Microsoft Azure:

The Ultimate Flexible Enterprise-Level Solution

Janet Bailey, PhD
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Microsoft Corporation

Background

Project Assignment

Evaluate the Value and Fit of Azure for Walmart

Initiator

Steven Lamey, Senior Business Manager, Walmart Corporation

UALR Student Team

4 Graduates / 2 Undergraduates

Time Frame

8 months (4 months research & development)

Faculty Mentor

Janet Bailey, PhD

Industry Support

Bradley Jensen, PhD

UALR Student Team with Walmart and Microsoft Executives

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Corporate
Headquarters
Bentonville, AR

1962

World's largest corporation

$421.849 billion annual sales 2010

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Brazil

In *15 countries*

Asia

>8,500 stores worldwide

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> 2.1 *million* associates worldwide

Walmart employs 1% of America

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US stores visited by ***100 million customers*** **every week**

In other words, 1/3 of America goes to Walmart every week!!

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> ***1 million customer transactions*** **every *hour***

databases estimated ***> 2.5 petabytes***—the equivalent of

167 times the books in America's Library of Congress

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So why did Walmart start considering Cloud Computing 2011?

#1 strategic technology initiative

Dangerous to not have a cloud strategy

Gartner

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Initially, Walmart thought they needed a cloud provider that could/would…

- Meet Walmart's massive processing/storage capacity requirements
- Provide a flexible application development environment
- Provide information on the cloud architecture
- Allow for secure access to data outside of the corporate firewall

We found they also required…

- Fast and easy scalability
- An environment that supports rapid application deployment
- Rapid application response times
- An environment that supports data quality and integrity
- An environment that places control in the hands of trained IT professionals

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We found they also required…

- A secure deployment and operational environment
- Accessibility to and integration of in-house applications and data
- A cost-effective solution for Walmart and their vendors
- Business intelligence capabilities
- A platform suited to mobile applications and accessibility

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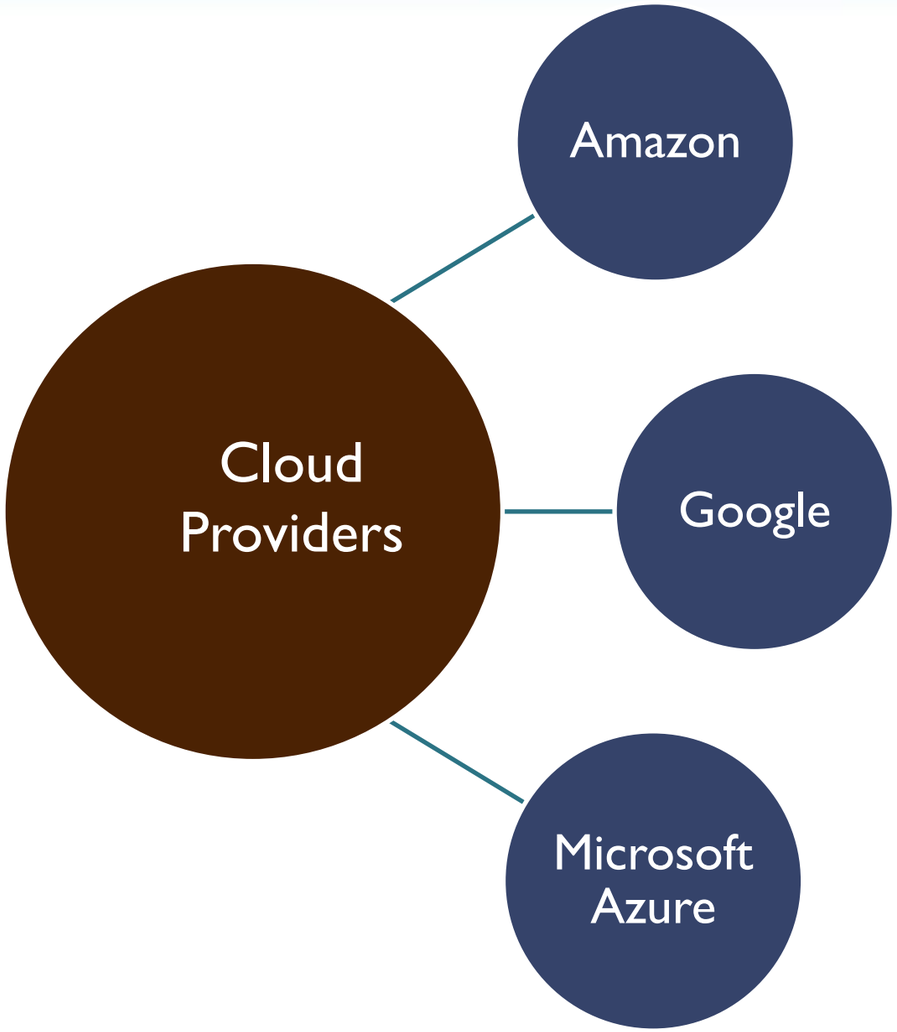
Options… Options… Options…



- October 2009 – 150 cloud providers in the market
- All dramatically different
- One size does NOT fit all

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Table 1: Classification of Cloud Providers

Provider	Software as a Service (Saas)	Platform as a Service (PaaS)	Infrastructure as a Service (IaaS)
3Tera			✓
Amazon			✓
Google	✓	✓	
Intuit	✓		
Joyent	✓	✓	✓
Microsoft	✓	✓	
NetSuite			✓
Rackspace		✓	✓
Salesforce.com	✓		
VMware			✓

Ability to Provide Capacity Required by a Corporation the Size of Walmart

"Our original architecture supported 10,000 vessels, but the Windows Azure platform enables us to support hundreds of thousands or even millions of vessels, without any capital expenses. To scale the application, we will simply provision more computing capacity and add more message queues from the Windows Azure platform Web portal."

Richard Prodger, Technical Director, Active Web Solutions

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Fast and Easy Scalability

"The ability to scale smoothly as we grow is the single most important challenge we're facing. To be able to scale up without a whole lot of planning, financial investment, and hardware maintenance is key. No one has ever done this on the scale we're doing it. The cloud-based, pay-as-you-go model of Windows Azure is an excellent fit."

Naylor, Founder and Chief Technology Officer, Advanced Telemetry

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Flexibility in Application Development

"Windows Azure was built from the ground up with interoperability in mind. Developers can use just about any language or development tool to build their application, run it on Windows Azure, and consume data from any other cloud or on-premises platform. Using DreamFactory tools, users can then drag, drop, and connect applications and data between clouds. We bring a new level of interoperability to cloud computing."

Appleton, Co-Founder, DreamFactory

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Environment that Supports Rapid Application Deployment

"Outback wanted its application to go live as soon as possible. With Amazon, we'd have had to set up the infrastructure and all the servers and make a lot of back-end services decisions. And the Google programming interface takes too long to learn."

Zimmerman, Chief Technology Officer and Lead Developer

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Capability for Providing a 99% or Better System Uptime

"Windows Azure scales very well, and is highly available. From an architectural perspective, these systems have been designed to provide an availability of 99.99 percent."

Prashant Agrawal, Senior Project Manager for Windows Azure, MindTree

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Rapid Application Response Times

"Since implementing Windows Azure, latency issues are a thing of the past, and we no longer worry about poor performance."

Andy Harjanto, Cofounder, Guppers

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Willingness to Provide Information on their Cloud Architecture

"It was great to get real-time input from Microsoft about how we could extend our solution's capabilities using Windows Azure. We'd never know who to talk to for support at Amazon."

Stephen Beeman, Developer, Glympse.

"We don't have to accommodate Windows Azure; Windows Azure accommodates us."

Martin Svensson CEO at Sagastream

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Environment that Supports Data Quality and Integrity

"We determined that SQL Data Services was being built to a higher, enterprise-grade level of reliability compared with Amazon SimpleDB, which we also evaluated. Microsoft has always been in the software business, which isn't really Amazon's core competency."

Nicholas Bedworth, Founder and Chief Technology Officer, Digital Direct

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Environment that Places Control in the Hands of Trained IT Professionals

"With Windows Azure, scalability, reliability, and security are handled by the platform itself, so developers are free to focus on addressing our core customer needs."

Alex Barnett, Group manager, Developer Relations, Intuit

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Secure Deployment and Operational Environment

"When customers connect to applications behind another company's firewall, they usually have to work with those companies' IT organizations to open up service bus ports. With the Service Bus, you don't have to do this, because the request comes from behind the firewall."

Rishi Vaish, Vice President of Engineering, Cast Iron Systems

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Accessibility and Integration of In-House Based Applications and Data

"Developing for Windows Azure is straightforward, but working with the Microsoft team to port the software from UNIX was a big part of the success of this project."

Yih-En Andrew Ban, Project Leader and Scientist, Arzeda

"It's also been nice that Microsoft, maybe surprisingly, wasn't averse to our bringing over whatever building blocks we needed, such as open source software, to facilitate our product."

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Cost-Effective for Walmart and their Vendors

"Without the need for application servers and database servers onsite, customers can save an average of $8,000 for startup hardware costs, depending on the number of users and the customer's processing needs."

Chechelkonogov, Chief Technology Officer, Acumatica

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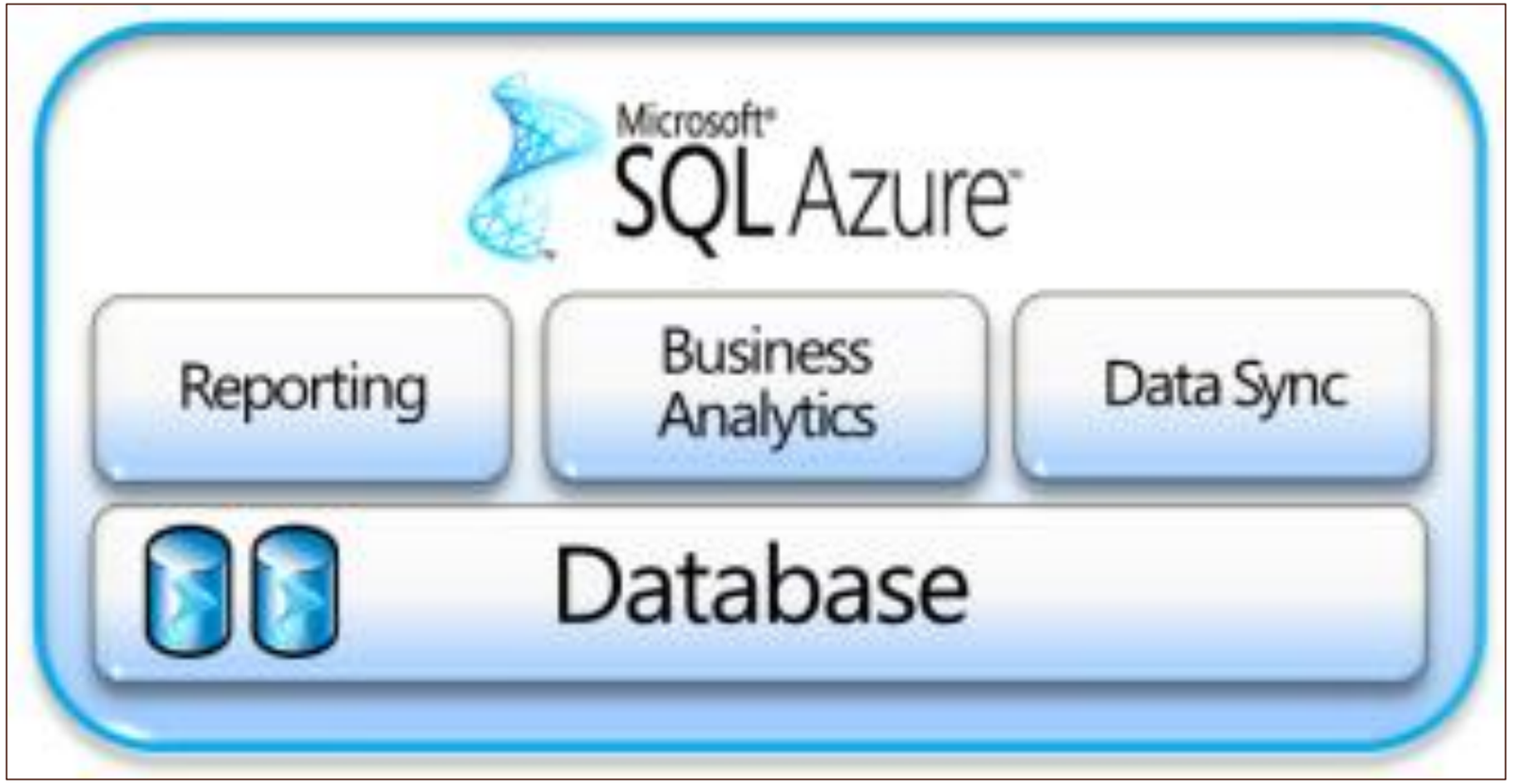
Business Intelligence Capabilities



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Suited to Mobile Applications and Accessibility

"We are continually looking for ways to enhance the functionality and value of ServiceReach. Windows Azure and the Microsoft development tools allow us to easily make changes and quickly update the solution—a perfect complement to the flexibility that customers have to add or modify features that they need."

Fildey, President, Broad Reach Mobility

Azure is Even Trusted by Other Cloud Providers

"We chose Windows Azure because Microsoft is the clear leader in cloud computing."

Jeff Collins, Architect, IPP at Intuit

Sample Costs of Our Application

Sample Azure Pricing Chart assuming 2k simultaneous users at all times		
Description	Price Description	Extended Price
Medium Compute instances = 4 (ea w/ 2, 1.6 GHz CPU, 3.5 GB RAM)	.48 per hour	$691.20
Azure Storage (avg 20 GB/month)	.15 per GB/month	$3.00
Azure Storage transactions = 10,000,000	.01 per 10,000	$10.10
Content Delivery Network transferred (avg 0.5 GB/hr)	.15 per month	$54.50
Content Delivery Network 10,000,000 transactions	.01 per 10,000	$10.10
SQL Azure Web database 1 GB	9.99 per month	$9.99
Bandwidth (inbound) used from web roles (avg 0.5 GB/hr)	0.10/hour	$36.50
Bandwidth (outbound) used from web roles (avg 0.5 GB/hr)	0.15/hour	$54.50
Estimated Total Monthly Charge		**$869.89**

Information is Power…

Azure provides a secure way to provide information to managers, associates, vendors worldwide thus: