

Recap of Key Learnings

Dr. Vasili Ganishev

Lead Data Scientist
Automotive Industry, Germany
AI Expert



Understanding AI Agents

Definition

Software entities that perceive their environment and act toward achieving specific goals.



Key Characteristics of AI Agents



Autonomy

Functions independently without human intervention.



Adaptability

Continuously learns and adjusts behavior based on environmental data.



Decision-Making

Utilizes logic, heuristics, or machine learning to achieve specific objectives.



Action-Oriented

Executes tasks efficiently to fulfill predefined goals.

Types of AI Agents



Hybrid Agents



Learning Agents



Deliberative Agents



Reactive Agents

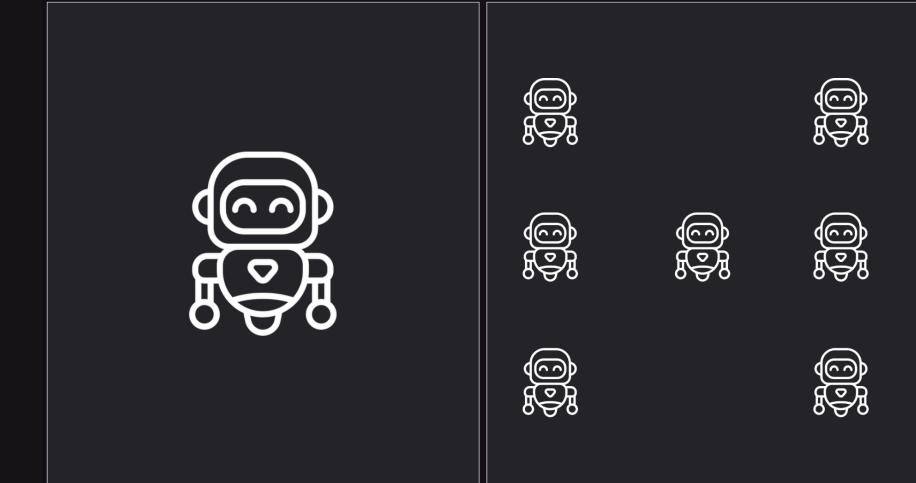
Single-Agent vs. Multi-Agent Systems

Single-Agent System

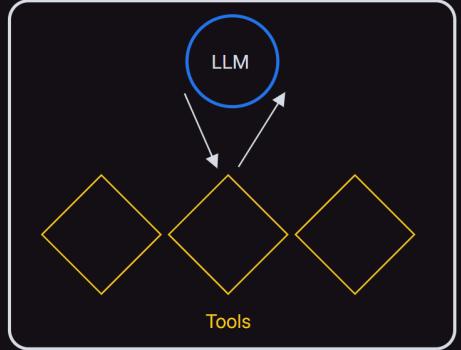
One agent is responsible for all tasks —simpler to design but limited in scalability.

Multi-Agent System

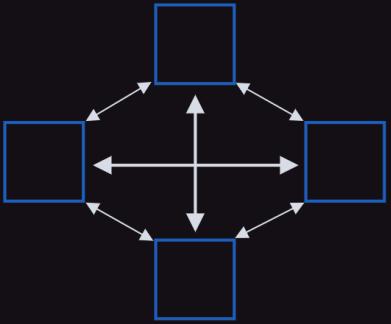
Multiple agents, each potentially specialized; coordinate or communicate to solve larger or more complex problems.



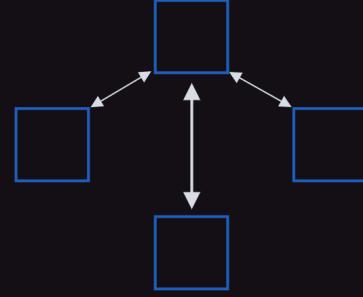
Multi-Agent Architecture Patterns



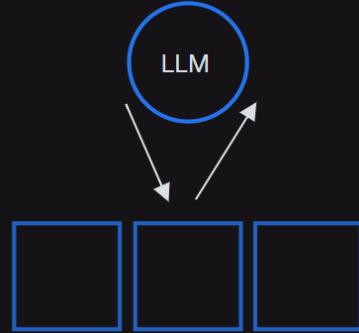
Single Agent



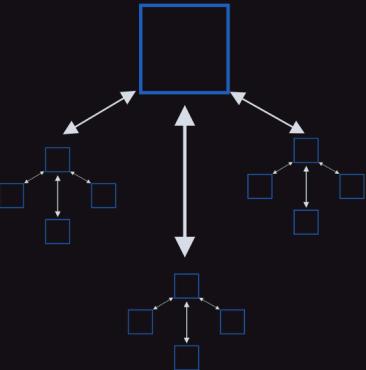
Network



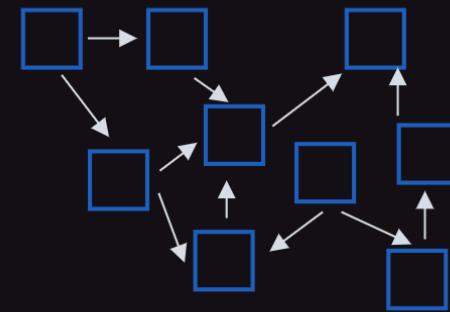
Supervisor



Supervisor (as tools)



Hierarchical



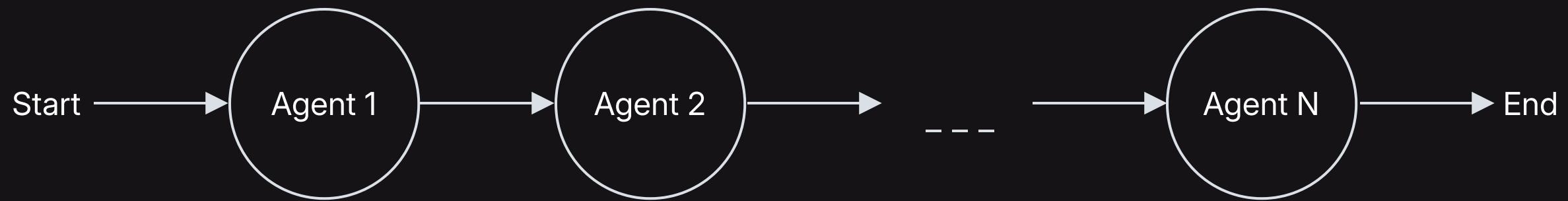
Custom

Basic LangGraph Functionalities

- Concept of Graphs
- Using different tools
- Working with messages (states)

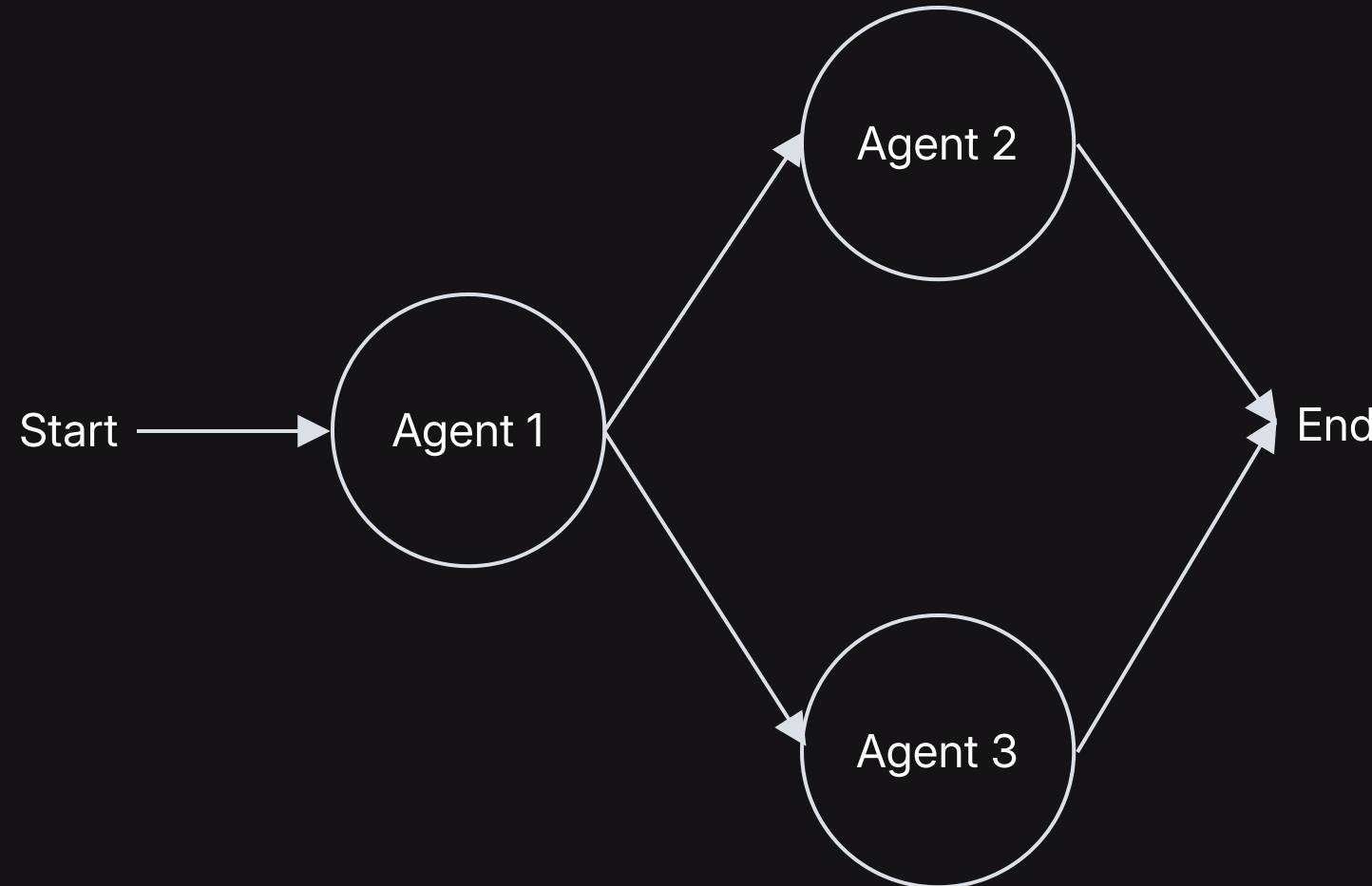
Advanced LangGraph Orchestration Techniques

Sequential Execution



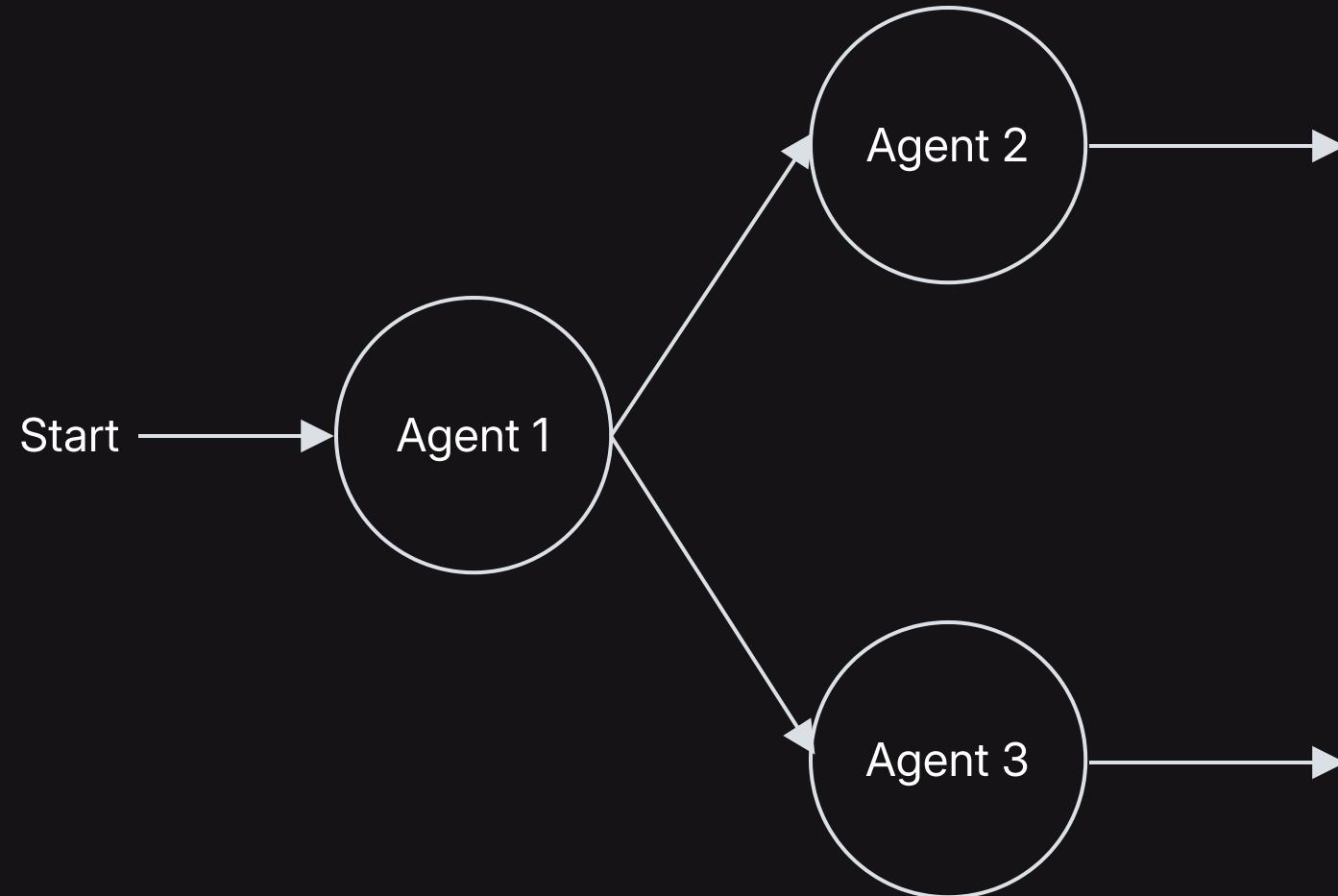
Advanced LangGraph Orchestration Techniques

Hierarchical Delegation



Advanced LangGraph Orchestration Techniques

Parallel Execution



Typical Edge Cases and Failures

- Invalid user input (e.g. date in past)
- Hallucinations
- Connection issues with tools

Different Error-Handling Strategies

