AI Agent Capabilities Periodic Table (AIA CPT)
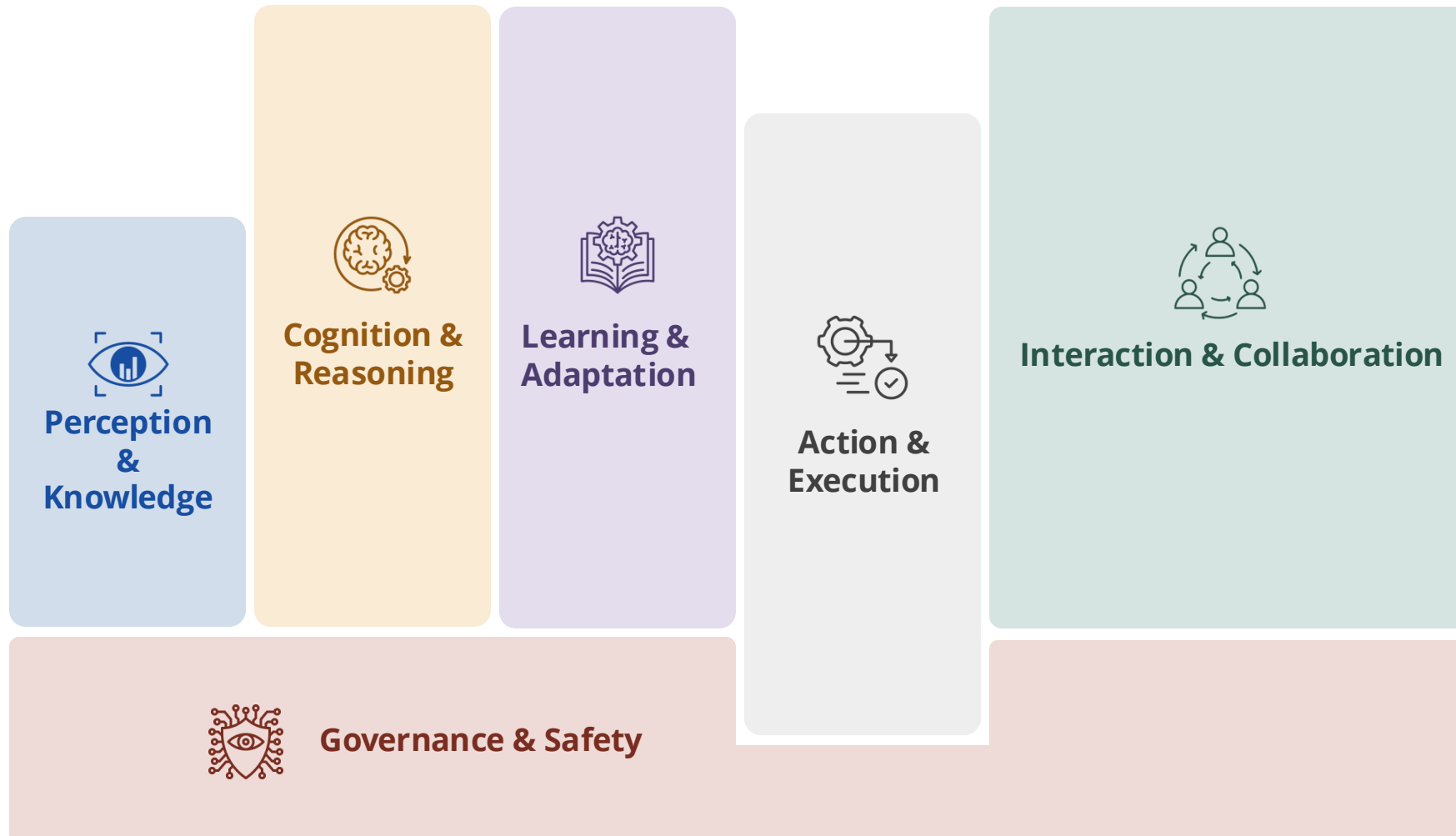
AI Agent Capabilities Periodic Table v1.0

Perception & Knowledge

Cognition & Reasoning

Learning & Adaptation

Action & Execution

Interaction & Collaboration

Governance & Safety

○ Perception & Knowledge   ○ Cognition & Reasoning   ○ Learning & Adaptation   ○ Action & Execution   ○ Interaction & Collaboration   ○ Governance & Safety

AI Agent Capabilities Periodic Table v1.0

digital twin CONSORTIUM

Perception & Knowledge	Cognition & Reasoning	Learning & Adaptation	Action & Execution	Interaction & Collaboration	
	CG.PL Planning & Decomposition	**LA.MM** Memory Management		**IC.NL** Natural Language	**IC.CS** Consensus Protocols
	CG.RS Reasoning	**LA.RL** Reinforcement Learning	**AE.TX** Task Execution & Implementation	**IC.DM** Dialogue Management	**IC.CF** Conflict Resolution
PK.OB Environmental Sensing	**CG.DC** Decision Making	**LA.AD** Self-Optimization	**AE.TL** Tool Usage & API Integration	**C.HL** Human-in-Loop	**IC.SI** Industrial Integration
PK.KB Knowledge Access	**CG.PS** Problem Solving	**LA.SL** Supervised Learning	**AE.CG** Code Generation & Execution	**IC.AC** Agent Communication	**IC.ES** Enterprise Integration
PK.CX Context & Memory	**CG.PP** Formal Planning	**LA.VM** Vector Memory	**AE.CX** Content Creation & Generation	**IC.CL** Collaboration	**IC.MB** Message Brokers
PK.MF Multi-Modal Fusion	**CG.PA** Plan Adaptation	**LA.MS** Memory Scoring	**AE.TM** Tool Lifecycle Management	**IC.RB** Role Behavior	**IC.DS** Distributed Coordination
GS.DL Deployment Management	**GS.MO** Monitoring	**GS.EV** Evaluation	**AE.MC** MCP Integration	**GS.ET** Ethics	**GS.PR** Privacy
GS.SC Scaling	**GS.SF** Safety	**GS.SE** Security	**GS.EX** Explainability	**GS.RL** Reliability	**GS.TC** Trust Management

○ Perception & Knowledge   ○ Cognition & Reasoning   ○ Learning & Adaptation   ○ Action & Execution   ○ Interaction & Collaboration   ○ Governance & Safety

AIA CPT – AI Agent Types

Type 0: Static Automation
- Pre-programmed responses with no learning or adaptation
- *Traditional rule-based Symbolic AI systems and basic automation*

Type 1: Conversational Agents
- Natural language interaction with basic context management
- *Customer service chatbots, FAQ systems, voice assistants*

Type 2: Procedural Workflow Agents
- Multi-step task execution with tool integration and role-based collaboration
- *Workflow automation, task orchestration, process management*

Type 3: Cognitive Autonomous Agents
- Self-directed planning, learning from experience, sophisticated reasoning
- *Research assistants, predictive systems, autonomous decision-making*

Type 4: Multi-Agent Generative Systems (MAGS)
- Collaborative intelligence with emergent behaviors and distributed coordination
- *Industrial automation, smart city systems, complex orchestration*

Typical AIA CPT Development Workflow

Digital Twin CPT Stream

Digital Twin Use Case Business Requirements

Prompt - Digital Twin Business Requirements Generator

Identify Digital Twin Capabilities for the Use Case

Prompt - Digital Twin Capability Selector (In CPT GitHub)

Generate Detail for Key Capabilities

Prompt - Capability Deep Dives (In CPT GitHub)

Generate Custom CPTs by Industry or Application Type

Custom Prompts (In CPT GitHub)

Generate Agent or Agent Team Configuration

Prompt - Team Design Generation

Generate Custom AIA CPTs for Use Case

Prompt - AIA CPT Capability Mapping

Generate Custom CPTs for Use Case

Custom Prompts (Github)

AI Agent CPT Stream

Core Process   Optional