



What is the cloud?

An approach to computing that's about internet scale and connecting to a variety of devices and endpoints



Windows Azure

Cloud Services



IaaS

Infrastructure-as-a-Service

host



PaaS

Platform-as-a-Service

build



SaaS

Software-as-a-Service

consume

Windows Azure

Cloud Computing Patterns

On and Off

On & off workloads (e.g. batch job)
Over provisioned capacity is wasted
Time to market can be cumbersome



Growing Fast

Successful services need to grow/scale
Keeping up w/ growth is big IT challenge
Cannot provision hardware fast enough



Unpredictable Bursting

Unexpected/unplanned peak in demand
Sudden spike impacts performance
Can't over provision for extreme cases



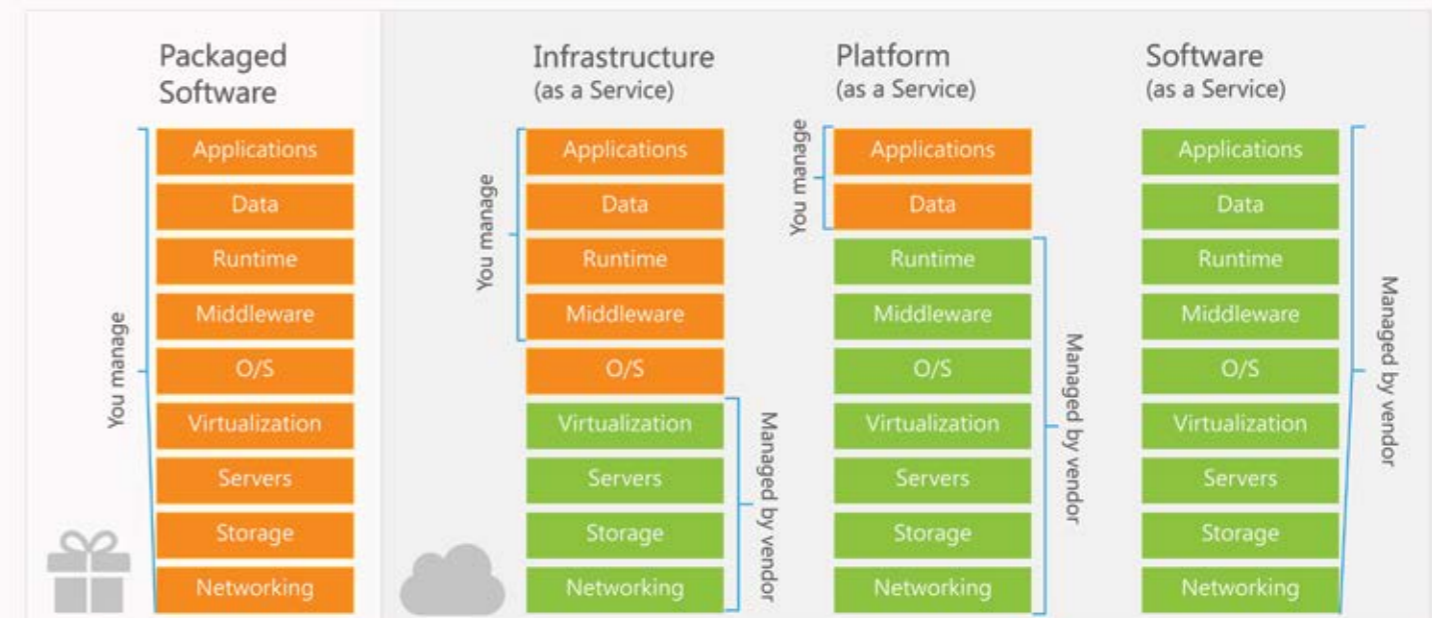
Predictable Bursting

Services with micro seasonality trends
Peaks due to periodic increased demand
IT complexity and wasted capacity



Windows Azure

Cloud Services



Windows Azure

Windows Azure

Comprehensive set of services that enable you to build, host and scale applications in Microsoft datacenters



Open & Flexible



Leverage Existing Investments



Designed for next generation apps

Windows Azure

Windows Azure provided...

- Environments for your apps
- Machines, rack space, switches, connectivity
- Automated deployment & configuration
- Isolation, redundancy, load balancing
- Abstraction & Flexibility



Windows Azure

Windows Azure



Compute



Storage



Database

Core Services

Windows Azure

Windows Azure Storage



Scalable storage in the cloud

100tb per storage account
Auto-scale to meet massive volume and throughput

Accessible via REST services

Access from Windows Azure Compute
Access from anywhere via internet
Supporting .NET Client Library

Various storage types

Table - group of entities (name/value pairs)
Queue - Simple non-transactional message queue
Blob - Large binary storage
Drives - NTFS VHD mounted into Compute instance

Windows Azure

SQL Azure Database

SQL Server relational database model delivered as a service

Support for existing APIs & tools
Built for the cloud with high availability & fault tolerance
Easily provision and manage databases across multiple datacenters

SQL Azure provides logical server

Gateway server that understands TDS protocol
Looks like SQL Server to TDS Client
Actual data stored on multiple backend data nodes



Windows Azure

Building Block Services



Caching

Distributed, in-memory cache for Windows Azure apps
Session state provider for Windows Azure applications
.NET client library for caching data



Access Control

Authn support using multiple identity providers
Easily integrate Live ID, Facebook, Yahoo, Google, & AD
Support for industry standards and existing .NET APIs



Service Bus

Messaging & connectivity for building distributed and loosely-coupled apps in the cloud
Enables hybrid apps across both on-premises & the cloud
Queues & Topics for persistence & pub/sub messaging

Windows Azure

SQL Azure Database

Logical optimizations supported

Indexes, Query plans etc..

Physical optimizations not supported

File Groups, Partitions etc...

Transparently manages physical storage



Windows Azure



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Secure. Evolve. Innovate. with Windows Server 2016

The cloud offers IT organizations opportunities to flourish under a new model that delivers faster time to value and innovation. Many organizations, however, face strict compliance or business requirements. For organizations that need it all—security, efficiency, and innovation—Windows Server 2016 delivers it. Windows Server 2016 is the cloud-ready operating system that supports your current workloads while introducing new technologies that make it easy to transition to cloud computing when you are ready.

Security at the OS level

Windows Server 2016 includes built-in breach resistance to help thwart attacks on your systems and meet compliance goals. Even if someone finds a way into your environment, the layers of security built into Windows Server 2016 limit the damage they can cause and help detect suspicious activity.

- **Protect your virtual machines.** Use the unique Shielded Virtual Machines feature to encrypt your VMs with BitLocker and help ensure they can run only on hosts approved by the Host Guardian Service.
- **Help secure admin credentials.** Protect admin credentials from Pass-the-Hash attacks using Credential Guard and Remote Credential Guard, and control administrator privileges with Just-In-Time Administration and Just Enough Administration, which together help minimize the time and capability granted for specific privileges.
- **Protect the operating system.** Resist breaches with built-in Control Flow Guard, which helps prevent memory corruption attacks, and Windows Defender, optimized for server roles. Help ensure only trusted software can be run on the server with Device Guard.
- **Improve ability to detect attacks.** Use advanced auditing capabilities to help detect malicious behavior.
- **Isolate applications.** Help protect container-based applications with Windows Server containers with Hyper-V isolation, which do not share the host kernel with other containers. Use the distributed firewall, a software-defined networking capability, to control internal and external network traffic to VMs.



Bring Windows Server licenses to Azure

When you are ready to transition workloads to the public cloud, you can leverage your existing investment in Windows Server. The Azure Hybrid Use Benefit lets you bring your on-premises Windows Server licenses with Software Assurance to Azure. Rather than paying the full price for a new Windows Server virtual machine, you pay only the base compute rate.

"Within a few years, I suspect that all hosters—and their clients—will require the use of Shielded Virtual Machines to protect workloads from hosters and fabric admins."

– Philip Moss
Chief Product Officer
Acuutech

"We're moving towards a world where we don't need to know where our data is—on-premises or in the cloud. The combination of Storage Spaces Direct, Hyper-V, scale-out flash storage, and SMB3 allows us to focus on functionality rather than location. With Windows Server 2016, migration is no longer a project, just a task."

– Ulf Preisler
IT Director
Danske Fragtmænd

Secure. Evolve. Innovate.

Evolve your infrastructure

Datacenter operations are struggling to reduce costs while handling more data traffic. New applications stretch the operational fabric and create infrastructure backlogs that can slow business. As organizations push the boundaries of highly virtualized environments, they can use Windows Server 2016 capabilities to meet operational and security challenges, freeing up IT resources to plan a strategy that uses the cloud for future applications and solutions.

Resilient compute

Run your datacenter with a highly automated, resilient server operating system.

- **Trust your workloads to an enterprise-class hypervisor.** You can be confident your workloads will perform on Hyper-V, which Microsoft uses to run hyper-scale datacenters around the globe. When needed, you also can easily migrate a Hyper-V workload from on-premises to a Windows Server VM in Azure.
- **Upgrade efficiently.** Upgrade infrastructure clusters to Windows Server 2016 with zero downtime for your Hyper-V or Scale-out file server workloads, and without requiring new hardware, using Mixed OS Mode cluster upgrades.
- **Stay open.** Deploy applications on multiple operating systems with best-in-class support for Linux on Hyper-V.
- **Automate server management.** Use PowerShell and Desired State Configuration to automate routine operations.
- **Control Windows servers remotely.** Use PowerShell or GUI solutions such as Server Manager or Microsoft Management Console (MMC) tools.

Affordable high-performance storage

Storage systems are critical to the performance of most business applications. But traditional, expensive, manually configured storage systems can prevent organizations from realizing the efficiency benefits of a software-defined datacenter. In contrast, the Azure-inspired, software-defined storage capabilities in Windows Server 2016 use policies and automation to reduce costs and add scale.

- **Reduce cost.** Build highly available, scalable software-defined storage solutions at a fraction of the price of SAN or NAS. With Storage Spaces Direct, you can use industry-standard servers with local storage, including high speed solid-state drives.
- **Create affordable business continuity.** Prepare for the worst using Storage Replica synchronous storage replication for disaster recovery among datacenters.
- **Prioritize storage resources.** Ensure critical applications receive priority access to storage resources using storage Quality of Service (QoS) policies.

Remote Desktop Services with Windows Server 2016

Desktop virtualization is one way IT leaders can more securely deliver applications to the wide array of devices that mobile workers use on the job. Because apps don't execute on the client devices, IT also helps secure corporate data, extends the life of older equipment, and gets more out of newer, lower-cost hardware. The remote desktop experience just got better with Windows Server 2016:

Better graphics experience

Graphics cards (GPUs) can be assigned to a virtual machine, unleashing the full power of available server-class graphics cards to virtual desktops and apps, thus using the native driver of the GPU.

Enhanced connection broker

Connection broker can now handle up to 10,000 concurrent connections.

More efficient cloud deployment

Reduce the number of VMs required for deployment in Azure IaaS, which combines services into a single VM.

Support for cloud-managed domain services

Deploy as easily on-premises as in the cloud, helping mobile workers be productive anywhere, anytime.

Azure-inspired networking

Traditional network infrastructures are rigid and complex. Organizations can respond faster to market changes by moving the network control layer from hardware to software to create a software-defined network. This enables them to centrally configure and manage physical and virtual network devices such as routers, switches, and gateways, resulting in automatic load balancing and the ability to shift workloads without setting switches. IT can continue to use existing physical switches, routers, and other hardware devices with the virtual controllers, while achieving deeper integration between the virtual network and the physical network.

- **Manage by policy.** Deploy and manage workloads across their entire lifecycle with hundreds of networking policies (isolation, QoS, security, load balancing, switching, routing, gateway, DNS, etc.) in a matter of seconds using a scalable Network Controller.
- **Enhance network security.** Dynamically segment your network based on workload needs using a distributed firewall and network security groups to apply rich policies within and across segments. Layer enforcement by routing traffic to virtualized firewall appliances for even greater levels of security.
- **Gain workload mobility.** Take control of your hybrid workloads, including running them in containers, and move them across servers, racks, and clouds using standards-based VXLAN and NVGRE overlay networks and multi-tenanted hybrid gateways.

Application innovation

Increasingly, organizations use apps to help differentiate themselves from the competition. Apps help win, engage, and support customers. Developers building and updating the apps tend to have little patience for the realities of IT infrastructure. They don't want to wait long for IT services, and they want apps in production to work the same way the apps work on developers' machines.

Windows Server 2016 supports application innovation using container technology and microservices. Containers can help speed application deployment and streamline the way IT operations and development teams collaborate to deliver applications. In addition, developers can use microservices architectures to separate app functionality into smaller, independently deployable services, which make it easier to upgrade part of the app without affecting the rest.

Windows Server 2016 helps organizations update and innovate with their apps in three ways:

- **Secure fabric for existing applications.** Give your hard-working client-server applications some assistance. You can run existing apps on Windows Server 2016 without modifying them, which enables them to take advantage of enhanced security and efficiency features in the fabric.

Management options

Microsoft System Center 2016

Whether you have a few servers or thousands, System Center provides efficient deployment and management functionality for your virtualized, software-defined datacenter to bring you increased agility and performance.

PowerShell and Desired State Configuration

Define, deploy, and manage your software environment through PowerShell scripting and Desired State Configuration, using a single console.

Operations Management Suite

To manage and help protect workloads in multiple cloud types, you can extend management to Operations Management Suite (OMS) services for visibility and control across Azure, AWS, Windows Server, Linux, VMware, and OpenStack systems.

"Most of our application portfolio consists of older legacy applications that are cumbersome to update. By moving these applications into Windows Server containers and embracing a microservices architecture, we can break these big applications apart and update the pieces independently. This will reduce customer downtime and increase business agility."

– Stephen Tarmey
Chief Architect
Tyco International

- **Deliver container benefits to existing apps.** Containers isolate the app at the operating-system level and help you move existing applications into a modern DevOps environment with little or no code changes, while gaining benefits such as continuous integration and better security. Containers can help you introduce new architectures, including microservices, which improve application agility and scale. Also, when developers package apps into containers for delivery to IT, they help standardize on a platform that streamlines deployment on-premises, to any cloud, or to a hybrid architecture across clouds.
- **Build cloud-native and hybrid apps.** Create new microservices applications using fewer and compressed resources, and more agile "just enough" technologies. Use containers to build, test, and deploy the apps to any cloud, including Microsoft Azure cloud infrastructure.

Installation options

Customers who choose the Datacenter or Standard editions are able to customize their installation of Windows Server 2016 by choosing from two options:

Option	Scenario	Details
Server Core	Small-footprint, headless operating system removes the desktop UI from the server and runs only required components.	<ul style="list-style-type: none"> • Includes limited local graphical tools such as Task Manager and PowerShell for local or remote management. • Does not include Server Manager or MMC tools.
Server with Desktop Experience (previously known as Server with a GUI)	Provides user experience for those who need to run an app that requires a local user interface or for a Remote Desktop Services Host.	<ul style="list-style-type: none"> • Experience a full Windows client shell and experience, consistent with Windows 10. • Use with Microsoft Management Console (MMC) and Server management tools available locally on the server.

Windows Server 2016 editions

Windows Server 2016 Datacenter for highly virtualized datacenter and cloud environments.

- Features exclusive to the Datacenter Edition include Shielded Virtual Machines, software-defined networking, Storage Spaces Direct, and Storage Replica.

Windows Server 2016 Standard for physical or minimally virtualized environments.

Windows Server 2016 Essentials for small businesses with up to 25 users and 50 devices.



Microsoft Enterprise Mobility + Security

ALL-IN-ONE IDENTITY, MOBILE MANAGEMENT, AND SECURITY

Microsoft Enterprise Mobility + Security (EMS) is the only comprehensive solution designed to help manage and protect users, devices, apps, and data in a mobile-first, cloud-first world.

Identity-driven security

Safeguard your resources at the front door. EMS calculates risk severity for every user and sign-in attempt, so risk-based conditional access rules can be applied to protect against suspicious logins.

Protect your data against users mistakes. Gain deeper visibility into user, device, and data activity on-premises and in the cloud to create more effective, granular-level policies. Classify and label files at creation, track their usage, and change permissions when necessary.

Detect attacks before they cause damage. Identify attackers in your organization using innovative behavioral analytics and anomaly detection technologies – all driven by vast amounts of Microsoft threat intelligence and security research data.

Managed mobile productivity

Mobile apps without compromising your Office experience. EMS is the only solution built with and for Microsoft Office. This means that email and other Office files can be secured without compromising the Office experience – the gold standard of productivity.

Enable easy access to resources. Sign in once for secure access to all corporate resources, on-premises and in the cloud, from any device. This includes pre-integrated support for Office365, Salesforce.com, Box, ServiceNow and thousands more popular SaaS apps.

Enable users to protect and control data. Employees can encrypt virtually any type of file, set granular permissions, and track usage. The encryption stays with the file where it goes, enabling more secure file sharing, internally and externally.

Flexible + Comprehensive

Work with what you have. Get an integrated set of solutions that are designed to work together with your on-premises investments, avoiding the need for costly and complicated integration efforts across point capabilities.

Future-proof your investment. As a cloud solution that integrates with your on-premises infrastructure, EMS takes the worry out of scale, maintenance, and updates.

Simplify your set-up. To make deployment even easier, EMS comes with FastTrack – a Microsoft service that includes best practices, tools, resources, and experts committed to make your experience with EMS a success.

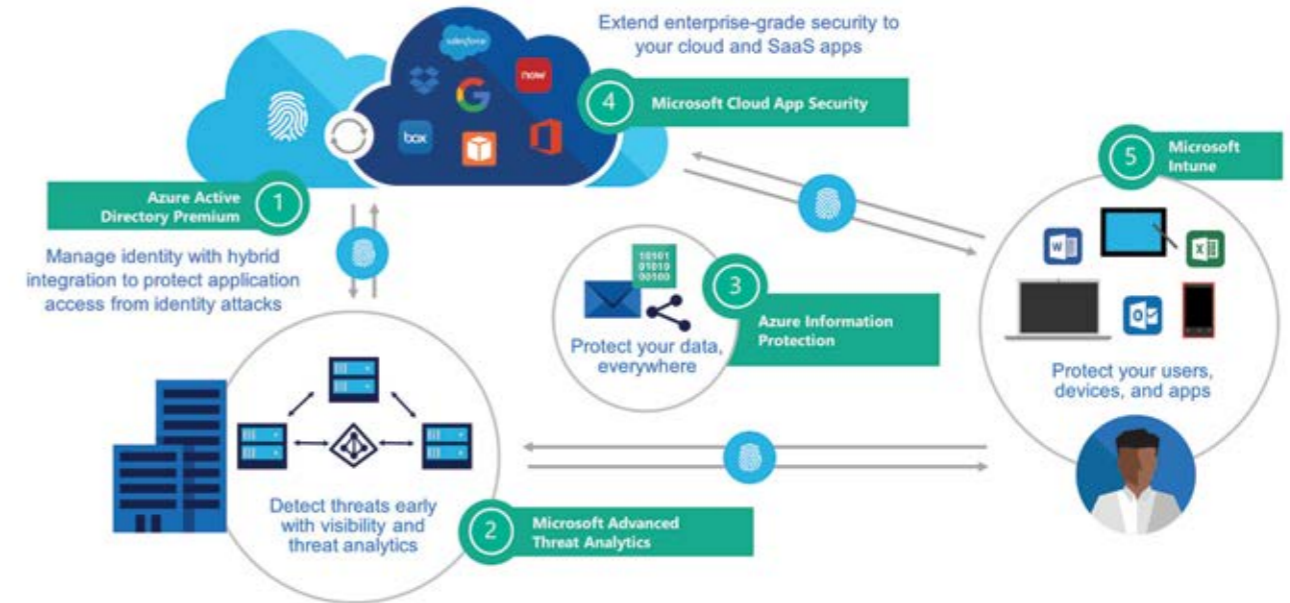
Get more for less. Our complete solution can cost less than combining standalone products from other vendors.



MICROSOFT MOBILITY MANAGEMENT

The enterprise mobility solution designed for a mobile-first, cloud first world.

Microsoft's Enterprise Mobility + Security solution provides a holistic framework to protect your corporate assets whether they're on-premises, on your mobile devices, or in the cloud.



- 1 Azure Active Directory Premium** delivers multi-factor authentication; access control based on device health, user location; and, holistic security reports, audits, and alerts.
- 2 Microsoft Advanced Threat Analytics** helps extend the visibility, auditing, and control you have on-premises to your cloud applications.
- 3 Azure Information Protection** provides persistent data protection of files shared internally and externally, including the option to track, classify and label data.
- 4 Microsoft Cloud App Security** provides deep visibility and control of data inside cloud applications.
- 5 Microsoft Intune** makes it easier to secure and manage iOS, Android, and Windows PCs all from one console. Deep integration with Office 365 helps keep company data secure in the Office mobile apps.



It's more secure
Security is at our core. We help you to identify security breaches before they cause damage.



It protects Office better
The only solution designed to protect your Microsoft Office email, files, and apps.



It just works
It's simple to set up, always up-to-date, and connects to your on-premises datacenter.



It's comprehensive
We protect iOS, Android, Windows, Windows 10, and over 2,500 popular SaaS apps.



It's a great value
EMS offers more and costs less than equivalent standalone solutions.