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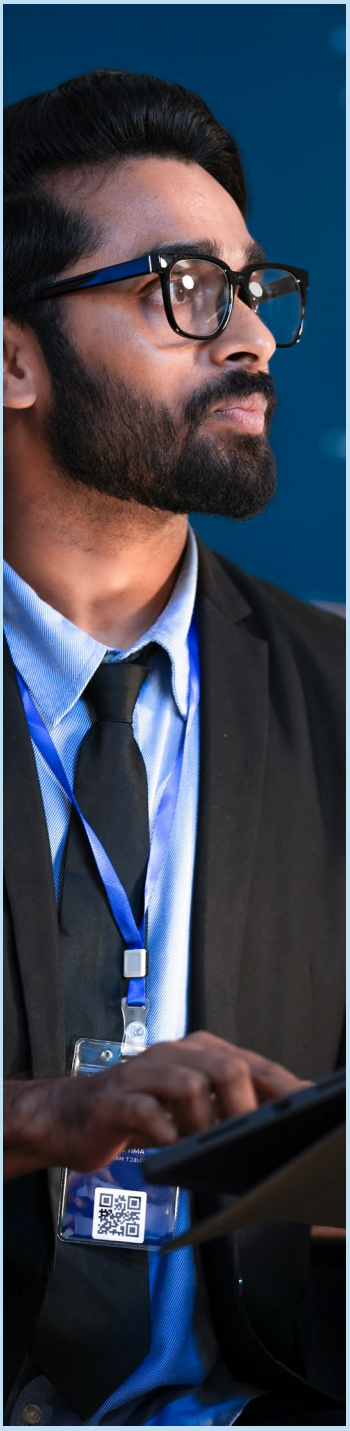

REINVENTING APR USING AI

GAINING REAL TIME CONTROL OF YOUR APPLICATION PORTFOLIO

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1. Executive Summary

In today's fast-paced digital landscape, traditional Application Portfolio Rationalization (APR) is no longer a strategic advantage; it's a bottleneck. The manual, periodic nature of legacy APR methods leaves organizations with bloated, misaligned, and costly application portfolios that struggle to keep pace with evolving business demands. This paper introduces a transformative, AI-powered approach to APR - shifting from a reactive, static exercise to an intelligent, continuous, and autonomous capability.

Our vision: An autonomous APR engine that integrates enterprise data, identifies hidden inefficiencies and risks, provides real-time visibility through interactive dashboards, and delivers actionable insights for cost optimization, risk management, and agility. This new paradigm leverages artificial intelligence and machine learning (AI/ML) to continuously monitor, analyze, and optimize an organization's application portfolio in real time. The result is a proactive system that reduces technical debt, accelerates decision-making and frees up resources for innovation - making your application portfolio a true enabler of business agility.

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2. Introduction: Limitations of the periodic APR approach

For many organizations, APR has long been a periodic, largely manual "snapshot" exercise - run once or twice a year using spreadsheets, CMDBs, and surveys to establish portfolio visibility and guide actions. That cadence served well in more stable, on-premises environments. In contemporary, cloud-native and service-based landscapes, however, several practical limitations emerge: the snapshot ages quickly, decisions rely on dispersed data, and governance can become slower than change itself.

Key limitations of the current approach:

1

Cadence vs. change:

Annual or episodic reviews struggle to keep pace with ongoing product releases, cloud migrations, and evolving business priorities

2

Data completeness & consistency:

Portfolio data often lives across multiple tools and formats; missing attributes or duplicates reduce confidence in decisions

3

Spend-to-value clarity:

Redundant capabilities and under-utilized applications are hard to spot without consolidated cost, usage, and dependency signals - making Capex control and ROI tracking harder1

4

Operational responsiveness:

Complex portfolios and limited automation can elongate the path from recommendation to execution (e.g., decommission or consolidate)

5

Risk visibility:

Shadow IT, expired contracts, and compliance gaps are easier to miss when insights are assembled intermittently from siloed sources2

These limitations can be mitigated by **evolving APR from a periodic project to a continuous, AI-enabled operating capability** - improving data quality, decision speed, and governance without discarding what already works.

3. AI Capabilities for Modern APR

To make APR continuous, objective, and explainable, organizations rely on a set of AI-enabled capabilities that together form the analytical and execution backbone. These capabilities operate under policy and governance controls and reduce reliance on manual surveys and subjective validation.

1. Discovery & Ingestion (GenAI/ NLP + Connectors):

Continuously collect and normalize portfolio records from CMDBs, ITFM/ TBM, licensing repositories, cloud inventories and contracts to maintain an always-current portfolio baseline. Automatically tag each application with cost, usage, ownership, and tech stack, capturing lineage and confidence.

» In practice, tools such as ServiceNow Discovery, Dynatrace, AppDynamics, BMC Helix Discovery and Flexera One IT Visibility are used to enable continuous discovery by replacing point-in-time surveys with observed usage and runtime signals

2. Data Quality & Context (Entity Resolution, Feature Engineering, Dependency Graphs):

Merge duplicate records into unified application identities, enrich missing attributes, and rebuild application, service, & data dependencies to form complete rationalization view. Translate APR signals (cost-to-value, usage, technical health, lifecycle status, and dependency criticality) into model-ready features with consistent, explainable semantics for AI-driven decisions

» This enrichment is often supported by enablers such as ServiceNow Service Mapping, Dynatrace Smartscape, LeanIX and iGrafx. Some organizations also rely on data governance catalogs (e.g., Collibra/ Alation) to reinforce lineage and trust

3. Automated Assessment (Classification, Scoring, Redundancy Clustering):

Apply standardized rationalization frameworks (e.g., 7R/TIME) using AI-driven classification and scoring models which combine runtime telemetry, financial utilization, delivery signals, and technical health indicators.

- This helps generate disposition recommendations with reason codes and confidence levels, reducing reliance on self-reported assessments.

4. Scenario Optimization (What-If Models, Policy Optimization, TBM/ITFM Alignment):

Simulate cost, risk, compliance, and multi-period Capex/ Opex impacts under policy and budget constraints

- Scenarios are aligned to TBM taxonomies and cloud financial analytics (e.g., Apptio, CloudHealth) to prioritize rationalization actions based on quantified economic and risk outcomes.

5. Execution & Documentation (ITSM Orchestration + GenAI Drafting):

Orchestrate approved rationalization actions (retire, consolidate, modernize) through standardized playbooks integrated with ITSM platforms (e.g., ServiceNow, Jira Service Management).

- Change records, approvals, rollback plans, and supporting evidence, are automatically generated ensuring traceable execution and reduced validation overhead

6. Governance & Continuous Improvement (Dashboards, Telemetry, Model Governance):

Measure savings realization, run-ops trends, capital discipline, and compliance through portfolio dashboards in real-time. Apply governance controls to manage policy updates, monitor model outputs and route exceptions for human review, enabling continuous portfolio recalibration without recurring survey cycles.

- Change records, approvals, rollback plans, and supporting evidence, are automatically generated ensuring traceable execution and reduced validation overhead

Reducing bias in rationalization through evidence-led signals

Traditional APR is survey-led and prone to subjectivity. AI-enabled APR grounds validation in observed operational and financial signals - telemetry, consumption, transaction volumes, dependency graphs and utilization, ensuring rationalization decisions are evidence-led. Human validation shifts to policy-bound exception handling, materially reducing bias and improving consistency, transparency and defensibility. Together, the above capabilities form the backbone of a continuous APR cadence, directly addressing the structural limitations of traditional APR.

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4. Turning APR Challenges into AI Advantages

In the digital economy, traditional APR's periodic, manual approach is difficult to sustain. AI, cloud, and advanced analytics enable a step-change - from episodic clean-up to continuous optimization - so APR operates as a proactive governance capability rather than as a one-off project. This shift is already visible in market signals: AI agents are being embedded into enterprise applications - continuous APR decisioning3, GenAI is accelerating documentation and scenario generation - faster assessments and rationalization4, and adoption and ROI signals - APR becomes a strategic lever, not back-office hygiene5 6. The remainder of this section translates that shift into specific APR challenges and the AI capabilities that address them - setting up the operating control loop and solution architecture that follow. With these capabilities established, the persistent APR gaps become tractable

APR Challenge	AI Capability	Value Added
Periodic, manual, reactive assessments	GenAI/ NLP for automated ingestion, discovery and classification	Faster assessments, less manual effort and repeatable decisions
Hidden technical debt	Usage analytics & anomaly detection on logs/ tickets; predictive cost-to-value scoring	Identifies "zombie apps" for retirement, reduces run costs
Investment misalignment (redundant tools, weak ROI)	AI-powered dashboards + TBM/ ITFM integration for TCO/ ROI tracking	Aligns spend to value, improves Capex control
Complex dependencies	Graph analytics/ ML to map app/ service/ data dependencies	Safer consolidation and change impact analysis, fewer surprises
Siloed, low-quality data (CMDB inaccuracies)	AI-assisted CMDB enrichment and smart duplicate detection	Trusted inventory, better governance
Slow execution & documentation	GenAI for ticket summaries, knowledge creation, automated drafts	Lower support costs, faster run-ops and consistent documentation

Taken together, these levers recast APR as a governed, real-time control function which is budget-aware, responsive to change, and disciplined in Capex control. The operating cadence that makes these levers durable is a closed loop discovery to governance, with AI embedded at every turn.

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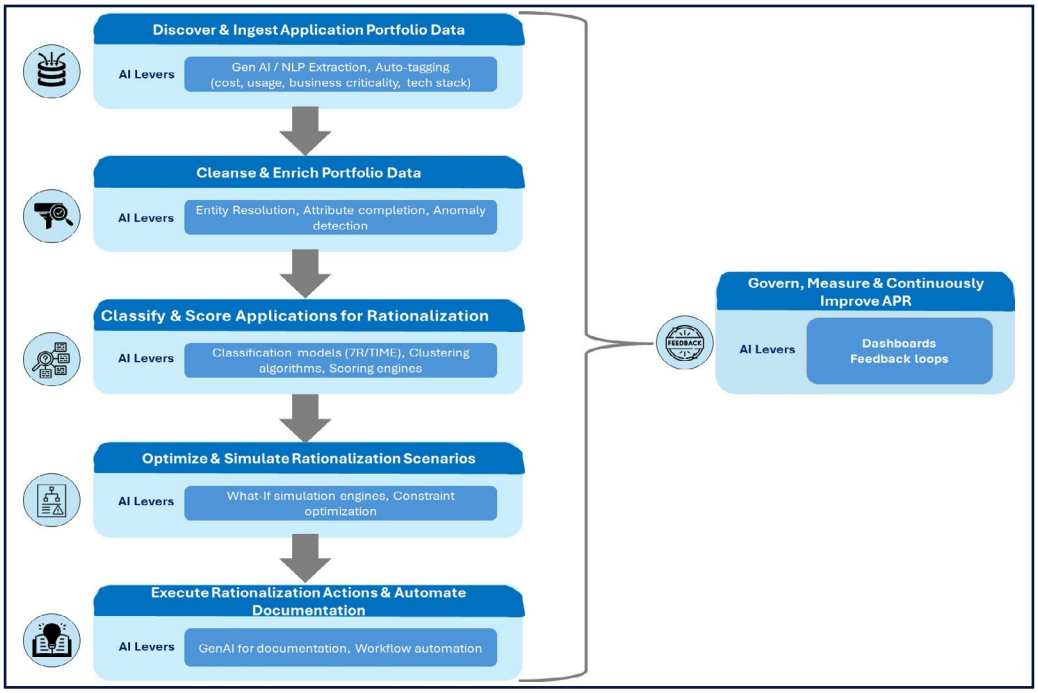
5. APR control loop powered by AI

APR scales when decision-making runs as an operational **AI driven control loop** and not an event - each turn reinforces the last.

Leveraging AI across discovery, enrichment, classification, optimization, execution, and governance creates speed, accuracy, and control.



1. Discover & ingest application portfolio data

- **AI lever:**

Continuously aggregate portfolio records from operational, financial, licensing, and contract sources under policy-bound access. Each application instance enters the loop with traceable lineage, ownership, and confidence scoring so discovery remains current and auditable.

- **Business impact:**

Rapid, accurate portfolio discovery - surfacing shadow IT and establishing accountable ownership which set a trustworthy baseline for rationalization decisions

2. Cleanse & enrich portfolio data

- **AI lever:**

Resolve duplicates into canonical application identities, complete missing attributes, and rebuild dependency context across apps/ services/ data. The loop gates downstream decisions until minimum data-quality thresholds are met.

- **Business impact:**

Trusted "single source of truth" for APR decisions; eliminates errors that derail rationalization

3. Classify & score applications for rationalization

- **AI lever:**

Apply standardized rationalization logic with reason-codes and confidence, produce technical-health and business-fit scores, and expose redundancy clusters. Governance allows expert overrides while preserving explainability.

- **Business impact:**

Clear, defensible rationalization paths - retire, consolidate, or modernize, delivered at pace and consistently across business domains

4. Optimize & simulate rationalization scenarios

- **AI lever:**

Quantify cost, risk, compliance, and multi-period Capex/ Opex impacts; sequence actions under policy and budget guardrails; align outputs to TBM/ ITFM taxonomies for finance traceability.

- **Business impact:**

Enables CIOs to prioritize moves that free funds for transformation while improving risk posture and Capex control

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5. Execute rationalization actions

- **AI lever:**

Run standardized playbooks via ITSM. Generate change notes, approvals, rollback plans, and evidence artifacts automatically. Track cycle time and first-time-right execution to keep operations predictable.

- **Business impact:**

Faster execution of rationalization plans, lower support costs, and consistent audit-ready documentation

6. Govern, measure & continuously improve APR

- **AI lever:**

Operate dashboards for savings, run-ops trends, Capex discipline, risk and compliance. Refresh features, thresholds, and policies on a defined cadence, monitor drift and bias to sustain model reliability.

- **Business impact:**

APR becomes an always on governance function with transparent TCO/ ROI tracking and continuous optimization

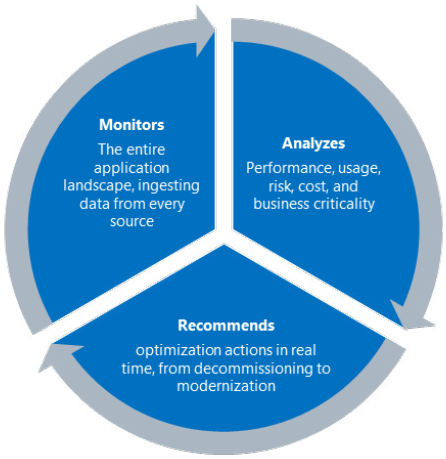
AI is not just a technology layer - it is the enabler that transforms APR from a reactive clean up exercise into a proactive, continuous governance capability. By embedding AI across discovery, assessment, optimization, and execution, organizations can unlock trapped value, reduce technical debt, and redirect funds toward strategic transformation initiatives. At enterprise scale, this loop is enabled by a **governed system architecture - a backbone that carries data, decisioning, orchestration, and evidence.**

6. Solution - Our Vision: The Intelligent, Autonomous APR Engine

APR requires an "always-on" system to run the loop reliably, at scale, and under policy. The **intelligent, autonomous APR Engine** provides real-time control, aligning the portfolio with evolving business needs and market conditions. Think of it as the portfolio's trading desk: algorithms continuously optimize the application portfolio for cost, risk, and value.

At its core, the engine continuously **Monitors, Analyzes and Recommends** in a loop.

The engine is built on a **modular, multi-layered architecture** designed for accuracy, scalability, and transparency.



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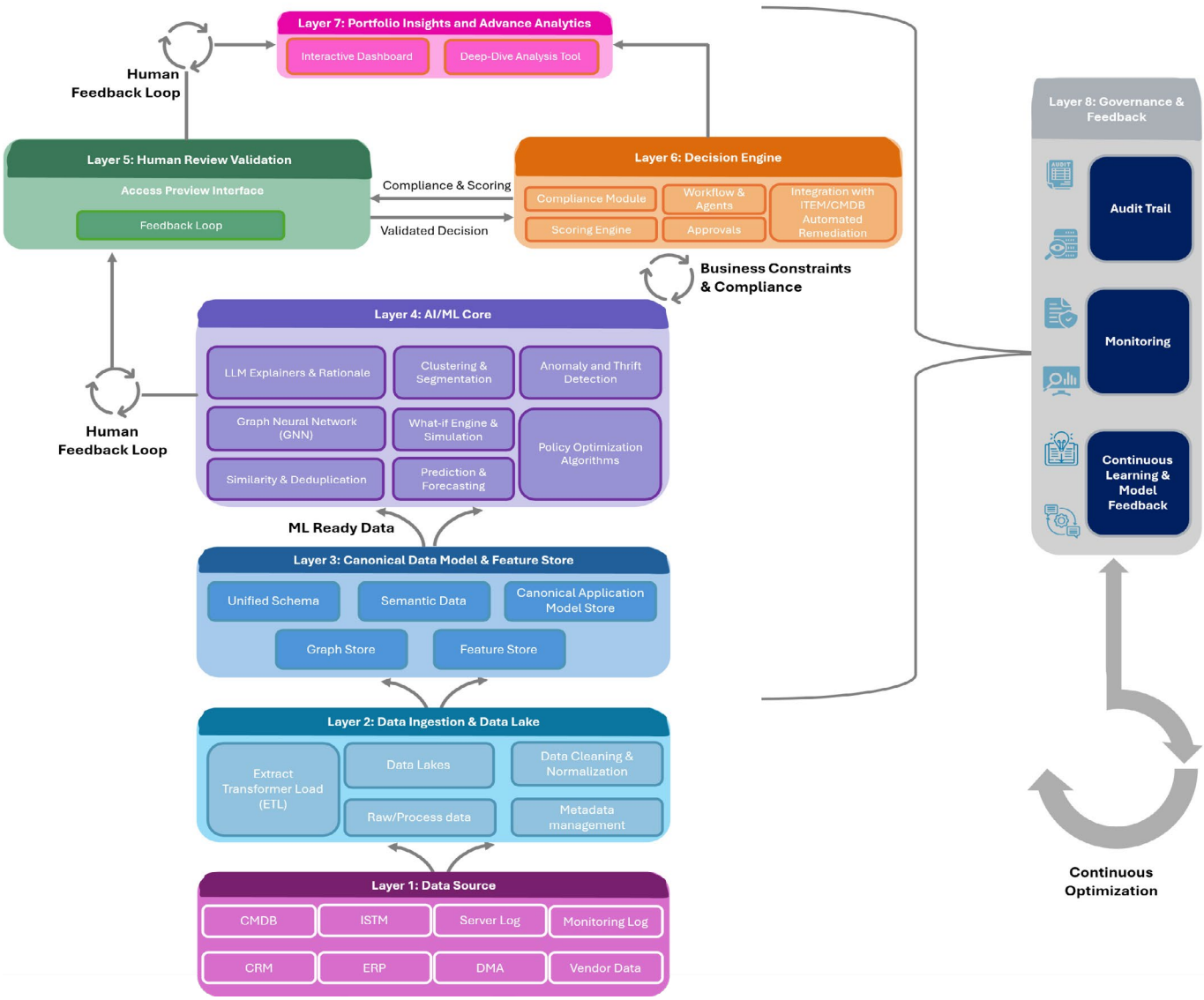

How the architecture operationalizes APR:

Layer 1-2	Layer 3	Layer 4	Layer 5	Layer 6	Layer 7-8
Establish the raw and curated data backbone for discovery	Turns data into APR signals (canonical semantics, features, dependency graph)	Drives classification, scoring, and scenario optimization	Embeds human validation for explainability and governance	Orchestrates execution and automates documentation via ITSM	Provide portfolio insight, audit trails, and closed-loop improvement

Intelligent, Autonomous APR Engine is structured across a meticulously designed, multi-layered architecture. Each layer plays a critical role in transforming raw enterprise data into actionable insights and continuously optimized portfolio decisions.

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Layer 1

Data Sources

This foundational layer aggregates application-specific information from CMDBs, vendor contracts, license repositories, monitoring logs, and financial systems. It captures costs, usage, dependencies, and technology attributes, creating a comprehensive fact base raw, unfiltered stream of data for portfolio rationalization. Sources are prioritized by cost, risk, and compliance relevance to ensure the portfolio fact base reflects financial reality and control obligations.

Layer 2

Data Ingestion & Data Lake

Application data from diverse systems is cleansed, normalized, and harmonized before storage in a scalable data lake. Both raw and curated datasets are retained to support subsequent analytical stages. Provenance and lineage are captured so APR decisions remain traceable and auditable end- to- end.

Layer 3

Canonical Data Model & Feature Stores

This layer establishes a unified semantic framework for the entire application portfolio. A canonical application model standardizes entities, attributes, and interdependencies in a knowledge store. In parallel, a feature store prepares machine-learning-ready datasets, and a graph store maps application/service/data dependencies for relationship analysis. APR signals such as cost-to-value, usage intensity, technology obsolescence, and dependency risk are encoded as features and graph relationships. Entity resolution consolidates duplicate application records across sources into a canonical ID, linking cost, usage, and dependency attributes to a single, trusted entity.

Layer 4

AI/ML Core

The analytical powerhouse of the engine, this layer houses a suite of advanced Artificial Intelligence and Machine Learning models. It includes modules for Clustering & Segmentation, Graph Neural Networks to assess complex dependencies, Prediction & Forecasting models, "What If" Engine for scenario simulation, and Policy Optimization Algorithms. AI decision making within defined parameters, ensuring intelligent, constraint-aware recommendations. Model outputs include reason codes for 7R/ TIME and policy- aware simulations of cost, risk, compliance, and Capex/ Opex impacts.

Layer 5

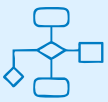
Human Review & Validation

AI-generated rationalization options flow into this layer for expert validation. It provides interfaces for human experts to review AI-generated insights and recommendations, offering a mechanism for approval, override, and the injection of nuanced qualitative feedback. Structured approval workflows ensure critical decisions blend automation with human oversight. This check-point makes APR recommendations explainable, governed, and consistent with enterprise policies.

Layer 6

Decisioning Orchestration & Automation Engine

This layer serves as the command centre for executing application portfolio rationalization strategies. Here, AI-generated recommendations (from Layer 4), once validated by human experts (Layer 5), are finalized, scored against predefined policies and constraints, and translated directly into actionable, automated workflows. This engine orchestrates the entire execution lifecycle, from generating precise actionable plans and integrating seamlessly with IT Service Management (ITSM) and Configuration Management Database (CMDB) systems to triggering automated remediation tasks for decommissioning, modernization, or consolidation initiatives. It ensures that approved decisions are not merely recommendations, but automatically initiated and tracked actions, providing end-to-end control and accountability.



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Layer 7

Portfolio Insights & Advanced Analytics

This layer serves as the central interface for accessing and interacting with application portfolio intelligence. It unifies advanced visualization, reporting, and analytics to deliver transparent, real-time insights into application portfolio health and rationalization progress. Users are presented with interactive dashboards and custom reports (driven by Layer 4's AI/ ML insights) that present insights on cost optimization trends, risk exposure, compliance posture, and KPI performance. Crucially, this layer also integrates deep-dive analytical functionalities, enabling enterprise architects and domain experts to drill down from high-level summaries into granular data. They can perform ad-hoc investigations, explore complex application dependencies, and validate AI-generated recommendations with enriched contextual data, fostering an integrated journey from broad insights to specific, actionable understanding. APR dashboards expose freed funds, support-cost trends, and Capex discipline alongside risk and compliance indicators.

Layer 8

Governance & Feedback Loops

This cross-cutting layer enforces auditable controls through approval trails of rationalization decisions, versioned models & policies and compliance checks on decommissioned or consolidated applications. Crucially, it closes the loop by feeding post-execution data such as realized savings, risk reduction, and portfolio simplification back into the engine, enabling continuous APR optimization.

Why this approach is different:

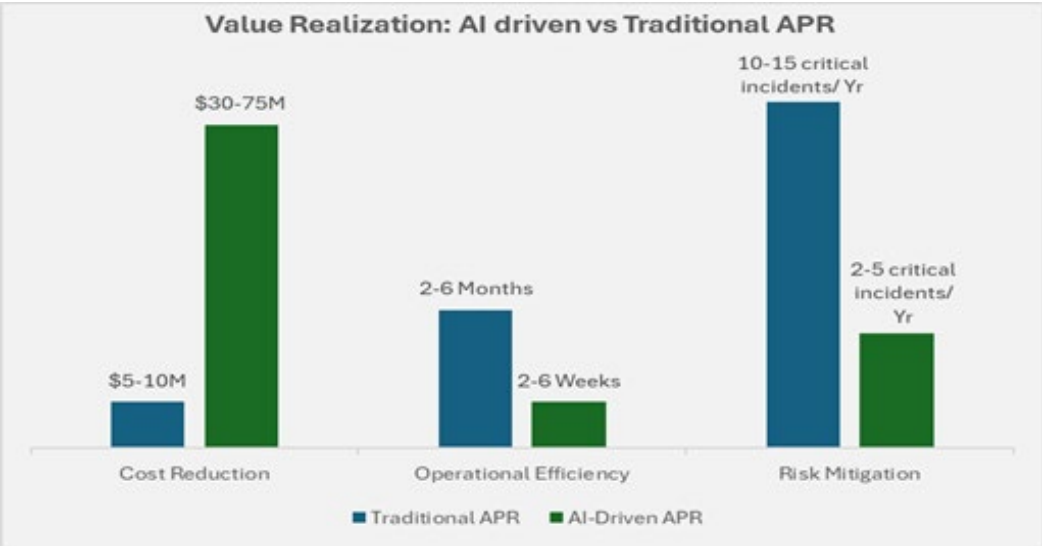
The proposed architecture does more than automate APR - it institutionalizes a continuous optimization paradigm. Unlike periodic projects that lag business change, this system operates in real time, embedding predictive analytics[7] and policy-aware simulations into every decision. **Its strength rests on three pillars**

- **Unified data integration layer** that breaks down silos and ensures a trusted portfolio fact base
- **AI/ ML decision engine** that transforms raw data into actionable insights and rationalization scenarios
- **Transparent governance and automation framework** that makes decisions auditable, explainable, and aligned with enterprise controls

Together, these pillars enable APR to operate as a disciplined control function - **driving agility, cost efficiency, and risk assurance** at scale

7. Value Realization: Business and IT Benefits

Continuous, AI-driven APR goes beyond rationalization - it's about unlocking measurable business value and enabling true strategic agility. Its impact spans cost savings, operational efficiency, governance, and proactive risk management.



Source: Synthesized from industry reports (Gartner, Forrester etc.) and Infosys cases studies, illustrating typical comparative benefits

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Tangible Benefits

Reduced Total Cost of Ownership (TCO)

Proposed AI engine automates the identification and elimination of redundant and underutilized applications, leading to significant savings in licensing, maintenance, and infrastructure costs

Improved ROI

Smarter, data-driven investments in high-value applications and modernization initiatives that are truly aligned with business goals

Operational Efficiency

Automation of manual data collection and analysis processes, freeing up valuable time for IT teams to focus on strategic, high-impact work

Intangible Benefits

Enhanced Agility

The ability to continuously monitor and optimize the portfolio allows the organization to respond to market changes faster and more effectively

Proactive Risk Management

The engine proactively detects security vulnerabilities, compliance gaps, and technology obsolescence, mitigating risks before they become critical issues

Stronger Business-IT Alignment

AI-generated, business-friendly insights create a shared language between IT and business leaders, leading to more collaborative and effective decision-making

Unlocking Architectural Capacity for Innovation

By automating routine portfolio assessment and rationalization tasks, the AI-driven engine minimizes manual effort and operational overhead. This frees architecture teams to focus on high-impact priorities such as modernization strategies, innovation roadmaps, and strengthening architectural governance—ultimately accelerating enterprise-wide transformation and amplifying strategic outcomes

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Beyond Rationalization - Real-time visibility & governance:

The proposed AI engine elevates APR from a back-office task to a strategic control function through interactive dashboards that provide

- **Real-Time Health Metrics:** Cost, risk, compliance posture
- **Executive Visibility:** CIOs and architects can act on insights instantly
- **Integrated Decision Support:** Links portfolio decisions to enterprise architecture KPIs

Cost-Benefit Analysis - Continuous vs Periodic APR:

Waiting two years for APR means carrying redundant costs, unmanaged risks, and misaligned investments for far longer than necessary. Continuous APR reduces technical debt, accelerates decision-making, and delivers measurable savings and agility

Factor	Periodic APR (Every 2 Years)	Continuous AI-Driven APR
Frequency	18–24 months	Real-time, ongoing
Effort	High (manual data collection)	Low (automated ingestion)
Cost Visibility	Limited, outdated	Real-time dashboards
Risk Management	Reactive	Proactive, predictive
ROI	Slow, hard to measure	Faster, measurable

8. Looking Ahead: The Future of Application Portfolio Governance

The future of application portfolio governance is autonomous. APR will evolve from a back-office task to an intelligent, automated governance function that anticipates needs, mitigates risks proactively, and fuels continuous innovation.

As AI models become more sophisticated, they will not only recommend actions but also orchestrate their execution, from automatically decommissioning a redundant application to provisioning a new cloud service. Organizations that embrace this transformation will not only achieve greater efficiency and resilience but will also gain a profound strategic advantage, ensuring their IT landscape is always a step ahead of the competition.

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9. Conclusion: Intelligent Rationalization as a Leadership Imperative

The time for reactive, manual APR is over. In a world defined by constant change, a static application portfolio is a liability. Leaders must recognize that intelligent, AI-powered rationalization is no longer a "nice to have" but a strategic imperative. By adopting a continuous optimization model, organizations can unlock trapped value, manage risks proactively, and empower their teams to focus on innovation that truly moves the business forward. The time to reinvent APR is now.

Sources:

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2. Hidden costs of maintaining legacy systems

3. Gartner IT Symposium/Xpo 2024

4. Gartner – Generative AI Hype Cycle

5. ROI of Gen AI

6. AI index report 2025

7. AWS Case Study - Application Portfolio Rationalization using Generative AI

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About the Authors:

Vaibhav Deshmukh
Principal

Vaibhav Deshmukh is a Principal with the Technology Transformation practice of Infosys Consulting. He brings proven experience in IT strategy, cloud transformation, and application portfolio rationalization, having led major initiatives for clients across BFSI, Telecom, and Retail sectors in the EMEA, APAC, and ANZ regions.

Kiran Umakanth
Senior Principal

Kiran Umakanth is a Senior Principal with the Technology Transformation practice of Infosys Consulting. He carries extensive experience in leading IT Strategy engagements for multiple organizations across domains of BFSI, Utilities and Manufacturing.

Yogesh Narde
Consultant

Yogesh Narde is a Consultant within the Technology Transformation practice at Infosys Consulting, with a focus on cloud services and enterprise modernization. He has played key roles in IT strategy, cloud migration, and technology transformation programs, delerivering outcomes for clients across BFSI, Telecom, Manufacturing, and Healthcare.

Swaroop Patil
Consultant

Swaroop Patil is a Consultant within the Technology Transformation practice at Infosys Consulting, with a focus on IT Strategy and Enterprise Architecture. He has played key roles in formulating application portfolio rationalization strategies, IT operating models, and executing technology transformation programs; delivering outcomes for clients across Utilities, Retail and Healthcare domains.

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