Windows Azure and private cloud

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Agenda

- Cloud Computing Fundamentals
- Windows Azure
- How Windows Azure works
- Private Cloud in your own network
Cloud Computing Fundamentals

Value Visibility to End Users

SaaS

PaaS

IaaS

End Users

Application Developers

Network Architects

2012
Cloud: Efficiency Versus Control

Windows Azure

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<thead>
<tr>
<th>= Managed for You</th>
<th>Standalone Servers</th>
<th>IaaS</th>
<th>PaaS</th>
<th>SaaS</th>
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Efficiency <-> Control + Cost

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IaaS

1) Choose image, then create VM for DBMS and configure DBMS
2) Choose image, then create and configure VM(s) for application
3) Provision database, then create tables and add data
4) Install application
5) Configure load balancer
6) Manage VMs and DBMS (e.g., deploying new OS images in VMs)
PaaS

1) Provision database, then create tables and add data

2) Deploy application

Developer

DBMS

Application

Web Server

Operating System

VM

Operating System

VM

Load Balancer
Microsoft Cloud Consistency Vision - Applications

One Consistent Platform ...

... For Application Delivery

WEB

CLOUD

VIRTUAL

WORKLOAD

WEB APPS

CLOUD APPS

TRADITIONAL APPS

WINDOWS AZURE EXPERIENCE

Windows Azure Web Sites

Windows Azure Worker Role

Windows Azure Virtual Machines

WINDOWS SERVER EXPERIENCE (Service Provider & Enterprise)

Windows Azure Web Sites

TBD

Windows Private Cloud

CLOUD ENABLED SERVICES

SERVICES

business analytics

identity

storage

networking

SQL database

caching

messaging

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Windows Azure

- Windows Azure is an OS for the data center
  - Handles resource management, provisioning, and monitoring
  - Manages application lifecycle
  - Allows developers to concentrate on business logic
- Provides common building blocks for distributed applications
  - Reliable queuing, simple structured storage, SQL storage
  - Application services like access control, caching, and connectivity
Windows Azure Platform

Windows Azure Applications

- Azure Caching
- Azure Access Control Service
- Azure Service Bus
- SQL Azure
- Windows Azure Storage
- Windows Azure CDN

“Red Dog” Front End (RDFE)

Fabric Controller

Windows Azure Networking
The Windows Azure Service Model
The Windows Azure Service Model

• A Windows Azure application is called a “service”
  • Definition information
  • Configuration information
  • At least one “role”

• Roles are like DLLs in the service “process”
  • Collection of code with an entry point that runs in its own virtual machine

• Windows Azure compute SLA requires two instances of each role
  • 99.95% for connectivity to two instances
  • Achieved with update and fault domains
Role Types

- There are currently three role types:
  - Web Role: IIS7 and ASP.NET in Windows Azure-supplied OS
  - Worker Role: arbitrary code in Windows Azure-supplied OS
  - VM Role: uploaded VHD with customer-supplied OS

- VM Role: is it a VM?
  - No, because it is stateless

- Good for:
  - Long install (5+ minutes)
  - Manual install/config
  - Fragile install/config
Windows Azure Storage
Windows Azure Storage Fundamentals

- Storage characteristics
  - Durable – replicated three times
  - Scalable (capacity and throughput)
  - Highly available

- Simple and familiar programming interfaces
  - REST (HTTP and HTTPS)
  - .NET accessible
High Availability and Windows Azure Services
The Fabric Controller (FC)

• The “kernel” of the cloud operating system
  • Manages datacenter hardware
  • Manages Windows Azure services

• Four main responsibilities:
  • Datacenter resource allocation
  • Datacenter resource provisioning
  • Service lifecycle management
  • Service health management

• Inputs:
  • Description of the hardware and network resources it will control
  • Service model and binaries for cloud applications
Node and Role Health Maintenance

- FC maintains service availability by monitoring the software and hardware health
  - Based primarily on heartbeats Automatically “heals” affected roles

<table>
<thead>
<tr>
<th>Problem</th>
<th>Fabric Detection</th>
<th>Fabric Response</th>
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</thead>
<tbody>
<tr>
<td>Role instance crashes</td>
<td>FC guest agent monitors role termination</td>
<td>FC restarts role</td>
</tr>
<tr>
<td>Guest VM or agent crashes</td>
<td>FC host agent notices missing guest agent heartbeats</td>
<td>FC restarts VM and hosted role</td>
</tr>
<tr>
<td>Host OS or agent crashes</td>
<td>FC notices missing host agent heartbeat</td>
<td>Tries to recover node</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FC reallocates roles to other nodes</td>
</tr>
<tr>
<td>Detected node hardware issue</td>
<td>Host agent informs FC</td>
<td>FC migrates roles to other nodes</td>
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<tr>
<td></td>
<td></td>
<td>Marks node “out for repair”</td>
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Because you're accessing sensitive info, you need to verify your password.

swimjoe@hotmail.com

Sign in

Can't access your account?
Sign in with a different Microsoft account
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One Consistent Platform ...

... For Application Delivery

- **WEB**
  - WEB APPS
  - Windows Azure Web Sites
  - Windows Azure Worker Role
  - TBD

- **CLOUD**
  - CLOUD APPS
  - Windows Azure Virtual Machines
  - Windows Private Cloud

- **VIRTUAL**
  - TRADITIONAL APPS
  - Windows Azure Web Sites

**SERVICES**
- business analytics
- identity
- storage
- networking
- SQL database
- caching
- messaging
Microsoft is committed to delivering customers a consistent platform regardless of deployment location and calls this vision the Cloud OS. As part of this strategy, Microsoft is now enabling Hosting Service Providers to use Windows Server and System Center to deliver the same great experiences already found in Windows Azure. The first two of these finished services are high density website hosting and virtual machine provisioning and management. Hosting Service Providers enable these modules through the new Service Management API and optional portal, which will continue to add more services from Microsoft and 3rd party providers over time.
Conclusion

• Platform as a Service in Windows Azure is all about reducing management and operations overhead

• The Windows Azure Fabric Controller is the foundation for Windows Azure’s PaaS
  • Provisions machines
  • Deploys services
  • Configures hardware for services
  • Monitors service and hardware health

• It is extremely easy to use Windows Azure and Window Azure alike environment in your own network
Resources

• Windows Azure
  • http://www.windowsazure.com/en-us/

• Bring Windows Azure Services to Windows Server

• Download installation guide
Q&A