

What is Microsoft Azure and how does it work



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Microsoft Azure

Microsoft Azure is a public cloud computing platform offering a wide array of services such as compute, analytics, storage, and networking. Users can select and utilize these services to create and scale new applications or run existing ones in the public cloud.

The platform is designed to assist businesses in addressing challenges and achieving their organizational objectives. It caters to various industries, including e-commerce, finance, and Fortune 500 companies, and supports open source technologies. This allows users the freedom to use their preferred tools and technologies. Additionally, Azure provides different forms of cloud computing, including infrastructure as a service (IaaS), platform as a service (PaaS), software as a service (SaaS), and serverless functions.

Microsoft adopts a pay-as-you-go (PAYG) model, where subscribers are billed monthly based on the specific resources and services they have utilized.

How does Microsoft Azure work?

Upon subscribing to Azure, customers gain access to the Azure portal, which offers a range of services for creating cloud-based resources like virtual machines (VMs) and databases. These resources and services can be assembled to create running environments for hosting workloads and data storage.

In essence, Microsoft Azure operates as a versatile and robust cloud computing platform, allowing users to access and utilize a diverse range of services to meet their computing and business needs. They are billed only for the specific resources and services they use on a monthly pay-as-you-go basis.

Azure portal offers various third-party vendor software in addition to Microsoft services, with costs varying and potentially involving both subscription fees for the application and usage fees for hosting infrastructure. Microsoft provides five customer support options for Azure: Basic, Developer, Standard, Professional Direct, and Enterprise (Premier). Each option varies in scope and price, with Basic support available to all accounts and the others incurring fees. Developer support costs \$29 per month, Standard support costs \$100 per month, and Professional Direct support costs \$1,000 per month. The pricing for Enterprise support is not disclosed. If you have specific questions or issues related to these services, feel free to ask for further assistance.

What is Microsoft Azure used for?

Microsoft Azure offers a wide array of services and resources, leading to diverse usage scenarios. One common use case is running virtual machines or containers in the cloud, supporting infrastructure components, server services, networking, and third-party applications. Azure also serves as a platform for hosting various types of databases, including both relational and non-relational databases. Additionally, organizations frequently utilize Azure for backup, disaster recovery, and archival storage to meet long-term data retention requirements. These varied applications demonstrate the versatility and comprehensiveness of Microsoft Azure as a cloud computing platform.

Azure products and services

Azure cloud services are categorized into nearly 20 distinct groups, each encompassing a variety of specific instance or service types. Here are some of the most widely used service categories:

Compute: enables the deployment and management of VMs, containers, batch jobs, and offers support for remote application access.

Mobile: aids in building cloud applications for mobile devices, providing notification services, back-end task support, and tools for building APIs.

Web: supports the development and deployment of web applications along with features for search, content delivery, API management, and notification.

Storage: provides scalable cloud storage for structured and unstructured data, supporting big data projects, persistent storage, and archival storage.

Analytics: includes distributed analytics and storage, real-time analytics, big data analytics, and data warehousing.

Networking: encompasses virtual networks, dedicated connections, gateways, traffic management, load balancing, DNS hosting, and DDoS protection.

Media and CDN: services include on-demand streaming, digital rights protection, encoding, media playback, and indexing.

Integration: includes services for server backup, site recovery, and connecting private and public clouds.

Identity: ensures only authorized users can access Azure services and protects encryption keys and sensitive information.

IoT: helps capture, monitor, and analyze IoT data from sensors and other devices, including notifications, analytics, monitoring, and support for coding and execution.

DevOps: provides project and collaboration tools, application diagnostics, tool integrations, and test labs for build tests and experimentation.

Development: supports code sharing, application testing, and tracking potential issues, as well as offers a range of application programming languages and tools.

Security: provides capabilities to identify and respond to cloud security threats, as well as managing encryption keys and other sensitive assets.

AI and machine learning: comprises a wide range of services to infuse AI, machine learning, and cognitive computing capabilities into applications and data sets.

Containers: supports creation, registration, orchestration, and management of containers in the Azure cloud, using common container platforms.

Databases: includes offerings for SQL and NoSQL database as a service (DBaaS), Azure SQL Data Warehouse, caching, and hybrid database integration.

Migration: provides tools for estimating workload migration costs and performing the actual migration of workloads to the Azure cloud.

Management and governance: offers a range of backup, recovery, compliance, automation, scheduling, and monitoring tools to manage an Azure deployment effectively.

Mixed reality: designed to help developers create content for the Windows Mixed Reality environment.

Blockchain: Azure Blockchain Service for joining a blockchain consortium or creating one.

Intune: used to enroll user devices, push security policies, deploy mobile apps, track app usage, and remotely wipe data from devices.

These categories and services demonstrate the extensive capabilities and resources available within the Microsoft Azure platform.

Azure for DR and backup

Azure is frequently used by organizations for data backup and disaster recovery, as well as an alternative to their own data center storage. Public clouds, such as Azure, are well-suited for high-volume, short-duration tasks like data analytics. They offer virtually unlimited storage capacity, allowing organizations to store large data sets, perform analytics, and manage data lifecycle without the need to invest in local hardware. This utility computing model has been a key driver of public cloud adoption.

Many organizations opt to run some or all of their business applications in Azure instead of investing in local servers and storage. To ensure availability, Microsoft has established Azure data centers worldwide, with services available in 55 regions across 140 countries as of January 2020. However, it's important to note that not all services are available in every region, so Azure users need to ensure that workload and data storage locations comply with prevailing compliance requirements and legislation.

Privacy

Data security and privacy are significant concerns for cloud subscribers due to regulatory compliance requirements. To address these worries, Microsoft has established the online Trust Center, offering detailed information about the company's security, privacy, and compliance measures. According to the Trust Center, Microsoft commits to using customer data only when necessary to provide agreed-upon services and to never disclose customer data to government agencies unless required by law.

Azure also offers a range of services, including identity and access management, firewall, and other security features, enabling users to establish a secure infrastructure and promptly detect

intrusions. These security services are crucial for public cloud adoption, helping users safeguard the privacy of sensitive data and key workloads.

Azure Pricing and Costs

Azure primarily utilizes a pay-as-you-go (PAYG) pricing model, billing users based on their actual usage. However, when a single application utilizes multiple Azure services, each service may involve multiple pricing tiers. It's typical for one service to consume a subset of other services, contributing to the total cost.

For instance, a typical application running in a VM may incur one cost, while the associated storage instance might add a second cost. Additional expenses may arise from networking services, reporting tools, and other resources utilized by the workload. Conversely, services like Azure Functions are free, with users only paying for the compute and other resources required to execute the function for its duration, typically billed to the closest second.

Moreover, users who make long-term commitments to certain services, such as compute instances, may be eligible for discounted rates. Azure reserved VM instances, for example, offer potential savings of up to 80% on VM costs.

Even relatively simple applications can involve multiple interdependent cloud services and resources, making it essential for organizations to review and manage their cloud usage to minimize costs. Azure-native tools like Azure Cost Management can assist in monitoring, visualizing, and optimizing cloud spending. Additionally, third-party solutions like Cloudability and RightScale, along with emerging FinOps practices, can be employed to manage Azure resource usage and associated costs effectively.

Significant Outages

Since early 2012, Microsoft Azure has experienced several major outages. Some notable incidents include a leap day bug disruption in February 2012, an interruption in the West

Europe region in July 2012 lasting approximately two and a half hours, and a worldwide outage in March 2017 affecting 26 of Microsoft's 28 data centers.

Other significant outages occurred in February 2013, October 2013, November 2014, December 2015, September 2016, September 2017, June 2018, September 2018, May 2019, March 2021, April 2021, and October 2021. These incidents led to service unavailability, some lasting for several hours.

Microsoft maintains a comprehensive index of these outages and issues from the past five years, which users can access to research specific outages, understand their implications, root causes, and the implemented fixes at Microsoft's Azure status history page.

Azure Competition

Major public cloud service providers, including Microsoft Azure, Google Cloud, AWS, Oracle, and IBM Cloud, operate on a large global scale. However, there is a notable lack of standardization among their services and capabilities. While these providers offer a broad suite of similar services, no two cloud providers offer the same service in the exact same way.

Cloud providers rely on APIs and other integrations to facilitate provisioning and services in a programmatic manner. Due to the unique nature of these APIs, users are responsible for accommodating differences between cloud providers. As a result, migrating a workload from one cloud to another may require significant recoding of the application or rearchitecting the cloud environment to support the workload. Consequently, utilizing more than one public cloud provider when pursuing a multi-cloud strategy can be challenging.

To mitigate some of these challenges, businesses can leverage third-party cloud management tools. These tools can help streamline the management of multiple cloud environments and alleviate some of the complexities associated with utilizing different public cloud providers.

Azure History

In 2008, Microsoft announced its plans to launch a cloud computing service named Windows Azure. After making preview versions available, the service was officially launched in early 2010. Initially, early editions of Azure lagged behind more established offerings like AWS. However, the platform continued to evolve, offering support for a wider range of programming languages, frameworks, and operating systems.

By early 2014, Microsoft had expanded and updated its service portfolio, adding features such as Azure SQL, Windows Azure CTP, Windows Azure Connect, Traffic Manager, and HPC Scheduler. Recognizing the broad implications of cloud computing beyond the Windows ecosystem, the service was rebranded as Microsoft Azure. Additionally, Azure introduced its first public previews of Machine Learning services during this period.

Subsequently, Azure introduced SONiC (a cross-platform Linux distribution), Azure ARM Portal (2015), Azure Service Fabric (2016), Azure Service Fabric Mesh (2018), and Azure IoT Central (2018). Over time, Azure has emerged as a strong commercial competitor to other major public cloud providers



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