Microsoft Azure
The Cloud Computing

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Abstract— Microsoft Azure is a cloud computing platform and infrastructure, created by Microsoft, for building, deploying and managing applications and services through a global network of Microsoft-managed and Microsoft partner hosted datacenters. It provides both PaaS and IaaS services and supports many different programming languages, tools and frameworks, including both Microsoft-specific and third-party software and systems. Azure was announced in October 2008 and released on 1 February 2010 as Windows Azure, before being renamed to Microsoft Azure on 25 March 2014. In the most recent Gartner "Magic Quadrant" rating of cloud IaaS providers, Azure was one of only two vendors.

Keywords— Microsoft Azure, IaaS SaaS, PaaS.

I. INTRODUCTION

Microsoft Azure uses a specialized operating system, called Microsoft Azure, to run its "fabric layer": a cluster hosted at Microsoft's data centers that manages computing and storage resources of the computers and provisions the resources (or a subset of them) to applications running on top of Microsoft Azure. Microsoft Azure has been described as a "cloud layer" on top of a number of Windows Server systems, which use Windows Server 2008 and a customized version of Hyper-V, known as the Microsoft Azure Hypervisor to provide virtualization of services. Scaling and reliability are controlled by the Microsoft Azure Fabric Controller so the services and environment do not crash if one of the servers crashes within the Microsoft data center and provides the management of the user's web application like memory resources and load balancing.

Azure provides an API built on REST, HTTP, and XML that allows a developer to interact with the services provided by Microsoft Azure. Microsoft also provides a client-side managed class library which encapsulates the functions of interacting with the services. It also integrates with Microsoft Visual Studio, Git, and Eclipse.

In addition to interacting with services via API, users can manage Azure services using the web-based Azure Portal, which reached General Availability in December 2015.[17] The portal allows users to browse active resources, modify settings, launch new resources, and view basic monitoring data from active virtual machines and services.

II. VIRTUAL MACHINES

Windows Azure virtual machines constitute the infrastructure as a service (IaaS) offering from Microsoft for their public cloud. Virtual machines enable developers to migrate applications and infrastructure without changing existing code and can run both Windows Server and Linux

virtual machines. It was announced in preview form at the Meet Windows Azure event in June 2012.Customers can create virtual machines, of which they have complete control, to run in Microsoft's data centers. The General Availability version of Virtual Machine was released in May 2013. As of December 2015, Azure supported Windows Server 2008 and 2012 operating systems, as well as Linux distributions including Ubuntu, Debian, CentOS, openSUSE, SLES, and CoreOS.

III. CLOUD COMPUTING SERVICES

Cloud service providers that can be collected into three categories:

A. SAAS: Cloud application services or "Software as a Service (SaaS)" deliver software as a service over the Internet, eliminating the need to install and run the application on the customer's own computers and simplifying maintenance and support.

B. PAAS: The "Platform as a service" covering a layer of software and presents it as a service that can be used to construct a higher-level services. In other words, the capability provided to the consumer is to deploy onto the cloud infrastructure consumer- related or acquired applications created using programming languages and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly application hosting environment configurations.

C. IAAS: Cloud infrastructure services or "Infrastructure as a Service (IaaS)" delivers computer infrastructure, typically a platform virtualization environment as a service. Rather than purchasing servers, software, data center space or network equipment, clients instead buy those resources as a fully outsourced service. The service is typically billed on a utility computing basis and amount of resources consumed (and therefore the cost) will typically reflect the level of activity. It is an evolution of virtual private server offerings.

IV. SERVICES

Websites

High density hosting of websites developers to build sites using ASP.NET, PHP, Node.js, or Python and can be deployed using FTP, Git, Mercurial or Team Foundation Server. This feature was announced in preview form in June 2012 at the Meet Microsoft Azure event Customers can create websites in PHP, ASP.NET, Node.js, or Python, or select from several open source applications from a gallery to deploy. This

comprises one aspect of the platform as a service (PaaS) offerings for the Microsoft Azure Platform. It was renamed to Web Apps in April 2015.

WebJobs

These applications can be deployed to a Web App to implement background processing. That can be invoked on a schedule, on demand or can run continuously. The Blob, Table and Queue services can be used to communicate between Web Apps and Web Jobs and to provide state.

Cloud Services

Azure network and computes deployment architecture.Cloud Services is a platform as a service (PaaS) environment and can be used to create scalable applications and services. It supports multi-tier architectures and automated deployments. Previously named "Hosted Services", the Cloud Services for Microsoft Azure comprise one aspect of the PaaS offerings from the Microsoft Azure Platform. The Cloud Services are containers of hosted applications. These applications can be Internet-facing public web applications (such as web sites and e-commerce solutions) named "Web Roles", or they can be private processing engines for other work, such as processing orders or analyzing data named "Worker Roles".

V. BIG COMPUTE

Batch

Helps run large parallel and high performance computing workloads in the Cloud. in the cloud means program runs on the resources of Microsoft and result comes to the user.

HPC Pack

The high performance computing pack lets developers implement parallel processing.

Scheduler

Scheduler automatically runs previously declared recurring and one-off tasks.

Remote App

Delivers Windows apps from Azure to run on a variety of devices – Windows, Mac OS X, iOS or Android. Remote applications are run on Windows Server in the Azure cloud, where they're easier to scale and update. Application users install Remote Desktop clients on their Internet-connected laptop, tablet or phone, and can access applications as if they were running locally.

VI. STORAGE SERVICES

Storage Services provides REST and SDK APIs for storing and accessing data on the cloud.

Table Service

This service lets programs store structured text in partitioned collections of entities that are accessed by partition key and primary key.

Blob Service

This service lets programs store unstructured text and binary data as blobs that can be accessed by a path.

Queue Service

This service lets programs communicate asynchronously by message using queues.

File Service

This service lets programs store and access data on the cloud using the SMB protocol.

VII. DATA MANAGEMENT

SQL Database

SQL Database, formerly known as SQL Azure Database, works to create, scale and extend applications into the cloud using Microsoft SQL Server technology. It also integrates with Active Directory and Microsoft System Center and Hadoop.

Azure Search

The Search service provides text search and a subset of [OData]'s structured filters using REST or SDK APIs.

Document DB

DocumentDB is a NoSQL database service that implements a subset of the [SQL] SELECT statement on [JSON] documents.

Redis Cache

A managed implementation of Redis

VIII. TIMELINE

October 2008 (PDC LA)
- Announced the Windows Azure Platform
- First CTP of Windows Azure

March 2009
- Announced SQL Azure Relational Database

November 2009
- Updated Windows Azure CTP
- Enabled full trust, PHP, Java, CDN CTP and more
- Announced VM Role, Project Sidney, Pricing and SLAs
- Project "Dallas" CTP

February 2010
- Windows Azure Platform commercially available

June 2010
- Windows Azure Update
  - .NET Framework 4
  - OS Versioning
  - CDN
- SQL Azure Update (Service Update 3)[18]
  - 50 GB databases
  - Spatial data support
  - DAC support

October 2010 (PDC)
- Platform enhancements
  - Windows Azure Virtual Machine Role
  - Role enhancements
  - Admin mode, Startup tasks

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- Full-IIS support
- Extra Small Instances
- Windows Azure Connect
  - Access to on-premises resource for cross-premises apps
  - Support for domain-joining VMs
  - Direct role-instance connectivity for easier development
  - Use your existing remote administration tools
- Improved Dev / IT Pro Experience
  - New Windows Azure Platform Management Portal
  - Multiple users & roles for management
  - Remote Desktop
  - Enhanced Dev Tools
  - PHP development
  - Marketplace

December 2011
- Traffic manager
- SQL Azure reporting
- HPC scheduler

June 2012
- Websites
- Virtual machines for Windows and Linux (backed by persistent storage)
- Python SDK
- New portal
- Locally redundant storage

April 2014
- Windows Azure renamed to Microsoft Azure
- New beta preview management portal released
- Azure experiences an outage affecting several customers - "An internal server error has occurred".

July 2014
- Azure Machine Learning public preview

November 2014

- Microsoft Azure experiences outage affecting major websites including MSN.com.

September 2015
- Azure Cloud Switch introduced as a cross-platform Linux distribution.

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