The Agentic Cloud Modernization

Cockpit Suite

2026 Edition — Fully Agentic Architecture

Powered by Google ADK, MCP, A2A, and Vertex AI Agent Engine

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I. Strategic Imperative: The Fully Agentic Modernization Mandate

The transition from siloed, application-specific tools to a unified, fully autonomous Cloud Modernization Cockpit represents a fundamental shift in how enterprises approach digital transformation in 2026. This Cockpit is not merely a dashboard; it is an integrated, agentic operating system designed to manage the entire modernization process as a continuous continuum, moving beyond one-off projects to sustained value realization.

By synthesizing three critical enterprise functions—discovery and assessment, strategic financial modeling, and factory execution—into a single, multi-agent solution built on production-ready protocols (MCP, A2A, Google ADK), the Cockpit ensures alignment between high-level business goals and ground-level technical execution with zero human-in-the-loop for routine decisions.

I.A. What Has Changed Since the 2025 Edition

The 2026 edition represents a complete architectural overhaul driven by the maturation of the agentic AI ecosystem. The original PRD described a conceptual HMAS framework. This revision replaces that conceptual design with production-grade infrastructure using tools and protocols that have reached general availability.

Dimension	2025 PRD (Original)	2026 PRD (This Document)
Agent Framework	Conceptual LangChain + Vertex AI hybrid	Google Agent Development Kit (ADK) v0.5 as primary framework with LangGraph for specialized chains
Agent-to-Agent Communication	Custom ACP (Agent Communication Protocol)	Google A2A Protocol v0.3 (Linux Foundation open standard) with Agent Cards for discovery
Tool Integration Protocol	Conceptual MCP references	Anthropic MCP with Streamable HTTP, OAuth 2.1 authorization, structured tool outputs, and MCP Registry
Deployment Platform	Vertex AI Agent Builder (preview)	Vertex AI Agent Engine (GA) with managed runtime, sessions, memory bank, and agent identity
Orchestration Model	Static hierarchical delegation	Dynamic ADK orchestration: Sequential, Parallel, Loop workflows with LLM-driven adaptive routing
Security Model	IAM-only	Agent Identity (IAM), A2A signed security cards, MCP OAuth 2.1 Resource Servers, SCC Agent Engine Threat Detection
Observability	Custom logging	OpenTelemetry Protocol (OTLP) native across A2A and ADK, Cloud Trace, Cloud Monitoring

Model Foundation	Gemini 1.5 Pro	Gemini 3 Pro (most powerful agentic model) with ADK compatibility
Multi-Cloud Support	GCP-centric with AWS tool references	Full multi-cloud via MCP servers for AWS, Azure, and GCP tools with unified agent orchestration
Agent Marketplace	Not available	Vertex AI Agent Garden and Agentspace for discoverable, governed agent deployment

I.B. The Modernization Continuum and Phased Strategy

Application modernization remains a continuous life cycle encompassing assessment, planning, execution, and ongoing maintenance. The Cockpit governs this entire process, ensuring rigor at every stage from initial discovery through expansion, innovation, and optimization.

Modernization phases can be defined using three primary methods, each with direct implications for how the ADK orchestrator delegates work across the agent hierarchy:

- Division by component or layer: Separating phases based on workload boundaries (e.g., database migration before application refactoring before UI modernization). This requires sequential ADK workflow orchestration with intensive vertical communication.

- Division by priority and complexity: Organizing from low-risk noncritical services to high-risk core business logic. This minimizes immediate business disruption and allows parallel ADK execution.

- Division by business function: Structuring phases around functional boundaries (e.g., user management before payment processing). This enables maximum L1 agent autonomy and parallel execution across the factory model.

The ADK orchestrator dynamically adapts its coordination patterns—selecting Sequential, Parallel, or Loop workflow agents—based on the strategy defined during the planning phase. The system uses LLM-driven transfer routing to adaptively redirect work when runtime conditions deviate from plan.

I.C. Synthesis of Core Capabilities

The Cockpit unifies three previously disparate capabilities into a cohesive platform:

- Integrated Discovery and Assessment: Centralizes ingestion of current-state application portfolios, server schematics, and dependency maps via MCP servers connected to on-premises discovery tools (e.g., Migration Center, Stratozone, Flexera). Feeds the engine for Cloud Readiness Analytics.

- Strategic Financial Modeling: Provides differentiation between ROI (performance value vs. investment) and TCO (comprehensive cost including hidden, opportunity, and innovation costs). Agents access cloud pricing APIs via dedicated MCP tool servers for AWS Cost Explorer, GCP Billing, and Azure Cost Management.

- Automation Factory Integration: Incorporates the structured Cloud Migration Factory framework across four phases: discovery/assessment, planning/design, execution, and validation/iteration. L1 agents manage migration waves, update server metadata, and create end-to-end pipelines through MCP-connected REST APIs.

II. Architectural Blueprint: Hierarchical Multi-Agent System on Google ADK

The Cloud Modernization Cockpit is structured as a Hierarchical Multi-Agent System (HMAS) implemented using Google's Agent Development Kit (ADK). ADK provides the flexible orchestration primitives—Sequential, Parallel, Loop workflow agents, and LLM-driven dynamic routing via agent transfer—that map directly to the layered HMAS design. All agents are deployed to Vertex AI Agent Engine for production-grade managed runtime, scaling, and governance.

II.A. HMAS Layers and Agent Roles on ADK

The HMAS employs a three-tiered structure implemented as an ADK multi-agent hierarchy. Each layer is a composition of specialized ADK agents with defined parent-child relationships and transfer policies.

Strategic Layer (L3): The Executive Command. Implemented as the root ADK agent with LLM-driven routing. The Executive Planning Agent (EPA) defines overarching strategic mission goals, sets financial targets, and authorizes budget allocation. It delegates to L2 tactical sub-agents via ADK's agent transfer mechanism. The EPA uses Gemini 3 Pro for maximum reasoning capability across complex strategic decisions.

Tactical Layer (L2): The Strategy Decomposers. Implemented as ADK sub-agents under the EPA, each with specialized tool access via MCP. The Refactoring Strategy Agent (RSA) determines optimal modernization paths. The Financial Insight Agent (FIA) performs continuous TCO/ROI modeling. The Governance Agent (GA) enforces compliance and risk profiles. These agents use ADK workflow orchestration to coordinate parallel work streams.

Execution Layer (L1): The Real-Time Executors. Implemented as leaf-level ADK agents with direct MCP tool connections to cloud APIs and deployment infrastructure. The Migration Velocity Agent (MVA) tracks execution rates. The Deployment Orchestration Agent (DOA) runs automation pipelines. The Performance Monitoring Agent (PMA) monitors post-migration health. L1 agents operate with high localized autonomy within governance guardrails set by L2.

II.B. Communication Protocol Stack (2026)

The 2026 architecture replaces the conceptual protocol references of the original PRD with production-ready, standards-based protocols:

Protocol	Scope	Function in Cockpit	2026 Status
Google A2A v0.3	Agent-to-Agent collaboration	Enables cross-platform agent discovery via Agent Cards, secure task delegation between agents from different vendors or frameworks, and long-running task management. Used for L2-to-L1 delegation and for integrating external partner agents (e.g., customer's existing ServiceNow agents).	GA under Linux Foundation, gRPC support, signed security cards, 150+ org ecosystem

Anthropic MCP	Agent-to-Tool integration	Provides standardized, secure access to external tools, APIs, data sources, and knowledge bases. Each cloud service (AWS Migration Service, GCP Datastream, Azure Migrate) is exposed as an MCP server. L1 agents connect as MCP clients. Supports Streamable HTTP for remote servers.	Production with OAuth 2.1, structured tool outputs, MCP Registry for discovery, Streamable HTTP transport
ADK Internal Orchestration	Intra-hierarchy coordination	ADK's native agent transfer mechanism handles parent-child communication within the HMAS hierarchy. Sequential, Parallel, and Loop workflow agents manage execution patterns. LLM-driven routing enables adaptive task delegation.	GA in ADK v0.5, deployed on Vertex AI Agent Engine
OpenTelemetry (OTLP)	Observability	All agents emit structured traces, logs, and metrics in OTLP format. A2A traffic carries trace IDs natively. Integrated with Cloud Trace, Cloud Monitoring, and Cloud Logging for unified observability across the entire agent hierarchy.	Industry standard, native in A2A and ADK

II.C. Agent Architecture Reference Table

Layer	Agent (Acronym)	ADK Implementation	Key Function	Protocol Stack
Strategic (L3)	Executive Planning Agent (EPA)	Root LlmAgent with Gemini 3 Pro, dynamic transfer routing to L2 sub-agents	Defines strategic goals, financial targets. Synthesizes L2 reports for executive dashboards. Authorizes budget allocation and R-Model escalation.	A2A (external partner agents), MCP (reporting tools), ADK transfer (internal)
Tactical (L2)	Refactoring Strategy Agent (RSA)	LlmAgent sub-agent with tool access via MCP to Migration Center, assessment APIs	Decomposes L3 goals into technical phases. Selects R-Model strategy (Re-host/Re-platform/Refactor). Defines phased deployment structure.	MCP (assessment tools), ADK transfer (delegates to L1), A2A (external assessment agents)
Tactical (L2)	Financial Insight Agent (FIA)	LlmAgent sub-agent with MCP connections to Cost Explorer, Billing APIs, Pricing Calculators	Continuous TCO/ROI modeling. Dynamically adjusts projections based on L1 performance data. Identifies cost optimization opportunities.	MCP (financial data sources), ADK transfer (receives L1 data), OTLP (cost metrics)
Tactical (L2)	Governance Agent (GA)	LlmAgent sub-agent with deterministic	Enforces risk profiles, compliance checks.	MCP (compliance tools), ADK callbacks

		guardrails via ADK callbacks	Validates stakeholder approval gates before L1 execution. Manages audit trail.	(guardrails), OTLP (audit logs)
Execution (L1)	Migration Velocity Agent (MVA)	LlmAgent leaf agent with real-time data stream tools	Tracks migration rate (servers/month) against deadlines. Flags velocity degradation to L2. Monitors help desk volume for service friction.	MCP (migration tracking APIs), OTLP (velocity metrics), ADK transfer (escalation to L2)
Execution (L1)	Deployment Orchestration Agent (DOA)	LlmAgent leaf agent with MCP tool connections to migration service REST APIs	Runs automation pipelines, manages migration credentials, connects to cloud migration services (AWS MGN, GCP Migrate, Azure Migrate).	MCP (migration service APIs, Datastream, Storage Transfer), REST (direct tool calls)
Execution (L1)	Performance Monitoring Agent (PMA)	LlmAgent leaf agent with Cloud Monitoring MCP server	Monitors post-migration performance: Load Average, CPU, Memory, Uptime, Response Times. Triggers L2 review on anomalies.	MCP (CloudWatch, Cloud Monitoring, Azure Monitor), OTLP (performance metrics)

III. Technology Stack and Enterprise Platform Strategy

III.A. Google ADK as the Primary Agent Framework

Google's Agent Development Kit (ADK) v0.5 replaces the previous hybrid LangChain/Vertex AI approach as the primary framework for building the Cockpit's agent hierarchy. ADK provides the production-grade primitives required for enterprise HMAS:

- Multi-Agent Architecture: Native support for composing specialized agents in hierarchies with parent-child relationships, precisely mapping to the L3/L2/L1 HMAS design.
- Flexible Orchestration: Sequential, Parallel, and Loop workflow agents for deterministic pipelines, plus LLM-driven dynamic routing via agent transfer for adaptive behavior.
- Rich Tool Ecosystem: Pre-built tools (Grounding with Google Search, Code Execution, RAG Engine) plus custom MCP tool integration for cloud migration services.
- Deployment Ready: Direct deployment to Vertex AI Agent Engine, Cloud Run, or GKE with managed scaling, security, and monitoring.
- Built-in Evaluation: Systematic assessment of agent performance across both response quality and step-by-step execution trajectory.
- Multi-Language Support: Python, TypeScript, Go, and Java SDKs for teams with diverse skill sets.

III.B. Vertex AI Agent Engine as the Managed Runtime

All Cockpit agents are deployed to Vertex AI Agent Engine, which provides the enterprise-grade managed runtime:

- Managed Runtime: Fully managed infrastructure for agent deployment, scaling, and lifecycle management. Developers focus on agent logic, not operational concerns.
- Sessions and Memory Bank (GA): Short-term session management and long-term memory bank for maintaining context across interactions. Critical for the EPA to maintain strategic context across planning cycles.
- Agent Identity: IAM-based agent identity for secure, scoped access to cloud resources. Each L1 agent receives its own identity with least-privilege permissions for its specific migration domain.
- SCC Agent Engine Threat Detection: Built-in security monitoring to detect and investigate potential attacks on deployed agents. Essential for an enterprise system managing production infrastructure.
- Cloud API Registry Integration: Administrators govern which tools are available to agents, ensuring L1 agents can only access approved migration and monitoring APIs.

III.C. MCP Server Architecture for Tool Integration

Each external tool and cloud service is exposed as an MCP server, providing a standardized, secure integration layer. The Cockpit maintains a curated registry of MCP servers organized by modernization domain:

MCP Server Domain	Connected Services	Primary Consuming Agent	Auth Model
Discovery and Assessment	GCP Migration Center, AWS Migration Hub, Azure Migrate, Flexera, ServiceNow CMDB	RSA (L2)	OAuth 2.1 with resource indicators
Financial Modeling	GCP Billing API, AWS Cost Explorer, AWS Budgets, Azure Cost Management, Pricing Calculators	FIA (L2)	OAuth 2.1 service account delegation
Migration Execution	AWS Application Migration Service (MGN), GCP Migrate for Compute Engine, Azure Migrate, Terraform providers	DOA (L1)	Agent Identity (IAM) per-agent credentials
Data Migration	GCP Datastream (CDC), Storage Transfer Service, AWS DMS, Azure Database Migration Service	DOA (L1)	Agent Identity with data-scoped permissions
Containerization	GKE, Cloud Run, EKS, AKS, Docker registries	DOA (L1)	Agent Identity with container registry access
Monitoring	GCP Cloud Monitoring, AWS CloudWatch, Azure Monitor, Datadog, PagerDuty	PMA (L1)	OAuth 2.1 read-only scoped tokens

Compliance	SCC, AWS Security Hub, Azure Defender, policy engines	GA (L2)	OAuth 2.1 with audit logging
Velocity Tracking	Jira, ServiceNow, migration factory web APIs	MVA (L1)	OAuth 2.1 with project-scoped access

III.D. A2A Protocol for Cross-Platform Agent Collaboration

The A2A protocol (v0.3, Linux Foundation) enables the Cockpit to collaborate with agents outside its own hierarchy—a critical enterprise requirement. Each Cockpit agent publishes an Agent Card (JSON at /.well-known/agent.json) describing its capabilities, endpoint, and supported authentication.

Key A2A integration scenarios for the Cockpit:

- Customer Agent Integration: Enterprise customers with existing ServiceNow, Salesforce, or SAP agents can connect them to the Cockpit via A2A. The customer's change management agent can receive migration notifications and automatically create change tickets.
- Partner Agent Ecosystem: SI partners can deploy specialized assessment or remediation agents that integrate with the Cockpit via A2A, extending the factory's capabilities without code changes.
- Multi-Cloud Orchestration: Agents managing workloads across AWS, Azure, and GCP coordinate via A2A, maintaining vendor neutrality while enabling unified orchestration.
- Agentspace Discovery: Cockpit agents can be published to Google Agentspace, making them discoverable and consumable as enterprise services with built-in governance and safety controls.

IV. Persona-Driven Capabilities and Agentic Workflows

IV.A. Sales Persona: Value Capture and Pipeline Acceleration (L3 View)

The Sales persona requires high-level, decisive, and quantifiable data to qualify opportunities and accelerate the sales cycle. The L3 Executive Planning Agent (EPA) operates an embedded Opportunity Qualification subroutine that synthesizes discovery data with industry benchmarks.

The EPA uses Gemini 3 Pro's multimodal capabilities to ingest uploaded portfolio documents, spreadsheets, and architecture diagrams, generating an objective Cloud Readiness Score and estimated ROI within minutes. The agent leverages ADK's Grounding with Google Search tool to benchmark against current industry pricing and competitive positioning.

The Cockpit enables a data-driven Sales motion, selling concrete, quantified business outcomes rather than generalized features. By having instant, agent-generated insights about prospect pain points and value realization, the Sales team shares credible data with both technical and executive decision-makers.

IV.B. Presales Persona: Technical Feasibility and Financial Justification (L2 View)

The Presales persona is tasked with deep understanding of customer needs and matching them to technically sound, financially justified solutions. The L2 agents provide this tactical view:

- Solution Design: The RSA receives the high-level mandate, accesses the customer's portfolio data via MCP-connected discovery tools, and designs the phased technical solution. It selects the optimal R-Model and defines the deployment structure using ADK's Sequential workflow agent for dependent phases or Parallel workflow agent for independent workstreams.

- Financial Proof: The FIA translates the strategic plan into a detailed financial model, accessing cloud pricing APIs via MCP servers. It generates granular TCO vs. current infrastructure reports, including hidden costs and optimization projections. The FIA uses ADK memory bank to maintain historical pricing context across engagements.

- Risk Management: The GA prepares the Modernization Risk Profile using ADK's deterministic callback guardrails to ensure all compliance criteria are validated before any L1 execution begins.

Continuous ROI Validation Loop: The FIA continuously monitors PMA outputs (response times, uptime, CPU utilization) via OTLP metrics. If post-migration performance exceeds benchmarks, the FIA autonomously recalculates a higher realized ROI and updates the executive dashboard. This closed-loop validation ensures the business case remains dynamically accurate throughout the Optimize and Innovate phases.

IV.C. Delivery Persona: Execution Velocity and Operational Excellence (L1 View)

The Delivery persona requires real-time, quantifiable metrics for progress tracking, security assurance, and service reliability. L1 agents provide operational visibility:

- Velocity Tracking: The MVA tracks migration execution rate against deadlines (servers migrated per month). It uses ADK's Loop workflow agent for continuous monitoring cycles, escalating velocity degradation to L2 via agent transfer.

- Autonomous Remediation: When the DOA encounters a dependency failure during migration, it consults its MCP-connected tool context, identifies alternatives (e.g., switching from bulk migration to Datastream CDC for a problematic Oracle database), and autonomously attempts remediation before escalating. This is the core agentic capability that differentiates the Cockpit from traditional automation.

- Service Reliability: The PMA monitors post-migration health via MCP-connected Cloud Monitoring servers. It tracks help desk volume trends as an early warning system for user friction, triggering proactive remediation.

V. Functional Module Blueprint: Agent-Driven Modernization Lifecycle

V.A. Assessment and Strategy Module

This module governs initial decision-making using data gathered on the current application portfolio. The RSA ingests portfolio inventory via MCP servers connected to discovery tools, performs R-Model analysis, and the FIA constructs the financial model. The GA ensures all planning criteria and risk mitigation strategies are defined before transitioning to execution.

Cockpit Module	Phase	Primary Capability	Supporting Agent	Key Output
Assessment Dashboard	Assess/Plan	Portfolio inventory, dependency mapping, readiness scoring via MCP-connected discovery tools	RSA (L2)	Application Health Map, R-Model Recommendation
Strategic Planning Suite	Plan	Strategy selection, governance planning, phased deployment definition via ADK workflow orchestration	FIA + GA (L2)	TCO vs. ROI Report, Risk Mitigation Plan, ADK Workflow Definition

V.B. Migration Execution Module (The Agentic Factory Core)

This module is the operational engine. L2 Tactical agents delegate validated execution phases to L1 agents via ADK agent transfer. The DOA orchestrates end-to-end migration pipelines through MCP-connected migration service APIs. Key 2026 enhancements:

- Multi-Cloud Execution: The DOA connects to AWS MGN, GCP Migrate for Compute Engine, and Azure Migrate through dedicated MCP servers, enabling unified migration orchestration across cloud providers.
- Containerization Pipeline: When the RSA selects Refactor as the R-Model, the DOA invokes containerization tools via MCP to convert VM workloads to containers for GKE, Cloud Run, EKS, or AKS.
- Data Migration Orchestration: Specialized DOA sub-agents handle complex data movement using Datastream (CDC from Oracle, MySQL, PostgreSQL, SQL Server to BigQuery), Storage Transfer Service, AWS DMS, and Azure DMS.
- Infrastructure as Code: The DOA generates and applies Terraform configurations via MCP-connected Terraform providers, ensuring all migration infrastructure is version-controlled and reproducible.

V.C. Optimization and Continuous Monitoring Module

This module addresses the ongoing Optimize, Maintain, and Innovate phases. It enforces continuous cost efficiency and performance improvements through autonomous agent loops:

Cost Optimization Loop: The FIA maintains a continuous monitoring loop via MCP connections to cloud billing APIs. It autonomously identifies non-optimized resources, calculates cost impact of idle instances, and delegates optimization actions to L1 DOA agents (resizing, scheduling, commitment recommendations). The ADK Loop workflow agent ensures this runs continuously.

Performance Monitoring Loop: The PMA monitors core operational metrics and, on detecting sustained poor performance, initiates vertical escalation via ADK agent transfer to the L2 RSA. This triggers a strategy review and potentially initiates a new optimization or refactoring cycle.

FinOps Integration: The FIA integrates with FinOps practices by publishing cost and utilization data to shared dashboards and feeding anomaly detection back into the governance framework via the GA.

VI. Security Architecture: Defense in Depth for Agentic Systems

The 2026 architecture implements defense-in-depth security specifically designed for multi-agent systems, addressing the unique attack surfaces of agentic AI:

Security Layer	Mechanism	Implementation
Agent Identity	IAM-based per-agent identity with least-privilege permissions	Each L1 agent receives a unique Vertex AI Agent Engine identity. The DOA has migration-service-scoped permissions; the PMA has monitoring-read-only permissions. No agent can exceed its defined authority.
Agent-to-Agent Authentication	A2A signed security cards with mutual authentication	All A2A communications between Cockpit agents and external partner agents require signed Agent Cards. gRPC support provides encrypted, authenticated channels.
Tool Access Authorization	MCP OAuth 2.1 with resource indicators (RFC 8707)	Every MCP server connection uses OAuth 2.1 tokens tightly scoped to the specific MCP server (resource indicator prevents token misuse across servers). Cloud API Registry governs which tools each agent can access.
Threat Detection	SCC Agent Engine Threat Detection	Built-in monitoring detects and investigates potential attacks on deployed agents, including prompt injection attempts and unauthorized tool access.
Governance Guardrails	ADK deterministic callbacks on the GA agent	The Governance Agent uses ADK callback mechanisms to enforce hard compliance gates. No L1 execution proceeds without GA validation. All decisions are audit-logged.
Observability and Audit	OpenTelemetry (OTLP) across all layers	Every agent interaction generates structured traces with correlation IDs. A2A traffic carries native trace IDs. Complete audit trail from L3 strategic decision to L1 execution action.
Data Protection	Encryption at rest and in transit, VPC Service Controls	All agent communications within GCP use VPC Service Controls. MCP server connections use TLS. Vertex AI provides encryption for all stored agent state and memory.
Supply Chain Security	MCP Registry and Agent Garden curation	Only MCP servers and agents from the curated Vertex AI Agent Garden and verified MCP Registry entries are permitted. No unvetted tool or agent connections.

VII. Deployment Architecture and Scalability

VII.A. Deployment Topology

The Cockpit supports three deployment paths on Vertex AI, each suited to different operational requirements:

- Vertex AI Agent Engine (Primary): Fully managed runtime for the complete HMAS hierarchy. Recommended for most deployments. Handles scaling, monitoring, session management, and memory automatically.
- Cloud Run (Flexible): For organizations requiring custom container configurations or specific networking requirements. A2A agents are containerized and deployed with serverless scaling.
- Google Kubernetes Engine (Maximum Control): For organizations requiring full Kubernetes control over agent infrastructure. Suitable for air-gapped or highly regulated environments.

The Agent Starter Pack CLI tool enables complete CI/CD setup for any deployment path, providing production-ready foundations for building, testing, and deploying the Cockpit's agent hierarchy.

VII.B. Scalability Model

The HMAS on ADK inherently addresses scalability through its hierarchical design. L1 agents can be horizontally scaled independently based on migration wave size. The ADK Parallel workflow agent enables concurrent execution across multiple migration streams. Vertex AI Agent Engine automatically adjusts compute resources based on demand, and the A2A protocol supports long-running tasks that may take hours or days—critical for large-scale migration waves.

VIII. Executive KPI Synthesis: From L1 Execution to L3 Outcomes

The strategic value of the Agentic Cockpit lies in establishing direct, quantifiable causal links between tactical execution and strategic business outcomes, all visible through a unified dashboard powered by OTLP telemetry:

KPI Category	L3 Strategic Metric	L2 Supporting Metric	L1 Operational Metric	Causal Relationship
Value Realization	Estimated ROI	TCO Deviation from Budget	CPU/Memory Utilization	Inefficient utilization increases resource consumption (L1), increasing TCO deviation (L2), requiring the FIA to dynamically adjust ROI projections (L3).

Project Control	Timeline Risk Profile	Migration Velocity Rate	Automation Script Error Rate	High script error rates (L1) degrade migration velocity (L2), increasing timeline risk (L3) and potentially triggering EPA authorization for additional resources.
Service Quality	Business Agility Score	Response Time (p95)	Post-Migration Help Desk Volume	Increased help desk volume (L1) signals poor service reliability, requiring RSA review (L2) to determine if the modernization strategy meets performance targets (L3).
Cost Efficiency	FinOps Maturity Score	Cloud Spend vs. Committed Budget	Idle Resource Percentage	High idle resource percentage (L1) indicates optimization opportunity, triggering FIA cost analysis (L2) and improving overall FinOps maturity (L3).
Security Posture	Compliance Attestation Status	Vulnerability Remediation Rate	SCC Threat Detection Alerts	Unresolved threat alerts (L1) reduce remediation rates (L2), blocking compliance attestation (L3) and halting migration waves via GA guardrails.

IX. Implementation Roadmap

Phase	Timeline	Deliverables	Key Dependencies
Phase 0: Foundation	Months 1–2	GCP project setup, Vertex AI Agent Engine provisioning, ADK development environment, MCP server registry initialization, A2A Agent Card templates	GCP organization policies, IAM configuration, Agent Engine billing activation
Phase 1: L3 + L2 Core	Months 3–5	EPA agent with executive dashboard, RSA with R-Model analysis, FIA with TCO/ROI modeling, GA with compliance guardrails. All deployed to Agent Engine with sessions and memory.	MCP servers for discovery tools, financial APIs. ADK workflow definitions for Sequential and Parallel orchestration.
Phase 2: L1 Factory	Months 5–8	DOA with multi-cloud migration pipeline execution, MVA with velocity tracking, PMA with performance monitoring. Full HMAS hierarchy operational.	MCP servers for AWS MGN, GCP Migrate, Azure Migrate, monitoring APIs. A2A integration testing with partner agents.
Phase 3: Optimization	Months 8–10	Continuous cost optimization loop, FinOps integration, autonomous remediation capabilities, Agentspace publication for enterprise discovery.	Production migration data for training optimization models. OTLP telemetry pipeline validation.

| Phase 4: Scale | Months 10–12 | Multi-customer deployment, Agent Garden publication, partner agent marketplace, advanced analytics and predictive modeling. | Customer onboarding automation, A2A partner certification program, Agent Engine scaling validation. |

X. Conclusion: Enterprise Readiness Assurance

The 2026 Agentic Cloud Modernization Cockpit represents a generational leap from the conceptual HMAS framework of the original PRD to a production-ready, fully agentic system built entirely on GA infrastructure. By leveraging Google ADK for agent orchestration, Vertex AI Agent Engine for managed deployment, MCP for standardized tool integration, and A2A for cross-platform agent collaboration, the Cockpit delivers:

- True Autonomy: L1 agents resolve common execution failures without human intervention, consulting MCP-connected tools and autonomously attempting remediation before escalating.

- Enterprise Security: Defense-in-depth with agent identity, signed A2A security cards, OAuth 2.1-scoped MCP connections, and SCC threat detection.

- Production Scalability: Vertex AI Agent Engine provides managed scaling, session management, and memory for sustained, large-scale migration operations.

- Ecosystem Integration: A2A enables seamless collaboration with customer and partner agents. MCP provides universal tool connectivity. Agentspace enables enterprise-wide agent discovery.

- Continuous Value: Closed-loop financial validation ensures business cases remain dynamically accurate, with autonomous cost optimization driving sustained value realization.

This architecture positions the Cockpit not as a point solution but as the foundational agentic operating system for enterprise cloud modernization—one that grows more capable with every migration wave, every optimization cycle, and every agent added to the ecosystem.

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