AWS Cloud Migration Readiness Guide

The AWS Professional Services Methodology for Migration Readiness and Cloud Adoption

July 2018

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Overview

Adopting cloud services provides many benefits, such as increased business agility, improved flexibility, and reduced costs. As an organization's cloud journey evolves from building and running programs that are designed specifically for a cloud computing architecture to mapping out the migration of their entire IT operations to the cloud, unique migration challenges surface. In addition to real and perceived security barriers and long migration timelines, the lack of broad stakeholder buy-in and the absence of a clearly defined strategy often prevent organizations from taking advantage of widespread cloud adoption. Large-scale migrations require upfront business planning and a degree of business transformation before delivering the full value of operating in the cloud.

The AWS Professional Services migration methodology is a culmination of our experiences helping thousands of organizations with their cloud migrations. From these experiences, we developed a set of methods and best practices to enable a cost-effective and operationally efficient move to the AWS Cloud.

This guide walks you through what it means to be ready to migrate and how to establish a foundation to save time and prevent roadblocks. We discuss the importance of driving organizational change and establishing foundational readiness planning, and present our iterative AWS ProServe approach to migration. We also demonstrate the value of supplementing your team and provide you with resources to enhance your organization's skills to help maximize results.

Introduction

There are many reasons why public sector customers are migrating to the cloud. Some are migrating to the cloud to increase the productivity of their workforce. Others are looking to consolidate data centers, minimize costly infrastructure sprawl, and modernize legacy applications that lost value over time. Additionally, visionary organizations are re-imagining their missions by upgrading to cloud-hosted technologies that drive digital transformation.

This modernization process reveals cost reduction opportunities and facilitates growth opportunities. The demand for cloud IT is driven by mandates to lower IT costs, gain greater availability of secure cloud solutions, and gain faster data

insights. Cloud helps organizations to empower accurate decision-making, protect from data loss, and focus on better serving citizens.

Business Drivers

Each organization will have its own reasons for moving to the cloud, however, we observe common migration drivers across public sector customers:

Cost Avoidance

Eliminating the need for hardware refresh programs and constant maintenance programs are key contributors to cost avoidance. We find that customers are looking to mitigate and/or eliminate the cost and effort required to execute a big refresh cycle or data center renewal.

Reduced Operational Costs

In addition to eliminating capital expenditures, cloud deployments also help reduce operational costs by automating tactical activities. According to the Federal CIO Survey[2], Federal CIOs indicated they spend 73% of their budget on operations and maintenance versus activities focused on innovation. Cloud deployments help minimize the amount of time and money spent on lesser value added deliverables, and allows IT resources to shift onto projects that drive the organization forward, such as implementing new technologies or improving the analysis of data.

Increased Workforce Productivity

Cloud adoption drives workforce productivity in multiple ways. End users no longer have to wait for IT infrastructure to be ready, as hardware is no longer purchased, provisioned, and patched through lengthy procurement processes. IT buyers and users have access to the entire AWS cloud portfolio on-demand, without building data centers or maintaining hardware. It is common for us to see workforce productivity improvements of 30-50% following a large migration.

Improved Operational Resilience

By supporting disaster recovery and resiliency plans in the cloud, an organization can immediately reduce its risk profile and risk mitigation costs. AWS cloud computing resources are hosted in multiple locations worldwide. These locations are composed of AWS Regions and Availability Zones. Each AWS Region is a separate geographic area. Each AWS Region has multiple, isolated locations known as Availability Zones. As an example, Amazon Relational Database Service (RDS)

provides you the ability to place resources, such as instances, and data in multiple locations. Resources aren't replicated across AWS Regions unless you do so specifically. AWS has the global footprint to improve uptime, thereby reducing your risk-related costs. The AWS Cloud spans 55 Availability Zones within 18 geographic Regions and one Local Region around the world, with announced plans for 12 more Availability Zones and four more Regions in Bahrain, Hong Kong SAR, Sweden, and a second AWS GovCloud (US) Region.

In addition, the AWS GovCloud (US) Region allows U.S. government agencies and their partners at the federal, state, and local levels to run sensitive and regulated IT workloads in the cloud by addressing their specific compliance requirements, such as FedRAMP High, Department of Defense Impact Levels, and Criminal Justice Information (CJI) designations, among others.

Business Agility

Migrating to the AWS Cloud helps increase your overall operational agility, letting you respond to market conditions more quickly through activities such as instant access to infrastructure and data insights. This empowers organizations to make business decisions in real time.

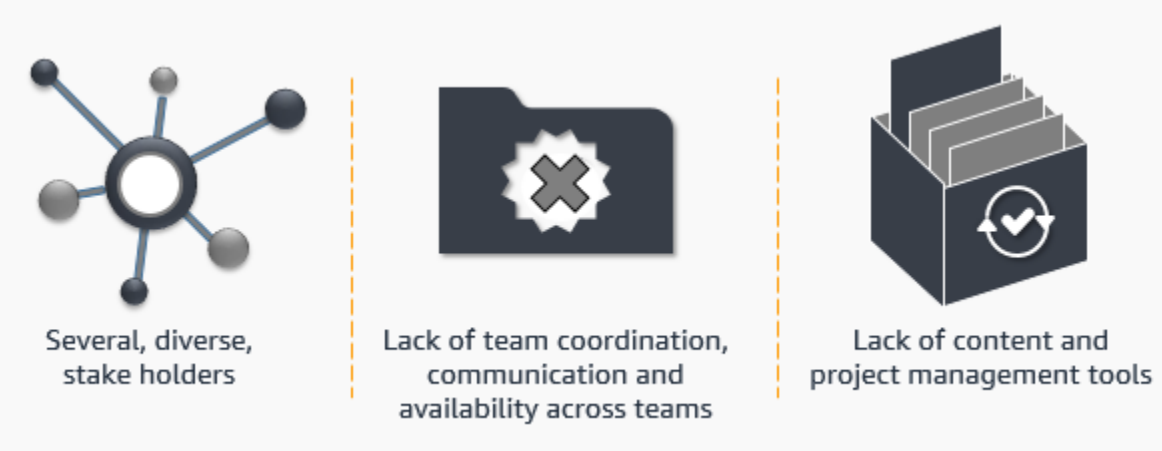
Customer Migration Readiness Challenges

After engaging with thousands of customers, our AWS Professional Services (ProServe) teams uncovered a variety of common challenges impacting large-scale cloud migration.

First, many organizations inadvertently forget to include cloud stakeholders across their cross-functional teams, even after an internal business case for cloud adoption has been approved by their CIO. Cross-functional leads can include cloud architects, IT leads, application developers, DBAs, legal leads, financial leads, and respective executive sponsors. For these individuals, cloud adoption concerns include costs, legal obligations, data security, application performance, business continuity needs, integration and support for proposed cloud services, and the impact on legacy systems.

Many organizations lack internal communication tools to help facilitate full immersion into the cloud migration process. For a cohesive approach to cloud adoption, IT stakeholders leading migrations should make themselves available.

Finally, many organizations lack formal content and project management tools to maintain project timelines and document new learnings, processes, and best practices. Poor documentation negatively impacts cloud projects, since migrations happen in phases and this documentation forms the basis for future automation and makes cloud migrations repeatable.



AWS Cloud Adoption Framework

Developing and executing your cloud transformation can be intimidating even to experienced IT leaders. And while each customer has his or her own desired outcome, some cloud-related goals are universal. That is why AWS created the AWS Cloud Adoption Framework (CAF), which identifies a number of common cloud migration activities and best practices that customers can use to optimize their migrations and cloud adoption outcomes. The AWS Cloud Adoption Framework is also adaptable and organized into common perspectives, focus areas, and building blocks. Creating an AWS CAF Action Plan will help you prepare for the transition to cloud-based IT. The journey begins with your leadership team reviewing the CAF perspectives. Each perspective is used to create work streams that uncover gaps in your existing skills and processes, which are recorded as inputs. These inputs are the basis for creating an AWS CAF Action Plan to guide your organization's change management as you journey to the cloud.

AWS Cloud Adoption Framework Perspectives

Perspective	Area of Focus
Business 	Business support capabilities to optimize business value with cloud adoption. Common Roles: Business Managers; Finance Managers; Budget Owners; Strategy Stakeholders
People 	People development, training, communications, and change management. Common Roles: Human Resources; Staffing; People Managers.
Governance 	Managing and measuring resulting business outcomes. Common Roles: CIO; Program Managers; Project Managers; Enterprise Architects; Business Analysts; Portfolio Managers.
Platform 	Develop, maintain, and optimize cloud solutions and services. Common Roles: CTO; IT Managers; Solution Architects.
Operations 	Allows system health and reliability through the move to the cloud, and delivers an agile cloud computing operation. Common Roles: IT Operations Managers; IT Support Managers.
Security 	Ensures that the workloads deployed or developed in the cloud align to the organization's security control, resiliency, and compliance requirements. Common Roles: CISO; IT Security Managers; IT Security Analysts; Head of Audit and Compliance.

Drafting Your Business Case

After creating your CAF Action Plan, it's time to add depth to key sections. First, you need to focus on your business case in order to garner support from all key stakeholders. Return on investment (ROI) calculations typically define the payback of investments against the benefits to the organization using financial terms and variables that are fairly static. These calculations fall short when used in the more complex, constantly evolving world of cloud computing. Deployment models vary, options change frequently and can break traditional ROI models, leaving potential benefits unaccounted for. Benefits extend beyond IT, changing the way functional areas conduct and approach business.

Understanding your current IT environment costs – the total cost of ownership of the systems and applications you are considering moving to the cloud – is critical to estimating the potential return. The elements discussed below provide the starting point for this analysis. To establish the baseline costs of your organization's IT

environment, we recommend looking at four key areas: data center infrastructure, labor, licensing, and training, and then begin assigning costs to each sub-segment.

Key Cost Elements for Evaluation

Data Center infrastructure	Labor	Licensing	Training
Server Hardware	Application Management	Operating System	Application
Network Hardware	Database Management	Database	Database
Hardware and Network Maintenance	Operating System Administration	Virtualization	Operating System
Hardware Power	Server Administration	Security Software	Network
Power for HVAC/Utilities	Support	Management Software	Infrastructure
Primary Data Storage	Security Monitoring		Security
Data Backup and Retention	Maintenance and Disaster Recovery		
Infrastructure Costs Such as Load Balancers, Firewalls, Routers/Switches, Data Replication Appliances, etc	Consulting Labor for Projects such as Technology Refresh		
System Security and Monitoring Equipment			
Other Facility Costs – Rent, Insurance, etc			

To quantify the benefits of a technology environment – whether on-site or in the cloud, we recommend examining the benefits your technology investments deliver through two specific perspectives.

1. Total cost reduction: This is closely linked to total cost of ownership (TCO). You can lower your total cost of ownership by reducing what the organization is spending on IT today, as well as repurposing existing investments. The next question to ask is: by adopting cloud services, which infrastructure, licensing, labor, and training costs can you trim or eliminate altogether? Assigning a monetary value to these costs is relatively straightforward once you've identified the cost elements of each.
2. Cost avoidance/value-added benefits: This second lens is critical to understanding the full benefit derived from moving to the cloud. You can avoid costs and gain value-added benefits by examining how the solution can enhance normal operating capabilities your organization has today or plans to add in the future.

There are several value-added benefits you'll gain from moving to the cloud. Working with our many customers to aggregate and understand the relevant data, we identified a core set of benefits.

1. The value of reduced downtime: To calculate, you must look at more than the number of hours the application is unavailable. Instead, you should also evaluate the number of total application users, concurrent application users, average hourly compensation, and the percentage of downtime that affects those users over the course of year. With this information, we arrive at a dollar figure for lost productivity due to downtime.
2. The value of improved performance: Taking into consideration the number of users and associated labor costs, measure those costs against application requests per user per hour (to calculate how many times per hour a user is affected by slow performance) and system latency (to calculate cumulative latency per hour per user). With this information, we arrive at a dollar figure for lost productivity due to poor performance.
3. The value of fewer security incidents or data losses: Even one security breach can have a significant effect on your organization's reputation and financial health. One can measure this by calculating an average incident cost per user record and multiplying that by the probability of a security incident.
4. The value of application currency: Application currency is the on-going process of determining how current an application is compared to the latest available version as well as understanding the supported and certified operating system platforms. While maintenance costs for on-premises enterprise applications are significant, those maintenance dollars do provide value –upgrades, updates, patches, support, and more. As you calculate the value of application currency, also remember to look at the speed at which new upgrades and updates can be applied. Improved currency means fewer institutional resources involved in lengthy and cumbersome upgrades.
5. The value of more efficient backups: To calculate this value, we again use the number of users and associated labor costs, and evaluate those numbers against hours of lost work due to inefficient backups.
6. The value of better disaster recovery: The number of users, associated labor costs, and probability of a disaster in a given year are taken into the calculation. We also look at metrics such as time to recovery and cost per disaster due to lost productivity.

To get a deeper insight into building a comprehensive business plan, AWS customer and partner Ellucian has created a guide that provides a detailed business analysis and a scenario for the education market segment. Ellucian delivers a broad portfolio of technology solutions, developed in collaboration with the global education community.

AWS also provides a variety of tools to help create your business case for migration. The AWS Simple Monthly Calculator provides directional business case inputs, while the AWS Total Cost of Operation (TCO) calculator supports your refined business case. Additionally, AWS has tools help with cost estimation and the total cost of migration.

People and Organization

It is important to develop a critical mass of people with AWS experience in production environments as you prepare for a larger migration. It is a cloud best practice to establish operational processes and form a Cloud Center of Excellence (CCoE) dedicated to mobilizing appropriate resources. The CCoE will lead your organization through transformations over the course of the migration effort, and a CCoE institutionalizes best practices, governance standards, and the use of automation. When done well, a CCoE inspires a cultural shift towards innovating and a 'change is normal' mindset.

An effective CCoE team evolves over time in size, makeup, function, and purpose. Long-term and short-term objectives, as well as key operating model decisions, will require adjustments to your team. In the early stages of cloud adoption, team development begins as a small, informal group connected by a shared interest, for example, experimentation with cloud implementation. As your cloud initiative grows and the need for a more formalized structure increases, it becomes beneficial to establish a CCoE dedicated to evangelizing the value of the cloud.

While the CCoE establishes best practices, methods, and governance for your evolving technology operations, additional cloud execution teams will also form. These smaller teams migrate candidate applications and application groupings, commonly referred to as migration waves, to your cloud environment. The CCoE directs the operating parameters of your migration teams. Lessons are learned and documented collectively, improving efficiency and confidence through hands-on experience.

Migration Readiness and Planning

Migration Readiness and Planning (MRP) is a method that consists of tools, processes, and best practices that prepare an organization for cloud migration. During the Migration Readiness and Planning (MRP) phase, you will team with AWS Professional Services and/or a migration acceleration partner to build the foundation for a large-scale migration and gain experience migrating and operating several workloads on AWS. AWS and our MAP partners developed a prescriptive methodology and approach based on best practices assembled from hundreds of customer migration projects that significantly reduce time to migrate while lowering cost and risk. To prepare a cloud operational foundation, you will follow an agile

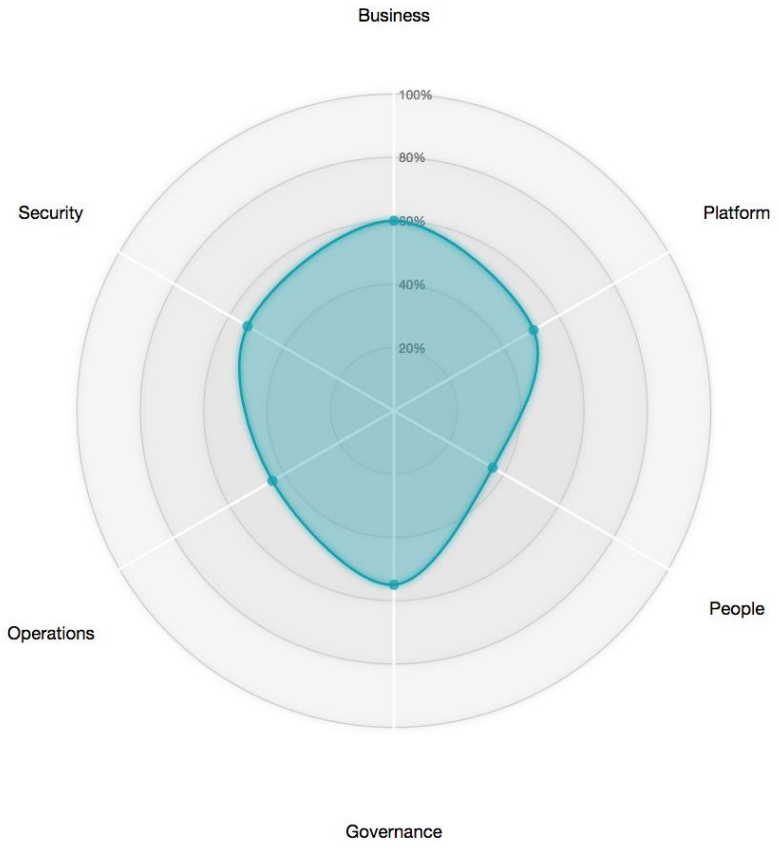
approach with work streams for cloud center of excellence, landing zone, operation model, and security and compliance. In addition, we'll work with you to develop a strong migration plan and compelling business case that articulates the total cost of ownership (TCO) and return on investment (ROI) for a cloud migration. At the end of this phase, which is usually completed in 2-4 months, you will be ready to migrate at scale. The MRP method aligns to the AWS Cloud Adoption Framework and is execution-driven. Note that MRP also describes an AWS Professional Services offer. Below we highlight some key MRP questions to consider:

- Have you clearly defined the scope and the business case for the migration?
- Have you evaluated the environment and applications in scope through the lenses of the AWS CAF?
- Is your virtual private cloud (VPC) secure, and can it act as a landing zone for all applications in scope? A VPC is a virtual network dedicated to your AWS account. It is logically isolated from other virtual networks in the AWS Cloud. You can launch your AWS resources, such as Amazon EC2 instances, into your VPC.
- Have your operations and employee skills been reviewed and updated to accommodate the change?
- Do you (or does a partner) have the experience necessary to move the tech-stacks that are in scope?

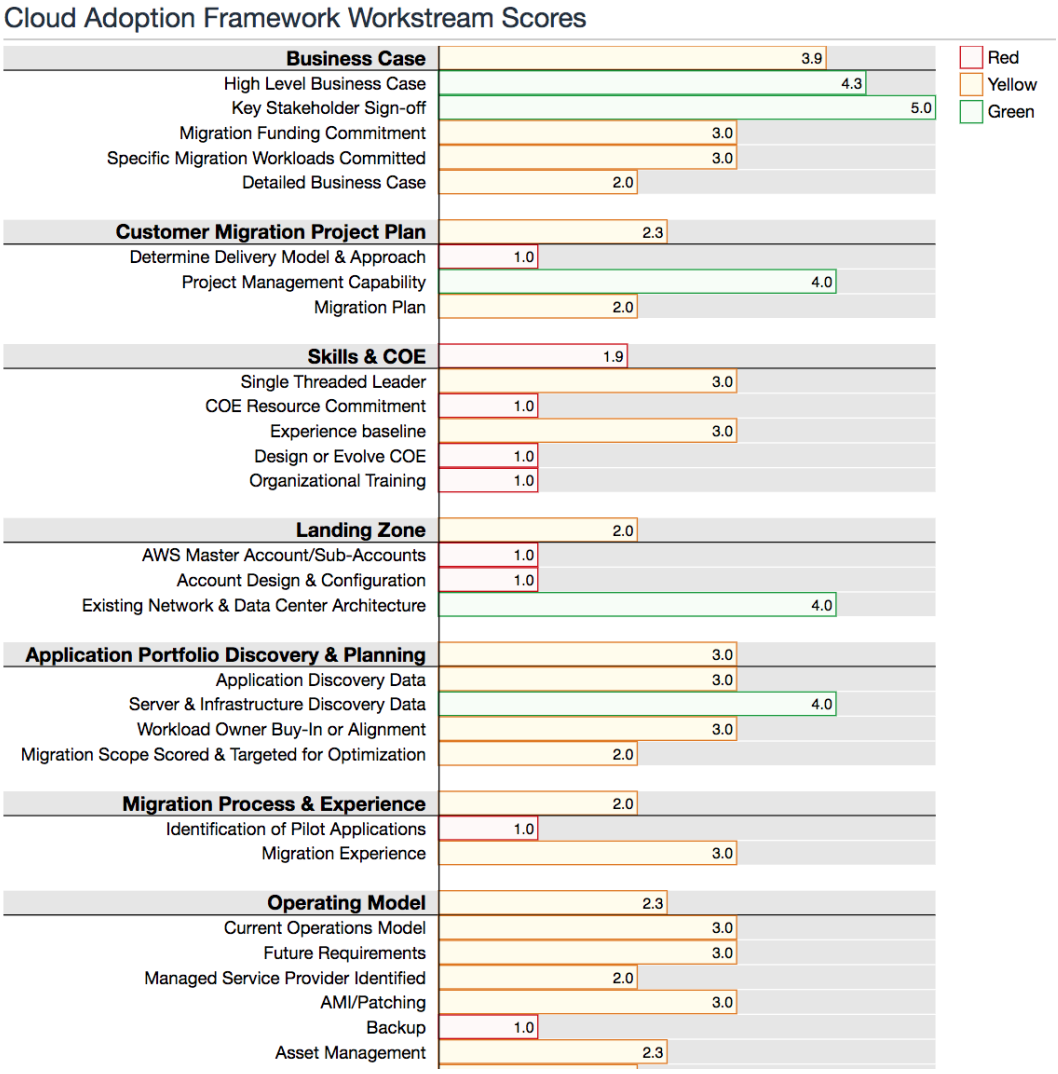
AWS has also developed a set of tools to help you assess your organization's current migration readiness state in each of the AWS CAF perspectives. One of these tools is the Migration Readiness Assessment (MRA). This assessment identifies readiness gaps and makes recommendations to fill gaps in information and preparation for a large migration effort.

The MRA is completed interactively in a cross-group setting involving key stakeholders across your IT organization, building a common view of your current state. You may have representatives from IT Leadership, Networking, Operations, Security, Risk and Compliance, Application Development, Enterprise Architecture, and your CCoE or Cloud Business Office (CBO) respond to MRA questions. Lastly, you will able to create a migration roadmap and identify the necessary data you will need for your business case. Additionally, MRA output includes actions, next steps and visuals like a radar chart and heat map. The MRA is available through AWS or an AWS Migration Partner.

Example of a Cloud Adoption Framework Radar Chart



Example of a Cloud Adoption Framework Radar Scoring Chart



AWS Professional Services

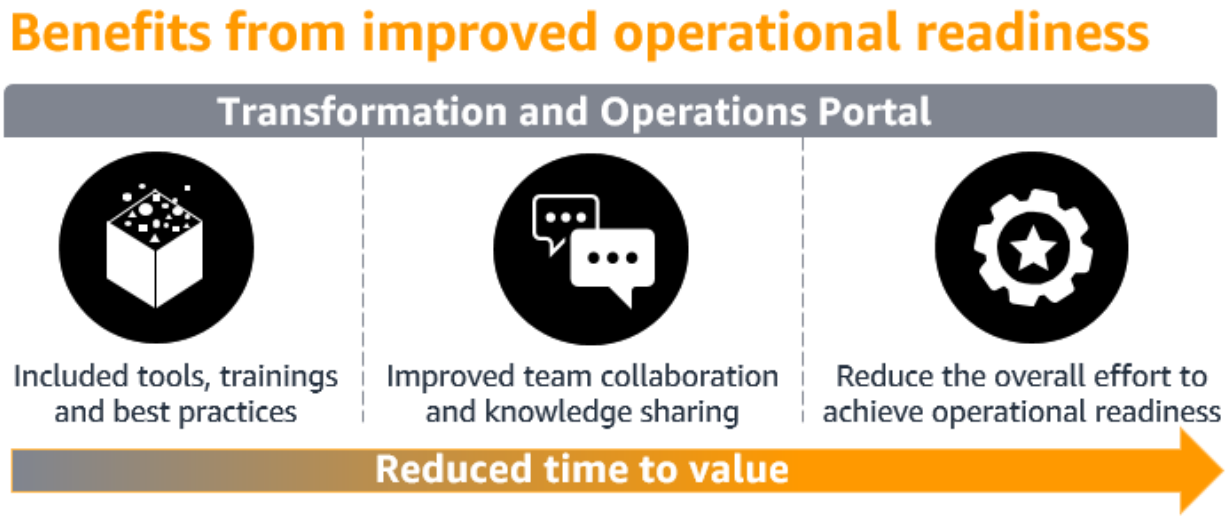
The AWS Professional Services (ProServe) organization is a global team that can help you realize your desired business outcomes with the AWS Cloud. We work closely with your team or your AWS partner to execute your enterprise cloud computing initiatives.

Our ProServe team provides assistance through a collection of offerings, which help you achieve specific outcomes with your large-scale cloud adoptions. We also deliver focused guidance through our global specialty practices, which cover a variety of solutions, technologies, and industries.

In preparing for an AWS consulting engagement, customers and partners are asked to review the Know Before You Go Checklist below:

1. Align business requirements and bring key stakeholders along with you. These include executive sponsors from technical, financial, legal, and operational domains.
2. Review AWS migration frameworks and implement key agile planning tools.
3. Build a Cloud Center of Excellence with all cross-functional pillars included, such as cloud architects, IT leads, application developers, DBAs, legal leads, financial leads, and respective executive sponsors.
4. Implement a full-immersion environment in order for stakeholders to be fully vested, make themselves available, and utilize the key agreed upon tools.
5. Create an AWS CAF Action Plan. The journey begins with your leadership team reviewing the CAF perspectives.
6. Publish guidance and share best practices where they exist and set rules to continue these activities as new items come to light.

By following the checklist, you can reduce time to value and build organizational confidence. During the migration lifecycle, customers can also expect to have access to AWS frameworks, tools, and architectural best practices. With proper preparation, customers can also anticipate improved team collaboration, knowledge-sharing, and the ability to create a successful model for future migrations.



Conclusions

Many organizations are moving their applications to the AWS Cloud in order to simplify infrastructure management, modernize services, improve service availability, increase agility, and innovate faster at a lower cost. Having a clear understanding of existing infrastructure costs and the details of your unique migration use case will help you calculate payback time and projected ROI.

Through our ProServe experiences, we deliver a mature set of cloud services designed for the unique security, compliance, privacy, and governance requirements of large organizations. Leveraging the breadth and depth of the AWS portfolio, AWS ProServe offers robust enablement engagements using our cloud experience to help your organization move faster, and do more.

Further Reading

For additional information and customer case studies please consult the following resources:

- Professional Services homepage
- AWS Migration Whitepaper
- The AWS Cloud Adoption Framework
- AWS Migration Acceleration Program (MAP)

- AWS Well-Architected
- AWS Case Study: UK Ministry of Justice
- AWS Case Study: Australian Post
- AWS Case Study: California Polytechnic University
- AWS Case Study: American Heart Association
- AWS Case Study: Raytheon
- AWS Case Study: State of Arizona

Contributors

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1. Understanding Cloud Adoption in Government: https://www.gartner.com/smarterwithgartner/understanding-cloud-adoption-in-government/
2. Managing Federal IT in a Dynamic Environment: https://www.pscouncil.org/Downloads/documents/CIO%20Survey/2017_FEDCIO_survey_Final.pdf