

Modernize Your Microsoft Applications on Amazon Web Services

How to Start Your Journey

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Abstract

The cloud is now the center of most enterprise IT strategies. Many enterprises find that a well-planned “lift and shift” move to the cloud results in an immediate business payoff. This whitepaper is intended for IT pros and business decision makers in Microsoft-centric organizations who want to take a cloud-based approach to IT and must modernize existing business-critical applications built on Microsoft Windows Server and Microsoft SQL Server. This paper covers the benefits of modernizing applications on Amazon Web Services (AWS) and how to get started on the journey.

Why Modernize Applications?

For many IT organizations, application modernization is a major initiative for a few major reasons:

- **Move off legacy software**

To avoid the time, cost, and performance and reliability challenges of maintaining legacy software and unsupported versions (Windows Server 2003, SQL Server 2003, and SQL Server 2005).

- **DevOps Initiatives**

To take advantage of new DevOps and application lifecycle management methodologies. By moving to new application delivery platforms, companies can increase the speed of innovation.

- **Mobility initiatives**

As users move to mobile devices, the use of IT services can increase by one or more orders of magnitude. This poses scalability challenges if an application is not prepared for that kind of growth.

- **New product launches**

New product launches can cause rapid spikes in demand for IT. The underlying applications, including Microsoft SQL Server and Microsoft SharePoint, must be ready with the scale required to support the launch.

- **Mergers and acquisitions (M&A) activity**

In the case of mergers and acquisitions, complexity builds up over time. After multiple acquisitions, a company may find itself in possession of several hundred SharePoint sites, multiple Exchange instances, and countless SQL Server databases. Streamlining the management of disparate applications is often a huge undertaking.

Why Run Microsoft Applications on AWS?

In a recent survey¹, International Data Corporation (IDC) reported that 50 percent of respondents were using AWS to support productivity applications like those from Microsoft. Of that number, 65 percent said they planned to increase their use of AWS either to move existing applications or to expand applications already running on AWS. Clearly, customers are already making the move to modernize their Microsoft applications.

AWS for Corporate Applications

Customers can improve their security posture and application performance and reliability by running corporate applications built on Microsoft Windows Server in the AWS cloud. For example, customers can deploy a globally accessible SharePoint environment in any of the 33 AWS Availability Zones in a matter of hours. To reduce complexity, customers can use AWS tools that integrate with Microsoft management and access control applications like System Center and Active Directory. Customers can also use AWS CloudFormation templates to perform application deployments reliably and repeatedly.

AWS for LOB Applications and Databases

Line of business (LOB) owners are running applications in areas as diverse as oil and gas exploration, retail point of sale (POS), finance, health care, insurance, pharmaceuticals, media and entertainment, and more. To accelerate and simplify the time to deployment, customers can launch pre-configured Amazon Machine Image (AMI) templates with fully compliant Microsoft Windows Server and Microsoft SQL Server licenses included.

AWS for Developers

Customers who develop on AWS have access to Microsoft development tools, including Visual Studio, PowerShell, and the .NET Developer Center. When these tools are combined with scalability and agility of AWS CodeDeploy, AWS Elastic

¹ <http://www.idc.com/getdoc.jsp?containerId=256654>

Beanstalk (Elastic Beanstalk), and AWS OpsWorks, customers can complete and deploy code on AWS much faster and with lower risk.

Which Microsoft Applications Can I Run on AWS?

Customers have successfully deployed virtually every Microsoft application to the AWS cloud, including:

- Microsoft Windows Server
- Microsoft SQL Server
- Microsoft Active Directory
- Microsoft Exchange Server
- Microsoft Dynamics CRM and Dynamics AX, Dynamics ERP
- Microsoft SharePoint Server
- Microsoft System Center
- Skype for Business (formerly Microsoft Lync)
- Microsoft Project Server
- Microsoft Visual Studio Team Foundation Server
- Microsoft BizTalk Server
- Microsoft Remote Desktop Services

How Do I Get Started?

For enterprises, the first step is to determine which of the more than 50 AWS services will be used to support their application modernization initiative. The following figure shows how the typical functions of an enterprise IT organization map to AWS offerings. This paper discusses some of the key services in this map and how they fit into a Microsoft application modernization initiative.

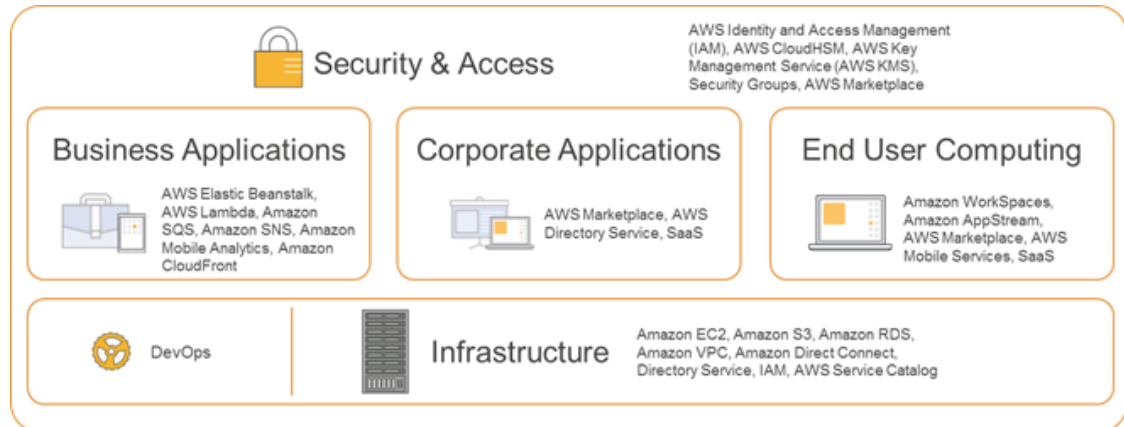


Figure 1: A Conceptual Map of Enterprise IT with Amazon Web Services

Security and Access

We worked with AWS to develop a security model that allows us to be more secure in AWS than we can be even in our own data centers.

— Rob Alexander, CIO, Capital One

With the increasing concern and focus on security, most customers start here by choosing services that ensure compliance and manage risk. The same security isolations found in a traditional data center are used in the AWS cloud, including physical security, separation of the network, isolation of server hardware, and isolation of storage. AWS has achieved ISO 27001 certification and has been validated as a Level 1 service provider under the Payment Card Industry (PCI) Data Security Standard (DSS). AWS undergoes annual Service Organization Control (SOC) 1 audits and has been successfully evaluated at the Moderate level for federal government systems and Department of Defense Information Assurance Certification and Accreditation Process (DICAP) Level 2 for Department of Defense (DOD) systems.

For many enterprises considering the right set of services for security and permissions, AWS virtual private networks, AWS Direct Connect, and AWS Directory Services are at the heart of the discussion. Amazon Virtual Private Cloud (Amazon VPC) lets customers launch AWS resources into a virtual network that they've defined. This virtual network closely resembles a traditional network in an on-premises data center, but with the benefits of the scalable infrastructure of AWS.

AWS Direct Connect links the organization's internal network to AWS over a private 1 gigabit or 10 gigabit Ethernet fiber-optic cable. One end of the cable is connected to the data center router, the other to an AWS Direct Connect router. With this encrypted connection in place, customers can create virtual interfaces directly to the AWS cloud (for example, to Amazon Elastic Compute Cloud (Amazon EC2) and Amazon Simple Storage Service (Amazon S3)) and to Amazon VPC, bypassing Internet service providers in the network path.

AWS Directory Service is a managed service that makes it easy to connect AWS services to existing on-premises Microsoft Active Directory (through the use of AD Connector) or to set up and operate a new directory in the AWS cloud (through the use of Simple AD and AWS Directory Service for Microsoft Active Directory).

Data encryption services are provided for data in flight (through SSL) and at rest, through options for both server-side and client-side encryption. AWS Certificate Manager (ACM), AWS Key Management Service (AWS KMS), and AWS CloudHSM can be used together to ensure key and certificate management services are provided to securely generate, store, and manage cryptographic keys used for data encryption.

Finally, AWS WAF provides web application firewall services to help protect web applications from common web exploits that could affect application availability, compromise security, or consume excessive resources.

Compute: Windows Server Running on EC2 Instances

We didn't have time to redesign applications. AWS could support our legacy 32-bit applications on Windows Server 2003, a variety of Microsoft SQL Server and Oracle databases, and a robust Citrix environment.

— Jim McDonald, Lead Architect, Hess

After a security strategy is in place, it's time to look at the infrastructure that will support the applications that will be modernized.

Amazon EC2 is a web service that provides resizable computing capacity that is used to build and host software systems. When designing Windows applications to run on Amazon EC2, customers can plan for rapid deployment and rapid reduction of compute and storage resources, based on changing needs. When customers run Windows Server on an EC2 instance, they don't need to provision the exact system package of hardware, virtualization, software, and storage the way they do with Windows Server on-premises. Instead, they can focus on using a variety of cloud resources to improve the scalability and overall performance of the Windows applications. After an Amazon EC2 instance running Windows Server is launched, it behaves like a traditional server running Windows Server. For example, whether Windows Server is deployed on-premises or on an Amazon EC2 instance, it can run web applications, conduct batch processing, or manage applications requiring large-scale computations. Customers can remote directly into Windows Server instances using Remote Desktop Protocol for easy management. They can run PowerShell scripts against a single Windows Server instance or against an entire fleet using the Amazon EC2 Run Command.

Applications built for Amazon EC2 use the underlying computing infrastructure on an as-needed basis. They draw on resources (such as storage and computing)

on demand in order to perform a job, and relinquish the resources when done. In addition, they often terminate themselves after the job is done. While in operation, the application scales up and down elastically based on resource requirements. Elastic Load Balancing automatically distributes incoming application traffic across multiple Amazon EC2 instances in the cloud. This enables customers to achieve more fault tolerance in applications, seamlessly providing the required amount of load balancing capacity required to distribute application traffic.

Auto Scaling lets customers follow the demand curve for applications very closely, reducing the need to manually provision capacity in advance. For example, customers can set a condition to add new Amazon EC2 instances to the Auto Scaling group in increments when the average utilization of the Amazon EC2 fleet is high; similarly, they can set a condition to remove instances in the same increments when CPU utilization is low.

Databases: SQL Server Running on Amazon RDS or Amazon EC2

Amazon Relational Database Service (Amazon RDS) allows our DBA team to focus less on the day-to-day maintenance and use their time to work on enhancements. And Elastic Load Balancing has allowed us to move away from expensive and complicated load balancers and retain the required functionality.

— Chad Marino, Director of Technology Services, Kaplan

Another key building block in modernization planning is the choice of database services. Customers who want to manage, scale, and tune SQL Server deployments in the cloud can use Amazon RDS or run SQL Server on Amazon EC2.

Customers who prefer to let AWS handle the day-to-day management of SQL Server databases choose Amazon RDS because the service makes it easy to set up, operate, and scale a relational database in the cloud. Amazon RDS automates installation, disk provisioning and management, patching, minor version upgrades, failed instance replacement, and backup and recovery of SQL Server databases. Amazon RDS also offers automated synchronous replication across multiple Availability Zones (Multi-AZ) for a highly available and scalable environment fully managed by AWS. This allows customers to focus on higher-level tasks, such as schema optimization, query tuning, and application development, and eliminate the undifferentiating work that goes into maintenance and operation of the databases. Amazon RDS for SQL Server supports Windows Authentication, making it easier for customers to access and manage Amazon RDS for SQL Server instances.

Amazon RDS for SQL Server supports Microsoft SQL Server Express, Web, Standard, and Enterprise Editions. SQL Server Express is available at no additional licensing cost, and is suitable for small workloads or proof-of-concept deployments. SQL Server Web Edition is best for public and Internet accessible web workloads. SQL Server Standard Edition is suitable for most SQL Server workloads, and can be deployed in a Multi-AZ mode. SQL Server Enterprise Edition is the most feature-rich edition of SQL Server, and can also be deployed in Multi-AZ mode.

Management Services: Amazon CloudWatch, AWS CloudTrail, Run Command

The way CSS automated launching instances reduced the time to launch a project by about 75 percent. What used to take four days now only takes one day. We're not rebuilding web and database servers from the ground up all the time. We can just clone and reuse images.

— Nick Morgan, Enterprise Architect, Unilever

AWS provides a comprehensive set of management services for the enterprise:

- **Amazon CloudWatch:** Customers can use Amazon CloudWatch to monitor, in real time, AWS resources and applications running on AWS. CloudWatch alarms send notifications or, based on rules that customers define, make changes automatically to the monitored resources.
- **AWS CloudTrail:** With AWS CloudTrail, customers can monitor their AWS deployments in the cloud by getting a history of AWS API calls made in their account, including API calls made through the AWS Management Console, the AWS SDKs, command line tools, and higher-level AWS services. Customers can also identify which users and accounts called AWS APIs for services that support CloudTrail, the source IP address from which the calls were made, and when the calls occurred. CloudTrail can be integrated into applications using the API to automate trail creation for the organization, check the status of trails, and control how administrators turn CloudTrail logging on and off.
- **Amazon EC2 Run Command:** For automating common administrative tasks like patch management or configuration updates that apply across hundreds of virtual machines, customers can use the Amazon EC2 Run Command, which provides a simple method for running PowerShell scripts. The Run Command is integrated with AWS Identity and Access Management (IAM) solutions to ensure administrators have access to updates for only those machines they own. All updates are audited through AWS CloudTrail.

AWS add-ins for Microsoft System Center extend the functionality of existing System Center implementations for use with Microsoft System Center Operations Manager and Microsoft System Center Virtual Machine Manager. After installation, customers can use the familiar System Center interface to view and manage Amazon EC2 for Microsoft Windows Server resources in the AWS cloud, as well as Windows Servers installed on-premises.

Complete the Solution with the AWS Marketplace

Customers often have a preferred ISV for specialized software solutions for enhanced security, business intelligence, storage, and more. AWS Marketplace is an online store that makes it easy for customers to discover, purchase, and deploy the software and services they need to build solutions and run their businesses.

With more than 2,600 listings across more than 35 categories, the AWS Marketplace simplifies software licensing and procurement by enabling customers to accept user agreements, choose pricing options, and automate the deployment of software and associated AWS resources with just a few clicks. AWS Marketplace also simplifies billing for customers by delivering a single invoice detailing business software and AWS resource usage on a monthly basis. The AWS Marketplace includes offerings from SAP, Tableau, NetApp, Trend Micro, F5 Networks, and many more. Customers have access to Microsoft applications, such as Microsoft Windows Server, Microsoft SQL Server, and Microsoft SharePoint custom AMIs through Marketplace partners.

Licensing Considerations

Customers have options for using new and existing Microsoft software licenses in the AWS cloud. For new applications, customers can purchase Amazon EC2 or Amazon RDS instances with a license included. With this approach, customers get new, fully compliant Windows Server and SQL Server licenses directly from AWS. Customers can use them on a “pay as you go” basis with no upfront costs or long-term investments. Customers can choose from AMIs with just Microsoft Windows Server, or with Windows Server and Microsoft SQL Server already installed. Client access licenses (CALs) are included.

Customers who have already purchased Microsoft software have a “bring your own license” (BYOL) option, which is allowed by Microsoft under the Microsoft License Mobility policy through Software Assurance. Microsoft’s License Mobility program allows customers who already own Windows Server or Microsoft SQL Server licenses to run their deployment on Amazon EC2 and Amazon RDS. This benefit is available to Microsoft Volume Licensing (VL) customers with Windows Server and SQL Server licenses (currently including Standard and Enterprise Editions) covered by Microsoft Software Assurance contracts.

In cases where the customer’s license agreement requires control to the socket, core, or per-VM level, customers can use Amazon EC2 Dedicated Hosts, which provide the customer with hardware that to track license consumption and compliance and report it to Microsoft or ISVs.

Conclusion

This paper describes the benefits of modernizing your applications on Amazon Web Services and how you can get started on the journey. It shows how you can benefit from running corporate applications, LOB and database applications, or developing new applications using the AWS platform for your modernization initiative. We recommend the AWS services that you should look to start the process of modernizing your applications on AWS.

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