

Application Modernization

building what your business
will become

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Application modernization: building what your business will become

Modern applications no longer just support your business - they shape its future: from growth to resilience.





Could yesterday's application estate now be your liability?

Businesses rely on software as the foundation of how they operate and grow. But as application estates evolve over time, they often become more complex, interconnected, and harder to change. What once enabled growth can begin to slow it down - limiting flexibility and agility, increasing cost, and making even small changes difficult to deliver.

The challenge is rarely visible in a single moment. It builds gradually - through accumulated technical debt, fragmented architectures, and growing dependencies.

At the same time, business expectations are accelerating. New capabilities, faster delivery cycles, and AI-driven innovation all require application landscapes that can adapt quickly and reliably.

This is where the gap emerges - between what the business needs and what the application estate can support.

Historically, addressing this gap meant difficult trade-offs: invest heavily and accept disruption, or defer change and absorb growing inefficiencies.

Application modernization: Capgemini's definition

Application modernization is the business-led transformation of an application estate to become AI-ready, adaptable, and outcome-driven at scale.

It goes beyond upgrading legacy systems. It is about simplifying architectures, unlocking data, and creating a trusted, intelligent foundation for continuous evolution.

Modernization is not a single program or a linear journey. It is a series of prioritized, value-led transformations - combining replatforming, refactoring, and rationalization - shaped by business context, risk, and ambition.

Crucially, modernization is now inseparable from AI.

You cannot scale AI - or unlock new business models - on top of fragmented architectures and technical debt. Clean data, interoperable systems, and modern platforms are prerequisites for sustainable value at scale.



Are application modernization and cost savings irreconcilable?

Thanks to AI-powered approaches, businesses today can now reduce costs, minimize risk, and free up resources - which can then be reinvested in new capabilities, faster product delivery, and AI adoption at scale.

Application modernization is no longer a fork in the road requiring difficult trade-offs, but a practical, scalable path to sustainable growth.

Before	Today
Manual, slow and resource-intensive discovery phases	AI agents rapidly map, classify, and prioritize modernization tasks, giving teams a clearer starting point, in far less time.
Value delayed for years	Incremental value-led delivery approach focuses on delivering measurable outcomes in short cycles. No more big bang.
High-risk of business disruption	Continuous modernization is orchestrated by AI agents. (Note: AI doesn't replace teams but augments them by accelerating analysis, reducing manual effort, and improving outcome predictability.) Humans then validate the outputs to maintain quality.

With the right approach and partner, organizations no longer have to choose between controlling cost and enabling growth - they can achieve both.



The business case for urgent modernization

It is natural for organizations to look for ways to increase revenue and deliver greater value to customers. Outdated systems make this exceptionally difficult, as they slow the business down, increase maintenance costs, and expose IT environments to substantial risks.

These include mounting technical debt and, most critically, increased exposure to security breaches.

Legacy systems often lack the latest security features and patches, making them prime targets for cybercriminals. In today's interconnected environments, a single failure can trigger a domino effect - impacting productivity, quality, and partner trust, all of which are costly to restore once lost.

Failing to modernize legacy systems therefore puts the entire organization at a disadvantage.

Without modernization

- Cloud spend inefficiencies persist (often 30%+)¹
- Security exposure increases significantly e.g., "80% of data breaches are linked to unpatched or outdated systems."²
- Outages and productivity loss become more frequent - outages can increase by 30%, and productivity can fall by as much as 50%, impacting revenue and business sentiment.³

Many have chosen to move fast and smart. In fact, the global market for application modernization services is expected to grow to \$32.8 billion by 2027 (up from \$15.2 billion in 2022).⁴

Using the latest technologies, cloud platforms, and AI tools to simplify and automate modernization pathways, software engineers can work faster, with greater agility. This allows them to not only increase the quality and quantity of new products but also enhance experiences for both employees and customers.

Modernization as a control and compliance enabler

Beyond growth and efficiency, modernization is increasingly about control.

Organizations must operate in a world shaped by regulatory pressure, data sovereignty requirements, and geopolitical complexity. Legacy systems make this difficult - limiting visibility, flexibility, and governance.

Modern architectures enable:

- Greater control over where data resides and how it is used
- Easier compliance with evolving regulatory requirements
- More resilient, regionally adaptable operating models

Modernization is no longer just about agility - it is about operating safely and confidently in a more complex world.

¹ <https://www.vertice.one/insights/september-2023>

² <https://gitnux.org/patch-management-statistics>

³ <https://trilio.io/wp-content/uploads/2022/08/true-Cost-of-Downtime-infographic-1.pdf>

⁴ <https://www.marketsandmarketsblog.com/application-modernization-services-market-share-trends-and-forecasted-growth-for-2023-2027.html>



AI brings clarity to complex legacy - but it must be applied with control

For many organizations, legacy systems are not just old - they are complex, undocumented, and deeply embedded in business operations. AI-powered tools now make it possible to understand and modernize these environments at a speed and depth previously unachievable.

AI can:

- Rapidly analyze applications, dependencies, and code structures across large estates
- Surface hidden relationships and risks, creating a clearer, more reliable view of the landscape
- Recommend optimal modernization paths - whether to replatform, refactor, rewrite, or retire
- Automate key tasks such as code transformation, test generation, and regression validation
- Continuously monitor and optimize applications, helping to reduce technical debt over time

But AI requires governance and human judgment.

To be effective, insights must be interpreted, decisions guided by business context, and outcomes validated.

This is why modernization must be human-led and AI-enabled:

- **Human in the loop** to validate outputs, challenge assumptions, and ensure quality
- **Human in control** to make trade-offs between speed, cost, risk, and business priorities
- **Human and AI working together** to combine automation with experience and judgment

When applied this way, AI doesn't just accelerate modernization - it makes it more precise, predictable, and aligned to business outcomes.

AI accelerates the journey.

Expertise ensures it delivers value.

Fast, intelligent, scalable: the new reality of AI-powered application modernization

With AI-powered tools, partner funding, and innovative accelerators, it's possible to modernize with speed and conviction.

See what you're working with. AI-powered discovery accelerates application analysis, dependency mapping, and documentation generation - providing faster visibility into complex estate. Now there are tools that bring clarity fast.

Modernize and scale fast. The effort required for application modernization is significantly reduced. Autonomous AI agents can automate tasks such as code conversion, framework updates, and test generation,

significantly reducing manual effort. And with cloud-provider incentive programs, organizations can offset a portion of modernization spend, making the transformation more achievable.

Build a modernization roadmap case that's clear and credible. One of the biggest roadblocks to application modernization used to be providing value. That's no longer a problem. When there's a higher level of data quality, risk is lowered, estimates are tighter, and outcomes are more predictable.

What was once a long, uncertain journey is now a more structured and achievable path.



From cost optimization to modernization investment

Modernization can unlock efficiencies and cost savings that help fund future transformation initiatives. Through FinOps-led optimization, application rationalization, cloud rightsizing, and hyperscaler incentive programs, organizations can identify new sources of investment while reducing operational waste.

To make it investable, a compelling business case is essential.

This should demonstrate that modernization is not a sunk cost, but a value-generating investment with measurable return on investment.

Key elements include:

- Quantification of ROI. Show how much savings can be expected (even rough ranges or examples).
- Comparing legacy vs. target state costs. Include things like licensing, infrastructure, support, and skills.
- Funding model. Explain how savings are captured and reinvested, e.g., using FinOps, and cloud-provider initiatives.
- Partner support. Explain how external partners can help shape the funding roadmap, accelerate value realization, and reduce upfront investment requirements.
- Cloud services. Prove how rightsizing, scaling, and configuring appropriate services can save on cloud run costs.
- Simplification. Limiting the number of apps and optimizing licenses can reduce operational complexity and maintenance costs.
- Tools and templates. Reference tools, which process and visualize application quality data (code health, maintainability, security, performance, etc.), can be used to build and validate the case.

Together, these form the foundation of a business case that supports a self-sustaining modernization approach.



Knowing where to start is everything

When there are thousands of applications and budgets are constrained, identifying the right starting point is critical.

This requires understanding the application estate in context - including dependencies, usage, and alignment to business priorities.

That clarity comes from understanding the application estate in context, not just which applications exist, but how essential each is to business operations, what other systems and processes rely on them, and how well they support the organization's future ambitions and modernization priorities.

This assessment can be done using a criticality matrix to determine each application's failure risk and potential

impact. Whether the outcome is to replatform, refactor, rewrite, or retire, the goal is the same: invest in the right changes first, with confidence.

Just as a garden needs pruning, reshaping, and sometimes replanting, an application portfolio thrives when unnecessary complexity is removed. Many organizations discover that simply retiring what no longer serves them creates immediate savings that fund the modernization of what does.

Every business has a different starting position. For some, cloud readiness will dictate their path; for others, regulatory or sovereign requirements will shape the decision. What matters is choosing the route that offers the highest impact with the lowest risk – for your business context.

Benefits of modernized systems

- Short lead times --> Faster response to compliance requirements and market opportunities
- Robust API capabilities --> Seamless integration with agentic AI and other technologies
- Modern release processes --> Accelerated time-to-market for new features and services
- Up-to-date technology and readily available skills --> Reduced support costs and easier talent acquisition
- Low-risk updates --> Quick improvements or critical update (eg security patched) with minimal service interruptions
- Secure components --> Stronger security and reduced vulnerability to threats





Modernizing a global vehicle ordering platform at scale

A leading automotive manufacturer runs one of the most complex vehicle ordering systems globally, processing billions of transactions across more than 150 countries.

Built on mainframe technology, the platform was highly reliable but constrained scalability and speed. It also contained decades of embedded, often undocumented business logic.

The challenge was to modernize without disrupting a system that underpins global production and sales.

Capgemini led a pragmatic transformation, combining replatforming, targeted refactoring, and AI-powered analysis to accelerate progress while maintaining continuity.

AI supported rapid analysis of applications, dependencies, and code, helping extract business rules and identify optimal modernization paths.

However, success depended on deep expertise - including understanding tacit knowledge and managing complex legacy environments.

The result was a zero-disruption transition, significant cost reduction, and a scalable, future-ready platform.

AI accelerated the journey.

Expertise ensured it succeeded.



From clarity to action: a pragmatic approach to modernization

Application modernization does not need to be slow, overbudget, or overwhelming.

With the right approach, it becomes structured, predictable, and value-driven - delivering impact early while managing complexity over time.

With the right partner, it can also be significantly de-risked - with transformation complexity actively managed rather than passed on to the business.

Capgemini combines strategy, execution, and continuous improvement into a connected modernization journey.

1. Understand and prioritize opportunities

Application modernization begins with visibility: mapping your application estate with dependencies, assessing technical debt, and understanding business priorities.

AI-powered discovery accelerates the analysis, revealing opportunities, bottlenecks, and modernization candidates.

This understanding helps create a business-aligned roadmap that identifies the most valuable changes and derisks decision-making.

2. Select the right modernization paths

With clarity on value, risk, and urgency, each application is mapped to its optimal path, whether that's to replatform, rewrite, refactor, or retire. AI accelerators speed up code analysis, cloud migrations, and architecture evolution, ensuring decisions aren't just fast, but also precise and repeatable.

3. Deliver application modernization at scale

Modernization happens in sequenced waves, not long programs that delay outcomes.

Industrialized patterns, automation, and AI-powered execution ensure faster delivery, higher quality, and reduced disruption.

Value is realized early and often, with each wave strengthening both the technical landscape and business performance.

4. Assure quality and mitigate risk continuously

AI agents generate and run test cases, validate new features, and perform detailed regression checks. This ensures that updates integrate smoothly with existing systems, potential bugs are caught early, and security standards are consistently upheld, with human supervision/approval when necessary. Continuous monitoring means that improvements are measured in real time, and processes are adapted as needed to maintain momentum and minimize risk.

5. Make modernization business as usual

The journey doesn't end once applications are modernized. With continuous updates, automated refactoring, and proactive technical-debt management, modernization becomes part of everyday operations instead of a disruptive event that happens every few years. Applications stay current, resilient, and ready for evolving business needs.





A dose of reality: AI accelerates modernization. It doesn't replace judgment.

AI can analyze code, map dependencies, and automate large parts of the modernization journey.

But it **cannot**

- Understand fully business context
- Make strategic trade-offs
- Own transformation outcomes

Modernization is not just a technical exercise - it's about aligning systems with how the business operates, competes, and evolves.

That requires:

- Experience in complex, large-scale transformation
- Deep understanding of legacy architectures and domain context
- The ability to balance speed, risk, cost, and business impact

AI changes the speed and scale of modernization. **Expertise determines whether it succeeds.**

That's where an experienced partner - like Capgemini - makes the difference; combining AI-powered acceleration with the judgment, governance, and delivery confidence needed to modernize at scale.

What makes Capgemini different

Modernization requires more than tools - it requires the ability to combine AI-driven acceleration with deep engineering and domain expertise.

Capgemini brings three distinct advantages:

- 1. AI-powered industrialization at scale:** We combine leading tools, proprietary accelerators, and agentic AI to industrialize modernization - reducing timelines and improving consistency.
- 2. Deep legacy and industry expertise:** We understand how systems actually work in practice - including undocumented processes and dependencies - across industries. This tacit knowledge is critical to avoiding disruption.
- 3. Pragmatic, business-led transformation:** We deliver phased, value-driven modernization aligned to business priorities — balancing speed, cost, and risk while avoiding “big bang” approaches.

4. De-risked modernization with accountable delivery:

We help clients modernize with confidence by combining proven delivery methods and pathways, AI-powered clarity and understanding, and end-to-end accountability. Through incremental value realization, rigorous governance, and global delivery scale, we continuously manage and mitigate transformation risk jointly with our client stakeholders.

The result: a controlled, scalable, and low-risk modernization journey that continuously deliver business and technology value. Clients gain the confidence to move faster and bigger because transformation risk is actively managed, outcomes are measurable, and visible value is delivered incrementally.



Ready to start modernizing?

The question is no longer whether to modernize - but how to do it fast, safely, and at scale.

Capgemini combines AI-powered acceleration with deep expertise to turn modernization into measurable business value.

Start where it matters most - and build forward with confidence.

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About Capgemini

Capgemini is the business transformation partner for enterprises in the age of AI. We help organisations imagine and build an intelligent, sustainable future, combining AI, technology and human ingenuity to transform how they operate, innovate and grow. With unique end-to-end capabilities spanning strategy, technology, engineering and intelligent operations, we bring together deep industry expertise and market-leading capabilities in AI, cloud and data to turn ambition into measurable business outcomes at scale. Supported by a robust ecosystem of partners and nearly 60 years of expertise, Capgemini is a responsible and diverse global organization of over 410,000 team members in more than 50 countries. The Group reported 2025 revenues of €22.5 billion.

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