

5 Steps for a Cost-efficient Migration to AWS Cloud



Getting ready to migrate to the Amazon Web Services (AWS) Cloud?

If you're looking to modernize your applications or get out of the datacenter, migration to AWS can improve agility, performance, and cost efficiency.

However, many companies struggle to develop the right staff, tools, and processes to migrate quickly and cost-efficiently. In this eBook, we'll share a well-tested methodology for migrating to AWS and how to confront unexpected challenges that can cause major delays or inefficiencies.

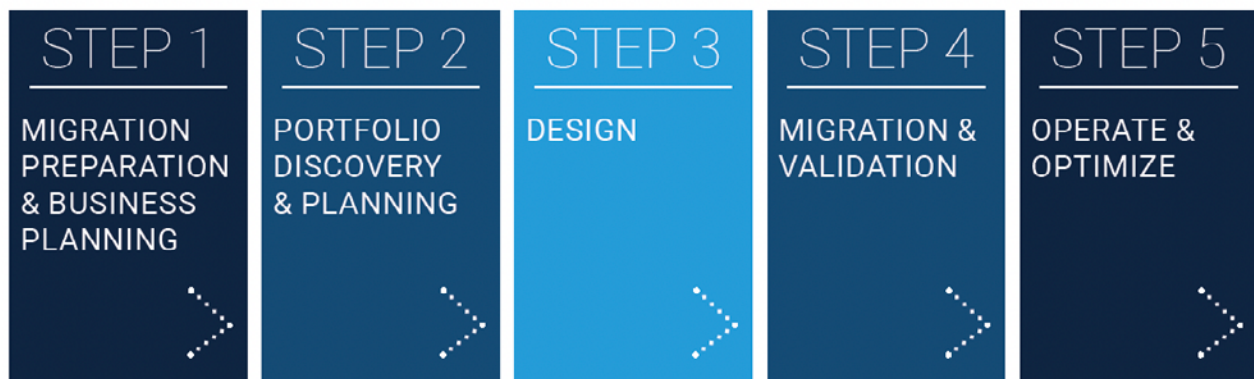
You should walk away with a clear idea of how to plan and execute your next AWS migration project.

The Migration Process

The process of migrating existing applications to AWS is complex and often involves stakeholders from every part of an organization. Therefore, it's important to spend time upfront to acknowledge that cloud migration is not just an IT project – it affects many different groups, and often requires a close collaboration between finance, compliance, product, systems, and other teams.

If you are preparing for migration, start by understanding the standard AWS migration process.

AWS divides the process into the following five phases:



Each cloud migration project is unique. But the success of any migration depends on understanding your organization's current and target state, and the steps required to get to the target state. Armed with this information, you can set the right goals and help your team succeed in the cloud.

Step 1: Migration Preparation and Business Planning

The first step in any migration project is to bring together key stakeholders to discuss and finalize your goals for moving to the cloud.

After helping thousands of organizations move to AWS, the AWS team created the [The AWS Cloud Adoption Framework \(AWS CAF\)](#) to provide guidance for each unit in your organization. According to AWS, the CAF helps each business unit understand how to update skills, adapt existing processes, and introduce new processes to take maximum advantage of the services provided by cloud computing. The AWS CAF is organized into six focus areas to help organize your efforts:

AWS CAF Six Focus Areas

 BUSINESS	 PLATFORM
 PEOPLE	 SECURITY
 GOVERNANCE	 OPERATIONS

Source: AWS

By breaking down the process into focus areas, each business unit can better plan for the impact of cloud adoption.

The AWS CAF is usually delivered in the format of a live, in-person workshop, facilitated by an approved AWS CAF workshop partner like [RapidScale](#).

The ultimate goal of the AWS Cloud Adoption Framework is to unify stakeholders and create an action plan designed to move your team from cloud goals to cloud implementation.

Sample AWS CAF Workshop Agenda

IDENTIFY & CLASSIFY CHALLENGES					
ACTION 1 IDENTIFY CHALLENGES		ACTION 2 GROUP BY STAKEHOLDER		ACTION 3 IDENTIFY THEMES	
DETERMINE ACTIONS & BUILD CONSENSUS				BEGIN YOUR CLOUD JOURNEY	ACTION 8 FINALIZE NEXT STEPS
ACTION 4 CLASSIFY CHALLENGES		ACTION 5 CREATE ACTIONS			
		ACTION 6 ASSIGN PRIORITIES		ACTION 7 DETERMINE NEXT STEPS	

Step 2: Portfolio Discovery and Planning

When tackling a project of significant magnitude, the most challenging part is deciding where to get started. If you already have a project in mind for migration, this step is relatively simple; but if your infrastructure is spread across multiple data centers or multiple teams, without a unified set of metrics for assessing applications, it can be very difficult to identify the set of applications that are best suited for the first wave of migration.

Selecting the right applications for migration is both art and science. A combination of the right data and the right expertise can help you make it through this phase.

Understand & Document Your Current Infrastructure

In order to identify the right applications for migration, you must have a common method for analyzing, documenting, and evaluating your current infrastructure.

This is where using an architecture assessment solution like AWS Migration Evaluator or CloudEndure can help collect and analyze infrastructure performance, usage, and configuration from on-premises or virtualized servers. It funnels that data into a single dashboard, and can even make recommendations for the cost of running that application on the public cloud.

Using a SaaS tool is far more efficient than asking individual data center teams to inventory application infrastructure, which can take many days or even weeks.

Data collected from various teams may be in a different format, making comparisons difficult. A unified, SaaS based assessment process helps business decision makers compare apples-to-apples in order to make the right migration decisions.

Determine Which Applications to Include in First Wave of Migration

Once you have collected data on your current systems, it is time to determine the best applications for migration.

There are many criteria to determine pilot applications; hopefully, in Step 1, you have identified your business' priorities, and can decide whether you are simply looking for the applications with the greatest cost savings on public cloud, or the applications whose developers require greater agility.

If you haven't migrated to AWS yet, the best approach is to begin migrating the workloads with the fewest dependencies. This allows you to ramp up slowly, building expertise and confidence before tackling the more complex workloads. Another approach is to start with the workloads that have the most over-provisioned, or idle resources. [Industry research](#) suggests that as many as 30% of on-premises servers, both physical and virtual servers, are zombies (showing no signs of useful compute activity for 6 months or more). On top of that, more than 35% of servers showed activity less than 5% of the time. As long as you rightsize your cloud deployment on AWS, these workloads will see the greatest price/performance improvements once migrated.

• • • • • LOW-HANGING FRUIT WORKLOADS

- Fewest discrepancies
- Over-provisioned servers
- Applications on servers with washed capacity

• • • • • MORE CHALLENGING WORKLOADS

- Large, "temperamental" legacy applications
- Applications that require low-latency connectivity to local fire systems
- Purpose-built appliances like Oracle Exadata and IBM DataPower

Choose a Migration Strategy

Once you've determined your end state and which workloads you will begin with, you must decide on a migration strategy. You may have multiple different strategies depending on the workload, application, and business unit, but organizations typically pick one of the following options:

1. **Lift and shift.** This approach allows you to keep the application mostly as is, and make any necessary adjustments to run on AWS. This is one of the fastest approaches, and there are many migration tools that can assist with the process.
2. **Partial refactor.** Some aspects of your applications can remain as is, but other parts may need to be rebuilt to operate properly on AWS. A partial refactor may also leave the existing application as is, and build additional supporting services on top of it.
3. **Full refactor.** A full rebuild of your application is the most time-consuming approach, but it also represents the greatest opportunity to take advantage of the elasticity and availability of the AWS Cloud. This could also be a good opportunity to break an application down into microservices, or build out a container-based architecture.
4. **Transition to SaaS or PaaS.** If the workload you are migrating is a commodity application (e.g., email, CRM), or has commodity components (e.g., a relational database), you can incorporate a SaaS or PaaS into the mix. This will help accelerate migration plans, as well as reduce management overhead.

A lift and shift strategy is the simplest and fastest approach, and is the most common method for companies that are migrating their first applications to AWS. However, be aware that you may not see significant cost savings on AWS if you use this method, as you may not be able to use some of the cost saving services of AWS, like horizontal scaling, managed databases, and more.

Decide on the Right Team to Architect, Build, Migrate, and Manage your Cloud

A mistake many teams make is to assume that AWS is "easy". While it is true that you can spin up a new AWS instance in minutes, architecting and managing a growing AWS environment requires the same level of expertise as someone managing any complex system. Your team can choose either to train your existing team in AWS, outsource work to an external team, or to partner with a company like [RapidScale](https://www.rapid-scale.com) that will build, migrate, and manage your cloud alongside your in-house team.

Many companies hire a partner to go through the first phases of migration alongside their team. This allows the internal team to get some experience on AWS, while having the support of an expert AWS team to reduce risks and help you avoid common mistakes.

Step 3: Design

The last question to consider is tactical, but complex: what will your infrastructure look like on AWS? Which instance types should you use, and in which configurations? Which Reserved Instances should you purchase to maximize your investments?

The ultimate goal of the design phase is to deliver a target reference architecture that is approved by all stakeholders identified in Step 1. This process usually involves the following steps:

- Look at historical performance data across CPU, memory, network, and disk for servers, and across throughput, capacity, and IO for storage.
- Decide how much "headroom" you want to give each asset (typically 25%), and then look at the actual minimum, maximum, and average usage across these metrics to determine which instance type makes the most sense on AWS. A virtual machine is considered undersized when the amount of CPU demand peaks above 70% for more than 1% of any 1 hour. On the other hand, a virtual machine is considered oversized when the amount of CPU demand is below 30% for more than 1% of the time during a 7-day period. Looking at 30 days of history is sufficient, because it is easy to scale up resources on the cloud if you need to. When going through this process, it's critical to normalize for different generations of physical infrastructure.
- Design a strawman AWS architecture, both in the form of an architecture diagram and a list of proposed services including EC2 instances, EBS volumes, VPCs, etc. and associated costs.
- Share with key stakeholders identified in Step 1. If you involve security and compliance teams in the design stage, you will be much more likely to meet your project deadlines than if you involve them after the infrastructure is built out.

Step 4: Migration and Validation

The next step is purely technical: your team must build the approved AWS architecture and migrate applications and data to the target architecture.

Ideally, the process follows this pattern:

- Cloud engineers build the approved architecture in AWS CloudFormation or Terraform, an architecture templating tool that allows you to "build" once and spin out future environments instantly
- An AWS provided machine image (AMI) is used, and further configured for each application using an automated configuration management tool like Puppet, Chef or AWS Systems Manager

- Cloud engineers build the approved architecture in an infrastructure-as-code tool that allows you to “build” once and spin out future environments instantly
- An AWS provided machine image (AMI) is used, and further configured for each application using an automated configuration management tool like Puppet or Chef or AWS Systems Manager
- Your IaC templates should be kept in a code repository and versioned and updated
- Applications and data are migrated to AWS, either over the internet (which takes quite a bit of time), or through an AWS migration service, like those listed below
- Cloud engineers begin testing process, whereby infrastructure is torn down/rebuilt with infrastructure-as-code and/or configuration management

Many teams make the mistake of building AWS resources manually using the CLI or console. While this may be a quick, short-term solution, it makes the build-out of future test/dev environments complicated, and causes long-term management issues, which we'll highlight below.

When you automate infrastructure build-out from Day 1, you enable your team to build consistent, documented, easily-updated AWS environments. It is well worth your time to learn AWS CloudFormation or Terraform. All mature AWS users build and maintain AWS resources with a templating tool like AWS CloudFormation (there are other open source products available as well).

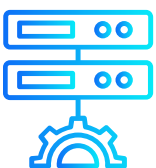
After you build your target environment, it is time to move your applications and data. AWS has nearly a dozen services to help you migrate to AWS. Here are just a few examples:



AWS Database Migration Service (DMS) helps you migrate databases to AWS easily and securely. The source database remains fully operational during the migration, minimizing downtime to applications that rely on the database. The [AWS Database Migration Service](#) can migrate your data to and from most widely used commercial and open-source databases.



AWS Server Migration Service (SMS) is an agentless service which makes it easier and faster for you to migrate thousands of on-premises workloads to AWS. [AWS SMS](#) allows you to automate, schedule, and track incremental replications of live server volumes, making it easier for you to coordinate large-scale server migrations.



AWS Snowball is a petabyte-scale data transport solution that uses secure appliances to transfer large amounts of data into and out of AWS. Using [Snowball](#) addresses common challenges with large-scale data transfers including high network costs, long transfer times, and security concerns.

There are also hundreds of 3rd party services and AWS Technology Partners that can help you migrate. One thing to be aware of is that during the migration process, there is a period of time where both your current and your AWS infrastructure will be up and running. This is usually a period of higher costs. You should anticipate and budget for this period. The planning that you've done in Steps 1–3 will help minimize the length and impact of this "double" infrastructure period.

Step 5: Operate and Optimize

While many of the key elements of a cost efficient migration are determined during the migration process, the key to long-term success on the AWS platform is ongoing optimization.

By necessity, you will have some inefficiencies during the migration stage. As environments are tested and instances are changed to meet the demands of the application, there will be some unexpected costs. After migration, you will have time to examine those inefficiencies and continually improve your infrastructure.

24/7/365 Ticket Support

During the Business Planning phase, you should have identified the key teams that will manage the AWS environment(s) on an ongoing basis. If you are managing internally, use the time after migration and before go-live to determine SLAs, establish roles and responsibilities, and prepare procedures for common tasks, such as instance rebooting, access management, etc.

Relying on an external Managed Services Provider, like [RapidScale](#), can help reduce the burden of around-the clock management on internal teams.

Cost Tracking and Analysis

One of the greatest benefits of using AWS cloud is that you can get real-time billing information and notifications of unusual or unexpected spending. But in order to filter that information and turn data points into actionable information, use a cost analysis and cloud governance platform. Your cost tracking and analysis dashboard should be your "single pane of glass" over both on-premises and cloud-based environments. Ideally, it should also be as accessible as possible by your cloud engineering team, who should be held accountable for maintaining their project budgets.

Your team should schedule regular internal reviews or reviews with your Managed Services Provider related to the cost of the environment. AWS is continually adding new products and services, and these can impact the cost of an environment without the proper guardrails in place. For example, a new instance type that better fits your application may mean you can downsize and save.

Well-Architected Framework Reviews

AWS recommends that every team conduct a Well-Architected Framework review every six months. The Well-Architected Framework is a structured approach for evaluating cloud environments based on these five Pillars:

- Security
- Reliability
- Performance efficiency
- Cost optimization
- Operational excellence

Regular, formal assessments allow you to have a consistent approach for continuous improvement of your infrastructure, and a common standard of excellence across all teams and AWS accounts. Whether you perform these internally or with the help of an approved Well-Architected Framework Review Partner, like [RapidScale](#), these reviews will help lower the ongoing risk of operations, improve cost-efficiency, and expose areas of potential weakness in your architecture.

While a formal review takes place every six months, ideally your team would be constantly measuring your environment against the best practices outlined in the Well-Architected Framework. A SaaS-based governance solution can provide the data and recommendations to keep your team in line with best practices all year long.

Summary

If you're ready to take the next steps in planning your migration, find out how RapidScale can help simplify the process of migrating assets from your data center to the AWS cloud. RapidScale's Migration Services enable you to efficiently assess and model workloads for migration and then manage and optimize your infrastructure for cost, usage, performance, and security once they are running on the cloud. This helps reduce complexity and move faster in your migration process. Learn more about how RapidScale can help you plan, build, and manage your cloud environment by visiting rapidscale.com.

About RapidScale

RapidScale, the leader in compliant cloud solutions, provides end-to-end cloud strategy, RapidScale helps customers migrate, run, and operate mission-critical workloads on AWS with security, scalability, and efficiency baked in. RapidScale's Cloud Reliability Platform combines world-class engineering talent, policy-as-code, and integrated tooling to enable customers to confidently meet compliance regulations, security requirements, cost control, and high availability. Together with our team of dedicated certified engineers and decades of IT management experience, we ensure our customers' success across every stage of the Cloud Adoption Framework and governance.



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- L1 MSSP Services Competency
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