Amazon Web Services Partner Package for Department of Veterans Affairs (VA) Cloud Operations and Migration Services (COMS)

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# Introduction

Amazon Web Services, Inc. (AWS) has provided input for the Department of Veteran’s Affairs (VA)’s Cloud Operations and Migration Services (COMS) Request for Task Execution Plan (RTEP). Given the scope of COMS, AWS is providing information on our cloud adoptions and migration processes for use within your RTEP response. Please let us know if you have any additional questions we can help you with as they relate to this initiative.

Cloud computing changes organizations by giving them the ability to trade capital expense for variable expense, take advantage of massive economies of scale, make agile capacity decisions, increase mission speed and agility, reduce the money spent on operating data centers, and provide all of this globally in minutes. This change can be very disruptive to an organization and needs to be properly planned and executed in order to be successful. This is where the AWS’ migration methodologies come in. These frameworks have been used to modernize some of the largest companies in America from the ground up through large-scale migrations to the cloud. They understand the cultural, technical, management, and logistical challenges associated with migrations of this scale and will use proven frameworks to enact immediate and meaningful change for VA.

The AWS programs that apply for large-scale migrations include the AWS Cloud Adoption Framework (AWS CAF), described in **Section 2.0**, and AWS Migration Readiness Assessment (MRA) and Migrations Readiness and Planning (MRP), described in **Section 3.0**. Some of the migration challenges these frameworks address are:

* Efficient coordination and communication across a large team of business, application, development, operations, and partner participants.
* Discovering, transforming, and deploying complex sets of workload components.
* Addressing demand for automated management of AWS infrastructure and applications.
* Addressing insufficient WAN bandwidth to support ongoing operations alongside parallel server and data migrations.

# AWS Cloud Adoption Framework (AWS CAF)

Successful cloud adoption requires that fundamental changes are enacted across the VA and that stakeholders—both outside and within IT—support these changes. To guide VA in best practices of cloud adoption based on their cloud readiness, we’ve developed the AWS CAF. The AWS CAF helps organizations understand how cloud adoption modernizes the way they work, and it provides structure to identify and address gaps in skills and processes. Applying the AWS CAF in VA will result in an actionable plan with defined work streams that can guide VA’s path to cloud adoption.

The AWS CAF supports each stakeholder group within VA so that they understand how to update skills, adapt existing processes, and introduce new programs to take full advantage of the cloud. Thousands of organizations around the world have successfully migrated to the AWS Cloud, relying on the AWS CAF to guide their efforts. At the highest level, the AWS CAF organizes guidance into six focus areas, termed “perspectives.” Each perspective encompasses distinct responsibilities owned or managed by functionally related stakeholders. As demonstrated in **Figure 1**, perspectives address both business and technology stakeholders. Three perspectives address the business stakeholders: business, people, and governance. Three perspectives address the technology stakeholders: platform, security, and operations.

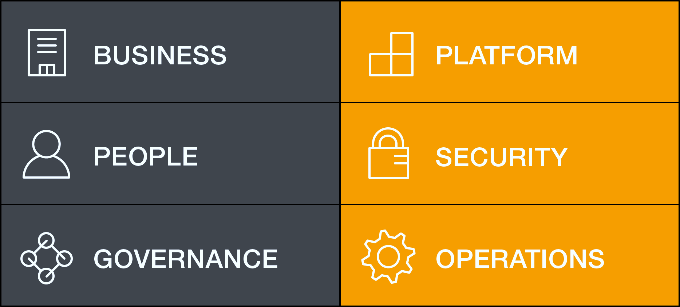


Figure 1 – AWS CAF provides VA with guidance on how to plan for and execute cloud adoption from perspectives impacting business stakeholders (left hand column) and technology stakeholders (right hand column).

# AWS Migration Frameworks

The AWS MRA and MRP are designed to help agencies that are committed to a migration journey achieve a range of business benefits by migrating existing workloads to the cloud. These has been successfully applied to projects ranging from hundreds to tens of thousands of servers to the cloud. We have pooled the experience of our AWS team to develop a structured methodology to prepare for and successfully execute this migration.

The AWS MRA, MRP and Migration phases (see **Figure 2**) include the following:

* MRA phase (see **Section 3.1**)
* MRP phase (see **Section 3.2**)
* Migration phase (see **Section 3.3**)

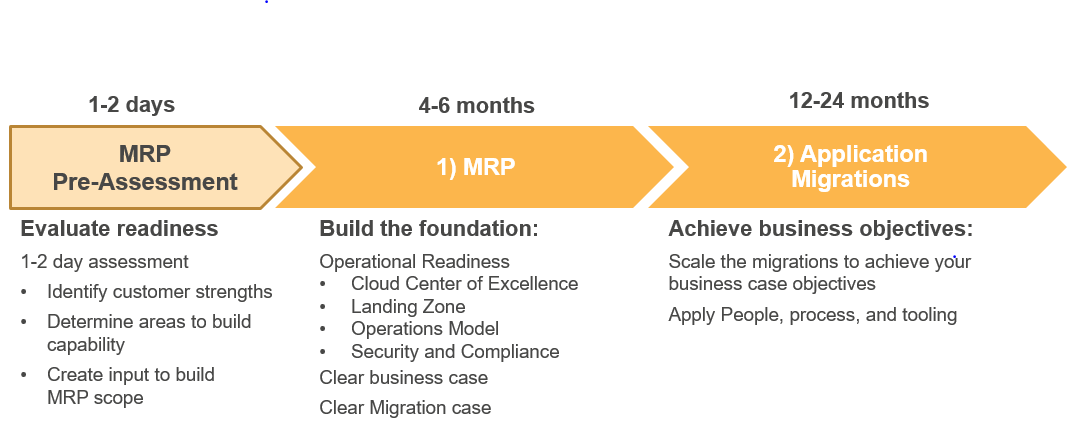


Figure 2 – The AWS MAP guides agencies through large-scale cloud migration from inception to execution. The timelines noted here are examples based on our experience. Actual timelines for the VA’s modernization will be determined during the planning phase.

## Migration Readiness Assessment (MRA) Phase

The MRA phase typically consists of a one-day workshop delivered to VA IT leadership by the AWS. During the MRA workshop we determine the current state of VA’s readiness to migrate, where VA already has strong capabilities, and where further development is needed to migrate at scale.

By identifying the gaps in skills and processes between the current IT environment and the future cloud environment, an organization can create an action plan designed to close these gaps. Priorities and gaps identified during this assessment help define the scope for the MRP phase.

## Migration Readiness & Planning (MRP) Phase

During the MRP phase, VA and AWS/ partner teams will build the foundation for a large-scale migration. AWS has a prescriptive approach based on best practices gleaned from hundreds of enterprise migrations. Our approach significantly reduces the time to migrate while lowering cost and risk. The primary outputs from the MRP phase are:

* Operational readiness: Achieved through the following work streams:
  + *Landing zone*: Design and deploy the environment in AWS, including the account structure, network design that considers Virtual Private Cloud (VPC), Virtual Private Network (VPN), direct connection and multi-region components, controlled identity and access management, and service catalog definition to achieve VA functionality and user experience needs.
  + *Cloud Center of Excellence*: Define, train, and build experience in VA teams.
  + *Cloud Operations Model*: Determine the structure, planning, and operations practices for VA to maximize benefits.
  + *Security and Compliance*: Assess and close gaps, and implement the security and compliance practices and monitoring systems.
* Develop business case: Develop a strong migration plan and compelling business case that articulates the TCO and ROI for VA’s cloud migration.
* Develop migration plan: Mobilize VA resources, leading them through application migration challenges, best practices, agile based execution frameworks, tools, and processes inherent in a large-scale migration.
* Migrate up to five production applications: Migrate up to five applications to help VA prepare for an enterprise migration (as we are able to address all aspects of a migration on a smaller scale).

At the end of the MRP phase, which is usually completed in four to six months, VA will be ready to migrate at scale.

## Migration Phase

In the migration phase, VA will execute the migration plan developed during the MRP phase, typically with the assistance of AWS. A key component is establishing a “migration factory” composed of teams, tools, and processes to streamline the movement of workloads from on-premises infrastructure to AWS. The migration factory teams work through a prioritized backlog of workloads based on migration patterns identified in the portfolio discovery and planning process. Where possible we apply known migration and operational patterns to accelerate the movement of workloads, reduce risk, and improve the final outcome. With this approach, you will quickly start to achieve the benefits of lower operating costs and increased agility and scalability. Once in the cloud, VA can focus on optimization of applications, processes, operations, and costs. This phase typically takes 12-24 months to execute.

# General Comment regarding PWS Section 5.2.3.1.1

Section 5.2.3.1.1 of the PWS proposes to “Perform O365 Migration to SharePoint Online or On-Premise SharePoint Farm”. We would like to highlight that a migration of SharePoint content to O365 SharePoint Online may not be possible if any customization to the VA’s SharePoint sites. Since this is the case, we’d like the VA to consider migrating their customized SharePoint sites to the AWS Cloud instead.

Customers that have applied non-trivial customizations to their SharePoint environment can encounter unforeseen and expensive obstacles that may prevent migration to an Office 365/SaaS platform. For example, SharePoint implementations with custom ASP.NET master pages and custom SharePoint workflows will likely not port to and run in a SaaS environment (like O365). However, any customizations, configurations, and add-ins that the Government uses on the Microsoft servers will run on the AWS Cloud.

The Government can engage one of numerous technology vendors who offer discovery and analysis services to identify any potential migration issues that would prevent migration to a SaaS environment.

From our experience hosting Microsoft workloads for customers (i.e., Windows Server, SQL Server, Exchange, SharePoint, Skype for Business, Dynamics CRM, Dynamics AX), customers will want to confirm – up front – the feasibility of migrating an on-premises SharePoint platform to SaaS. The following considerations are key ingredients to such a confirmation. The Government should consider each of the items listed below to avoid unforeseen and costly technology investment. Additional information on each consideration is provided in **Appendix 1** –

* **Developer considerations**
  + Now or in the future, do you use or want to take advantage of developer features such as full-trust solutions or sandbox solutions with user code? Do you use 3rd party ISV applications with SharePoint? Do you use and customize business connectivity services? Do your users want to create their own site definitions to customize and extend standard SharePoint site templates? Do your users want to provision custom sites and quickly start using their custom sites?
* **IT Professional considerations**
  + Now or in the future, do you use or want to take advantage of claims-based authentication? Do you need distributed cache to address users located globally? Do you need multiple web front ends mapped to a common URL? Do you need patch management, quota templates, or read-only database support? Do you need remote blob support for supporting video and graphics outside of SharePoint? Do you need the SharePoint health analyzer? Do you want support of all Windows PowerShell cmdlets? Do you need the state service to monitor whether all services in the farm are configured correctly?
* **Content and Information Security considerations**
  + Now or in the future, do you use or want to take advantage of Information Rights Management (IRM) from Windows Server AD RMS? Do you want host-named site collections to create simpler URLs? Do you want Word automation services to automatically save Word documents on the server in other formats such as PDFs?
* **Data Insight considerations**
  + Now or in the future, do you use or want to take advantage of scorecards & dashboards or SQL Server Reporting Services (SSRS) integrated mode?
* **Enterprise Search considerations**
  + Now or in the future, do you use or want to take advantage of custom entity extraction to enable all property search, extensible content processing, on-premises search index, or the search connector framework to search through non-included file formats?
* **SharePoint Sites considerations**
  + Now or in the future, do you use or want to take advantage of custom managed paths, web parts from current and previous versions, mobile connectivity, or multi-lingual user interface?
* **SharePoint Social considerations**
  + Now or in the future, do you use or want to take advantage of full blog functionality such as allowing comments to blogs? Do you use or want to take full advantage of communities such as allowing public community-provided help?

**If the answer to any of the above questions is “yes” then a SaaS deployment is very likely not an option for your existing workloads, and the Government would require a managed service option based on an IaaS platform to meet its needs.**

By performing the feasibility study we are recommending, the Government will be able to consider if their customization and content migration requirements can be fully met by each of the SaaS products listed in this posting, and fully investigate the potential limitations involved with using each product under a SaaS model, many of which may not be self-evident on the surface.

## Running Customized SharePoint Sites on AWS

We recommend the VA consider running their customized SharePoint sites on the AWS Cloud as an alternative solution. AWS provides a flexible, secure, affordable, and highly available cloud environment where you can take advantage of the content and collaboration features of Microsoft SharePoint Server.

Use this Quick Start to deploy SharePoint Server 2016 into your AWS account automatically, in accordance with AWS best practices for security and high availability.

If you'd like to deploy SharePoint Server with other popular servers from Microsoft (Lync Server, Exchange Server, and SQL Server), use the [Microsoft Servers on AWS Quick Start](http://docs.aws.amazon.com/quickstart/latest/accelerator-msservers/).

1. SharePoint Online Missing Features

## Developer features

* [Access Services using Access 2010](https://technet.microsoft.com/en-us/library/415c9536-ae70-4d4b-b481-5255cb03cc32#bkmk_AccessServices)
* [BCS: Profile Pages](https://technet.microsoft.com/en-us/library/415c9536-ae70-4d4b-b481-5255cb03cc32#bkmk_BCSProfilePages)
* [BCS: Rich Client Integration](https://technet.microsoft.com/en-us/library/415c9536-ae70-4d4b-b481-5255cb03cc32#bkmk_BCSRichClientIntegration)
* [Custom Site Definitions](https://technet.microsoft.com/en-us/library/415c9536-ae70-4d4b-b481-5255cb03cc32#bkmk_CustomSiteDefinitions)
* [Custom Site Provisioning](https://technet.microsoft.com/en-us/library/415c9536-ae70-4d4b-b481-5255cb03cc32#bkmk_CustomSiteProvisioning)
* [Full-Trust Solutions](https://technet.microsoft.com/en-us/library/415c9536-ae70-4d4b-b481-5255cb03cc32#bkmk_FullTrustSolutions)
* [InfoPath Forms Services](https://technet.microsoft.com/en-us/library/415c9536-ae70-4d4b-b481-5255cb03cc32#bkmk_InfoPathFormsServices) (17)
* [Sandboxed Solutions](https://technet.microsoft.com/en-us/library/415c9536-ae70-4d4b-b481-5255cb03cc32#bkmk_SandboxedSolutions) (16)

## IT Professional features

* [Alternate Access Mapping (AAM)](https://technet.microsoft.com/en-us/library/b6db338b-522b-44bf-afb7-1de7827691d0#bkmk_AlternateAccessMapping)
* [Claims-Based Authentication Support](https://technet.microsoft.com/en-us/library/b6db338b-522b-44bf-afb7-1de7827691d0#bkmk_ClaimsBasedAuthenticationSupport)
* [Configuration Wizards](https://technet.microsoft.com/en-us/library/b6db338b-522b-44bf-afb7-1de7827691d0#bkmk_ConfigurationWizards)
* [Distributed Cache](https://technet.microsoft.com/en-us/library/b6db338b-522b-44bf-afb7-1de7827691d0#bkmk_DistributedCache)
* [Host Header Site Collections](https://technet.microsoft.com/en-us/library/b6db338b-522b-44bf-afb7-1de7827691d0#bkmk_HostHeaderSiteCollections)
* [Improved Self-Service Site Creation](https://technet.microsoft.com/en-us/library/b6db338b-522b-44bf-afb7-1de7827691d0#bkmk_ImprovedSelfServiceSiteCreation)
* [Managed Accounts](https://technet.microsoft.com/en-us/library/b6db338b-522b-44bf-afb7-1de7827691d0#bkmk_ManagedAccounts)
* [Patch Management](https://technet.microsoft.com/en-us/library/b6db338b-522b-44bf-afb7-1de7827691d0#bkmk_PatchManagement)
* [Quota Templates](https://technet.microsoft.com/en-us/library/b6db338b-522b-44bf-afb7-1de7827691d0#bkmk_QuotaTemplates)
* [Read-Only Database Support](https://technet.microsoft.com/en-us/library/b6db338b-522b-44bf-afb7-1de7827691d0#bkmk_ReadOnlyDatabaseSupport)
* [Remote BLOB Storage](https://technet.microsoft.com/en-us/library/b6db338b-522b-44bf-afb7-1de7827691d0#bkmk_RemoteBLOBStorage)
* [Request Management](https://technet.microsoft.com/en-us/library/b6db338b-522b-44bf-afb7-1de7827691d0#bkmk_RequestManagement)
* [Request throttling](https://technet.microsoft.com/en-us/library/b6db338b-522b-44bf-afb7-1de7827691d0#bkmk_Requestthrottling)
* [Resource throttling](https://technet.microsoft.com/en-us/library/b6db338b-522b-44bf-afb7-1de7827691d0#bkmk_Resourcethrottling)
* [SharePoint Health Analyzer](https://technet.microsoft.com/en-us/library/b6db338b-522b-44bf-afb7-1de7827691d0#bkmk_SharePointHealthAnalyzer)
* [State Service](https://technet.microsoft.com/en-us/library/b6db338b-522b-44bf-afb7-1de7827691d0#bkmk_StateService)
* [Streamlined Central Administration](https://technet.microsoft.com/en-us/library/b6db338b-522b-44bf-afb7-1de7827691d0#bkmk_StreamlinedCentralAdministration)
* [System Status Notifications](https://technet.microsoft.com/en-us/library/b6db338b-522b-44bf-afb7-1de7827691d0#bkmk_SystemStatusNotifications)
* [Unattached Content Database Recovery](https://technet.microsoft.com/en-us/library/b6db338b-522b-44bf-afb7-1de7827691d0#bkmk_UnattachedContentDatabaseRecovery)
* [Usage Reporting and Logging](https://technet.microsoft.com/en-us/library/b6db338b-522b-44bf-afb7-1de7827691d0#bkmk_UsageReportingandLogging)
* [Windows PowerShell Support](https://technet.microsoft.com/en-us/library/b6db338b-522b-44bf-afb7-1de7827691d0#bkmk_WindowsPowerShellSupport) (all cmdlets)

## Content features

* [eDiscovery Search](https://technet.microsoft.com/en-us/library/b95d72bf-206f-4c26-a53d-ba61ff73605c#bkmk_eDiscovery_Search) (6)
* [eDiscovery Hold](https://technet.microsoft.com/en-us/library/b95d72bf-206f-4c26-a53d-ba61ff73605c#bkmk_eDiscovery_Hold) (6)
* [eDiscovery Export](https://technet.microsoft.com/en-us/library/b95d72bf-206f-4c26-a53d-ba61ff73605c#bkmk_eDiscovery_export) (6)
* [Email enabled lists and libraries](https://technet.microsoft.com/en-us/library/b95d72bf-206f-4c26-a53d-ba61ff73605c#bkmk_Email_Enable_ListsandLibraries)
* [External Sharing: External Access](https://technet.microsoft.com/en-us/library/b95d72bf-206f-4c26-a53d-ba61ff73605c#bkmk_ExternalSharingExternalAccess) (9)
* [External Sharing: Guest Link](https://technet.microsoft.com/en-us/library/b95d72bf-206f-4c26-a53d-ba61ff73605c#bkmk_ExternalSharingGuestLink) (9)
* [IRM using Windows Server AD RMS](https://technet.microsoft.com/en-us/library/b95d72bf-206f-4c26-a53d-ba61ff73605c#bkmk_InformationRightsManagement)
* [Office Web Apps Server integration](https://technet.microsoft.com/en-us/library/b95d72bf-206f-4c26-a53d-ba61ff73605c#bkmk_OfficeWebAppsServerIntegration)
* [PowerPoint Automation Services](https://technet.microsoft.com/en-us/library/b95d72bf-206f-4c26-a53d-ba61ff73605c#bkmk_PowerPointAutomationServices)
* [WCM: Faceted navigation](https://technet.microsoft.com/en-us/library/b95d72bf-206f-4c26-a53d-ba61ff73605c#bkmk_WCMFacetedNavigation)
* [WCM: Multiple Domains](https://technet.microsoft.com/en-us/library/b95d72bf-206f-4c26-a53d-ba61ff73605c#bkmk_WCMMultupleDomains)
* [Word Automation Services](https://technet.microsoft.com/en-us/library/b95d72bf-206f-4c26-a53d-ba61ff73605c#bkmk_WordAutomationServices)

## Insights Features

* [PerformancePoint Services](https://technet.microsoft.com/en-us/library/0e717a90-c241-4376-aec8-c29537f617f7#bkmk_PerformancePointServices)
* [PerformancePoint Services (PPS) Dashboard Migration](https://technet.microsoft.com/en-us/library/0e717a90-c241-4376-aec8-c29537f617f7#bkmk_PerformancePointServicesDashboardMigration)
* [Power BI](https://technet.microsoft.com/en-us/library/0e717a90-c241-4376-aec8-c29537f617f7#bkmk_PowerBI)
* [Scorecards & Dashboards](https://technet.microsoft.com/en-us/library/0e717a90-c241-4376-aec8-c29537f617f7#bkmk_ScorecardsDashboards)
* [SQL Server Reporting Services (SSRS) Integrated Mode](https://technet.microsoft.com/en-us/library/0e717a90-c241-4376-aec8-c29537f617f7#bkmk_SQLServerReportingServicesIntegratedMode)

## Search Features

* [Custom entity extraction](https://technet.microsoft.com/en-us/library/cb36484c-0e8f-480e-be88-5daa8bf2d47d#bkmk_CustomEntityExtraction)
* [Extensible content processing](https://technet.microsoft.com/en-us/library/cb36484c-0e8f-480e-be88-5daa8bf2d47d#bkmk_ExtensibleContentProcessing)
* [On-premises search index](https://technet.microsoft.com/en-us/library/cb36484c-0e8f-480e-be88-5daa8bf2d47d#bkmk_OnPremisesIndex)
* [Ranking models](https://technet.microsoft.com/en-us/library/cb36484c-0e8f-480e-be88-5daa8bf2d47d#bkmk_Ranking_Models) (5)
* [Search connector framework](https://technet.microsoft.com/en-us/library/cb36484c-0e8f-480e-be88-5daa8bf2d47d#bkmk_SearchConnectorFramework)

## Sites Features

* [Custom Managed Paths](https://technet.microsoft.com/en-us/library/d5e81d50-2b0f-40df-bf05-09149c9eabab#bkmk_CustomManagedPaths)
* [OOTB Web Parts](https://technet.microsoft.com/en-us/library/d5e81d50-2b0f-40df-bf05-09149c9eabab#bkmk_OOTBWebParts) (previous versions)
* [Mobile Connectivity](https://technet.microsoft.com/en-us/library/d5e81d50-2b0f-40df-bf05-09149c9eabab#bkmk_MobileConnectivity) (10)
* [Multi-Lingual User Interface](https://technet.microsoft.com/en-us/library/d5e81d50-2b0f-40df-bf05-09149c9eabab#bkmk_MultiLingualUserInterface) (11)

## Social features

* [Blogs](https://technet.microsoft.com/en-us/library/207c5829-0ba9-440a-a602-1222458fb479#bkmk_Blogs) (12)
* [Communities Reputation, Badging, and Moderation](https://technet.microsoft.com/en-us/library/207c5829-0ba9-440a-a602-1222458fb479#bkmk_CommunitiesReputationBadgingModeration) (12)
* [Community](https://technet.microsoft.com/en-us/library/207c5829-0ba9-440a-a602-1222458fb479#bkmk_Community) (13)