Microsoft Application Platform 2010
for rapidly developing and deploying applications on-premise or cloud
State of Cloud Computing

> Perceptions
  • “The end of software”
  • On-demand infrastructure
  • Cheaper and better

> Reality
  • Hybrid world; not “all-or-nothing”
  • Leverage existing IT skills and investments
  • Seamless user experiences
  • Evolutionary; not revolutionary

> Drivers
  • Ease-of-use, convenience
  • Product effectiveness
  • Simplify IT, reduce costs

> Types
  • Public
  • Private
  • Hybrid
  • Dedicated
  • Community

> Categories
  • SaaS
  • PaaS
  • IaaS
Microsoft in the Cloud

- 450M+ active users (15 years)
- 550M users/mth (13 years)
- 320M+ active users (12 years)
- Largest non-ICP/IP cloud service x100M users
- 2B queries/mth (11 years)
- 450M+ active users (15 years)
- 5B conf min/yr (7 years)
- 4B emails/day (6 years)
Bing – “Auto Pilot” Architecture
~100,000 Servers in Multiple Data Centers
The Microsoft Cloud
Data Center Infrastructure

- Purpose-built data centre to accommodate containers at large scale
  - Cost $500 million, 100,000 square foot facility (10 football fields)
- 40 foot shipping containers can house as many as 2,500 servers
  - Density of 10 times amount of compute in equivalent space in traditional data centre
- Can deliver an average PUE of 1.22

PUE: Power Usage Effectiveness benchmark from The Green Grid™ consortium on energy efficiency
The Microsoft Cloud
Data Center Infrastructure
The Microsoft Cloud
Data Center Infrastructure
The Microsoft Cloud
~100 Globally Distributed Data Centers

Quincy, WA  Chicago, IL  San Antonio, TX  Dublin, Ireland  Generation 4 DCs
The Microsoft Cloud
Highly available, scalable, and consistent application fabric environment
Types of Clouds

**Private (On-Premise)**
- Applications
- Runtimes
- Security & Integration
- Databases
- Servers
- Virtualization
- Server HW
- Storage
- Networking

**Infrastructure (as a Service)**
- Applications
- Runtimes
- Security & Integration
- Databases
- servers
- Virtualization
- Server HW
- Storage
- Networking

**Platform (as a Service)**
- Applications
- Runtimes
- Security & Integration
- Databases
- Servers
- Virtualization
- Server HW
- Storage
- Networking

You manage

Managed by vendor
A Hybrid World

Consistency & Control

- Real-Time Performance
- Security & Privacy
- Customizability
- Physical Resources
- Heterogeneity

Scalability & Availability

- Redundancy & Resiliency
- Global Reach
- Ease of Provisioning
- Abstract Resources
- Homogeneity

On-premise ↔ Public Cloud
## Windows Azure Platform

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Windows Azure Platform

Application Services

Frameworks

Security

Connectivity

Data

Compute

Storage

Microsoft Pinpoint
Microsoft Codename "Dallas"

“Dublin”

“Velocity”

“Geneva”

Project "Sydney"

SQL Azure Data Sync

Table Storage
Blob Storage
Queue
Drive
Content Delivery Network

Windows Server AppFabric

Windows Azure platform AppFabric

Windows Azure platform AppFabric

Microsoft SQL Azure

Windows Azure
Application Models

Web Hosting
- Massive scale infrastructure
- Burst & overflow capacity
- Temporary, ad-hoc sites

Application Hosting
- Hybrid applications
- Composite applications
- Automated agents / jobs

Media Hosting & Processing
- CGI rendering
- Content transcoding

High Performance Computing
- Parallel & distributed processing
- Massive modeling & simulation
- Advanced analytics

Information Sharing
- Reference data
- Common data repositories
- Knowledge discovery & mgmt

Collaborative Processes
- Multi-enterprise integration
- B2B & e-commerce
Case Study

About

- kbb.com, established 1995; vehicle data aggregation and publication service provider
- 14M UU/month
- Multiple physical data centers

Solution

- Cloud-based overflow capacity
- Windows Azure Web Role
- SQL Azure database

Benefits

- ~$100,000 savings / year in hosting costs alone
- Retire failover data center (27 Web servers & 9 SQL Servers)
- <1% code changes needed for application compatibility
- 6 weeks down to 6 minutes to add server capacity
Case Study

About

- Legacy call-center application for order processing and fulfillment
- On-premise systems integration with ERP and master data management

Solution

- Cloud-based Web-enablement of on-premise assets
- Windows Azure Web Role
- Web services integration via on-premise ESB endpoints

Benefits

- “In a matter of weeks, we were able to see the fruits of our efforts very rapidly.” – Kevin Flowers, Dir. Enabling Technologies
- “The resilience and reliability of this platform is some of the benefits that we are seeing.” – Esat Sezer, SVP & CIO
Sounds Familiar v3.0 Architecture

www.bobfamiliar.com

Features:
• TabControl
• ListBox
• DataGrid
• ComboBox
• MediaElement
• MultiScaleImage (DeepZoom)
• Async Service Invocations
• Out of browser capability

1. User requests page
2. Page w/ SL Reference is returned
3. App makes async service calls to retrieve data
4. Service connects to Db and executes a Stored Proc
5. Data is bound to UI controls
Migration Steps

1. Relational Database
   • Migrating to SQL Azure

2. Web Service
   • Using WCF to create RESTful Endpoints

3. ASP.NET Application
   • Silverlight Client Bootstrap

4. Non-Relational Data
   • Binary Files
SQL Azure

- Highly available, scalable, and consistent distributed relational database; geo-replication and geo-location of data

- Relational database, provided as a service
  - Highly symmetrical development and tooling experience (use TDS protocol and T-SQL)
  - Highly scaled out, on commodity hardware
  - Built on the SQL Server technology foundation

- Editions: Web (1GB), Business (10GB)
SQL Azure Tools

> SQL Azure Migration Wizard
> SQL Server Management Studio
Windows Azure Storage

- Rich data abstractions – tables, blobs, queues, drives, CDN
  - Capacity (100TB), throughput (100MB/sec), transactions (1K req/sec)
- High accessibility
  - Supports geo-location
  - Language & platform agnostic REST APIs
  - URL: http://<account>.<store>.core.windows.net
  - Client libraries for .NET, Java, PHP, etc.
- High durability – data is replicated 3 times within a cluster, and (Feb 2010) across datacenters
- High scalability – data is automatically partitioned and load balanced across servers
Windows Azure Blob Storage

> Storage for large, named files plus their metadata

> Block Blob
  - Targeted at streaming workloads
  - Each blob consists of a sequence of blocks
  - Each block is identified by a Block ID
  - Size limit 200GB per blob

> Page Blob
  - Targeted at random read/write workloads
  - Each blob consists of an array of pages
  - Each page is identified by its offset from the start of the blob
  - Size limit 1TB per blob
Windows Azure Table Storage

- Designed for structured data, not relational data
- Data definition is part of the application
  - A Table is a set of Entities (records)
  - An Entity is a set of Properties (fields)
- No fixed schema
  - Each property is stored as a <name, typed value> pair
  - Two entities within the same table can have different properties
  - No schema is enforced
Windows Azure Queue

- Performance efficient, highly available and provide reliable message delivery
- Asynchronous work dispatch
  - Inter-role communication
  - Polling based model; best-effort FIFO data structure
- Queue operations
  - Create Queue
  - Delete Queue
  - List Queues
  - Get/Set Queue Metadata
- Message operations
  - Add Message
  - Get Message(s)
  - Peek Message(s)
  - Delete Message
Cerebrata Cloud Studio

- Rich Client for managing Azure Cloud Storage

http://cerebrata.com/
Windows Azure Compute

Development, service hosting, & management environment
- .NET, Java PHP, Python, Ruby, native code (C/C++, Win32, etc.)
- ASP.NET providers, FastCGI, memcached, MySQL, Tomcat
- Full-trust – supports standard languages and APIs
- Secure certificate store
- Management API’s, and logging and diagnostics systems

Multiple roles – Web, Worker, Virtual Machine (VHD)

Multiple VM sizes
- 1.6 GHz CPU x64, 1.75GB RAM, 100Mbps network, 250GB volatile storage
- Small (1X), Medium (2X), Large (4X), X-Large (8X)

In-place rolling upgrades, organized by upgrade domains
- Walk each upgrade domain one at a time
Publishing Application Code

> Visual Studio 2010 Cloud Service Solution
3 Key Takeaways

> **Platform-as-a-service** fabric cloud
> **Hybrid** *on-premise* software and *cloud* services platform
> **Consistent** programming *model* and *tools*
http://www.azure.com

Sign up at the Windows Azure Platform developers’ portal

- Windows Azure access
- Developer tools
- White papers
- Sample applications

Plan pilot applications, proofs of concept, and architectural design sessions with Windows Azure partners
Thank you