



Windows on AWS – Infrastructure overview for system engineers

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AWS

Why AWS is the best place to Migrate & Modernize Microsoft Workloads

Figure 1. Magic Quadrant for Cloud Infrastructure as a Service, Worldwide



AWS Recognized as a Cloud Leader for the 9th Consecutive Year

Gartner, Magic Quadrant for Cloud Infrastructure as a Service, Worldwide, Raj Bala, Bob Gill, Dennis Smith, David Wright, July 2019. ID G00365830. Gartner does not endorse any vendor, product or service depicted in its research publications, and does not advise technology users to select only those vendors with the highest ratings. Gartner research publications consist of the opinions of Gartner's research organization and should not be construed as statements of fact. Gartner disclaims all warranties, expressed or implied, with respect to this research, including any warranties of merchantability or fitness for a particular purpose. The Gartner logo is a trademark and service mark of Gartner, Inc., and/or its affiliates, and is used herein with permission. All rights reserved.

Why Customers Choose AWS for their Microsoft Workloads

Most Experience

11

Years running Windows workloads, longer than Azure has existed

Greater Reliability

7x fewer

downtime hours in 2008 than Azure
Downtime hours from 1/1/18 to 12/31/18 pulled directly from the public service health dashboards of the major cloud providers.

Higher Availability

69

Availability zones spanning 23 geographic regions

Better Price-Performance

2x greater

Price-Performance than Azure when running Windows and SQL Server

Greater Security

89

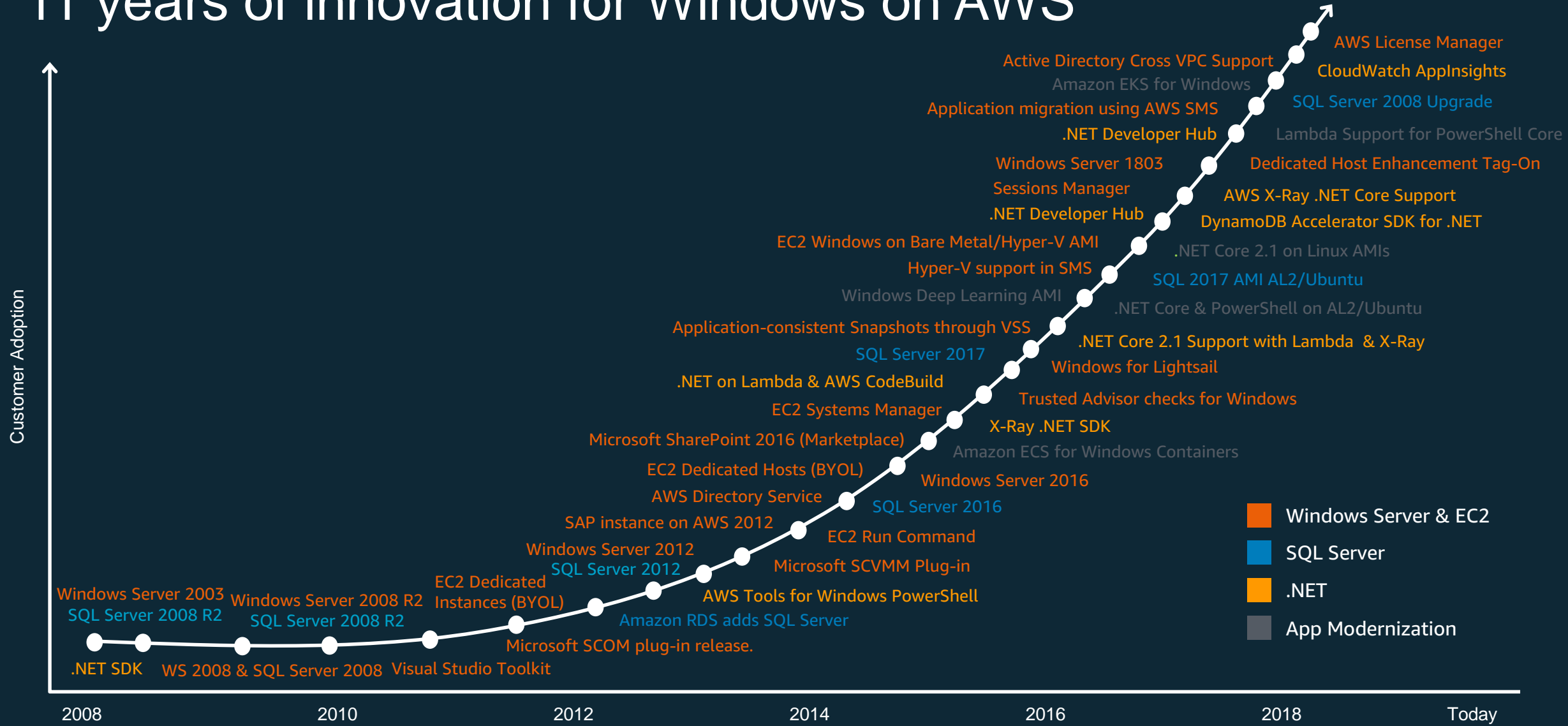
Compliance certifications
HIPAA, FISMA, ITAR, EU Model Clauses
SOC-1,2,3 FIPS, ISO

Better TCO

56% lower

Cost of operations over 5 years after migrating Windows to AWS

11 years of innovation for Windows on AWS





90%

**of the items on the roadmap
originate with customer requests
and are designed to meet specific
needs and requirements**

AWS hosts nearly 2x as many Windows Server instances in the cloud as Microsoft



re:Invent 2019 announcements for Windows

- FSX – Fully-managed native-windows compatible storage, low-cost multi-AZ file system
- License Manager – Ability to enforce license limits, easier tracking and governance on-prem/cloud
- Cloud-like dedicated host – integration with AWS License Manager 2019
- AWS Compute Optimizer – Identify optimal EC2 instance and EC2 auto scaling groups using ML engine
- AWS SSO – simplified user experience with central management and support for Azure AD (SAML, SCIM)
- Amazon EC2 Image Builder – automate creation, management and deployment of “golden” VM images
- AWS Launch Wizard – Guided experience to size, configure and deploy select enterprise workloads on AWS
- Migration acceleration program for Windows (Q1 – 2020) – Assessment, planning and execution
- AWS End-of-support Migration program (EMP) solution for migrating end of support Windows workloads
- Application Modernization Lab – Programmatic application modernization strategy to enable customers
- Group Managed Service Accounts (gMSA) support in ECS and EKS – containerize your existing applications without breaking AD integration
- Database freedom – Database migration from SQL Server to AWS-native database services (e.g. Aurora)
- Deep Learning AMI on Windows on AWS (85% of TensorFlow projects in the cloud happen on AWS)
- AWS Data Exchange – easily exchange data in the cloud between data providers and data subscribers

Getting started with AWS Compute Services (EC2)

Visit the AWS EC2 site

<https://aws.amazon.com/ec2/>

Check out the Windows on AWS site

<https://aws.amazon.com/windows>

Amazon EC2
Secure and resizable compute capacity in the cloud. Launch applications when needed without upfront commitments.

Amazon Elastic Compute Cloud (Amazon EC2) is a web service that provides secure, resizable compute capacity in the cloud. It is designed to make web-scale cloud computing easier for developers. Amazon EC2's simple web service interface allows you to obtain and configure capacity with minimal friction. It provides you with complete control of your computing resources and lets you run on Amazon's proven computing environment.

7x fewer downtime hours than the next largest cloud provider* **Millions of customers ranging from enterprises to startups**

22 regions and 69 availability zones globally **275 instances for virtually every business need**

*Based on downtime hours from 1/1/18 to 12/31/18 pulled directly from the public service health dashboards of the major cloud providers.

Reliable, Scalable, Infrastructure On Demand

- Increase or decrease capacity within minutes, not hours or days
- SLA commitment of 99.99% availability for each Amazon EC2 region. Each region consists of at least 3 availability zones
- The AWS Region/AZ model has been recognized by Gartner as the recommended approach for running enterprise applications that require high availability

Tomasz Kozlowski
Associate Director, Enterprise Architecture

Vast Breadth and Depth of Compute Services

- More workloads including SAP, HPC, Machine Learning, Windows, and many more run on AWS than on any other cloud
- 275 instance types to help optimize the cost and performance of your workloads
- Available with choice of processor, storage and networking options, operating system, and purchase model

airbnb

"We've seen that Amazon Web Services listens to customers' needs. If the feature does not yet exist, it probably will in a matter of months. The low cost and simplicity of its services made it a no-brainer to switch to the AWS cloud."

Tobi Knaup
Engineer, Airbnb

Windows on AWS
The most popular, secure, and reliable cloud for Windows

Get started on Windows Server

Customers have been running Windows workloads on AWS for over a decade. We run nearly 2x more Windows Server instances than the next largest cloud provider, according to an IDC report. Our experience running Windows applications has earned our customers' trust and the number of AWS enterprise customers using Amazon EC2 for Windows Server has grown 5x since 2015. You can select from a number of Windows Server versions including the latest version, Windows Server 2019. In addition, AWS supports everything you need to build and run Windows applications including Active Directory, .NET, System Center, Microsoft SQL Server, Visual Studio and Windows desktop-as-a-service. AWS also has the first and only fully managed native-Windows file system available in the cloud with FSx for Windows File Server and is the only cloud provider to provide production support for Kubernetes on Windows.

Windows Server 2008/2008 R2 End of Support

Support ends for Windows Server 2008/2008 R2 on January 14, 2020. Upgrade your legacy Windows Server applications to latest supported versions of Windows Server without any code changes.

Learn More

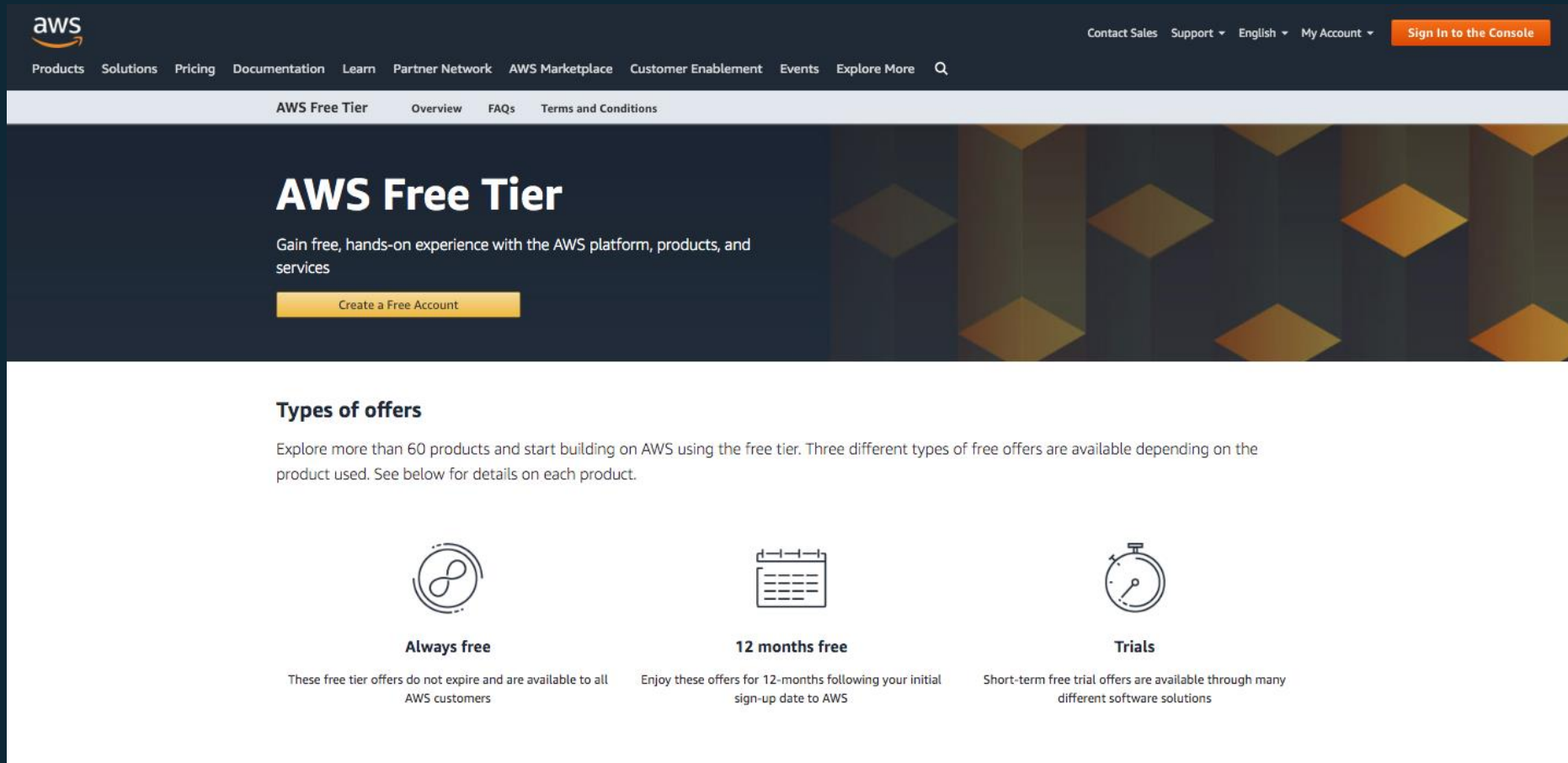
The AWS advantage for Windows over the next largest cloud provider

- 2x** More Windows Server instances
- 2x** More regions with multiple availability zones (22 vs. 10)
- 7x** Fewer downtime hours in 2018*
- 2x** Higher performance for SQL Server on Windows
- 5x** More services offering encryption

*Based on downtime hours from 1/1/18 to 12/31/18 pulled directly from the public service health dashboards of the major cloud providers.

Experiment with AWS Free tier

AWS provides a free tier, go try for yourself! <https://aws.amazon.com/free/>



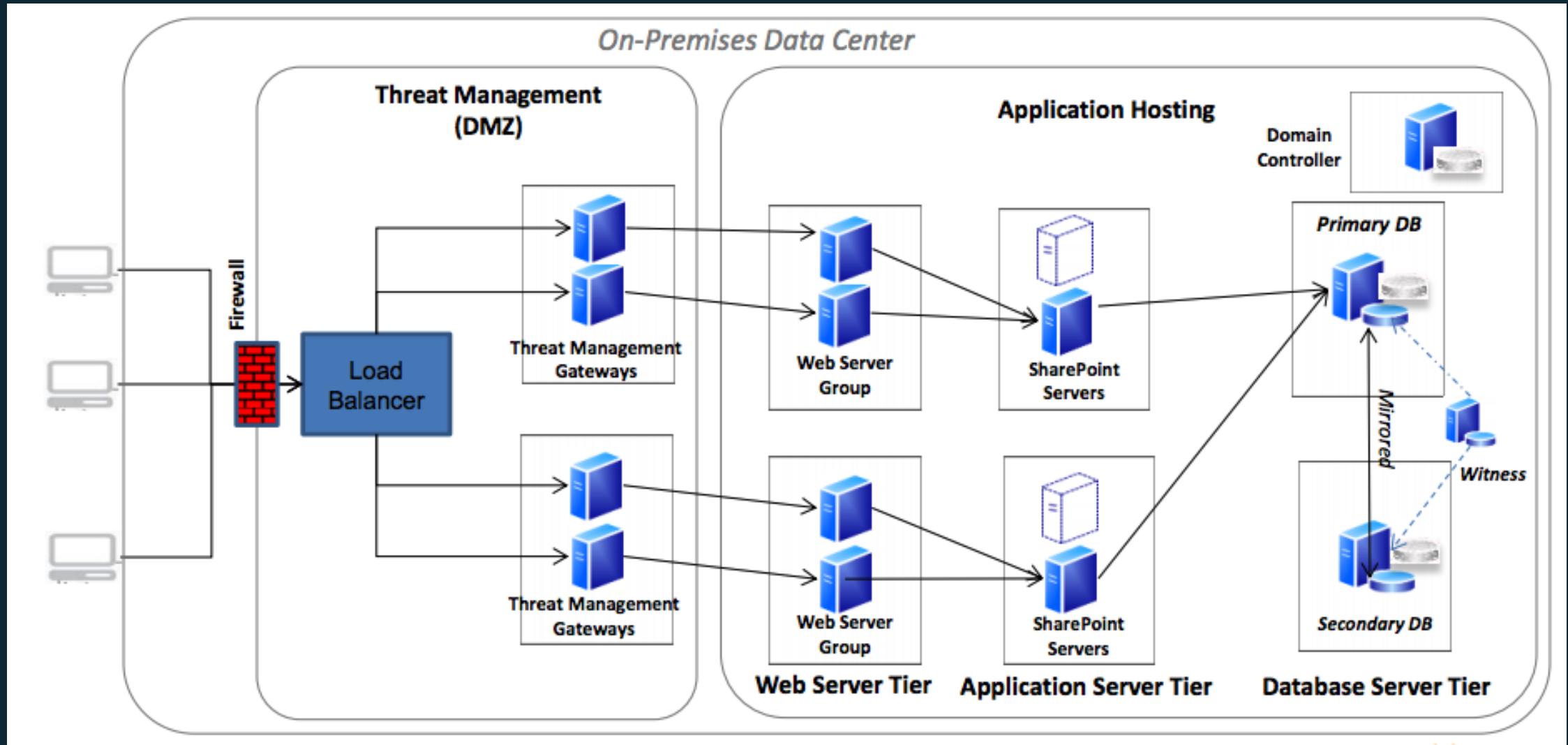
The screenshot shows the AWS Free Tier landing page. At the top, there is a navigation bar with the AWS logo on the left and links for 'Contact Sales', 'Support', 'English', 'My Account', and a 'Sign In to the Console' button. Below the navigation bar, there are links for 'Products', 'Solutions', 'Pricing', 'Documentation', 'Learn', 'Partner Network', 'AWS Marketplace', 'Customer Enablement', 'Events', and 'Explore More'. The main heading is 'AWS Free Tier' with sub-links for 'Overview', 'FAQs', and 'Terms and Conditions'. The main content area features a large heading 'AWS Free Tier' and a sub-heading 'Gain free, hands-on experience with the AWS platform, products, and services'. A prominent yellow button labeled 'Create a Free Account' is positioned below the sub-heading. The background of this section has a pattern of overlapping diamond shapes in shades of blue and orange. Below this, a section titled 'Types of offers' explains that there are more than 60 products and three types of free offers: 'Always free', '12 months free', and 'Trials'. Each offer type is accompanied by an icon and a brief description.

Types of offers

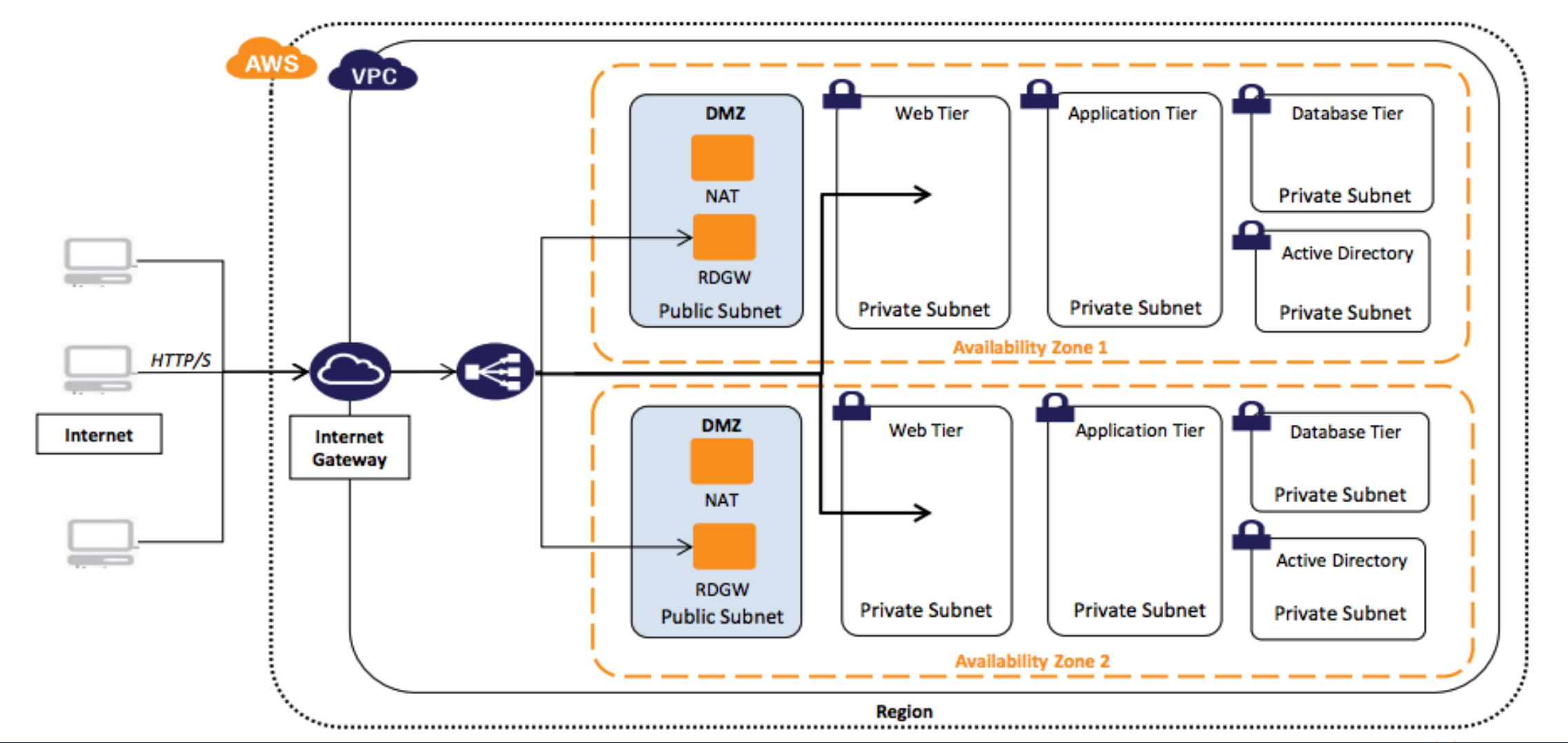
Explore more than 60 products and start building on AWS using the free tier. Three different types of free offers are available depending on the product used. See below for details on each product.

- Always free**
These free tier offers do not expire and are available to all AWS customers
- 12 months free**
Enjoy these offers for 12-months following your initial sign-up date to AWS
- Trials**
Short-term free trial offers are available through many different software solutions

Cloud infrastructure concepts (on-prem)



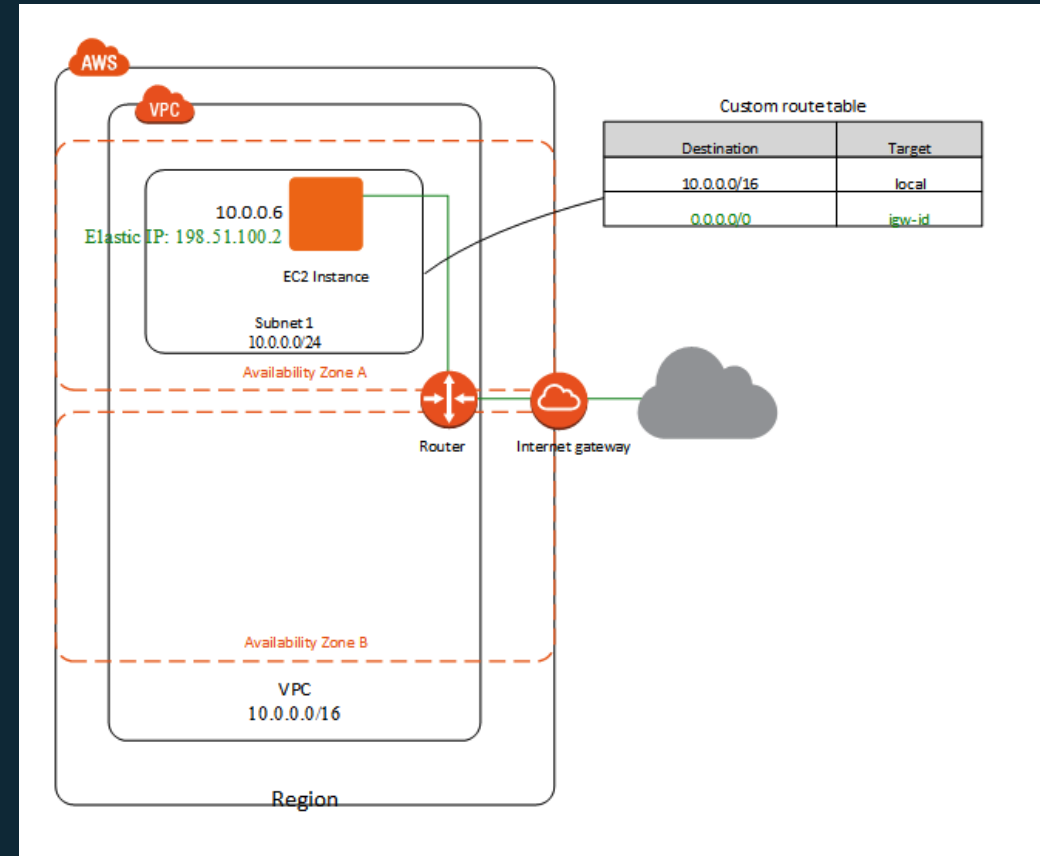
Cloud infrastructure concepts (AWS)



Networking concepts in AWS

Virtual Private Cloud (VPC) is a core foundation for AWS

- Resembles tradition network in data center
- Benefits of scalable infrastructure of AWS
- VPC is a virtual network dedicated to your AWS account.
- A subnet is a range of IP addresses in your VPC.
- A route table contains a set of rules, called routes, that are used to determine where network traffic is directed.
- An internet gateway is a horizontally scaled, redundant, and highly available VPC component that allows communication between instances.
- A VPC endpoint enables you to privately connect your VPC to supported AWS services



Network security concepts overview

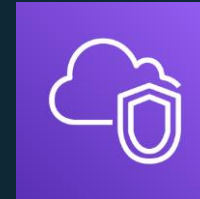
Firewalls (on-prem to AWS)

- Network access control lists (NACL) function as a firewall across subnets (stateless)
- Security groups function as a firewall for EC2 instance (stateful)



Network isolation

- VPC provides logical isolation of the AWS cloud
- Complete control of network environment
- IP address range
- Creation of subnets
- Route table configuration
- Network gateways



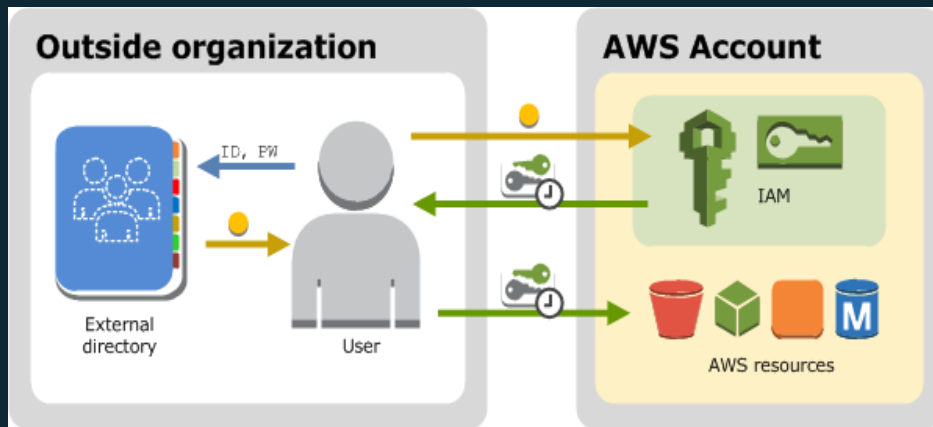
Threat management and detection

Amazon GuardDuty is an integrated threat management solution for AWS

- Uses machine learning, anomaly detection and integrated threat management
- Identify and prioritized threats, and analyzes events across multiple AWS data sources



Active directory and AWS (various options)



AWS Identity and Access Management (IAM)

- Securely manage AWS services and resources.
- Create and manage AWS users and groups
- Permissions to allow/deny access to AWS resources

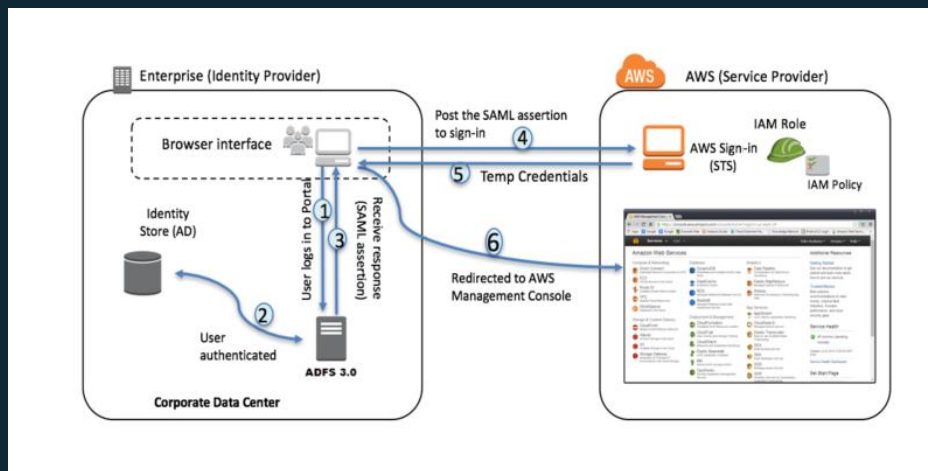
Use Microsoft AD to manage the windows environment

- Promote a domain controller to one of the EC2 Windows instances for the existing domain to work with AWS

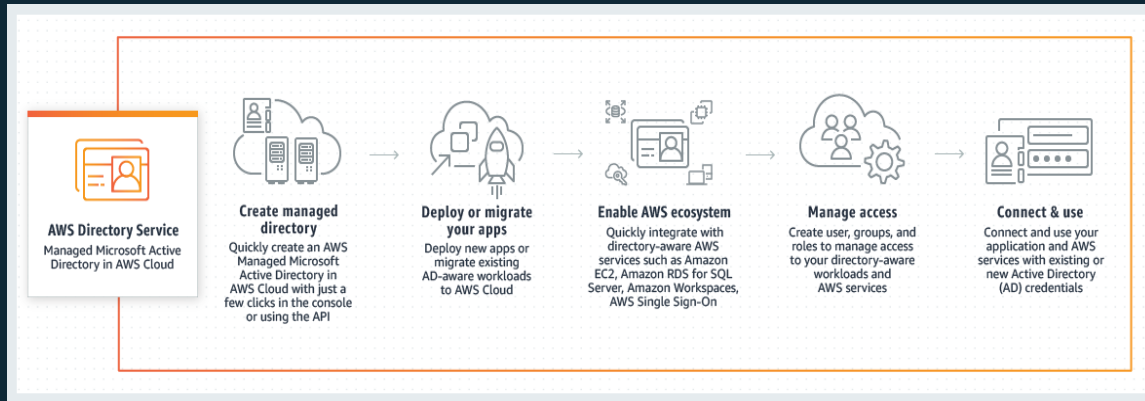
ADFS Federation to AWS

- IAM federated sign-in through AD and ADFS
- Centrally manage user security credentials
- Minimize administrative overhead

<https://aws.amazon.com/blogs/security/aws-federated-authentication-with-active-directory-federation-services-ad-fs/>



AWS Directory Service



AWS Directory Service

- Managed AD experience in AWS cloud
- Easy migration of directory-aware on-prem workloads
- Extension of existing domains
- Central management for applications access and devices

AWS Directory Service

Managed Microsoft Active Directory in the AWS Cloud

Get Started with AWS Directory Service

AWS Directory Service for Microsoft Active Directory, also known as AWS Managed Microsoft AD, enables your directory-aware workloads and AWS resources to use managed Active Directory in the AWS Cloud. AWS Managed Microsoft AD is built on actual Microsoft Active Directory and does not require you to synchronize or replicate data from your existing Active Directory to the cloud. You can use standard Active Directory administration tools and take advantage of built-in Active Directory features, such as Group Policy and single sign-on (SSO). With AWS Managed Microsoft AD, you can easily join Amazon EC2 and Amazon RDS for SQL Server instances to your domain, and use AWS Enterprise IT applications such as Amazon WorkSpaces with Active Directory users and groups.



Benefits

Easily migrate directory-aware, on-premises workloads

AWS Managed Microsoft AD makes it easy to migrate Active Directory-dependent applications and Windows workloads to the AWS Cloud. With AWS Managed Microsoft AD, you can use Group Policies to manage EC2 instances and run AD-dependent applications in the AWS Cloud without the need to deploy your own AD infrastructure.

Easily extend existing domains

AWS Managed Microsoft AD makes it easy to extend your existing Active Directory to the AWS Cloud. It enables you to leverage your existing on-premises user credentials to access cloud resources such as AWS Management console, Amazon Workspaces, Amazon Chime etc. and, Windows workloads in the cloud.

Use actual Microsoft Active Directory

Take advantage of actual Microsoft Active Directory to manage your users, groups, and devices. Use familiar Active Directory administration tools and Active Directory features, such as Group Policy objects (GPOs), domain trusts, fine-grain password policies, and Kerberos-based single sign-on. You can also delegate administrative tasks and authorize access using Active Directory security groups.

Centrally manage application access and devices in the AWS Cloud

Join your computers, laptops, and printers to a managed Active Directory domain. AWS Managed Microsoft AD makes it easy to extend your existing Active Directory to the AWS Cloud. It enables you to leverage your existing on-premises user credentials to access cloud resources such as AWS Management console, Amazon Workspaces, Amazon Chime etc. and, Windows workloads in the cloud. Microsoft AD provides you the option to administer your on-premises users, groups, applications, and systems without the complexity of running and maintaining an on-premises, highly available Active Directory.

Share a single directory for cloud workloads

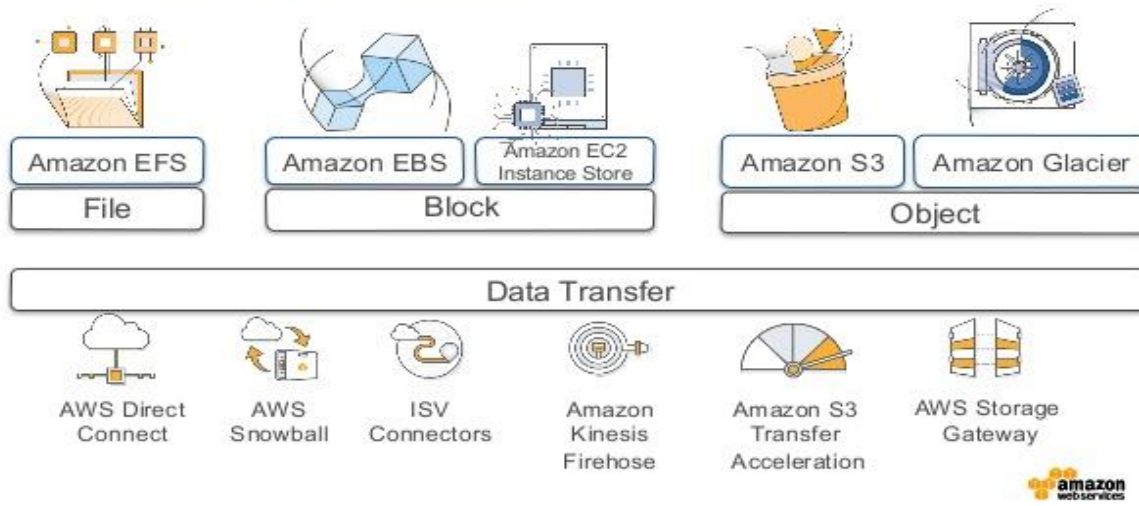
Share a single directory for all your Active Directory-aware Amazon EC2 instances, Amazon RDS for SQL Server instances, and AWS Enterprise IT applications such as Amazon WorkSpaces. You can also share your AD with multiple accounts. Using AWS Managed Microsoft AD helps avoid the complexity of replicating and synchronizing data across multiple directories.

Simplify administration with a managed service

AWS Managed Microsoft AD is built on highly available, AWS-managed infrastructure. Each directory is deployed across multiple Availability Zones, and monitoring automatically detects and replaces domain controllers that fail. In addition, data replication and automated daily snapshots are configured for you. You do not have to install software, and AWS handles all patching and software updates.

AWS Cloud Storage

AWS storage solutions



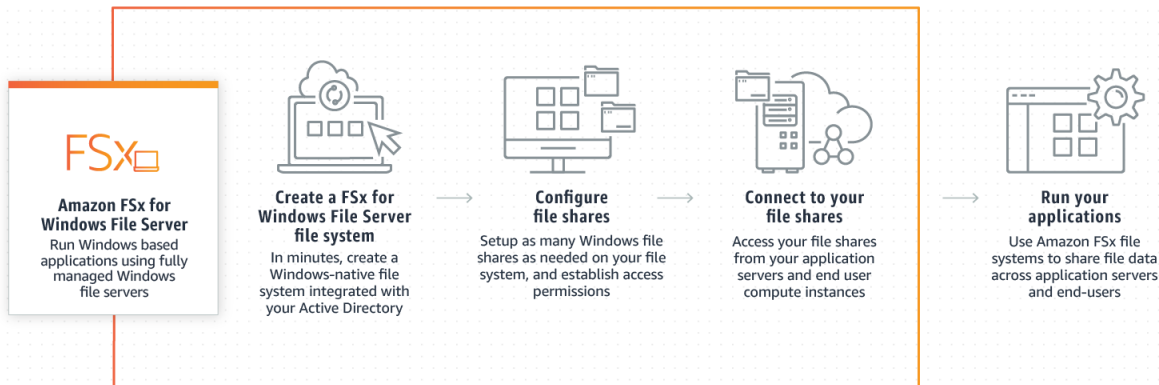
Typical enterprise data center storage

- Storage array networks (SAN)
- Network attached storage (NAS)
- Windows file system

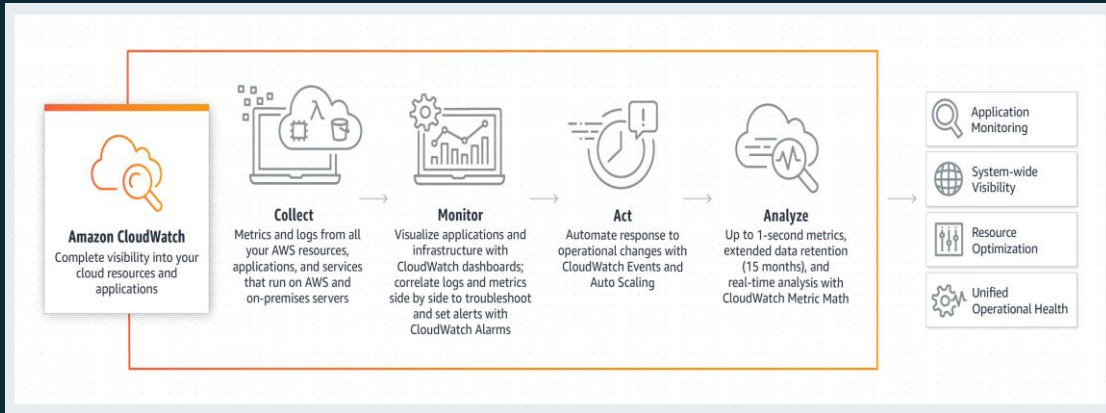
Typical AWS many storage options

- Amazon Elastic Block Store (EBS)
- Amazon EC2 Instance Store
- Amazon Simple Storage Service (S3)
- Amazon Glacier
- Amazon Elastic File System (Amazon EFS)
- Amazon FSx for Windows File Server
- Amazon Firehose Kinesis
- AWS Storage Gateway

AWS continues to innovate on behalf of our customers

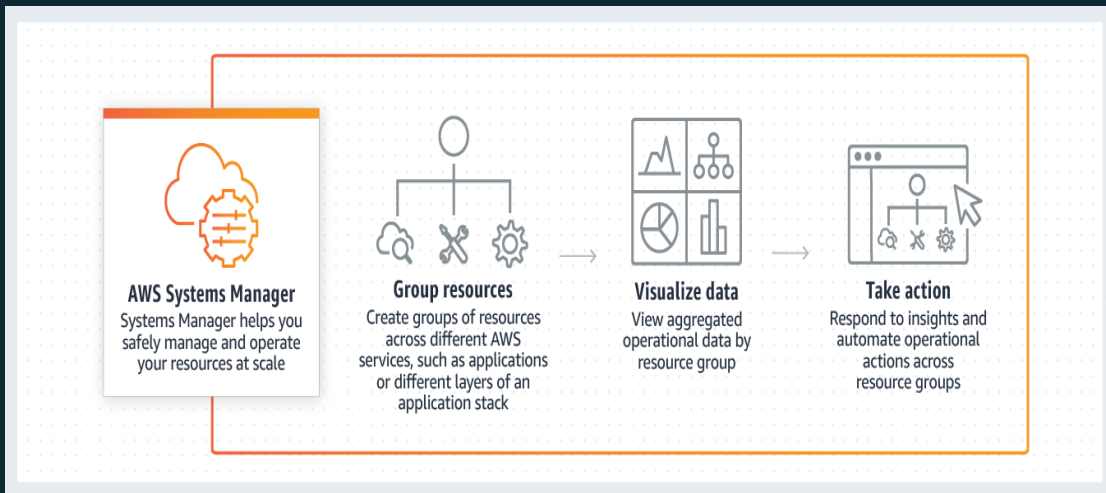


Monitoring in AWS



CloudWatch - monitor Windows workloads in AWS

- Actionable insights to monitor application
- Respond to system-wide performance changes
- Optimize resource utilization
- Unified view of operational health



System Manager - maintain security and compliance

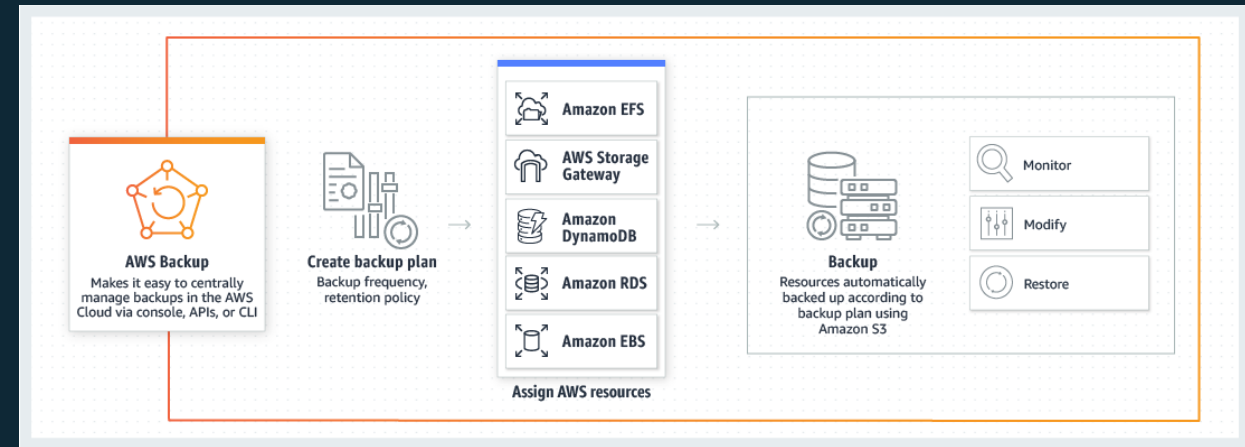
- Scanning managed instances
- Reporting on (or taking corrective actions)
- Visibility and control of cloud and on-prem
- Automates patching of Windows managed instances

Backup in AWS

The screenshot shows the AWS Marketplace website. At the top, there's a search bar and navigation links for Categories, Delivery Methods, Solutions, Migration Mapping Assistant, and Your Saved List. The main heading is "Solutions in AWS Marketplace" with a sub-heading "Find solutions that work for your business from Independent Software Vendors in AWS Marketplace." Below this is a "See solutions" button. A promotional banner for "CloudEndure Migration" is visible, stating it's available at no charge. The main content area is titled "Explore solutions by topic area and use case" and lists various categories like Business Applications, Data and Analytics, Developer Tools, Internet of Things, Machine Learning, Enterprise Resource Planning (ERP), Workforce optimization, Contact management, Training and certification, Media and entertainment, Migration, Infrastructure software, and Security.

AWS Marketplace

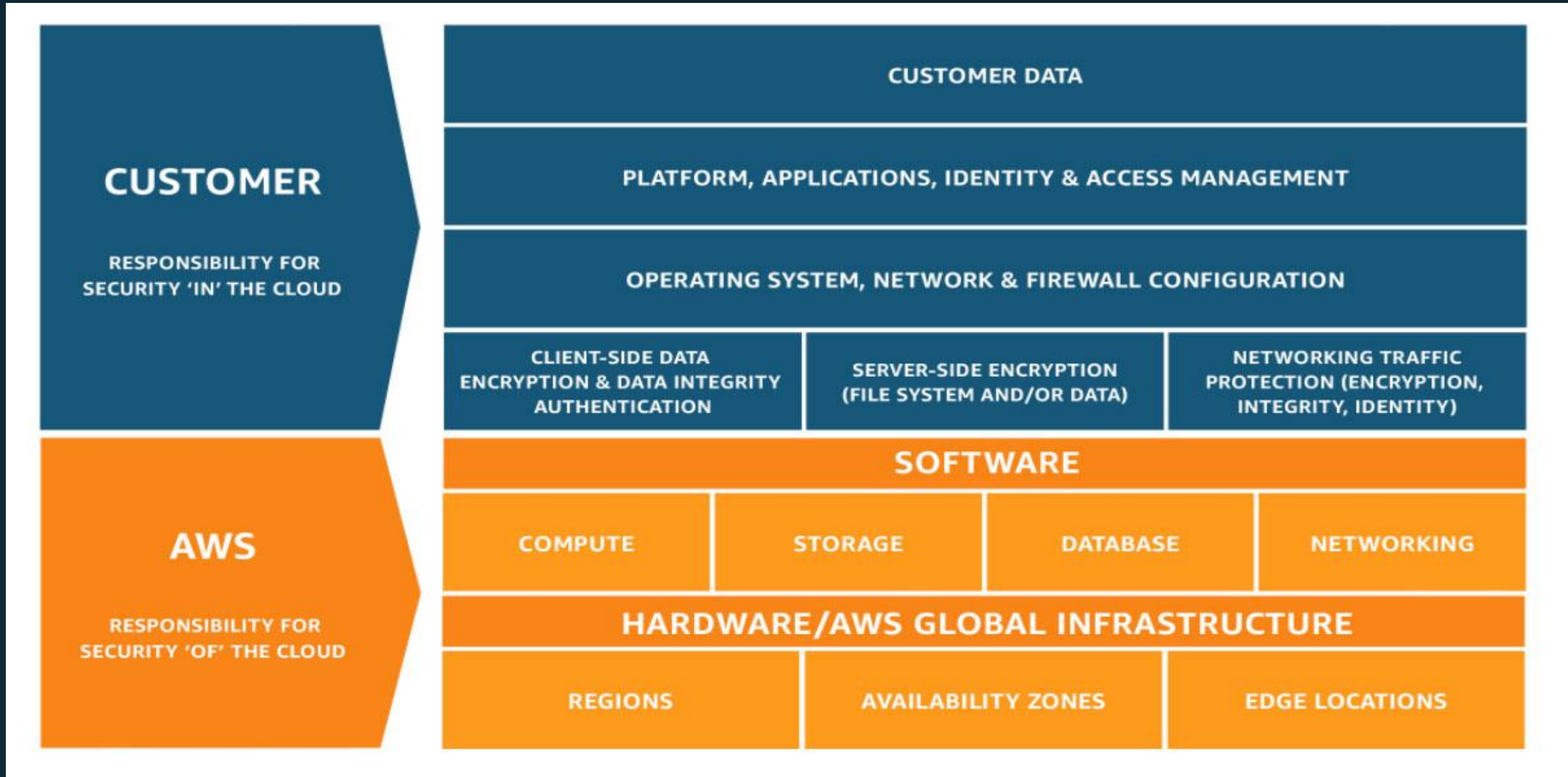
- Backup and data management solutions
- Many existing solutions have AWS cloud variants



AWS Backup key features

- Centrally manage backup
- Automate backup processes
- Improve backup compliance
- Supports multiple data sources
- Cloud-native and hybrid backup support
- On-premises backup (with storage gateway)

AWS shared responsibility model



Summary

- Introduction of Windows workloads on AWS
- Introduction to AWS and pace of innovation
- How to get started on AWS cloud
- Discussed infrastructure overview from on-prem to cloud
- Covered key AWS foundations for compute, networking, security, storage and backup.

Thank you