

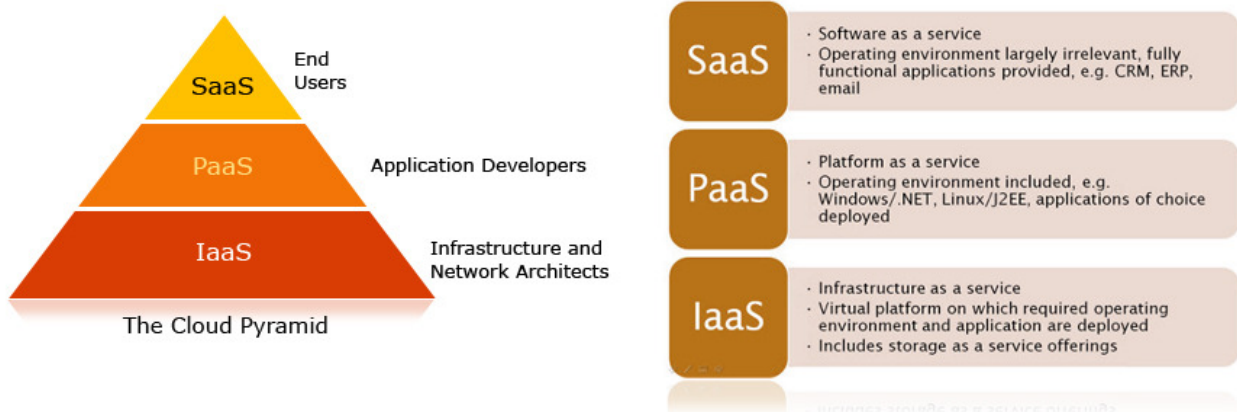
Windows Azure Platform: An Overview

Introduction to Cloud Computing

Cloud computing is the set of technologies and infrastructure capabilities being offered in a service based consumption model. The key features of cloud computing are:

1. Capital investment is less.
2. Pay –per-Use model which extensively aligns IT investment to operational expenses.
3. Improved business agility and ability to innovative with reduced entry barriers
4. Flexible scale which helps meet on demand needs more dynamically.

Cloud computing broadly divided into three categories:



Infrastructure-as-a-Service (IaaS)

This is the base layer of the cloud stack. It serves as a foundation for the other two layers, for their execution. The keyword behind this stack is Virtualization. It provides the abstract IT infrastructure resources such as CPU, storage and memory as services. A cloud provider manages the physical infrastructure; and the consumer has the provisions virtualized instances of the operating system. The consumer here is given the full ownership of the virtual machine which they can configure as their wish.

Platform-as-a-Service (PaaS)

Pass is the next higher level of concept in which not only does the technical infrastructure resources as discussed above, it provides essential application infrastructure services such as computation , messaging ,structured data persistence, connectivity, access control etc form a part of the service offering. PaaS provides all the facilities required to support the complete life cycle of building and delivering web applications entirely on the web.

Software-as-a-Service (SaaS).

SaaS is the highest level of concept on the cloud computing. SaaS which is based on a "one-to-many" model whereby an application is shared across multiple clients. Cloud consumers do not have any control in defining the infrastructure configuration and so there is no management and operational expenditure in maintaining the application in SaaS delivery model.

What is Azure?

Azure is Microsoft's Cloud computing offering to build and deploy applications on a Pay-per-use basis. Azure is a comprehensive set of storage, computing, and networking infrastructure services that reside in Microsoft's network of datacenters. Which provides a scalable infrastructure for consumer to run and host web based applications.

The Azure™ Services Platform (Azure) is an Internet-scale cloud computing and services platform hosted in datacenters created by Microsoft Corp., which provides an operating system and a set of developer services that can be used individually or together. The flexible and interoperable Azure platform can be used to build new applications to run from the cloud or enhance existing applications with cloud-based capabilities. Its open architecture gives developers the choice to build Web applications, applications running on connected devices, PCs, servers or hybrid solutions offering the best of both worlds(online and on-premise).

Courtesy: Microsoft (<http://www.microsoft.com/presspass/events/pdc/docs/StrataFS.doc>)

Azure provides the following Runtime Services

- **Virtual Machine environment for processing and hosting web applications.**
- **Storage system for files and structured contents.**
- **Connectivity Services for integration with on-premise applications**
- **Relational database capabilities using SQL Azure.**
- **Content delivery network**

Design Time Services

- **NET SDK for building applications for Azure**
- **Visual Studio tools for packaging and deploying applications to Azure**
- **Eclipse Plug-in for building PHP and Ruby applications for Azure.**
- **Simulation environment for testing Azure applications and storage locally**

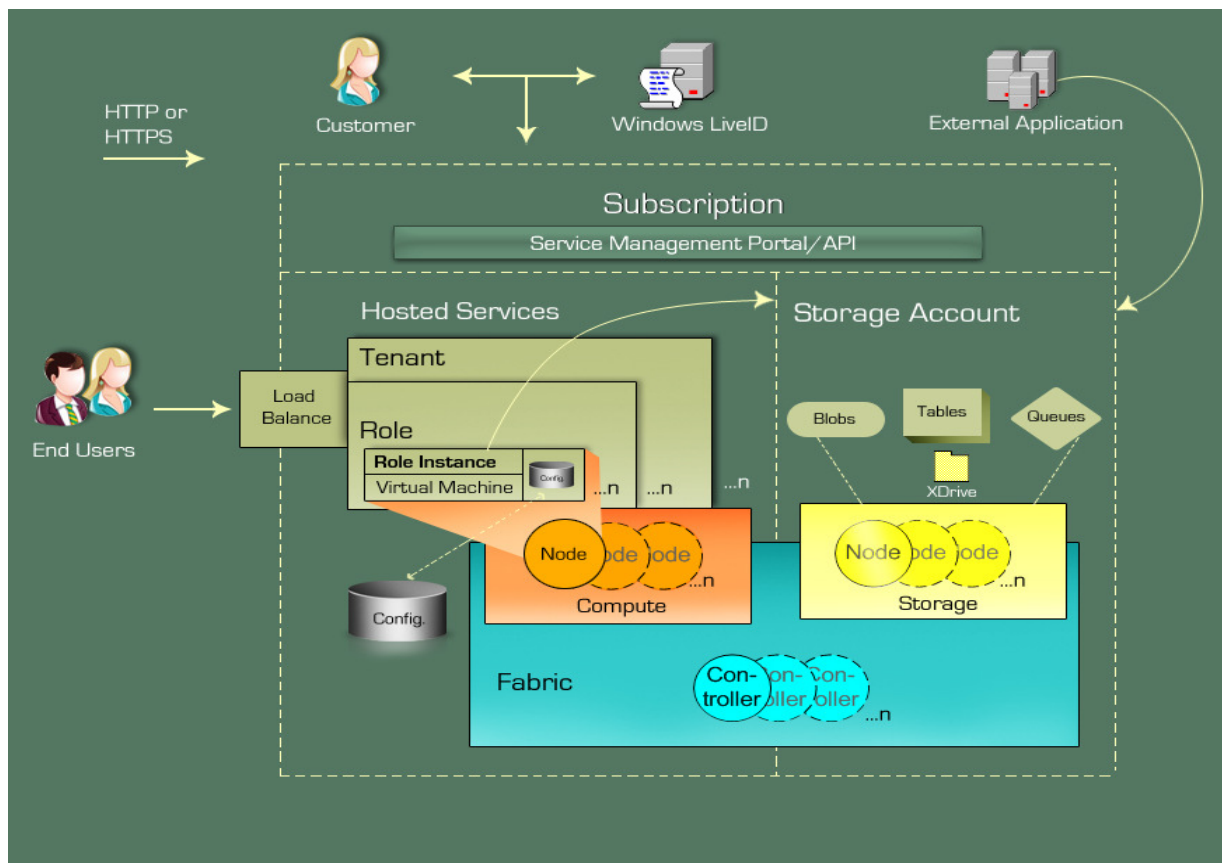
Operations Services

- **Web based console for manage azure accounts**
- **Web based console for managing and monitoring applications**

Azure supports the following:

Programming Language	.NET , Java , PHP , Ruby
Standards & Protocols	SOAP ,REST & XML
Development IDE	Visual Studio & Eclipse

Windows Azure has three core components: **Compute**, **Storage** and **Fabric**.



As the name suggest, Compute provides a computation environment with *Web Role* and *Worker Role* while Storage focuses on providing scalable storage (*Blobs*, *Tables*, *Queue* and *Drives*) for large scale

needs. Fabric makes up the physical underpinnings of the Windows Azure platform as the network of interconnected nodes consisting of servers, high-speed connections, and switches.

Compute: This is the Computational core of the windows Azure layer. It provides a scalable on-demand hosting environment to run Azure applications. The Compute service can run many different kinds of applications. A primary goal of this platform, however, is to support applications that have a very large number of simultaneous users. The service currently provides support for two roles, i.e. Web Role and Worker Role, with support for role customization being provided in future.

1. **Web Role :** A web role is a process which is specifically configured for directing Azure to hosting web based applications such as Asp.Net, WCF Services (SOAP/REST), ASMX services, FastCGI, Java, Python application.
2. **Worker Role:** A Worker role is similar to the windows service and can support generalized application developments which may not necessarily be web oriented in nature. The model is useful in running tasks which are offline in nature and do not need to behave in real time.

Storage: Windows Azure provides multiple storage services that are highly durable, scalable as well as constantly available. Azure storage provides users with following capabilities to persist both structured as well as unstructured data:

- Any where anytime access
- Store data for any length of time
- Scale to store any amount of data
- Pay for only what is used/stored

Azure offers three types of storage services, *BLOB*, *Table* and *Queues*, which cater to unstructured, structured as well as transient data requirements.

1. **BLOB storage** provides the capability to persist small to very large unstructured objects such as images, media, documents and XML on the cloud.
2. **Table storage** provides non-relational, schema-less but structured storage facility. It is built to provide massively scalable, constantly available and durable structured storage.
3. **Queues** provide reliable storage and delivery of messages in an application. It is used to support Store & Forward disconnected type architectural patterns which are essentially required to build highly scalable applications on Azure.

Fabric: Fabric is the actual life line of the Azure Platform. All infrastructure components are interconnected to form a fabric or mesh. A fabric is a web of inter-connected nodes where the inter-connections are facilitated by high speed switches through fiber optic channels and the nodes in the fabric are commodity hardware, servers, hardware balancers and other technical infrastructure. These infrastructure pieces are glued together by the Azure Fabric controller which governs the proper functioning of Azure. The Azure fabric controller maintains, manages and machines to host the applications created to be deployed on Azure. It offers services outside the mesh which are responsible for managing all the nodes and other edge devices such as load balancers, servers, switches, routers etc. on the fabric.