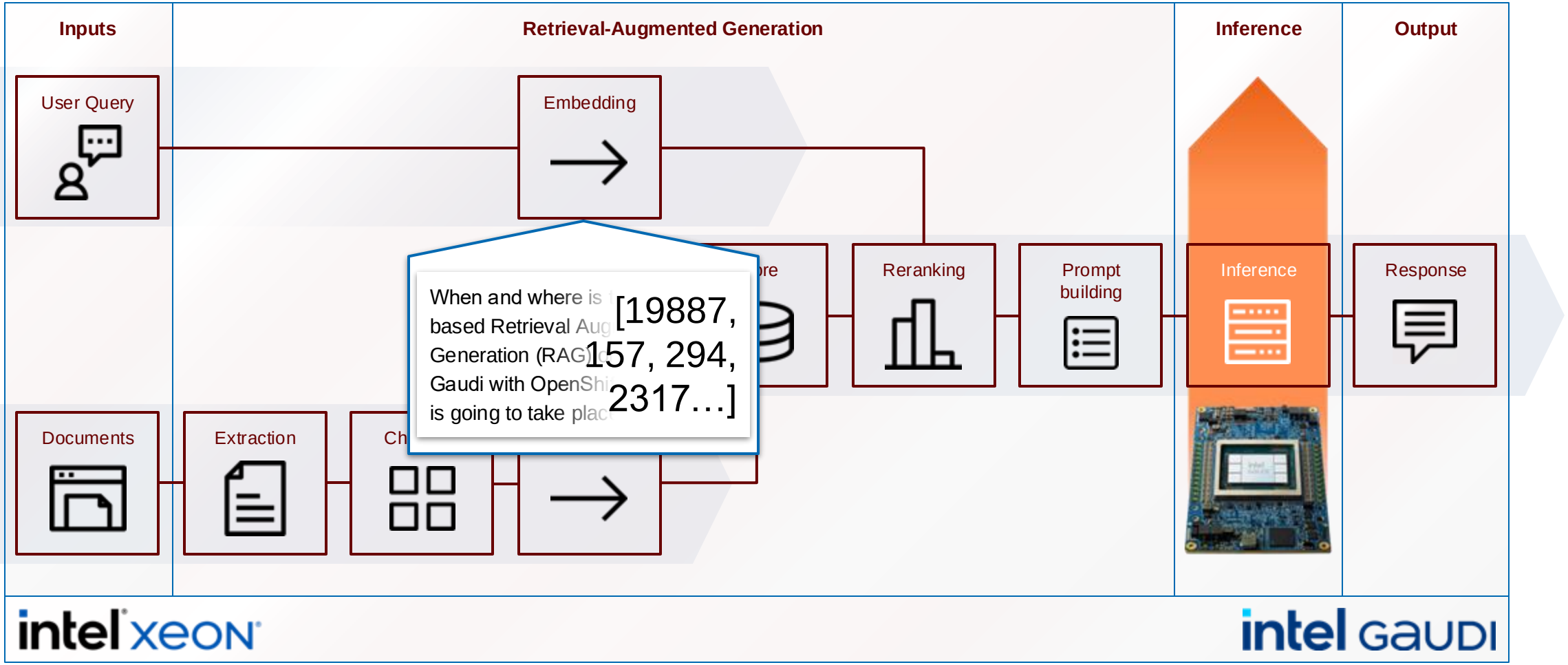
Retrieval Augmented Generation (RAG)



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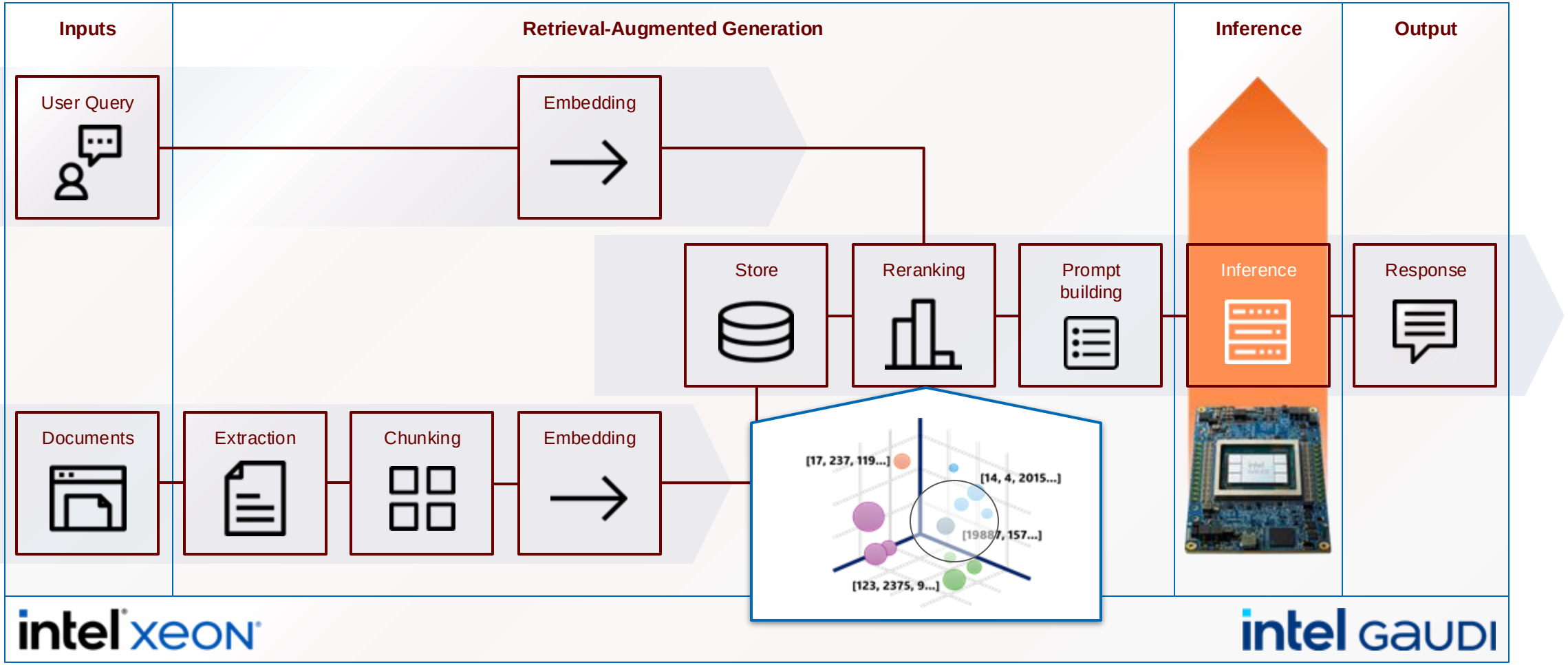
Retrieval Augmented Generation (RAG)



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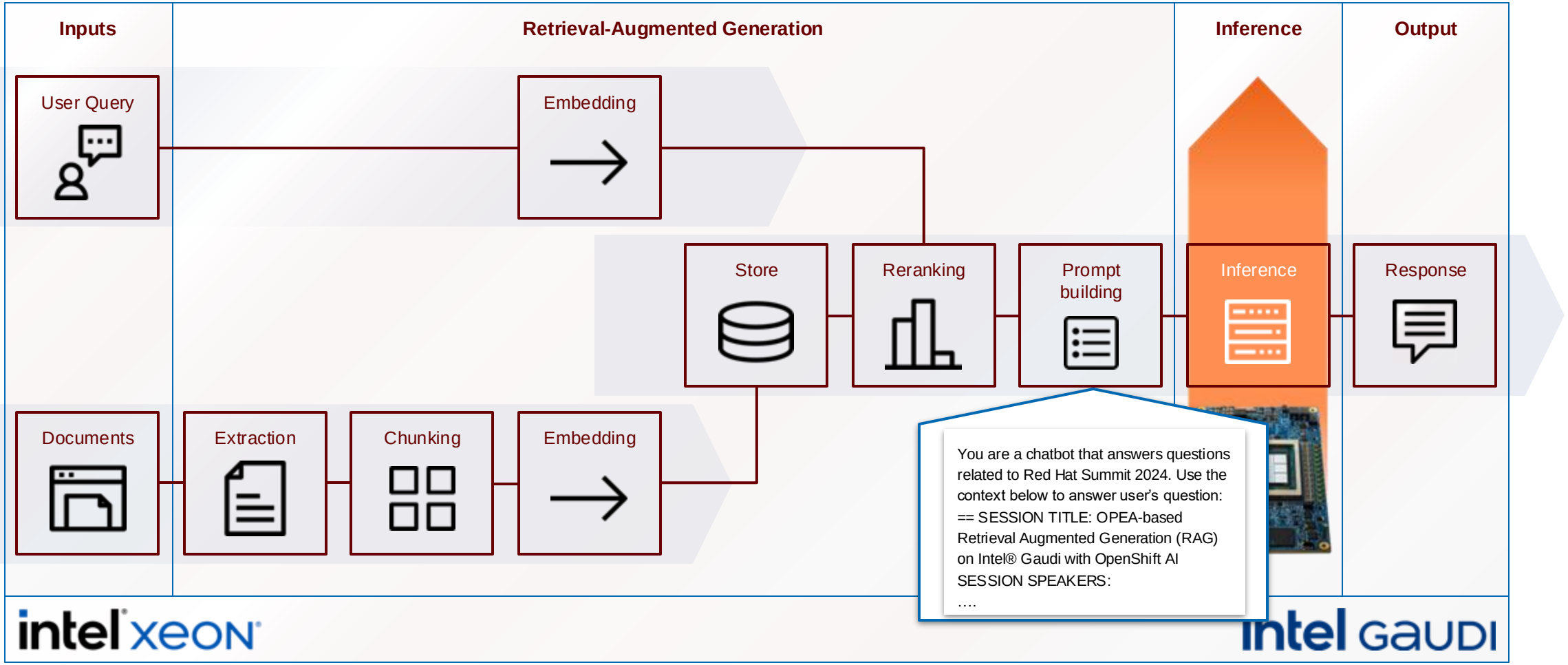

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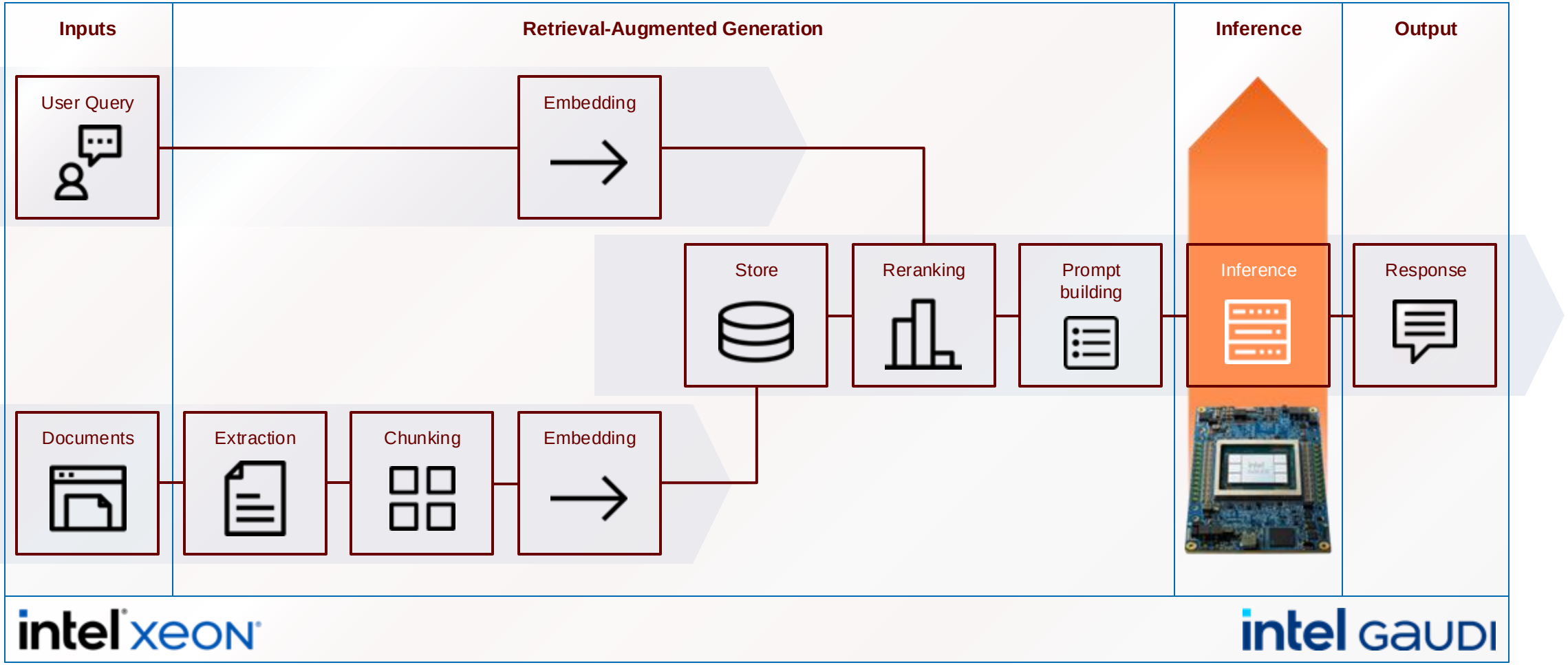

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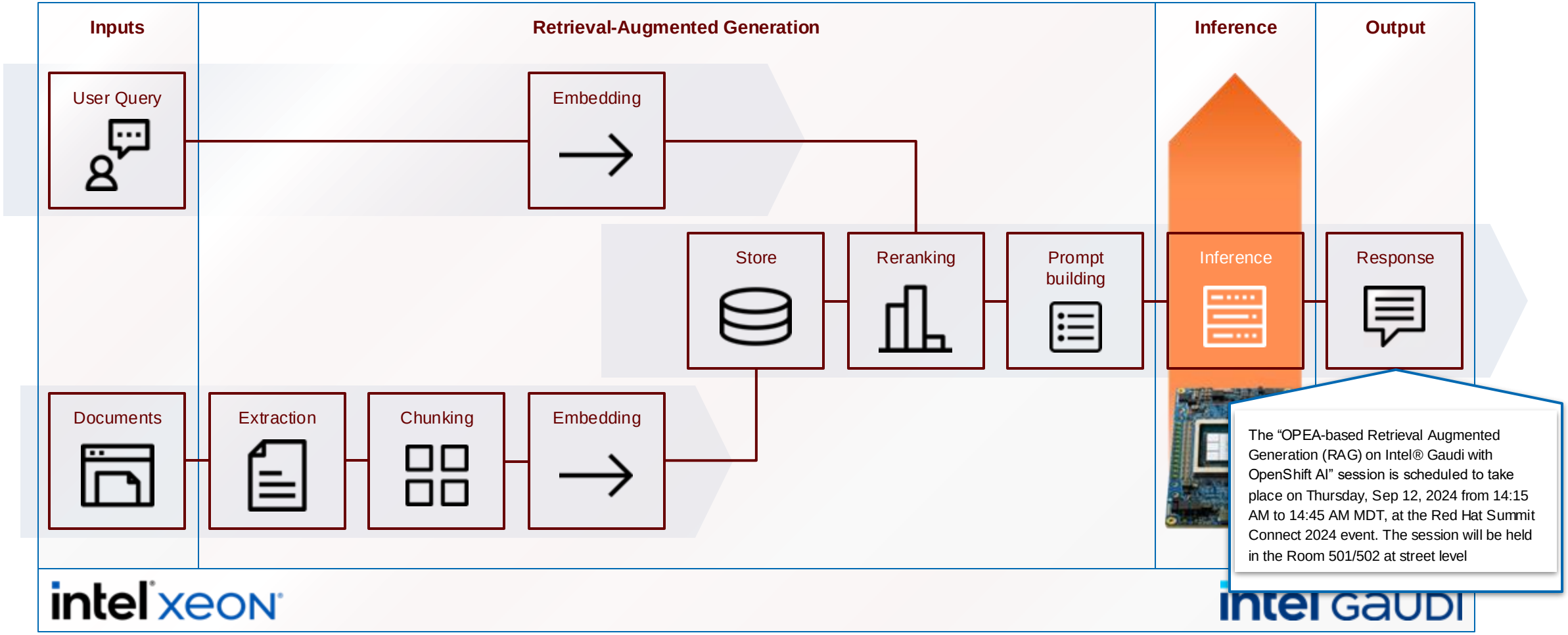

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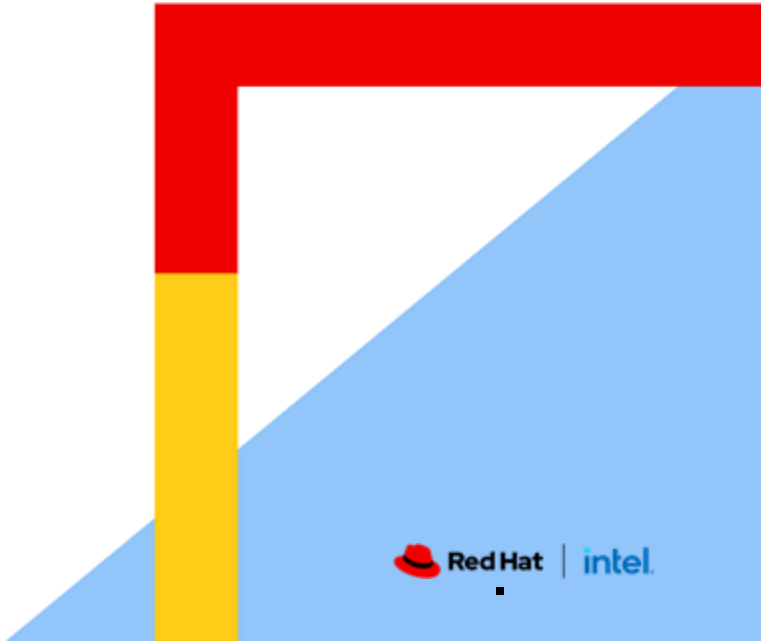
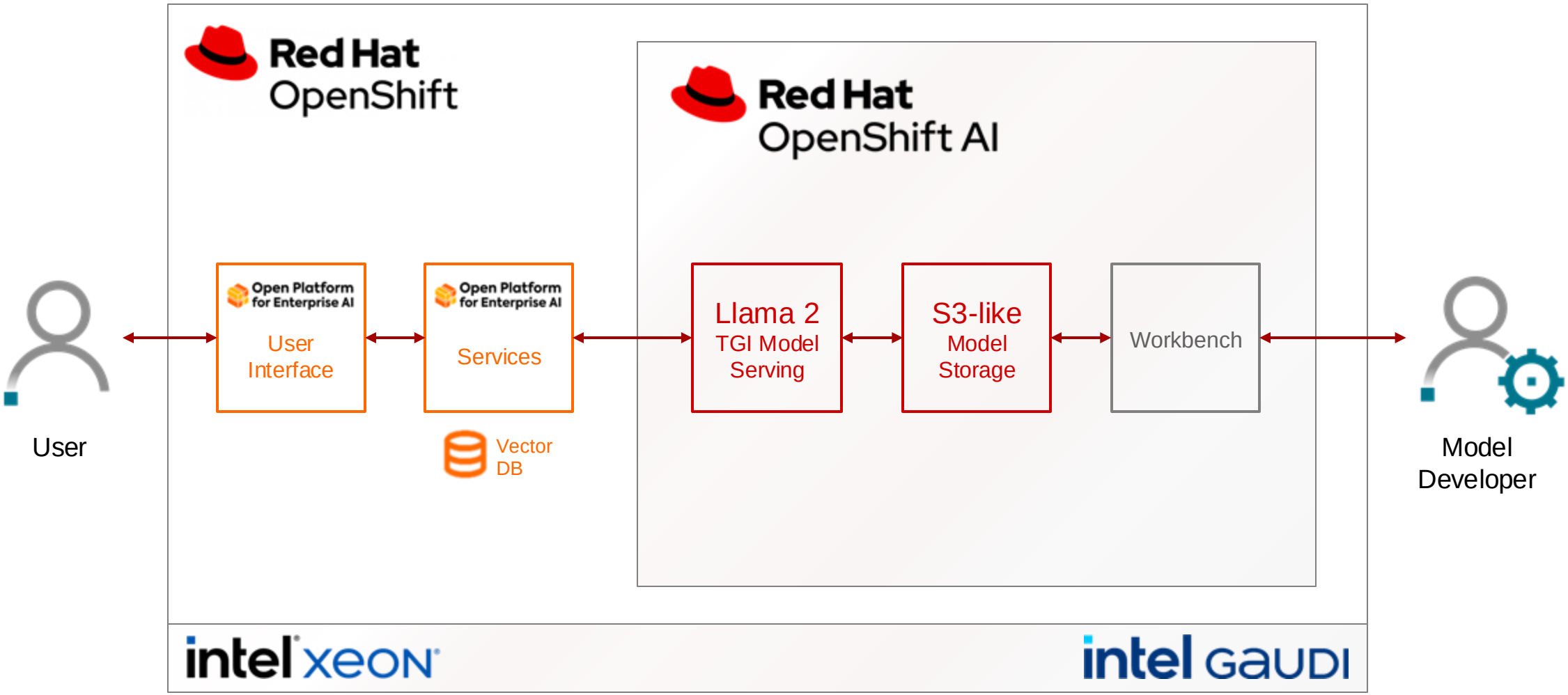
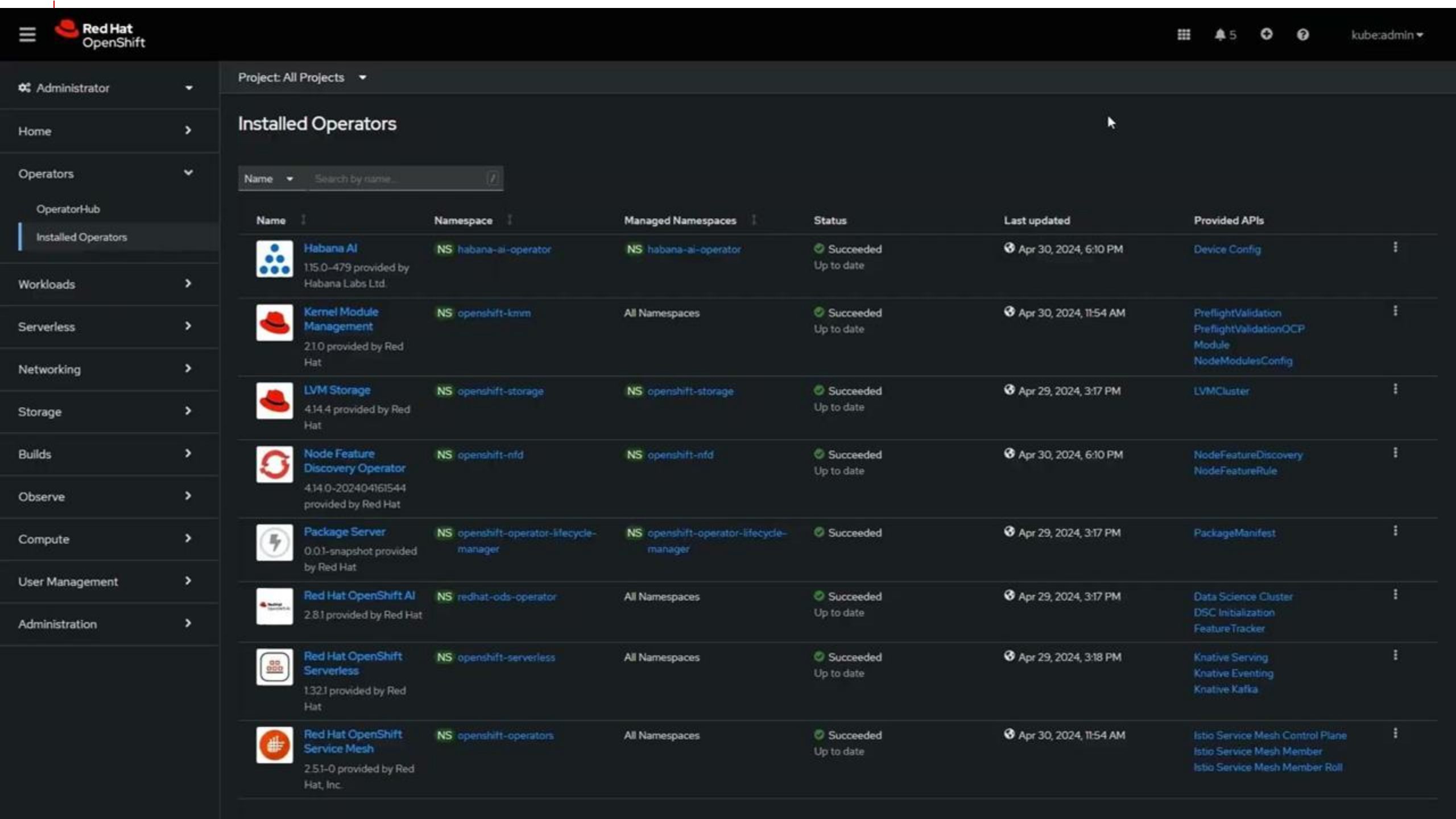
Retrieval Augmented Generation (RAG) Chatbot Demo




Red Hat OpenShift
Red Hat OpenShift AI
User
Open Platform for Enterprise AI
User Interface
Open Platform for Enterprise AI
Services
Vector DB
Llama 2
TGI Model Serving
S3-like
Model Storage
Workbench
Model Developer
intel XEON
intel GAUDI


Red Hat OpenShift
5
kube:admin
Administrator
Home
Operators
OperatorHub
Installed Operators
Workloads
Serverless
Networking
Storage
Builds
Observe
Compute
User Management
Administration
Project: All Projects
Installed Operators
Name
Search by name...
Name
Namespace
Managed Namespaces
Status
Last updated
Provided APIs
Habana AI
1.15.0-479 provided by Habana Labs Ltd
NS habana-ai-operator
NS habana-ai-operator
Succeeded
Up to date
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Device Config
Kernel Module Management
2.1.0 provided by Red Hat
NS openshift-kmm
All Namespaces
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PreflightValidation
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Module
NodeModulesConfig
LVM Storage
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Node Feature Discovery Operator
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NodeFeatureRule
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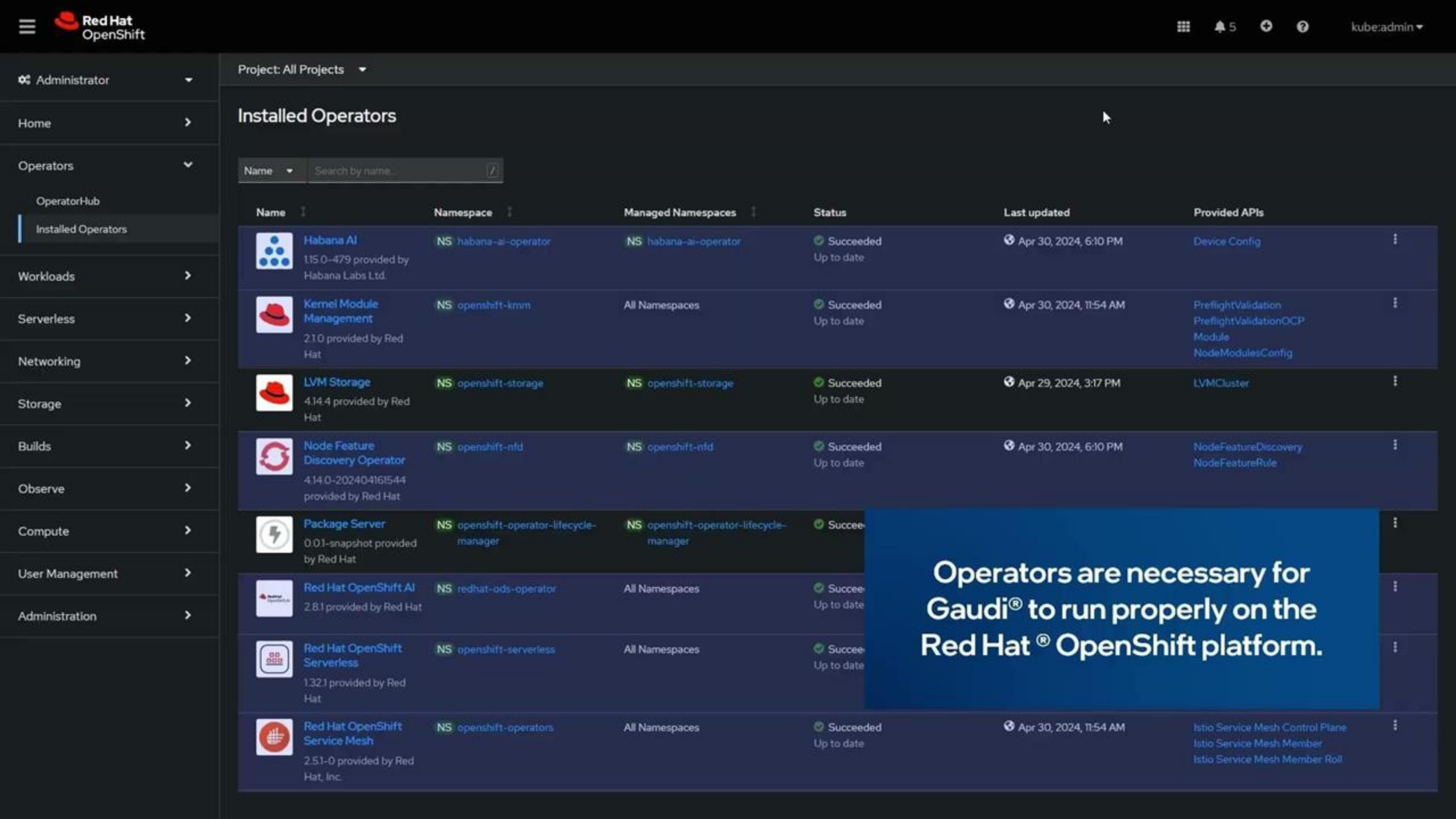
Istio Service Mesh Member
Istio Service Mesh Member Roll


Red Hat OpenShift
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Administrator
Home
Operators
OperatorHub
Installed Operators
Workloads
Serverless
Networking
Storage
Builds
Observe
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User Management
Administration
Project: All Projects
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Namespace
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NodeFeatureRule
Package Server
0.0.1-snapshot provided by Red Hat
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Succee
Red Hat OpenShift AI
2.8.1 provided by Red Hat
NS redhat-ods-operator
All Namespaces
Succee
Up to date
Red Hat OpenShift Serverless
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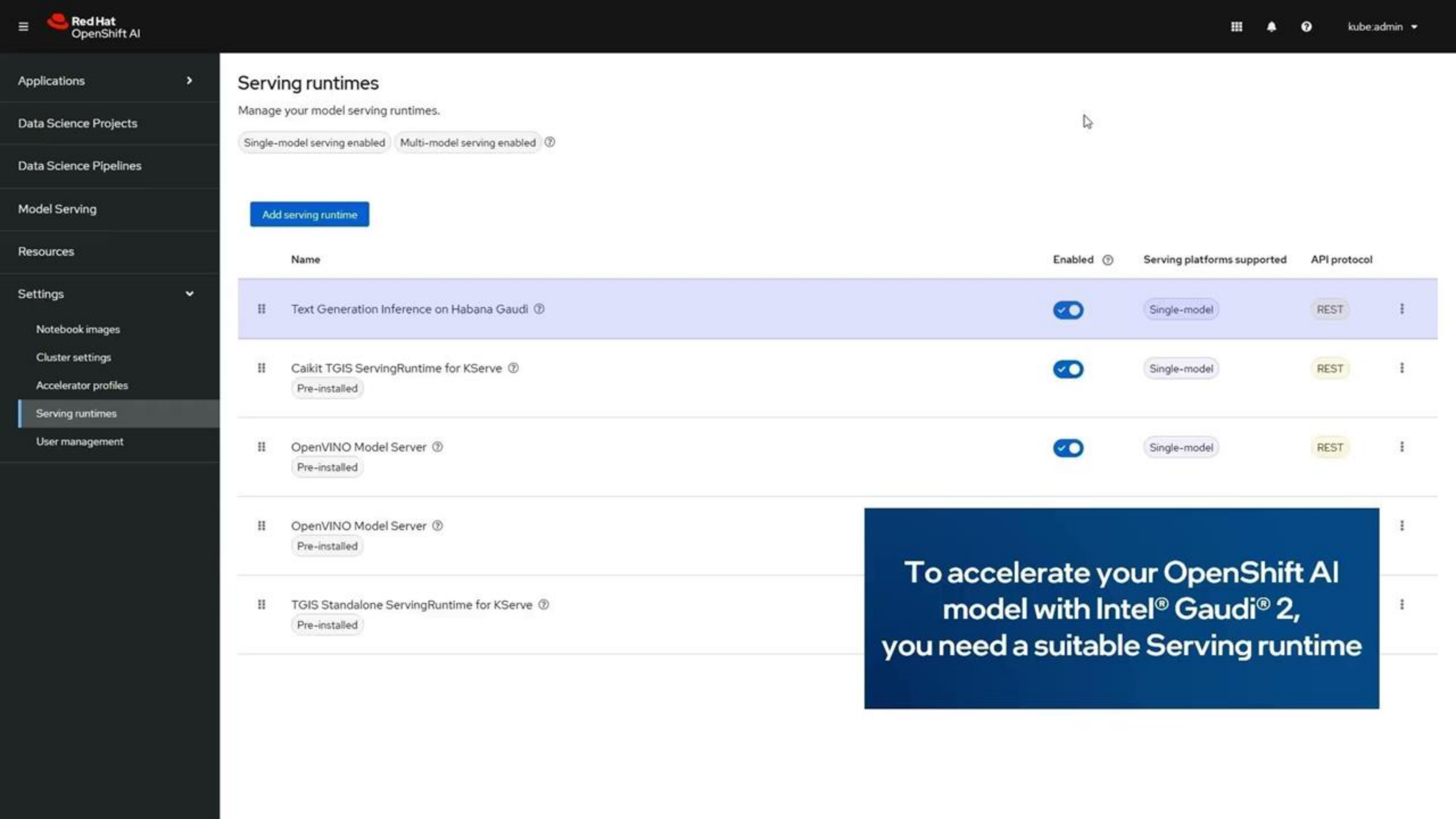
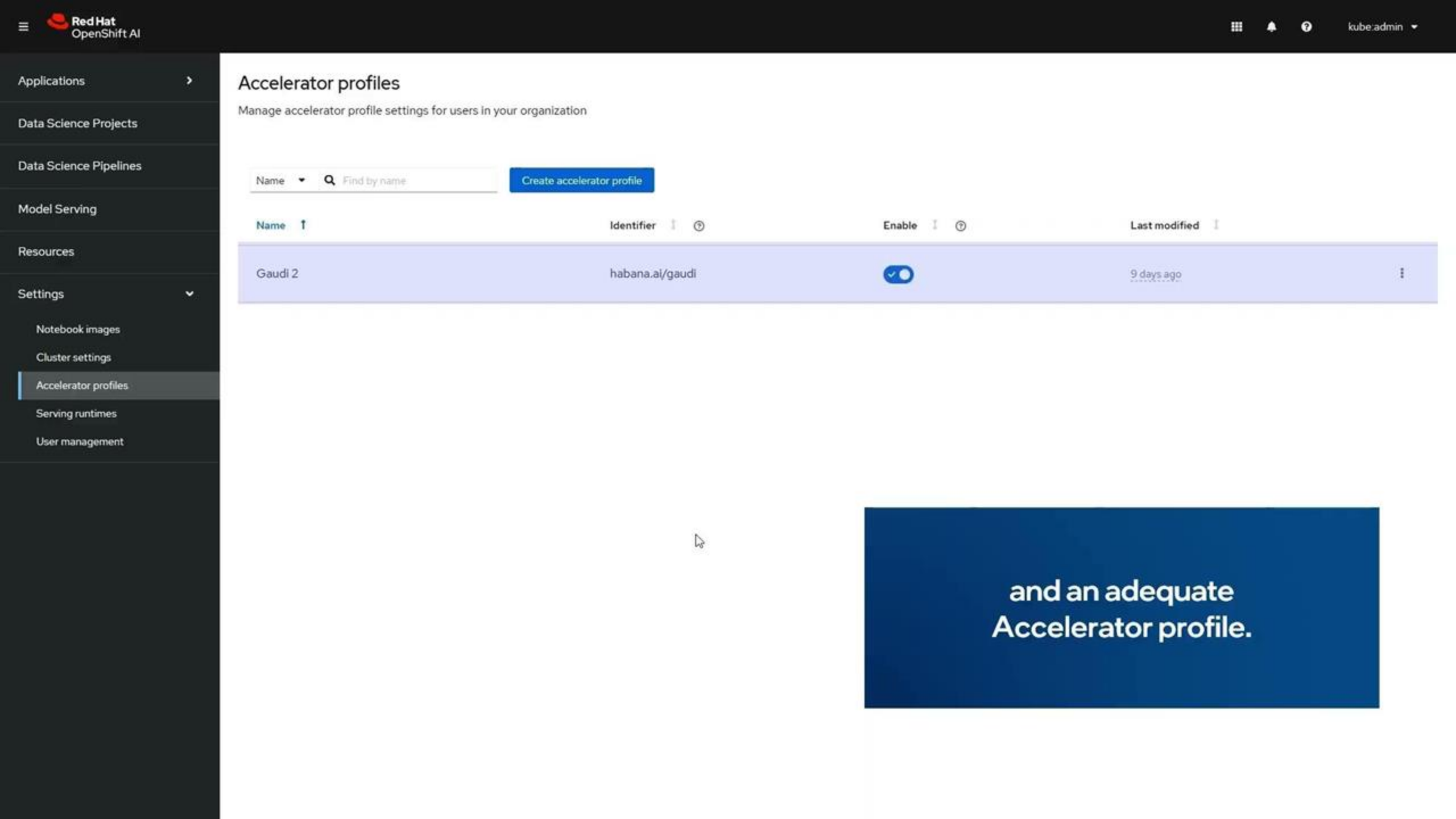
All Namespaces
Succee
Up to date
Red Hat OpenShift Service Mesh
2.5.1-0 provided by Red Hat, Inc.
NS openshift-operators
All Namespaces
Succeeded
Up to date
Apr 30, 2024, 11:54 AM
Istio Service Mesh Control Plane
Istio Service Mesh Member
Istio Service Mesh Member Roll
Operators are necessary for Gaudi® to run properly on the Red Hat ® OpenShift platform.


Red Hat OpenShift AI
kube:admin
Applications
Data Science Projects
Data Science Pipelines
Model Serving
Resources
Settings
Notebook images
Cluster settings
Accelerator profiles
Serving runtimes
User management
Serving runtimes
Manage your model serving runtimes.
Single-model serving enabled
Multi-model serving enabled
Add serving runtime
Name
Enabled
Serving platforms supported
API protocol
Text Generation Inference on Habana Gaudi
Single-model
REST
Caikit TGIS ServingRuntime for KServe
Pre-installed
Single-model
REST
OpenVINO Model Server
Pre-installed
Single-model
REST
OpenVINO Model Server
Pre-installed
TGIS Standalone ServingRuntime for KServe
Pre-installed
To accelerate your OpenShift AI model with Intel® Gaudi® 2, you need a suitable Serving runtime


Red Hat OpenShift AI
kube:admin
Applications
Data Science Projects
Data Science Pipelines
Model Serving
Resources
Settings
Notebook images
Cluster settings
Accelerator profiles
Serving runtimes
User management
Accelerator profiles
Manage accelerator profile settings for users in your organization
Name
Find by name
Create accelerator profile
Name
Identifier
Enable
Last modified
Gaudi 2
habana.ai/gaudi
9 days ago
and an adequate
Accelerator profile.

Applications
Data Science Projects
Data Science Pipelines
Model Serving
Resources
Settings
Notebook images
Cluster settings
Accelerator profiles
Serving runtimes
User management

Red Hat Summit LLM w/ RAG Demo

Components | Permissions

Jump to section
Workbenches
Cluster storage
Data connections
Models and model servers

Workbenches

Create workbench

Name	Notebook image	Container size	Status	
wb1	HabanaAI	Small	Running	Open

Cluster storage

Add cluster storage

Name	Type	Connected workbenches
wb1	Persistent storage	wb1

Data connections

Add data connection

Name	Type	Connected workbenches
bucket-70b-chat	Object storage	No connections
minio	Object storage	No connections

Models and model servers

Deploy model

Single-model serving enabled

Model name	Serving runtime	Inference endpoint	API protocol	Status
tgi-70b-1	Text Generation Inference on Habana Gaudi	https://tgi-70b-1-rag-on-gaudi.apps.cluster1.gaudi.internal	REST	
tgi-70b-2	Text Generation Inference on Habana Gaudi	https://tgi-70b-2-rag-on-gaudi.apps.cluster1.gaudi.internal	REST	

Edit
Delete

What's on your mind?

Stock Llama2 70b

intel Xeon intel Gaudi

Stock Llama2 70b with RAG

intel Xeon intel Gaudi redis

What is Red Hat Summit?

Stock Llama2 70b

Hi!

Hello! What can I help you with today?

intel Xeon intel Gaudi

Stock Llama2 70b with RAG

Hi!

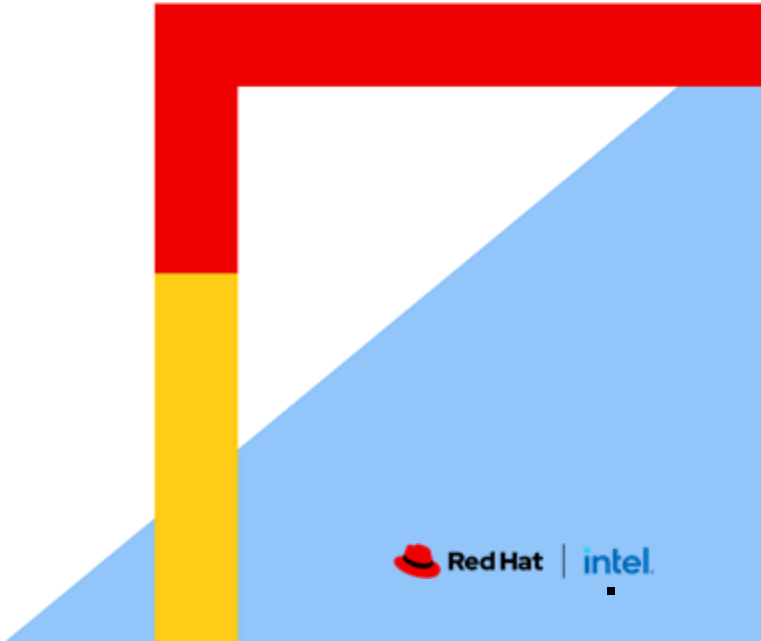
Hi! Welcome to Red Hat Summit 2024! We're excited to have you join us for this year's event. Can we help you with something specific? Are you looking for information on a particular topic or session? Or perhaps you'd like to know more about our keynote speakers or networking opportunities? Let us know, and we'll do our best to assist you. See you soon!

Sources

Red Hat Summit 2024 s...

intel Xeon intel Gaudi redis

Summary



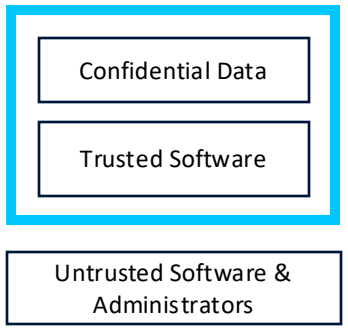
Key Takeaways

- RAG enhances AI development
- OPEA simplifies AI deployment
- OpenShift AI integrates into DevOps workflow
- Intel Gaudi 3 accelerates AI training and inference

Confidential AI Helps Protect Data & Models In-Use

Utilizing Confidential Computing for Containers with Intel TDX

Hardware-Based Protection of Data In-Use
With Intel Trusted Domain Extensions (TDX)



+

Openshift sandboxed containers

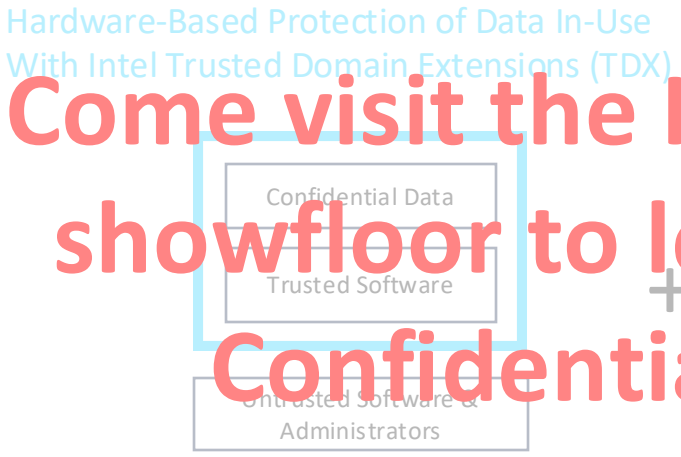
The Confidential Containers project

Confidential Computing is about protecting data in-use.

You do not have to trust the system admins of the providers any longer.

Confidential AI Helps Protect Data & Models In-Use

Utilizing Confidential Computing for Containers with Intel TDX



Come visit the Intel booth on the showfloor to learn more about Confidential Computing

Learn more!

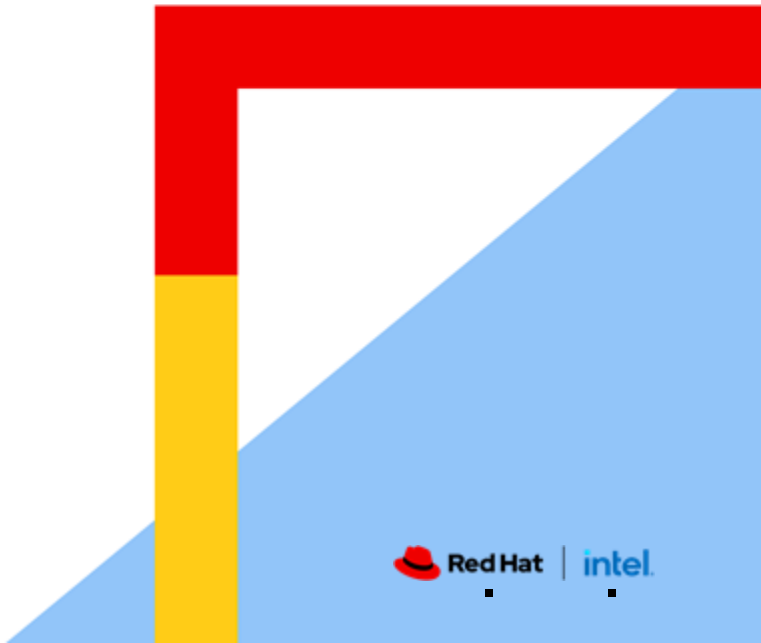
Learn more!

Confidential Computing is about protecting data in-use

You do not have to trust the system admins of the providers any longer

Red Hat | intel.

Q&A



Red Hat Summit

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Thank you

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 facebook.com/redhatinc

 youtube.com/user/RedHatVideos

 twitter.com/RedHat