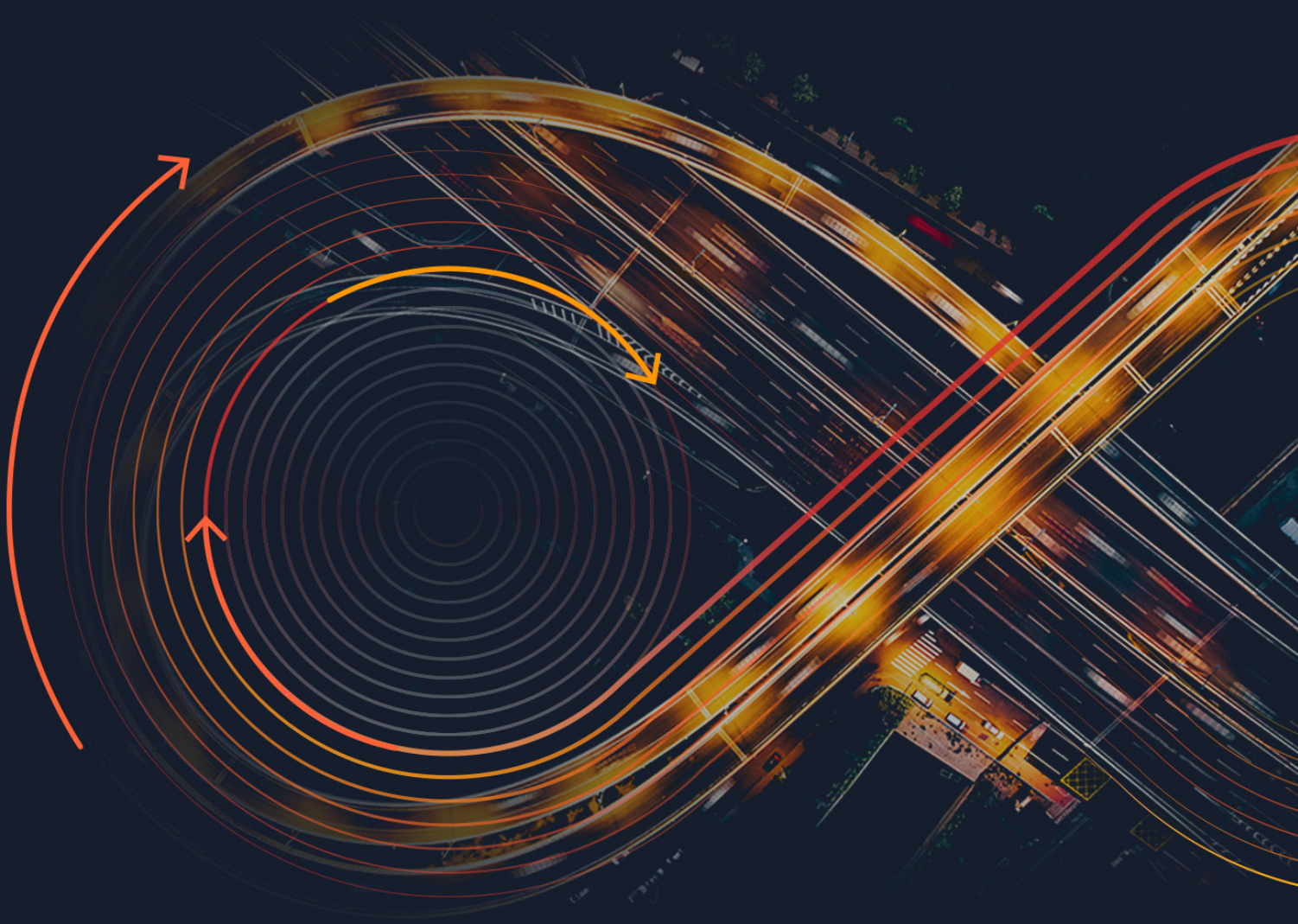
aws modern apps

Accelerating Your AWS Journey:

Migration & Modernization eBook



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How can I drive sustainable transformation?

Whatever the industry, today's organizations want to become more agile so they can innovate and respond to changes faster. However, they also manage a portfolio of applications and workloads that are complex and built over a long period of time.

When you re-evaluate your application portfolio, you have the opportunity to consider the best path for each, considering functional, feature, or business requirements. You may consider which applications to retain, and which to retire. For some applications, you may choose to move to the cloud as-is to gain total cost of ownership (TCO) benefits, and for others, you may want to invest in rewriting the application in a cloud native manner to maximize your agility. We call these decisions The 7 R's (retain, retire, relocate, rehost, repurchase, re-platform, and refactor), and they are all part of your cloud journey toward realizing the benefits offered by AWS. The more you understand the technical make up and customer value of your applications, the better equipped you will be to make sound decisions.

As our customers pursue the reality of migration and operating in a cloud-first development environment, they often tell us that their ability to move fast on the right path is a critical differentiator. Without speed, organizations begin to lose momentum and executive buy-in wanes. When results are realized too slowly (or aren't properly quantified and communicated), the business case weakens—potentially jeopardizing the project's financing and support. For many organizations, moving to the cloud quickly is the best first step.

Specifically, migrating with AWS leads to average cost savings of 31 percent, with substantial benefits extending into other metrics as well. Migrating applications to AWS results in an average of seven times fewer downtime hours, a 62 percent boost in IT staff productivity, and three times more features delivered by IT per year.[1]

Further, AWS customers we've identified as "high performers" (with respect to transformation and modernization) are greatly outpacing the status quo. These organizations establish 46x more releases, 440x faster lead time, 170x faster mean time to release (MTTR), 90 percent more automation, and a five times lower failure rate.

By re-evaluating your application portfolio—and considering whether migration or modernization is the best approach for each application—your organization can improve agility and increase innovation. Approaching modernization in a unified, holistic way can reduce costs and help you build and maintain the momentum you need to sustain long-term transformation.

"Migrating our network to AWS and modernizing our applications that process over $1.5 trillion in healthcare claims has let us transform the scalability of our service delivered to the nation's hospitals and health plans. We improved our development velocity and reliability using native AWS capabilities."

– Neil de Crescenzo, President & CEO, Change Healthcare

1 *https://pages.awscloud.com/rs/112-TZM-766/images/AWS-BV%20IDC%202018.pdf?alild=1614258770*

Why are migration and modernization important to IT professionals today?

Today's IT professionals are generally tasked to achieve three critical objectives. First, they must respond to customer demands. This requires fast, dynamic scalability—the ability to quickly and reliably scale up to meet the needs of millions of customers and back down when demand subsides, again and again, all without wasting budget.

Next, competitive pressures are charging today's IT professionals with the often-contradictory goals of succeeding in an increasingly crowded marketplace while also reducing costs.

Finally, IT professionals must continuously win new customers, delighting them with applications that meet their needs in exciting ways.

Today's CIOs must pivot to different directional priorities at a moment's notice—while also pursuing all of them simultaneously.

IT professionals are meeting these challenges through application modernization and transformation of their infrastructure. They're pivoting to new business models, developing unique and engaging customer experiences, enabling remote working and remote learning for staff, optimizing processes for greater agility, more frequent application development, and cost reduction.

Cloud migration is often an essential component of these strategies. The cloud enables faster and more frequent application releases, cost reduction through greater management efficiency and data center consolidation, and the freedom to direct more resources toward innovation by outsourcing administrative tasks.

In recent conversations we've had with leading technology decision-makers, we've found that organizations are discovering greater success by rethinking their application portfolios and the role of migration in modernization strategies. By viewing migration as an enabler and accelerator of modernization instead of a separate initiative, these leaders are achieving faster, more efficient, sustainable results across all of their key imperatives.

Migration and modernization

These terms can have many different meanings, depending on their contexts. But, for simplicity and clarity, here's how we'll be using these words within the pages of this eBook:

Migration – Moving infrastructure and applications to a cloud provider without making any changes to the architecture. Often called rehosting or "lift and shift," this can be the fastest way to start realizing benefits from the cloud.

Modernization – The adoption of cloud native technologies (like AWS Lambda and containers) to reduce operational burdens and maximize cloud value. This is generally achieved via re-platforming to managed cloud services or refactoring (also called rearchitecting) applications.

Why should I modernize my application portfolio?

Modern applications increase agility by lowering the time required to build, deploy, and maintain applications that can automatically scale to the needs of the workload. Using the AWS serverless platform, Siemens decreased customer control system alerts by 90 percent and reduced infrastructure costs by 85 percent.[2]

Modern applications also reduce total cost of ownership (TCO) by improving operational efficiency and resource utilization. According to IDC, building modern applications reduces TCO by 60 percent over a five-year period, with an average break-even period of nine months.[3]

From conversations we're having with organizations all around the world, we're learning that it's now more important than ever for modernization efforts to be accompanied by cost optimization. But you don't have to compromise on cost when you modernize—modernizing your applications can reduce your costs and also enable you to innovate rapidly.

"With the AWS Cloud, we knew we would get a reduction in our operational costs, but the real value we've gained has been business innovation beyond IT. When you can dissolve the barrier that often exists between your IT organization and the business, that's when magic really starts to happen."

– Claire Dickson, CIO, BP Downstream segment

2 *https://aws.amazon.com/solutions/case-studies/siemens-ic/*
3 *https://pages.awscloud.com/Gated_IDC_Generating_Value_Through_IT_Agility.html?trk=ar_card*

How should I rethink my application portfolio?

All IT professionals are portfolio managers. An application portfolio can be built up over years, if not decades. As cloud economics offer a disruptive opportunity to change, few if any organizations have a large enough IT staff to modernize their entire portfolios at once.

Every business' approach to technology modernization will be somewhat different, just as every organization has its own unique challenges and technology landscape. Success will hinge on a complex web of intersecting and divergent elements. However, with over 13 years of experience helping companies adopt the cloud, we have identified some commonalities and patterns that can significantly help the transformation of your IT posture.

For your larger strategy to be successful, you'll need to reduce the size of your application portfolio by cutting it down to a size that your team can effectively migrate and modernize without overstraining its resources. This is primarily achieved through two methods: ***replacement*** and ***retirement***.

For some applications, the best approach is to replace them with new offerings across SaaS, serverless architecture, and/or containers. We've learned from our customers that most businesses discard 20–30% of their application portfolios in favor of replacement sets from SaaS vendors. Often times customers rely on AWS Marketplace to enable their SaaS strategy.

As you review your application portfolio, you'll find that other applications simply need to be retired. Perhaps their capabilities have become outmoded or redundant, or you discover that maintaining them requires undue financial resources and/or time and manpower commitments. Whatever the case, retiring these applications further lightens the migration/modernization load, leading to faster results that help satisfy stakeholders and strengthen executive buy-in.

Make a plan for your application portfolio

Focus on your differentiators

Retire

SaaS

Reduce
the size of the estate through a mix of application retirement and SaaS replacement.

Rehost

Move
the bulk of the remaining application portfolio working with a single cloud provider as quickly as possible.

Re-Platform

+

ReFactor

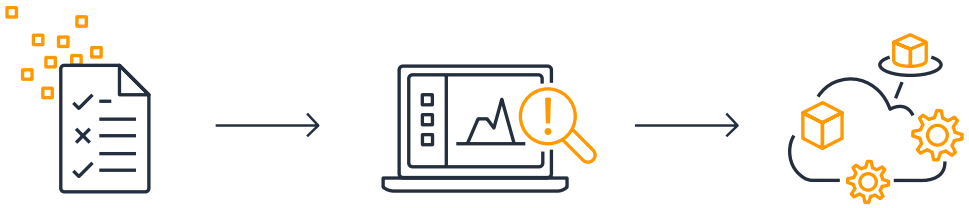
Transform
the migrated applications, where developers and engineers can take advantage of the new cloud environment.

AWS Marketplace

AWS Marketplace enables you to utilize current ISVs when migrating to the cloud and shift from in-perpetuity licensing to subscription-based, elastic metering and billing. We see customers increasingly embrace serverless models and container-based deployment—both of which contribute to substantially lower compute costs.

What are my options as I adopt the cloud?

Organizations that ***migrate*** a substantial part of their application portfolio early in their journey and combine those efforts with modernization initiatives generally drive the fastest results. Migration is often the first step in successful modernization. While every customer's migration journey is unique, we have often seen a standardized process take shape. This process can generally be broken into three phases of activities:



Assess
your on-premises resources

Mobilize
to address gaps uncovered in assessment

Migrate & Modernize
your application portfolio

In order to build an effective migration and modernization plan, you need to ensure that you have a comprehensive strategy that identifies the best pattern(s) for your application portfolio so you can achieve results faster.

The 7 R's: common use cases and deployment

When you deeply understand your application portfolio and the goals of your business, you're well equipped to choose the next path for each application. Using The 7 R's, you can categorize what is in your environment, what the interdependencies are, and the technical complexities of migration. From there, you can begin to create a plan on how you'll migrate each application or set of applications.

Rehost *also known as "lift-and-shift"*	**Refactor** *also known as rearchitect*
Quickly moving applications to the cloud without changing them.	Changing the way applications are architected and developed, usually by employing cloud-native features.
Re-platform *sometimes referred to as "lift-tinker-and-shift"*	**Repurchase** *casually known as "drop and shop"*
Making a few optimizations to applications—but without changing their core architecture, like moving from self-managed Kubernetes to Amazon EKS.	Replacing your current environment by moving to a newer version of software or purchasing an entirely new solution.
Relocate	**Retire**
Using VMware Cloud on AWS to quickly relocate up to hundreds of applications virtualized on vSphere to the AWS Cloud in days and without changing them.	Identifying assets that are no longer useful and turning them off, strengthening your business case by focusing on more widely used resources.
Retain	
Leaving the application on-premises—for now, at least.	

AWS Outposts

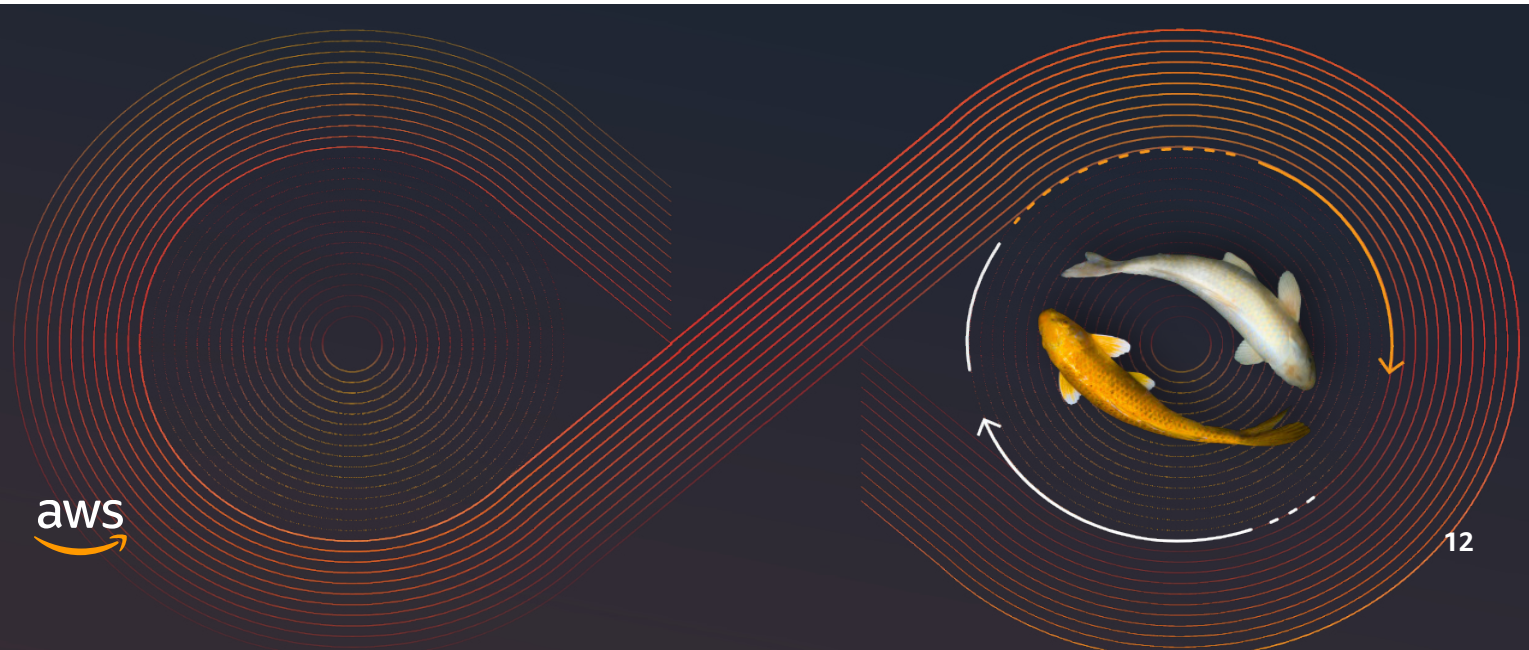
Even for applications you choose to keep on-premises, you can still realize the benefits of AWS services and innovations by "migrating & modernizing in place" with AWS Outposts. This service enables you to use the same AWS infrastructure, services, and tools both on premises and in the AWS Cloud for a truly consistent hybrid environment as you migrate and modernize your applications.

How do I modernize effectively and efficiently?

When we talk about ***modernizing the application portfolio***, we're primarily referring to two specific patterns in The 7 R's: refactor and re-platform. Let's explore each of these patterns again, including real-world success stories to help illustrate what refactoring and re-platforming your application portfolio may look like.

Refactor: Refactoring means rearchitecting an application into a more modular design, commonly referred to as microservices or modular architecture. The process of refactoring can offer high rewards—adopting modular architectures with serverless technologies improves agility by lowering time and resources necessary to build, deploy, scale, and maintain applications. It also reduces total cost of ownership (TCO) by improving operational efficiency and resource utilization.

With modular services, there are more moving parts to manage, which is why we recommend adopting serverless technologies as much as possible (a serverless-first strategy) to eliminate operational overhead. Practically, most customers approach refactoring by automating software delivery, wrapping the applications with APIs, and/or decoupling application components. New applications can be built from the ground up with this modular design and technologies to achieve these benefits from the start.



Business-critical applications are prime candidates for refactoring. For example, data warehouses connect organizations to their customers, mobile applications generate new revenue and competitive differentiation for the organization, and back-end services power the organization by driving efficiency. When your applications in their current form are not fast enough, not scalable, have poor resource utilization, or require a lot of cost and operational overhead to maintain, refactoring is often the best path forward.

Refactoring to microservices also lends itself to the creation of small, independent teams that take ownership of each service. This organizational change fosters an environment of innovation for your development teams, giving them the authority to make changes with a lower risk to the organization as a whole.

Urbanbase used AWS services to create a new microservices architecture, resulting in:

20x
faster services launch

100x
accelerated deployment

Reduced
deep learning costs

"If we'd built infrastructures in a traditional way, it would have taken more than 20 times longer than using Amazon SageMaker in a serverless environment..."

– Bang HyunWoo, CTO, Urbanbase

Re-platform: Re-platforming involves moving from services you manage yourself to fully managed cloud services—but without changing the core architecture of your applications. You'll typically choose this option for applications you feel need to be reshaped to match your overall cloud strategy or to better take advantage of the native capabilities of your cloud provider. Your cloud provider should be able to provide assistance throughout this process.

Specifically, AWS offers managed services that enable you to reduce your operational overhead without rewriting all your code. For example, if you're managing a messaging broker today, you can easily replace it with the fully managed Amazon MQ service without rewriting or paying for third-party software licenses. Or, if you're migrating a Windows-based application that requires file storage, you can use the fully managed Amazon FSx for Windows File Server. To reduce the amount of time you spend managing Kubernetes clusters, you can move to a managed Kubernetes service like Amazon EKS.

When you're ready to move existing applications straight to containers, you can streamline the process through AWS App2Container (A2C). A2C is a command-line tool for modernizing .NET and Java applications into containerized applications. It analyzes and builds an inventory of all applications running in virtual machines, on-premises, or in the cloud and packages the application artifact and identified dependencies into containers.

Babylon Health accelerated its mission to provide affordable healthcare, using AWS services to:

- Develop applications using fast microservices architecture
- Create and deploy 300+ containerized applications
- Build machine learning infrastructure on Amazon EKS with Kubeflow

"We now have unprecedented high availability across the globe, while reducing the average time to bring a change to the stack from four weeks to a matter of hours."

– Jean-Marie Ferdegue, Director, Platform Engineering, Babylon Health

Why should I choose AWS to help me with migration and modernization?

With over a million active customers and a global cloud presence since 2006, AWS has the most experience helping organizations of all ages, industries, and geographies benefit from the cloud.

Our software, services, support, and partner ecosystem can help you optimize results and provide you with prescriptive guidance throughout every phase of your journey. As you resize your application portfolio, migrate to the cloud, and modernize your applications and infrastructure, AWS will help you meet your goals, upskill your teams, and accelerate positive business outcomes every step of the way.

Following the guidance in this eBook will enable you to maximize the benefits of the cloud with urgency, purpose, and foresight. The end result: business transformation that helps you free up IT resources for projects and tasks that add real value, reach milestones and benchmarks faster, and create an ever-stronger migration/modernization business case that reinforces the buy-in, enthusiasm, and commitment of everyone at your organization.

Additional resources

MODERN APPLICATIONS OVERVIEW
Modern Applications eBook

MODERNIZATION ASSESSMENT
Modern Applications Fluency Assessment

EXECUTIVE SUPPORT
AWS Executive Insights

RE-SKILLING STAFF
AWS Migration Training

BUILDING AND OPERATING SOFTWARE
The Amazon Builders' Library

ELEMENTS OF MODERN APPLICATIONS
Modern Apps at AWS

CLOUD TRANSFORMATION PRINCIPLES
What are Your Cloud Transformation Principles?

SECURITY
Serverless Security at AWS

CLOUD CENTER OF EXCELLENCE (CCOE)
A Leader's Guide to Cloud Transformation

REHOST OR REFACTOR?
The Great Cloud Refactoring Debate

AVOIDING DIGITAL TRANSFORMATION PITFALLS
Effective Patterns for Enterprise IT

AWS ENTERPRISE STRATEGY BLOG
Enhance and accelerate your transformation journey with leadership perspectives from AWS and other large enterprises

GET STARTED ON YOUR MIGRATION JOURNEY
AWS Migration Acceleratoin Program (MAP)