Phase IV: Local Kubernetes Deployment (Minikube, Helm Charts, kubectl-ai, Kagent, Docker Desktop, and Gordon)

Cloud Native Todo Chatbot with Basic Level Functionality

Objective: Deploy the Todo Chatbot on a local Kubernetes cluster using Minikube, Helm Charts.

Requirements

- Containerize frontend and backend applications (Use Gordon)
- Use Docker AI Agent (Gordon) for AI-assisted Docker operations
- Create Helm charts for deployment (Use kubectl-ai and/or kagent to generate)
- Use kubectl-ai and kagent for AI-assisted Kubernetes operations
- Deploy on Minikube locally

Note: If Docker AI (Gordon) is unavailable in your region or tier, use standard Docker CLI commands or ask Claude Code to generate the `docker run` commands for you.

Technology Stack

Component	Technology
Containerization	Docker (Docker Desktop)
Docker AI	Docker AI Agent (Gordon)
Orchestration	Kubernetes (Minikube)
Package Manager	Helm Charts
AI DevOps	kubectl-ai, and Kagent
Application	Phase III Todo Chatbot

AIOps

Use Docker AI Agent (Gordon) for intelligent Docker operations:

```
# To know its capabilities
docker ai "What can you do?"
```

Enable Gordon: Install latest Docker Desktop 4.53+, go to Settings > Beta features, and toggle it on.

Use kubectl-ai, and Kagent for intelligent Kubernetes operations:

```
# Using kubectl-ai
kubectl-ai "deploy the todo frontend with 2 replicas"
kubectl-ai "scale the backend to handle more load"
kubectl-ai "check why the pods are failing"

# Using kagent
kagent "analyze the cluster health"
kagent "optimize resource allocation"
```

Starting with kubectl-ai will make you feel empowered from day one. Layer in Kagent for advanced use cases. Pair them with Minikube for zero-cost learning and work.

Research Note: Using Blueprints for Spec-Driven Deployment

Can Spec-Driven Development be used for infrastructure automation, and how we may need to use blueprints powered by Claude Code Agent Skills.

1. Is Spec-Driven Development Key for Infrastructure Automation?
2. ChatGPT Progressive Learning Conversation
3. Spec-Driven Cloud-Native Architecture: Governing AI Agents for Managed Services with Claude Code and SpecKit