

#3

We're  
all in.

Into the

# Cloud



Staffing the  
Data Center,  
introducing:



"Squishy" the Stress Ball presents "Into the Cloud"

"Leah"



"Zach"



...and the villan  
Clunky, who  
attacks the data  
center!



Into the



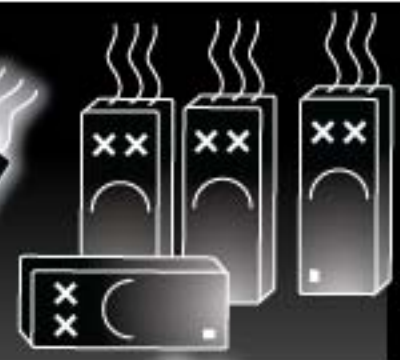
Cloud

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(heee!  
heee!)



We're having a **MELTDOWN !!!**

5 more **servers** went  
down last night!!!

We need a  
**flexible  
cloud-computing  
platform!**

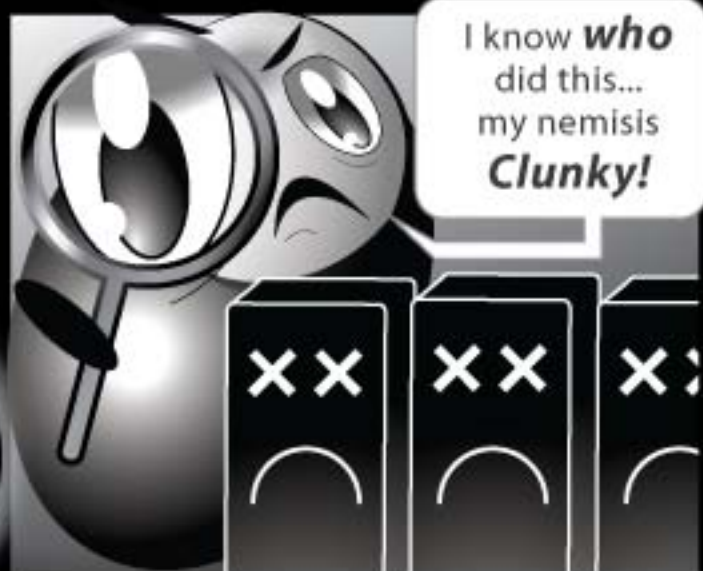
...that's pretty easy?

Can we roll it out by  
**TOMORROW**  
?

An opportunity...

... to improve our self-service  
provisioning!

**Dynamic Infrastructure  
Infinite Scale**



Squishy...  
**Who's Clunky?**

**A threat to our IT infrastructure!**

The **CLOUD** ?

We can defeat **Clunky** and meet business needs efficiently by going to **THE CLOUD!**



Here's a summary  
of the **CLOUD!**

**Just-in-Time  
Provisioning**

**Scaling  
services  
on shared  
hardware**

How's this **different** from  
what we are doing today ?

We use virtualization technology already!  
Doesn't that mean we **are** in the cloud?

The industry is  
going through a  
**transformation** across  
the entire stack,  
the paradigm is  
**shifting**  
**!**

**DATA CENTER AND  
HARDWARE MODEL**

**APPLICATION MODEL**

**OPERATIONAL MODEL**

# "STANDARDIZATION AND VIRTUALIZATION"

Existing Model

New Model

- **Lack of Standardization** of server hardware.



- **Scale up** servers to increase capacity.



- **Fault Tolerance** requires **mirroring** of those beefy servers.



Heel Heel!

- **Standardize server hardware**



- **Flexible infrastructure**



- **Software-enabled fault tolerance**



**DATA CENTER AND  
HARDWARE MODEL**

**"FOCUS ON THE CAPABILITY OF THE SERVICE"**  
**NOT THE**  
**"CAPABILITY OF THE SERVER"**

**Existing Model**

**New Model**

- **Dependent applications** on server hardware and system resources.



- **Detaching** applications from hardware.



- **Limited Scaling** of applications written with specific configuration and/or environment in mind.



- **Practically infinitely scalable applications**



- **Not resilient to system failures**



- **Smart and self-healing**



**APPLICATION MODEL**

“FOCUS ON RUNNING A SERVICE”  
NOT  
“KEEPING A SERVER RUNNING”

Existing Model

New Model

- **Just keeping the systems running** not enabling innovation.



- **Reactive Mindset** bandaging outdated systems.



- **Labor Intensive**



Don't worry!  
We'll make our data center  
more resilient with the Cloud.

- **Proactive and creative**



- **Service-centric**



- **End-to-end service management.**



Our **paggers!**  
The data  
center is under  
**ATTACK!**

OPERATIONAL MODEL

**Meanwhile... back at the Data Center**



# Back to The Cloud...

**HEY!**

*I get it!*

Cloud computing makes our business agile!

How's it do **that**?

The **flexible** nature of cloud computing allows us to **build** and tear down computers and environments **quickly**. Applications and services can be deployed quickly and **efficiently**!

**OH!**  
*wow!*

We can focus on solving business problems, not just putting out the next fire!

But what about our customers?

We'll spend **less time** on operations and more time creating predictable and **consistent** customer experiences.

**How** does this affect our organization?

Using computers in the **cloud** can make lots of sense. Rather than buying and maintaining your own machines, why not take advantage of the acres of **Internet-accessible servers** on offer.

No need to **invest** upfront on expensive infrastructure. Wow, that will make my job a lot **easier!**

And our boss will be happy about this!

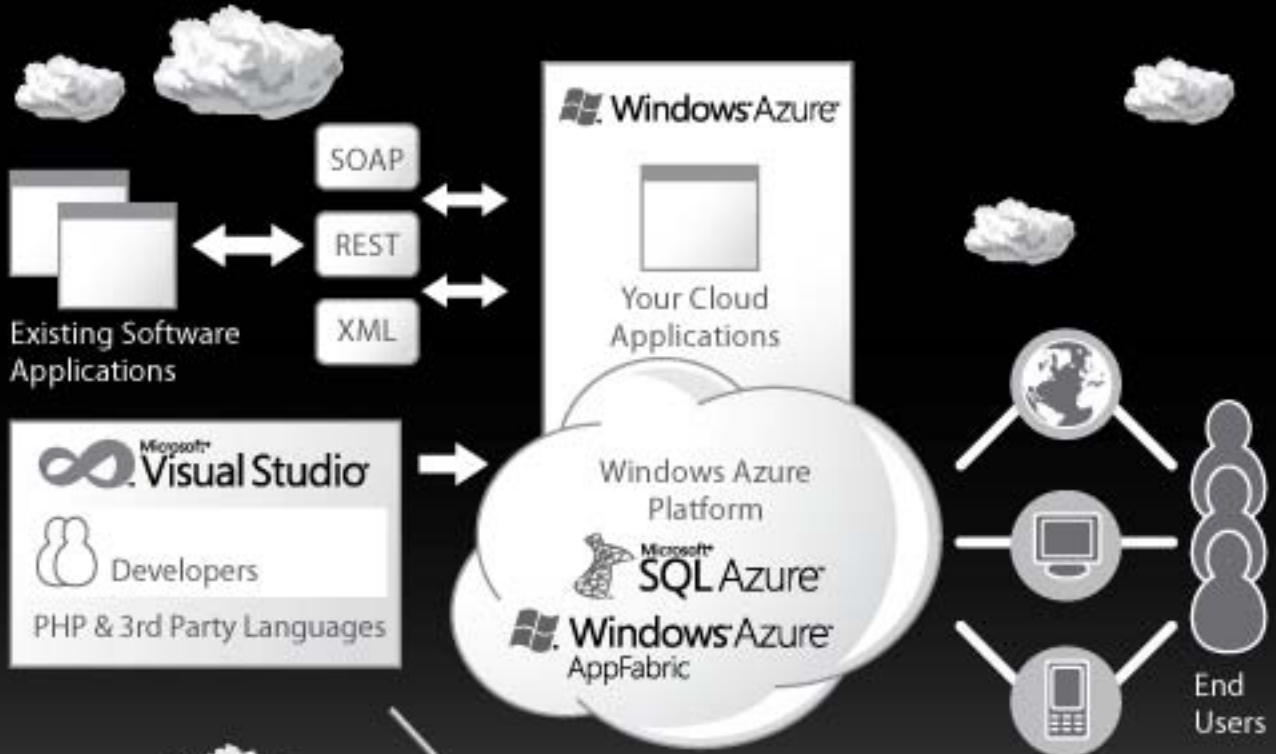
We're all in.

Microsoft

Now that you have the mindset and know the benefits of **THE CLOUD** Let's analyze our options before we make the right decision for your business....

**OPTIONS?**

We'll see about that!!!



We're all in.

Let's take a look at the **Windows Azure** model!

This model provides highly **scalable** and **flexible** cloud services to customers worldwide. **Microsoft** provides the service platform and the data centers that run it.



But! How do we use  
**Windows  
Azure™**  
?

You can  
use  
**Windows  
Azure™**  
to...

- *Build, modify, and distribute scalable applications with minimal on-premises resources.*

- *Perform large-volume storage, batch processing, intense, or large-volume computations.*

- *Create, test, debug, and distribute Web services quickly and inexpensively to customers around the world.*

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## The Windows Azure Platform

**Windows Azure Platform** is a group of cloud technologies, each providing a specific set of services to application developers.



### **Windows Azure**

Windows Azure is a Windows environment for running applications and storing data on computers in Microsoft data centers.

### **Microsoft© SQL Azure™**

Also hosted in the Windows Azure platform is Microsoft SQL Azure, which provides relational database services and automated management of relational services. SQL Azure can help reduce costs by integrating with existing tool sets and by providing symmetry with on-premise and cloud databases.

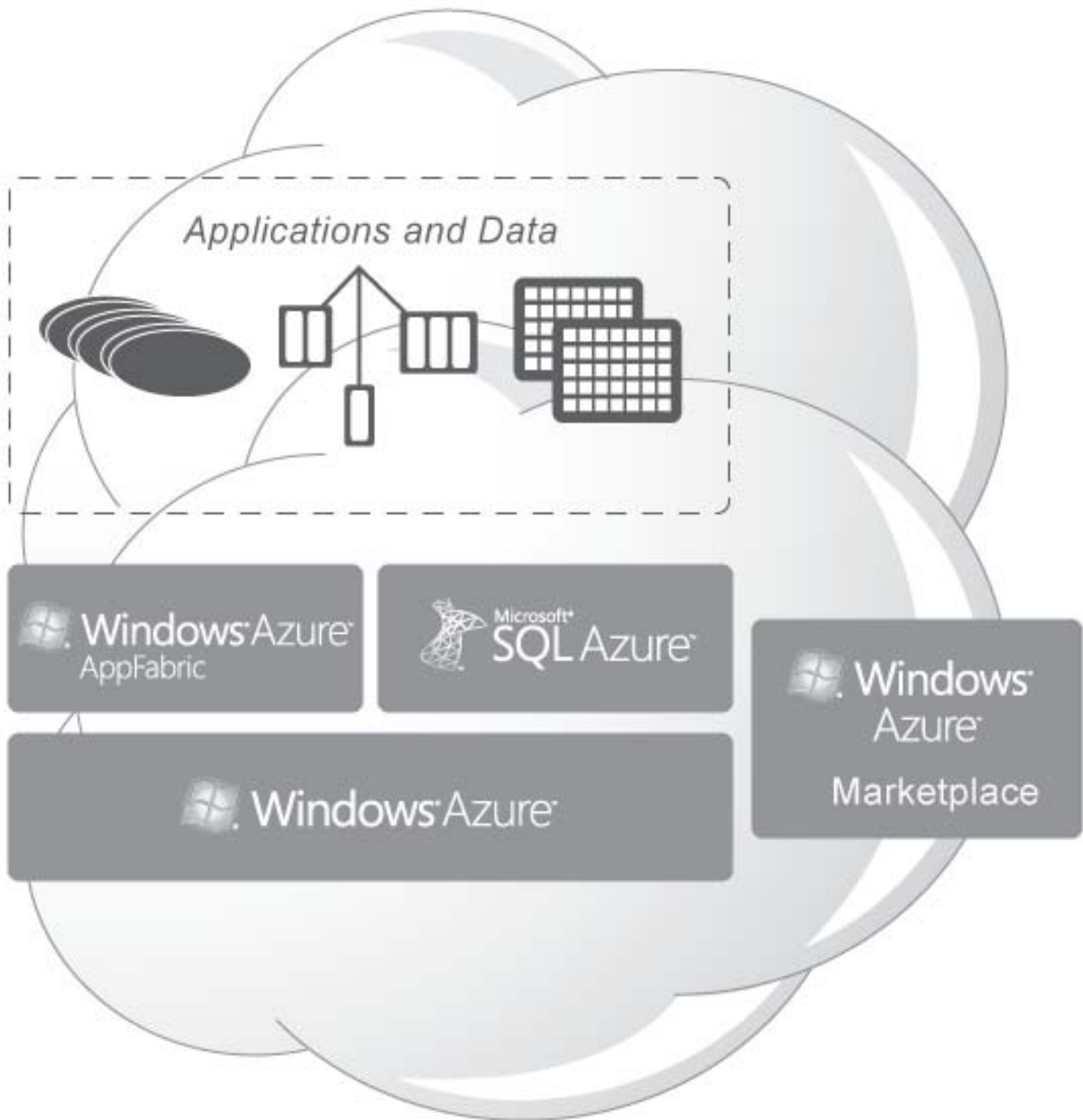
### **Windows Azure AppFabric**

Windows Azure AppFabric provides infrastructure for applications. The people who create applications can benefit from different kinds of infrastructure, and so AppFabric contains various parts. This section takes a closer look at Service Bus, Access Control, and Caching, the three components of Windows Azure AppFabric today.

### **Windows Azure Marketplace**

An online service for purchasing cloud-based data and applications.

Take a look at this diagram...



# Defining Windows Azure Architecture™

Windows Azure is a collection of virtual machines that provide compute and storage resources. This collection of virtual machines is called the fabric. The fabric is managed by the fabric controller, which monitors and manages every virtual machine, and starts, stops and restarts them as necessary.



**The Fabric Controller** communicates with every server within the fabric. It manages the Windows Azure operating system, and every application, and decides where new applications should run in order to optimize hardware utilization.



# Windows Azure™ Automates the Management of Your IT Resources

The fabric controller manages the day-to-day maintenance, monitoring, and updating of the underlying operating system and of the applications and services running on it. This frees IT staff to focus on creating solutions instead of being consumed by tedious and repetitive maintenance tasks.



## Virtualized Computation

provides massive application scalability. You can build a combination of web and worker roles. Those roles can be replicated as needed to scale the applications and computational processing power.

## Storage Services

allow you to scale to store large amounts of data – in any format – for any length of time, only paying for what you use or store.

## Service Management

is performed by the fabric controller, which controls all the resources within the data center. The fabric controller deploys your service and monitors the overall health of the fabric.

## Security and Control

comprises state-of-the-art physical security processes combined with a strictly controlled OS access model. Data is replicated in multiple fault domains in a location selected by you.

## State-of-the-art data centers

are located around the world. You can host your applications and data securely, while making them accessible from any place you allow.



We're all in.

Microsoft

Let's get out of here  
before the whole thing  
blows up on us  
!

**Don't worry!** The  
**Windows Azure Platform**  
offers scalable, durable  
utility-based storage.  
And both Windows Azure  
applications and on-premises  
applications can access  
the Windows Azure  
storage service.



# Storage Services in Windows Azure™

Scalable, durable  
utility-based storage



Windows Azure offers scalable, durable utility-based storage and offers different options for storing data, and it has authenticated access and triple replication to help keep your data safe. You can also programmatically access data with simple Representational State Transfer (REST) interfaces, available remotely and from the data center. And, if you need a more relational approach to data storage, you can use SQL Azure™, which is a cloud-based relational database service built on SQL Server® technologies. SQL Azure provides a highly available, scalable, multi-tenant database service hosted by Microsoft in the cloud. Microsoft SQL Azure Database helps to ease provisioning and deployment of multiple databases.

To use Windows Azure storage, a developer must first create a storage account. To control access to the information in this account, Windows Azure gives its creator a secret key. Each request an application makes to information in this storage account—binary large objects (BLOBS), tables, drives, and queues—carries a signature created with this secret key. In other words, authorization is at the account level.

# Blobs, Tables, Queues and Drives

*Know when to use what...*

## BLOBS

Provide a simple interface for storing named files along with metadata for the file.

## TABLES

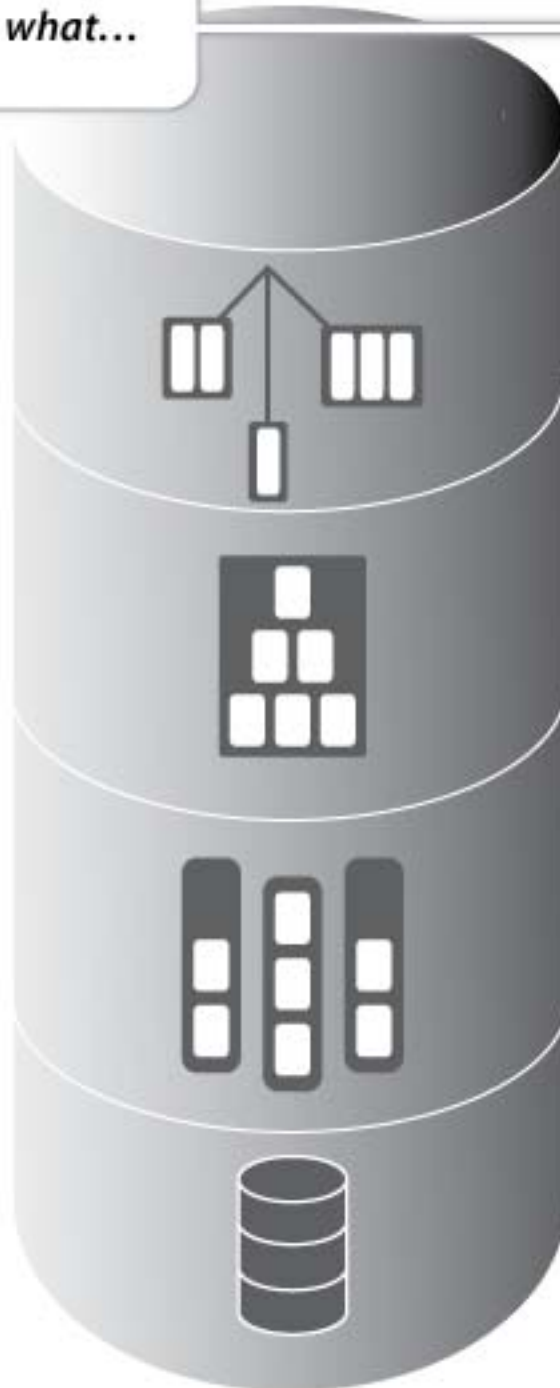
Provide structured storage. A table is a set of entities which contain a set of properties.

## QUEUES

Provide reliable storage and delivery of messages for an application.

## DRIVES

Provide a durable NTFS file system volume, sharable across instances.



Large, unstructured data (audio, video, etc.)

Massive amounts of simply structured data, accessed using OData or WCF Data Services

Serially accessed messages or requests, allowing processes to interact

Files organized in a directory structure



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# Microsoft SQL Azure™

**Microsoft® SQL Azure™ Database** is a cloud-based relational database service built on SQL Server® technologies. It provides a highly available, scalable, multi-tenant database service hosted by Microsoft in the cloud. SQL Azure Database helps to ease provisioning and deployment of multiple databases. Developers do not have to install, set up, patch, or manage any software. High availability and fault tolerance is built-in, and no physical administration is required. SQL Azure Database supports Transact-SQL (T-SQL). You can use existing knowledge in T-SQL development and a familiar relational data model for symmetry with existing on-premises databases. SQL Azure Database can help reduce costs by integrating with existing tool sets and provide symmetry with on-premises and cloud databases.

The release of Microsoft SQL Server 2008 R2 adds client-tools support for SQL Azure, including added support through SQL Server Management Studio (SSMS). SQL Server Management Studio can be used to manage SQL Azure and can be downloaded for free along with SQL Server Express. Additionally, SQL Server 2008 R2 and SQL Server Express have full support for SQL Azure – in terms of seamless connectivity, viewing objects in the object explorer, SMO scripting, and more.



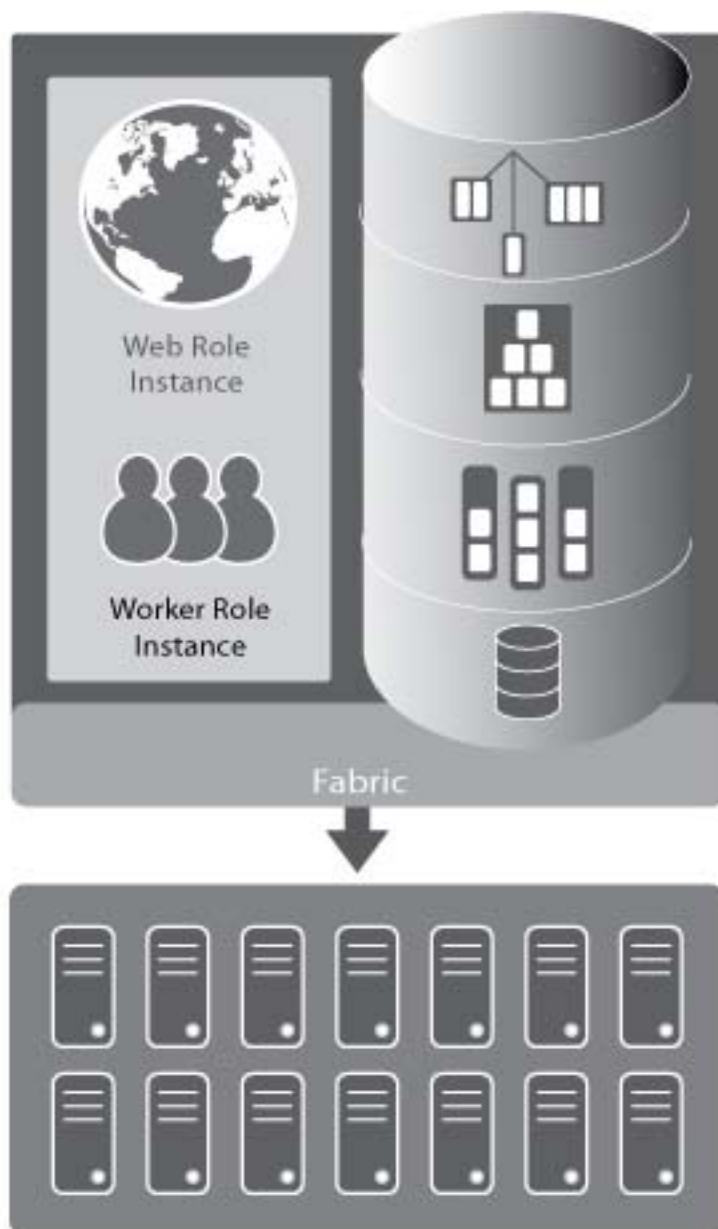
# Service Management in Windows Azure™

Ok.

I understand **storage services**, but I'm not yet clear on how computers and resources in Windows Azure are **organized and managed** ?

Let's find out!

Computers dedicated to Windows Azure are organized into a fabric managed by the fabric controller.



## Automated application management and control

The collection of servers

Multiple VMs per server

Choose from five different VM sizes, based on your application needs

Service management


You tell it what to do— it figures out how

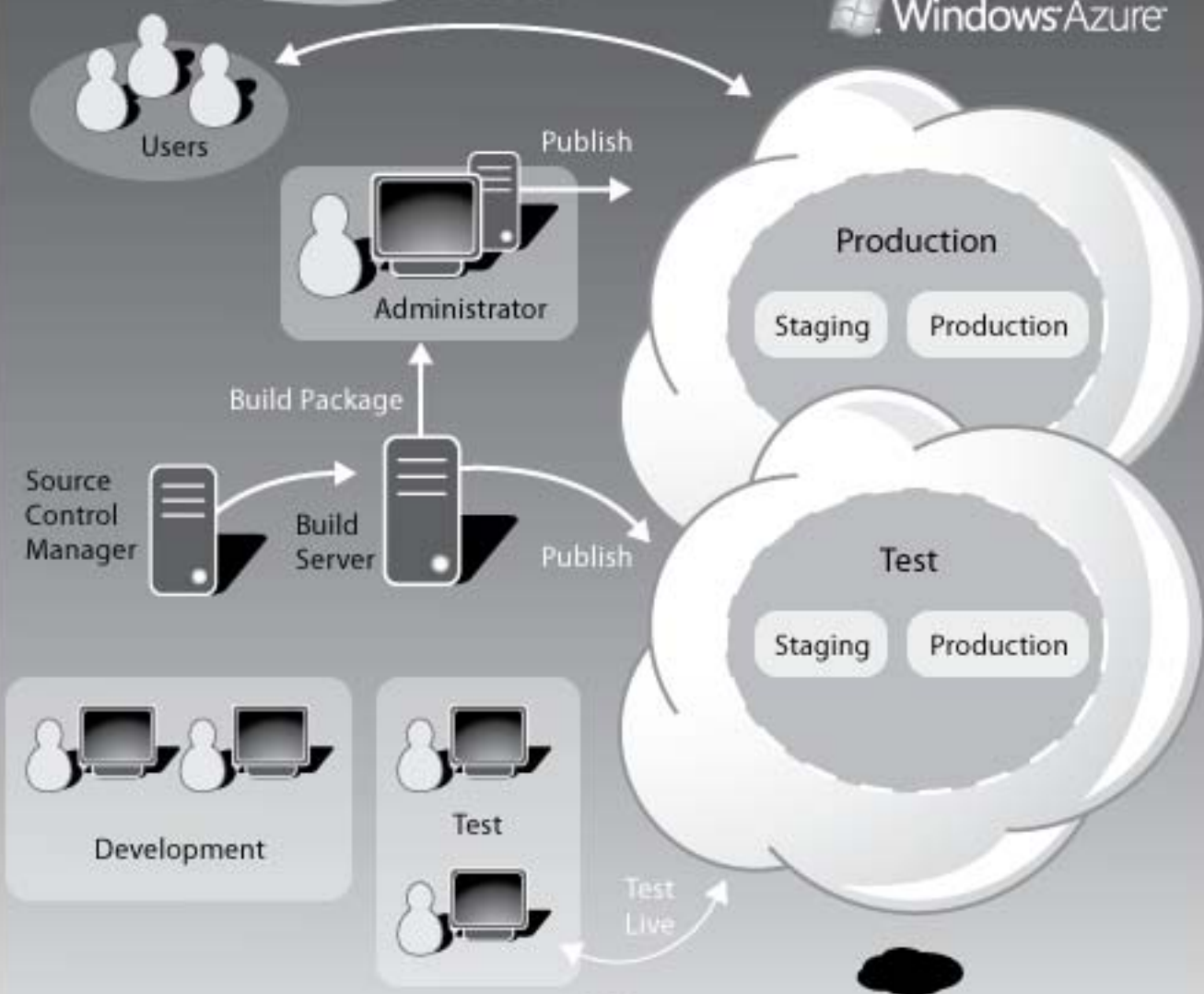
Dynamically scale up, scale down, update or roll application back to a previous version

Simple system management and deployment APIs

Now that you understand **Windows Azure**, let's look at the application life cycle and deployment for your Windows Azure **implementation**.



 Windows Azure



## ***Now, let's look at a real-world implementation...***

In my spare time, I develop applications for Windows Azure. While we can do a great deal of testing locally, we eventually have to test our applications in the cloud before we deploy to the live production environment.

To do this, we have two Windows Azure subscriptions. One is an account we use for testing, and the other is the live production account. Because each account has its own Windows Live® ID, and its own set of API keys, we can limit access to each environment to a particular set of people. Members of the testing team and key members of the development team have access to the testing account. Only two key people in our operations department have access to the production account.

Both of these accounts are standard Windows Azure accounts, and because the environments are identical we can be confident that application code will run in the same way in both. We can also be sure that application deployment will work in the same way in both environments because we'll use the same package to deploy to both test and production.

Our company can also perform testing by running the application in the development fabric while we point the application at storage in the test Windows Azure environment. This is important because there are more differences between development storage and cloud storage than between the development fabric and the cloud runtime environment. Also, cloud storage is relatively inexpensive to use compared to other cloud resources.



Let's go  
tell our  
**Boss!**

We learned  
about a more  
**efficient** way to  
run our datacenter  
and provide  
services  
**!**



**Wow!**  
Sounds great.  
Hey, ... can I get a ride?

[http://msdn.microsoft.com/  
zh-cn/windowsazure/](http://msdn.microsoft.com/zh-cn/windowsazure/)

We're all in!  
Let's go  
**Into  
the Clouds**  
**!**



# Get into the CLOUD!



**APPLICATION MODEL**

**OPERATIONAL MODEL**

*Learn more about the Windows Azure Platform....*

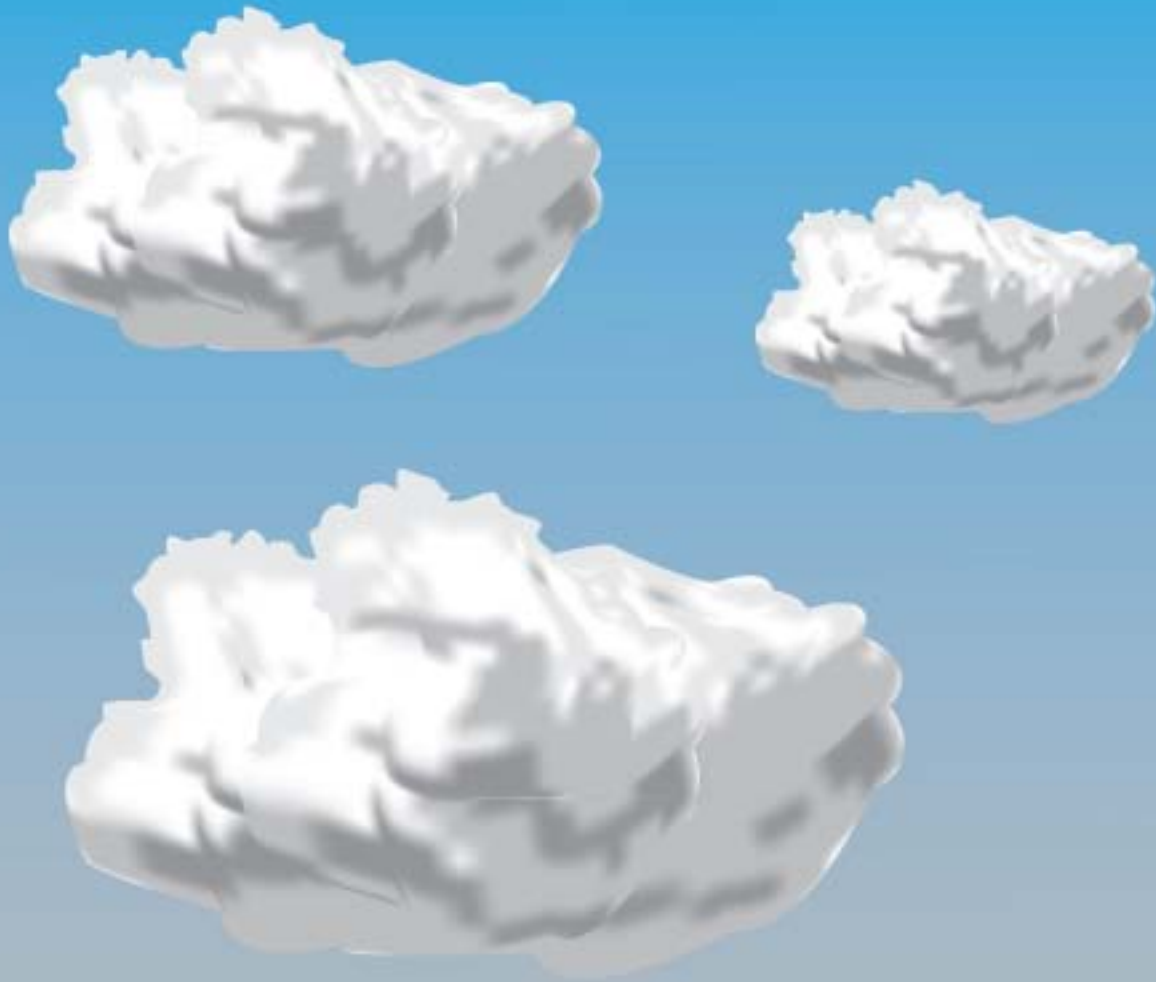
<http://www.windowsazure.com/getstarted>

Windows Azure™ is an Internet-scale cloud services platform hosted in Microsoft data centers around the world that provides a simple, reliable, and powerful platform for the creation of web applications and services.

Together with Leah and Zach, you will learn about the cloud mindset and:

- The benefits of cloud computing
- The powerful features and options for storage and service management that Windows Azure offers
- The application life cycle for Windows Azure applications





*Learn more about the Windows Azure Platform....*

<http://www.windowsazure.com/getstarted>

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