Running Windows Workloads on AWS

Why AWS for Windows?

Customers have been running Windows workloads on AWS for over 12 years—longer than any other cloud provider. We have the most experience with Microsoft applications in the cloud, and we offer the best platform for Windows Server and SQL Server.

We support everything you expect to build and run on Windows, including Active Directory, .NET, Microsoft SQL Server, Windows desktop-as-a-service, and supported versions of Windows Server. We also provide the first and only fully managed native-Windows file system available in the cloud with FSx for Windows File Server, and durable, performant block storage with Amazon Elastic Block Store for your most demanding SQL Server deployments. With our proven expertise, we are able to help you select and implement the right solution for you. We have yet to find a Windows workload we cannot deploy and start lowering costs.

Business opportunities you can achieve with AWS

- Accelerate business transformation
- Reduce operating costs
- Improve security & compliance
- Develop cloud skills
- Increase agility & innovate faster
- Unlock the full potential of the cloud

Windows on Amazon EC2 instances powered by 2nd Gen Intel® Xeon® Scalable processors provides the ease in application portability, speeds application development on AWS, and allows for the reuse of current application software. You can commission one, or scale to hundreds or even thousands of server instances simultaneously.

"If you're running Windows with other workloads or are thinking about future integrations with advanced analytics or machine learning, you'd be crazy not to consider AWS."

Phillip Frantz, Special Projects, Redcat

AWS is better for Windows workloads

Countless customers with large volumes of Windows workloads, including Jack in the Box, are "all in" on AWS. Some of the largest enterprises in the world, including Expedia and BP, run their Windows workloads on AWS as part of a hybrid architecture.

We've provided unbridled scaling for our customers' largest and most complex workloads and delivered:

- **36%** savings using AWS over three years by right-sizing instances with Migration Evaluator

- **2x** price/performance advantage for SQL Server vs the largest cloud provider[1]

- **442%** projected five-year ROI running Windows on AWS[2]

- **2x** more regions with multiple availability zones than the next largest cloud provider

- **5x** more services offering encryption than the next largest cloud provider

Navigate your journey with unparalleled expert guidance:

- **AWS Consulting Partners** help organizations of all types and sizes accelerate their journey to the cloud. These professional services firms include system integrators, strategic consultancies, agencies, managed service providers (MSPs), and value-added resellers.

- **AWS Professional Services** is a global team of experts who can help you realize your desired business outcomes when using the AWS Cloud. AWS Professionals Services works with your chosen AWS Partner to help you architect, design, develop, and implement the AWS platform while transforming your organization to a services-based model.

- **AWS Microsoft Workloads Competency Partners** help customers select the most qualified AWS Partners for migrating and modernizing their Windows-based applications to AWS. These partners have validated technical capabilities and demonstrated success in helping customers build, manage, or deploy Microsoft Workloads to AWS.

"AWS Professional Services has been at the heart of our transformation with our teams. They have brought their technical expertise and their culture to help change the culture at NAB and they have also brought us their delivery methodology to help us move at scale. They have helped us work through the strategy and the delivery plan for our mass migrations. The AWS Professional Services team has been fantastic."

Paul Roney, General Manager, Technology Platforms, National Australia Bank

[1] ZK Benchmarking Research, July 2018
[2] IDC, The Business Value of Efficiently Running High-Performing Windows Workloads in the AWS Cloud, Doc #US45111619, June 2019

Every business is unique. We help you choose the right migration strategy for you.

Rehosting "lift-and-shift"	The most popular choice for organizations that want to rapidly scale migration to meet a business case. Most rehosting can be automated, although you may prefer to do it manually and learn how to apply your legacy systems to your new cloud platform. Applications are often easier to optimize and re-architect once they're already running in the cloud.
Replatforming	Make a few cloud optimizations during migration, but otherwise keep your core architecture. By swapping common components, you improve performance without the risk, complexity, cost, and time of a full refactor. You can also take advantage of some cloud-native benefits, including less management, higher availability, and lower costs.
Refactoring/ Re-architecting	Re-imagine how an application is architected and developed, typically using cloud-native features. Refactoring is usually driven by a strong business need to add features, scale, or performance that would otherwise be difficult to achieve in the application's existing environment. For example, if you are looking to migrate from a monolithic architecture to a service-oriented (or server-less) architecture to boost agility or improve business continuity, refactoring may be the solution.
Retire	Once you've discovered everything in your environment, you might find some of your applications are no longer adding value. We've found that as much as 10 percent of an enterprise IT portfolio is no longer useful and can simply be turned off. These savings can boost the business case, direct your team's scarce attention to the things that people use, and reduce the number of applications you have to secure.
Retain	Usually, this means "revisit" or do nothing (for now). Maybe you're still riding out some depreciation, aren't ready to prioritize an application that was recently upgraded, or are otherwise not inclined to migrate some applications.

Migration to the cloud is not just a journey: it's a transformation. And AWS is with you every step of the way. We help you manage your migration and optimize your Windows workloads after you migrate—so you can continue to save, automate, and scale. And when you're ready to break free from the high costs of commercial licensing, we help you modernize your applications and accelerate innovation.

This eBook highlights why and how to migrate, modernize, and build your Windows workloads on AWS.

Migrating to AWS

Cloud has become the new normal as companies of every size have realized the benefits of the cloud. For most organizations, the question isn't "if" anymore; it's "how fast can we move?" and "what are we moving first?" A recent whitepaper by IDC shows the customers who migrate to AWS can experience a 56 percent lower five-year cost of operations, 32 percent

higher gross productivity, and a 98 percent reduction in downtime.[3]

By moving to AWS, you have access to the critical Windows infrastructure you depend on at a compelling price, with more reliable infrastructure than you've been able to commit to in an on-premises world.

Assess

Your journey begins. The Assess phase establishes your readiness for cloud migration, analyzes your specific requirements, and begins building the business cases for migrating each workload.

Assess your readiness	Analyze your usage	Build a business case
Evaluate Windows workloads on-premises and cloud environments to determine your readiness to migrate.	Analyze resource utilization, third-party licensing, and application dependencies to inform cost optimization scenarios.	Build a TCO model that includes a migration and licensing strategy using AWS programs and tools.

AWS Optimization and Licensing Assessment (OLA) is a free program for new and existing customers to assess and optimize current on-premises and cloud environments, based on actual resource utilization, third-party licensing, and application dependencies

AWS OLA identifies everything in your organization's environment—regardless of platform, application, or geography—and provides recommendations for Optimized Licensing, Dedicated Hosts, Optimized CPU and Reserved and Spot instances.

AWS also provides additional tools, questionnaires, workshops, and reports to help you quantify your migration readiness. You can use Migration Evaluator to ingest millions of data points and determine the best fit for each of your workloads on AWS. Using validated processor performance data from Intel and up-to-the-minute pricing from AWS, you can make an informed decision to start your migration to the AWS Cloud.

"Even before we migrated, AWS helped us prepare for our migration through an Optimization and Licensing Assessment (OLA) that helped us right-size our instances to control our costs during migration by 18-20%. After migrating our Windows workloads to AWS, we are able to scale up and down easily to handle fluctuating server traffic. Now, we have the freedom to focus on innovation instead of managing our physical servers, and improved our speed to upload and download applications."

Tommaso Salsetta, ICT Manager Italy,
Giunti Psychometrics

Migrate

Execute. The Migrate phase includes building a secure landing zone, migrating resources and data, reporting, and providing visibility on the progress of your migration.

Identify cloud capabilities	Build and mobilize	Migrate
Uncover gaps in your existing skills and processes and identify capabilities needed for a successful migration.	Address the capability gaps and dependencies in your environment and determine which workloads to migrate first.	Migrate your applications, servers, and databases with AWS tools and services while testing for application performance and security.

AWS Migration Acceleration Program (MAP) for Windows is a comprehensive program that helps organizations execute large-scale migrations and modernizations of their Windows workloads on AWS. MAP for Windows follows our proven three-step migration process and provides unique tools, services, best practices, and service credits to accelerate your migration. With expert guidance from our APN Partner and Professional Services teams, including training and service credits, MAP for Windows helps you reduce risk and lower costs as you embark on your migration journey.

"We moved our legacy Windows workloads out of 20 datacenters this year to cut monthly costs by 50% and avoided an additional 70% increase of expenditure in 2020. By using learnings from the MAP for Windows program, we were able to upskill our staff. Our engineers who hadn't even known how to use AWS console were fluent in services like AWS CloudFormation, including new college hires who were starting from scratch."

Avi Boru, Senior Manager of Cloud Engineering, World Fuel Services
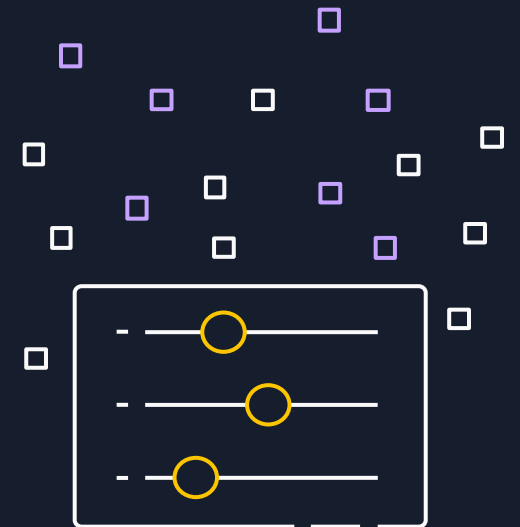
Why now is a great time to migrate your legacy SQL Server workloads to AWS

Microsoft ended its support for SQL Server 2008 on July 9, 2019, and Microsoft is planning to end support for SQL Server 2012 Service Pack 4 on July 12, 2022. This means Microsoft will stop security updates, making your databases and applications vulnerable. That makes now the ideal time to migrate your legacy SQL Server workloads to AWS. AWS gives you the tools and programs to make your SQL Server migration efficient and cost-effective. What's more, you can use tools like AWS Systems Manager to easily upgrade your SQL Server 2008 and 2012 to the latest SQL Server version to address the end-of-support timelines.

SQL Server on AWS Recommendation Matrix

AWS offers many ways to run your SQL Server workloads and manage your new and existing SQL Server licenses for all your business needs. Here are some ways to optimize your SQL Server workloads on AWS, whether you want to modernize or simply lift-and-shift.

- You can choose Amazon Relational Database Service (Amazon RDS) for SQL Server if you want to stay on SQL Server and leverage RDS automation to offload the undifferentiated heavy lifting of database administration tasks like installation, configuration, patching, upgrades, etc.

- You can rehost your SQL Server workloads on Amazon EC2 without making any code changes if you want to stay on SQL Server and need full database control.

- If you want to move away from SQL Server and leverage a cloud-native relational database service, you can choose Amazon Aurora to get 3X-5X faster performance at 1/10th the cost. AWS provides Database Migration Service and Schema Conversion Tool to make it easy for you to migrate from SQL Server to Amazon Aurora.

Flexible options for your SQL Server licenses

If you have existing SQL Server licenses and Software Assurance (SA), you can bring your own license (BYOL) to EC2 default/shared tenancy. If you don't have SA, you can choose Amazon EC2 Dedicated Hosts (as long as the licenses were purchased prior to October 1, 2019)[4]. If you don't have existing SQL Server licenses, you can choose SQL Server License Included (LI). It is a pay-as-you-go licensing model and you don't need to worry about managing complex licensing terms and conditions.

AWS License Manager makes it easier to track the usage of software licenses and reduce the risk of non-compliance. Gain control over license usage, reduce costs, and reduce the risk of noncompliance through automated administrative controls for AWS Cloud accounts and on-premises environments.

[4] Or added as a true-up under an active Enterprise Enrollment that was effective prior to October 1, 2019

Amazon EC2 offers z1d instances with high single thread performance due to a custom Intel® Xeon® Scalable processor with a sustained all core frequency of up to 4.0 GHz. It's ideal for SQL Server workloads because SQL Server is licensed per CPU core and z1d's higher clock speed of 4.0GHz will reduce the number of CPU cores, which can result in significant cost savings.

Amazon Elastic Block Store (EBS), with new Amazon EC2 R5b instances powered by custom 2nd Gen Intel® Xeon® Scalable processors (Cascade Lake), provides easy to use, high-performance block storage for Microsoft SQL Server. With R5b on EBS, you can utilize up to 60 Gbps of EBS bandwidth and 260K IOPS (I/O operations per second) for large relational database workloads. You can take advantage of this improved EBS performance to accelerate data transfer to and from Amazon EBS, reducing the data ingestion time for applications and speeding up delivery of results.

Optimize

Optimize your costs, usage, and licenses to suit your business needs. Use Managed Services to automate tasks and workloads, centralize management of operations, and open the doors to modernization.

Monitor usage and spend	Optimize workloads	Automate operational tasks
Access custom reports to visualize, understand, and manage your costs and usage. Identify trends and cost drivers, and detect anomalies.	Analyze historical usage to optimize your workloads for additional cost savings and improved performance.	Automate tasks such as monitoring, security, and backup services using AWS Managed Services.

After moving your Windows workloads onto AWS, you can continue optimizing your costs, usage, and licenses to suit your business needs. With AWS Cost Explorer, you can visualize, understand, and manage your AWS costs and usage over time to take control of spend. AWS Compute Optimizer recommends optimal AWS Compute resources for your workloads so that you can reduce costs up to 25 percent by analyzing historical utilization data. AWS Managed Services

can help operate your cloud environment post-migration by analyzing alerts and responding to incidents, reducing operational overhead and risk. You can use AWS Systems Manager to automate operational tasks across your AWS resources and better manage your infrastructure at scale.

"Having a team like AMS who was able to provide the infrastructure services and tooling for us made the program. If we had to set up all of those tools and infrastructure services ourselves, we would probably still be doing it right now."

Justin Wright, Vice President of Architecture and Development, Thomson Reuters

Modernizing with AWS

Migration is just the beginning. Modernization is where your business breaks free from licensing lock-ins and software audits, accelerates innovation, and unlocks the full potential of running in the cloud.

With AWS, you can transform your applications to increase agility, efficiency, cost savings, and security. You can free up resources and scale infrastructure on demand. Boost the skills and experience you need to achieve your objectives. Or all of the above.

Modernization can mean many things, but AWS will help you find the pathway that's right for you. Whether you choose to move to managed services or transform with open source technologies, here are a few of the pathways that you can use to modernize your Windows workloads on AWS.

Modernization pathways

AWS will help you follow the right pathway, and the right pace, of modernization for your organization.

Repackage your applications with managed services and containers

Let experts manage your cloud infrastructure while you use serverless API services. Moving to managed services can occur immediately or after relocating your workloads.

- Run managed SQL Server databases: Optimize your SQL Server workloads on RDS to increase performance and resilience without needing to manage database administration tasks. You can run RDS using the latest 2nd Gen. Intel Xeon Scalable technology for the right balance of compute, memory and networking for your commercial or open source database deployment—and only pay for what you use.

Restructure your code with open source

Break free from licensing and unlock the full capabilities of the cloud by moving to open source. Gain agility, cost savings, and performance by taking advantage of cloud-native technologies.

- Run .NET Core on containers: Embrace the full potential of open source by running your modernized Windows applications on container services such as AWS Fargate, Amazon Elastic Kubernetes Service (EKS), and Amazon Elastic Container Service (ECS).

Rebuild monolithic applications

Breaking monolithic apps into a collection of applications which each do one thing really well, known as microservices. Switching to microservices can unlock value and cut operating costs dramatically.

- Deploy .NET microservices: Transform your legacy .NET applications to take advantage of innovations in cloud-native technologies.

By transforming its monolithic .NET Framework app to a .NET Core microservices-based architecture, AgriDigital can "scale to meet our compute needs whenever we need to" rather than keep paying for unused but still running instances.

Windows on AWS Modernization

Windows on AWS Modernization helps you innovate and modernize your applications on the AWS platform. We provide incentives, service credits, and benefits for modernization of .NET applications and SQL Server on AWS, including leveraging partners, modernization COEs, and self-service resources.

ProServ offers a one-day free Envisioning and Alignment workshop to help customers lay a foundation for a cloud and product modernization strategy.

ProServ can co-develop a Proof of Concept (POC) of a high-value use case with a pattern for scaling for modernization, high-level architecture, roadmap, and cost model.

"We were fortunate to have had the opportunity to partner with AWS during the development/rollout of the DMS migration service to migrate from Microsoft SQL Server to Aurora MySQL. In performing this migration, Jobvite realized cost reduction of 40%, improved responsiveness to customer requests by up to 40%, eliminated monthly database maintenance that took the application down for 3 hours, and reduced refresh time from 20 hours to 2 hours. All of these benefits have allowed Jobvite to invest efforts into other aspects of the business to improve customer satisfaction."

Chaitanya Konduri, DevOps Manager, Jobvite

Build on AWS

Empower your .NET developers to build next-generation applications using their preferred tools and our industry-leading services.

AWS provides a reliable, scalable, and global infrastructure platform with a broad set of global cloud-based services. With over 200 services that can be provisioned quickly without upfront capital expenses, AWS provides the ideal environment to not only deploy existing .NET applications but also to create new, modern, and innovative .NET applications with all the familiar tooling and integrations .NET developers expect. AWS supports both legacy customer use cases with .NET Framework and modern workloads with support for LTS and current releases of .NET Core/.NET 5.

Development tooling and DevOps

.NET developers and teams use a wide variety of tools to develop, deploy, and monitor their applications. With the advent of .NET Core, and now .NET 5, developers are able to take advantage of other platforms (Linux, macOS) to develop application code. AWS offers free plug-ins for popular IDEs for .NET development and an SDK that makes integration of AWS services with application code easy and convenient.

Software Development Kits

AWS SDK for .NET

For developers looking to integrate AWS services in their application code, AWS provides the free AWS SDK for .NET. Available on NuGet, each AWS service is encapsulated in individual packages together with a shared common core package. The SDK makes calling AWS service APIs from within application code as easy as calling a method on an object. AWS also provides additional open source extension libraries to make application integration with AWS even easier. Each service package provides a client type implementing the service's API, and a collection of rich request, response, and model types associated with the API. The SDK handles all of the interactions with the services, including authentication, throttling, and retries.

AWS Cloud Development Kit

The AWS Cloud Development Kit (AWS CDK) is an open source software development framework that enables your developers to define cloud applications using familiar languages. Your teams can also build and share libraries of constructs configured to your organization's cloud resources.
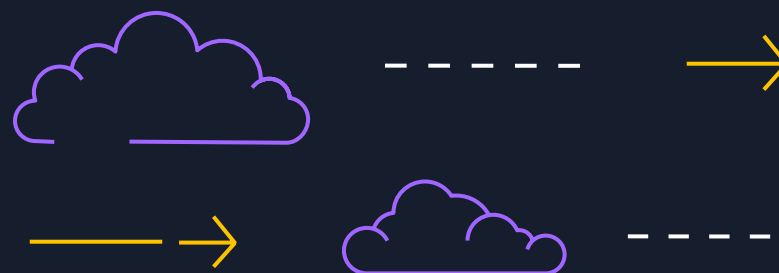
"After moving from .NET Framework to .NET Core, We are identifying and fixing code issues faster before moving into production. We can track and build enhancements and features more consistently now, which gives our development customers more confidence in our API."

Dan Wilkins, Head of Development, Epos Now
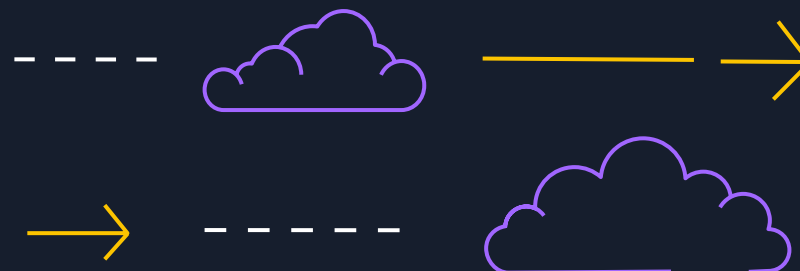
Are you ready to begin your journey?

AWS is the world's leading cloud provider and the ideal partner to help you migrate, modernize, and build your Windows workloads in the cloud.

We provide the platform, people, and tools to get the very best from your Windows-based applications. With thousands of successful migrations for some of the world's largest enterprises and fastest growing start-ups, we have the unmatched experience you can depend on throughout your journey.

Choose AWS for Windows to dramatically lower your costs while amplifying your agility, performance, and security. Then accelerate innovation and seize a world of opportunity. Together we will establish a robust foundation to transform your applications—and your organization.

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> **AWS migration resources**
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