

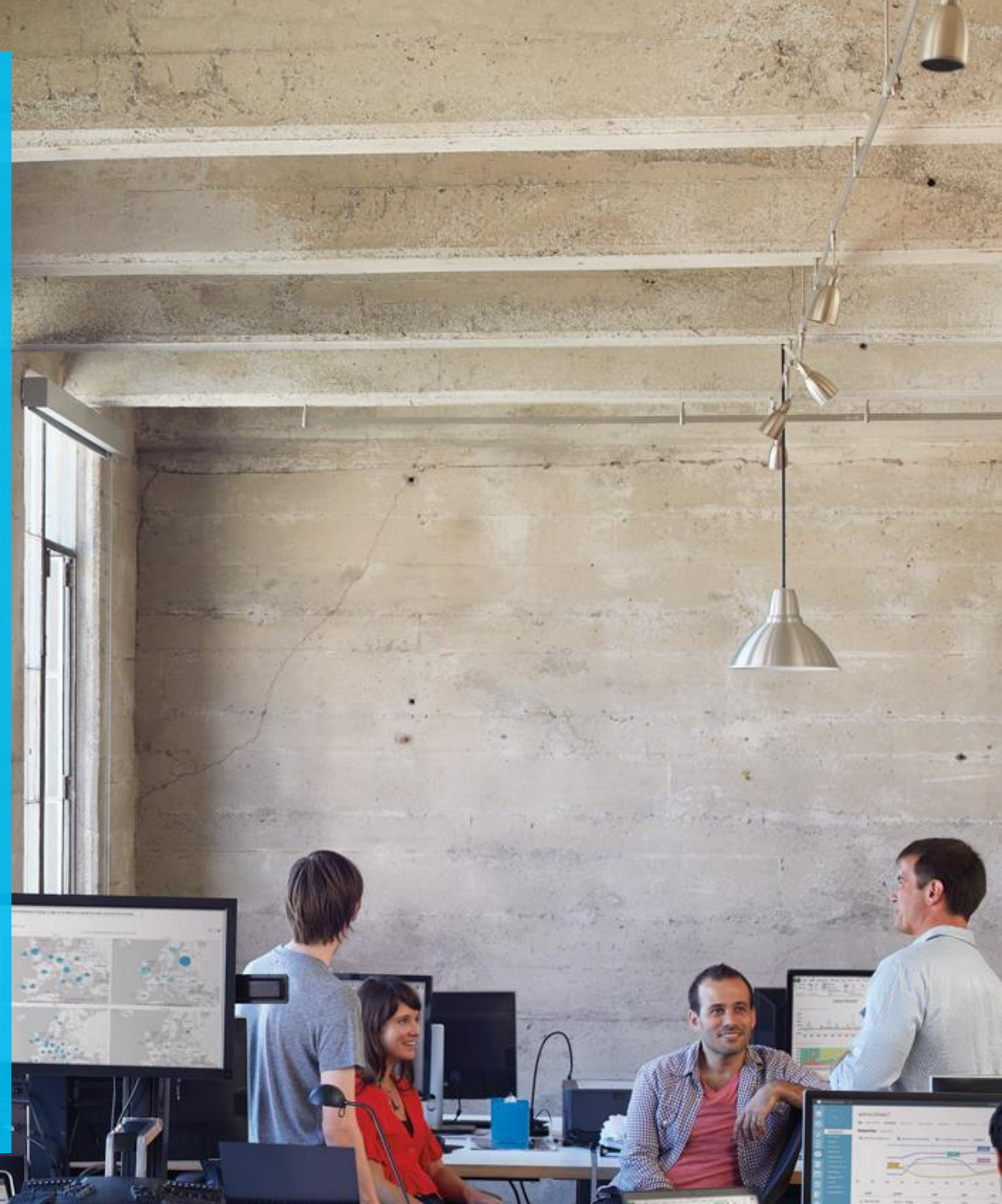


# Microsoft Azure

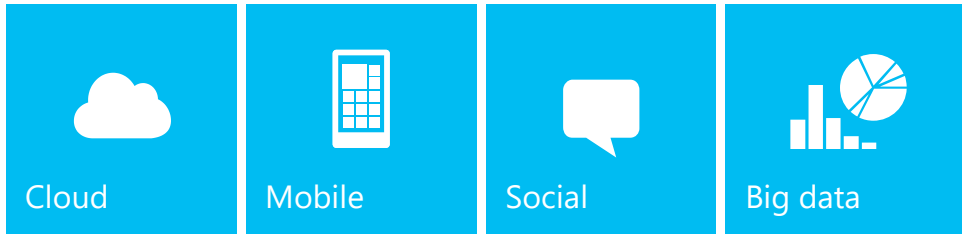
The cloud platform  
built for business of  
Education

Bill Campman (Billc@Microsoft.com)

5/31/16



# The next strategic opportunity is here



IT

How do you use  
technology  
innovation...

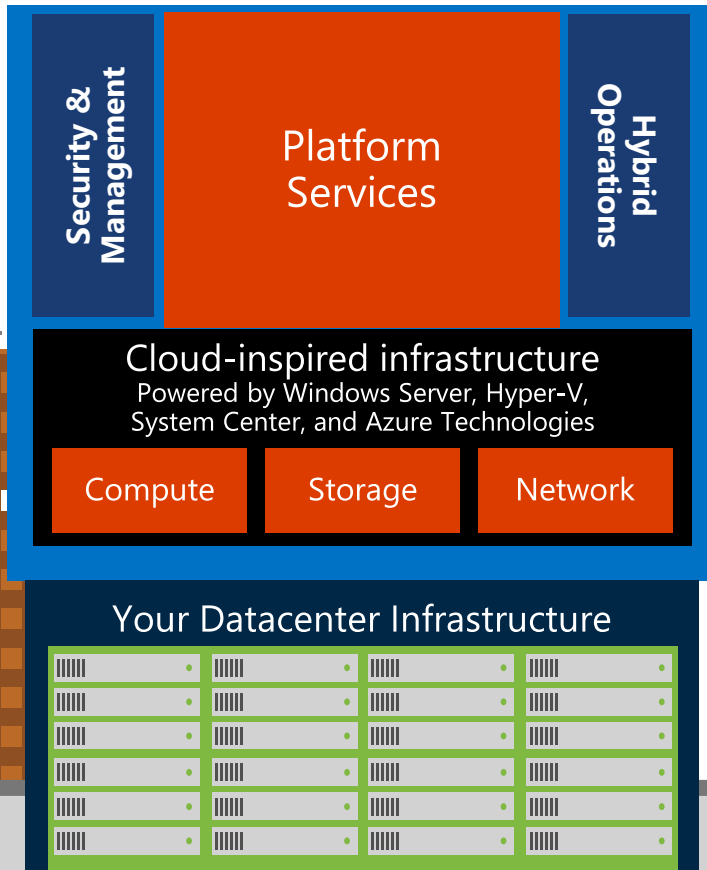


to architect  
classroom  
innovation?

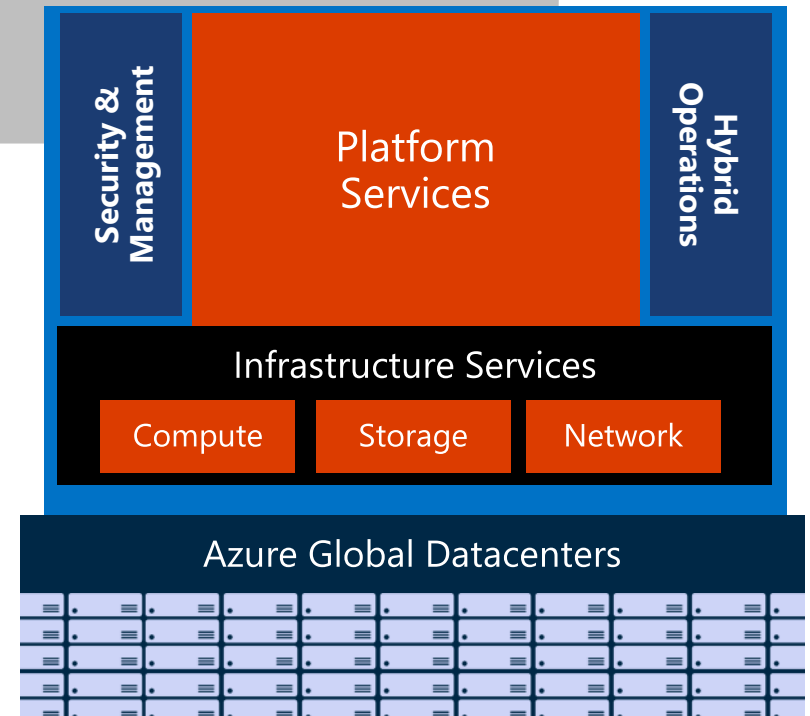
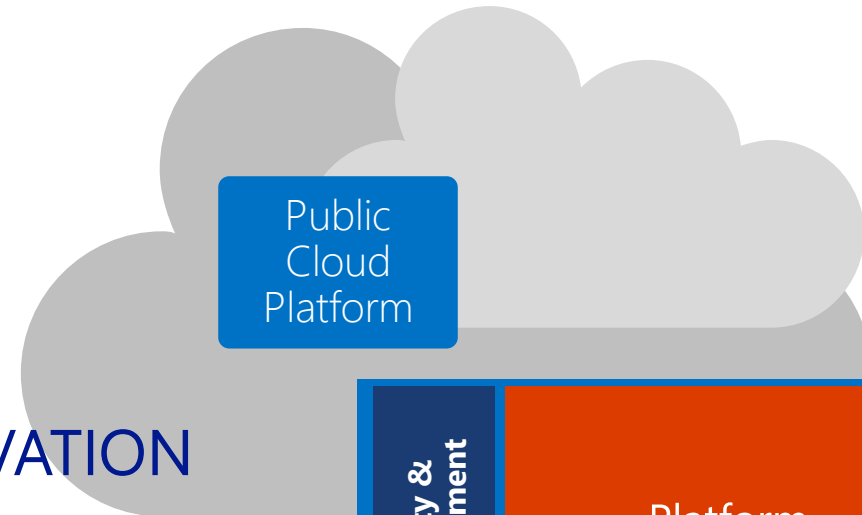
Learning



# The Azure Platform Strategy



Microsoft Azure Stack & Cloud Platform System



Microsoft Azure  
Public, Global, Shared Datacenters

# Azure is an open cloud



# Most Comprehensive Hybrid Cloud

HYBRID STORAGE

StorSimple + Azure Storage

HYBRID BACKUP + DR

Azure Backup + Azure Site Recovery

HYBRID DATABASE

SQL Server 2016 StretchDB + Azure SQL DB

HYBRID CONNECTIVITY

VPN + ExpressRoute  
Azure Stack + Cloud Platform System

VPN + ExpressRoute

HYBRID APP INTEGRATION

Azure ServiceBus + BizTalk Services

HYBRID IDENTITY

Azure Active Directory

HYBRID CLOUD MANAGEMENT

Operations Management Suite + System Center

## Platform Services

### Security & Management

- Portal
- Azure Active Directory
- Azure AD B2C
- Multi-Factor Authentication
- Automation
- Scheduler
- Key Vault
- Store/Marketplace
- VM Image Gallery & VM Depot

### Services Compute

- Cloud Services
- Service Fabric
- Batch
- RemoteApp

### Integration

- Storage Queues
- BizTalk Services
- Hybrid Connections
- Service Bus

### Media & CDN

- Media Services
- Content Delivery Network (CDN)

### Web and Mobile

- Web Apps
- API Apps
- Mobile Apps
- Logic Apps
- API Management
- Notification Hubs

### Developer Services

- Visual Studio
- Azure SDK
- VS Online
- App Insights

### Data

- SQL Database
- Data Warehouse
- DocumentDB
- Redis Cache
- Azure Search
- Storage Tables

### Analytics & IoT

- HDInsight
- Machine Learning
- Stream Analytics
- Data Lake
- Data Factory
- Event Hubs
- Data Catalog
- IoT Hub
- Mobile Engagement

### Hybrid Operations

- Azure AD Health Monitoring
- AD Privileged Identity Management
- Domain Services
- Backup
- Operational Analytics
- Import/Export
- Azure Site Recovery
- StorSimple

## Infrastructure Services

### OS/Server Compute

- Virtual Machines
- Container Service

### Storage

- BLOB Storage
- Azure Files
- Premium Storage

### Networking

- Virtual Network
- Load Balancer
- DNS
- Express Route
- Traffic Manager
- VPN Gateway
- App Gateway

Datacenter Infrastructure (27 Regions, 22 Online)

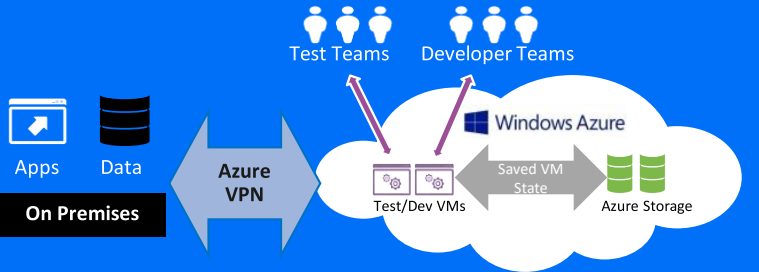


# Azure Education Common Workloads and Scenarios

## Test / Development

**Customer pains:** Long set-up times  
High infrastructure costs  
Limited datacenter capacity  
Hard to replicate production

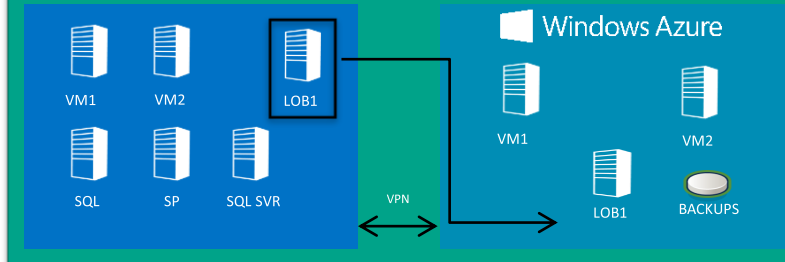
**What we offer:** Azure VMs to run test and dev workloads  
Seamless connectivity and easier access  
Lower development costs and greater agility



## Disaster Recovery

**Customer pains:** Datacenter costs  
DR is difficult

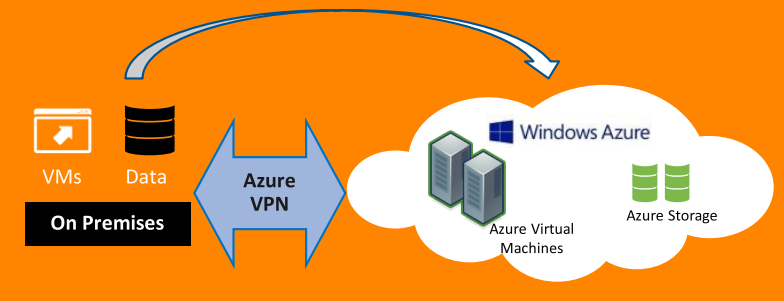
**What we offer:** Compute (VMs), Storage  
Azure site recovery  
InMigrate migration assistant



## IaaS Azure VMs

**Customer pains:** Datacenter costs  
Management costs

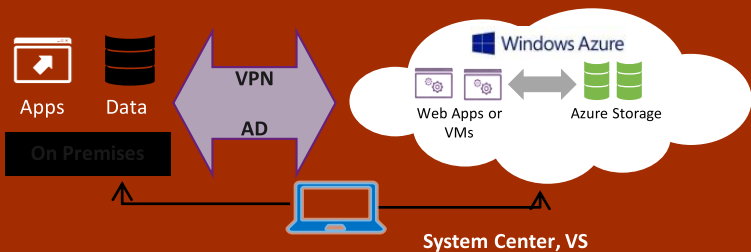
**What we offer:** Compute (VMs)  
Storage  
System Center



## Web Sites/Applications

**Customer pains:** Downtime not acceptable  
Limited datacenter capacity  
Slow response to capacity spikes

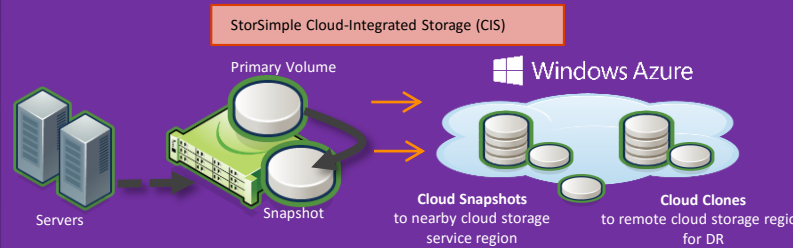
**What we offer:** Azure Websites and VMs  
Seamless connectivity and management  
Lower TCO and greater agility



## Storage and Backup

**Customer pains:** Equipment sprawl and expanding footprint  
Data growth and data management complexity  
Back-up issues and untested Disaster Recovery

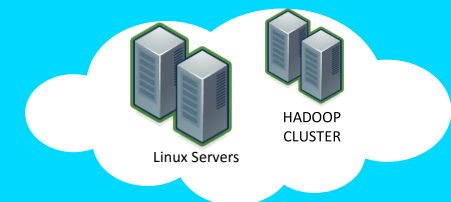
**What we offer:** Consolidate primary, archive, back-up and DR through seamless integration with Azure  
Cloud snapshots=revolutionary speed, simplicity, and reliability for back-up and recovery  
Reduce enterprise TCO by 60-80%



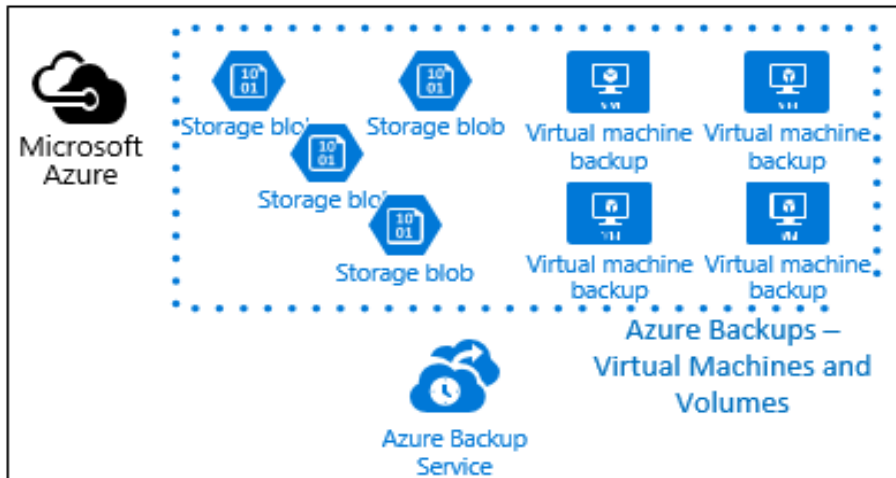
## Research Computing

**Customer pains:** Researchers require infinite capacity  
Research usage patterns are inconsistent  
Researchers require high security environments

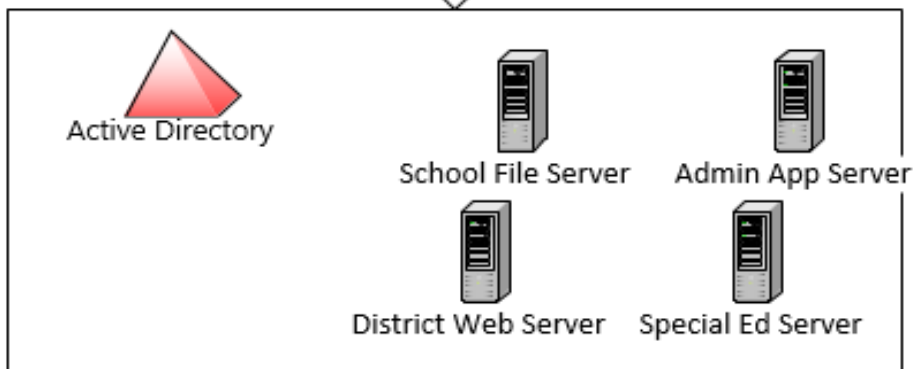
**What we offer:** Hyper scale compute and storage worldwide  
Pay for only what you use  
Open Platform (Hadoop, Linux, MySQL, R, etc.)  
Research Grants



# Backup School Data in Microsoft Azure



Azure Backup Vault  
(Geo-replicated)



On Premises Network

## Benefits:

- Azure backup is a compelling alternative to tape backups with significant cost savings, shorter recovery time and up to 99 years of retention.
- Backing up clients or servers to Azure is secure over the wire and at rest. Backups are stored in geo-replicated storage which maintains 6 copies of you data across two Azure datacenters.

## Tips:

- Azure backup can back up physical servers and virtual machines both in the cloud and on premises.
- Use Data Protection Manager for multi-server or complex application workloads (E.g. Exchange, SharePoint, etc.)

## Resources:

- Blog with new Edu pricing - <http://azure.microsoft.com/blog/2015/03/31/azure-backup-announcing-new-pricing-model-for-tco-reduction/>
- Intro to Azure Backup - <http://azure.microsoft.com/en-us/documentation/articles/backup-introduction-to-azure-backup/>
- Back up Windows Servers - <http://azure.microsoft.com/en-us/documentation/articles/backup-configure-vault/>
- Back up Azure VMs with Azure backup – <http://azure.microsoft.com/en-us/documentation/articles/backup-azure-vms/>
- Azure Backup FAQ - <http://azure.microsoft.com/en-us/documentation/articles/backup-azure-backup-faq/>
- Azure Backup Forums - <http://go.microsoft.com/fwlink/p/?linkid=290933&clid=0x409>

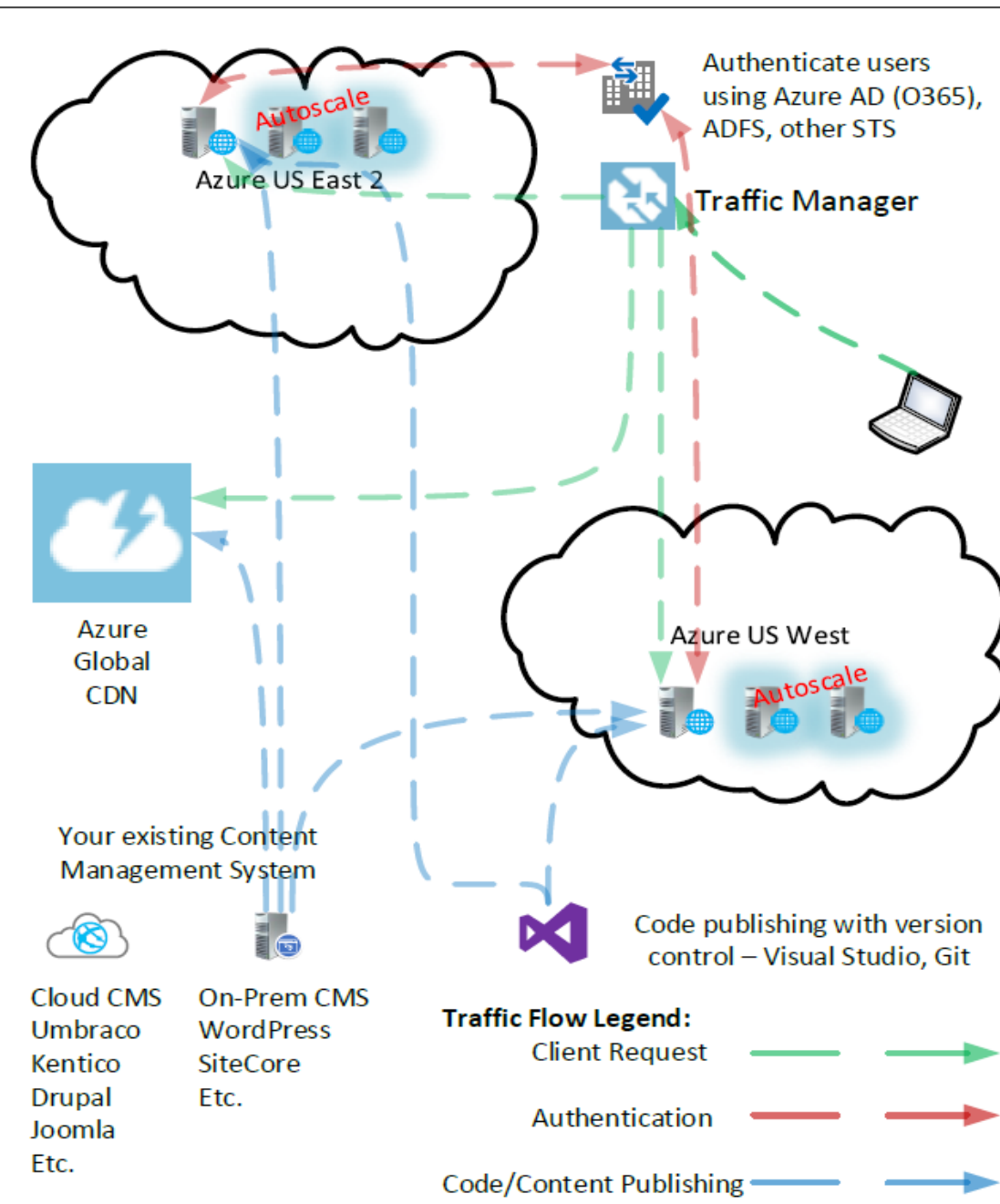
Sample Bill of materials - 4 Servers - 1 Large (900GB), 2 Med (400GB/ea), 1 Small (40GB)

	Monthly Rate	Quantity	Extended
Cost per protected VM instance			
Small Instance (up to 50GB)	\$ 5.00	1	\$ 5.00
Med (51 to 500GB)	\$ 10.00	2	\$ 20.00
Large (over 500GB - \$10/mo per 500GB)	\$ 10.00	2	\$ 20.00
<b>Total</b>			<b>\$ 45.00</b>
		# Units	Cost per GB
Locally Redundant Storage (File Setrver)		900	0.024
Geo Redunant Storage (App, Web and Special Ed)		840	0.048
<b>Total</b>			<b>\$ 61.92</b>
<b>Total Monthly Cost</b>			<b>\$ 106.92</b>

This is a sample only. Data storage costs might grow over time



# Your Public Web Site in Azure App Service



## Benefits:

- You don't have to patch/upgrade OS, IIS, Java, .Net, etc.
- Multi-Geography, out of region infrastructure with lower maintenance/management overhead.
- Easy auto-scaling to handle peak loads (start/end of semester/year, athletic events, commencement, etc.)
- Integrate Azure Content Delivery Network (CDN) for audio, video, photos, etc.
- Cross-platform: ASP.Net, Java, Node.js, .Net, WordPress, C#, Python, PHP, HTML5
- User Auth – supports Azure AD (O365) as well as on-premises ADFS & other STS as well as multi-factor
- Secure – ISO, SOCS, PCI compliant
- Backups support built-in (consumes Azure Storage for backup retention)

## Tips:

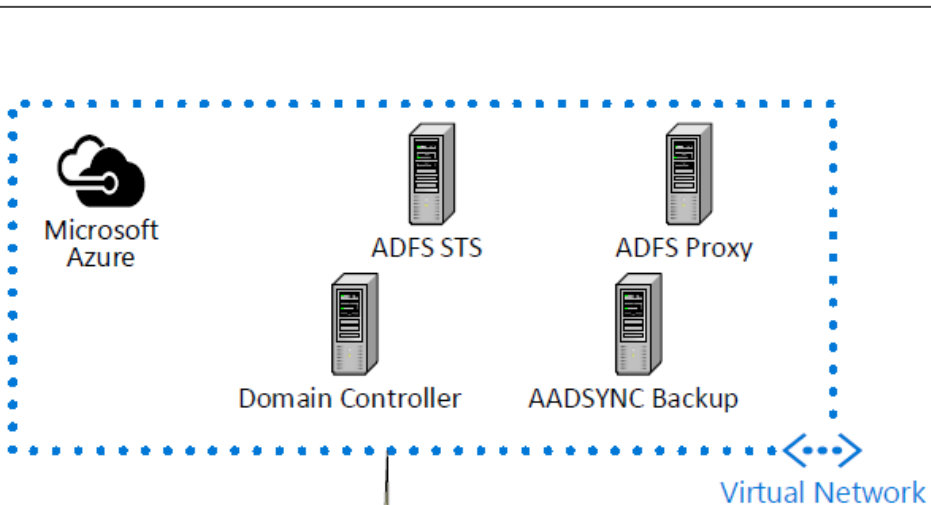
- Identify existing Content Management Service (CMS) – likely can publish to Azure Web Sites
- CDN raises performance for heavy media but adds some complexity – assess cost/benefit to your website
- Work with your CMS/Devs to agree on target URL's for Traffic Manager Health Probes

## Resources:

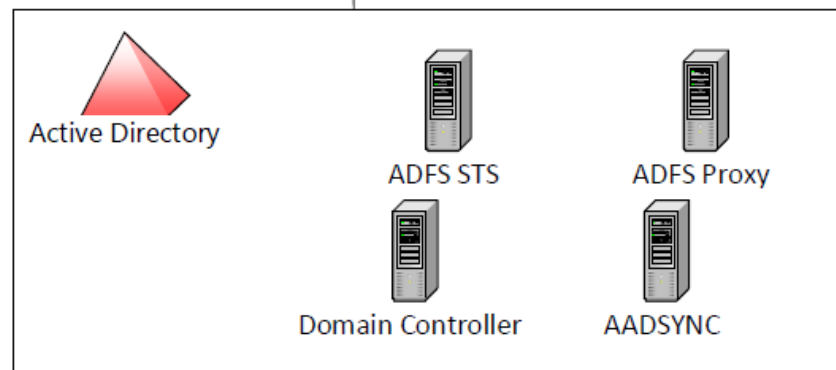
- App Service pricing details - <http://azure.microsoft.com/en-us/pricing/details/app-service/>
- Use Azure CDN in Azure App Service - <http://azure.microsoft.com/en-us/documentation/articles/cdn-websites-with-cdn>

Sample Bill of materials - 2 Web Servers	Monthly Rate	Quantity	Extended
<b>Cost per Web App Worker Instance (VM)</b>			
B1 (Basic Plan, 1 Core, 1.75GB RAM, 10GB Storage)	\$ 56.00	0	\$ -
S1 (Standard Plan, 1 Core, 1.75GB RAM, 50GB Storage)	\$ 74.00	2	\$ 148.00
S2 (Standard Plan, 2 Core, 3.5GB RAM, 50GB Storage)	\$ 149.00	0	\$ -
P2 (Premium Plan, 2 Core, 3.5GB RAM, 500GB Storage)	\$ 149.00	0	\$ -
<b>Cost for additional services</b>			
Data Egress 500GB/Month	\$ 59.40	1	\$ 59.40
SNI SSL (qty. 5 incl. Standard & above, modern browser)	\$ 9.00	0	\$ -
IP SSL (qty. 1 incl. Standard & above, all browsers)	\$ 39.00	0	\$ -
Azure CDN 1TB	\$ 89.00	1	\$ 89.00
Block Blob Storage, LRS (for backups) 100GB	\$ 2.40	2	\$ 4.80
<b>Total Monthly Cost</b>			<b>\$ 301.20</b>

# Hosting Active Directory and ADFS Infrastructure in Microsoft Azure



SSL VPN or  
ExpressRoute  
connection  
To Azure



On Premises Network

## Benefits:

-Putting DCs and ADFS in Azure provide authentication redundancy. If your local AD is down, users can still authenticate to O365 for critical services like Email

## Tips:

- Windows Server 2012 or later is required if running DCs in Server Virtualization
- Configure AD Sites link costs appropriately
- Azure DNS doesn't support AD, you need your own DNS presence in Azure
- Place the AD DIT/SYSVOL on non-cached data drive

## Resources:

- Deploy AD DS or AD FS and Office 365 with single sign-on and Azure Virtual Machines - <https://technet.microsoft.com/en-us/library/dn509513.aspx>
- TUTORIAL: Install a Replica Active Directory Domain Controller in Azure Virtual Networks - <http://azure.microsoft.com/en-us/documentation/articles/virtual-networks-install-replica-active-directory-domain-controller>
- TUTORIAL: Install a new Active Directory forest on an Azure virtual network - <http://azure.microsoft.com/en-us/documentation/articles/active-directory-new-forest-virtual-machine/>
- Documentation: Guidelines for Deploying Windows Server Active Directory on Azure Virtual Machines - <http://msdn.microsoft.com/library/azure/jj156090.aspx>
- White paper: Office 365 Adapter - Deploying Office 365 single sign-on using Azure Virtual Machines - <http://technet.microsoft.com/en-us/library/dn509539.aspx>

## Sample Bill of materials - best bet is to run Azure IaaS estimator on a actual on premises server

	Hourly Rate	Monthly Rate	# Servers	Extended
A3 Windows VMs - Domain Controllers 500GB Data	\$ 0.2618	\$ 194.78	1	\$ 194.78
A3 Windows VMs ADFS STS 100GB Data	\$ 0.2618	\$ 194.78	1	\$ 194.78
A3 Windows VMs ADFS PROXY 100GB Data	\$ 0.2618	\$ 194.78	1	\$ 194.78
A2 Windows VMs AADS SYNC backup 100GB Data	\$ 0.1309	\$ 97.39	1	\$ 97.39
				\$ 681.73
	Per Unit	# Units	Monthly Cost	
Storage, Locally Redundant, per GB	\$ 0.0511	800	\$ 40.88	
Site to Site VPN, per Hour	\$ 0.0360	744	\$ 26.78	
Storage Transactions, per 100M IOPS	\$ 3.6000	10	\$ 36.00	
Data Egress, for # of GB transferred out	\$ 0.0870	100	\$ 8.70	
			\$ 112.36	
			\$ 794.09	



# Microsoft Azure Hybrid Use Benefit



# What are my Hybrid Use Benefit entitlements?

- Both versions of Windows Server – Standard and Datacenter – are eligible for the Hybrid Use Benefit.

## ON-PREMISES LICENSE

## ENABLEMENT FOR WINDOWS SERVER VMs IN AZURE

## LICENSE IMPACT



Two instances up to eight cores, or  
One instance up to 16 cores

WS license **cannot** be assigned to other  
HW while HUB is used



Two instances up to eight cores, or  
One instance up to 16 cores

WS license **can** be assigned to both  
on-premises and Azure deployments

