

Applying Microsoft Cloud OS for initial tactical wins

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Contents

- Evolving corporate IT into the cloud..... 3
- Using Azure Infrastructure as a Service 3
 - Rapidly provisioning development and test systems 4
 - Running highly available SQL Server workloads in a hybrid cloud 5
 - Running open-source software in Azure..... 6
 - Setting up a more secure hybrid cloud with Azure networking..... 7
 - Using highly reliable Azure storage for backup and recovery..... 8
- Extending applications through Azure platform as a service 8
 - Enabling hybrid cloud messaging 10
- Additional information 10
- What’s next..... 11

Evolving corporate IT into the cloud

Organizations that are deciding whether to deploy applications, infrastructure, and data to the cloud also need to evaluate the risks—a task that typically involves Enterprise Architects like you. Where do you start?

In “Cloud Risk Decision Framework,”¹ Microsoft experts offer guidance to help you determine whether the cloud is the right solution for your organization. In addition, the Microsoft Azure Trust Center provides resources to help you mitigate security and privacy risks that arise from your risk assessment.

As part of your enterprise cloud strategy, you might consider how to achieve early tactical wins by migrating solutions to the public cloud.² You can start with low-risk, low-traffic solutions that you use to learn what it means to host an application in the cloud—including costs, processes for development and testing, and impact on operations and security. The experience you gain by experimenting with solutions and evaluating results can establish a basis for future planning.

This paper explores how you can apply Microsoft Cloud OS with Windows Server 2012 R2 and Microsoft Azure for initial tactical wins—and serves as a first step to help your organization develop a suitable cloud computing strategy.

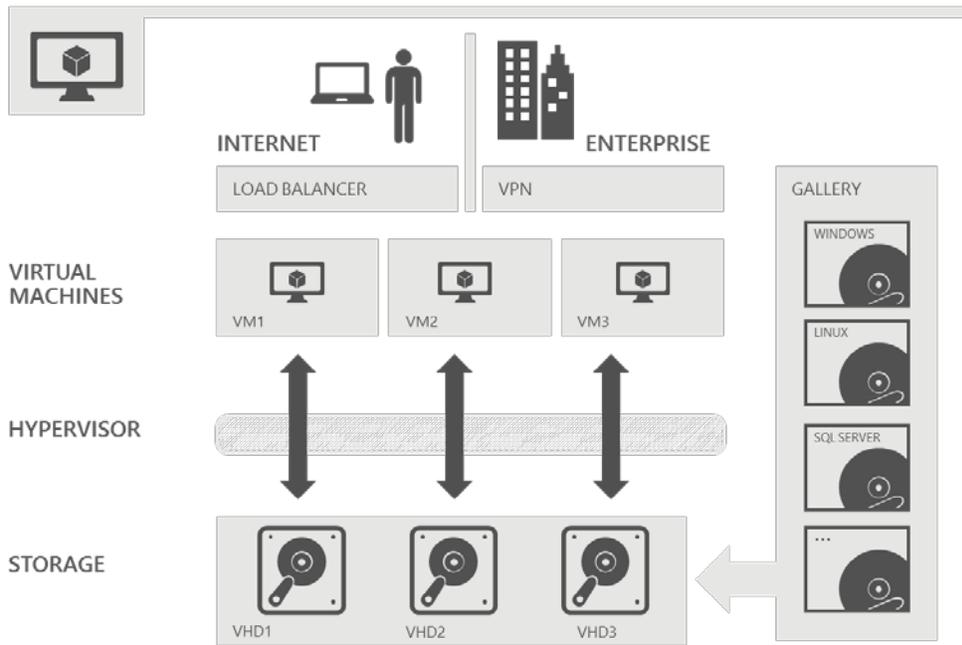
Using Azure Infrastructure as a Service

Business demand for infrastructure often comes with only a moment’s notice, whether for a short-term project, the need to get developers and testers up and running quickly, or the need to archive older solutions that reside in an on-premises data center to make room for higher-risk applications. Microsoft Azure helps reduce time-to-solution through cost-effective compute, network, and storage resources on demand to support business solutions, as shown in Figure 1.

¹ Stone, Greg and Noel, Pierre, “Cloud Risk Decision Framework,” http://download.microsoft.com/documents/australia/enterprise/SMIC1545_PDF_v7_pdf.pdf, retrieved June 16, 2014.

² Briggs, Barry, “Building an Enterprise Cloud Strategy,” Architecture @ Microsoft, <http://blogs.msdn.com/b/msarchitecture/archive/2014/04/07/building-an-enterprise-cloud-strategy.aspx>, retrieved June 16, 2014.

Virtual machines



Virtual machines can run both Windows and Linux operating systems. Create virtual machines from Virtual Hard Disk images stored as blobs. Create VHDs locally and upload them, choose from a stock gallery, or modify a running virtual machine and save the image to your personal gallery.

Figure 1. Overview of Azure Infrastructure as a Service (IaaS)

Let's look at examples of how you can incorporate IaaS into your architecture strategy.

Rapidly provisioning development and test systems

Microsoft Azure provides a low-cost alternative for on-premises or cloud-based solutions that require development and test environments. Developers can upload code and artifacts to Azure on-premises Hyper-V virtual hard drives (VHDs), create virtual machines based on the VHDs, and provision additional resources by using Windows PowerShell. They also can use the Microsoft Virtual Machine Converter Solution Accelerator to convert virtual machines from VMware ESX, ESXi, or vCenter servers to VHD format and then upload the VHD to Azure³.

For organizations running SAP NetWeaver solutions, SAP has certified Azure for production environments. With certification, organizations have greater agility to create development and test environments in Azure and can take the option to deploy solutions on-premises or in Azure. If

³ Mayer, Keith, "Migrate VMware VMs to Windows Azure," <http://cloud.dzone.com/articles/migrate-vmware-vm-windows>, retrieved June 16, 2014.

you have a SAP account, you can get more information about running SAP NetWeaver solutions in Azure from the following resources:

- SAP OSS Note: [1928533](#) – SAP Applications on Azure: Supported Products and Azure VM types
- SAP OSS Note: [2015553](#) – SAP on Microsoft Azure: Support Requirements

Running highly available SQL Server workloads in a hybrid cloud

SQL Server 2014 supports several high availability solutions through AlwaysOn Availability Groups in Azure. Figure 2 shows how you can use Azure to provide a SQL Server 2014 AlwaysOn Availability Group secondary replica. By having the secondary replica in Azure, you can take advantage of the read-only replica to offload reporting from your on-premises server or perform backups of the database replica in Azure and store them in Azure storage blobs.

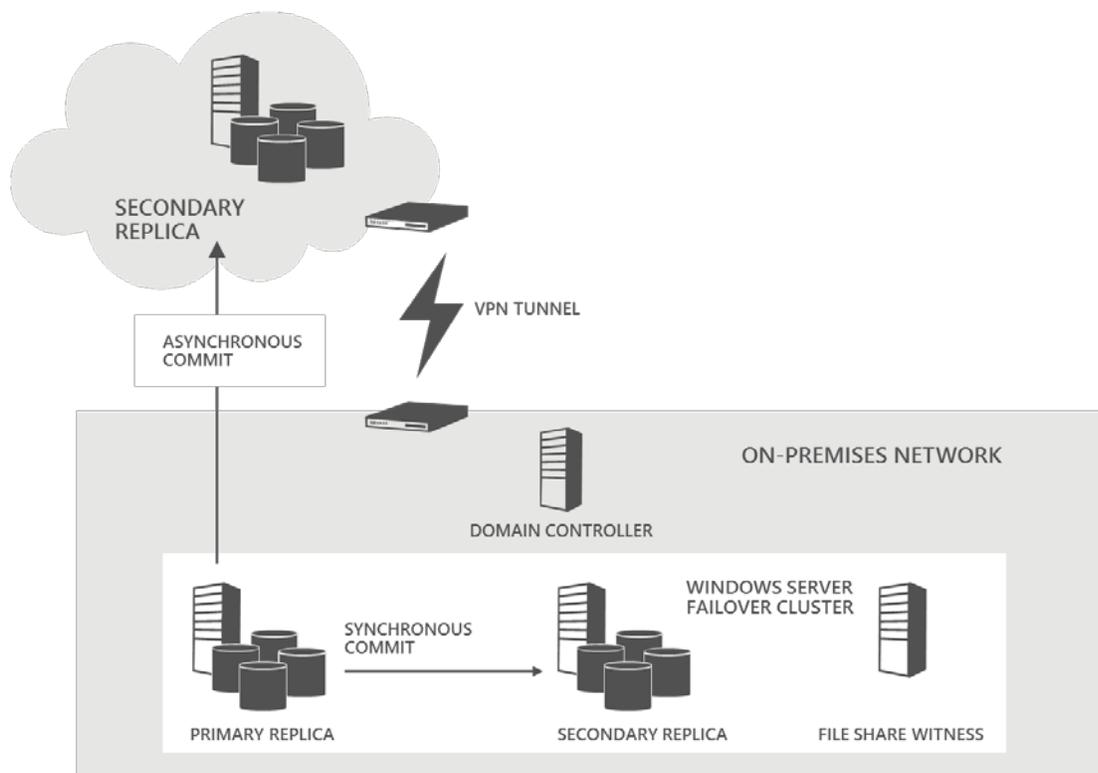


Figure 2. Using SQL Server 2014 virtual machine as a secondary replica role in Azure

In Azure and SQL Server 2014, you can run a Windows Server Failover Cluster to support AlwaysOn Availability Groups entirely in Azure.

The Microsoft architecture blueprint for line-of-business applications⁴ shows how you can configure SQL Server 2014 AlwaysOn Availability Groups as a data tier in Azure, as shown in Figure 3.

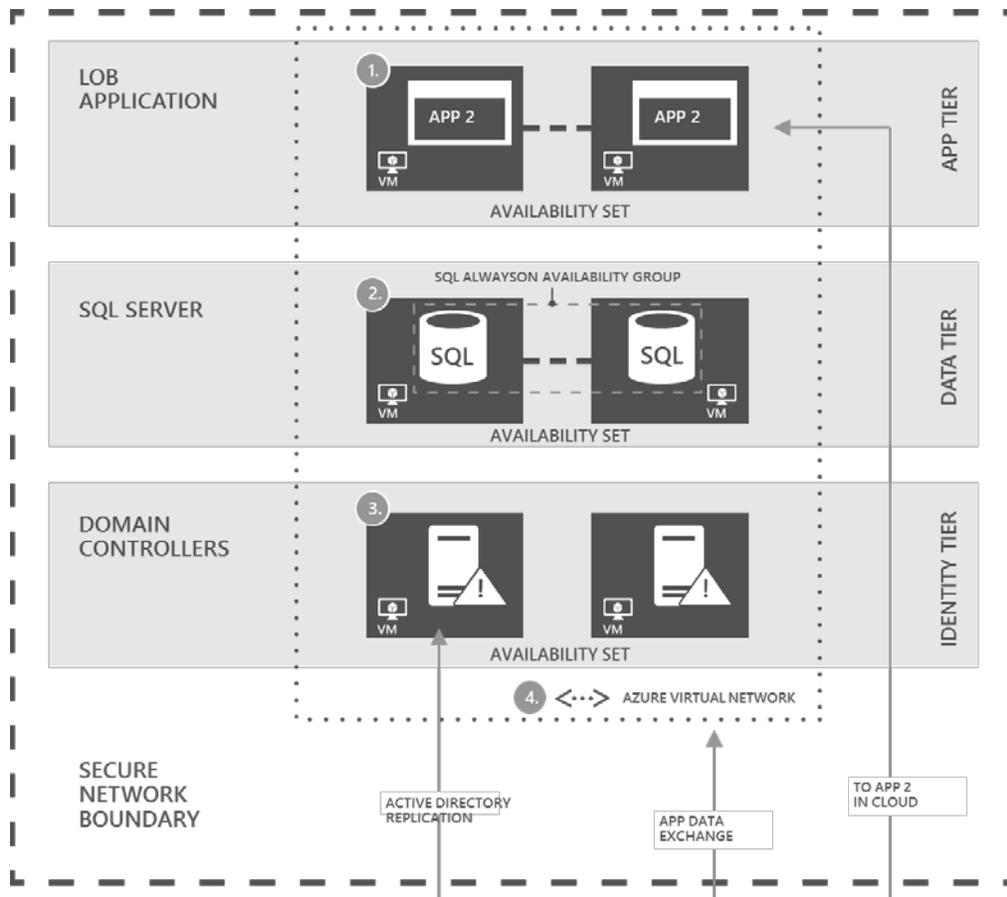


Figure 3. Running SQL Server 2014 AlwaysOn Availability Groups in Azure as the data tier

In this scenario, SQL Server 2014 uses a Windows Server Failover Cluster in Azure within an Azure Availability Set for enabling an AlwaysOn secondary replica. The failover cluster provides the failover services for SQL Server 2014 Availability Groups. Note that failover clustering of machines is not supported in Azure.

Running open-source software in Azure

Microsoft Azure supports a large and growing number of open source applications, frameworks, and languages as a result of collaboration between Microsoft and the open source community. Developers can easily spin up popular open source software by using Azure gallery images and VHDs for both Windows and Linux environments.

⁴ Architect Blueprints, Microsoft Developer Network, <http://msdn.microsoft.com/dn630664>

Developers working in Microsoft .NET, Java, PHP, Node.js, and Python can use freely available SDKs for those languages to get started quickly and take full advantage of Azure services. Developers working in virtually any language can use Azure services through established standards such as REST and HTTP, in addition to emerging standards such as AMQP and OData.

Setting up a more secure hybrid cloud with Azure networking

Microsoft Azure virtual networking provides the following options for extending an on-premises network for applications:

- **Virtual private network in Azure:** Set up a preferred private IPv4 space in Azure.
- **Cross-premises connectivity over site-to-site IPsec VPNs:** Extend an on-premises network to Windows Azure and treat virtual machines and services deployed in your virtual networks as though they were on your local premises, as shown in Figure 4.
- **ExpressRoute through an Exchange provider or network service provider:** Create private connections between Azure data centers and infrastructure that's on your premises or in a co-location environment, as shown in Figure 4.

Virtual network and ExpressRoute

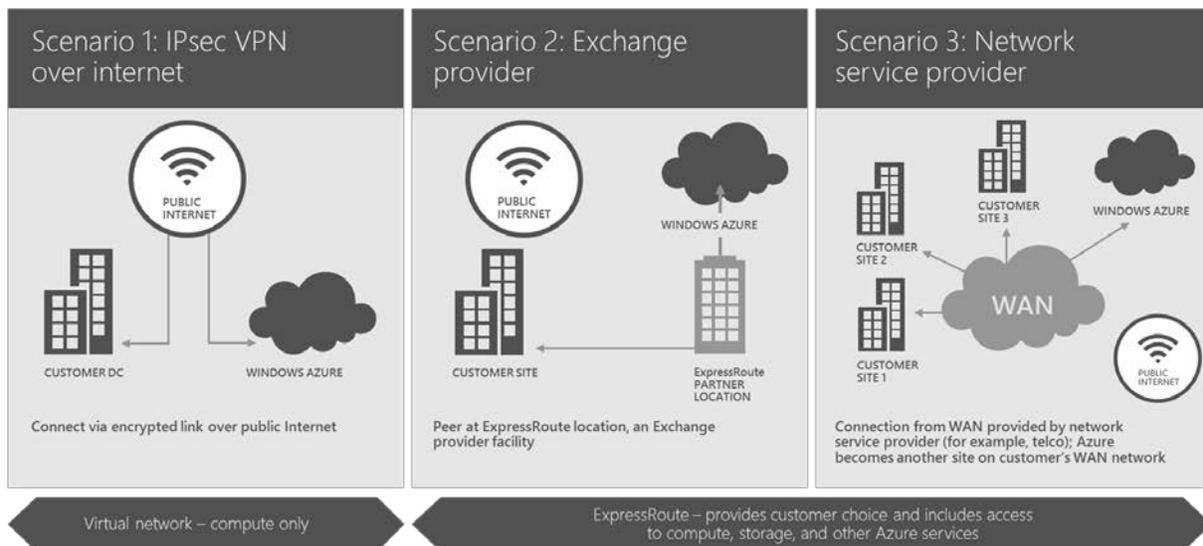


Figure 4. Extending on-premises networks to Azure options

When your site uses an Exchange provider, it connects through an ExpressRoute partner directly to Azure. Because you install, configure, and manage hardware in the Exchange provider's data center, you have greater flexibility and control over routing—at connection speeds as high as 10 gigabits per second.

With the network service provider option, your current managed WAN provider can connect directly to Azure, which makes Azure look like a site on your WAN that has connection speeds as

high as 1 gigabit per second. The advantage of this approach is that it is easier for you to onboard the direct connection by using your existing provider.

Using highly reliable Azure storage for backup and recovery

Once you have extended your on-premises network to Azure, you can take advantage of Azure storage and infrastructure. Consider the following business cases:

- **Archival of historical solutions for auditing and governance.** In some industries, an organization needs to provide access to older solutions and data. Data centers often have to keep the physical server and storage available for potential audits. With Windows Server physical to virtual migration, you can transfer the solution to a VHD file and then upload it to Azure storage for future hydration.
- **Lower backup storage costs.** For organizations that use SAN storage, Azure storage can provide a less expensive alternative to corporate SAN systems that are based on chargebacks. SQL Server 2014 and System Center 2012 Data Protection Manager both support backup of data to Azure.

Extending applications through Azure platform as a service

With an understanding of how Azure IaaS can reduce time-to-solution, it makes sense to evaluate the rich set of platform as a service (PaaS) offerings to create or extend projects in Microsoft Azure. For example, if you need to spin up a content management system for a department in your organization, you can use the Web Sites service, as shown in Figure 5.

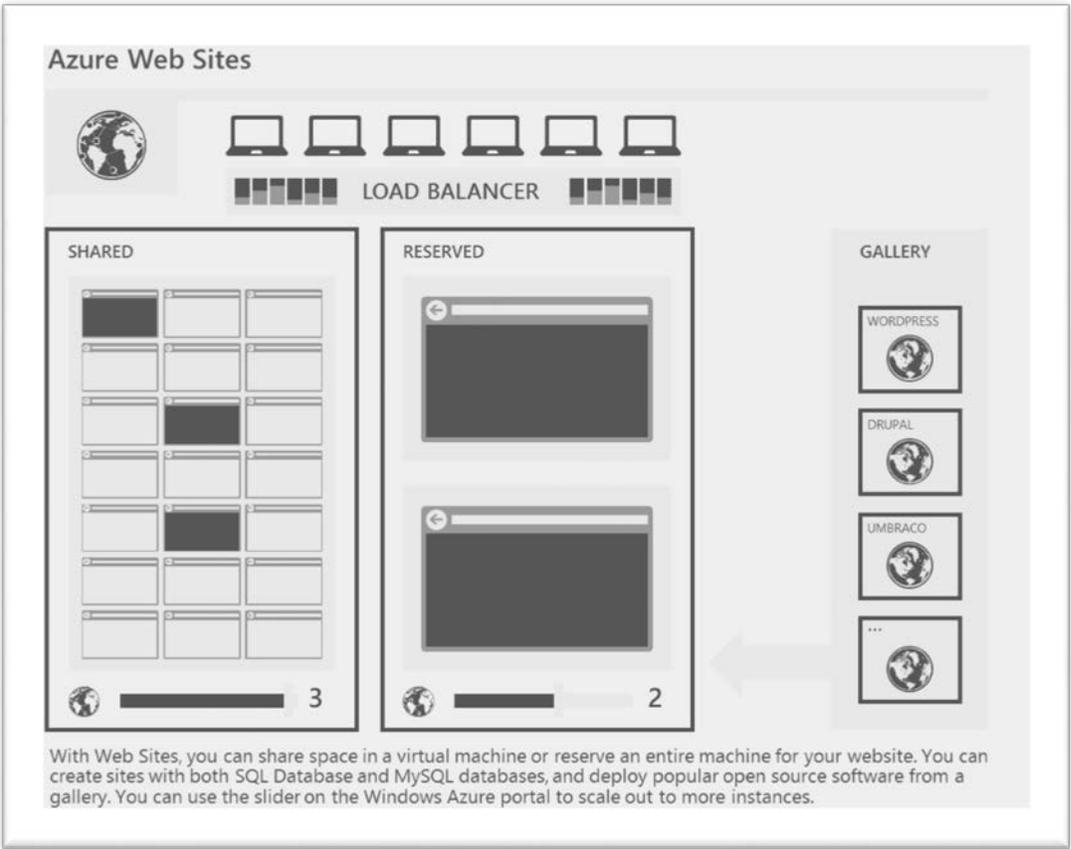


Figure 5. Scalable Azure Web Sites

For larger, multiple-tier web-based solutions, you can use the full set of Azure Cloud Services, as shown in Figure 6.

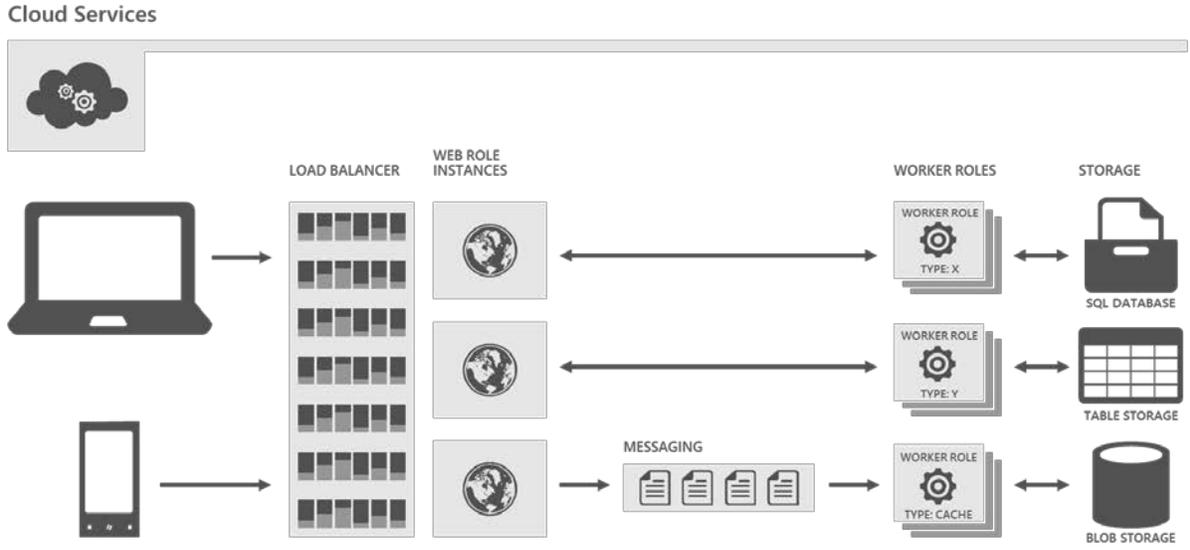


Figure 6. Azure Cloud Services overview

Azure Cloud Services consists of Internet-facing web roles and worker roles that run background tasks. Web roles can offload computing jobs to worker roles and can distribute work through queues to scalable pools of worker roles. All roles can access data stores such as Azure SQL Database files, table storage, blob storage, and other services.

Enabling hybrid cloud messaging

For organizations already using Microsoft BizTalk Server for message-based architectures and enterprise service bus solutions, you can extend integration services to Azure with BizTalk Services, Service Bus, Service Bus Queues, and other PaaS services to support Internet of Things, business-to-business transactions, branch office integration, and other hybrid scenarios.

For example, you may have a business requirement to improve the reliability of data synchronization between branch offices and central corporate systems across different time zones that have intermittent Internet connectivity. Service Bus provides a cloud-scale messaging channel that runs in Microsoft Azure data centers around the world to reliably communicate and synchronize information across branches and the central office. By using Service Bus Queues in the “store and forward” pattern, each branch can continue to operate without interruption—even when Internet connection speeds do not support real-time communication—with eventual synchronization ensured.

Another common example of where BizTalk services can help is in dealing with the business requirement to integrate software as a service (SaaS) applications such as Salesforce.com with other line-of-business applications. BizTalk Services makes it easier to integrate these SaaS applications seamlessly with core on-premises systems.

Additional information

For more information about what Microsoft Cloud OS with Windows Server 2012 R2 and Microsoft Azure can do to increase business agility and reduce costs for your organization, see the following resources:

- Microsoft Azure Trust Center: <http://azure.microsoft.com/en-us/support/trust-center/>
- Microsoft Azure for Development and Test: <http://azure.microsoft.com/en-us/solutions/dev-test/>
- Microsoft Virtual Machine Converter: <http://msdn.microsoft.com/en-us/library/hh967435.aspx>
- Microsoft Azure Virtual Network overview: <http://msdn.microsoft.com/en-us/library/azure/jj156007.aspx>

- Using SAP on Azure Virtual Machines: <http://msdn.microsoft.com/library/azure/dn745892.aspx>
- High Availability and Disaster Recovery for SQL Server in Azure Virtual Machines: <http://msdn.microsoft.com/en-us/library/jj870962.aspx>
- Microsoft Azure Open-Source Software: <http://azure.microsoft.com/en-us/community/open-source-software/>
- Architecture Blueprints: <http://msdn.microsoft.com/dn630664>
- Azure BizTalk Services: <http://azure.microsoft.com/en-us/services/biztalk-services/>
- SQL Server 2014: <http://www.microsoft.com/en-us/server-cloud/products/sql-server/default.aspx>

What's next

Stay tuned for the latest information available for architects on Microsoft Developer Network at <http://msdn.microsoft.com/en-us/dn630665>.