



Elite Partner Cloud Enablement

Part Two

Microsoft Azure : March 15th, 2017



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Course Content

Part One (March 2nd)

- Pre-sales information
- Complete information
- Common Objections

- High level design
- Getting the pricing right
- Playing to Azures strength

Part Two (March 15th)

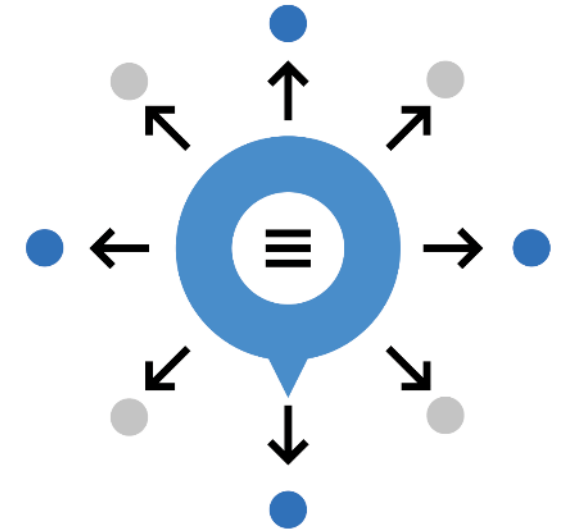
- Creating a typical MSP environment
- Network, Storage, Compute, Network Security etc

- Advanced performance considerations
- Workload Considerations e.g. SQL

Part Three (March 29th)

- Backup and Recovery Options in Azure

- Hybrid Cloud connectivity options
- Migrating workloads to Azure

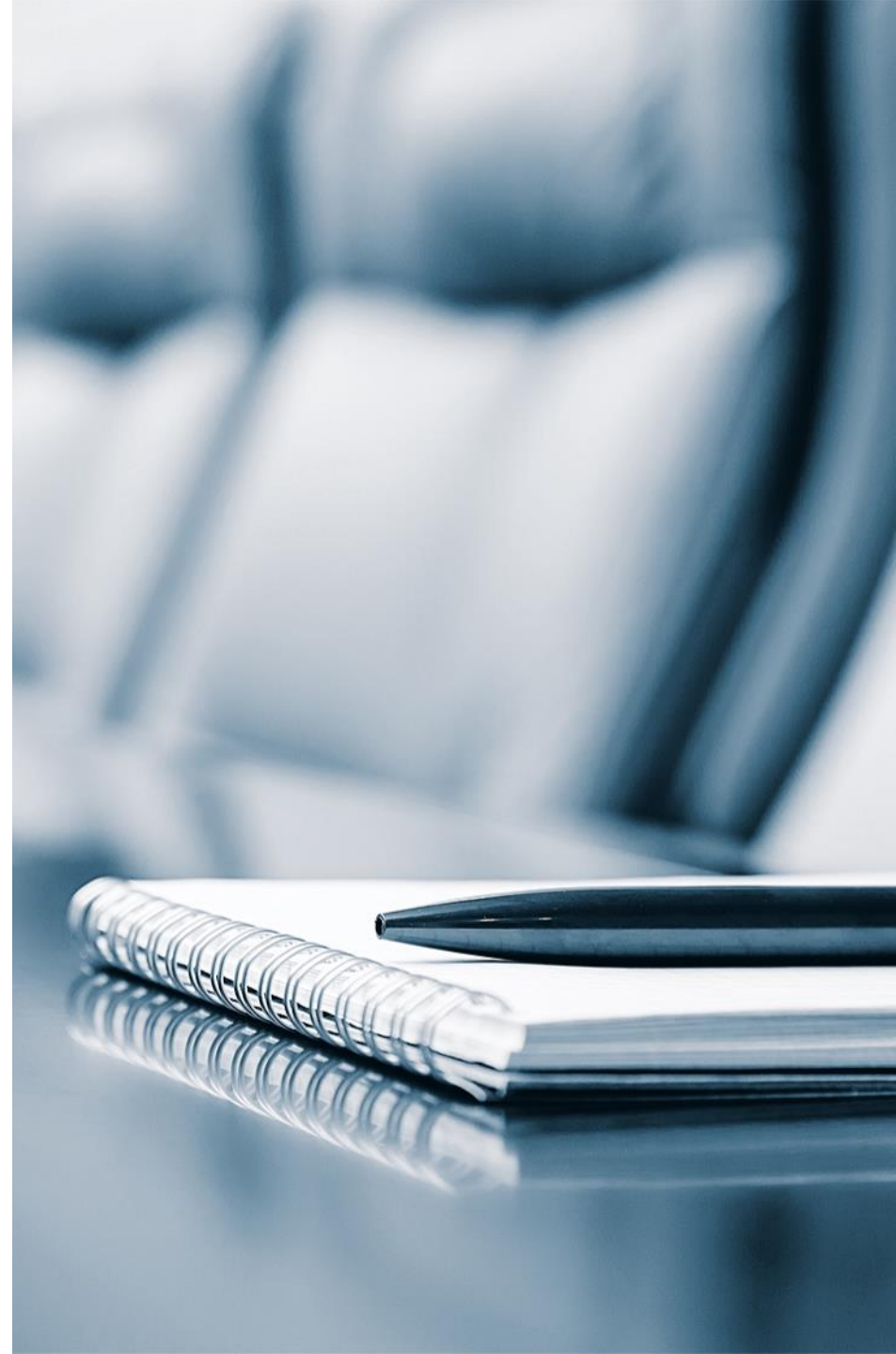


Today's Agenda

1. Tools of the Trade
 - What you need to install, configure and manage Azure
2. Networking Deep Dive
 - Getting the foundations right
3. Storage Deep Dive
 - Scale, limits, best practices
4. Compute
 - Choosing the right VM and building it correctly.
 - Relationship between storage and compute



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Today's Agenda

5. Advanced Scenarios

- Availability Sets
- Load Balancers
- Managed Disks

6. SQL Server in Azure

- Best Practice design

7. Antivirus and Security Centre

- Managing Exceptions with JSON templates



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About Westcoast CSP

- We have a dedicated cloud team of 25 people working between Ireland and the UK
- Westcoast employee over 1000 people across Europe.
- Our CSP market place platform allows our partners to self provision all Microsoft CSP products within minutes.
- We are presently running an Azure pilot support scheme for new Azure opportunities.
- We are also providing financial support on a opportunity by opportunity basis for both Azure and office 365 on CSP only.



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About Gavin

- Freelance IT Consultant
- Pluralsight author:
 - [Designing a Hybrid Cloud in Azure](#)
 - [Creating a DMZ in Azure](#)
 - Coming soon : Auditing Your Azure Assets for Security and Best Practices



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What **not** to do in Azure



Sample Azure Environment

Something to work towards

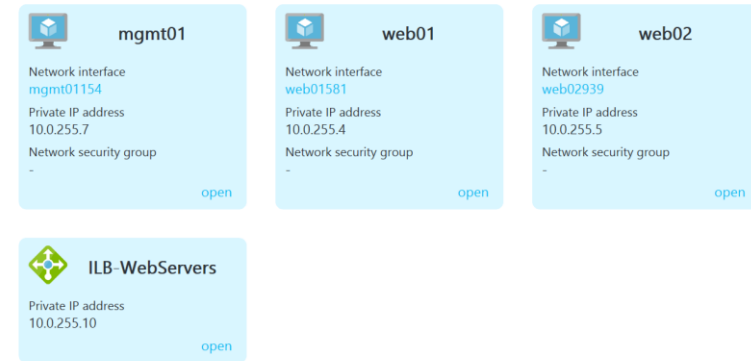


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A Sample Environment

Azure Diagram View of the demonstration environment we will use today.

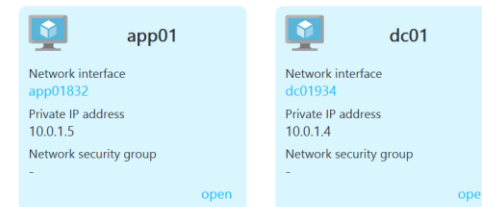
< . > dmz 10.0.255.0/24



< . > GatewaySubnet 10.0.0.0/24

i No connected devices

< . > lan 10.0.1.0/24





Azure Deep Dive

Tools, Network, Storage, Compute, Advanced Scenarios, SQL Server, AV/Security and Automation.



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Assuming that you have an
understanding of the **Azure**
Fundamentals.



Tools of the Trade

Tools of the Trade

Working with Azure will always mean tools of the trade are needed. You will never be able to live 100% in the Portal.

1. Configuration and Automation: PowerShell
2. Storage Management: Storage Explorer
3. ARM Template and DevOps: VS Code/Visual Studio – JSON Templates

What are you using to manage Azure environments?



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Tools of the Trade - PowerShell

Critical that you **use PowerShell from the beginning**. There are plenty of sample scripts and other resources to get you started.

PowerShell commands split into three areas:

- Azure Resource Manager
- Azure Service Management
- Azure Storage

Everything you need to get started :

<https://docs.microsoft.com/en-us/powershell/azureps-cmdlets-docs/>

<http://aka.ms/webpi-azps>



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Tip:

Don't do anything in PowerShell
unless you are using **PowerShell ISE**

Tip:

Don't mix up PowerShell commands.

Always look for **Rm** in the cmdlet

e.g. Get-Azure**Rm**VM and not Get-AzureVM

Tools of the Trade – Storage Explorer

Fastest way to do anything with Storage in Azure:

Azure Storage Explorer

<http://storageexplorer.com/>

<https://docs.microsoft.com/en-us/azure/vs-azure-tools-storage-explorer-blobs>

Tools of the Trade – VS Code

What is **VS Code**?

- More or less a free code editor.
- Does not have the orchestration and automation that Visual Studio has
- It is very useful for **JSON templates** ... more on than in the next session.

Everything you need to now about VS Code:

<https://docs.microsoft.com/en-us/azure/azure-resource-manager/resource-manager-vs-code>

<https://code.visualstudio.com/>

Tip:

Don't forget to **add the Azure module** to VS Code for JSON or it will not recognise the format

DEMONSTRATION: TOOLS OF THE TRADE



Virtual Networks and Connectivity

Virtual Networks – In This Section

1. Choosing an Address Space
2. Network/Subnet Design
3. DNS
4. Gateway Subnets
5. VPN and ExpressRoute
6. Co-existence
7. VNET Peering
8. Network Security Groups

Choosing an Address Space

- **ALWAYS** make sure the address space is routable to your customers network. Even if they don't ask for hybrid connectivity ... don't take the risk.
- **ALWAYS** allocate at least /16 Address Space. You might not use it now but you should future proof
- **NEVER** use public address ranges. Even if you customer is using them on-premise.
Remember that Azure VMs will always connect to public IP address for various services e.g. KMS, Load Balancer etc.

**There was a time when you could not
change an Azure Virtual Network Address Space!**

How Address Spaces and Subnets Work

- **SYSTEM ROUTES** are used in a Virtual Network
- Traffic between VMs in the same subnet.
- Between VMs in different subnets in the same virtual network.
- Data flow from VMs to the Internet.
- Allowing virtual machines to communicate with each other via a Vnet-to-Vnet VPN.
- Enabling virtual machines to route to your on-premises network via a gateway (site-to-site VPN or ExpressRoute).

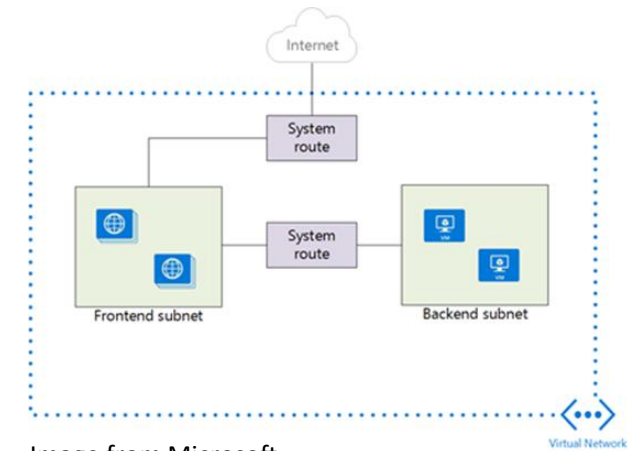


Image from Microsoft

How Address Spaces and Subnets Work

- **SYSTEM ROUTES** will work between different network ranges in an Azure Virtual Network

Example:

VNET01:

- 10.0.0.0/16 – [10.0.255.0/24, 10.0.0.0/24, 10.0.1.0/24]
- 192.168.0.0/16 : [192.168.1.0/24]

Importance of Gateway Subnets

- Gateway Subnets are different to other Subnets
- Not designed to put Virtual Machines in them
- Specifically for external network termination e.g. Various VPN connections and ExpressRoute
- Remember that **SYSTEM ROUTES** are in place

The Different Types of External Connection

- **Site-to-Site** – VPN connection over IPsec (IKE v1 and IKE v2). This type of connection requires a VPN device or RRAS.
- **Point-to-Site** – VPN connection over SSTP (Secure Socket Tunneling Protocol). This connection does not require a VPN device.
- **VNet-to-VNet** – This type of connection is the same as a Site-to-Site configuration. VNet to VNet is a VPN connection over IPsec (IKE v1 and IKE v2). It does not require a VPN device.
- **Multi-Site** – This is a variation of a Site-to-Site configuration that allows you to connect multiple on-premises sites to a virtual network.
- **ExpressRoute** – ExpressRoute is a direct connection to Azure from your WAN, not over the public Internet.

VPN Recommendations

- Design with **Multi-Site** in mind
- The **Standard VPN** type as a minimum for reasonable connectivity options e.g. co-existence, failover, speed etc.

Tip:

You cannot create the **Local Network Gateway** until you have created the **Virtual Network Gateway**

Local Network Gateway specifies the on-premise address space and creates the network routes in Azure

Quite Note on ExpressRoute

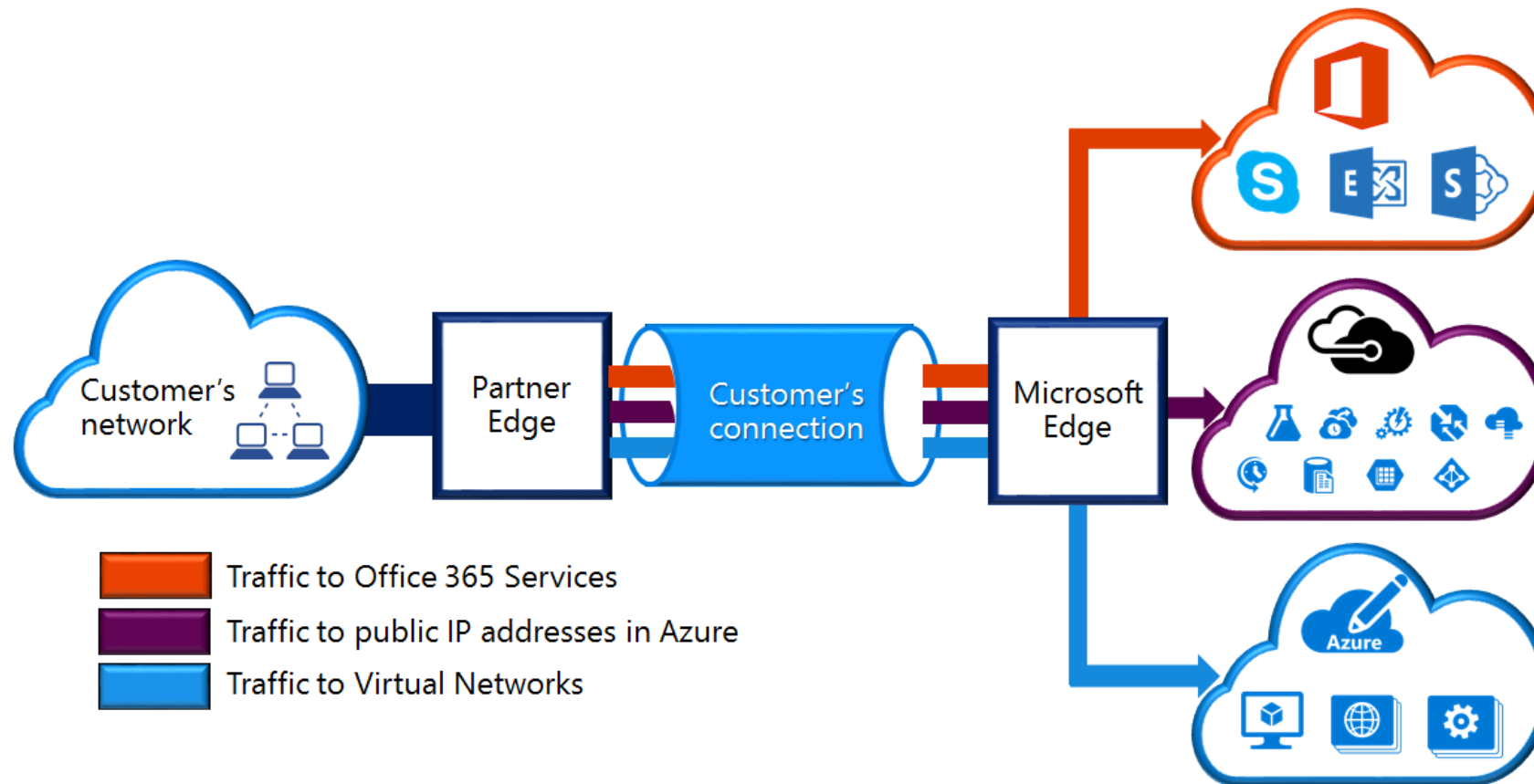


Image from Microsoft

Quite Note on ExpressRoute

- Three Peering Types:
 - Public: PaaS
 - Private: IaaS
 - Microsoft: SaaS

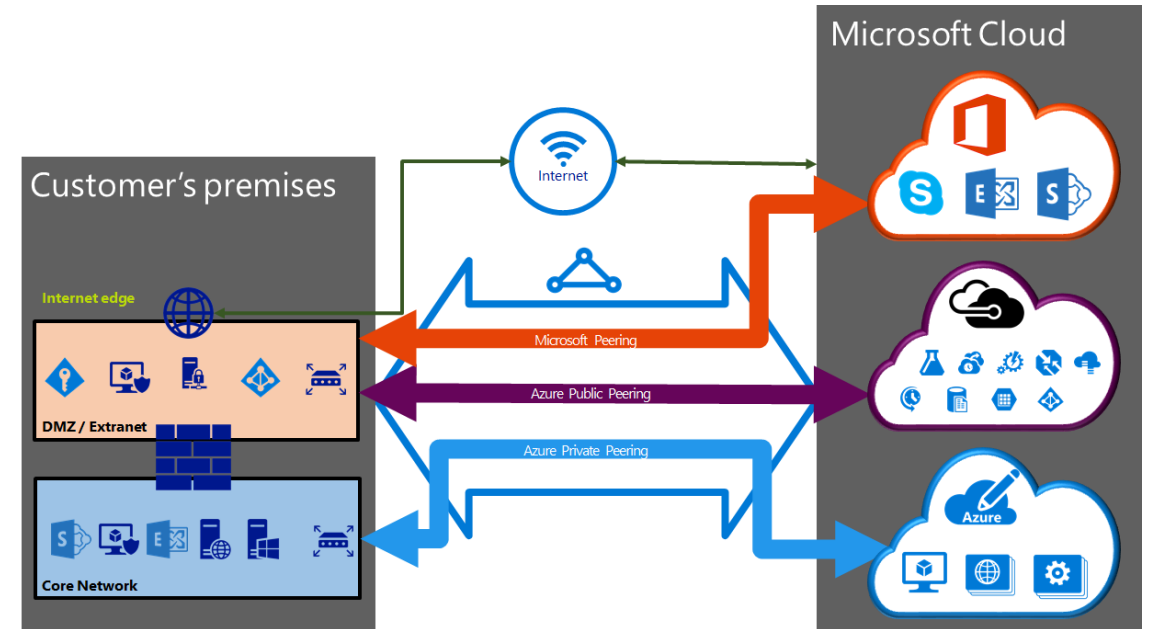


Image from Microsoft

<https://docs.microsoft.com/en-us/azure/expressroute/expressroute-circuit-peerings>

Tip:

Don't under estimate the **lead time**
and the **complexity** of setting up
ExpressRoute

Tip:

If **Default routes** are advertised over BGP on Private Pairing ... they **cannot be overwritten** by User Defined Routes (UDR).
This is the equivalent of Forced Tunnelling

Tip:

Multi-Site VPN has **specific hardware requirements**. Always check your customers network devices before starting anything.

<https://docs.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-about-vpn-devices>

Short Note on VNET-Peering

- Connect two VNETs in the **same region** through the Azure backbone network.
- The peered VNETs must have **non-overlapping IP address spaces**.
- VNet peering is between two VNETs, but there is **no derived transitive relationship across peerings**. For example, if VNetA is peered with VNetB, and VNetB is peered with VNetC, VNetA is not peered to VNetC.
- **You can connect Azure Classic VNET with an Azure ARM VNET.**

Network Security Groups:

Stateful packet inspection devices that use the **5-tuple** (the source IP, source port, destination IP, destination port, and layer 4 protocol) approach to create allow/deny rules for network traffic

Network Security Groups

- NSG can be applied to **Subnet** AND **Network Interfaces**
- **Common mistake:** Applying same rule to Subnet and Network Interface.
- NSG are network access controls. **Not aware of what program or service initiated the connection.** INBOUND or OUTBOUND ... that's it.
- **Rules are not bi-directional.** You have to account for traffic in both directions. Understanding TAGS is very important.

Network Security Groups

- Recommend that you **match the rule priority for both directions**. E.g. If INBOUND Priority rule is 100, then make the OUTBOUND 100.
- The **highest user created priority is 4096 in an NSG**.
Recommend you use this for the default DENY to VirtualNetwork

Tip:

You can **check effective network rights** for a virtual machine using the portal.

Advanced Scenarios

Important to know the advanced connectivity scenarios in Azure.

Not going to cover them here but they include:

- Automatic failover based on BGP for VPN
- Failover between ExpressRoute and VPN

**DEMONSTRATION:
VIRTUAL NETWORKS and
NETWORK SECURITY GROUPS**



Storage

Performance, Limits and Best Practice

Storage – In This Section

1. Replication Options
2. Performance and Limits
3. Azure Storage Service Encryption (SSE)
4. Azure Disk Encryption (ADE)

We will discuss Managed Disks later in the course.

Quick Recap on Storage Accounts

- General Purpose for VMs. Blob is Tiered storage.
- Standard or Premium set at the start
- Replication setting, by default, is RA-GRS
- Will discuss Storage Service Encryption (SSE) later

* Name ⓘ
 .core.windows.net

Deployment model ⓘ
☒ Resource manager ☐ Classic

Account kind ⓘ

Performance ⓘ
☒ Standard ☐ Premium

Replication ⓘ

* Storage service encryption ⓘ
☒ Disabled ☐ Enabled

* Subscription ⓘ

* Resource group ⓘ
☒ Create new ☐ Use existing

* Location ⓘ

☐ Pin to dashboard

Create

[Automation options](#)



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Storage and Replication for VMs

- **GRS cannot be accessed unless there is a region outage** i.e. an Azure datacentre going offline and Microsoft decide to fail to another DC
- This means **Virtual machines cannot access replicated storage** ... well, that's not entirely true. What about RA-GRS?

Storage and Replication for VMs

- You can access the ReadOnly storage in RA-GRS account without Microsoft help. But its read only.
- You could copy the ReadOnly disk to another account to make it Writeable ... but **there is no SLA on the asynchronous replication**. So you cannot tell what condition your disk will be in when replication finishes.
- **GRS replicates each blob separately**. Which means each disk is separately replicated, without any consistency with OS, Applications or Data.
- **You cannot rely on consistent protection using RA-GRS.**

Storage Performance Limits

This was very, very, very relevant ... its now just very relevant. Managed Disk has changed everything.

There is a big list of the Azure Storage Scalability and Performance Targets

Scalability targets for blobs, queues, tables, and files

Resource	Default Limit
Number of storage accounts per subscription	200 ¹
TB per storage account	500 TB
Max number of blob containers, blobs, file shares, tables, queues, entities, or messages per storage account	Only limit is the 500 TB storage account capacity
Max size of a single blob container, table, or queue	500 TB
Max number of blocks in a block blob or append blob	50,000
Max size of a block in a block blob	100 MB
Max size of a block blob	50,000 X 100 MB (approx. 4.75 TB)
Max size of a block in an append blob	4 MB
Max size of an append blob	50,000 X 4 MB (approx. 195 GB)
Max size of a page blob	1 TB
Max size of a table entity	1 MB
Max number of properties in a table entity	252
Max size of a message in a queue	64 KB
Max size of a file share	5 TB
Max size of a file in a file share	1 TB
Max number of files in a file share	Only limit is the 5 TB total capacity of the file share
Max 8 KB IOPS per share	1000
Max number of files in a file share	Only limit is the 5 TB total capacity of the file share
Max number of blob containers, blobs, file shares, tables, queues, entities, or messages per storage account	Only limit is the 500 TB storage account capacity
Max number of stored access policies per container, file share, table, or queue	5
Maximum Request Rate per storage account	Blobs: 20,000 requests per second for blobs of any valid size (capped only by the account's ingress/egress limits) Files: 1000 IOPS (8 KB in size) per file share Queues: 20,000 messages per second (assuming 1 KB message size) Tables: 20,000 transactions per second (assuming 1 KB entity size)
Target throughput for single blob	Up to 60 MB per second, or up to 500 requests per second
Target throughput for single queue (1 KB messages)	Up to 2000 messages per second
Target throughput for single table partition (1 KB entities)	Up to 2000 entities per second
Target throughput for single file share	Up to 60 MB per second
Max ingress ² per storage account (US Regions)	10 Gbps if GRS/ZRS ³ enabled, 20 Gbps for LRS
Max egress ² per storage account (US Regions)	20 Gbps if RA-GRS/GRS/ZRS ³ enabled, 30 Gbps for LRS
Max ingress ² per storage account (Non-US regions)	5 Gbps if GRS/ZRS ³ enabled, 10 Gbps for LRS
Max egress ² per storage account (Non-US regions)	10 Gbps if RA-GRS/GRS/ZRS ³ enabled, 15 Gbps for LRS

Storage Performance Limits

- **20,000 IOPS** per storage account
- For Availability and performance you have to **spread your Virtual Machines across the Storage Accounts.**
- Do not forget that **Backup/Restore impacts performance**
- **Performance** figures are referred to as **“Targets”**

<https://docs.microsoft.com/en-us/azure/storage/storage-scalability-targets>

Storage Tips/Recommendations

- You can mix Premium and Standard Storage on a single VM. Not sure why you would bother ... don't forget the **impact on SLA**.
- When you **strip disks use Storage Spaces** in Windows VMs.
- There should be **one column for each disk** or you could have performance issues

Storage Tips/Recommendations

- It is critical to **understand the VM scale limits and performance**
- MS says “make sure there is sufficient IOPS and Bandwidth available on your VM to drive the disk traffic”. It is very **common for total disk bandwidth to exceed VM storage bandwidth.**
- **Disk Bandwidth is separate to Network Bandwidth**

<https://docs.microsoft.com/en-us/azure/storage/storage-premium-storage>



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Azure Storage Service Encryption (SSE)

- If you are offering a Managed Service you will often be asked about **encryption at rest**. This is where SSE comes in.
- SSE **encrypts the blobs** on a chosen Storage Account
- There is **no performance overhead** and Microsoft manage the Keys for you.

Azure Storage Service Encryption (SSE)

SSE has a few nuances:

1. When you copy a disk from SSE account to a non-SSE account encryption is lost
2. If you enable SSE for an account that already has data, the existing data is not encrypted.
3. You cannot use SSE with Managed Disks (for now)

Tip:

Don't overlook Storage Service Encryption. It has its values and meets some/most requirements.

Azure Disk Encryption (ADE)

- Quite **different to SSE**. Users **Bitlocker** or **DM-Crypt** ... its Volume encryption.
- Works the **Azure Key Vault** AND **Azure Active Directory**.
- Security Centre will report on status of ADE
- It's a little complex but it is **100% encryption at rest**

<https://docs.microsoft.com/en-us/azure/security/azure-security-disk-encryption>



Choosing the Right Compute

Compute 101

- Region availability and cost is not universal

<https://azure.microsoft.com/en-us/regions/services/>

- Region performance at the storage backend is not the same

Max ingress² per storage account (US Regions)

10 Gbps if GRS/ZRS³ enabled, 20 Gbps for LRS

Max egress² per storage account (US Regions)

20 Gbps if RA-GRS/GRS/ZRS³ enabled, 30 Gbps for LRS

Max ingress² per storage account (Non-US regions)

5 Gbps if GRS/ZRS³ enabled, 10 Gbps for LRS

Max egress² per storage account (Non-US regions)

10 Gbps if RA-GRS/GRS/ZRS³ enabled, 15 Gbps for LRS



Compute 101

VM Processor types (this is important):

- **D Series:** Have never found the CPU type. Its slower than Dv2 and more expensive.
- **Dv2 Series:** 35% faster than D Series. 2.4Ghz Intel E5-2673v3 (Haswell) with boost.
- **F Series:** Same CPU as Dv2. Positioned as best price-performance.
- **G Series:** Xeon E5 v3 "family". Biggest machine type.

Compute 101. Cont.

VM Processor types (this is important):

- **H Series:** E5-2667 V3 and DDR4 memory with some RDMA/InfiniBand options at the top end of the cost scale.
- **Ls Series:** Same CPU as G Series. Level memory but *apparently* faster local disk (lower latency). Ive not tested.
- **NC and NV Series:** GPU-enabled using NVIDIA cards.

Tip:

You will most likely use Av2, Dv2 and F Series VMs. Start small and work up in sizes. **You will never find an exact match for requirements.** Its about compromise.

Example of changes to VM details

Local Disk Throughput figures were not listed when we ran part 1. Data updated 10/3/2017

Dv2-series

Size	CPU cores	Memory: GiB	Local SSD: GiB	Max local disk throughput: IOPS / Read MBps / Write MBps	Max data disks / throughput: IOPS	Max NICs / Network bandwidth
Standard_D1_v2	1	3.5	50	3000 / 46 / 23	2 / 2x500	1 / moderate
Standard_D2_v2	2	7	100	6000 / 93 / 46	4 / 4x500	2 / high
Standard_D3_v2	4	14	200	12000 / 187 / 93	8 / 8x500	4 / high
Standard_D4_v2	8	28	400	24000 / 375 / 187	16 / 16x500	8 / high
Standard_D5_v2	16	56	800	48000 / 750 / 375	32 / 32x500	8 / extremely high
Standard_D11_v2	2	14	100	6000 / 93 / 46	4 / 4x500	2 / high
Standard_D12_v2	4	28	200	12000 / 187 / 93	8 / 8x500	4 / high
Standard_D13_v2	8	56	400	24000 / 375 / 187	16 / 16x500	8 / high
Standard_D14_v2	16	112	800	48000 / 750 / 375	32 / 32x500	8 / extremely high
Standard_D15_v2**	20	140	1,000	60000 / 937 / 468	40 / 40x500	8 / extremely high*

Compute and Storage Performance

**Maximum uncached
throughput will often
exceed VM capacity**

Example:

- DS2_V2: 6,400/96
- If you attached 2 x P30 (striped) the disks
can do 10,000/400

DSv2-series*

Size	CPU cores	Memory: GiB	Local SSD: GiB	Max data disks	Max cached disk throughput: IOPS / MBps (cache size in GiB)	Max uncached disk throughput: IOPS / MBps	Max NICs / Network bandwidth
Standard_DS1_v2	1	3.5	7	2	4,000 / 32 (43)	3,200 / 48	1 moderate
Standard_DS2_v2	2	7	14	4	8,000 / 64 (86)	6,400 / 96	2 high
Standard_DS3_v2	4	14	28	8	16,000 / 128 (172)	12,800 / 192	4 high
Standard_DS4_v2	8	28	56	16	32,000 / 256 (344)	25,600 / 384	8 high
Standard_DS5_v2	16	56	112	32	64,000 / 512 (688)	51,200 / 768	8 extremely high
Standard_DS11_v2	2	14	28	4	8,000 / 64 (72)	6,400 / 96	2 high
Standard_DS12_v2	4	28	56	8	16,000 / 128 (144)	12,800 / 192	4 high
Standard_DS13_v2	8	56	112	16	32,000 / 256 (288)	25,600 / 384	8 high
Standard_DS14_v2	16	112	224	32	64,000 / 512 (576)	51,200 / 768	8 extremely high
Standard_DS15_v2***	20	140	280	40	80,000 / 640 (720)	64,000 / 960	8 extremely high**

Compute and Storage Performance

It is really important to **understand your application**.

- If you have lots of small I/O sizes then IOPS will be the performance measure (or bottleneck)
- If you have lots of larger I/O sizes (e.g. data warehouse) then Throughput will be the performance measure (or bottleneck). Why is this?

$$\boxed{\text{IOPS}} \times \boxed{\text{IO Size}} = \boxed{\text{Throughput}}$$

Compute and Storage Price-Performance

Some people are afraid to go with Premium Storage. **Its really important to run the price-performance comparision.**

Example: Application needs 16,000 IOPS

	Standard	Premium
Cost of VM per month	\$1,570.58 (Standard_D14)	\$1,003.66 (Standard_DS13)
Cost of Disks per month	\$1,638.40 (32 x 1 TB disks)	\$544.34 (4 x P30 disks)
Overall Cost per month	\$3,208.98	\$1,544.34

You are encouraged to **read** the following on **Storage: Design for High Performance**

<https://docs.microsoft.com/en-us/azure/storage/storage-premium-storage-performance>



Advanced Scenarios

Availability Sets, Load Balancers and Managed Disks



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Advanced Scenarios

- **Availability Sets** and **Load Balancers** are **linked**
- You really have to **plan** this out. Especially when it comes to layering with Network Security Groups.

Demo: **Availability Set and Load Balancer**

Managed Disks

- Managed disks are very, very useful. **Simplifies VM creation and management.**
- They also go hand-in-hand with **Availability Sets**
- All Managed Disks have a **fixed price**. No transaction costs and no pay-for-consumption options. Fixed price per disk size
- Storage Account **performance limits do not impact Managed Disks**

Managed Disks – Limitations (for now)

- Cannot have GRS or RA-GRS (so what! Not really important)
- Cannot encrypt the disks AND backup. Its one or the other.
- Other than that, no real issues of note.

Migration options:

- <https://docs.microsoft.com/en-us/azure/virtual-machines/virtual-machines-windows-migrate-to-managed-disks>



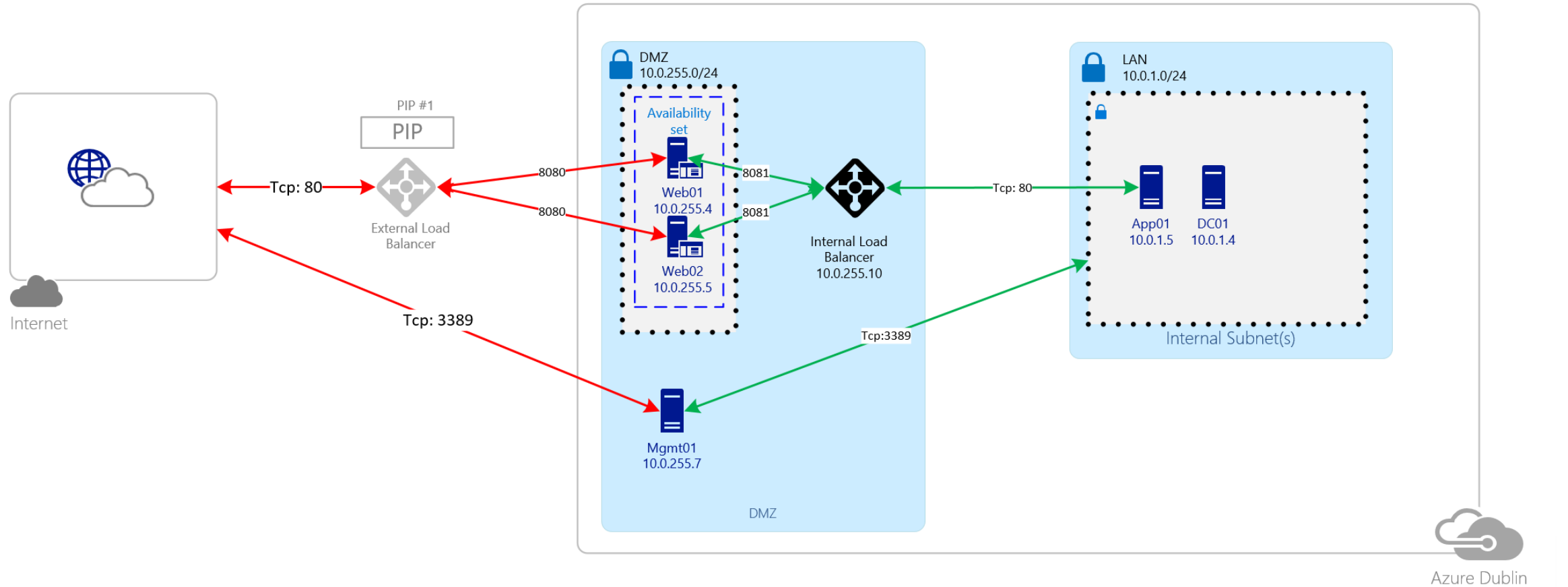
Lets do some hands on

Things that will cause you problems in a managed service



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Lets build this



Azure Dublin

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Setup Instructions

The following is needed based on the kit list:

1. Only allow RDP into the mgmt01 server (jump box) externally. Allow mgmt01 RDP into the LAN.
2. External and Internal Load Balancing for the Web servers. Port details are in the diagram.
3. Network and VMs as per the Excel sheet
4. Encryption at rest for storage
5. Everything to run in Dublin
6. Network Security Group to lock down the DMZ.
7. Protect the LAN with a NSG to stop all INTERNET inbound connections
8. Antivirus installed on each VM
9. If you have time, create an Domain Controller (with correct storage) and add Application server to Domain (Don't forget DNS settings)

https://1drv.ms/f/s!ArFq6nrZHt66k7pBC_C50yaNGyBUNQ ← Demo files and scripts



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Setup Instructions

There are scripts for the following:

1. Create the share on application server with the data file
2. Create the IIS pages on web01 and web02
3. Antivirus Management

https://1drv.ms/f/s!ArFq6nrZHt66k7pBC_C50yaNGyBUNQ ← Demo files and scripts

Setup Instructions

You have to manually do the following:

1. Create all Azure resources
2. Add IIS to the web servers
3. Test and prove you can get it working
4. Installing AD is optional – You can use the local accounts on each VM for authentication if required.

https://1drv.ms/f/s!ArFq6nrZHt66k7pBC_C50yaNGyBUNQ ← Demo files and scripts



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SQL VMs in Azure

SQL VMS in Azure

- It is much **easier** to create a SQL VM using Images **from the Gallery**. This assumes you want to pay for SQL licensing through the portal. This is the **pay-as-you-go licensing model**.
- Pay-as-you-go gives you options for **scale up and scale down as required**
- SQL VMs from the Gallery have most of the advanced configuration scripted as part of the install.
- SQL 2014 and especially **SQL 2016** are integrated with Azure Resource Manager. More on this later.

SQL VMS in Azure – Storage

- SQL can be **very sensitive to storage latency** (read and write). If the storage does not meet requirements SQL will crawl.
- SQL with **Premium Storage** is the ONLY way to do **production SQL servers**. For smaller configuration databases you might get away with Standard Storage. Not advisable though.
- Disk types should have different cache settings:
 - OS Disk – As configured
 - Data Disk/Temp DB – Read Cache
 - Logs – No cache

SQL VMS in Azure – Gallery Images

- When you create a new VM from the **Gallery it looks after a lot of the configuration steps** for you...this is a good and a bad thing.
- For larger SQL servers you **WILL have to make changes.**

Setting	Value
Stripe size	256 KB (Data warehousing); 64 KB (Transactional)
Disk sizes	1 TB each
Cache	Read
Allocation size	64 KB NTFS allocation unit size
Instant file initialization	Enabled
Lock pages in memory	Enabled
Recovery	Simple recovery (no resiliency)
Number of columns	Number of data disks ¹
TempDB location	Stored on data disks ²

¹ After the storage pool is created, you cannot alter the number of columns in the storage pool.

² This setting only applies to the first drive you create using the storage configuration feature.

SQL VMS – What you need to know

Important you know the background to the wizard driven Gallery Images.

- <https://docs.microsoft.com/en-us/azure/virtual-machines/windows/sql/virtual-machines-windows-sql-performance>
- <https://docs.microsoft.com/en-us/azure/virtual-machines/windows/sql/virtual-machines-windows-sql-server-storage-configuration>

Demo: **Create SQL VM from Gallery**



Next Course

Backup and Recovery (RTO/RPO) and Hybrid Options (including migration)

Course Content

Part One (March 2nd)

- Pre-sales information
- Complete information
- Common Objections

- High level design
- Getting the pricing right
- Playing to Azures strength

Part Two (March 15th)

- Creating a typical MSP environment
- Network, Storage, Compute, Network Security etc

- Advanced performance considerations
- Workload Considerations e.g. SQL

Part Three (March 29th)

- Backup and Recovery Options in Azure

- Hybrid Cloud connectivity options
- Migrating workloads to Azure

