



Windows Azure Platform

EXECUTIVE STRATEGY BRIEF

Windows Azure™ is a cloud services operating system that provides developers with on-demand compute and storage to host, scale, and manage web applications on the internet through Microsoft® datacenters.

This strategy brief discusses the opportunities for leveraging the power of cloud computing across business and public sector organizations, and addresses some of the common concerns customers have when considering moving critical workloads to the cloud.

IT as a Service

As with any major business or technology transformation, customer needs are driving the shift to cloud computing for enterprise customers. IT organizations are continually looking for ways to reduce capital and operating costs, increase business agility, and scale to business demands rapidly and rationally; cloud computing helps them achieve these objectives.

Moving certain workloads from on-premises to the cloud allows IT to:

- **Reduce Capital Expenditures:** adopting a cloud model shift the expense of providing capacity from a capital expense model—building out datacenters with all of the requisite servers, cooling, power, space, and security infrastructure—to a pay-as-you-go operating expense model. This frees up capital investments for core strategic business needs
- **Scale Appropriately with Demand:** a traditional datacenter build is a multi-year, high cost undertaking. Leadership must estimate the demand for IT services over a long time horizon, and bet big that their estimates are correct. Typically organizations will over-provision to provide a margin of safety. If the demand fails to materialize, organizations still bear the operating and amortization costs of these large build-out. A cloud-based service model allows capacity to scale rapidly with demand, either up or down.

- **Provide Organizational Agility:** at the departmental or organization level, business customers are continually demanding new capabilities and services. With most of IT focused on maintaining core infrastructure, the ability to respond is limited. A cloud-based environment frees up IT staff to focus on strategic initiatives, ultimately providing more value to the business or public organization.

A theme we should make clear at the outset is that it adopting cloud services is not an either-or proposition; in fact, a hybrid model that spans on-premises IT and the cloud is how we believe organizations will adopt cloud computing into their operations.

IT Workload Patterns Ideal for the Cloud

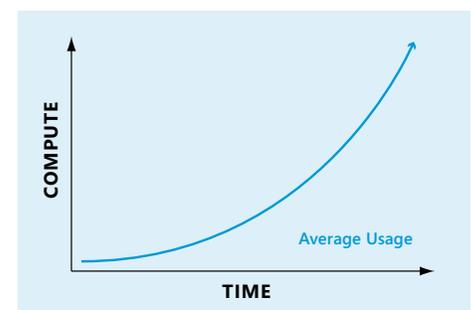
If business demands were consistent and predictable, IT would have a fairly easy time providing the necessary capacity and scale. However, most organizations face a dynamic environment where demand changes significantly, sometimes in a predictable manner—think holiday shopping or tax preparation—but often changes unpredictably—such as rapid business growth or a huge but temporary spike in online traffic.

The business dynamics that create an ideal opportunity for adopting cloud services are:

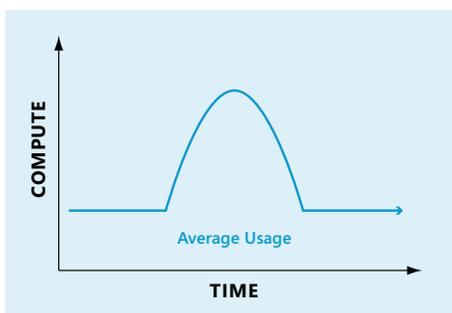
- **On and off**—many businesses have demanding processes that only run at certain times of the day or for other defined periods. Some examples of this pattern are financial securities firms that process transactions overnight or scientific applications that need tremendous power for a complex computation, but otherwise sit idle.



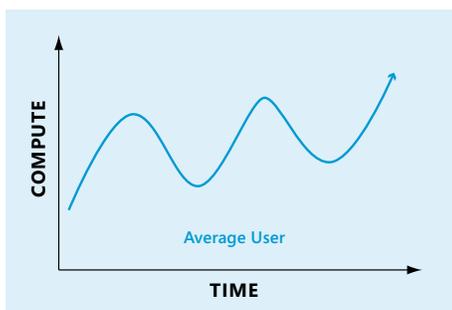
- **Growing fast**—this is the type of problem most companies dream of, but it creates huge challenges for IT—especially since building out significant compute capacity is time consuming and expensive. Rapidly deploying servers while trying to keep robust management processes in place will stress the best IT managers



- **Unpredictable bursting**—this pattern not only causes problems for IT management but can affect a company's reputation as well. When demand outstrips compute capacity, performance is compromised and the customer experience suffers. The way to protect against the unknown is to overprovision, which again is wasteful and expensive



- **Predictable bursting**—like in the tax preparation example above, many organizations face seasonality spikes they know will come, so they consequently provision for the peak to ensure a positive customer experience yet are trapped with idle capacity most of the year



In each of the cases above, a cloud-computing scenario allows organizations to respond to demand and maintain a quality experience for their customers, while avoiding the capital costs of overprovisioning and the operating expense of maintaining hardware and facilities that often sit idle.

Windows Azure

- Windows Azure is a service that allows developers to run applications and store data on servers owned and operated by Microsoft. These cloud applications can be targeted at businesses, consumers or both. Developers can use existing skills and familiar tools to develop applications that can run on-premises, in a private cloud, or in the public cloud, and with Windows Azure Connect and SQL Azure synchronization services these applications in most cases can seamlessly span between these domains. Windows Azure lets developers focus on delivering new applications for their business customers, and not be bogged down by operational hurdles.
- ISVs and System Integrators can develop new online applications and services and rapidly reach market without needing to invest in the infrastructure required for hosting. ISVs can focus on developing the application and Windows Azure provides the pay-as-you-go hosting environment that scales to customer demand.
- IT Managers gain access to a new set of resources without adding to the complexity of their core IT infrastructure. New business capabilities can be rapidly provisioned without large capital outlays.
- Businesses of all sizes are able to quickly respond as business needs change, whether in a growth stage, a burst, or a managed decline.

The Windows Azure platform is comprised of two major components. There is Windows Azure itself, which performs compute, storage, bandwidth, content delivery, and service management. SQL Azure delivers a relational database capability.

Economics of Windows Azure

Cloud computing fundamentally changes the economics of delivering IT services by standardizing and pooling resources, actively load balancing across complementing workload demands, and enabling a level of scale that individual organizations typically can't reach on their own. On the consumption side, cloud computing facilitates elastic consumption, self-service provisioning, and pay-as-you-go investment model.

The scale at which Microsoft operates our datacenters facilitates efficiencies in server utilization, operations, and datacenter design:

Server Utilization—virtualization technologies allow us to consolidate multiple workloads on a single server without compromising isolation. Multi-tenancy allows us to then balance workloads from customers with offsetting demand patterns, increasing the density of computational use.

Operations—Microsoft employs software-driven automated service management with remote break/fix, reducing the onsite personnel required to deploy and maintain the servers. Our datacenters are among the most monitored and measured in the world, informing more efficient operations and offering precise data on power consumption, the key cost driver.

Datacenter Design—each generation of datacenter design is yielding major gains in efficiency and sustainability. Our latest modular datacenters use about 50 percent less energy than those from just three years ago, leveraging wider operating temperature ranges and fresh air cooling, while maintaining high availability and geo-redundant back-up.

Windows Azure Purchasing Models

The promise of the public cloud is moving from capital-intensive long-term investments to a pay-as-you-go purchasing model.

- **Consumption**—many customers are purchasing Windows Azure through a consumption model, so IT costs linearly scale with capacity needs. This is ideal for organizations with expected but unpredictable growth needs.
- **Subscription**—many customers prefer the more predictability of month-to-month expenses, so we offer a subscription model with discounts based on the level of commitment.
- **Licensing**—enterprise customers are currently purchasing Microsoft products through an Enterprise Agreement, so we're piloting a program to connect existing EA customers to Windows Azure through an addendum to their licensing agreement

We will continue to innovate in how customers can take advantage of the flexibility and scale of cloud computing, but address specific security concerns they address with their on-premises IT. Microsoft offers Hyper-V Cloud, a set of technologies and programs built on Windows Server 2008 R2 and System Center that allow customers to build private clouds and deliver Infrastructure and a Service (IaaS) to their business users.

The Windows Azure Appliance is another example of how we are enabling IT organizations to create a private cloud, where they can deliver just-in-time services across divisions in their organization like a public cloud, but maintain the entire physical infrastructure on their own site.

The Windows Azure Appliance consists of Windows Azure, SQL Azure, and a Microsoft-specified configuration of compute, network, storage resources, and server hardware located in third-party (non-Microsoft) datacenters. The Windows Azure platform Appliance enables service providers and large enterprises to run and manage Windows Azure and SQL Azure in their own datacenters.

Windows Azure Security

A top concern among IT organizations considering public cloud services is protecting the confidentiality and security of their sensitive information. Microsoft employs robust policies, practices and processes to help ensure data remains private, secure, and available, and that organizations using our online services can meet their compliance requirements.

- **Physical**—it begins with protecting the physical infrastructure that hosts customer data. Microsoft's Online Services Security and Compliance team operates a comprehensive security program and control framework in all of our datacenter that is evaluated regularly by external third parties. Our datacenters meet and exceed ISO/IEC 27001:2005 certification standards and are subject to SAS Type I and Type II review. The ISO certification and SAS 70 attestations demonstrate Microsoft's commitment to delivering a trustworthy cloud computing infrastructure. Windows Azure has a roadmap to attain these certifications for the service itself in the near future.

- **Logical**—Windows Azure is optimized for cloud access with no administrative access to guests or applications, so no users or applications are able to update the operating system (OS). One key advantage with Windows Azure is that the OS is updated and maintained, removing the obligation for customers to administer patches and security updates. In addition, the architecture of Windows Azure specifically isolates applications or services from each other, since different customers will be running workloads in the same public cloud. This isolation spans physical machines, the network between services, and access to services from outside the datacenter.

Content Distribution Network

To provide the performance and reliability for end users, Windows Azure has a Content Distribution Network (CDN), enabling applications to deliver their data faster to their end users. Microsoft combines globally-distributed datacenters and edge computing nodes with one of the world's largest fiber backbones to provide over 2.5 terabits per second of capacity to over 1,200 networks with 99.95% availability.

This network provides multiple paths to many providers, allowing instantaneous re-routes around internet failures to maintain high reliability. Additionally, our Content Distribution Network service scales automatically without user intervention, ensuring end-users receive optimal performance and reliability.

Service Continuity

Our approach to security, privacy, and service continuity allows us to back up our Service Level Agreements (SLAs) with financial remedies if we don't meet our commitments. One unique aspect of Windows Azure is that we monitor compute instance as they are running, and when we detect an unhealthy condition we automatically initiate a corrective restart.

Microsoft also maintains geo-redundant datacenters around the world, with automatic fail-over within region that is tested regularly. Stored data is replicated many times, and the fabric is designed to be backed up and restored from checkpoints.

As a result of these attributes, Microsoft provides the following SLAs across the Windows Azure Service:

Advantages of the Windows Azure Cloud

Windows Azure provides a powerful platform to take advantage of the flexibility, efficiency, and scale of cloud computing:

- **Agility**—allows businesses to take advantage of development tools, automated service management, and global datacenter presence to respond faster to customer needs, focus on competitive differentiators, and reach new markets.
- **Efficiency**—Windows Azure improves productivity and increases operational efficiency by lowering up-front capital costs. Customers and partners can realize a reduction in Total Cost of Operations of some workloads by up to 30 – 40% over a 3 year period. The consumption based pricing, packages and discounts for partners lower the barrier to entry for cloud services adoption and ensure a predictable IT spend.

- **Focus**—helps businesses focus on delivering services and value to customers – and not on managing technology infrastructure. Windows Azure enables IT to spend less time on operational hurdles and more time focusing on competitive differentiators.
- **Simplicity**—developers can utilize existing skills in familiar languages such as .NET, Java and PHP to create and manage web applications and services.
- **Trustworthy**—provides an enterprise-class service backed by reliable service level agreements and a rich online services experience.

Not all workloads should, or even can be moved to the cloud. However, Microsoft provides the same familiar set of tools regardless of where computing power is hosted, so IT can operate with the same policies and processes whether the workload is maintained on-premises or migrates to the cloud.

In all, Windows Azure helps organizations rapidly deliver new capabilities and reach new markets, reduce capital expenditures and operating expenses, and effectively scale IT infrastructure to business demands—all within a trusted environment.

Compute Connectivity	Instance Monitoring and Restart	Storage Availability	Database Availability	Service Bus and Access Control Availability
Your service is connected and reachable via web. Internet facing roles will have external connectivity	All running roles will be continuously monitored. If role is not running, we will detect and initiate corrective state	Storage service will be available/ reachable (connectivity) Your storage requests will be processed successfully	Database is connected to the internet gateway and all databases will be continuously monitored	Service bus and access control endpoints will have external connectivity, and message operation requests will be processed successfully
>99.95%	>99.9%	>99.9%	>99.9%	>99.9%



Microsoft has extensive experience operating cloud services' infrastructures, with a history of innovation, operational excellence and industry leadership. As Microsoft's cloud services portfolio and infrastructure continues to grow with new services and applications launching on a rapid basis, the company is making thoughtful investments to answer our customer's needs for greater availability, lower latency, increased security, and lower costs.

Please visit www.microsoft.com/windowsazure for more information.

A DAY IN THE
MICROSOFT CLOUD 

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