

# Lightning Agents

Factory-of-Factories for Dynamic AI Agents

Austin AI MUG Lightning Talk

# The Problem

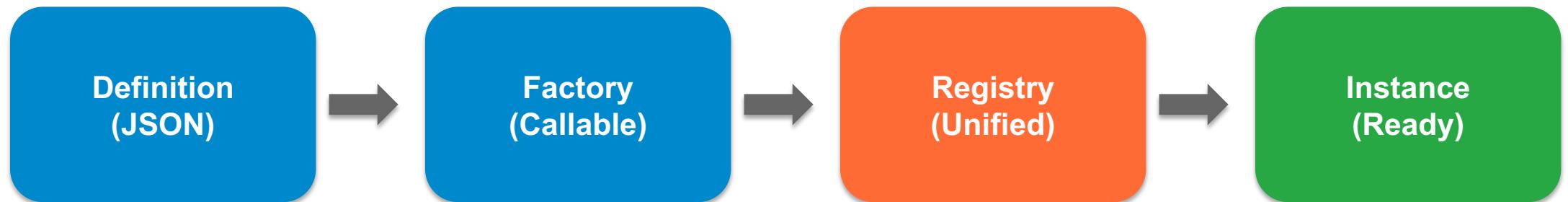
**Hardcoded** system prompts scattered across files

**Tightly coupled** agent definitions and execution logic

No standardized way to add agents **without code changes**

Manual **configuration duplication** when agents share patterns

# The Solution: Factory-of-Factories



# Simple Factory vs Factory-of-Factories

## Simple Factory

```
def create_agent(config):  
    return Agent(config)
```

## Factory-of-Factories

```
registry = AgentRegistry.from_json(  
    "agents.json"  
)  
agent = registry.create(  
    "researcher", {"topic": "AI"}  
)
```

# Declarative Agent Definition

```
{  
  "architect": {  
    "name": "Agent Architect",  
    "description": "Designs new agents",  
    "system_prompt": "You are an Agent Architect...",  
    "model": "sonnet",  
    "tools": []  
  }  
}
```

# The Registry Pattern

```
class AgentRegistry:  
    def from_json(path) -> "AgentRegistry":  
        # Load definitions -> build factories  
  
    def create(id, opts) -> AgentInstance:  
        # Factory creates configured instance  
  
    def register(id, defn) -> None:  
        # Add new agent to registry
```

# The Voyager Insight

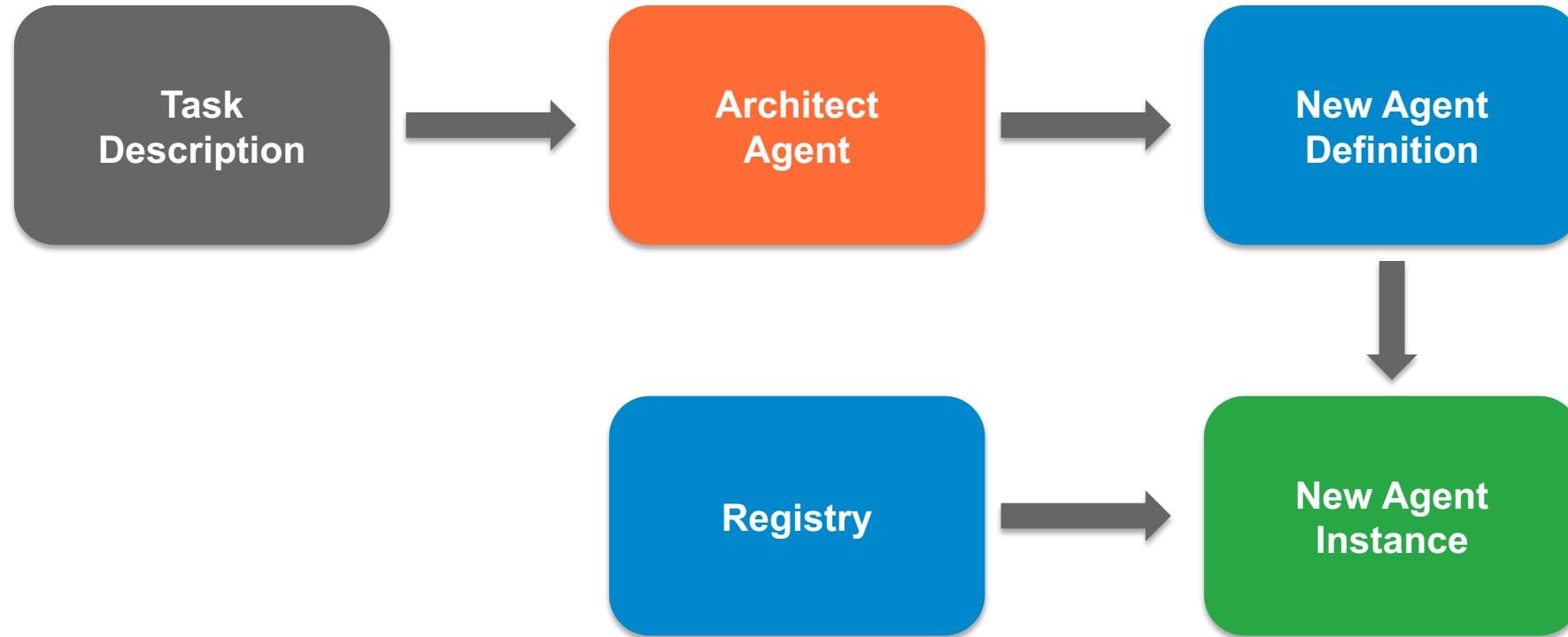
**Voyager**: Minecraft AI with a growing **skill library**

Learns new skills → **stores them** → reuses them

**Lightning Agents**: same pattern for AI agents

**architect** creates → **Registry** stores → **CLI** runs

# The Architect Agent



# But Wait... Tool Architect Too

Agents can also design **NEW TOOLS**

`tool_architect` registers definitions in `db/tools.json`

`paper_researcher` searches papers **AND** downloads PDFs

`presentation_slide_writer` manipulates slides **directly**

# Demo: What We Built

```
$ lightning list
10 agents: architect, tool_architect, paper_researcher...

$ lightning run paper_researcher "Find the Voyager paper"
Found: arxiv.org/abs/2305.16291
Downloaded: voyager_lifelong_learning.pdf

$ lightning run presentation_slide_writer "List slides"
12 slides in current presentation...
```

# The Meta Moment

We used `paper_researcher` to find the **Voyager paper**

Voyager inspired the **architect pattern**

We built `tool_architect` to create **more tools**

`presentation_slide_writer` is building **THIS presentation**

# Lightning Agents

Agents creating agents creating tools

Built with Claude Agent SDK + MCP

[github.com/aimug-org/lightning-agents](https://github.com/aimug-org/lightning-agents)