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Kubernetes Community Days
MUNICH 2024

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Speaker: Martin Brandl, Philip Welz

Company: white duck

# Build and run your own intelligent application based on open source using Semantic Kernel and Kaito

# Who we are

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# Agenda

- Intelligent applications
- Kaito
- Semantic Kernel
- Demo

# Intelligent applications

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# Intelligent applications

- ....leverage artificial intelligence (AI) services to perform tasks autonomously, making decisions and taking actions
- Model-as-a-Service is the common approach
  - OpenAI, ChatGPT, Gemini, ...
- But what if you need to run the model closer to the data?

# Why run models in Kubernetes?

- Leverage existing infra and knowledge
- Network and data security (sovereignty)
- Support for popular open-source LLMs or BYO
- Reduce time to inference
- MaaS approach can be a black-box

# Kaito

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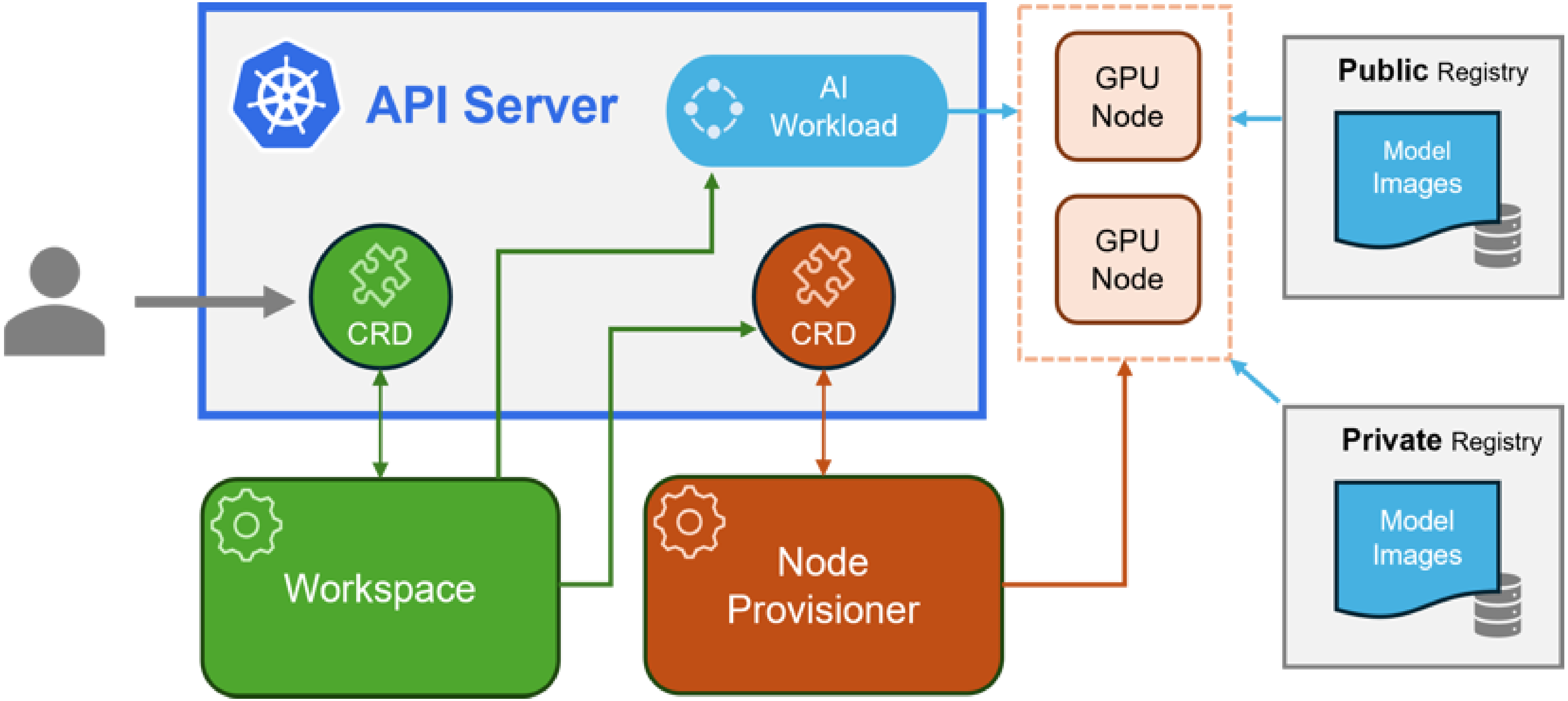
# Kaito

- Kubernetes AI toolchain operator
- Open-source
- Managed or standalone
- Manage LLMs using container images
- Hardware
  - Presets eliminating the need for manual tuning of deployment parameters to fit GPU hardware
  - automatically provisions GPU nodes based on the requirements

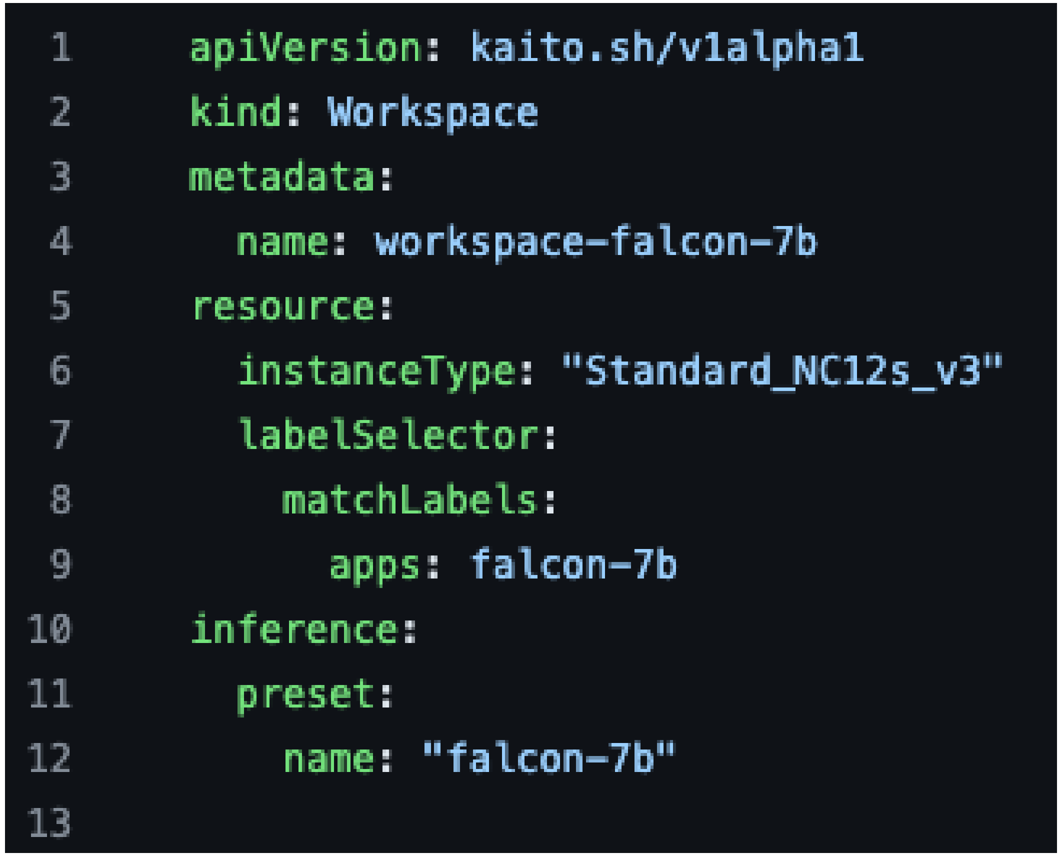
# Kaito



Picture source: https://github.com/Azure/kaito

# Kaito

- Model presets
  - falcon
  - llama2
  - llama2chat
  - mistral
  - phi-2
  - phi-3 (coming soon)



```yaml
apiVersion: kaito.sh/v1alpha1
kind: Workspace
metadata:
  name: workspace-falcon-7b
resource:
  instanceType: "Standard_NC12s_v3"
  labelSelector:
    matchLabels:
      apps: falcon-7b
inference:
  preset:
    name: "falcon-7b"

```

# Kaito

- Propose new OSS model
  - Kaito maintainers will setup the model presets configuration
- Deploy OSS model from your private registry
- Fine-tuning of the models
  - Leverage Workspace API for parameter-efficient fine-tuning (PEFT) of models

# Semantic Kernel

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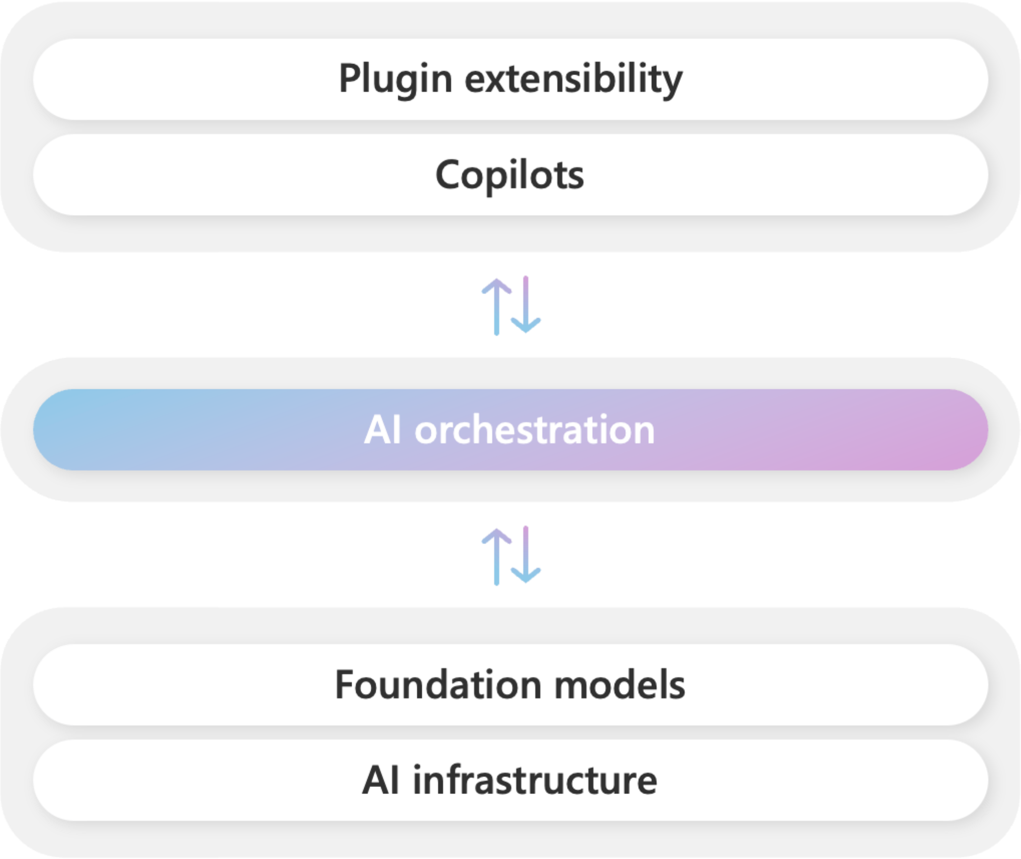
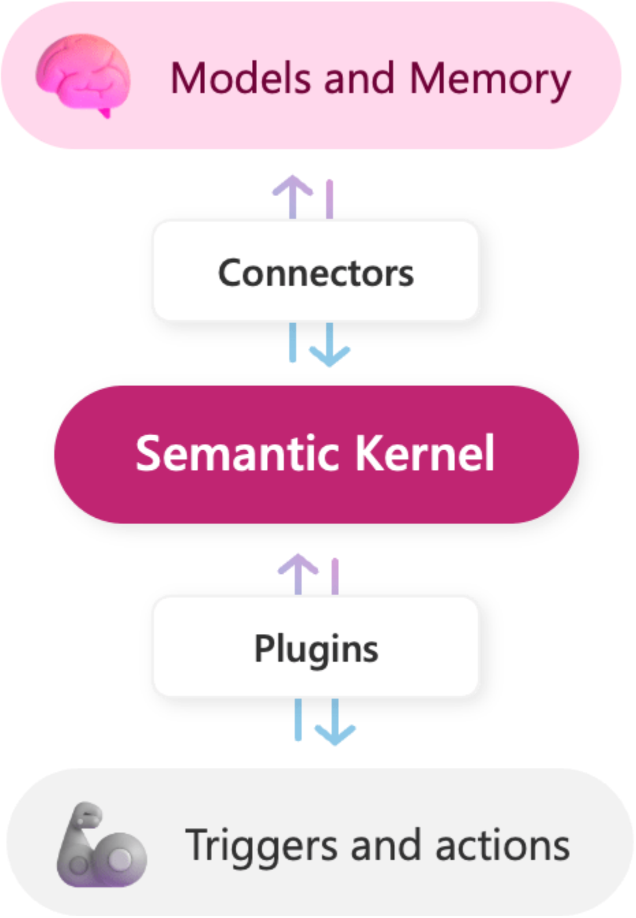
# Semantic Kernel

- Open Source SDK
- Seamlessly integrates AI services into your application
- Central component of an agent/copilot stack
- Supports multiple LLMs like Azure OpenAI and Hugging Face (no Lock-In to AI Providers)
- Available on multiple platforms like C#, Java and Python



# Semantic Kernel – Connectors & Plugins

- **Connectors:**
  - Integrate AI model
  - Add memories (Vector DB)
- **Plugins**
  - Easily Integrate Existing Code
  - Two Types
    - Native functions
    - Prompts
  - Out-of-the-box plugins (Math, HTTP, Wait, …)



# Semantic Kernel – Planners

- Automatically orchestrate plugins with AI
- Determines the optimal approach to fulfill the request
- May increase the costs but can also save money ☺

The planner
The plan

# Demo, demo, demo 🚀

- Demo
  - Falcon (Kaito) with Semantic Kernel
  - Azure OpenAI with Semantic Kernel
- Slides are also available within the repo
  - https://github.com/whiteducksoftware/demo-ai-kaito-semantic-kernel

# Questions?

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Thank you!