Migrate Windows Apps to the Cloud for Savings, Efficiency, and Performance

Government agencies are grappling with unprecedented demands for digital government services, increasing cyber threats, and IT workforce gaps – needs that require new, more efficient and responsive approaches to IT operations. Often, agencies find that they can't adapt to new and changing needs fast enough with on-premises infrastructure.

They know it's time to move more resources to the cloud – and Windows applications are likely near the top of the list. These apps are mission-critical for most agencies, and increasing user expectations for robust performance, functionality, and mobility have increased IT costs and staffing needs. By moving to the cloud, agencies are looking not only for infrastructure savings, but also greater efficiency and performance – to deliver on user expectations and fulfill mission objectives.

Even so, moving critical apps to the cloud deserves thoughtful consideration. Often, internal IT teams have deep experience in building and running Windows apps on premises, so making a change can seem daunting. At the very least, the idea raises a host of questions, including: What Windows apps can and should move to the cloud? Which provider should we choose? How do I get started? What about cost?

The top-line good news is: Windows in the cloud can be even better than Windows in the data center – more reliable, more cost effective, more scalable, more efficient, and better performing. In one study of public- and private-sector organizations running Windows workloads on Amazon Web Services (AWS), IDC estimated the average value achieved at $157,300 per 100 users per year ($6.59 million per organization), via IT infrastructure cost reduction, IT staff and user productivity improvements, and business productivity benefits. In addition, IDC estimated an average five-year return on investment of 442 percent and an average break-even point on investment in AWS at nine months from the beginning of deployment.

Getting Started

The full Windows stack can move to the cloud – from Active Directory to .NET Framework and .NET Core applications to SQL Server and Windows Server. Of course, migration projects are not one-size-fits-all. Some agencies are motivated by license renewal schedules or hardware upgrades. Others are driven by data center consolidation efforts, compliance requirements, productivity improvements, or digital transformation initiatives.

Once an agency has determined what Windows apps will move to the cloud, it must determine which provider it will use, and how to move those apps, on a case-by-case basis. When considering providers, experience, performance, and price are important factors. Looking at AWS vs. Microsoft Azure:

- AWS has been running Windows applications for 12 years – two years before Azure launched
- In 2018 and 2019, AWS had seven times fewer downtime hours than Azure
- SQL Server workloads run in AWS with nearly twice the performance and up to 40 percent better price performance than running the same database on equivalent infrastructure in Azure

The AWS Migration Acceleration Program (MAP) can help agencies determine which applications to move to the cloud, and how. It packages best practices, expertise, tooling, and financial incentives to help customers create a migration plan. MAP has three phrases:
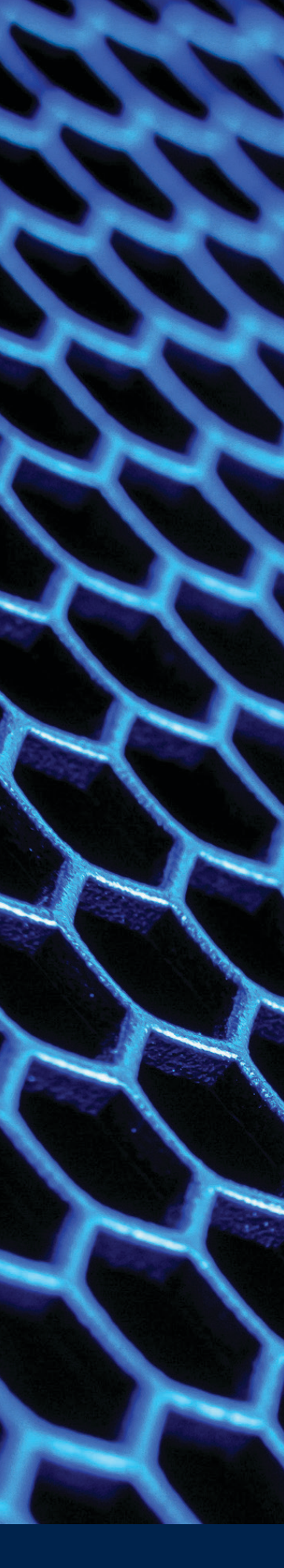
- **Assess:** Agencies evaluate their readiness for operating in the cloud, identifying desired business outcomes and developing the business case for the migration. The Migration Readiness Assessment is typically a one-day workshop conducted by AWS and/or a MAP partner
- **Mobilize:** Agencies create a migration plan that addresses gaps in readiness identified in the assess phase and refine their business case. They identify interdependences between apps and evaluate app portfolio data to determine whether they should rehost, replatform, repurchase, retire, or retain apps
- **Migrate and modernize:** Agencies migrate apps and validate them against predefined metrics that support the business case, and they continue to optimize workloads

Deciding How to Migrate

The migration planning process is intensive because it's designed to ensure that agencies get the greatest value from their investment. Organizations that don't thoroughly assess computing and storage practices across the enterprise before migrating applications to the cloud are at risk of transferring their on-premises challenges to their cloud environment.

A study by Bain & Company and TSO Logic found that 84 percent of on-premises workloads are overprovisioned. If those workloads are simply shifted to the cloud, the organization is still paying for more computing than it is using – and is likely to pay 10 to 15 percent more than on premises, according to Bain and TSO's analysis of more than 60,000 workloads. In contrast, organizations that conduct a thorough analysis and rightsize workloads before moving to the cloud can save 30 to 60 percent, Bain and TSO found.

The decision to rehost, replatform, repurchase, retire, or retain apps should be made on a case-by-case basis, informed by the agency's thorough assessment. Some small, tactical apps that were employed to solve a discrete problem may no longer be needed and can be retired. Agencies may determine that some apps should be retained on premises.

For apps that will move to the cloud, a range of migration options are available:

- **Rehosting** – Shifting an app as is. This strategy is applicable to a wide range of workloads, but again, agencies should determine if workloads are overprovisioned before moving to the cloud
- **Replatforming** – Leveraging cloud-native functionality such as a managed service to run the app; e.g., moving a SQL Server database to a managed service such as AWS Relational Database Service
- **Refactoring** – Modifying some aspect of the application to ensure that it works well in the cloud
- **Rearchitecting** – Replacing the entire application. This approach is typically used with workloads that are approaching end of life or are written in an unsupported language

Often, government agencies turn to AWS Consulting Partners to assist with migration. AWS Consulting Partners are professional consulting or managed services firms that help organizations of all types and sizes accelerate their journey to the cloud. These best-of-breed firms, members of the AWS Partner Network (APN), offer government and education customers a wide variety of cloud-based solutions. Top APN partners invest heavily in training and have a mature AWS practice, deep expertise, and a proven track record. AWS Government Competency Partners have demonstrated experience in delivering quality solutions to help agencies meet mandates, reduce costs, drive efficiencies, and increase innovation across state and local governments.

Leveraging Tools to Migrate

A range of AWS tools are available to help agencies migrate apps to the cloud. For example, CloudEndure can migrate any app or workload, and is particularly well suited for apps that will be rehosted. The process is straightforward:

- IT staff install the CloudEndure agent on each source machine that will migrate to AWS
- The agent detects all of the disks attached to each machine and automatically begins replicating data at the block level into AWS. Apps, operating systems, databases, and files are pulled into a low-cost staging area, which minimizes the cost of cloud infrastructure during replication

- Once the initial sync is complete, any changes will automatically sync to the staging area
- After the agency completes testing of the new environment, cutover is simple – with the push of a button in the CloudEndure console, all of the machines launch into a subnet within AWS

The U.S. Defense Logistics Agency used CloudEndure to migrate a complex environment of more than 200 virtual machines and 300 terabytes of data into AWS GovCloud (US) in in 138 days – six weeks ahead of schedule.

Other tools facilitate application replatforming. Two examples are AWS App2Container (A2C) and AWS Database Migration Service (DMS). A2C automates the process of containerizing and migrating legacy .NET applications to the cloud. DMS is used to move databases to AWS' managed service for databases, Relational Database Service (Amazon RDS). DMS can perform both homogenous migration, in which the source and destination databases are the same (e.g., SQL Server on premises to SQL Server hosted on RDS), and heterogeneous migration, in which the source and destination are different (e.g., SQL Server on premises to AWS Aurora). DMS migrates data; it works with AWS Schema Conversion Tool to migrate schema.

> "Being on AWS has been a drastic change for us in terms of user accessibility for Windows workloads because we had major issues before with [our legacy environment] … Automated failover is key — AWS does it flawlessly without us noticing."
>
> — Government user

Refactoring and rearchitecting are typically used with .NET applications. AWS offers a full range of services for running .NET Framework and .NET Core applications, from Amazon EC2, AWS Batch, and Amazon Elastic Container Service to serverless computing services AWS Fargate and AWS Lambda. Agencies that want to take advantage of serverless computing on AWS need to convert their .NET Framework applications to .NET Core. It's a complex, time-consuming task for developers, but it can be streamlined with the Porting Assistant for .NET. This free tool scans .NET Framework applications to identify incompatibilities with .NET Core and generates a detailed assessment, including recommended replacements.

Some legacy applications are particularly difficult to refactor or rearchitect because they have dependencies on underlying Windows operating systems that have reached end of support, such as Windows 2003 and 2008. Some agencies may not have the original source code, so they cannot upgrade, or they might not have the expertise to make required changes without introducing serious bugs. For these workloads, AWS provides the End-of support Migration Program for Windows Server (EMP). Through EMP, legacy apps are migrated to AWS and run on supported versions of Windows without any changes to the underlying application.

Embracing a Repeatable Process

Regardless of the migration strategy and tools used, the process is the same – plan, migrate, review, repeat. Most agencies will use multiple migration strategies and tools; those that have large Windows environments should plan migrations in waves, for greatest success.

For more information on Windows migration to the cloud with AWS, contact us today.

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