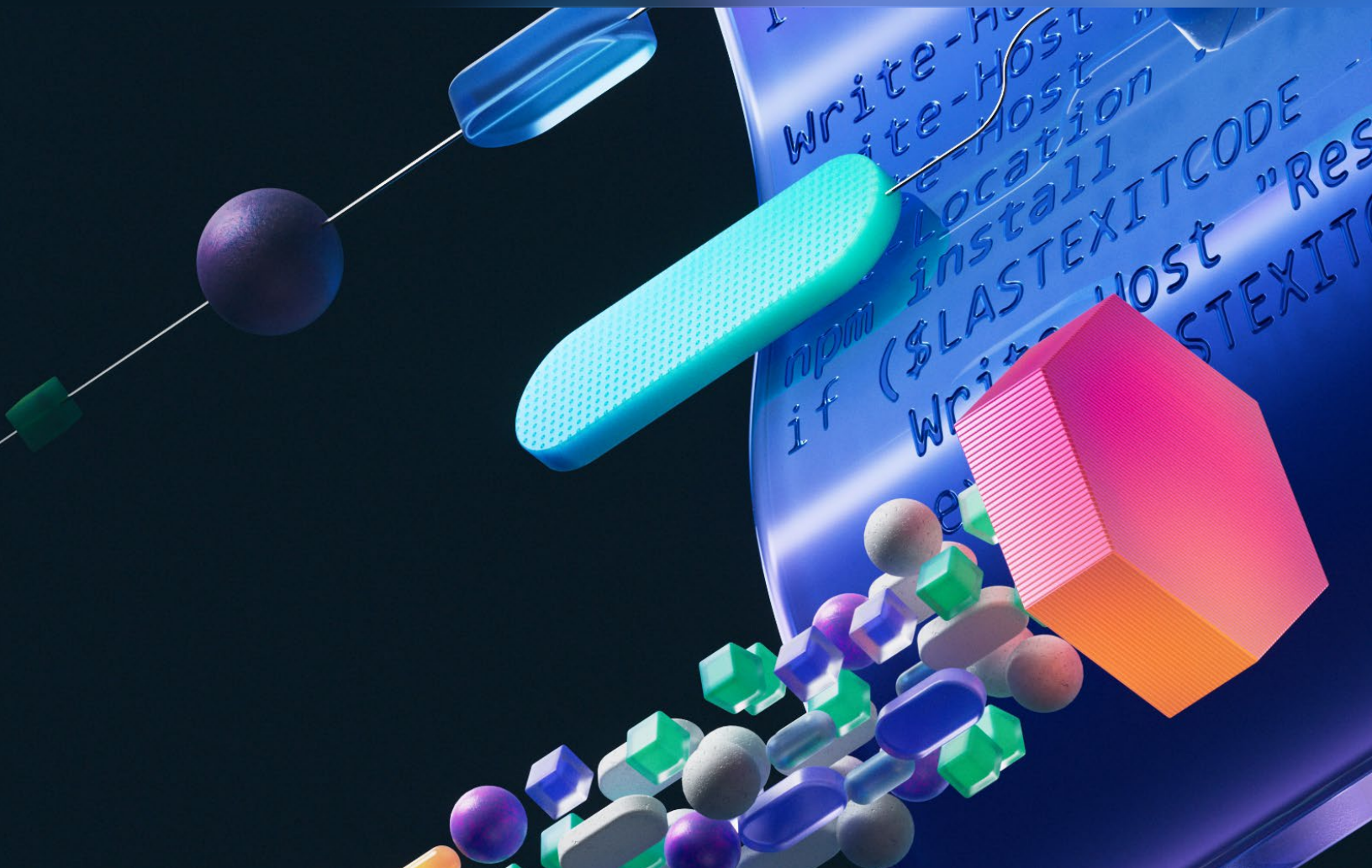




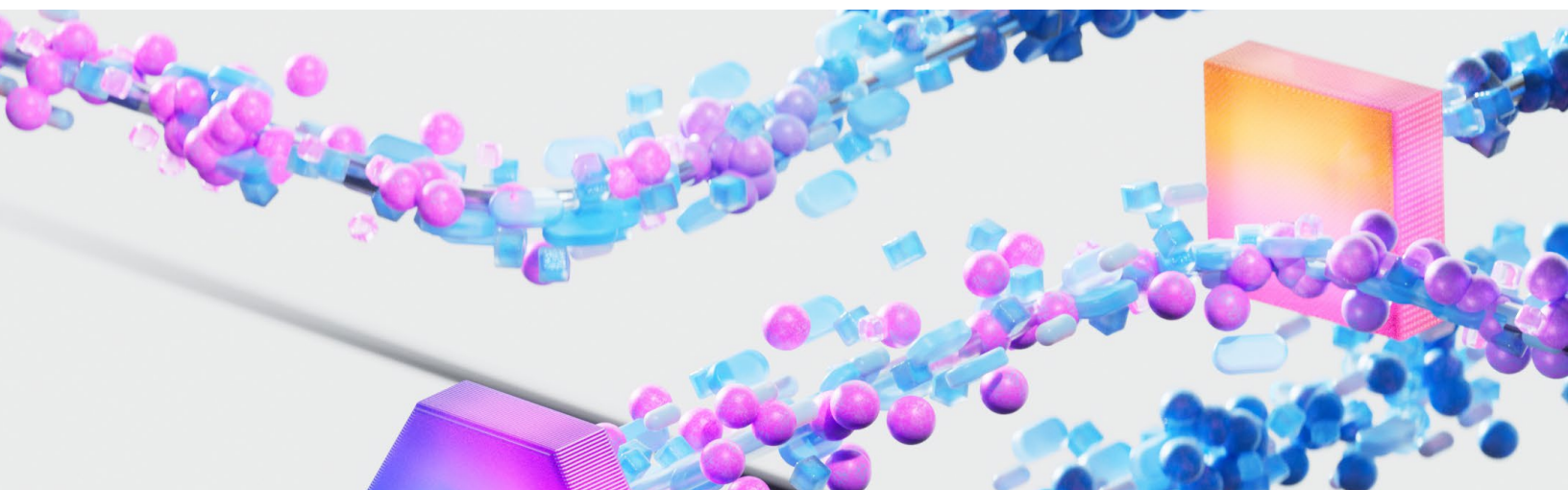
Modernising Apps and Data: A Practical Guide

Your roadmap from legacy systems
to an AI-ready foundation



Contents

03	Introduction	
04	Create an ROI-focused modernisation roadmap with agents	
	Choose your path to the cloud	05
	Map each stage of the route for high impact	05
	The six 'R's of app modernisation	06
07	Get started: a modernisation roadmap	
08	Use unified data to lay the right foundation	
	Map a route to unified data	09
11	Modernise apps to unlock cloud-native opportunities	
	Map a route to cloud-native agility	12
13	Unify security and governance for hybrid estates	
14	Consider roadmaps for five common workloads	
	Map a route that connects teams	16
17	Next steps	



Introduction

Cloud modernisation is your roadmap for accelerating business performance, and the pace of transformation has never been faster. Modern workloads are like high-performance sports cars: fast, agile and built for competitive advantage. But many organisations still operate like a fleet of mismatched vehicles scattered across different garages, making it hard to keep pace.

That fragmentation makes it difficult to steer toward modernisation at full speed. Balancing today's app and data requirements with tomorrow's AI demands is no small feat, especially when you're managing rising costs, end-of-support deadlines, cybersecurity threats, IT sprawl or a shortage of skills.

Modernisation is the on-ramp to AI transformation.

The organisations pulling ahead aren't waiting for a perfect moment.

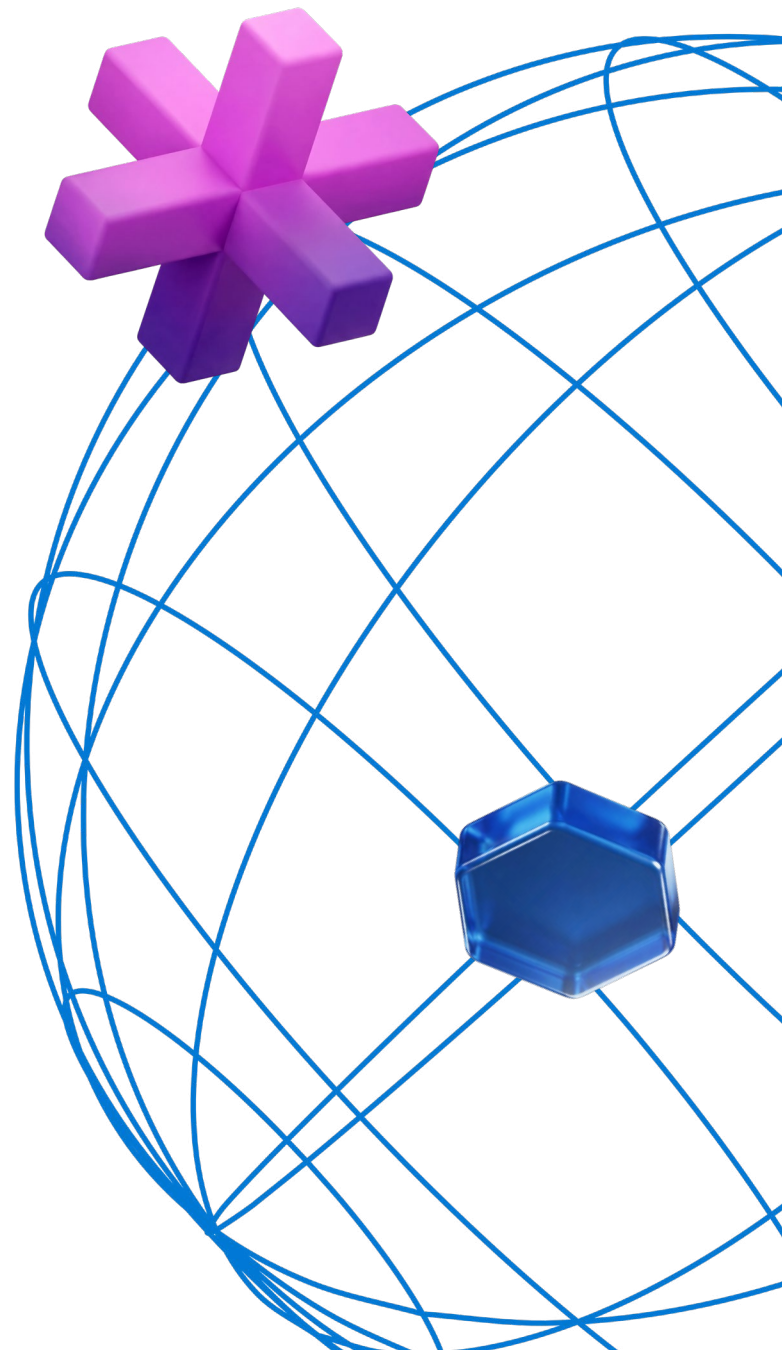
They're acting now.

AI is transforming modernisation itself. Agentic AI tools now guide and orchestrate the entire journey – from discovery and dependency mapping to code transformation and deployment. Work that once took months of manual planning now takes days, guided by clear, data-driven recommendations instead of guesswork.

This agentic approach removes the friction that keeps teams stuck, reducing operational toil, closing skills gaps and accelerating cloud adoption. Combined with Platform-as-a-Service (PaaS), your teams can shift focus from managing infrastructure to building secure, scalable and AI-ready applications. With AI embedded into the modernisation lifecycle, it becomes a persistent capability that supports continuous innovation, optimised costs and a durable foundation for responsible AI.

About this eBook

This eBook offers a practical view of app and data modernisation that cuts complexity and delivers more value from your existing resources. A roadmap to the cloud brings together modern applications, databases, analytics and AI services into a single AI-ready ecosystem centred on your business outcomes.



Create an ROI-focused modernisation roadmap with agents

The modernisation journey often starts with a pressure point – a data centre contract expiring, a software licence ending, rising infrastructure costs or an approaching end-of-support deadline. Whatever the trigger, shifting to cloud-managed services transforms your economics from costly capital expenditure to a flexible operational model where you can pay only for what you use.

The business case for moving is compelling. Organisations that modernised their workloads achieved 344% ROI over three years, with improved security capabilities, better compliance outcomes and IT security teams that were 34% more efficient.ⁱ

There's an environmental benefit too. Cloud-managed services shrink your operational footprint, reducing both cost and carbon from idle capacity. You can start tracking and optimising from the moment you begin modernising.

Azure valueⁱⁱ

344%

ROI over three years

43%

faster to market new products and solutions

69%

more IT time to focus on innovation

Proven outcomes with an end-to-end agentic modernisation approach

No matter where your estate starts, there's a proven path forward. The following results span .NET, Java, mainframe (COBOL, CICS, JCL), VMware, Windows, Linux and databases, including Oracle, PostgreSQL, MySQL and SQL Server.

- Up to 70% less migration time with AI-guided planning and execution.ⁱⁱⁱ
- 50% less effort required to upgrade legacy applications.^{iv}
- 500,000+ lines of code modernised in weeks, not years, at a Fortune 500 company.^v
- 4× faster overall modernisation with agentic AI tools.^{vi}
- 51% faster SQL Server performance at significantly lower costs in the cloud.^{vii}
- 2× performance and 5× more database capacity per instance with Azure SQL Managed Instance, with nearly 100% SQL Server compatibility.^{viii}
- Up to 60% fewer administrator hours and 55% better application performance with managed databases.^{ix}
- 58% lower total cost of ownership (TCO) and 65% performance improvement with managed PostgreSQL vs. on-premises deployments.^x

Choose your path to the cloud

To accelerate business value and reduce risk, two strategic pillars stand out:

- ✓ **Modernise in stages.**
- ✓ **Start with your data layer.**

Many organisations still operate complex legacy estates with disconnected tools and months of manual planning just to decide what to modernise. AI changes the dynamic. Agents analyse your environment, prioritise workloads based on your business goals and build migration plans automatically, putting your teams in control without overwhelming them.

Map each stage of the route for high impact

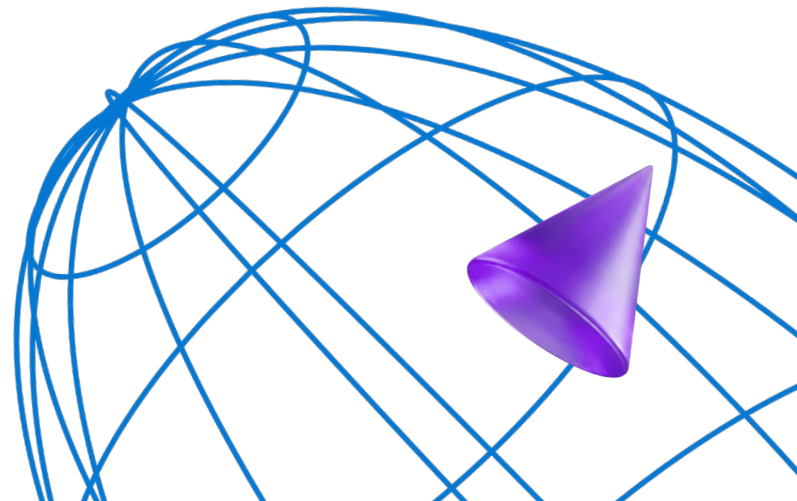
The sweet spot for maximising business value lies in striking the right balance of impact and effort as you modernise toward cloud-managed services. AI-powered planning agents can help you prioritise based on your business goals and sequence the entire journey.

Here's a common approach:

- ✓ **Start with the fastest, least disruptive path.** You can begin by rehosting workloads as-is on cloud infrastructure, reducing infrastructure costs and freeing data centre space with minimal disruption. Shifting on-premises SQL Server workloads to cloud-managed virtual machines, for example, can deliver 51% better price-performance for mission-critical workloads.^{xi}

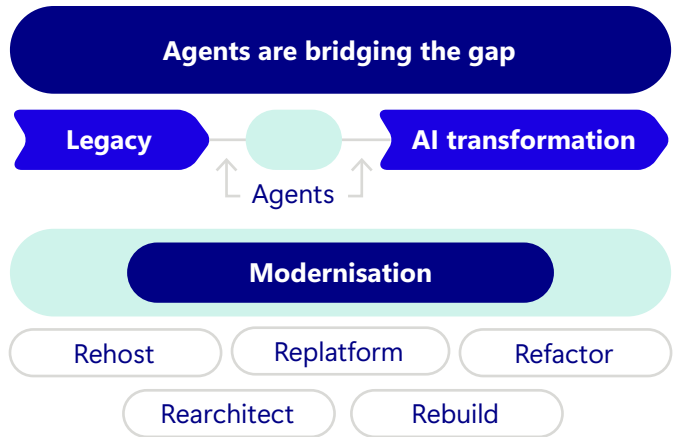
- ✓ **Offload maintenance and reduce licensing overhead.** Using managed databases, you can get your data estate in order, making it easier to modernise apps with fewer code changes. Organisations moving PostgreSQL workloads to fully managed cloud services achieve up to 58% lower TCO over three years.^{xii}
- ✓ **Integrate more services to build momentum.** When your apps and data run on a unified platform, you can easily integrate the latest cloud services, improving data access time for deeper business intelligence (BI) and AI use cases while simplifying governance and management.
- ✓ **Reduce technical debt and unlock cloud-native capabilities.** Modern app architectures combined with agentic AI increase agility and open new paths for AI transformation. AI-assisted code modernisation can pull assessments, build customised plans for each application, execute upgrades and deploy directly to the cloud – while keeping developers in control and working in the tools they already use.

These strategies are part of a best-practices framework known as the six app modernisation rationalisations (six 'R's for short) – rehost, replatform, refactor, rearchitect, rebuild and retire. AI-powered planning agents can help recommend which route to choose based on cost, business outcome, ROI and level of effort, so your teams can focus on innovation.



The six 'R's of app modernisation

- ✓ **Rehost** your applications by lifting them from on-premises infrastructure and shifting to the cloud. This simple, fast approach gets you to the cloud quickly, reducing data centre costs and boosting availability with minimal effort.
- ✓ **Replatform** when your apps and databases need only minor tweaks to run in the cloud. You gain the benefits of managed services automated backups, dynamic scaling and better security without a full architectural overhaul.
- ✓ **Refactor** when you want to incrementally improve your code or database schema. It's a low-risk way to boost efficiency and reduce costs, paying only for compute resources when you need them.
- ✓ **Rearchitect** (or rebuild from scratch) when you can redesign your core architecture. It's the best opportunity for modernising how applications and databases work together and delivering a better experience for users.
- ✓ **Retire** workloads that are obsolete, unused or no longer supported. While resistance to change can make this decision challenging, retiring these systems is a valuable opportunity to streamline your IT portfolio and reduce both cost and risk.
- ✓ **Retain** applications or databases that continue to deliver significant business value, recognising that technical, financial and operational considerations may make them difficult to move at this time.



Get started: a modernisation roadmap

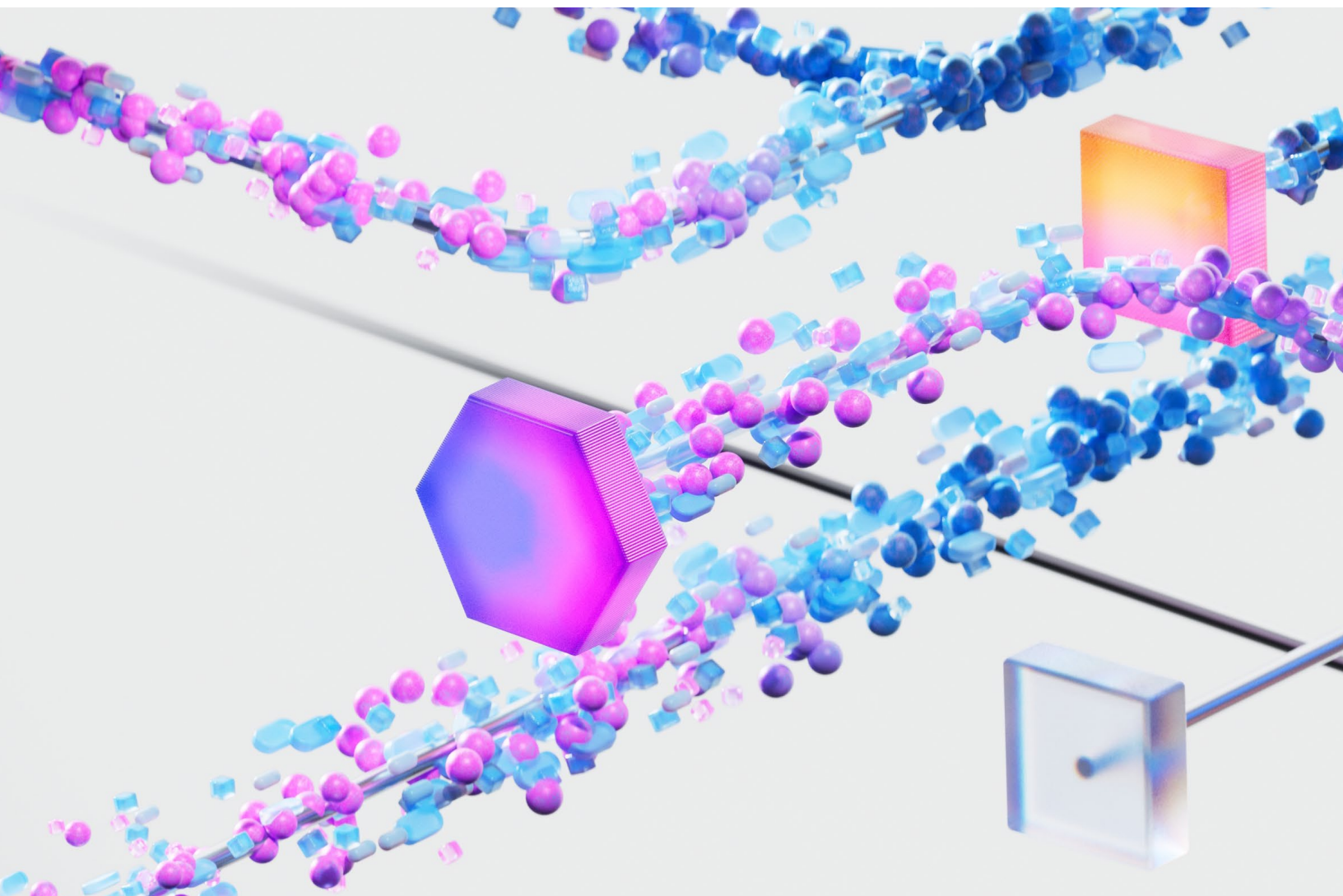
It's best to view modernisation as a cycle of continuous improvement guided by your goals. The cycle begins anew when an assessment of your business and technical readiness reveals a gap. You can then revisit the cloud platforms, services and principles adopted earlier and make them more cost-efficient, scalable and secure.

Goal	Assessment	Roadmap
 Gain cloud economies of scale	Start here if legacy applications or traditional on-premises systems are limiting your agility.	→ Prioritise workloads for migration, introducing managed cloud services where possible to lower TCO. → Assess your data estate and identify integration pain points. → Begin to build a unified data platform based on fully managed databases.
 Scale and secure momentum	Start here if you're ready to expand your use of cloud-native architectures.	→ Explore containers with Kubernetes, microservices and automation for incremental improvements and faster releases.
 Go to the next level	Start here if you're on track, but want incremental improvements.	→ Enhance performance, security and AI readiness with unified data. → Rearchitect business-critical applications to create AI-powered experiences and data-driven insights.
 Optimise and innovate	Start here if you want to optimise your existing cloud-native investments.	→ Redesign experiences using personalisation, recommender engines, AI-powered apps and agents and enterprise copilots. → Replace outdated components with the latest services.

Use unified data to lay the right foundation

Cloud databases give you the scale you need to process high-volume, high-velocity and high-variety datasets. But scale alone doesn't solve the complexity of integrating fragmented systems and siloed data, especially in hybrid and multicloud environments. The extra time and effort it takes to make different platforms and databases work together is integration overhead, a hidden tax that costs organisations as much as **30%** of their annual revenue from missed opportunities, inefficiency and poor decision-making.^{xiii}

That's where a unified data approach comes in. By bringing together fragmented datasets into a single governed, secure environment powered by cloud-native platforms, your applications, analytics and AI can all work from consistent, high-quality data. Instead of troubleshooting data mismatches or building custom connectors, you rely on services with native integrations designed to work together. Unified data is also easier to manage and govern, freeing up as much as **60%** of your administrators' time for higher-value work.^{xiv}



Map a route to unified data

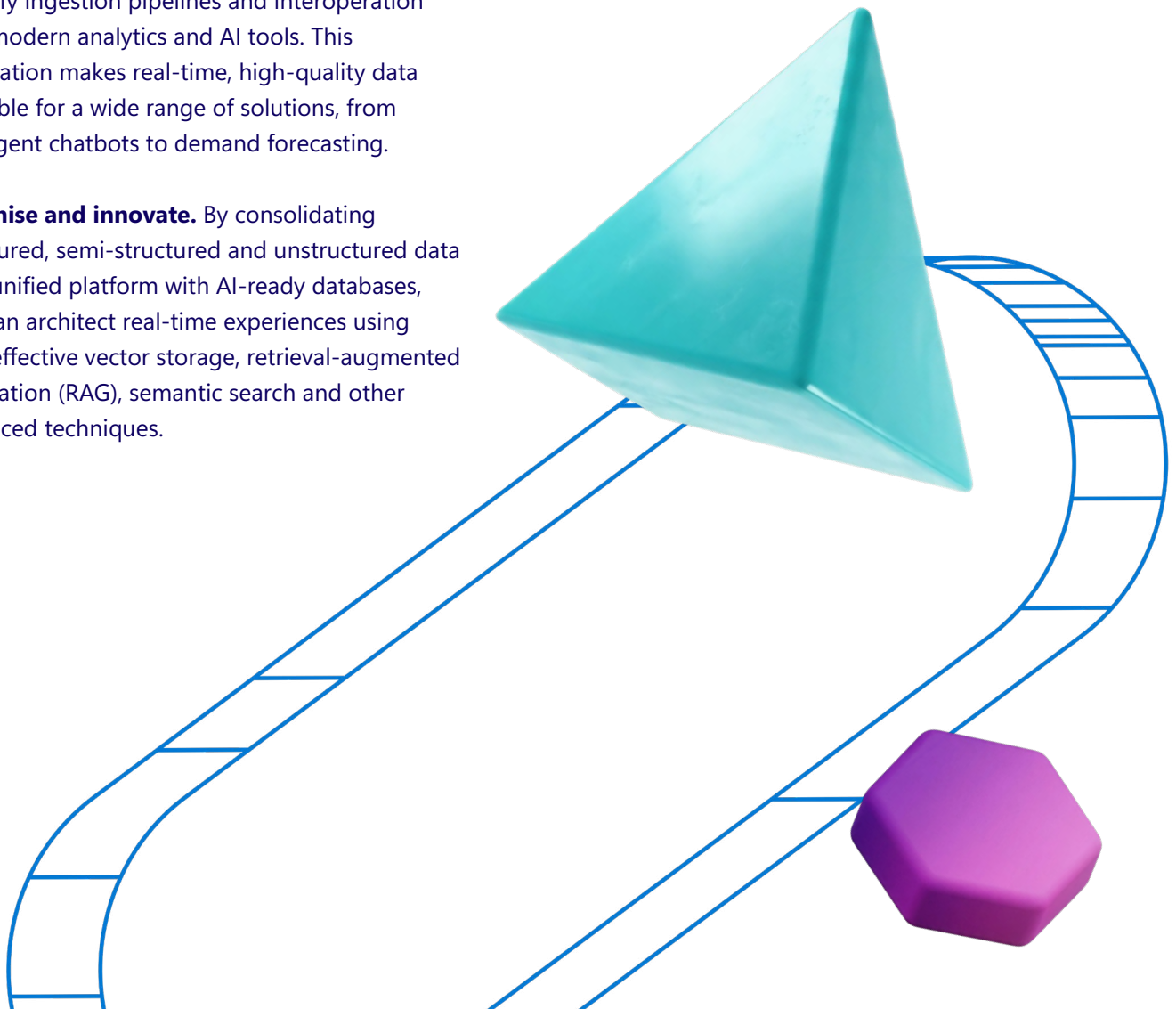
By focusing on unified data from the start, you ensure that data flows, APIs and workflows are optimised for AI-readiness. This proactive approach reduces future technical debt and accelerates the delivery of intelligent, data-driven capabilities. With these pieces in place, AI-powered tools can transform every aspect of your workloads, from how they're built to how they're managed and scaled.

✓ **Get started with unified data.** Rehost core on-premises databases or replatform them using managed services to begin building a unified data foundation. Establishing governance and security early means unified data is well-managed from the start.

✓ **Expand by applying AI-first design.** As you rearchitect apps for the cloud, you can begin embedding AI capabilities natively. Cloud-native databases expose APIs and connectors that simplify ingestion pipelines and interoperation with modern analytics and AI tools. This integration makes real-time, high-quality data available for a wide range of solutions, from intelligent chatbots to demand forecasting.

✓ **Optimise and innovate.** By consolidating structured, semi-structured and unstructured data on a unified platform with AI-ready databases, you can architect real-time experiences using cost-effective vector storage, retrieval-augmented generation (RAG), semantic search and other advanced techniques.

✓ **From raw data to real value with Azure Databases.** One of the most cost-effective ways to modernise legacy workloads for AI-readiness is to migrate to fully managed cloud databases. AI solutions demand fast, reliable access to large volumes of data. With managed databases, you gain native capabilities like vector indexing, semantic and hybrid search and integration with AI frameworks such as LangChain and Microsoft Foundry, making your data instantly usable for intelligent applications.



Azure Databases: Deliver AI apps and agents faster, with built-in capabilities for generative AI and LLM workloads

Azure offers fully managed services for SQL, NoSQL, PostgreSQL and MySQL, providing the foundation for any size business-critical workload your organisation uses to achieve AI transformation and business innovation.

With Azure Databases, companies get up to five times faster performance, intelligent threat detection and up to 58% lower TCO.^{xv} New apps, AI agents and data-driven solutions benefit from GitHub Copilot-assisted development, zero-touch recovery, single-digit millisecond latency, advanced vector search capabilities and integrations with the most loved developer tools, analytics platforms and AI technologies.



Knowing that we have a reliable and highly secure database platform positions us to think about how we can use AI in ways that will benefit our customers and their customers most. With Azure SQL Managed Instance in place, we're very well equipped to continue in our role as a leader in insurance tech.

Warren Perlman, CTO, Hexagon

[Read the full story](#)



Modernise apps to unlock cloud-native opportunities

After your data foundation is in place, app modernisation becomes the next strategic step: fully harnessing unified data to unlock scalability, speed and innovation.

To do that, you must transform legacy monoliths into modular, cloud-ready architectures. Enterprise applications like customer relationship management (CRM) and e-commerce are often tightly coupled with their data, making them expensive and time-consuming to maintain. Legacy environments are full of interdependencies that can become bottlenecks.

When you decouple data models from business logic, your new system can evolve independently without inheriting technical debt from the old one. You can shield modern components from legacy quirks and modernise in increments using flexible microservices architectures. You can independently deploy and scale application components, making it much faster and easier to align with agile business practices.

Microservices benefit from a data-first approach. Without unified data, microservices can introduce operational complexity. With a solid data foundation in place, you can give each decoupled service a fit-for-purpose, AI-ready data store and consistent, governed access, ensuring you stay aligned with cloud-native services from the start.

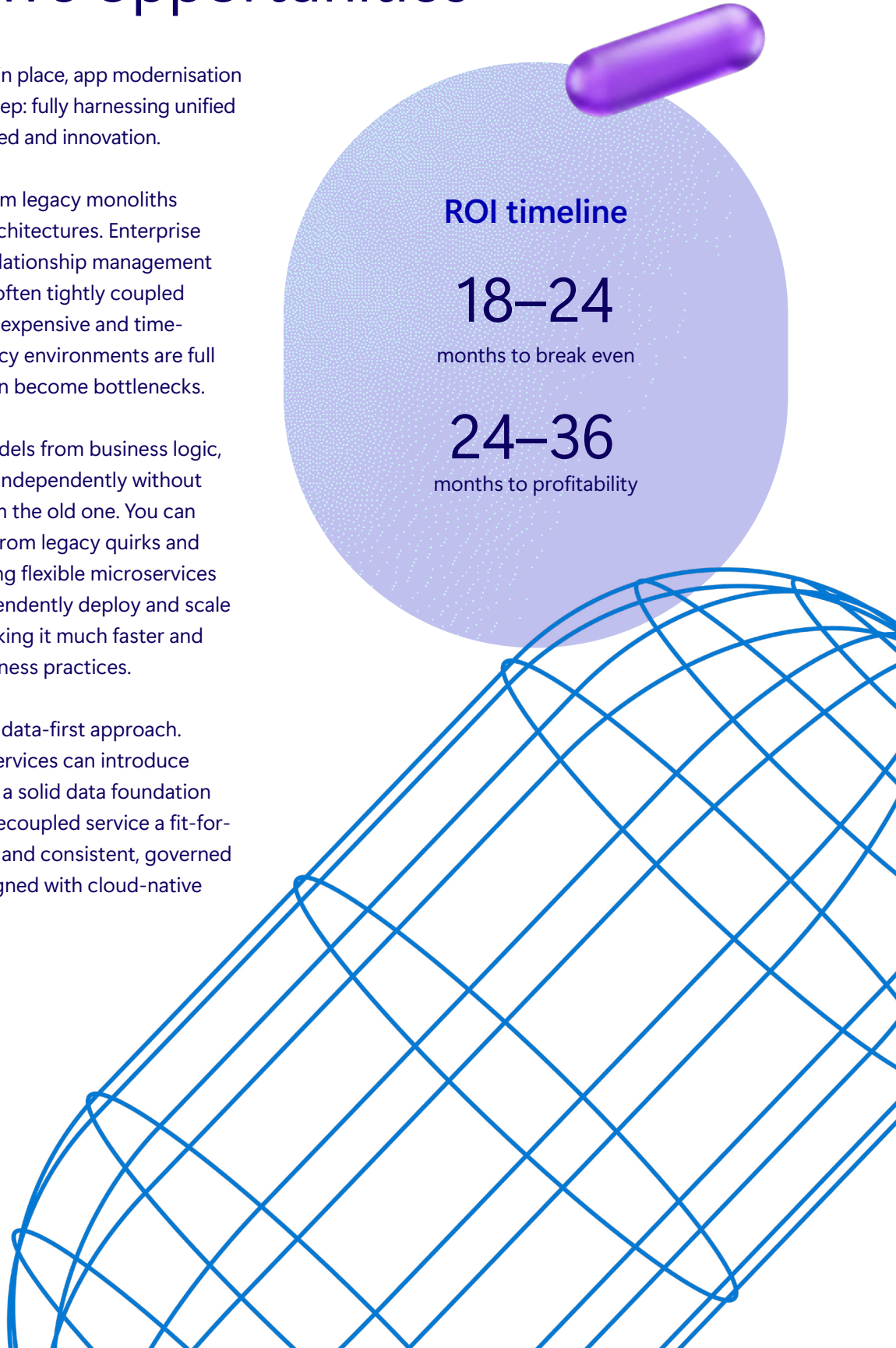
ROI timeline

18–24

months to break even

24–36

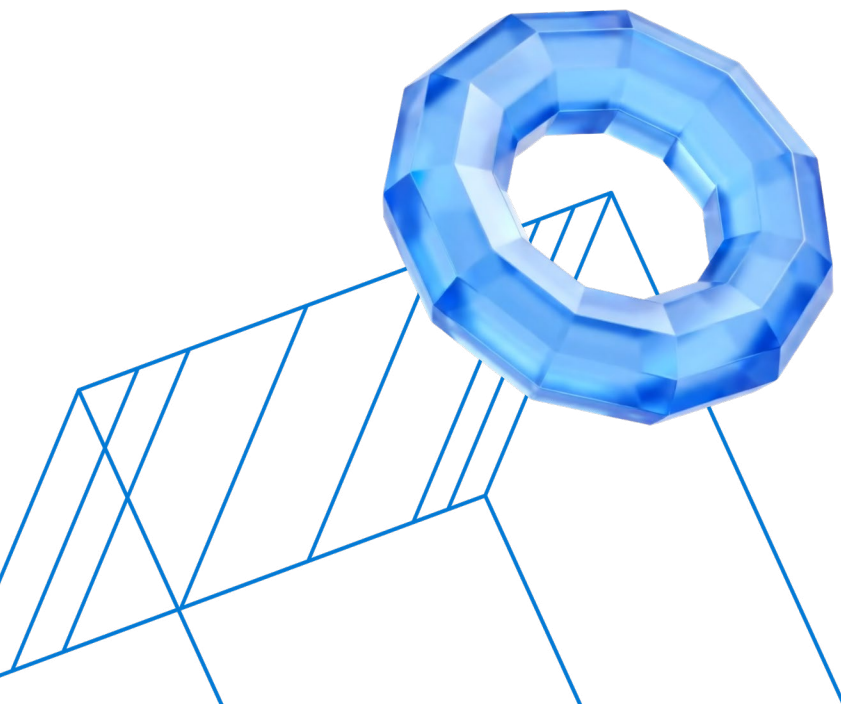
months to profitability



Map a route to cloud-native agility

To support AI readiness, you can take practical steps to ease app modernisation while continuing to deliver value and reduce risk.

- ✓ **Set up fast, safe development workflows.** Instead of inconsistent, slow and risky software releases, your teams can pack apps into portable containers, then use continuous integration and continuous deployment (CI/CD) to push out updates quickly and reliably.
- ✓ **Streamline your software delivery.** Blue-green and rolling deployment strategies enable safer releases with less disruption. They also strengthen delivery through improved collaboration, standardised workflows and greater visibility across the development lifecycle.
- ✓ **Minimise disruption and risk.** You can incrementally replace parts of a monolith, prioritising services that frequently change. Using containers standardises packaging and deployment so you can build, test and release updates to production without disrupting the entire system. You can introduce AI-first capabilities like predictive analytics or RAG-based search in containerised services while the legacy core continues to run.
- ✓ **Ensure security from code to cloud.** When you start with unified data, it's easier to create a cohesive, effective security operations workflow. A cloud-native application protection platform (CNAPP) unifies security across development and runtime, helping you reduce risk and complexity with full visibility and control.
- ✓ **Go from code to cloud with containers.** Containers are portable by design, so services can run across environments without being rewritten for each platform. You can choose from cloud deployment options ranging from fully managed Kubernetes services to lightweight serverless container platforms. The code-to-container-to-cloud toolchain builds on familiar development environments and automated workflows that reinforce best practices across the software development lifecycle.
- ✓ **Adopt an AI-first mindset.** Treating AI as a design principle, not a feature, means embedding it into your modernisation strategy so every app and database is AI-ready from day one.



Unify security and governance for hybrid estates

As you migrate workloads in phases, you may continue to manage on-premises assets. A hybrid cloud environment can leave blind spots that expose vulnerabilities in your security posture. To realise the full value of modernisation, you must protect your applications, data and cloud resources consistently, no matter where they reside.

Here are some considerations:

- ✓ **Address visibility gaps.** Use hybrid cloud management and distributed cloud platforms to extend cloud services to on-premises, edge and other environments, giving you a unified view of your entire estate.
- ✓ **Protect diverse and connected workloads.** Hybrid environments create more entry points for attackers, so cloud resources must be continuously assessed. To automate advanced protection, use a CNAPP. For added depth, consider an extended detection and response (XDR) solution. Consistent security management across hybrid and multicloud environments can reduce exposure to breaches and lower their impact.^{xvi}
- ✓ **Unify threat remediation.** Bring together all your security-related data logs, events and alerts into one unified platform for monitoring, analysis and response. Unified security platforms help teams remediate threats 30% faster and can deliver up to 117% three-year ROI.^{xvii}
- ✓ **Keep legacies secure.** Make sure that legacy resources are included in the systems you use for threat detection, identity management and compliance. Keep them patched and ensure they work with newer security tools to reduce their vulnerability to threat.
- ✓ **Protect data.** Make the most of a hybrid model to store sensitive, regulated data in a private, on-premises environment while taking advantage of the cloud's scalability and analytics for non-sensitive data. When data sovereignty is a consideration, work with cloud providers that offer region-specific data centres, customer-controlled encryption keys and full transparency in data handling.

Microsoft and digital sovereignty

Microsoft Sovereign Cloud is a comprehensive set of sovereign solutions across AI, productivity, security and cloud is one platform. Digital sovereignty is foundational to Microsoft cloud services through a well-governed combination of technical, contractual and operational controls, helping you protect sensitive data, meet regulatory requirements and maintain control over your operations.

Because every workload and organisation has different levels of sensitivity and criticality, you can adapt sovereignty controls to your specific needs across public, hybrid and disconnected environments. You can apply the right level of control, capability and compliance to each workload based on its sensitivity and criticality, rather than relying on a single deployment model.

→ [Learn more](#)

Consider roadmaps for five common workloads

Unified data lays the groundwork for phased modernisation of critical systems, ensuring stability and continuity throughout the process. This section outlines modernisation roadmaps for five common enterprise workloads.

01

Business intelligence

Accurate BI starts with unified, governed data. When you're ready to modernise BI systems, a few key considerations apply: your current data set-up, how new data needs to connect, how much you want to grow, your current analytics capabilities and your cloud readiness.

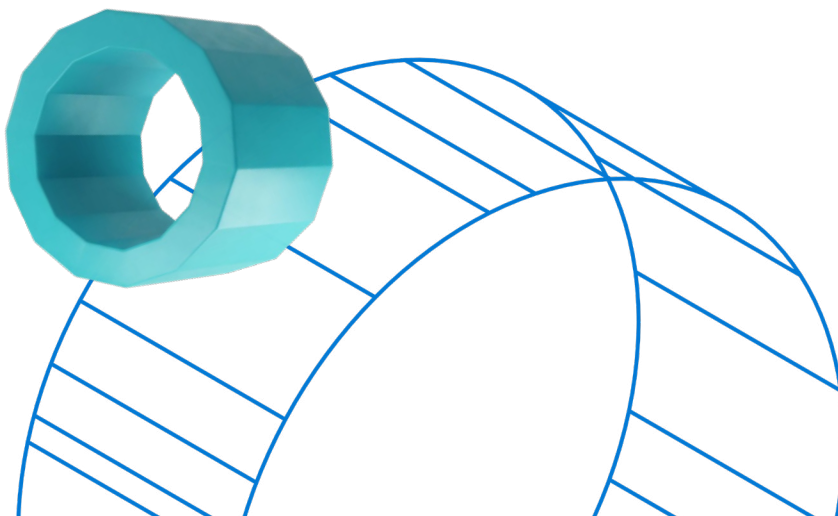
- **Get started:** Migrate to cloud-based BI tools for quick access and easier integration.
- **Enhance:** Strengthen data pipelines for high-performance analytics and real-time reporting using cloud-native data warehouses.
- **Optimise:** Implement data lakes, use machine learning and tune AI models to extract insights, drive automation and improve decision-making across the organisation.

02

Customer relationship management

To support real-time, personalised customer engagement, you need the capabilities that unified data provides: robust data exchange, operational efficiency and automation. Modernising your CRM helps you win on two fronts. It drives revenue through better customer retention and personalisation, and it cuts costs through automation.

- **Get started:** Migrate to cloud-based CRM platforms for faster access to new features and security updates.
- **Enhance:** Improve interoperability with other cloud-native services for marketing, analytics and collaboration.
- **Optimise:** Use APIs to streamline data exchange and automate workflows, so you can adapt processes and launch new digital services quickly.



03

E-commerce

A data-first approach to e-commerce migration reduces friction and ensures compliance. You can swap out all-in-one systems for a more flexible, building-block approach, accelerating feature delivery, keeping costs low with managed cloud services and providing a seamless shopping experience across every channel.

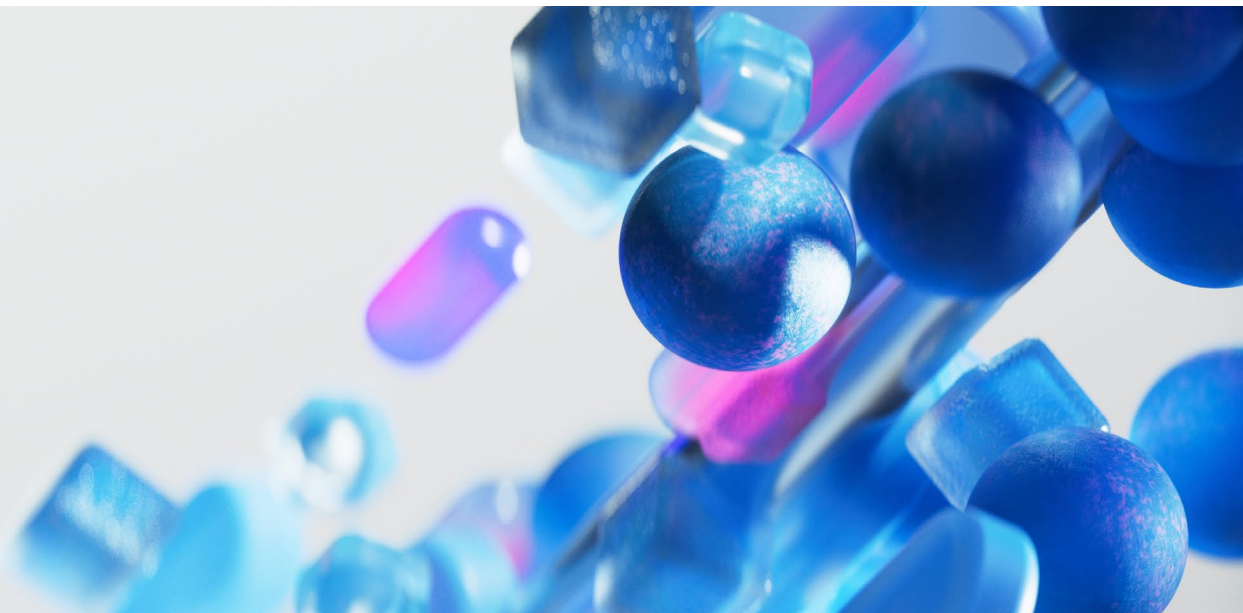
- **Get started:** Host custom e-commerce websites or storefronts using a cloud-managed service. With minimal refactoring, you can lower costs, improve reliability and gain access to modern tooling.
- **Enhance:** Modernise user experiences and payment gateways using cloud databases, and add event streaming to support orders, shopping baskets and browsing.
- **Optimise:** Implement microservices for components with spiky traffic, like the shopping basket, product catalogue or checkout service. Scale services independently and make frequent updates without impacting the whole system.

04

Enterprise resource planning

Modernising legacy enterprise resource planning (ERP) unlocks real-time data integration and automation when combined with a unified data platform. You can gradually replace monolithic customisations with microservices for scalability, resilience and faster feature delivery without disrupting the entire ERP system.

- **Get started:** Move to cloud-based ERP solutions or purpose-built virtual machines to reduce operational overhead and add scalability and resilience.
- **Enhance:** Update custom modules to take advantage of cloud-native features like autoscaling and integration. Without heavy custom code, connect ERP with e-commerce, payment gateways and analytics.
- **Optimise:** Implement microservices for custom modules so you can scale high-demand services like pricing and checkout without overprovisioning the entire ERP. With microservices, a failure in one module won't bring down the whole system.



05

Supply chain management

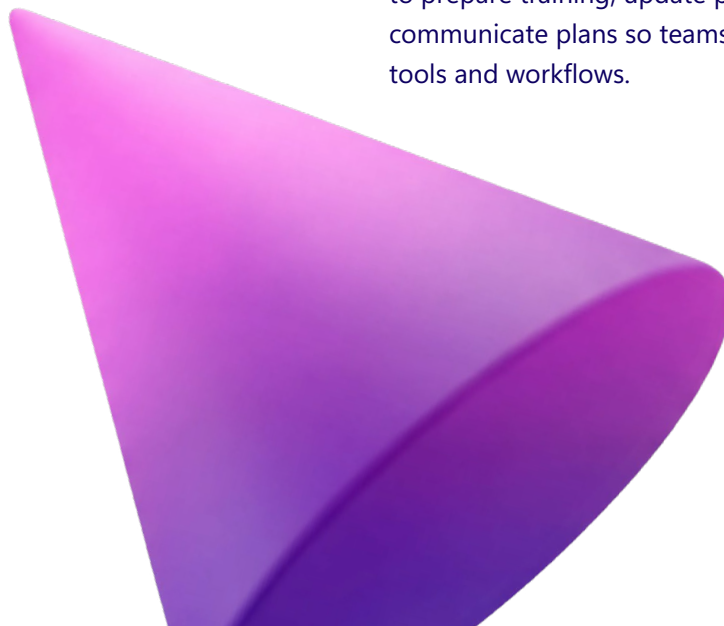
Supply chain management (SCM) depends on IoT devices, real-time tracking and analytics – all of which require unified data to ensure consistent, timely insights across the entire supply chain. Legacy platforms often lack real-time visibility, scalability and the integration capabilities needed for today's global, omnichannel operations. By modernising, you can adopt cloud-native, API-driven architectures that support agility, automation and advanced analytics.

- **Get started:** Shift SCM workloads to certified cloud infrastructures to stabilise operations and control costs without rewriting the entire system. This move sets the stage for incremental enhancements like real-time visibility and automation.
- **Enhance:** Replace tightly coupled custom scripts or legacy middleware with managed, API-first integrations that are easier to maintain, scale and secure.
- **Optimise:** Implement IoT for real-time tracking and analytics, or rearchitect critical modules into microservices for agility and resilience.

Map a route that connects teams

App and data modernisation require coordinated, cross-functional effort spanning product, engineering, security, data and operations. An outcome-driven roadmap brings teams together and ensures everyone in your organisation is prepared for the journey ahead.

- ✓ **Align stakeholders early** in the modernisation journey to make sure your business and technical goals advance together. Cross-functional teams can prioritise workloads, identify dependencies and constraints upfront and ensure you modernise the most impactful systems first.
- ✓ **Establish governance and security standards early.** When you involve security and compliance teams from the start, you can avoid costly rework and audit risks later.
- ✓ **Adopt a unified approach to data and integration.** Before migration begins, standardise data models, governance rules and real-time integration patterns for data sharing and interoperability.
- ✓ **Plan for change management and adoption.** User readiness must be part of your roadmap. Operations and product teams can collaborate to prepare training, update processes and communicate plans so teams are ready for new tools and workflows.



Next steps

Modernisation is more than just updating old systems; it unlocks new possibilities. By bringing together your applications and data on a unified cloud platform, you can build an AI-ready foundation for innovation.

The organisations that invest in modernisation today are building the foundation for tomorrow's competitive advantage.

Get end-to-end guidance, find experts and unlock funding

Explore Frontier Accelerate for step-by-step support to help you move faster with confidence.

→ [Frontier Accelerate](#)

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ⁱ [The Business Value of Migrating and Modernizing IT Estate with Microsoft Azure](#). IDC. April 2025.

ⁱⁱ [The Business Value of Migrating and Modernizing IT Estate with Microsoft Azure](#). IDC. April 2025

ⁱⁱⁱ [Accelerate migration and modernization with agentic AI](#). Azure Blog. September 25, 2025.

^{iv} [Modernize your applications in days, not months](#). GitHub App Modernization website.

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^{vi} [Microsoft's Agentic Tools Reshape Application Modernization for AI Era](#). LavX News. February 13, 2026.

^{vii} Based on [Azure Hybrid Benefit](#) and [GigaOm Benchmark: Migrating Windows Server Workloads to Azure v1](#).

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^{ix} McAfee, Nathan. [Analyzing the Economic Benefit of Azure SQL Managed Instance](#). Enterprise Strategy Group by TechTarget. March 2025.

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^{xii} [New ESG study validates how fully managed PostgreSQL on Azure delivers economic win](#).

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^{xiv} McAfee, Nathan. [Analyzing the Economic Benefits of Microsoft Azure SQL Managed Instance](#). Enterprise Strategy Group by TechTarget. March 2025.

^{xv} [New ESG study validates how fully managed PostgreSQL on Azure delivers economic win](#).

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^{xvii} [The Total Economic Impact™ of Microsoft Defender for Cloud](#). A Forrester Total Economic Impact Study commissioned by Microsoft. January 2025.