



Unlock innovation with AI-led legacy modernization

Transforming legacy systems for the future

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Contents

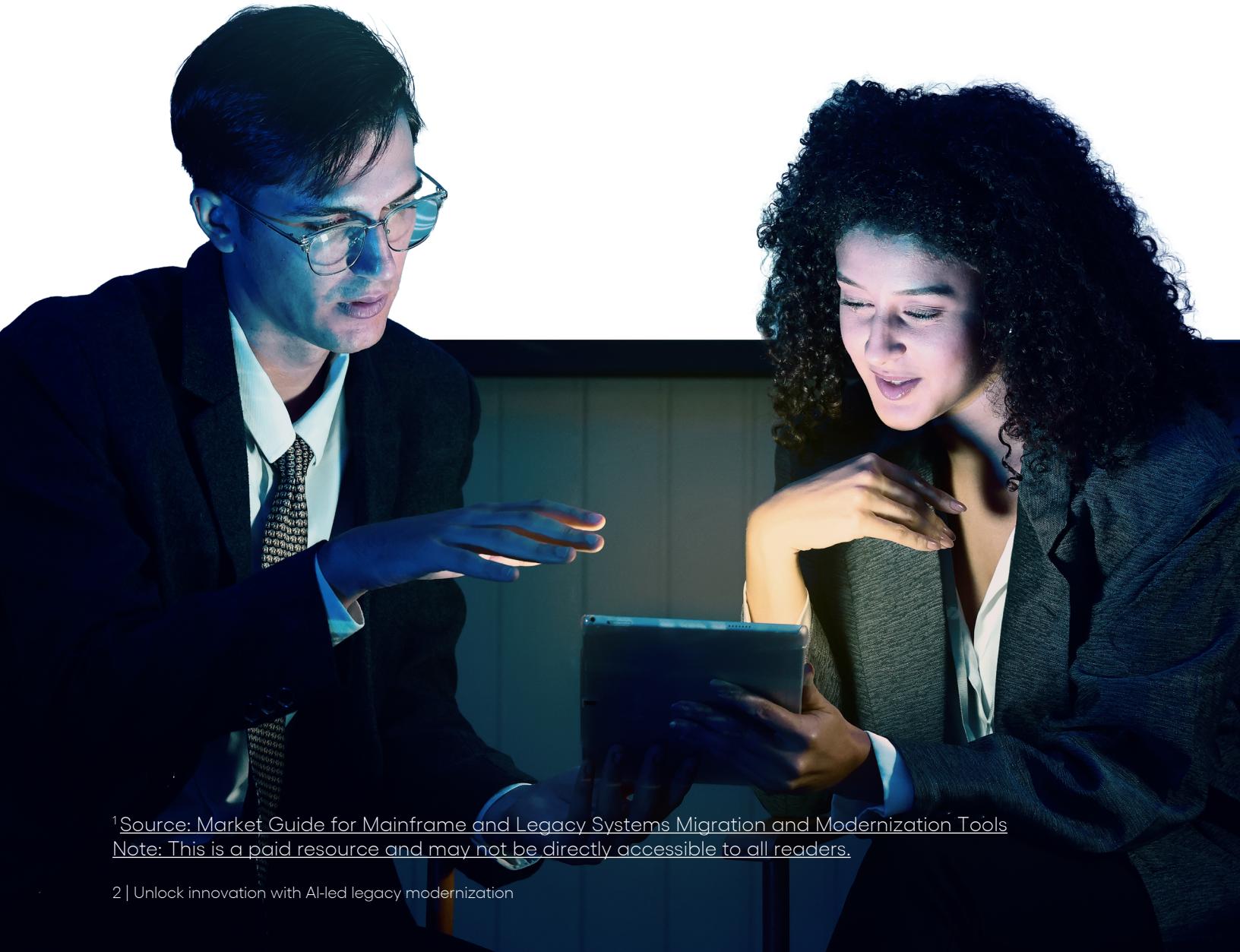
Introduction.....	2
Why modernization matters.....	3
Cognizant turns legacy into growth.....	4
AI-led modernization: The new enterprise imperative.....	5
Cognizant delivered outcomes using AI-led modernization.....	8
Real stories. Real impact.....	8
Conclusion.....	9
About the authors.....	9

Introduction

Legacy systems remain a barrier to innovation, preventing organizations from scaling and evolving effectively. According to Gartner Research's "Market Guide for Mainframe and Legacy Systems Migration and Modernization Tools"¹ published in September 2024, by 2027 organizations that fail to properly assess and select the right modernization approach will incur up to 50% higher costs than those that do.

What once posed considerable challenges—owing to limited documentation and a shrinking pool of subject matter experts—is now faster and more predictable with AI. As companies look to adopt new AI-native solutions—from generative copilots to autonomous decision agents—they must unlock the rich context trapped inside siloed legacy applications.

Generative AI can compress modernization timelines from years to months, while reducing complexity and risk. Transitioning into cloud-native, scalable and well-governed systems is now the critical foundation for achieving AI-native speed and impact.



¹Source: Market Guide for Mainframe and Legacy Systems Migration and Modernization Tools
Note: This is a paid resource and may not be directly accessible to all readers.

Why modernization matters

Legacy systems generate the majority of revenue for organizations, making their modernization a critical priority. Maintaining and modernizing existing systems consumes up to 80% of IT budgets²—blocking innovation, responding slowly to market shifts and resisting integration with the modern tech stack. Their rigidity inflates costs, limits scalability and creates operational risk, while the shortage of subject matter experts and poor documentation make maintenance harder.

Yet, replacing these systems has long been seen as complex, expensive, and a high-risk proposition. Concerns about disruption, data loss and security breaches have kept many organizations from acting—until now.

AI has transformed modernization from a high-risk gamble into a predictable, data-driven process. What once took years can now be achieved in months. AI enables reverse engineering by uncovering hidden dependencies, quantifies technical debt and automates code generation, testing and migration. Advances in generative and agentic AI enable human-AI collaboration across every phase, reducing risk, accelerating timelines and ensuring functional coverage.

Modernization is no longer a leap of faith—it's a strategic, AI-powered path to agility, resilience and growth.

AI success hinges on legacy modernization—and the clock is ticking

Businesses have just a two-year window to:



Reduce technical debt



Modernize infrastructure



Prepare for AI-powered transformation

What senior executives say*:

85% think their current tech stack might not support AI integration

76% say supporting consumer AI adoption with current systems will be difficult

18% expect to retire even half of their technical debt by 2030—despite aiming to meet modernization goals within two years

2030 budgets for maintaining legacy systems will be reduced from 61% to just 27%, freeing up funds for modernization and innovation

93% believe AI will help overhaul legacy infrastructure

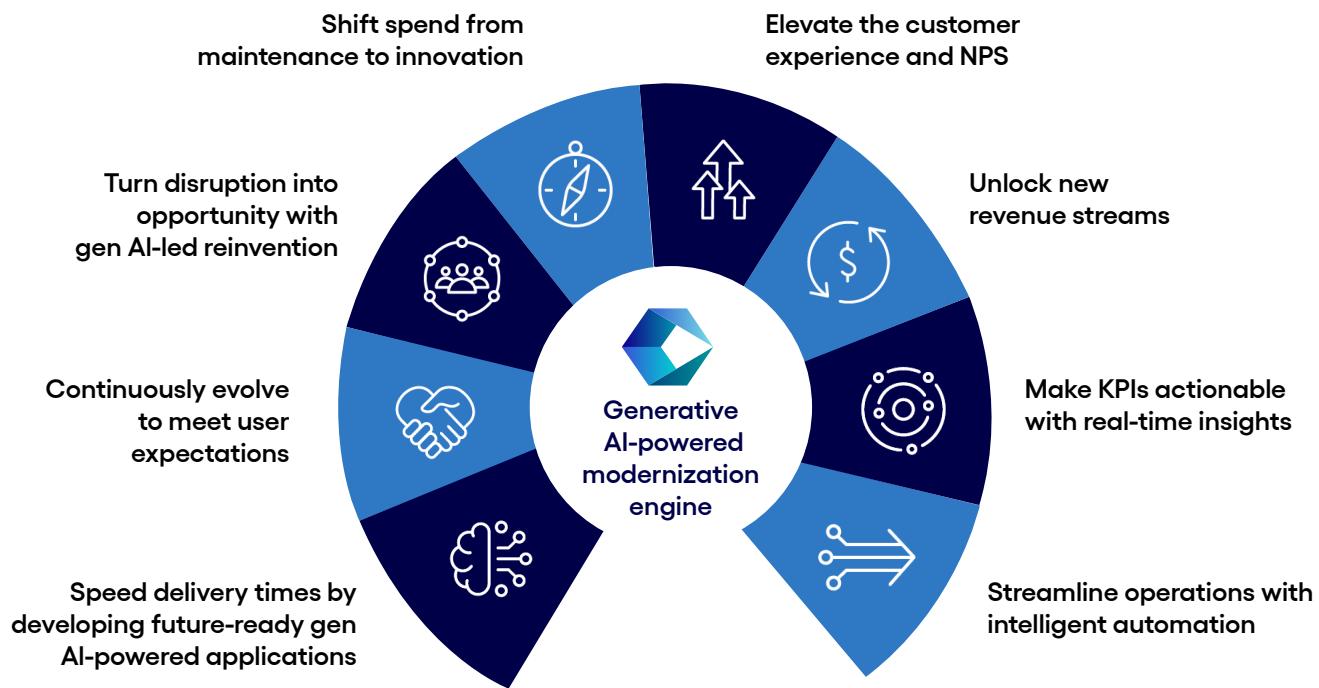
17% feel their current infrastructure can support advanced agentic AI systems

²Source: AI's two-year timeline: The path to meeting the legacy modernization mandate

Cognizant turns legacy into growth

We understand that legacy systems are the new bottleneck—and aim to transform them into growth engines for enterprises. We reimagine and modernize these systems to boost agility, cut costs and accelerate innovation by leveraging generative AI. Our AI-led modernization approach, delivered with speed and predictability, uniquely positions us to turn complex, brownfield IT landscapes into future-ready digital platforms. With our talent, tools and trust, we transform legacy into leadership.

Cognizant helps clients achieve the following key goals:



Reimagining business processes involves a comprehensive approach—integrating high-impact strategy that simplifies processes and infuses agentic AI in business applications. It fosters innovation, allowing the creation of entirely new solutions that align with current and future business needs. It involves not just migrating applications, but also fundamentally rethinking and remodeling them for modern architecture and technologies. It leads to enhanced customer experience and improved decision-making, which helps our clients stay ahead of their competitors.

Cognizant offers AI-powered application assessment, legacy modernization and mainframe modernization services. These services help clients leverage modern digital technologies and maintain a competitive edge in the rapidly changing environment. To learn more about our service offerings, visit [Legacy Modernization | Cognizant](#).

AI-led modernization: The new enterprise imperative

Cognizant's AI-powered approach is built on four phases—assessment, reverse engineering, forward engineering and governance—each reinforced by specialized platforms that embed intelligence and automation throughout the journey.



Assessment

The journey begins with a clear understanding of the technology estate and business KPIs. We use Cognizant Skygrade™ to perform portfolio analysis, cloud readiness checks and migration strategy planning. This phase validates outcomes early through proof of concept (PoC) and provides a roadmap that balances cost, speed and risk.



Reverse engineering

Once the path is defined, Cognizant uses its own proprietary tools and enterprise software that are integrated with Skygrade to extract business rules, map dependencies and ensure traceability from legacy code to modern architecture. These AI-driven insights eliminate reliance on tribal knowledge and accelerate knowledge transfer, reducing uncertainty.



Forward engineering

In this phase, Cognizant Flowsource™ takes center stage, automating the software development lifecycle. From generating user stories and writing code to testing and CI/CD, Flowsource leverages generative and agentic AI to deliver future-ready applications at speed.



Governance

Modernization doesn't end with deployment. Cognizant Neuro® IT Operations is combined to enable observability, performance engineering and compliance during parallel runs. Built-in reconciliations validate new systems without disrupting operations, while AIOps capabilities ensure proactive monitoring and automated remediation.

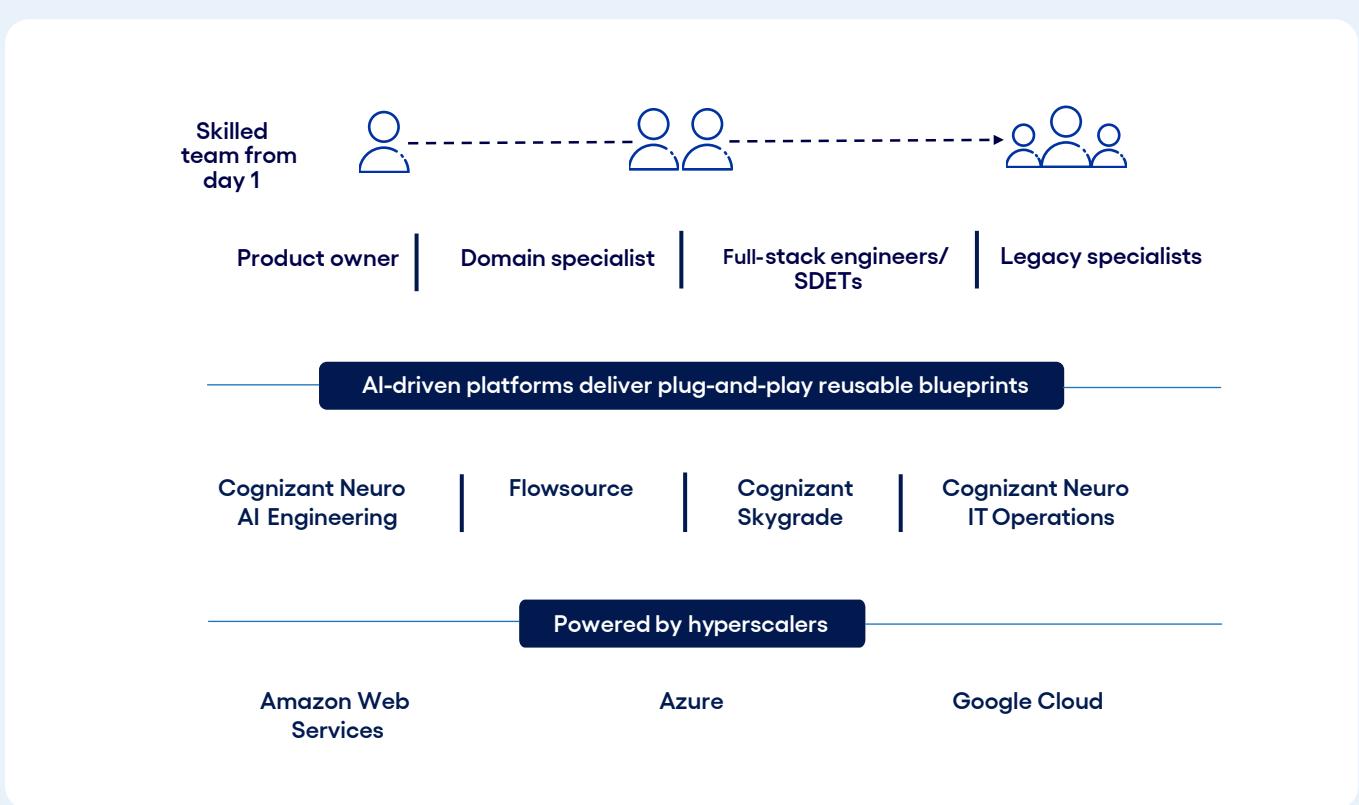
This integrated approach transforms modernization into a predictable, scalable and low-risk process—powered by AI and reinforced by Cognizant's deep domain expertise.

Reimagine framework



Cognizant's AI-led modernization approach blends human expertise with AI across every phase of transformation. From generative AI and modern engineering to cloud, data and infrastructure, Cognizant deploys cross-functional teams from day one—domain specialists, legacy specialists and full-stack engineers supported by reusable blueprints, code-companion tools and strong partnerships. This accelerates delivery of AI-powered applications while ensuring scalability and resilience. Complementing this, Cognizant's data modernization strategy transforms legacy databases into modern, cloud-native architectures through automated design, conversion and remediation.

Human + AI for legacy modernization



Benefits of our approach

Higher productivity due to automation and greater velocity through:

- Built-in quality ensuring reliability
- First-time right and shift-left approaches for early error detection
- Increased deep work for focused productivity
- Optimized delivery cycles due to MACH (microservices, API-first, cloud-native, headless) architecture

Cognizant delivered outcomes using AI-led modernization

We enable measurable business and technology impact:



Real stories. Real impact.

- A leading US retailer: Migrated 5 million lines of code to cloud, enabling auto-scaling and zero-trust security, supporting \$10 billion+ in digital sales.
- A global North American bank: Automated 250+ business flows, saving 40%-50% efforts and achieving 60%-70% legacy code accuracy from the business document extraction.

Conclusion

AI-led modernization is no longer optional—it is a strategic imperative for enterprises seeking resilience and growth in a digital-first economy. By embedding AI across every phase of modernization, organizations can reduce complexity, accelerate transformation and unlock new business opportunities.

Cognizant's approach combines advanced AI platforms, proven frameworks and deep domain expertise to deliver modernization with speed, predictability and confidence. This is not just about upgrading technology—it's about reimaging the enterprise for the future. Businesses that embrace AI-led modernization today will lead their industries tomorrow. With Cognizant as your strategic partner, your enterprise is empowered to transform mainframe solutions, drive innovation and confidently chart a path defined by resilience and growth.

About the authors



Nishant Upadhyaya, SBU Head, Digital Engineering

In his 27-year career in the IT industry, Nishant has partnered with global clients across diverse industries. He has held leadership roles in shaping large enterprise transformation deals and driving technology delivery for complex systems integration. His expertise spans cloud transformation, multi-cloud strategy, advanced integration, modern engineering practices (DevSecOps, SRE), gen AI/agentic AI systems, AI-led legacy modernization and data solutions. He brings extensive experience in the financial services, healthcare and retail sectors.



Shahrukh Khan, Senior Business Analyst, Digital Engineering

With over five years of experience spanning the IT and pharmaceutical industries, Shahrukh has played a pivotal role in multiple large-scale, cross-sector deals and has been instrumental in securing significant wins for Cognizant. He specializes in creating technical strategy roadmaps and developing go-to-market strategies for advanced technologies, including generative AI and agentic AI, for a diverse client base. His expertise includes market research, business unit strategy, stakeholder management and driving AI-led modernization initiatives.



Cognizant (Nasdaq-100: CTSH) engineers modern businesses. We help our clients modernize technology, reimagine processes and transform experiences so they can stay ahead in our fast-changing world. Together, we're improving everyday life. See how at www.cognizant.com or [@cognizant](https://www.linkedin.com/company/cognizant).

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