



AI & ML with Docker

Why Containers Matter More Than Ever in the Age of AI



by Gourav Shah

The AI/ML Revolution is Here



AI is already transforming every industry



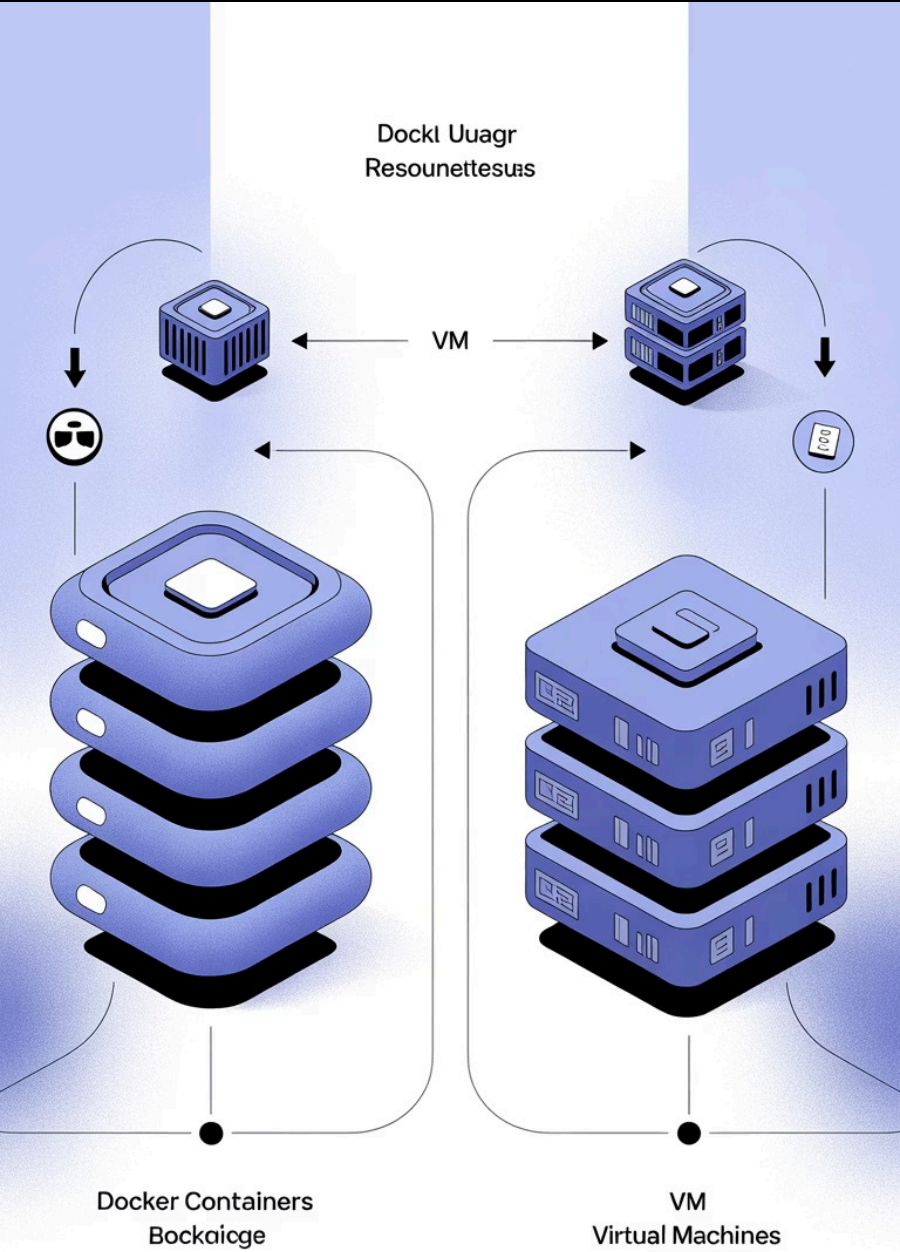
ML models are growing more complex and harder to deploy



Need for scalable, portable, reproducible environments

To scale AI/ML, we need tools that simplify and standardize workflows.

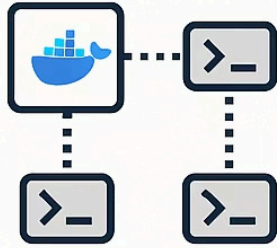




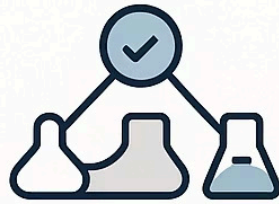
Docker vs VMs in ML

Feature	Docker	Virtual Machines
Startup Time	⚡ Fast	🐢 Slow
Resource Use	Efficient	Heavy
Portability	High	Medium
Isolation	High	Very High
Dev Workflow	Smooth	Clunky

Advantages of Using Docker for AI & ML



**Consistent &
Reproducible
Environments**



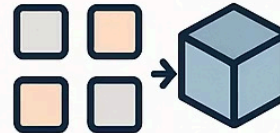
**Simplified
Dependency
Management**



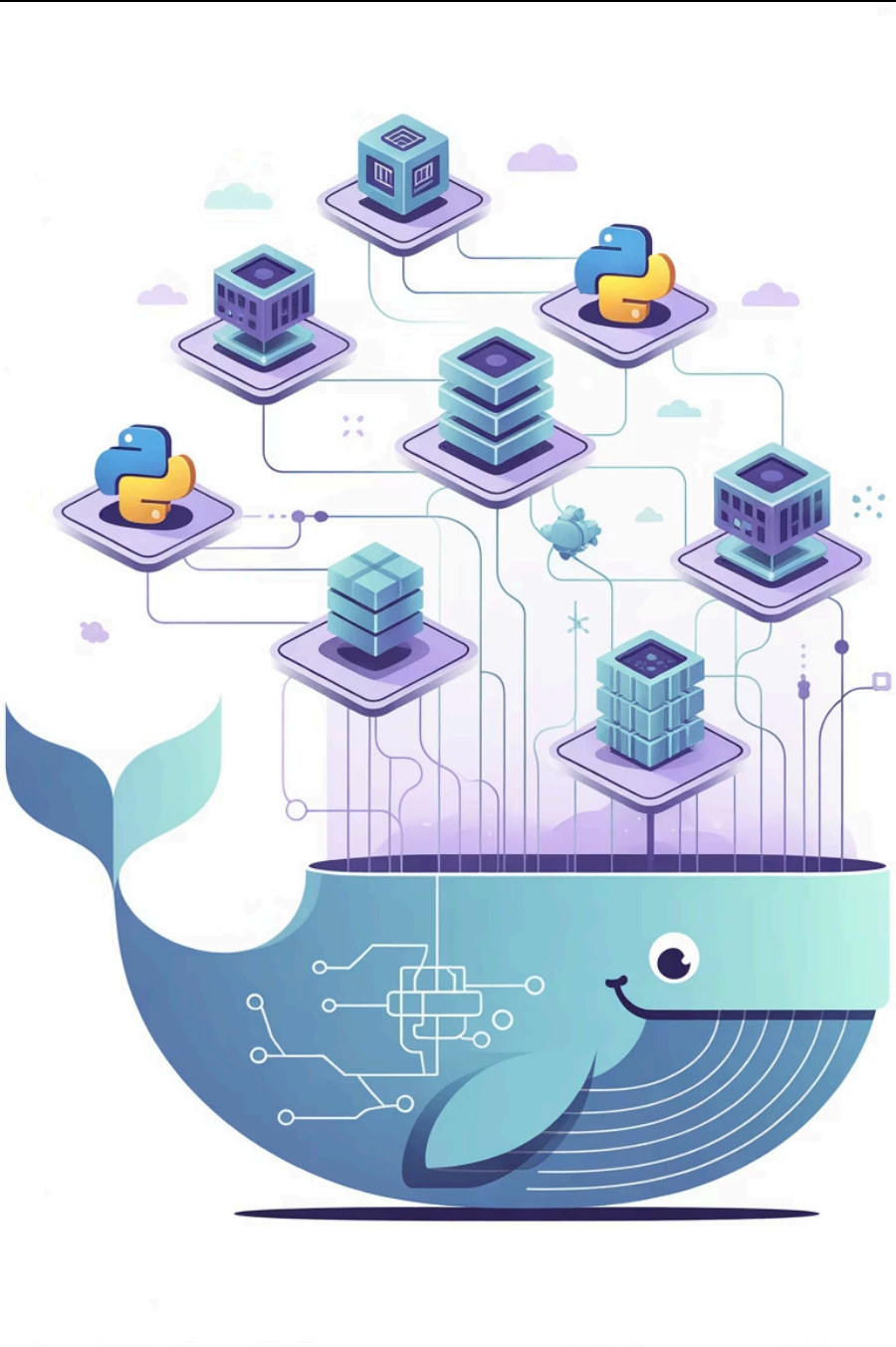
**Seamless
Experimentation
& Model Versioning**



**Portable Deployment
to Cloud, Edge
& Anywhere**



**Modular Microservices
for Scalable Inference**



Why Docker in AI/ML?

Removes "works on my machine" issues

Simplifies setup and dependencies

Enables repeatable experimentation

Empowers seamless deployment across environments

Docker is the glue between models and production.

Why Should *You* Care?

If you are a:



ML Engineer

reproducible experiments + scalable infra



DevOps Engineer

deploy models with confidence



Data Scientist

avoid environment hell



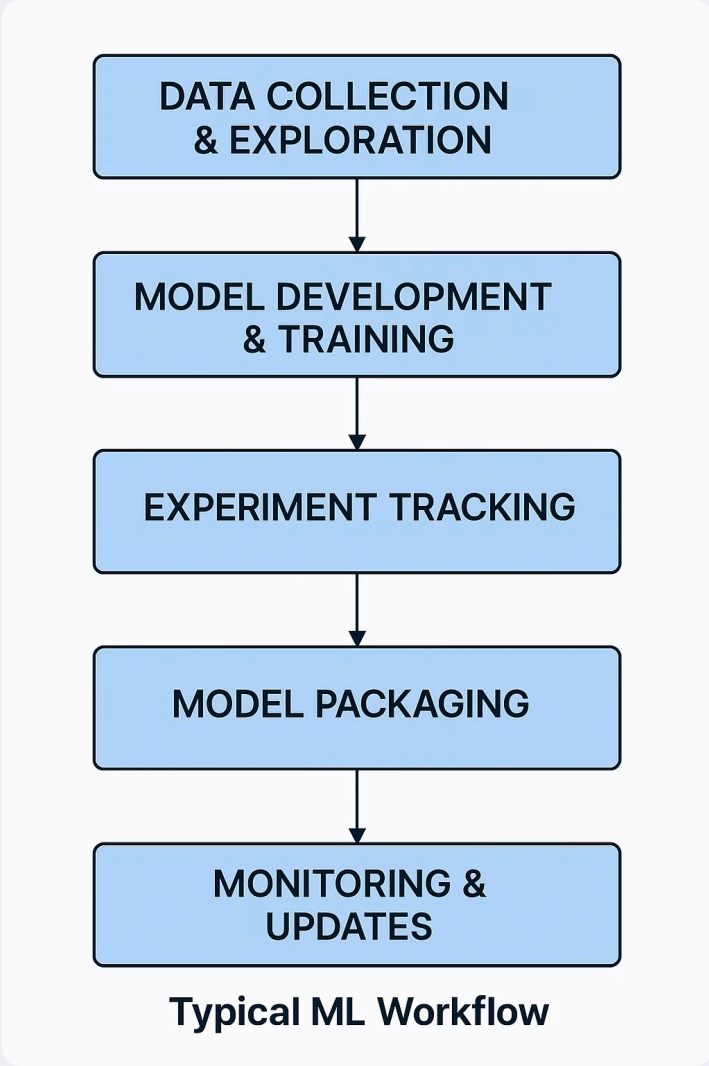
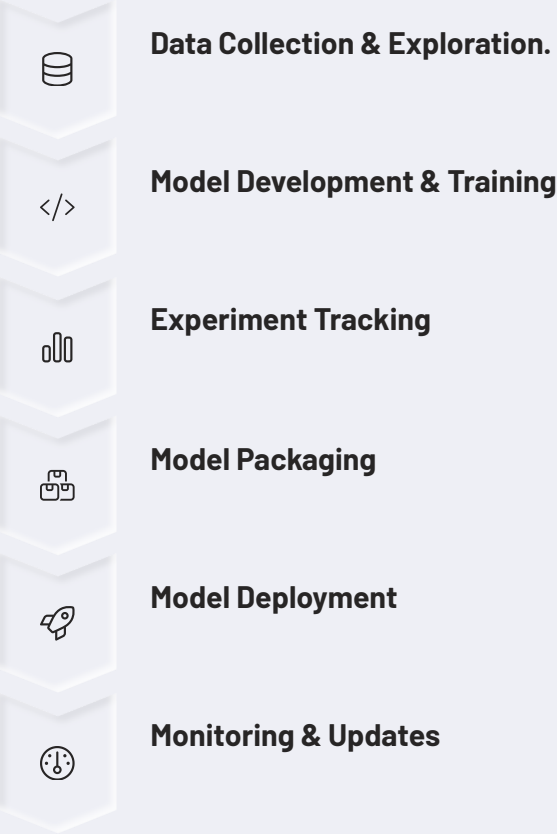
AI Hobbyist

run state-of-the-art models on your laptop

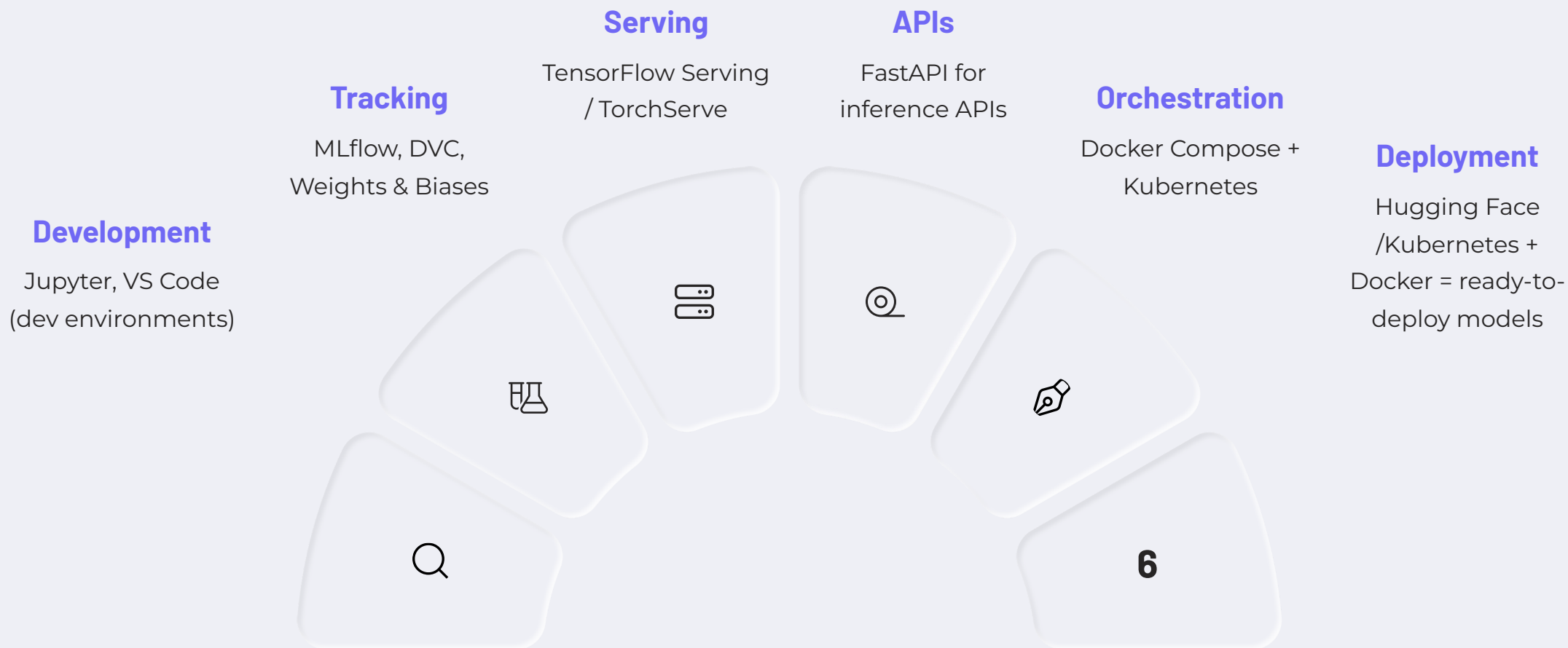
Containers make you 10x more productive in ML.



Where Docker Fits into the ML Workflow ?



Common Tools + Docker in ML



Popular Use Cases for Docker in ML



Containerized Jupyter notebooks for research



ML model training on GPU clusters



MLflow + Docker for experiment tracking



REST APIs for model serving (Flask/FastAPI)



Deploying models to Hugging Face Spaces



Portable inference on edge devices

Who's Using Docker for AI/ML?



Netflix

Personalize
d content
with ML
pipeline
containers



Uber

Michelang
lo platform
built on
Dockerized
workflows



Amazon

SageMaker
uses
Docker
under the
hood



NASA

Containeriz
ed ML for
space
simulations

Big names rely on containers to make AI reliable.

1. Uber: Streamlining ML Pipelines with Docker

Uber employs Docker to **containerize its machine learning workflows, facilitating consistent environments** for development and deployment. This approach enhances the scalability and reproducibility of their ML models, which are integral to services like ETA predictions and dynamic pricing.

Source : https://www.uber.com/en-IN/blog/from-predictive-to-generative-ai/?utm_source=chatgpt.com

2. Netflix: Orchestrating ML Workflows Using Docker

Netflix utilizes Docker containers to **manage and scale its machine learning workflows** efficiently. By containerizing their ML tasks, Netflix ensures consistent environments across development and production, aiding in tasks like **content recommendation and streaming optimization**.

Source : <https://netflixtechblog.com/maestro-netflixs-workflow-orchestrator-ee13a06f9c78>

3. Walmart: Scaling AI Solutions with Docker

Walmart leverages Docker to **containerize its AI applications**, facilitating **scalable and efficient deployment** across its vast retail infrastructure. This strategy supports various use cases, including **inventory management and customer experience** enhancements.

Source : <https://medium.com/walmartglobaltech/machine-learning-platform-at-walmart-b06819825ef7>

4. Ingka Group (IKEA): Scalable MLOps with Docker and Kubernetes

Ingka Group, the parent company of IKEA, adopted Docker and Kubernetes to build a robust **MLOps platform**. This setup allows for **dynamic scaling** of AI/ML applications, **improved collaboration** through **uniform development environments**, and **enhanced security**. The containerized approach accelerates prototyping and deployment of new models, aligning with IKEA's commitment to innovation.

Source : https://www.docker.com/customer-stories/ingka/?utm_source=chatgpt.com

5. NASA: Accelerating Data Analysis with Docker

NASA employs Docker containers to **standardize and expedite** its machine learning workflows, particularly in processing vast amounts of satellite data. Containerization aids in maintaining consistent environments, crucial for the reproducibility of scientific analyses.

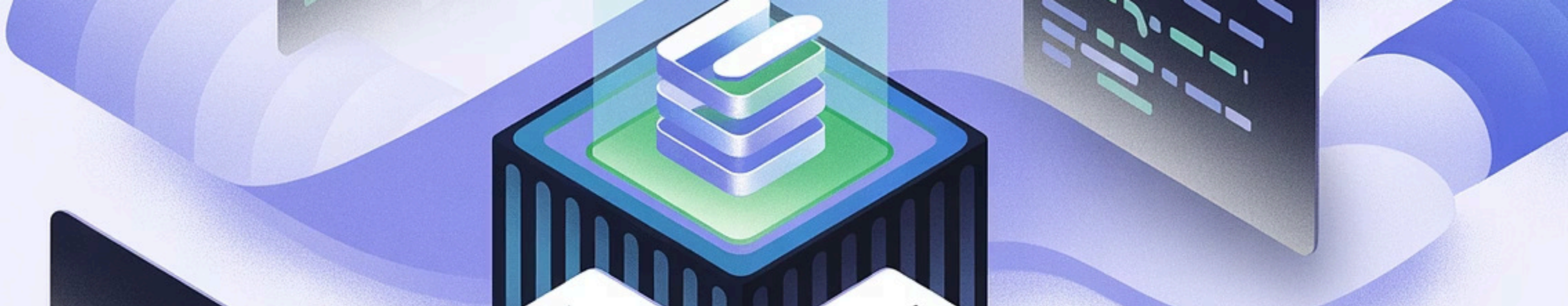
Source : https://aws.amazon.com/solutions/case-studies/nasa-jpl-spot-case-study/?utm_source=chatgpt.com

6. ZEISS Microscopy: Cross-Platform AI Model Deployment

ZEISS, a leader in optics and optoelectronics, utilizes **Docker to deploy AI models** across various platforms, including **cloud and local Windows-based clients**. By containerizing their AI solutions, ZEISS ensures **consistent performance** and **simplifies the distribution** of complex models, enhancing their microscopy software's capabilities.

Source : https://www.docker.com/customer-stories/zeiss/?utm_source=chatgpt.com

Docker in the world of LLMs / Agentic AI



Running Models with Docker Model Runner

Dockerized abstraction of any trained model

Package your model with all dependencies

Example: `docker run -p 8080:8080 ghcr.io/mlc-ai/model-runner:latest`

Launch a ready-to-serve REST API in seconds

No need to write custom API code

Framework agnostic (TF, Torch, XGBoost)

Works with all major ML frameworks

Docker + MCP Tooling

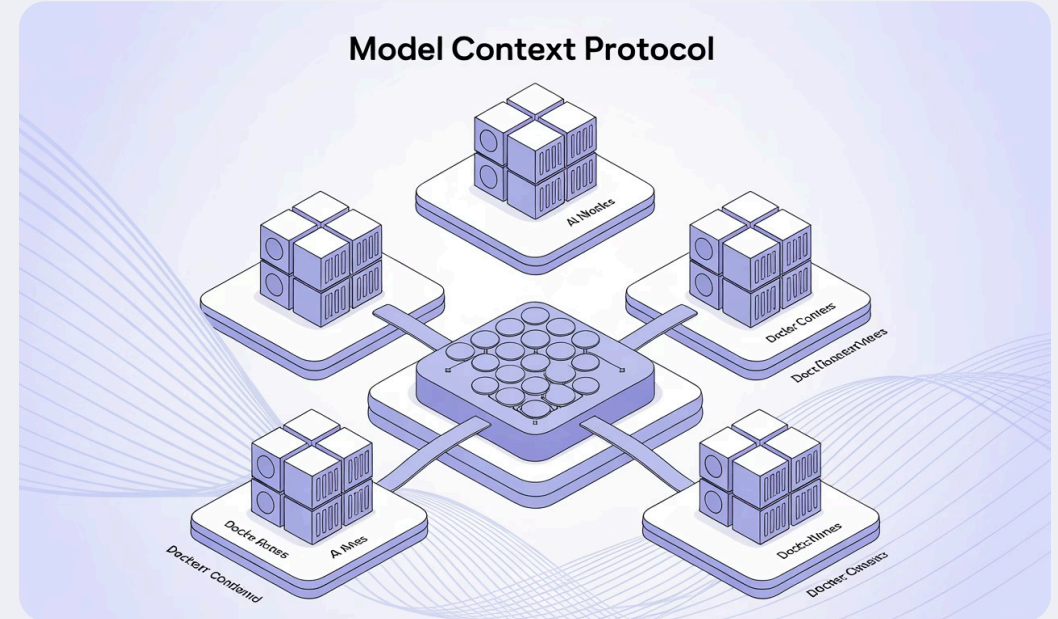
What's MCP? Model Context Protocol lets AI models access real-world tools

Docker + MCP =

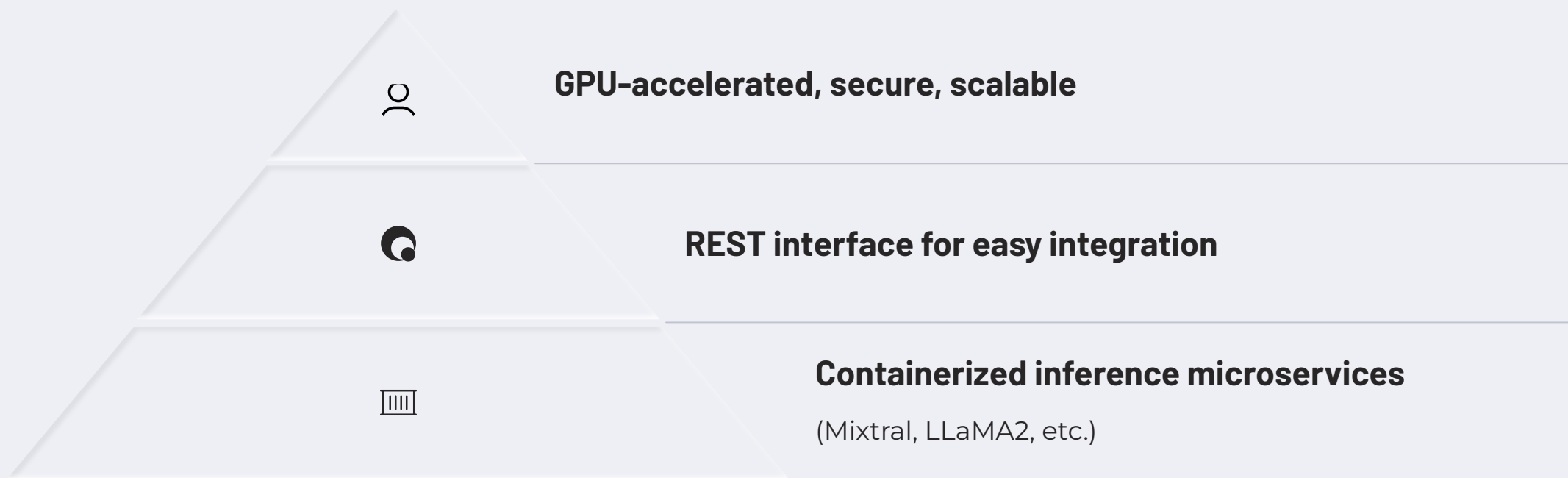
- Self-hosted MCP toolkits (Terraform, Kubernetes, CLI agents)
- Tool-aware autonomous agents

Example:

```
docker run -p 3000:3000 realops/kubernetes-mcp-server:latest
```



Deploying NVIDIA NIM with Docker



Example: `docker run --gpus all -p 8000:8000 nvcr.io/nim/mixtral:latest`

Agentic AI + Docker

Agentic AI = LLMs + Tools + Memory + Goals



Containerized toolchains




Isolated execution environments



Easy orchestration

(Docker Compose / K8s)

 Build and deploy autonomous AI agents with ease.

Sample Agentic DevOps Setup

Agentic AI Framework

(LangGraph / BeeAI)

Docker Networking or Kubernetes



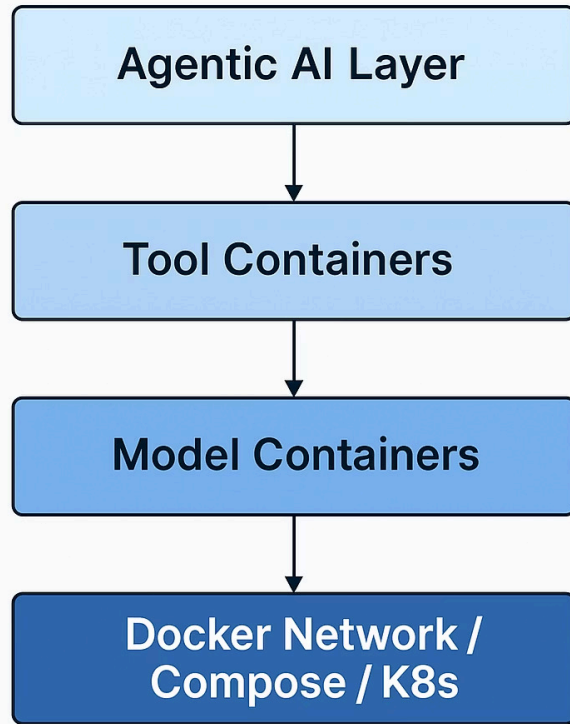
Tool Containers

(CLI tools, MCP tools)

Model Containers

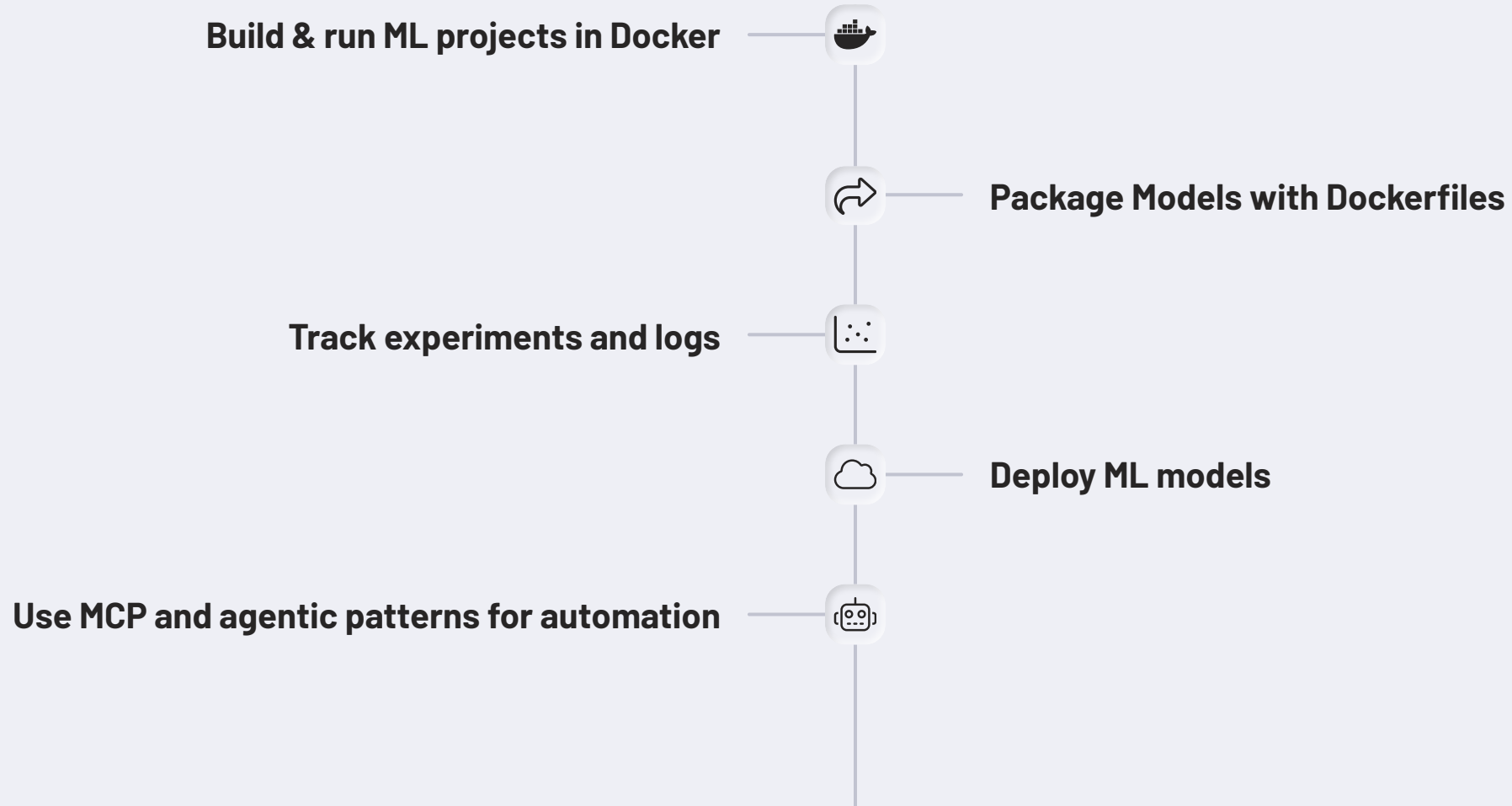
(LLMs, Embedders)

Reproducible. Scalable. Composable.



Sample Agentic DevOps Setup

What You'll Learn in This Course





What You'll Walk Away With

1

Hands-on Docker experience

2

A toolkit for AI/ML deployment

3

Understanding of real-world use cases

4

Readiness to tackle MLOps & AI automation

Let's Dockerize Your AI Journey!



Start with your first containerized ML project



Learn, build, deploy – the DevOps way



Ready to become future-proof?



Join the mission. Build real. Learn Docker for AI/ML.



Get Started with your AI/ML Journey

www.schoolofdevops.com

[\]www.schoolofai.dev](http://www.schoolofai.dev)