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AI Agents: The Next Big Thing in AI



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Tom Coshow

Sr Director Analyst



Erick Brethenoux

Distinguished VP Analyst



Gartner Poll

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Being on the same page when we say “AI”

Cognitive System

Artificial Intelligence

is a computer engineering discipline: a series of mathematically or logic-based techniques that **simulate** cognitive processes

Machine Learning

Deep Learning

Rule-Based Systems

Optimization Systems

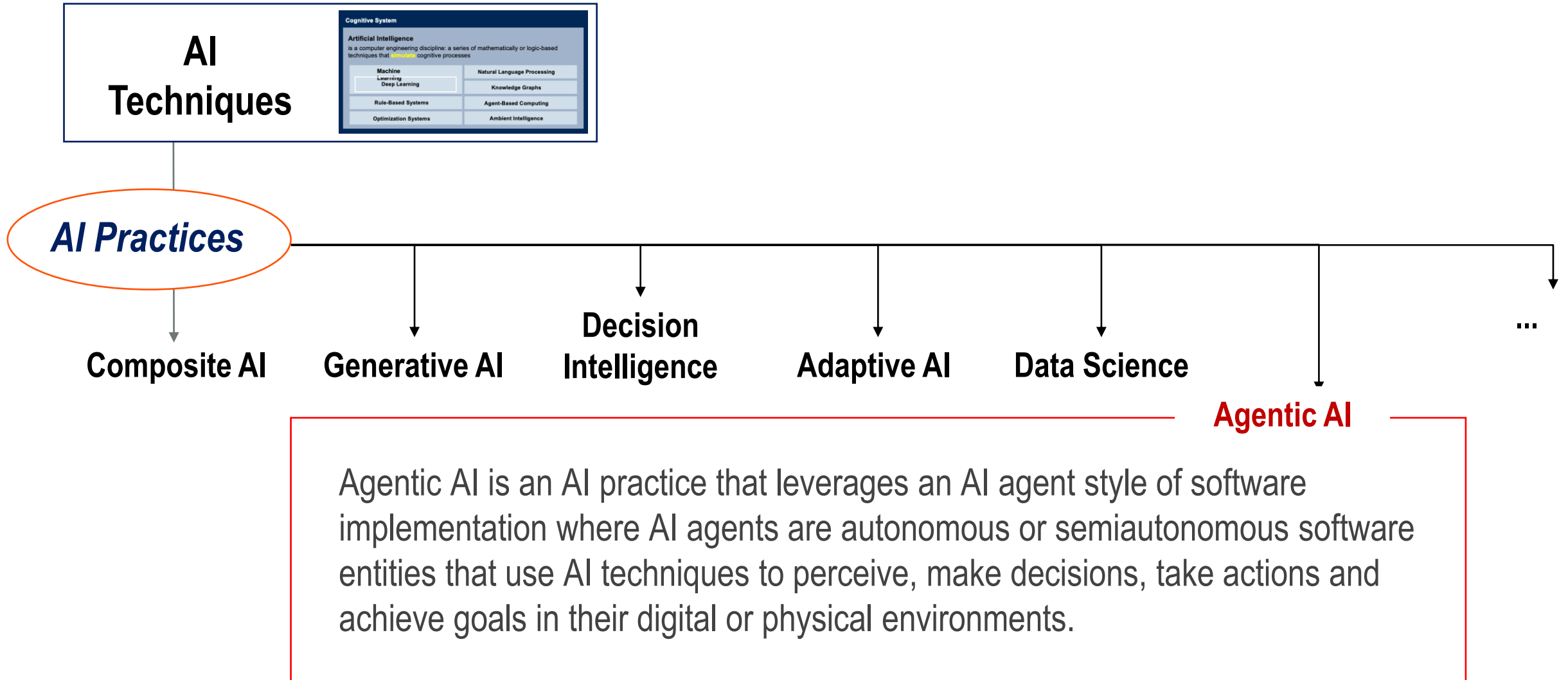
Natural Language Processing

Knowledge Graphs

Agent-Based Computing

Ambient Intelligence

AI Practices



Definition

AI agents are autonomous or semiautonomous software entities that use AI techniques to perceive, make decisions, take actions and achieve goals in their digital or physical environments.

NOT an AI Agent...

- Large Language Models (they are models)
- Set of instructions that carries out a specific task (like subroutines)
- Automated software functions (like procedures)
- Automated procedures from an RPA workflow (processes)
- Conversational assistants (or any other assistant)
- An interface to an assistant (like an assistant UX)
- ...

Closing the AI Agency Gap

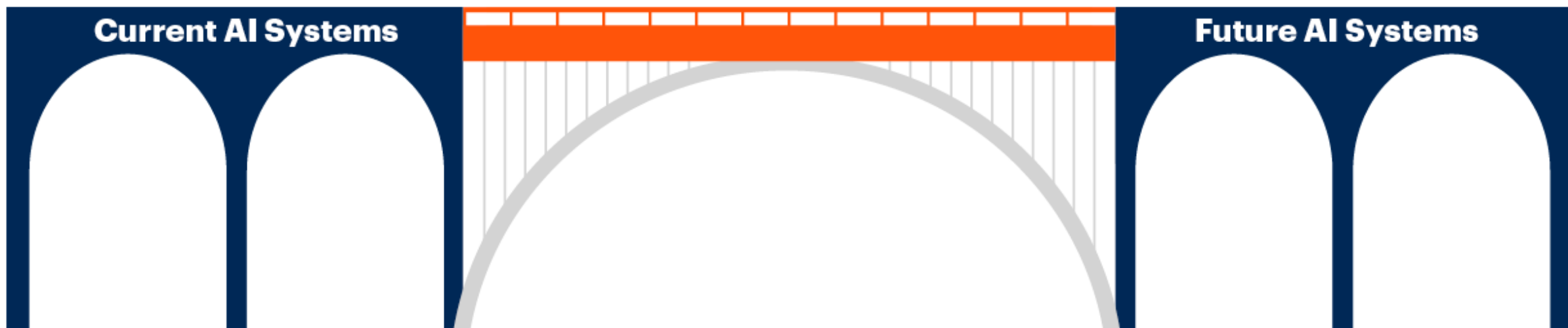
Illustrative

- Require strong supervision
- Execute simple tasks
- Static behavior



AI Agents

- Act autonomously
- Execute complex goals
- Adaptable behaviour



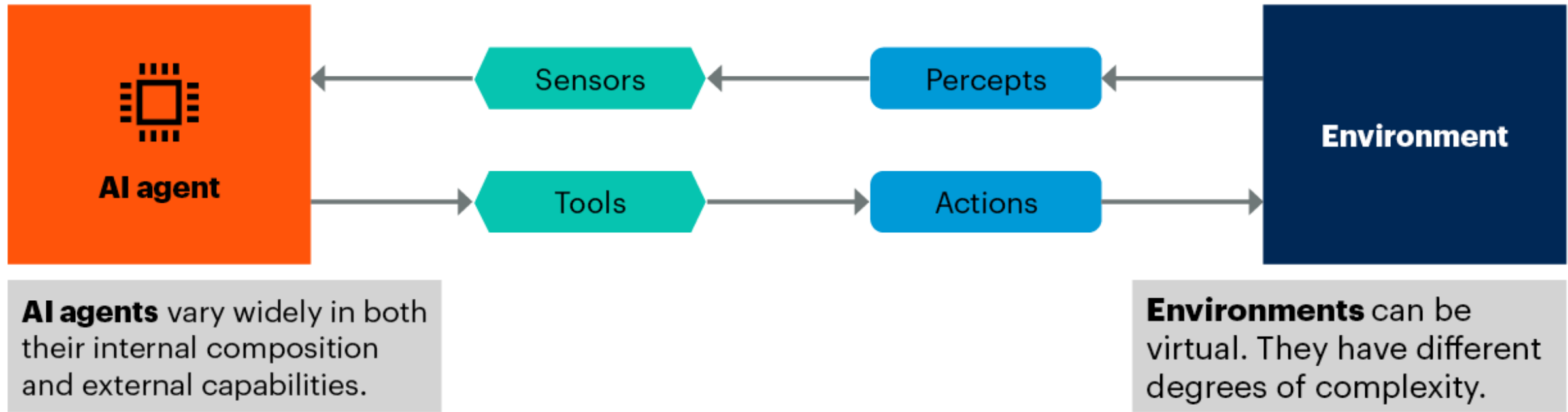
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Feedback Loop Between AI Agents and Their Environment

■ Capabilities ■ Inputs/outputs

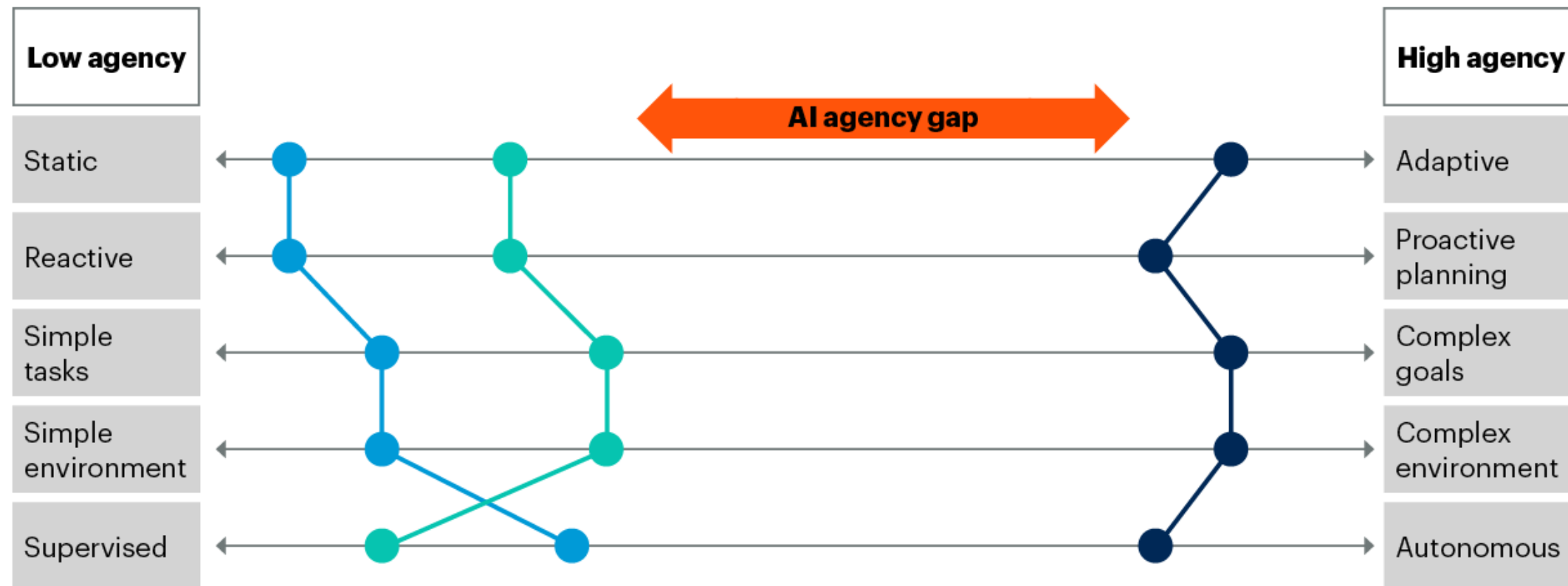


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Mind the AI Agency Gap

● Human agency ● Deterministic chatbots ● LLM-based assistants



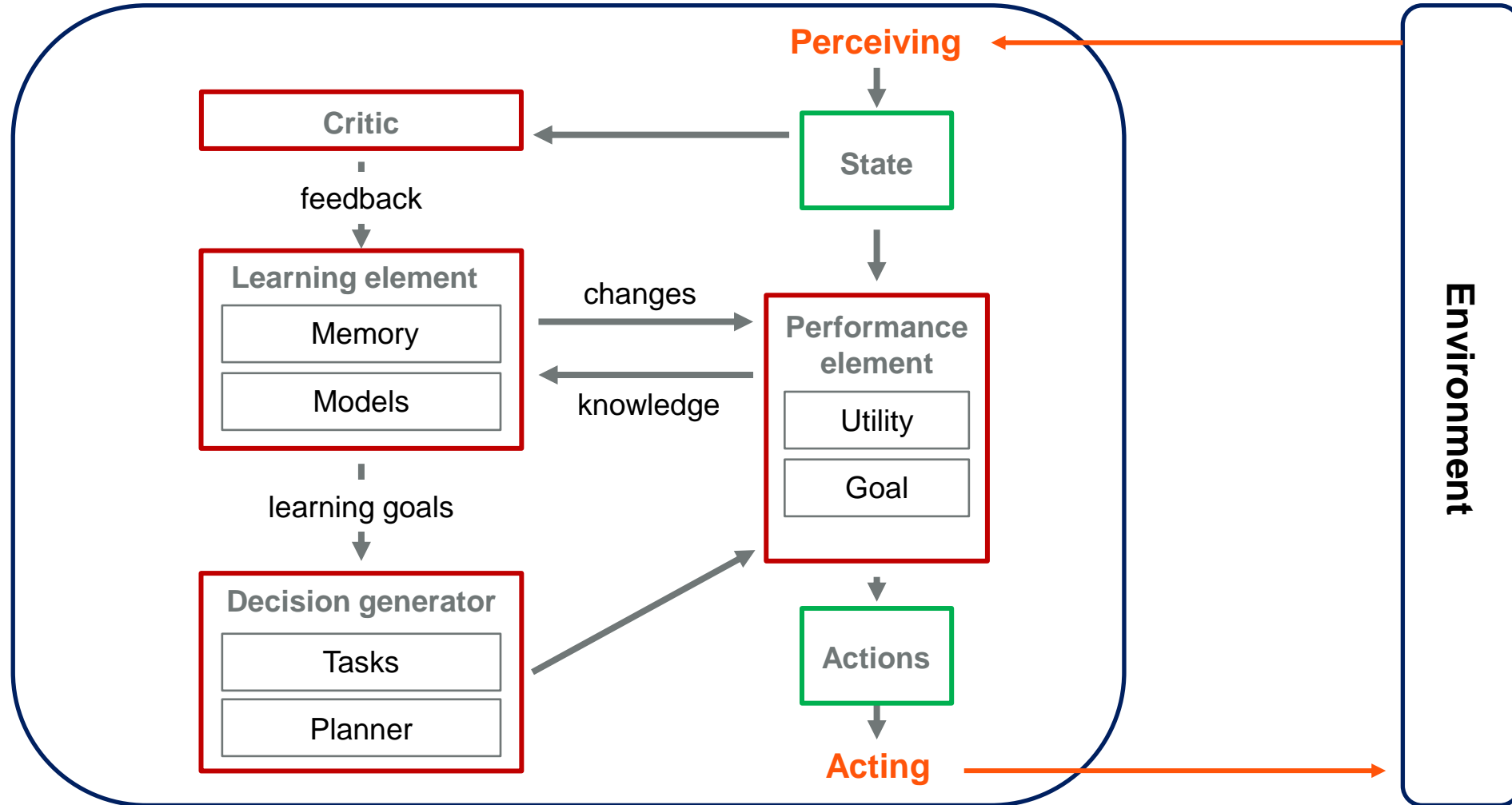
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What are AI Agents

Anatomy of a Learning Agent

Agent



Agent Architecture Patterns



Solo Agent



Agent Roles



Agent-to-Agent
Handoff



Multi-agent modularity

Agent Process Patterns



Prescribed
Plan



MHQA



Orchestrated
Agents



Dynamic
Plan Generation



Collaborating
Agents



Human-in-
the-Loop

Agent Evaluation Patterns



User-in-the-Loop



LLM-as-
a-Judge



Deterministic
(code-based)
evaluation



Interaction
Logging



Red
Teaming

LLM Interaction Patterns



ReAct



Chain of Thought



Structured
Response



Reflexion



Retry
Limits

Agent Action Patterns

$f(x)$

Function Calling



Generated Code
Execution



API Tool Use

Agent Memory Patterns



RAG



Memory
Longevity



Memory
Scope

Security & Identity Patterns



Identity Token
propagations



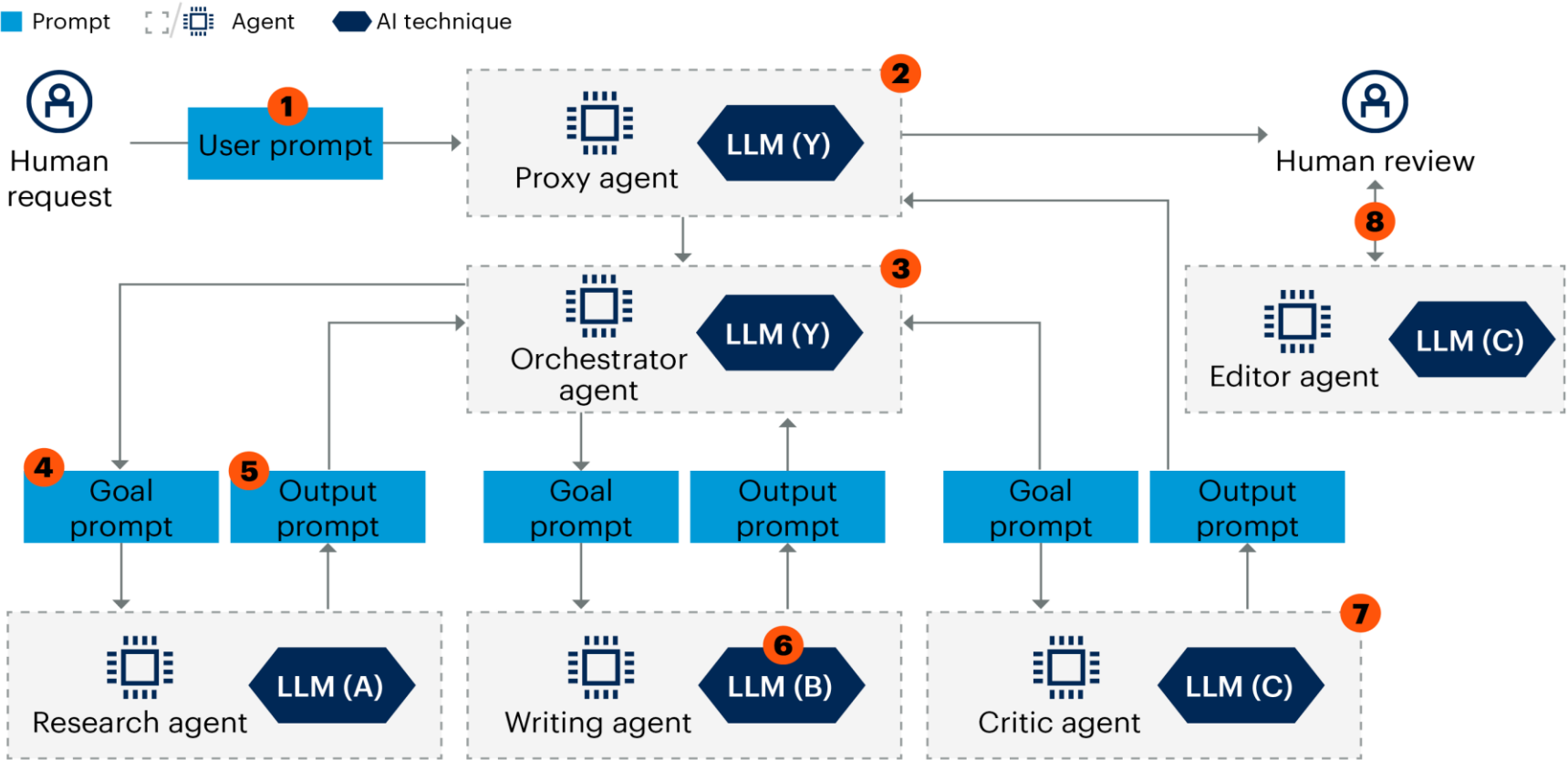
LLM Guardrails

MHQA - Multi-Hop Question Answering
ReAct - Reason + Act
RAG - Retrieval Augmented Generation
LLM - Large Language Model

Functional Patterns

Operational Patterns

AI Agent Blog Writer Multiagent System



- 1** User requests to write a blog

2 Communicates with the human

3 Coordinates the capabilities of other agents

4 Subgoal is a prompt to the next agent
- 5** Subagents return their output

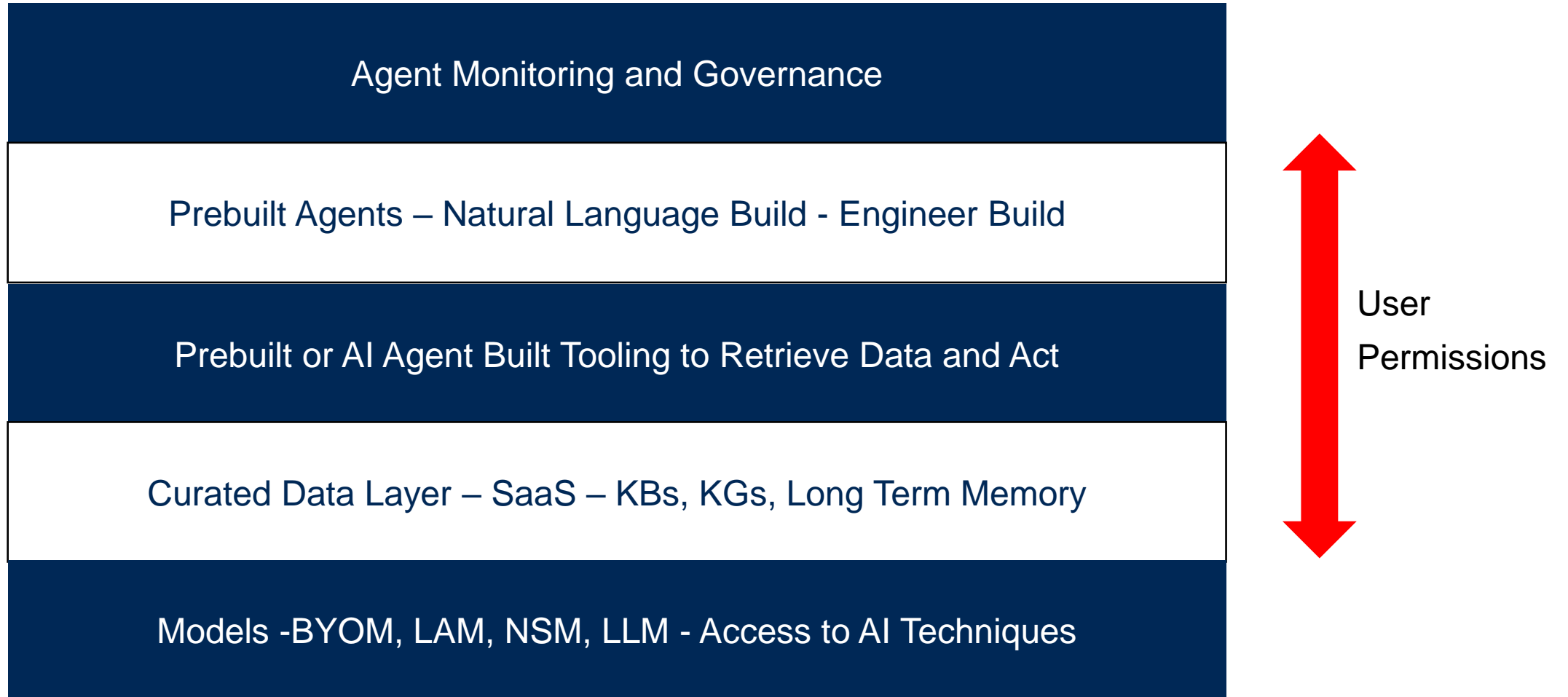
6 Agents in a MAS may use different LLMs

7 Self-reflection or self-critique

8 Human and AI agent coworker relationship

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AI Agent Platforms

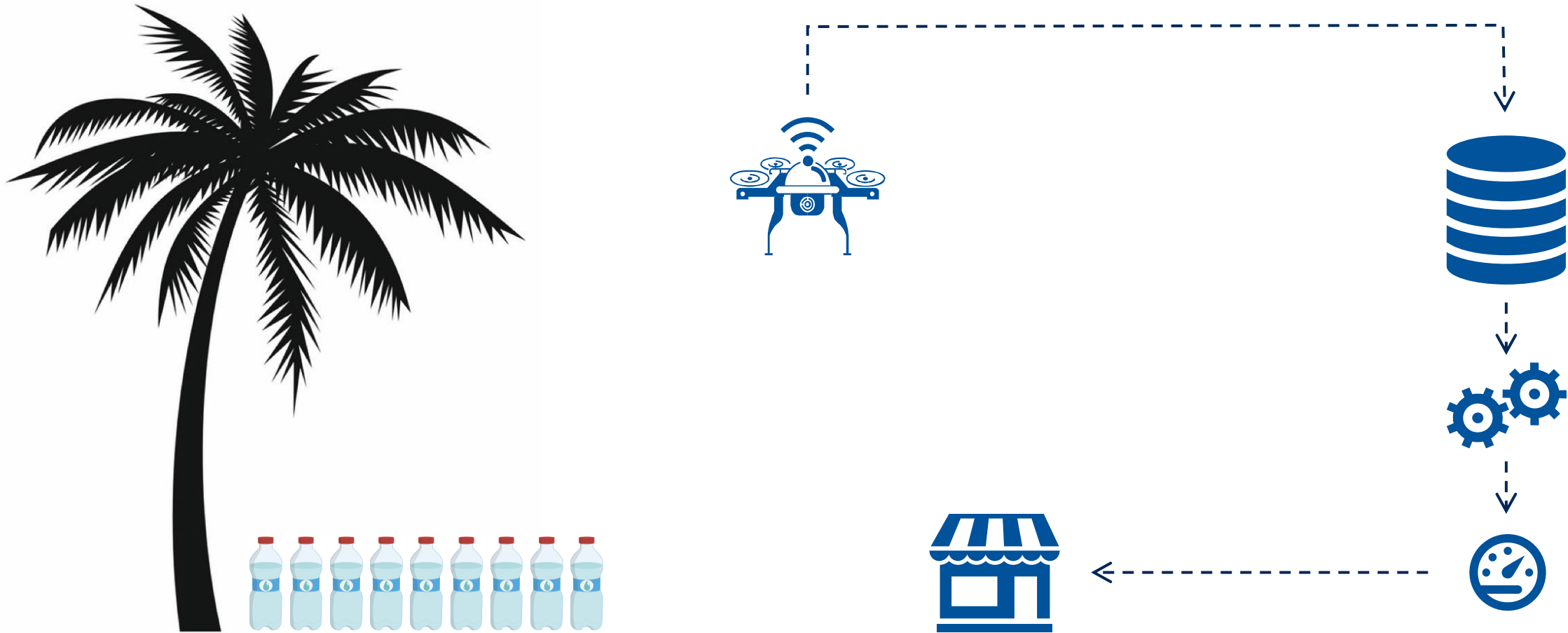


Evaluating a Use Case

- Is this currently a problem of scale?
- Do I have the data to make it work?
- What are the main benefits?
- What are does a mistake look like?
- How big are the risks?

Characteristics of agents-prone use cases
Dynamic and Unpredictable Environments
Complex Decision-Making
Continuous Adaptability
Autonomy & automation
Integration Potential

The new water cycle



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If I was doing this perfectly
at scale?

Before

With

After

Contact Center

Customer Facing
Chat Bot

Agent Assist

100% QA
NBA
Analytics

Gartner Analyst

Book Inquiry
Summarize Topic
Suggest Research

Suggest Research
Comment

Send Research
Client NBA
Close Case

Controller/CEO

Pull data from
disparate systems
and format

Voice Controls
Edits-Format
Advice in Meeting

Update and Email
on the 15th of each
month

Teacher

Create Lesson Plan
Write Lecture
Include Multimedia

Deliver Tests
Multimodal
Grade All

Update Grades
Deliver Follow Up
Track Improvement

Add what is next for Agents - Erick

- Large action models (LAMs)
- Neuro-symbolic AI
- Autonomies vs. autonomy
- Accountability & delegations
- Agent-based orchestration & emerging properties

Recommendations

- ④ Beware of market pressures around AI Agents leading to sterile AI investments.
- ④ Identify organization's solutions where AI Agents can really make a difference given their intrinsic capabilities.
- ④ Where AI Agents make sense prepare your software engineering team for disruptive practices.
- ④ Implement a comprehensive AI literacy program as the deployment of AI Agents implies a deeper understanding of composite AI techniques.
- ④ Prepare for the next stage of AI Agents by exploring software simulation environments.

Agentic AI Webinar

Tues. Jan 28th at 10 AM EST / 4:00 PM CET

Executive Essentials: Business Value Drivers for Agentic AI

Goals

- Identify the business value drivers of agentic AI
- Review the C-Suite business case and why your CEO should care about agentic AI

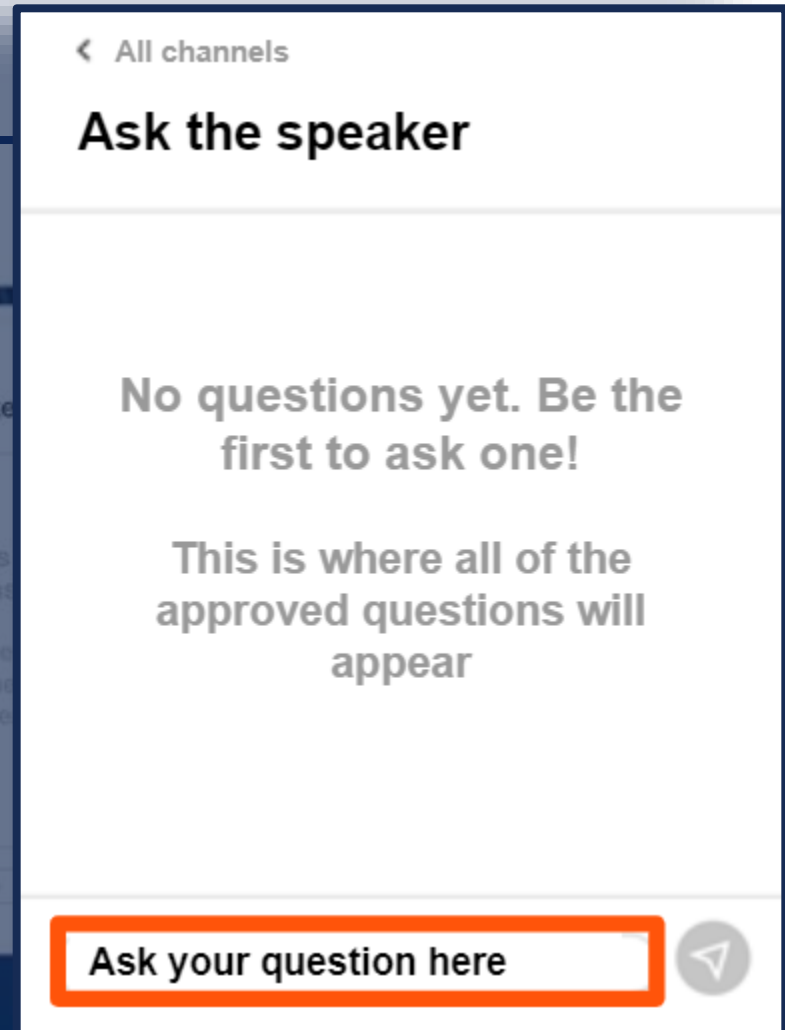
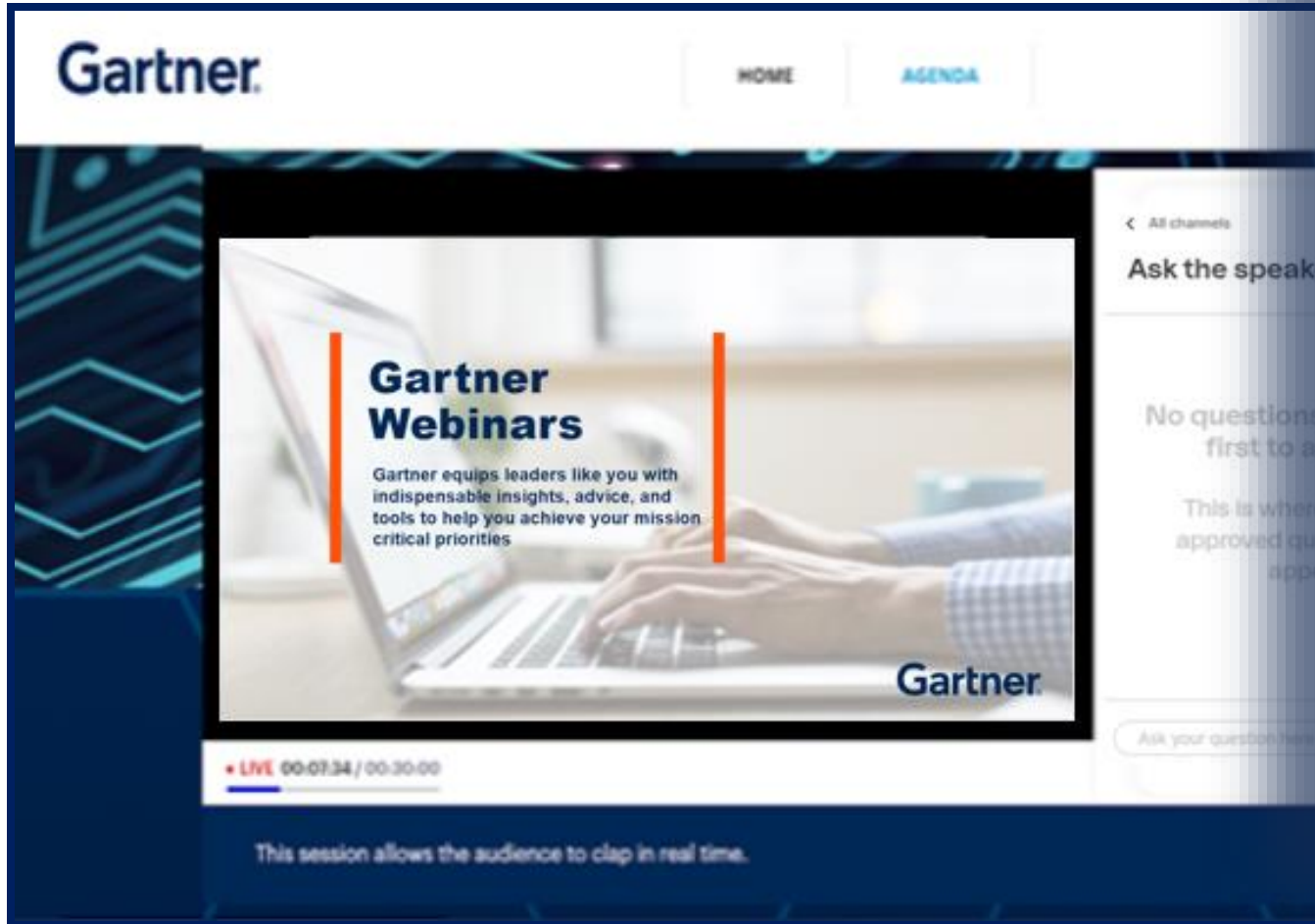
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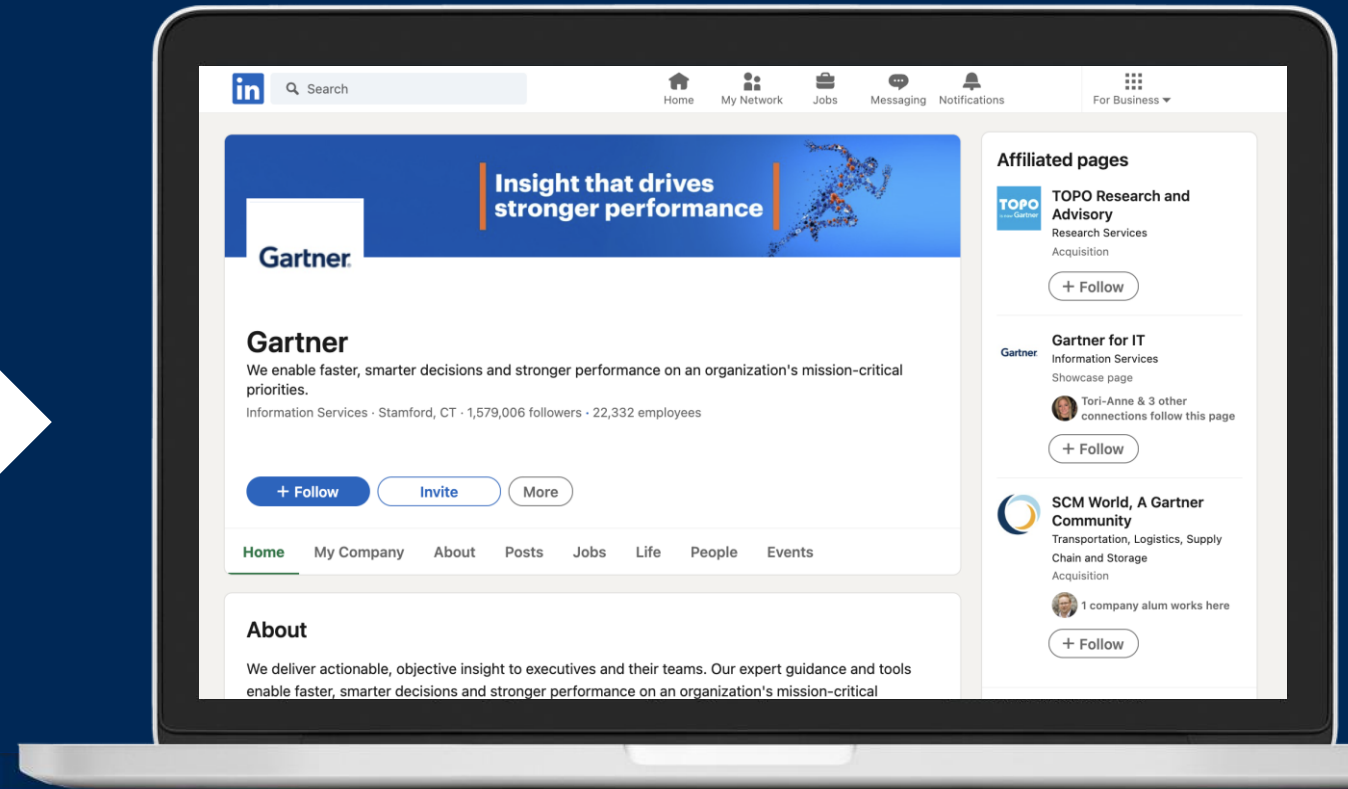
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LIVE Tue Nov 15, 11:00 AM - 12:00 PM EST (1 Hour)

The Future of Cloud in 2027: From Technology to Business Innovation

As cloud computing evolves from technology enabler to business disruptor, IT leaders must ensure they understand their organization's business strategy. Only then can they seek opportunities to leverage new and emerging cloud capabilities to accelerate that strategy. This free webinar reveals Gartner's top predictions for where cloud computing will be by 2027, and explores how these predictions will shape your cloud value proposition.

Explore what cloud computing will look like in 2027

Discover how multi-cloud and cloud native can affect organizations' cloud efforts

Ensure a successful cloud journey for your organization

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Speakers

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