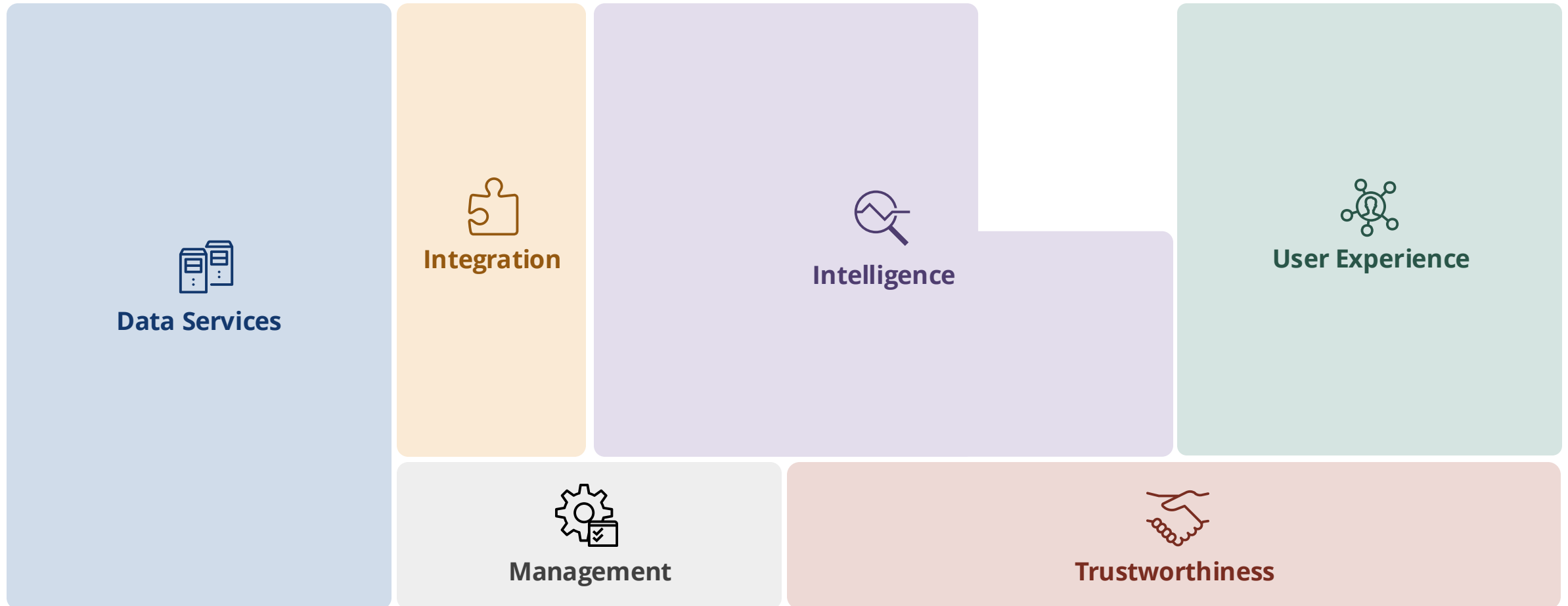




Digital Twins Capabilities Periodic Table

Digital Twin Capabilities Periodic Table v1.2



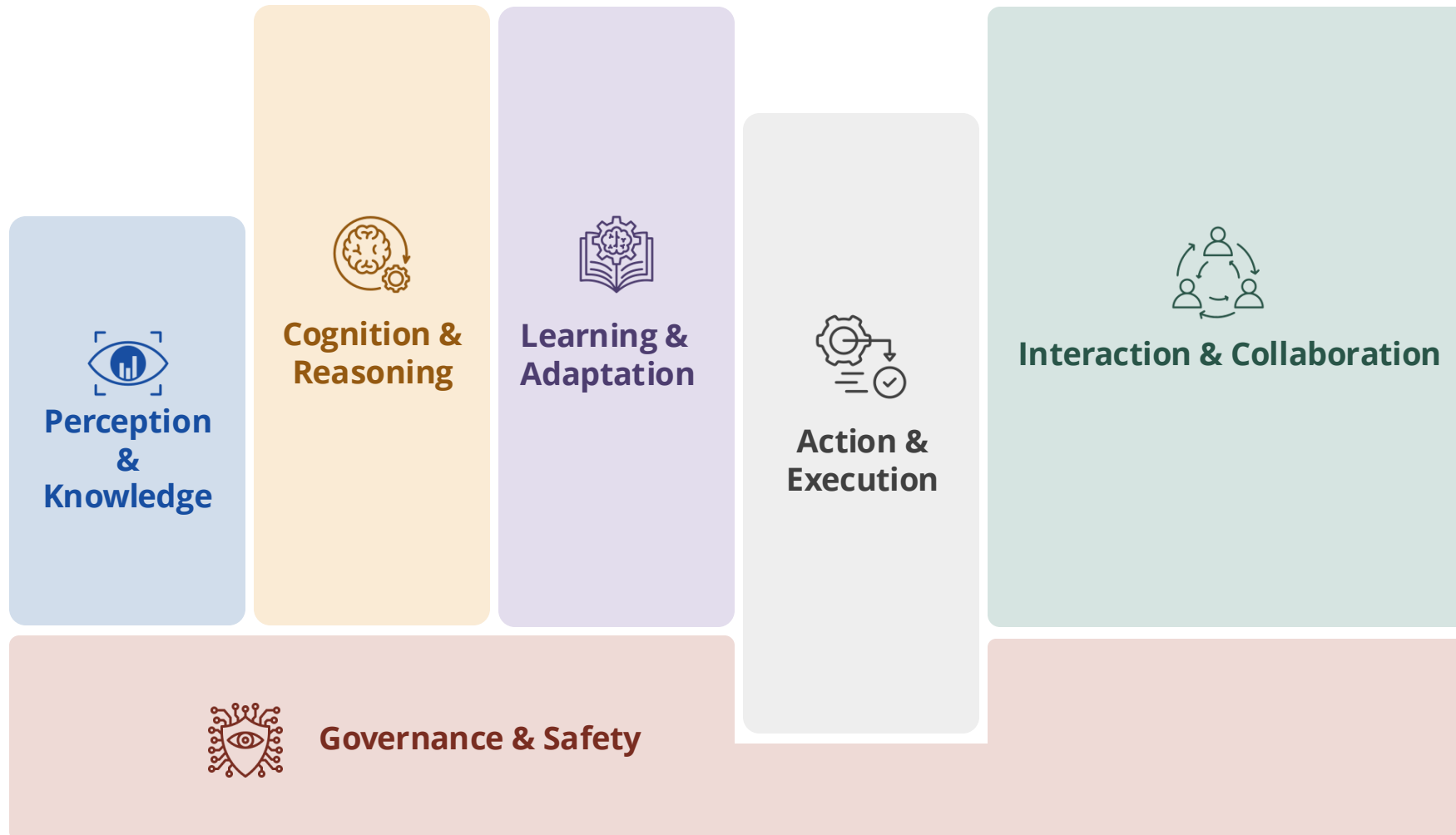
Digital Twin Capabilities Periodic Table v1.2

DS.AI Data Acquisition & Ingestion	DS.SG Synthetic Data Generation	IR.ET Enterprise System Integration	IC.SR Search	IC.PR Prediction		UX.BV Basic Visualization	UX.DB Dashboards
DS.ST Data Streaming	DS.ON Ontology Management	IR.EG Eng. System Integration	IC.CC Command & Control	IC.AI Artificial Intelligence		UX.AV Advanced Visualization	UX.CI Continuous Intelligence
DS.TR Data Transformation	DS.RP Digital Twin (DT) Model Repository	IR.IO OT/IoT System Integration	IC.OS Orchestration	IC.PS Prescriptive Recommendations		UX.RM Real-time Monitoring	UX.BI Business Intelligence
DS.CX Data Contextualization	DS.IR DT Instance Repository	IR.DT Digital Twin Integration	IC.AL Alerts & Notifications	IC.FL Federated Learning	IC.BR Business Rules	UX.ER Entity Relationship Visualization	UX.BP BPM & Workflow
DS.BP Batch Processing	DS.DS Domain Specific Data Management	IR.CL Collab Platform Integration	IC.RP Reporting	IC.SM Simulation	IC.DL Distributed Ledger & Smart Contracts	UX.XR Extended Reality (AV/VR/MR)	UX.GE Gaming Engine Visualization
DS.RT Real-time Processing	DS.SA Data Storage & Archive Services	IR.AS API Services	IC.AA Data Analysis & Analytics	IC.MA Mathematical Analytics	IC.CS Composition	UX.GM Gamification	UX.3R 3D Rendering
DS.AS Asynchronous Integration	DS.SR Simulation Model Repository	MG.DM Device Management	MG.EL Event Logging	TW.EC Data Encryption	TW.SC Security	TW.SF Safety	TW.RP Responsibility
DS.AG Data Aggregation	DS.AR AI Model Repository	MG.SM System Monitoring	MG.DG Data Governance	TW.DS Device Security	TW.PR Privacy	TW.RL Reliability	TW.RS Resilience



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

AI Agent Capabilities Periodic Table v1.0

	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
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 ● Interaction & Collaboration
 ● Governance & Safety

AIA CPT – AI Agent Maturity Levels

Level 0: Static Automation

- Pre-programmed responses with no learning or adaptation
- *Traditional rule-based Symbolic AI systems and basic automation*

Level 1: Conversational Agents

- Natural language interaction with basic context management
- *Customer service chatbots, FAQ systems, voice assistants*

Level 2: Procedural Workflow Agents

- Multi-step task execution with tool integration and role-based collaboration
- *Workflow automation, task orchestration, process management*

Level 3: Cognitive Autonomous Agents

- Self-directed planning, learning from experience, sophisticated reasoning
- *Research assistants, predictive systems, autonomous decision-making*

Level 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

