

# Agent-based business systems

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# What is an agent?

- “Agent” is of Latin origin
- Meaning: “to drive, lead, manage, perform, do”

→ “The one who acts”





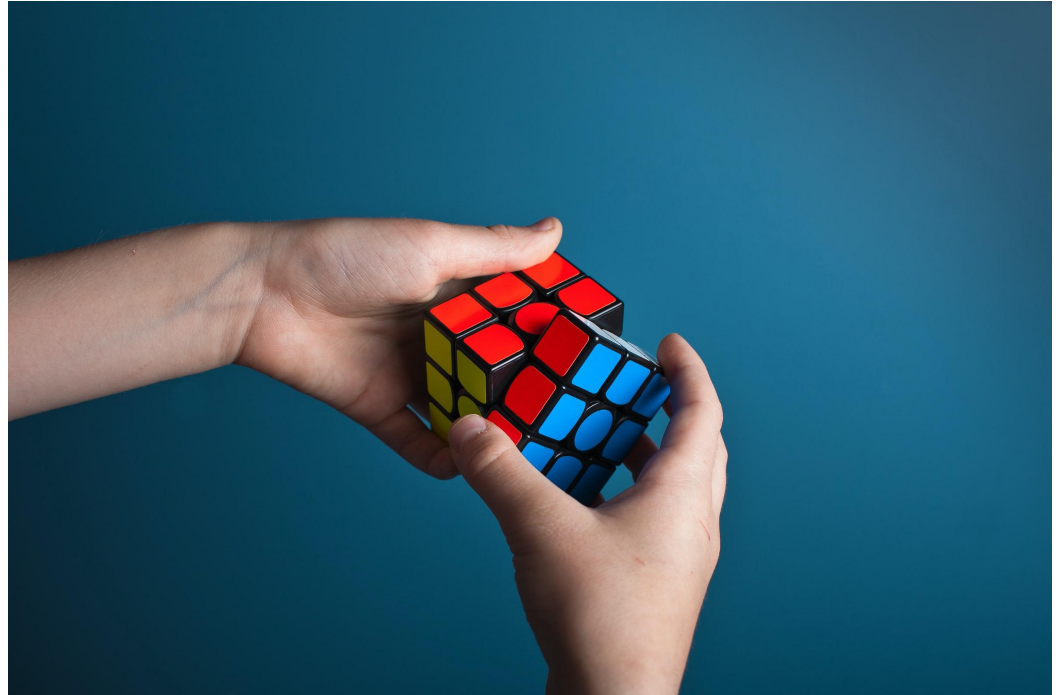
# What does an agent do?

- Collect information
- **Decide**
- Act

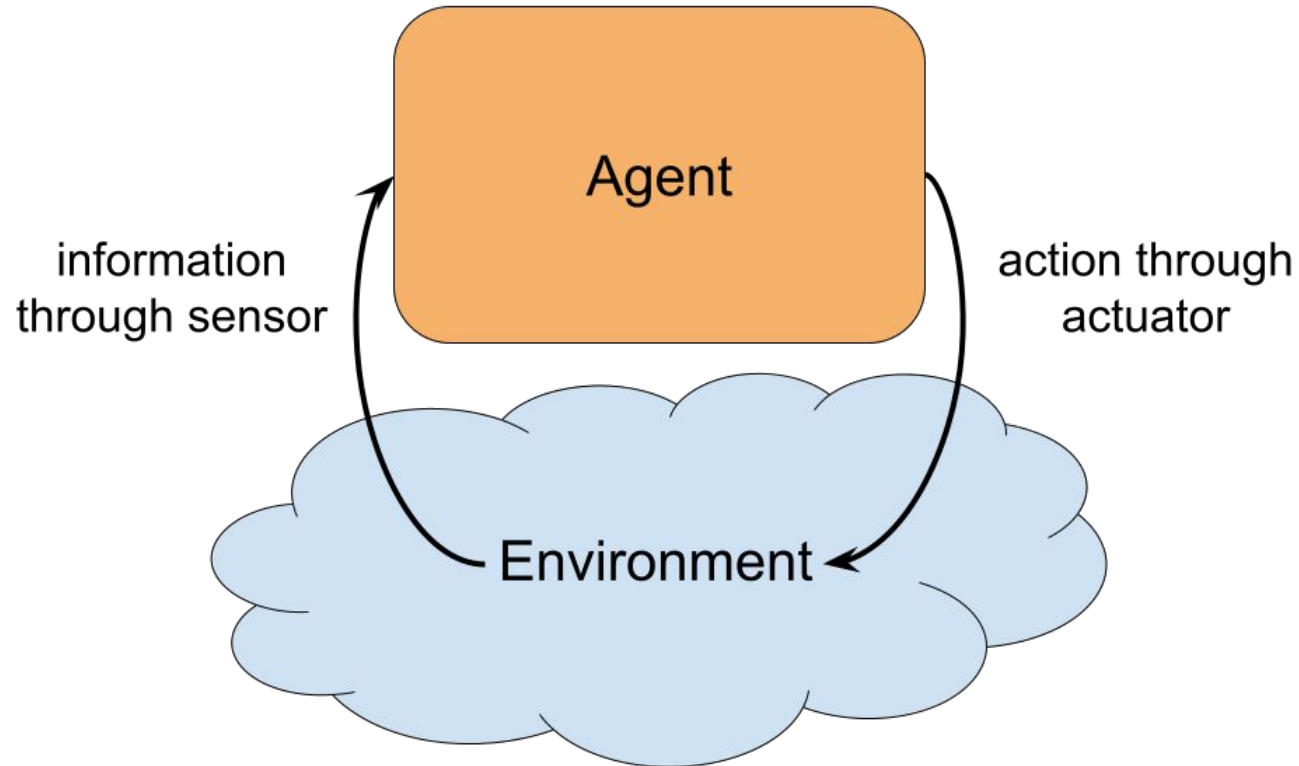


# Why do agents exist?

Agents solve  
problems!



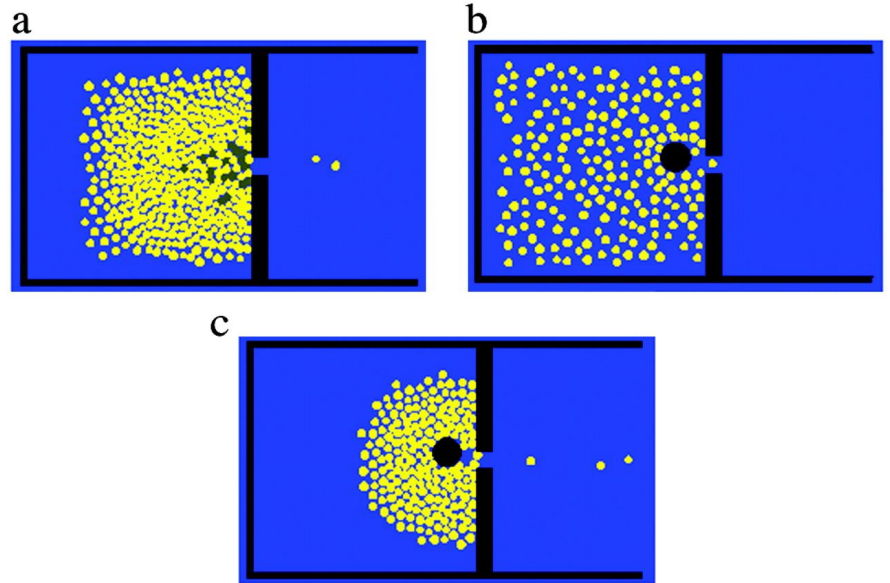
# What does an agent do?





# Agents are everywhere!

- Software architecture
- Biology
- Economics
- Artificial intelligence
- Game theory





# Properties of an agent


- Autonomy: Perform actions without any direct external influence
- Proactiveness: Take initiative to reach goals
- Responsiveness: Watch the environment and respond to changes
- **Social ability:** Interact with other agents



# Properties of an agent



Agent



I want to reach my goals in the best way possible!





# The inner workings of an agent


- Belief
- Knowledge
- State
- Thinking about past actions
- Learning
- Desire
- Obligation
- Commitment
- Goals



# Agents are social




Agent



I want to reach my goals in the best way possible!

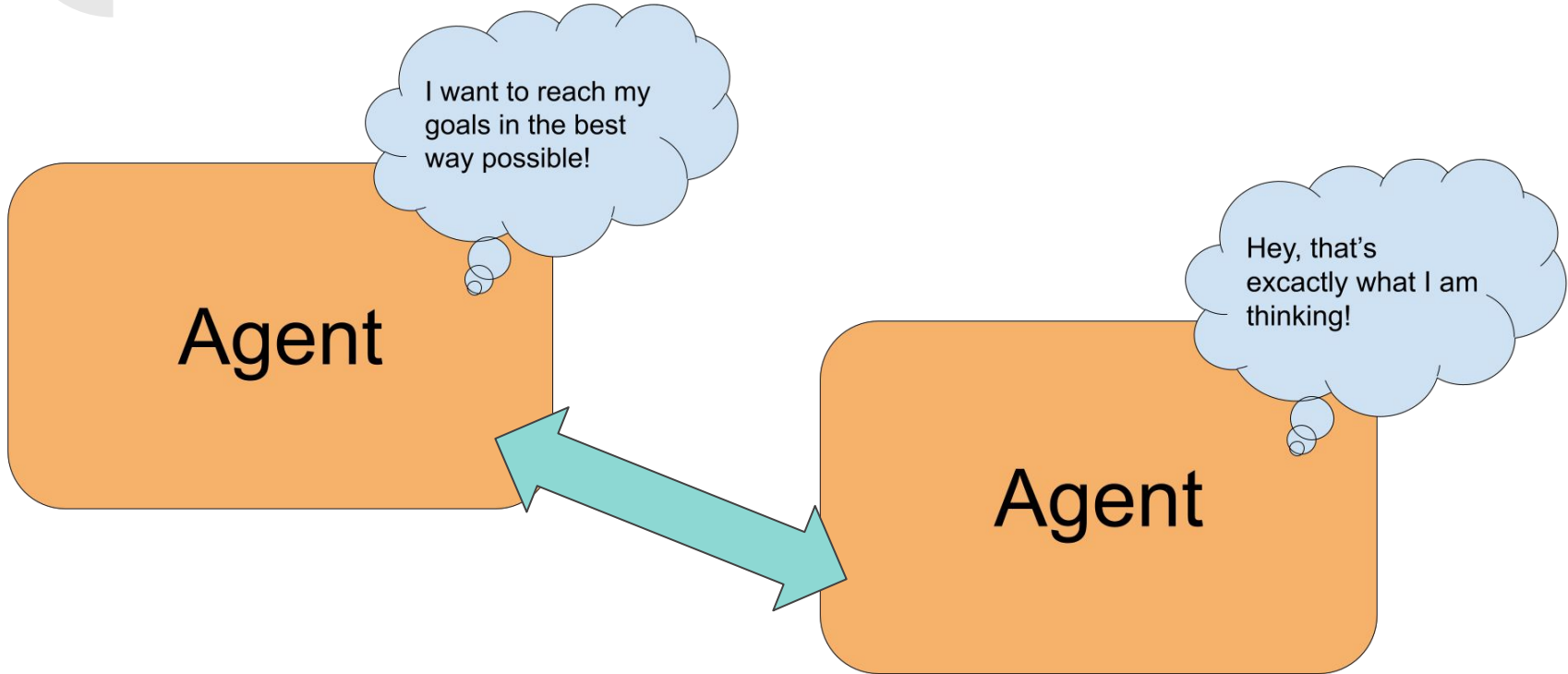


Agent



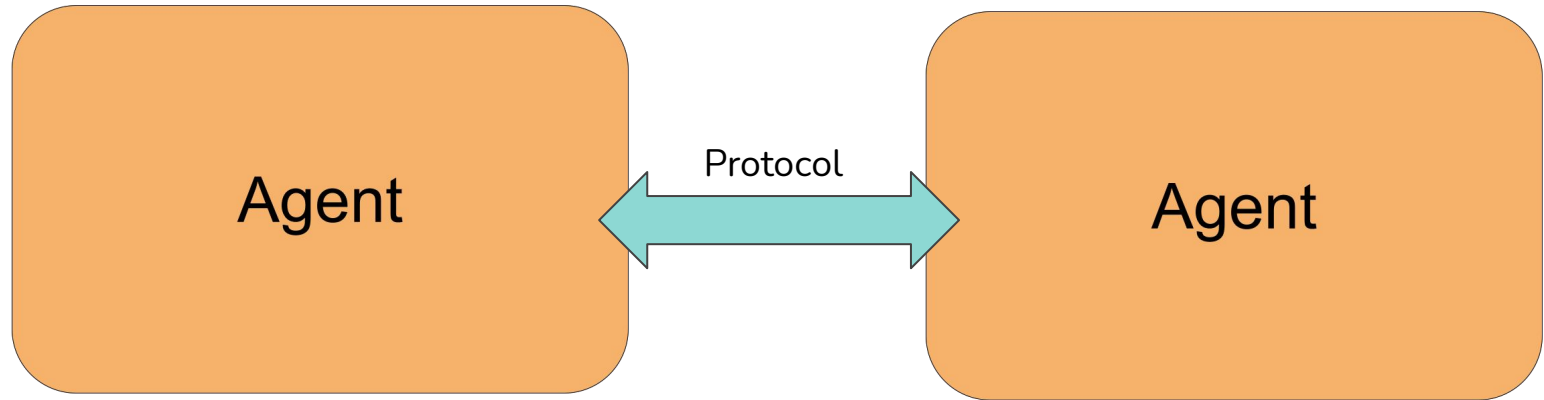
Hey, that's exactly what I am thinking!

# Agents are social





# Agents are social





# What is an agent-based system?

An **agent-based system** is one in which the key abstraction used is that of an **agent**.



# What is an agent-based system?



Agent

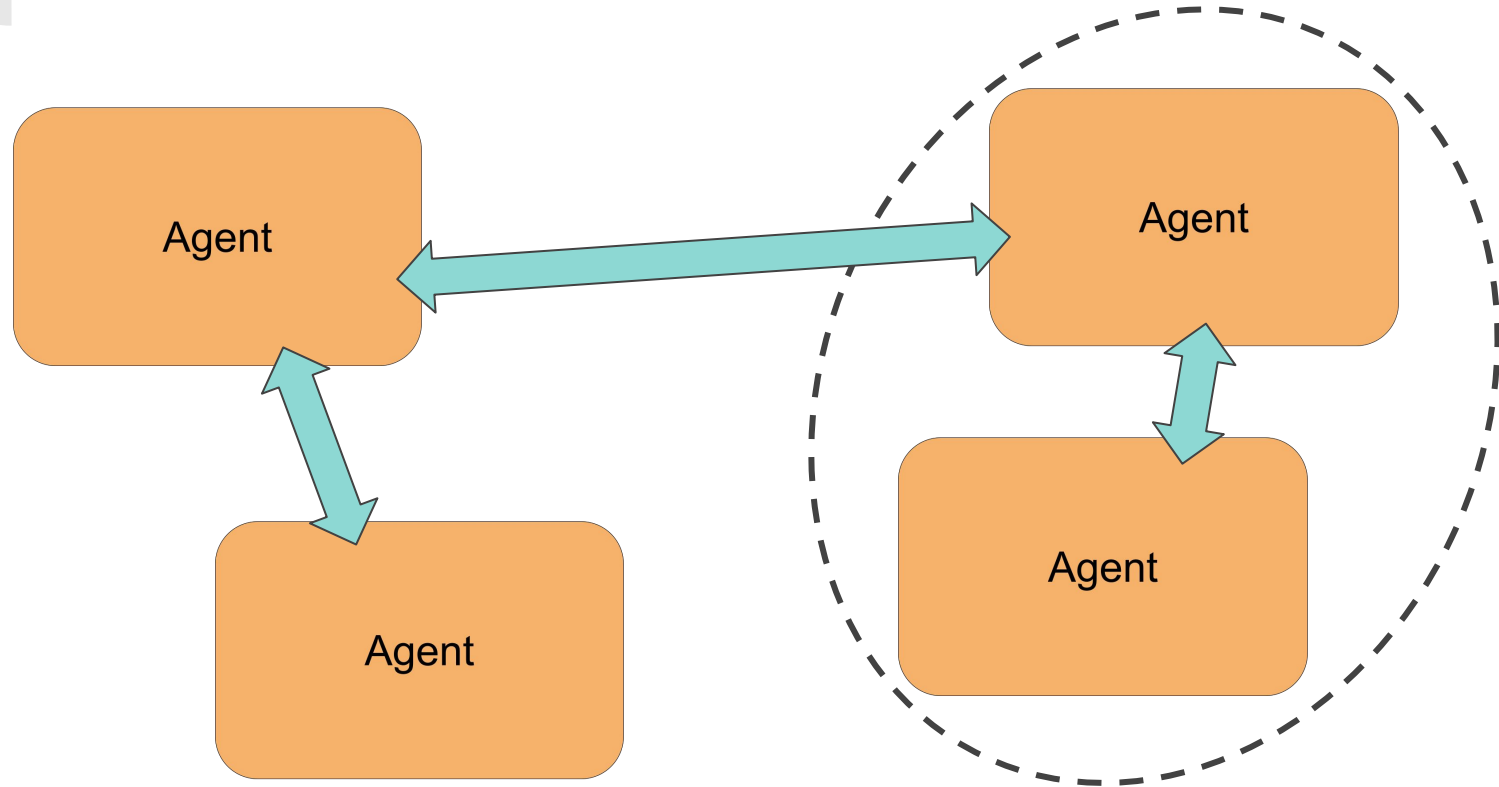
A large orange rounded rectangle with a thin black border, centered on the slide. The word "Agent" is written in black text in the center of the rectangle.



# Multi-agent systems



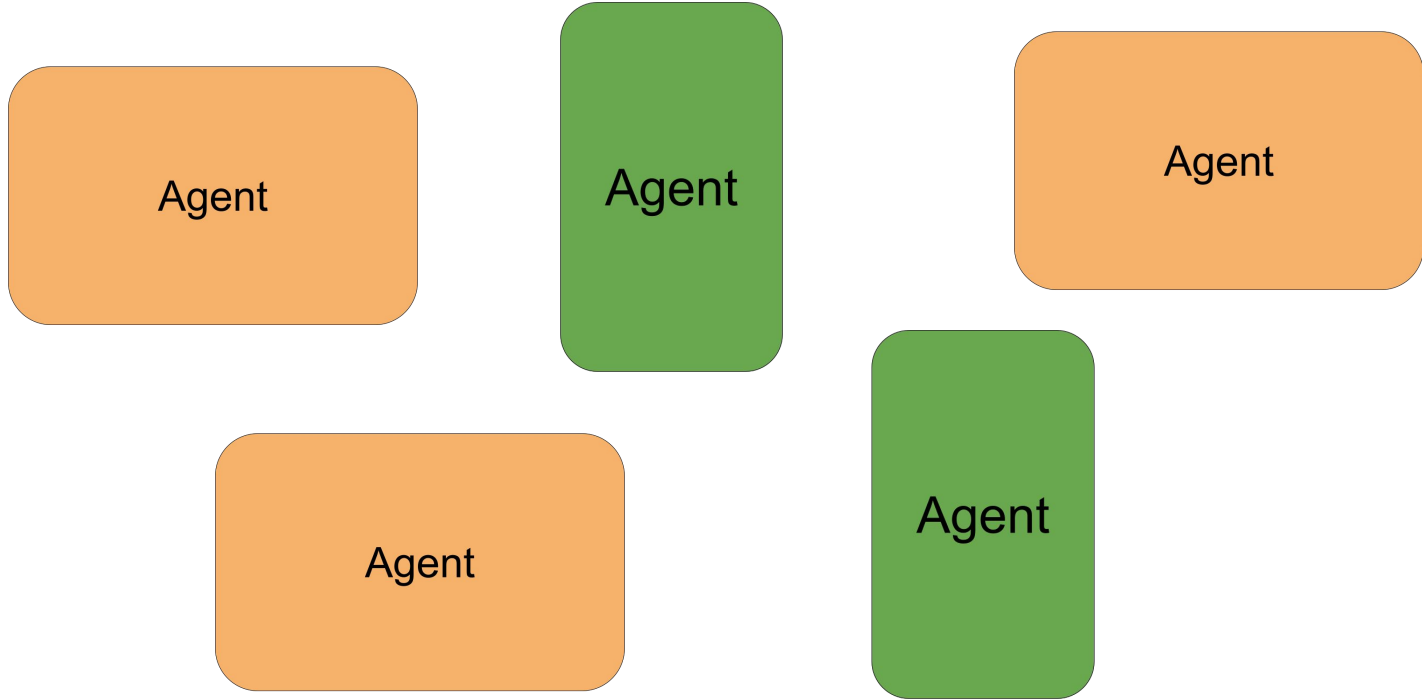
# Multi-agent systems





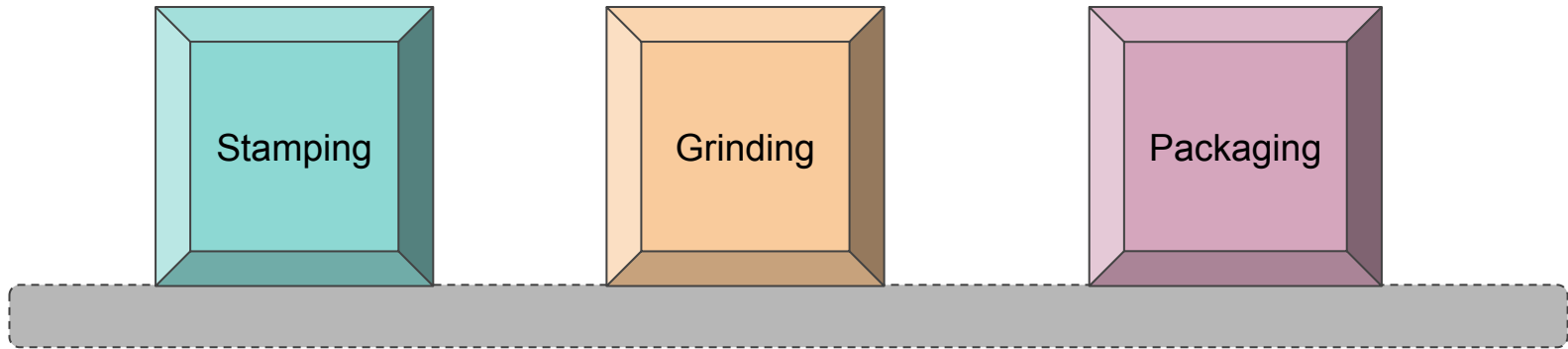


# Multi-agent systems



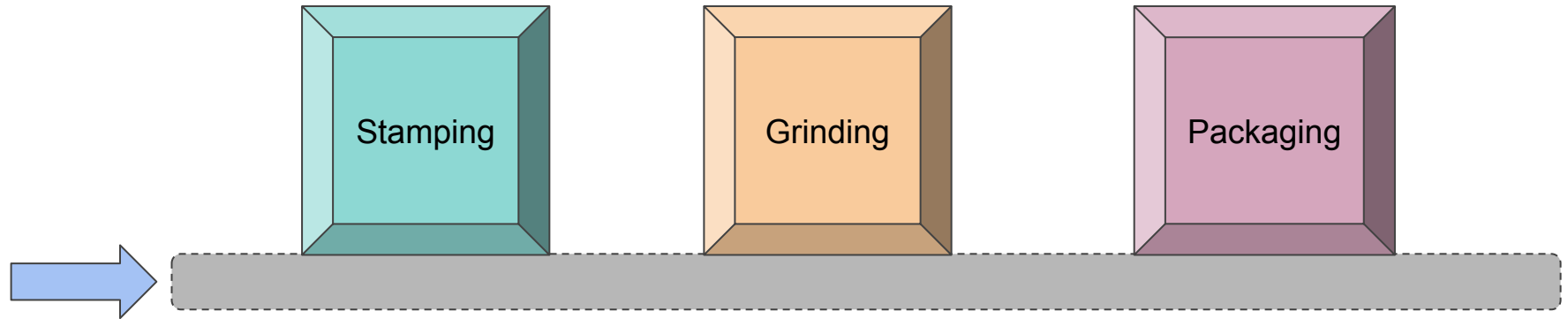


# Agent-based system example

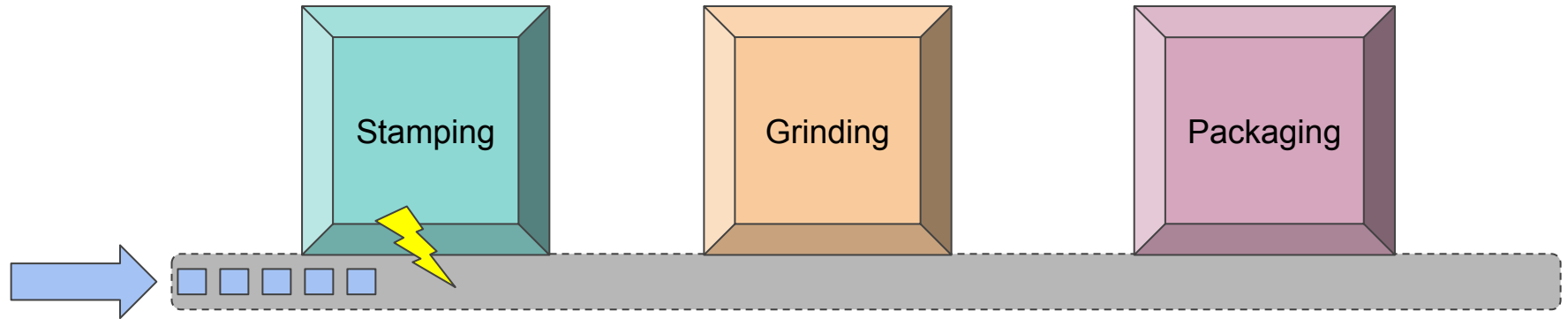




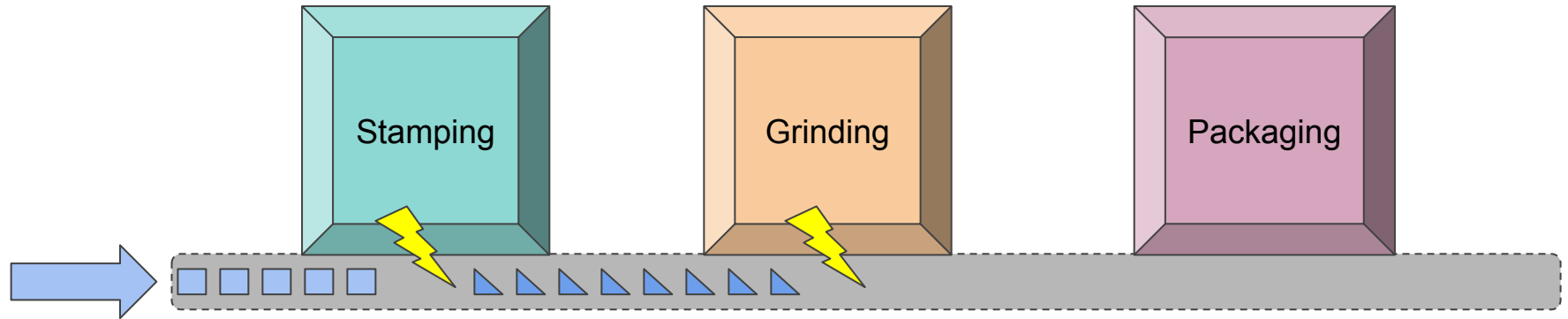
# Agent-based system example



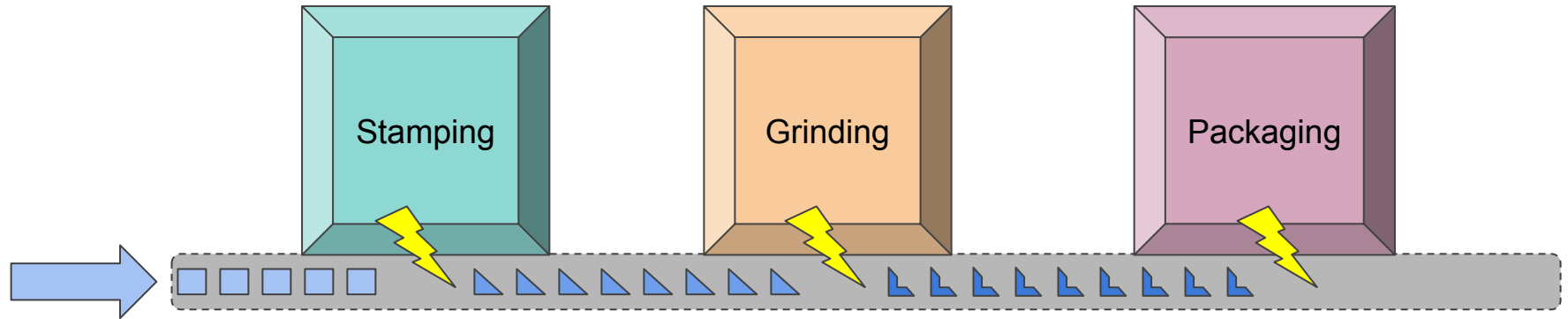
# Agent-based system example



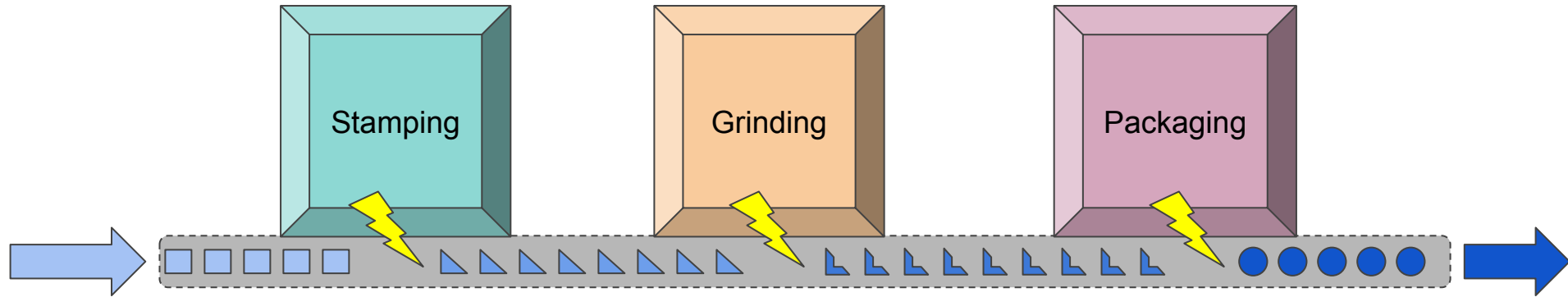
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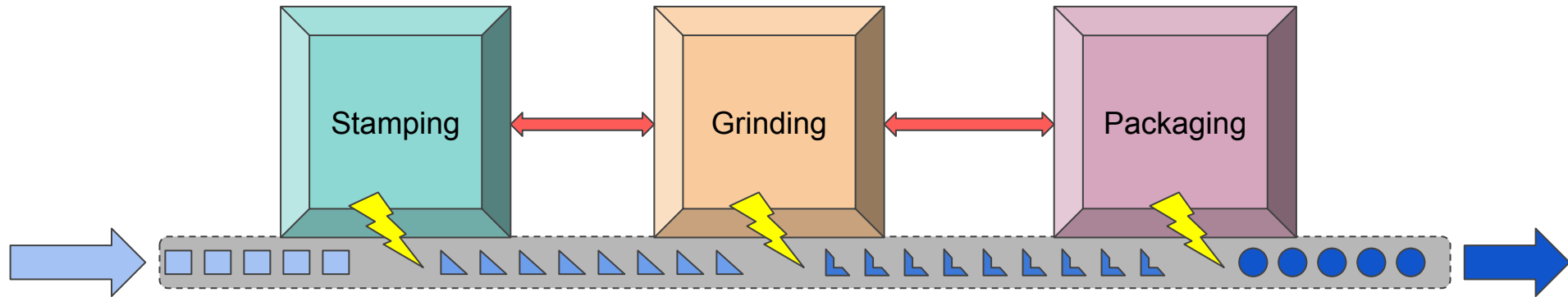
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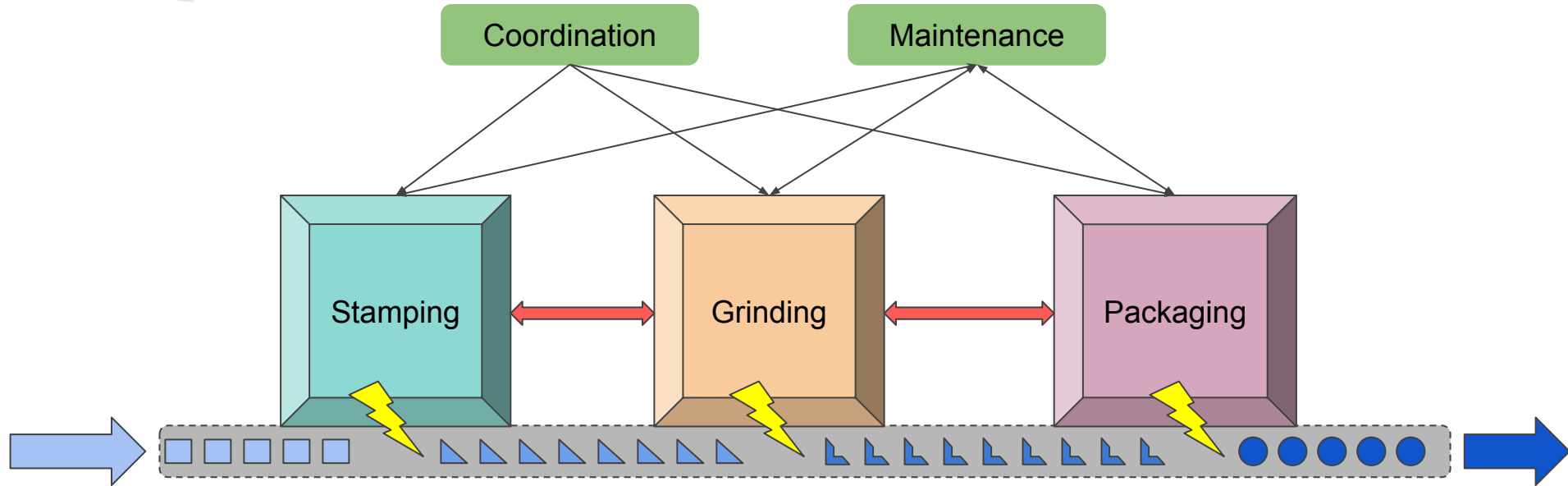


# Agent-based system example





# Agent-based system example

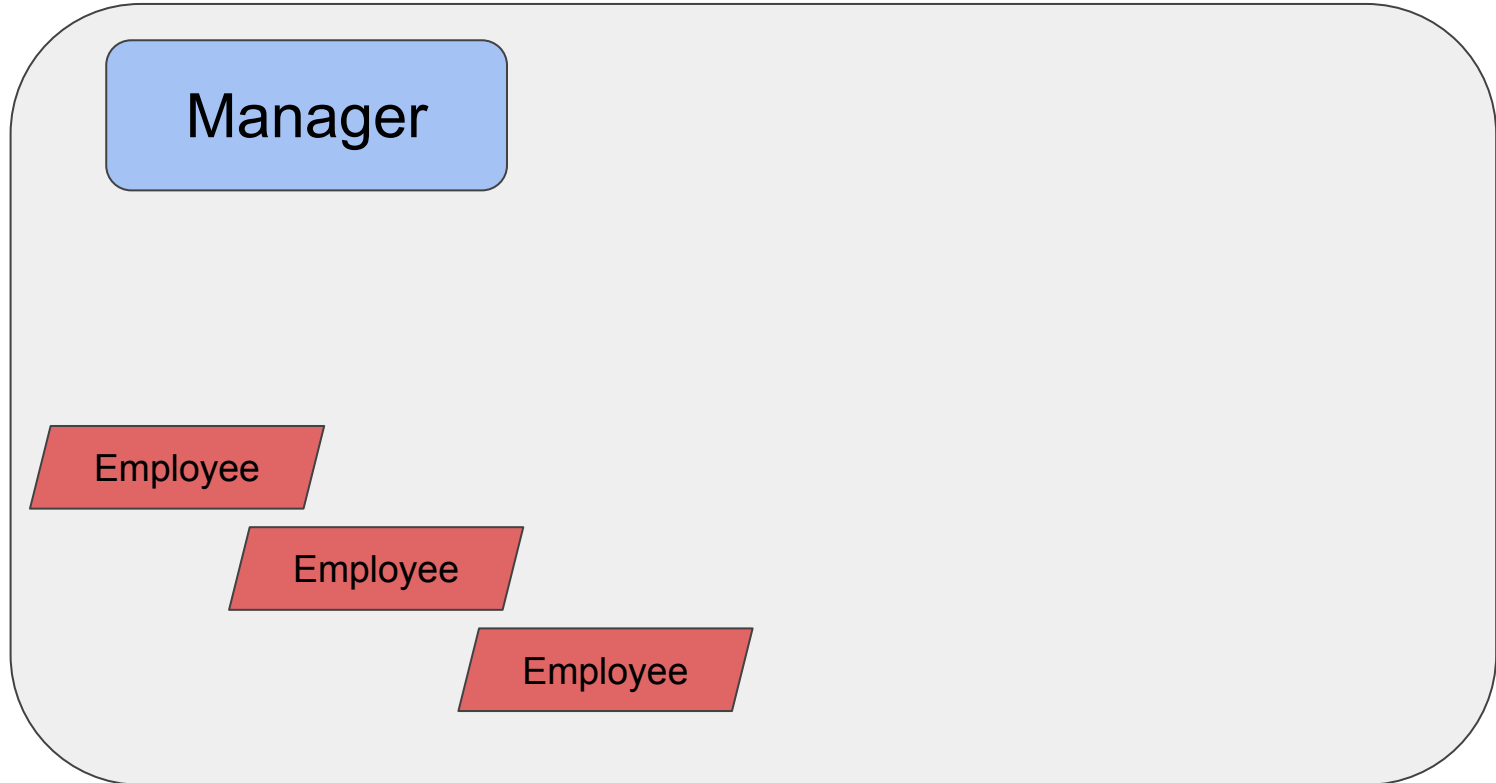




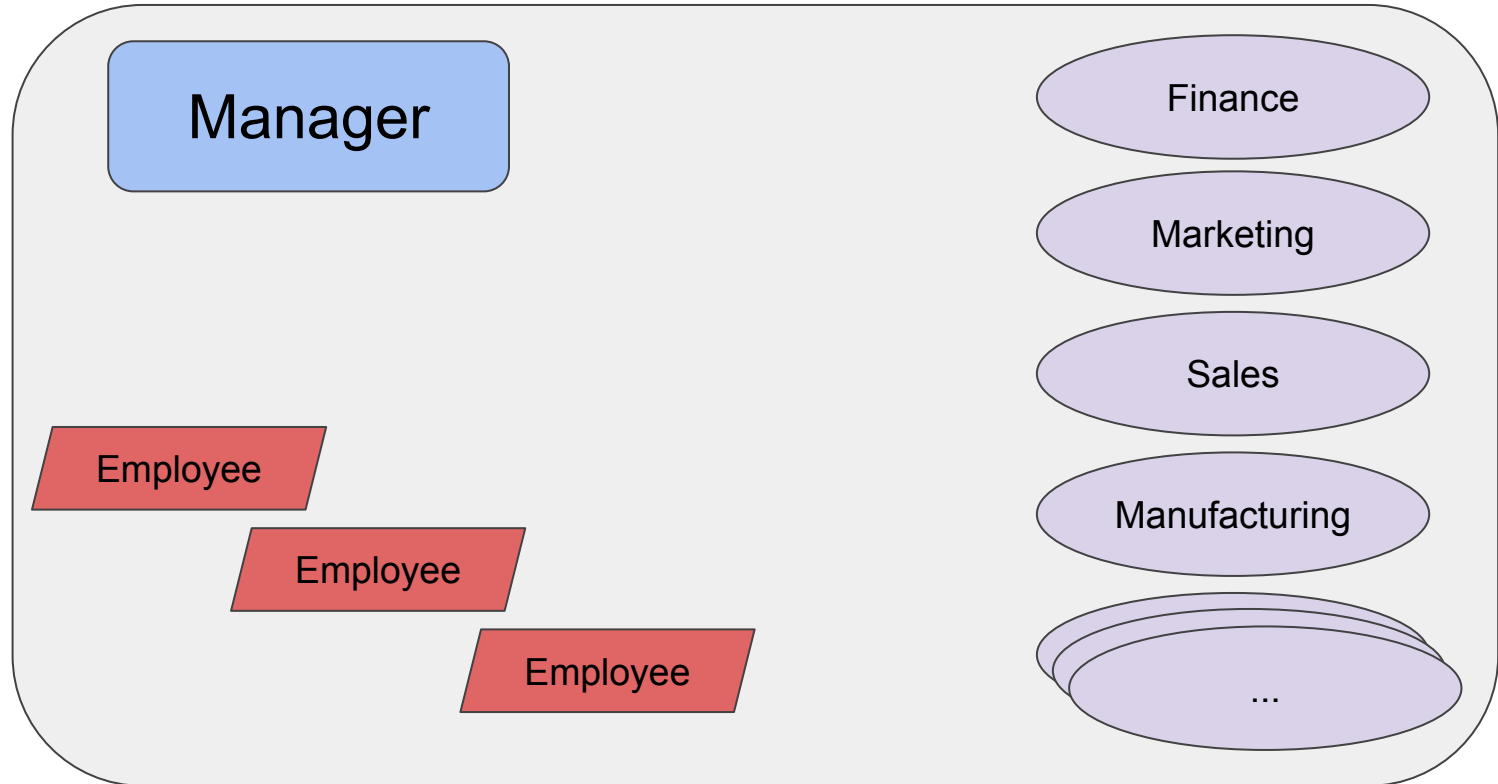
# Classical management

Manager

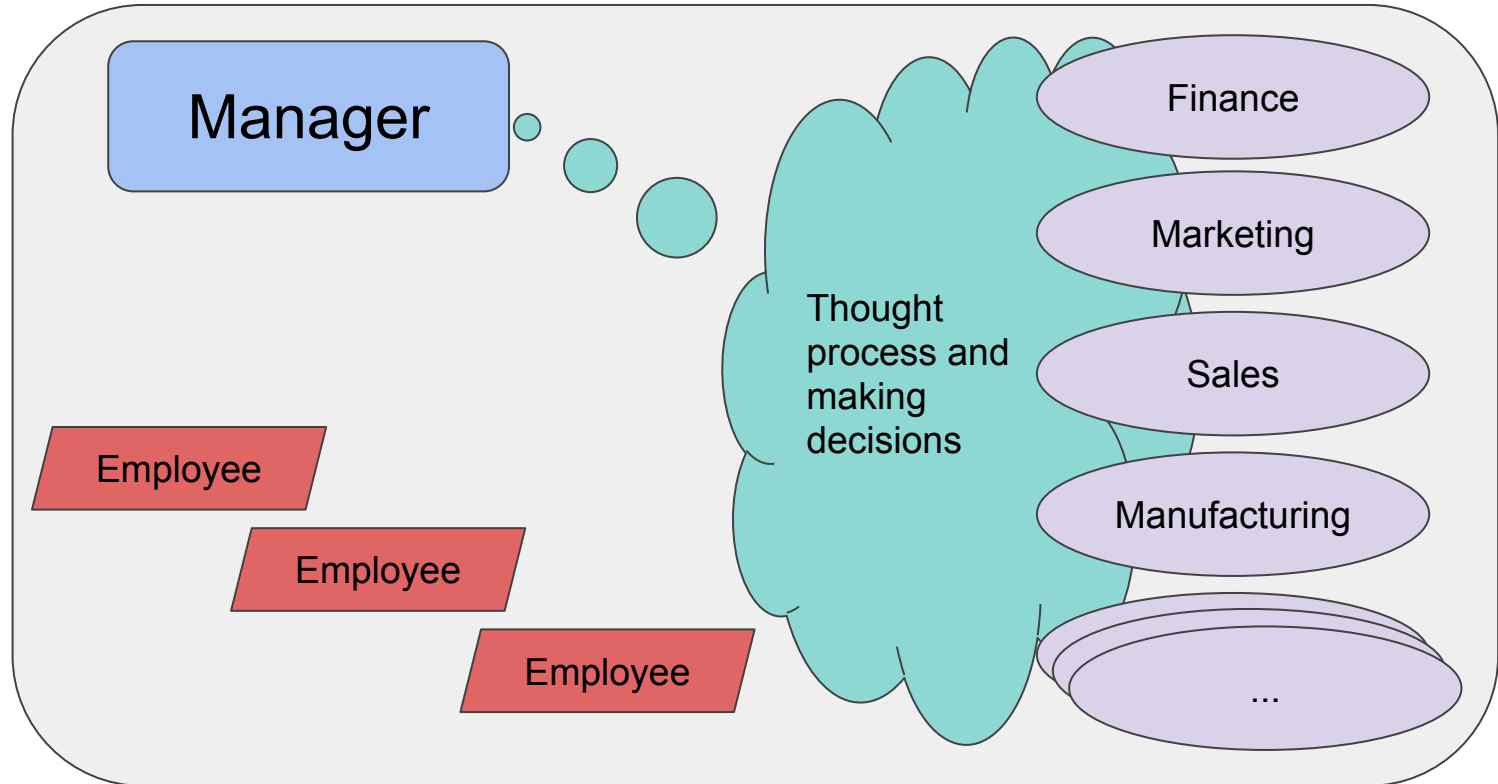
# Classical management



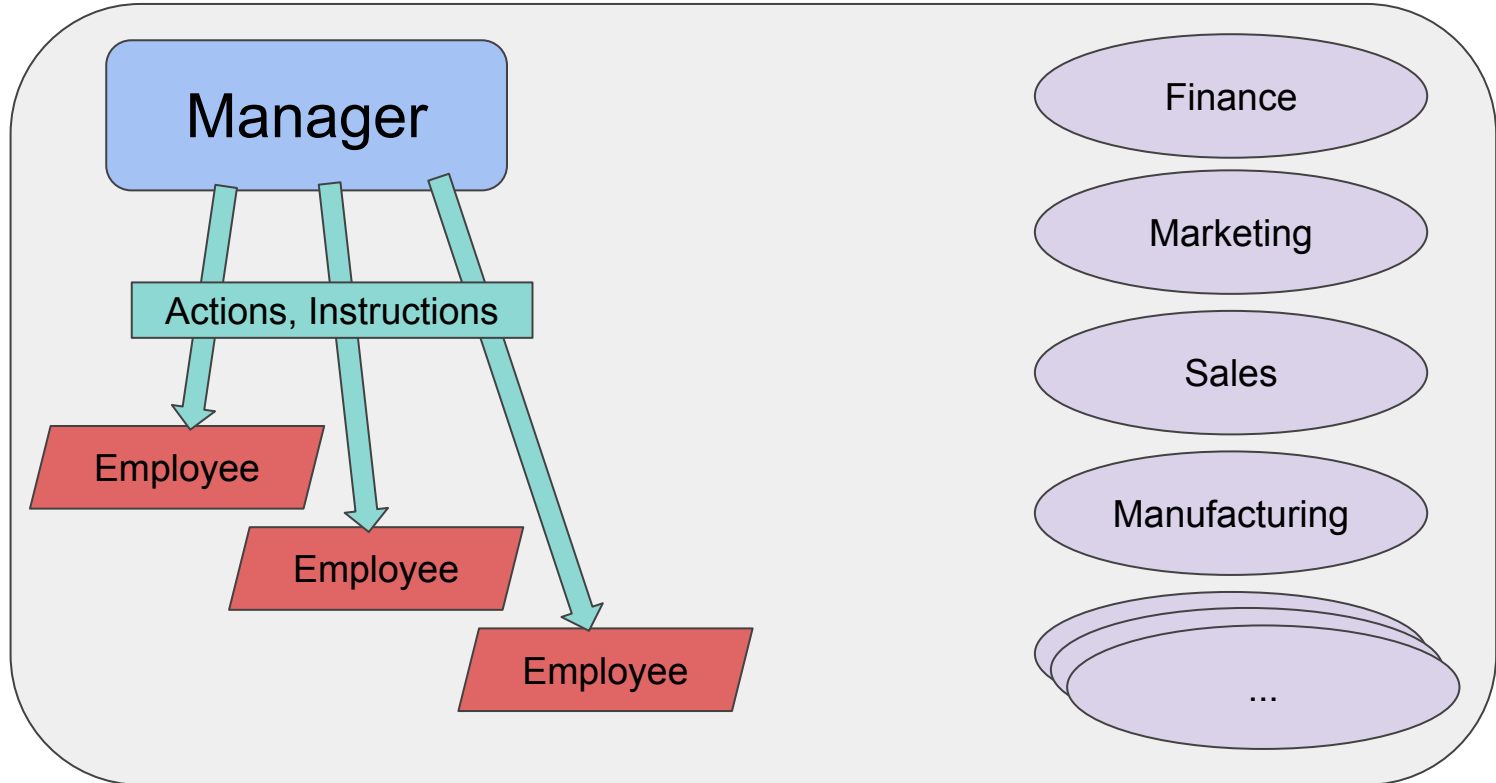
# Classical management



# Classical management



# Classical management



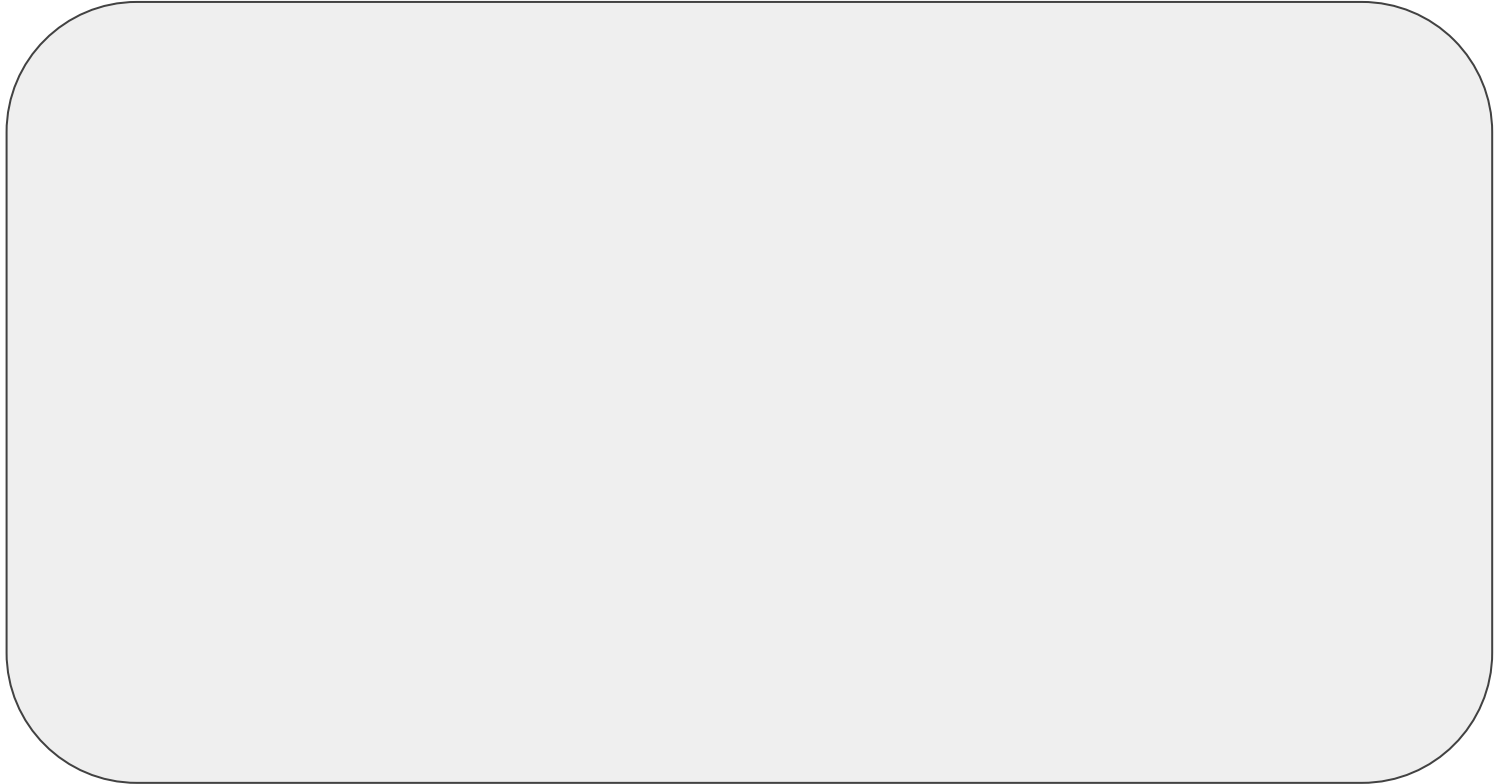


# Business environments

- Complex processes
- Concurrent processes
- Specialized processes
- Dynamic and unpredictable processes
- Need for monitoring and control
- Need for communication
- Physical distribution

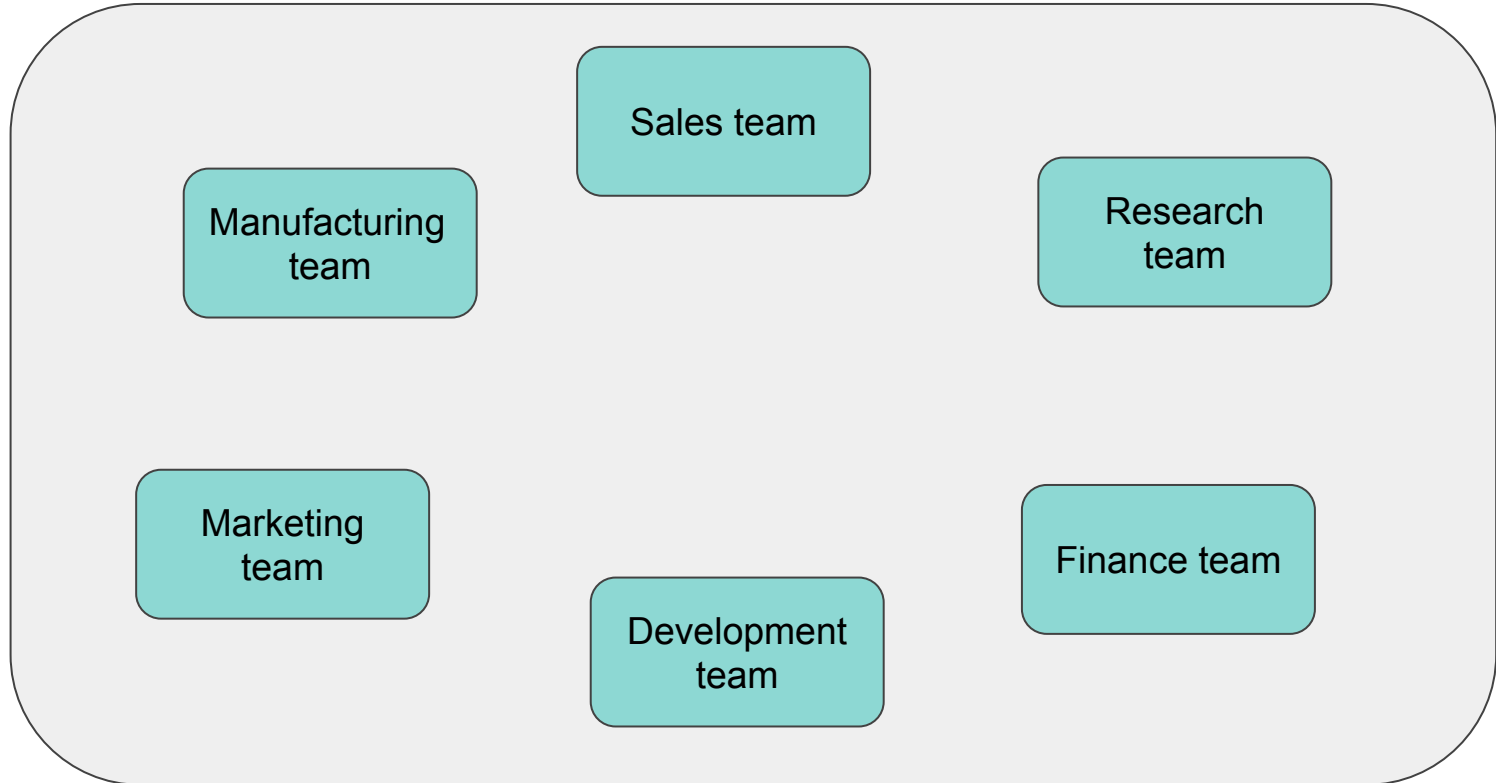


# Agent-based Business System

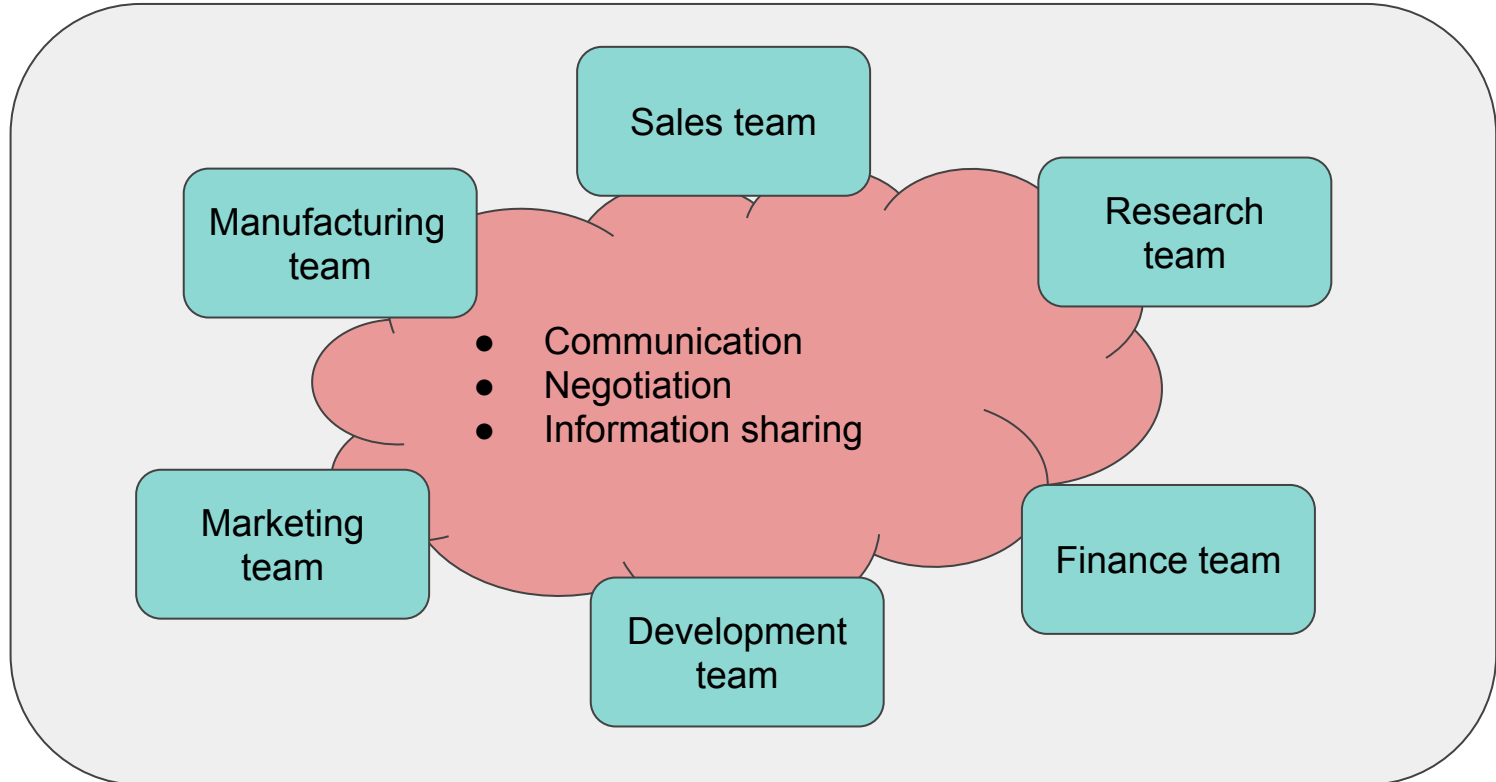




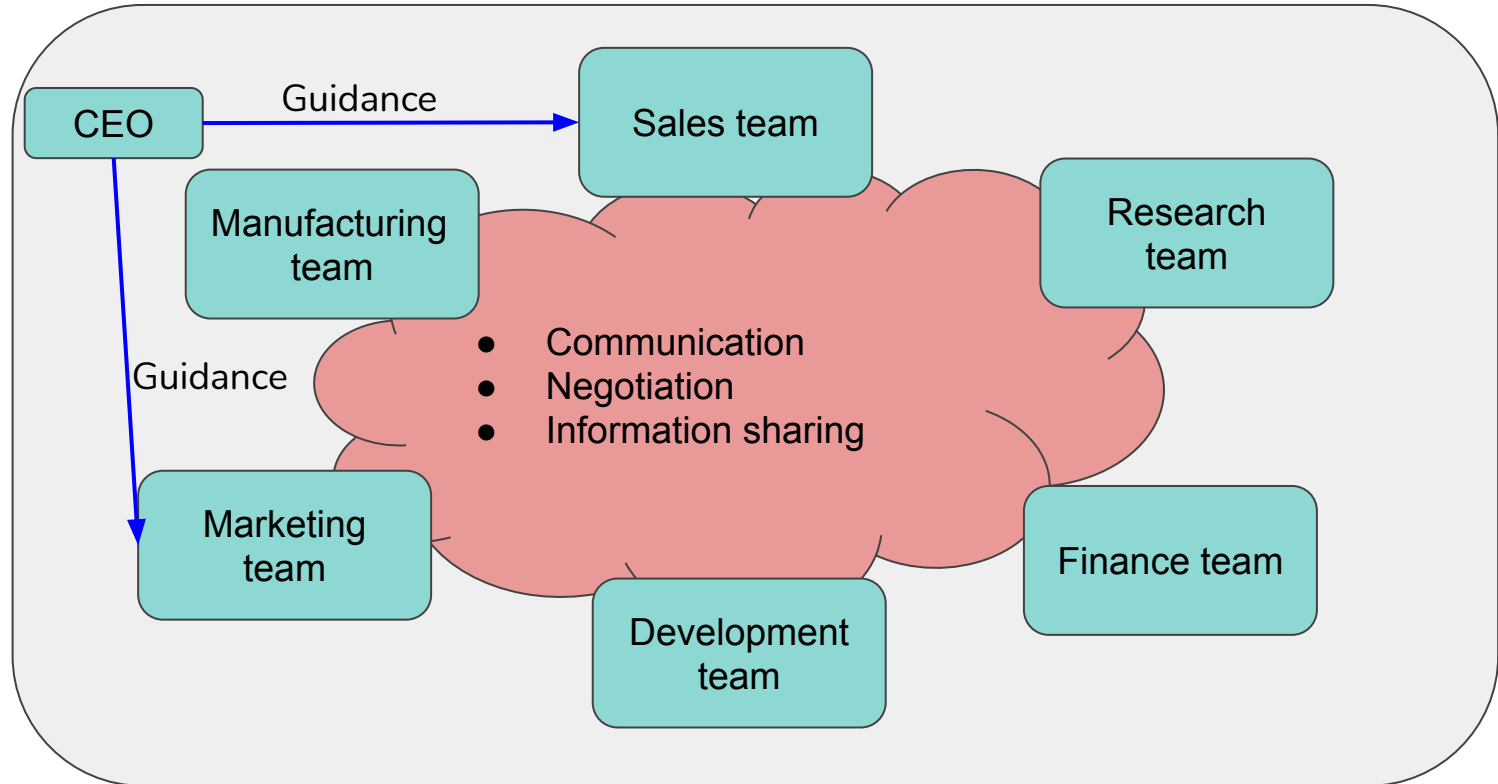
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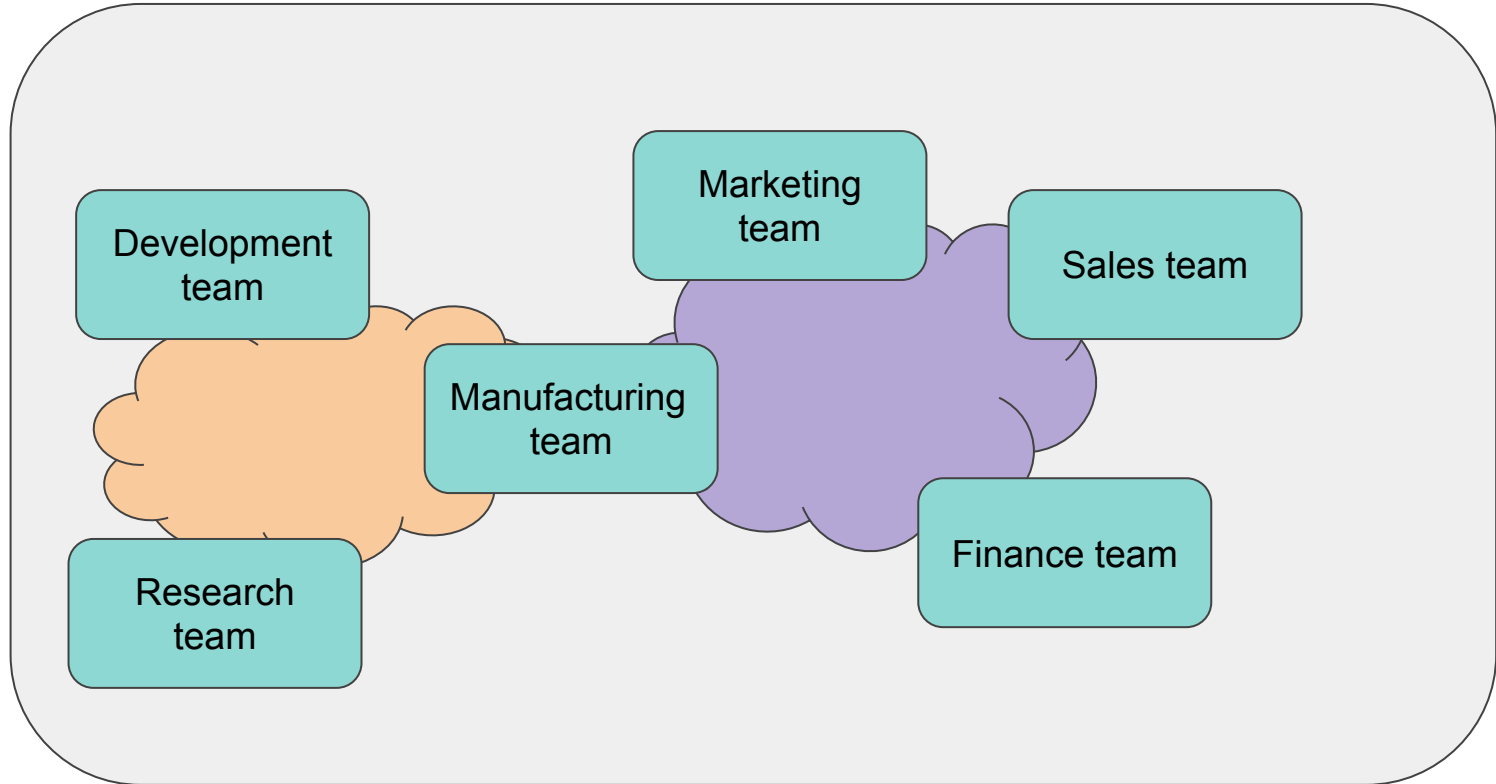
# Agent-based Business System



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# Agent-based Business System





## **Advantages of an agent-based approach in business environments**

- Head business management focuses on higher-level decisions
- Improved problem-solving capabilities through specialization
- Improved problem-solving capabilities through mutual support
- Sophisticated goal-oriented communication
- Improved physical organization
- Outsourcing of cross-cutting concerns



## **Problems for an agent-based approach in business environments**

- Depends on humans
- System is too inflexible
- No trust in system
- Personal does not follow system's guidelines
- No real incentive for personal
- Not respecting agent's boundaries
- Circumventing the communication protocol



## Advanced topics

- How are agents designed?
- What existing models and design philosophies exist?
- Are human agent-based systems used in businesses? Do they work? Are they successful?
- How can existing businesses be transformed to use an agent-based approach?