



WHITE PAPER

IT modernization: Modernize applications and data

Unlock the value of business platforms through modernization

The business case for modernizing apps and data

The appeal of the cloud reaches beyond immediate benefits such as provisioning resources at the touch of a button and moving to pay-as-you-go IT infrastructure.

Today, applications running in the cloud are the platform of choice for business innovation.

Modern apps practices enable organizations to unlock the insights and business value in legacy applications while lowering costs, future-proofing infrastructure and improving agility.

They help dramatically shorten the time from a new idea to the secure launch of new business initiatives, allowing quick rollout of new points of differentiation for customer service, data access and customer insights. Enterprises can rapidly disrupt the competition — or rapidly respond to disruption

IT modernization

This series explores ways to lower costs and complexity, increase speed, and improve agility and security through IT modernization.

- Simplify and optimize IT
- Modernize applications and data
- Operate and secure multicloud at scale

A key part of IT modernization

Most IT organizations are already migrating apps, launching agile DevOps processes and adopting cloud-based software-as-a-service (SaaS) applications, and they recognize the importance of securing applications and underlying data.

Moving apps to the cloud has revitalized interest in IT modernization, and organizations are looking to apply the tools, approaches and knowledge into all their applications portfolio initiatives.

IT organizations can unlock value from their investments through highly efficient methodologies and tools for modernization and migration, application development and security.

Modernizing applications and data can drive a host of benefits, including business agility, faster application delivery time and lower costs (as shown in Figure 1). Plus, organizations can more easily access data for new insights so they can build more personalized connections with customers, employees and partners.



Strategies for modernizing applications and data

Figure 1: Key strategies for modernizing applications and IT assets

Migrate to cloud

Improve agility, launch new initiatives

- Migrate on-premises applications to cloud and modern cloud-native platforms

Mainframe modernization

Improve performance, security and user experience

- Re-host applications to exit the mainframe
- Mitigate skills shortage and reduce TCO

Application modernization

Unlock the business value in applications

- Re-architect or rebuild applications to adopt cloud and platform-native services
- Expose existing applications through APIs to leverage existing assets and applications

Data and middleware modernization

Yield faster, more accurate insights from your data and analytics environment

- Modernize middleware and database to open source, cloud-ready or platform-as-a-service

Cloud-native development

Accelerate delivery of new services and capabilities

- Transform and containerize applications
- Develop and secure cloud-native solutions

Industry and enterprise apps to SaaS

Increase productivity and business agility

- Modernize industry and enterprise applications with SaaS alternatives

Securing the ecosystem

Secure data and operations

- Ensure data security of applications during continuous integration/continuous delivery process
- Provide real-time application security, monitoring, threat protection and policy enforcement

Migrating applications to the cloud

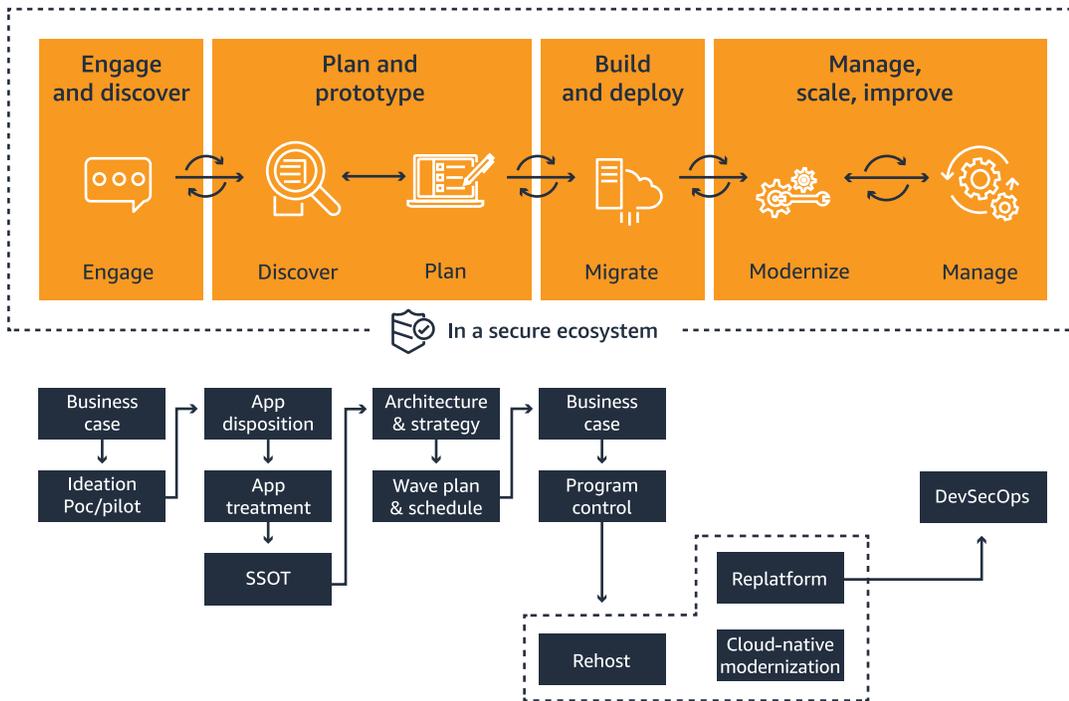
Applications migration is key to increasing business agility, but a common challenge facing many large enterprises is the sheer size of the applications portfolio. To migrate and modernize hundreds of applications at scale, including core business systems, organizations would benefit from an industrialized approach — a methodology that accelerates and standardizes migration and application transformation through a predefined, repeatable process.

Almost like a highly efficient assembly line in a manufacturing facility, each application moves through specific steps on its way to the cloud. The steps include:

- Discover and assess application readiness
- Plan and prepare the application for the cloud
- Decide which modernization methodology is appropriate
- Identify the best target platform in the cloud
- Test and validate the application prior to deployment



Figure 2: An industrialized, high-speed cloud migration process



During application discovery and assessment, enterprises should consider security, privacy and data residency, which are critical for storing sensitive data in a new environment. First, organizations should analyze the type of data being migrated, then apply an appropriate data classification policy and determine the best modernization strategy for that policy.

Modernizing mainframes

Compared to hosting in the public cloud, mainframe systems have higher hardware, software and staffing costs, but they securely and reliably process large amounts of data transactions at once, securely and reliably. The fastest transformation option is rehosting applications on a modern platform while keeping the application code essentially the same.

Rehosting applications typically involves converting legacy code into a modern language. These applications still will rely on batch processing and won't provide real-time data, but they will be open to modern DevSecOps practices and analytics tools. And managing these applications will no longer be limited to the shrinking pool of employees with mainframe skills.

Event-driven architectures and data-streaming technologies overcome the drawback of batch processing by providing up-to-the-minute transactional data that the mainframe and related systems can access.

Upgrading to the newest mainframe system or adding processor cores, memory and other hardware also improves performance. High-performance in-memory technology significantly reduces CPU usage and associated costs. Additionally, smart performance capping reduces cost without impacting mission-critical workloads.

IT teams can take advantage of cost-effective scaling options, modern monitoring, high-availability tools and many other choices available on x86 servers by moving to an open source Linux environment.

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Modernizing applications

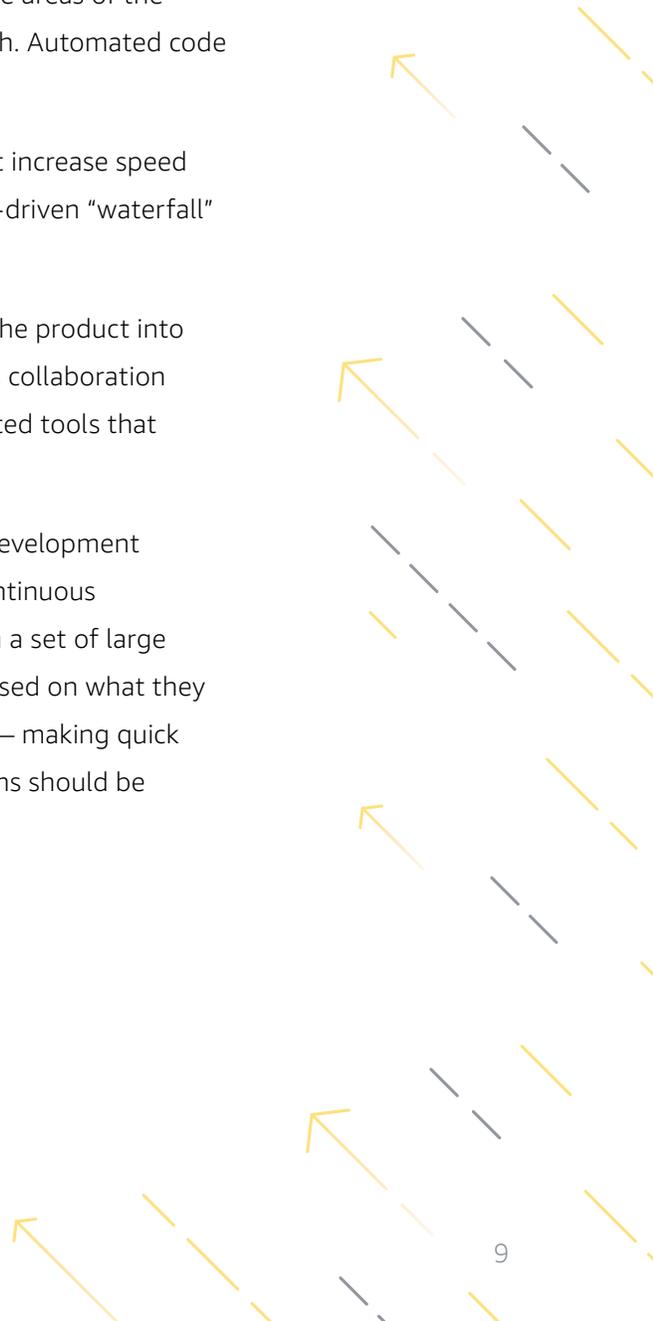
After an application moves to a modern platform, organizations can modernize it to take full advantage of real-time data, easier integration through open APIs and Agile development practices and rapid deployment.

Enterprises may choose to re-architect existing applications to a modern, open source environment or completely rebuild applications for a cloud-native environment. Typically, the deciding factors are the scope and complexity of legacy applications. For example, applications that perform specialized business functions may be suitable for re-architecting, while core applications that integrate with multiple areas of the business may be better candidates for rewriting the code from scratch. Automated code refactoring tools can accelerate this process.

Underpinning any modernization effort are new ways of working that increase speed and drive efficiencies into the process. The traditional big-bang, plan-driven “waterfall” approach for software development is no longer suitable.

Agile teams continuously iterate development and testing, breaking the product into small pieces and integrating them for final testing. DevOps promotes collaboration between development, operations teams and security, using automated tools that quickly deploy code to production.

IT organizations should set reasonable expectations for what these development methods can accomplish and view application modernization as a continuous improvement process, rather than a big-bang transformation or even a set of large projects. Agile teams typically adjust their plans and requirements based on what they have learned from incremental implementation and feedback loops — making quick and flexible adjustments when roadblocks and constraints arise. Teams should be empowered to “get good at getting better.”



Modernizing databases and middleware

Another foundational change involves shifting aging infrastructure, middleware and databases to open source alternatives.

Modernizing databases to an open source, cloud-ready or platform-as-a-service environment is particularly critical, since current trends such as e-commerce, internet of things (IoT) and mobility are driving a huge net increase in the amount of data that needs processing. Enterprises can build smart applications on a data foundation capable of scaling quickly through innovative tools and prebuilt services for analytics, artificial intelligence (AI) and machine learning.

In addition, older databases often contain security vulnerabilities and are primary targets of cyber criminals who rush to exploit them before patches can be installed. Database modernization is a key step in preventing an embarrassing and costly data breach. Enterprises also should continually monitor database access and usage patterns, perform regular audits to identify unused or poorly configured databases with sensitive data, and archive and encrypt stored data.

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Healthcare firm extends real-time patient information

A Japanese healthcare firm relying on an unsupported legacy database for patient information, insurance claims and billing was experiencing major delays and interruptions. The company consolidated and migrated its database to one instance of Microsoft SQL Server running on the AWS Cloud — reducing costs, centralizing access controls and security policies, and extending real-time patient information to doctors and nurses.

Driving business change with cloud-native development and containerization

As cloud-native applications comprise the bulk of new development, older systems will be phased out. Over time, cloud-native development can help cut costs by 30 percent or more, fundamentally changing infrastructure costs, ensuring greater utilization and aligning IT spending with business demands. Externally facing applications that offer fundamentally differentiated services for consumers and partners are prime candidates for cloud-native development.

Cloud-native development helps get the most out of cloud infrastructure. Applications are architected, designed, developed, packaged and managed for the cloud. Standardized and scalable processes residing in a multi-tenant environment provide all the hardware and services needed to prevent service disruption and drive high levels of automation.

Developers can deploy applications faster and cheaper using Agile techniques, DevSecOps, Kubernetes, robotic process automation, low-code/no-code development, APIs and microservices, and containerization.

Containerization, a key method for industrial-style development, breaks down applications into smaller units of code — typically only about 200 megabytes — that developers can spin up in milliseconds. They can develop the application in a container, then package, test and deploy it into production without additional testing.

Container-based applications feature open APIs that can run on AWS, private cloud or platform-as-a-service. A single platform supports development, incident management, patching, monitoring, performance reporting, and backup and recovery.

Moving industry and enterprise apps to SaaS

Telecom firm increases speed 12x with automation

A global telecommunications company struggling to meet demands to launch new mobile business features focused on streamlining application development. The company implemented agile DevOps automation and test-driven development to cut costs by 75 percent per feature and reduce deployment cycles by 12 times.

Cloud-native development can cut costs by 30 percent, ensuring greater utilization and aligning IT spending with business demands.

In many cases, rather than transforming apps, enterprises may replace on-premises industry and enterprise resource planning (ERP) applications such as SAP and Oracle with SaaS running in the cloud.

SaaS gives organizations access to a broader cloud-based ecosystem. For example, a human resources app that moves to the cloud can interconnect with LinkedIn and other social media sites or employ techniques like crowdsourcing in ways that it couldn't before.

SaaS also frees IT organizations from managing specialized hardware and software configurations in a data center. SaaS code can be customized at a rapid pace to drive innovation and major business differentiators.

For many companies, moving to SaaS poses a daunting task of modernizing tightly integrated, monolithic ERP applications with years of customization.

Digital business platform

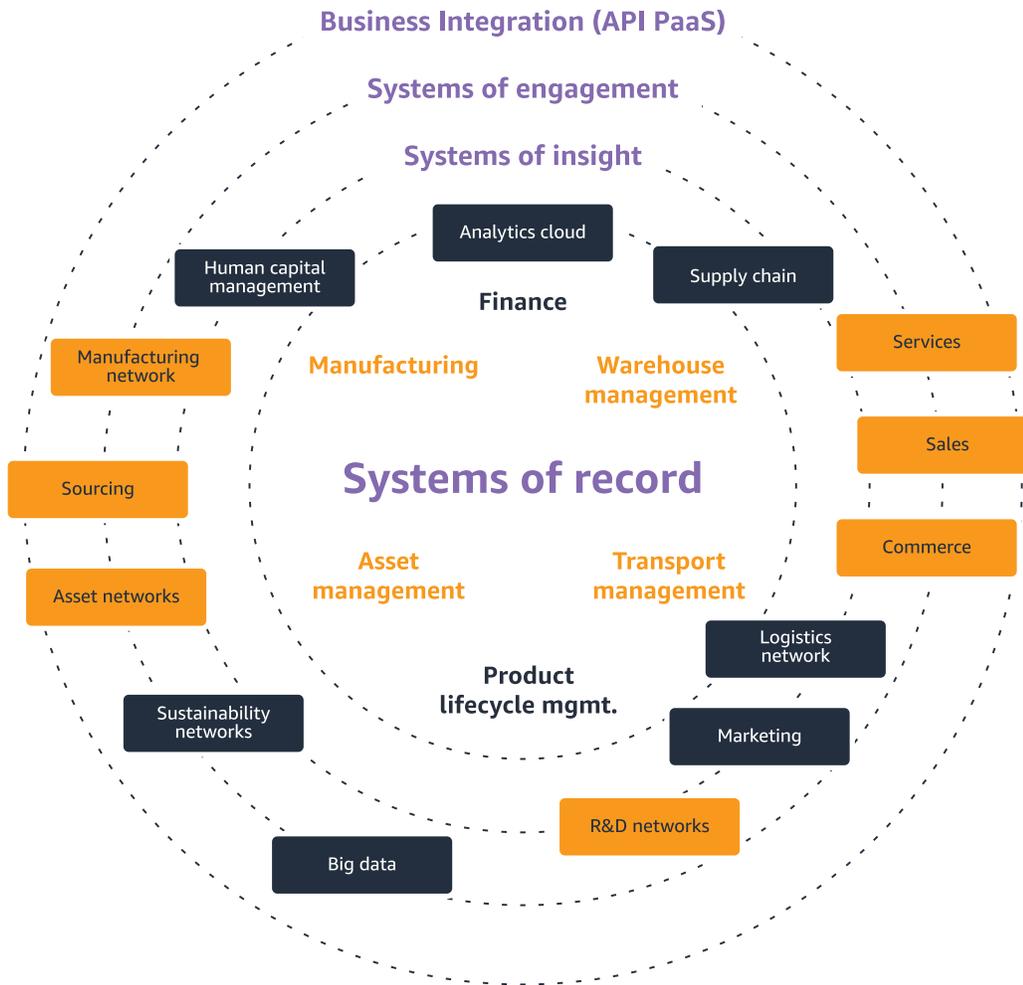


Figure 3: Transforming a monolithic ERP platform to SaaS, focusing on applications at the edges of the enterprise platform

This process is complex, but with the right tools and processes, organizations can create smooth interactions between SaaS and on-premises applications and manage the full application life cycle in a hybrid cloud world. The work begins by deconstructing the application from the edges and moving to SaaS-specific functionality such as marketing, sales and service, human capital management or supply chain planning.

Securing the ecosystem

As enterprises move to the cloud, they need new approaches for securing the ecosystem. Historically, security organizations focused on placing controls on servers, networks and storage, but in today's threat environment, phishing attacks and credential hijacking expose the underlying data to theft and ransomware-based extortion.

While major cloud providers include tools to protect data in their platforms, they don't accept responsibility for data loss. In most cases, in fact, data breaches in the cloud are attributed to misconfiguration or carelessness by users. Therefore, a key part of modernization is identifying and classifying important data assets. Data loss prevention tools and encryption of highly sensitive data help thwart hackers from getting unfettered access.

Critical ways to control access include strong multifactor authentication and end user behavioral analytics tools that can identify potential attackers based on the type of data they're trying to access, the timing and where the request is coming from. For example, a U.S.-based user attempting to access the system from somewhere in Asia in the middle of the night would be flagged as a potential cyberattack.

Installing data encryption and other new controls can be potentially disruptive to older client server, web-based or mainframe applications. Modernization efforts to refactor and re-architect systems present the perfect time to consider new methods and tools for protecting data.

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Conclusion: Next steps toward modernization

Organizations are at different steps along the enterprise modernization journey, but most IT organizations are working to modernize applications and databases, intelligently automate connectivity across hybrid environments and gain deeper business insights from enterprise data.

To reach these goals, organizations need to think in terms of enterprise-wide IT strategy and reimagine tools, processes, skills and culture. Following these steps will help ensure the success of digital initiatives:

- **Assess, plan and design modernization projects at the enterprise level.** The necessary first step toward modernization is aligning business transformation needs with business drivers for change. To aid decision making, adopt a strategy that clearly defines the tools, resources and responsibilities across the enterprise, and creates a long-term plan for modernizing the application portfolio and optimizing hybrid infrastructure. Plus, more reliable cost projections and schedules will help enlist executive buy-in and ongoing support.
- **Adopt an agile approach.** Implement fast and repeatable processes, including DevSecOps, Agile and cloud-native development. Recognize also that processes are constantly evolving as new tools and technologies are introduced, so processes should be well documented and flexible. Standardization tools, from development to workplace collaboration, are key to frictionless app modernization and deployment. Value-stream mapping of application work will increase productivity and prevent backlogs.
- **Promote a culture of innovation.** Create a more collaborative environment with new ways of working across multiple teams. Removing barriers such as time and resource constraints, as well as security weaknesses, empowers teams to look for new ways to support business innovation. Encourage individuals to think outside the box to develop, test and refresh applications at a faster pace.

As organizations gain agility through a comprehensive, enterprise-wide IT modernization strategy, they can increase speed, lower costs and accelerate their path to innovation.

How DXC and AWS can help

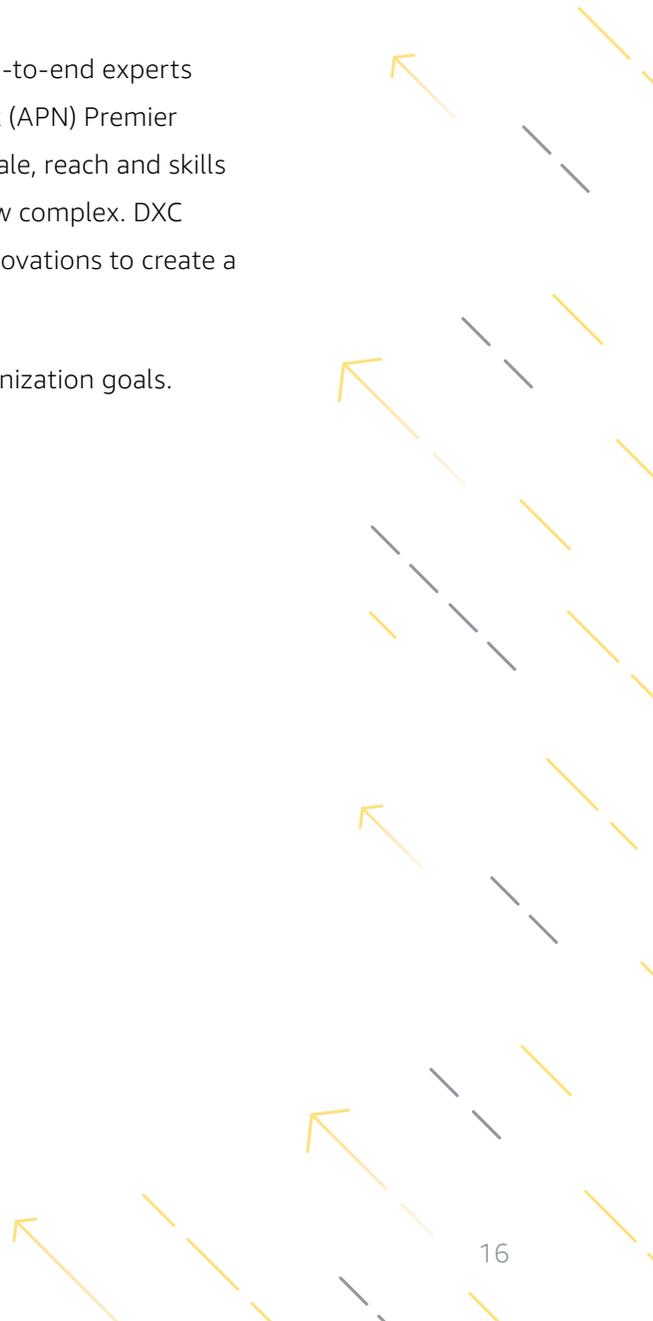
One of the world's leading IT services firms, DXC Technology is a recognized leader in complex, enterprise-scale transformation, with 10,000 DevOps and Agile experts and 1 million applications under management. DXC has helped customers:

- Reduce IT costs by up to 40 percent
- Securely migrate more than 60,000 workloads to the cloud annually
- Improve application release speed 46 times
- Respond to more than 1 million security incidents a month

Choosing DXC and AWS assures customers they are working with end-to-end experts in AWS infrastructure and solutions. With DXC, AWS Partner Network (APN) Premier Consulting Partner, customers have a partner with the credentials, scale, reach and skills to manage their data, workloads and cloud migrations, no matter how complex. DXC ensures that customers can take full advantage of the latest AWS innovations to create a mature cloud environment that meets business goals.

Find out how DXC can support your immediate and long-term modernization goals. Schedule a workshop and develop a roadmap for change.

Learn more at www.dxc.technology/ITmodernization



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About the author

Joe Paulsen is vice president and offering general manager for Migration and Transformation Services at DXC Technology. He is responsible for modernizing applications, migrating applications to public clouds and developing cloud-native applications.



