

Exam-532 Dashboard

Monday, September 19, 2016 7:44 PM

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(0) Azure Resource Manage (ARM)

Saturday, September 24, 2016 10:29 AM

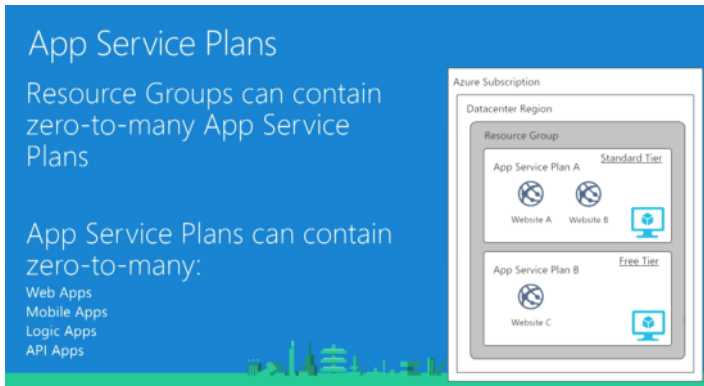


Figure -1: Important take away from the picture above is how resource group is applicable here and the big picture of how all the containers (Azure Subscription, DC Region etc.) are relevant to each other

☐ Creating ARM Template: [LINK](#)

☐ **Azure Resource Manage (ARM)**

Since everything resides within these containers, so it's important to understand the chemistry of these before diving into the other concepts necessary for the exam 70-532

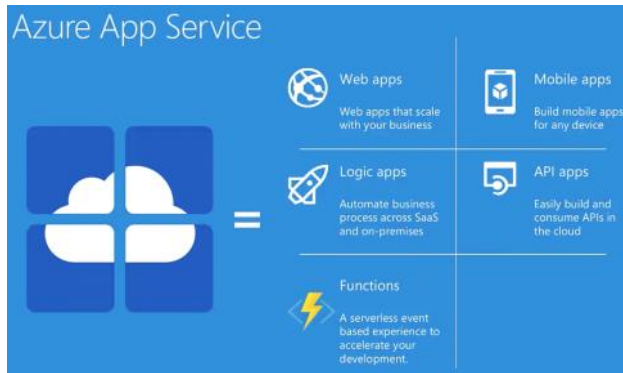
☐ Following is the explanation of ARM from the inside out approach:

- ▶ **Resource:** A manageable item available through Azure like SQL DB, Virtual Machine, IOT, Web App, Storage Accounts etc.
- ▶ **Resource Group (RS):** Logical grouping of resources. For instance, a LOB application needs may need resources like SQL, Web App, and Storage Accounts
 - The location associated with RS is where the metadata is stored. This metadata represents the resources in that group
 - The logical grouping of resources should be based on their resource life cycle, so given set of resources (group) can be managed together (deployed, updated, deleted)
 - Each resource can only exist in one resource group
 - Manage access against resource group
 - We can move resources among RS
 - Cross resource group interactions is possible. For instance, first RS with App and second RS with SQL
 - A resource group can contain resources that reside in different regions.
- ▶ **Resource Provider:** Each resource provider offers a set of resources and operations for working with technical area. This is more behind the scenes workings but good to know.
For instance,
 - Microsoft.Compute, supplies the virtual machine resource
 - Microsoft.Storage, supplies the storage account resource
 - Microsoft.Web, which supplies resources related to web apps
- ▶ **Resource Manager Template:** A JSON file which defines resources, respective resource groups, dependencies b/t the resources etc. You can see the power of this where we can design once and re -create the whole infrastructure via JSON file
- ▶ **ARM Benefits:**
 - Using JSON format, provision multiple resource groups (thus resources) in one shot
 - ARM can figure out dependencies of resources and spin missing ones. Moreover, ARM has the smarts to make determine which resource provisioning can be done parallel vs has to be sequentially
 - Granular permissions: for entire resource group(s) or individual resource in the group
 - Resource creation process is IDEMPOTENT
 - Using resource group, help provide billing information/charge back for the resources being consumed
 - Noteworthy
 - The ARM template size must be limited to 1MB and each parameter file to 64kb
 - PowerShell command to deploy local template file with optional parameters
- ▶ **Tags:**
 - Tags provide a convenient way to identify and manage multiple resources. For example, if you want to delete all resources for a particular project, you will have to manually find those resources
 - Each resource or resource group can have a maximum of 15 tags
 - The tag name is limited to 512 characters, and the tag value is limited to 256 characters

```
New-AzureRmResourceGroupDeployment -Name ExampleDeployment -ResourceGroupName ExampleResourceGroup -myParameterName "parameterValue"
```

(1) Azure App Services

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Azure App Services:

- Azure App Services is PaaS which offers several capabilities listed below.

FYI: These capabilities are provided through the 'Azure Service Fabric' mechanism. Azure Service Fabric is the piece that manages the underlying resources necessary to host the various service types.

- Capabilities:
 - Web Apps
 - It's the compute resources that Azure provides for hosting a website or web application
 - Web Apps can take advantage of features offered by API Apps (such as CORS support) and Mobile Apps (such as push notifications)
 - Mobile Apps
 - Host backend for mobile apps
 - Work offline and then sync back up
 - Provides push notifications
 - Logic Apps
 - It's a way to simplify and implement scalable integrations and workflows in the cloud
 - Host complex workflow which can call the APIs resided anywhere (in/outside Azure) like on premises
 - API Apps
 - It provides features that make it easier to develop, host, and consume APIs in the cloud and on-premises
 - Host existing API w/out any changes
 - Protect an API app from unauthenticated access with no changes to your code
 - Identity providers include Azure Active Directory, Facebook, Twitter, Google, and Microsoft Account
 - Integration with Logic Apps - API apps that you create can be consumed by App Service Logic Apps
 - Functions
 - A way to run independent code that responds to events. Like when a blob is added to a blob storage
 - Code hosted is independent and not part of any app
 - Common Benefits:
 - The app services share capabilities like authentication/authorization, scaling, hybrid connectivity
- All of the above capabilities are tied to an 'App Service Plan'
- App Service Plan represent collection of physical resources to host the app (capabilities listed above)
- App Service plans define:
 - Region (West US, East US, etc.)
 - Scale count (one, two, three instances, etc.)
 - Instance size (Small, Medium, Large)
 - SKU (Free, Shared, Basic, Standard, Premium)
- Multiple Apps can share the same App Service Plan; thus the underlying resources, if they are in the same:
 - Subscription
 - Region
 - Resource group
- App Services vs. Service Fabric vs. IaaS VM
 - App Services: good for hosting most Web Apps as PaaS model with all the automagic benefits of PaaS
 - Service Fabric:
 - Good for Microservice based architecture
 - Provides more control/direct access to the underlying infrastructure. For instance, one could remote into the servers and configure server startup tasks
 - Note:** service fabric services do not support IIS at all, so anything migrating to service fabric needs to be converted to Asp.Net Core
 - IaaS VM: If the user wants full control over the underlying infrastructure; however, this comes at a cost of manually managing everything yourself (OS patches, security etc.)

(1.2) Web Apps

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Deployment

Three ways to deploy application to the web app

- **FTP/FTPS:**
 - This is strictly a file upload process. No additional services are provided by App Service, such as version control, file structure management, etc.
 - we can do a FTP build to target the web sites
- **Kudu (Git/OneDrive/Dropbox/Visual Studio Online):**
 - Kudu is the engine behind source control based deployments into Azure App Service
 - It helps with the Continuous Integration (CI) to automate the build; workflow could include developers check-in the code and it automatically gets deployed to the Azure web app.
 - Learn hands on by setting up CI with GitHub to see how it differs from VSO
- **Web Deploy:** a way to deploy from within the Visual Studio
 - Understand the web deploy package format
 - Understand how web deployment works behind the scenes:
<https://www.iis.net/downloads/microsoft/web-deploy>
 - Web Deploy differs from Kudu in that application binaries are built before they are deployed to Azure
 - Similar to FTP, no additional services are provided by App Service

Deployment slot:

- Upon creation of a Web App, we automatically get a single slot acting as Production.
- As of 10/09/2016 (since Azure changes like every 5mints), we've following number of deployment slots available per web app:
 - Standard tier: up to 5 slots
 - Premium tier: up to 20 slots

Note: Any given time, there is only one deployment slot visible to the public (like PROD)

- Deployment slots provide the flexibility to deploy a separate "instance" of the application. For example, deploy an updated version to a slot (let's call it staging slot) and validate the changes before swapping out production this new version
- **Once happy with new changes in staging then one could 'point' load balancer (the public URL) from PROD to Staging**
- ★ All deployment slots for the same Web App are hosted within the same Virtual Machine (VM). So any activities taking more resources (like stress testing) could have potential performance impact on the production site
- When 'swapping', following is the list of items which either Do or Don't travel with the application instance
 - Note: 'sticky' flag allows us to control whether we want a particular setting to swap or not

Deployment Slots and Site Settings

Settings that swap	Settings that don't swap
General app settings (framework version, bits, etc)	Publishing endpoints
App settings (sticky)	Custom DNS domain names
Connection strings (sticky)	SSL certs and bindings
Handler mappings	Scaling settings
Monitoring/diagnostic settings	WebJobs schedulers
WebJobs content	

Configuration

- A way to control the web.config on the fly (at deployment time)
- One could define the key/value under the configuration of a given web app in Azure. Moreover, upon deployment time, the key/value if they were missing from 'web.config' would be added and any existing ones will be overwritten



App Settings

- For '.NET', application can get settings from the web.config; moreover, the web.config key/value can be either overwritten on new ones injected at runtime as defined in the Azure Web App 'app settings'
- For non .NET like PHP, Node etc, the settings are available as environment variables at runtime
- Database connection strings:

Connection String Environment Variables	
Azure SQL Database SQLAZURECONNSTR_	MySQL Database MYSQLCONNSTR_
SQL Server Database SQLCONNSTR_	Custom Database CUSTOMCONNSTR_

►

Diagnostics

These are 'not' turned on by default as they get verbose



Explore the settings in portal

The logs are available via a FTP link, so one could use existing tools to grab the logs from the FTP

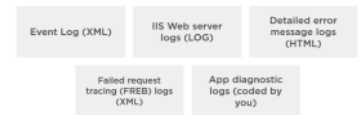
Streaming logs:

- One could see the logs real-time as the users are interacting with the application

Web Jobs

Logs

Log Sources



Retrieving Diagnostic Logs

Log Type	VM File System Path
Application diagnostics	D:\home\LogFiles\Application
Web server logs	D:\home\LogFiles\HTTP\RawLogs
Detailed errors	D:\home\LogFiles\DetailedErrors
Failed request traces	D:\home\LogFiles\W3SVC<randomid>

Application Diagnostic Logs

You need to add this code to your web app (Trace class)

```
Trace.TraceWarning("Message");
```

Error, Warning, Information, Verbose

Storage locations: File system; blob

```
Set-AzureWebSite -Name '704monitor2'  
-RequestTracingEnabled $true  
-HttpLoggingEnabled $true  
-DetailedErrorLoggingEnabled $true
```

Website Diagnostic Logs

Generated by the IIS web server

W3C Extended log file format

Detailed error messages: HTTP 400 and higher

Failed request tracing: Detailed XML info; one file per traced request

A way to offload resource intensive tasks that could be done by web sites but offloaded to the background.

Web Jobs could run on-demand/scheduled (continuous mode)
Use cases could be a like offloading a process to send out a welcome user email

Scaling/Hosting

App Service Plan (legacy name Web Hosting Plan)

- ▶ A container to spec out the VM size like memory/CPU etc.
- ▶ Container can be named and used to provision future sites; a consistent approach to allocate the memory/CPU etc.

(1.3) Virtual Machines

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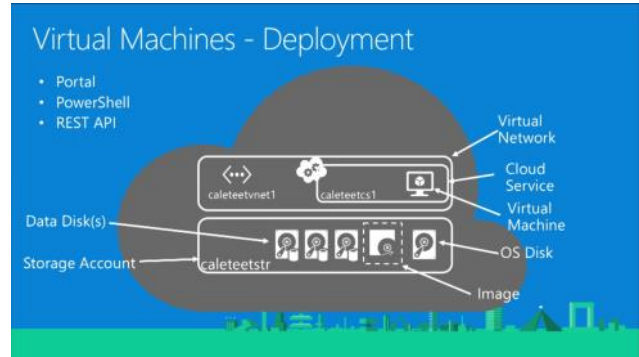
☐ Best Practices: [LINK](#)

☐ Virtual Machines

The way virtual machine have the following order to their existence

1. Create virtual network
2. In virtual network, you've a cloud service
3. In cloud service you can have 1-N virtual machines
4. Each VM by itself is a reservation of CPU and Memory. It's respective HD disks like OS disk, 1-N data disks and all these disks are stored in container called 'Storage Account'

The key part to wrap our head around is that VMs in Azure world are merely reservation of CPU/Memory/IP address and it's the composition of all of these other containers that complete the VM as we know them in our local development environment. Take a moment to read through container relationships in the figure below:



☐ Deployment

☐ **Imaging:** Basically use the Sysprep to create re-usable images

☐ **DSC (Desired State Configuration):**

A PowerShell utility which helps create script to manage desired state on the VMs; automate the VM creation and provide consistency.

The JSON describes the settings that should be enforced on each VM. So these could run in loop every night and reset the settings on the VM

```
Configuration ContosoWebsite
{
    param ($MachineName)

    Node $MachineName
    {
        #Install the IIS Role
        WindowsFeature IIS
        {
            Ensure = "Present"
            Name = "Web-Server"
        }

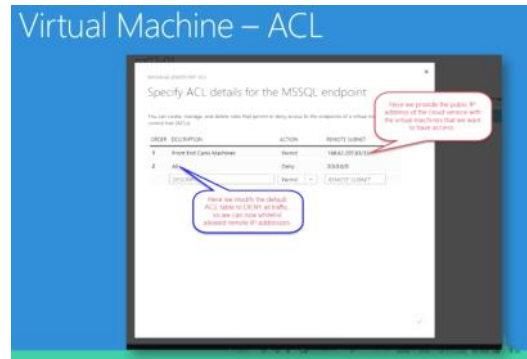
        #Install ASPNET 4.5
        {
            Ensure = "Absent"
            Name = "Web-Asp-Net45"
        }
    }
}
```

☐ **VM Agent** (Custom Extensions similar functionality as DSC)

- For resetting VM password if someone forgets it and no one can access the VM
- It runs as a service and can be used to extend the limited functionality provided by DSC

☐ **ACL (Lookup)**

- ☐ Way to control access to the VM (RDP). By default everything is whitelisted and one could use this to restrict access from certain subnets as an example
- ☐ Ordering of the 'actions' matter



☐ **Management** (key aspects are around the IP addresses)

- ☐ Reserved IP - VIP and the Public IP (PIP) address
- ☐ Static IP (for internal VM communication); essentially we're asking Azure to reserve the IPs. Example, if we bring up the VMs again next day in different order then to keep their internal communication they can't have their IPs changed

- ☐ Service limitations ([Lookup](#))
- ☐ Web EndPoint Status

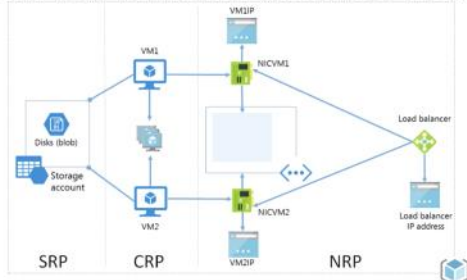
A way to measure latency from different locations; setup pings US - CA, US - Chicago and setup alerts to be notified

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Azure VM Architecture (ASM)



Azure VM Architecture (Resource Manager)



- Azure VM Features:

Characteristic	On-Premises Hyper-V	Azure
Console access available to virtual machine	Yes	No
Support for Generation 2 Hyper-V VM features	Yes	No
Support for VHDX file format	Yes	No
Upgrade Guest OS	Yes	Not supported
Requires ownership and control of physical hardware to run guest OS	Yes	No
Run anti-virus on virtual machines	Yes	Yes
Support for more than 1 virtual network adapter	Yes	Generally, No. Depends on VM size

- Sizing:

- | VM Size Family | Sizes |
|-------------------------------------|---|
| Entry Level | Basic_A0 - Basic_A4 and Standard_A0 - Standard_A4 |
| High Memory Entry Level | Standard_A5 - Standard_A7 |
| High Performance Computing | Standard_A8 - Standard_A11 |
| General Purpose Production | Standard_D1 - Standard_D14 and Standard_DS1 - Standard_DS14 |
| High Memory and Dense Local Storage | Standard_G1 - Standard_G5 and Standard_GS1 - Standard_GS5 |

- The Azure Compute Unit (ACU) provides a way of comparing compute (CPU) performance across Azure SKUs

- Creation Options:

- Azure Portal
- Using PowerShell two options:
 - New-AzureQuickVM
 - Advance Provision Configuration Mode (configuration object describing data disk, end point etc. info)

Some things are **only available** from the Advanced Provisioning Configuration.

- Create a virtual machine from an operating system disk.
- Specify Active Directory domain join information.
- Create new or attach existing disks.
- Disable Windows update.
- Specify time zone.
- Specify static IP address.
- Specify reserved IP address of the cloud service/domain name.

- Visual Studio
- Using Image
 - When migrating Hyper-V images to Azure the files must be VHD formatted, fixed sized, and sys -prepped

- IP Allocation:

- The dynamic IP addresses is from the resource's subnet IP address range (NOT DCH, though it behaves like one)
- ARM model - the first 5 'static' IP addresses in a region are FREE (yayy!!)
- Two types of IP addresses are available:
 - Public
 - Dynamic - allocated automatically when the resource is started (not just created)
 - Static - allocated immediately when the resource is created
 - Private:
 - Dynamic - allocated automatically from the resource's subnet
 - Static - assigned manually from the resource's subnet

- **Availability Set:** Helps guard against planned/unplanned hardware failures

- **Availability Set**: Helps guard against planned/unplanned hardware failures
 - For redundancy, configure multiple virtual machines in an Availability Set
 - Configure each application tier into separate Availability Sets (WFEs in one AVSet, SQL in another AVSet etc.)
 - Combine a Load Balancer with Availability Sets
 - Each virtual machine in an availability set is placed in two fault domains and five update domain

- Disks

- Every VM has at least two disks: one for OS and another one for temporary files like pagefile.sys
 - VHD disks are stored as Blob (page Blob)
 - c-drive, attached to VM as SATA drive, stores operating system with size of 127GB
 - d-drive, attached to VM as SCSI, temporary disks mainly to store pagefile.sys, cache files, or temporary files which could all go away upon restart
 - Instance size of the VM (like ram) determines the size of this temp drive
- VM can have more than one data disk with each disk max size of 1 TB
- Data disks are registered as SCSI drive, disks are stored in a BLOB under storage account, and these data disks can be used to store application data

Note: number of data disks that can be added is depending on the type of VM we choose

Note: All disks are VHD format only

- **VM Agent:**
The Azure Virtual Machines Agent (VM Agent) is a secured, light-weight process that installs, configures, and removes VM extensions on instances of Azure virtual machines.
- **VM Agent Extensions:**
 - To add an additional capability to the VM to perform desired tasks like installing software or settings via DSC
 - These extensions are bootstrapped on to the VM and offered both by Microsoft and partners
 - Hint: the extension like DSC can be stored in Azure storage and we can provide URL to the DSC and Azure can apply the appropriate settings to any VM out there
- After uploading VHD, we need to register it as well
- In addition to Portal and PowerShell, there is REST API to manage VM resources (like disks)
- On VM, installed extensions are located @C:\Packages\Plugins and respective Logs are @C:\WindowsAzure\Logs
- **Custom Script Extensions:** used to launch & execute VM customization tasks post configuration
 - It can download PowerShell scripts from Azure storage and launch them which can in turn download additional software components etc.

(2) Storage

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Account Creation:

- Name: the name has to be globally unique
- Premium storage can only be used with Azure virtual machine disks and is best for read and write intensive

Storage Types:

There are two kinds of storage accounts:

- General Purpose:
 - Provides access to blob, file, queues, and tables in a unified account
 - Has the option to choose standard/premium performance tier
 - Premium tier is only available for DS, D5v2, GS, or FS series virtual machines
 - Premium tier disks for virtual machines support up to 64 TBs of storage
 -
- Blob Storage:
 - Specialized for storing Blob data
 - Has only one performance tier option - standard
 - Has access tier: cool / hot
- Premium:
 - Only offers Blob storage
- Standard:
 - Offers all stores types; blob, file, tables, queues
- ! It is not possible to convert between standard storage accounts and premium storage accounts. You must create a new storage account with the desired type and copy data to it

Managing Tools:

Use the following tools to manage storage account assets

- Storage explorer
- PowerShell
- AzCopy

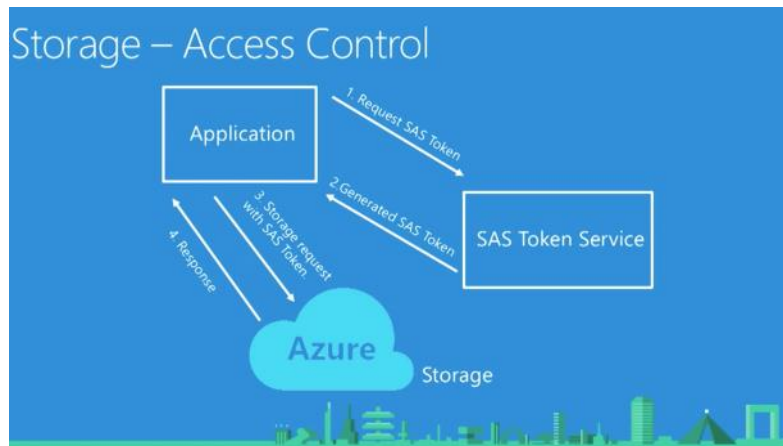
Managing Cost:

Following is how the billing is calculated:

- Billed only for data egress
- Transfer of data b/t Azure services in the same region is NOT billed
- Transactions requests against storage account
- Amount of storage used
- Standard vs Premium Differences:
 - Standard:
 - If 200GB is provisioned then you only pay for what's used
 - You DO get charged for transactions
 - Premium:
 - If 200GB is provisioned then you pay for the whole regardless of how much is being used
 - You DO NOT get charged for transaction

(2.1) Security & SAS Token

Wednesday, May 31, 2017 11:41 AM



<-- How it works:

How the Shared Access Signature (SAS) helps to control access:

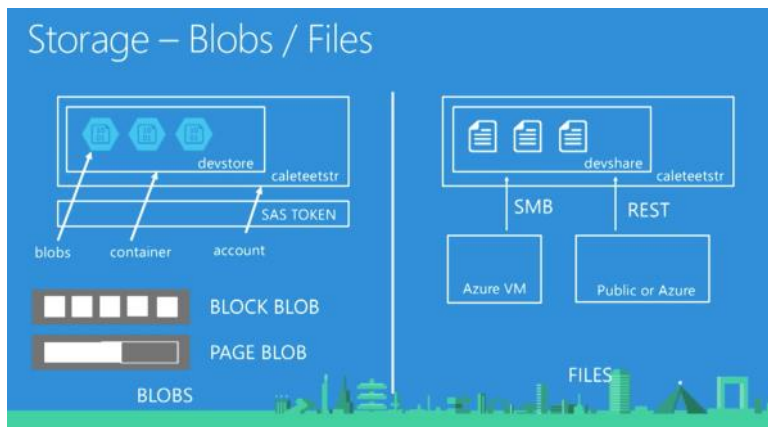
- Same SAS token approach applies to all stores types

Managing Permissions:

- Securing storage account
 - With resource manager model, we can use role based 'Access Control' to manage user (Azure AD users) permissions for given storage account. Like some users can access storage account keys and others can only view info. About the storage account
 - Securing access to data:
 - Method #1: using the storage account keys gives access to all data types (Blobs, Queues, Tables etc.) under the Azure storage account
 - Method #2: use Shared Access Signature (SAS) to grant access to specific data objects for specific amount of time
- Note:**
- Shared Access Signature (**SAS**) is a URI and we can manage granular restricted access rights to Azure storage resources
- To access a storage w/out subscription credentials, there are two options:
 - Shared Access Signature (SAS): Where a subscription admin can provide someone access to a storage account w/out giving having to provide their Azure subscription credentials
 - Account name and key

(2.2) File Share Storage

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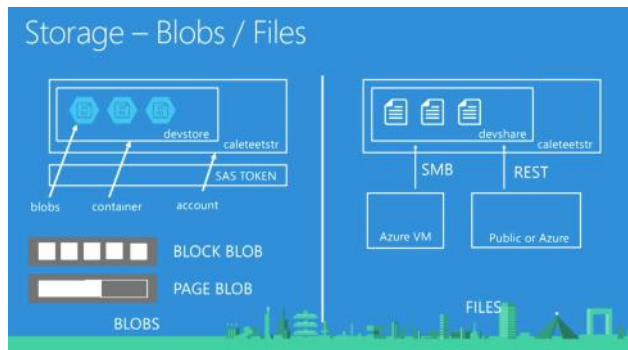


Azure File Service

- Provide rest API to file in the azure virtual machines
- Maximum size for file share is 5 TB

(2.3) Blob Storage

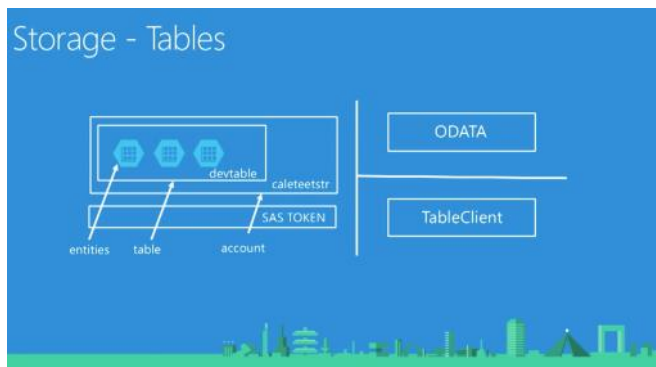
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- Blob storage is a service that stores unstructured data in the cloud as objects/blobs. Store any type of text or binary data, such as a document, media file, or application installer
 - All blobs must be in a container
 - Container provides grouping of a set of blobs
 - Following are the different blob types:
 - Block blob
 - ◻ Like upload file and pause/resume. So we've have the index and know where to start up
 - ◻ We can replace specific bits (positioned at certain index)
 - ◻ Ideal for storing text or binary files, such as documents and media files
 - Append Blob
 - ◻ Similar to block blobs in that they are made up of blocks, but they are optimized for append operations
 - ◻ Useful for logging scenarios
 - Page Blob
 - ◻ Can be up to 1 TB in size, and are more efficient for frequent read/write operations
 - ◻ These are like streams; can't pause and must playback all of it
 - ◻ Additional data just gets appended to the end of the existing data
 - ◻ Azure Virtual Machines use page blobs as OS and data disks
 - Files
 - Example usage is like creating shared storage which different DEVs can use to share some tools
 - Files can be accessed via SMB or REST API
- Emulate file structure using name of the blob but blob always reside in the root of the container.
- One could make the container publically accessible as they've a URI

(2.4) Table Storage

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Tables:

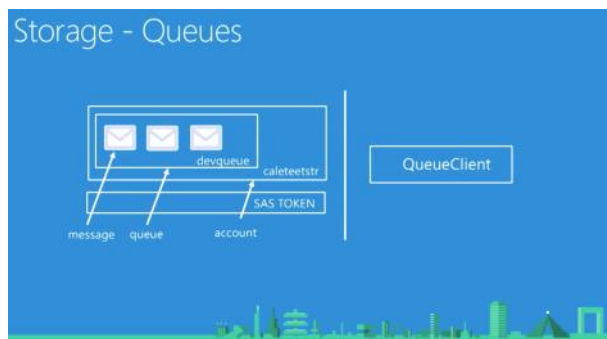
- Concept is centered around no SQL tables key/value pairs data. Example, JSON documents as stored in MongoDB
- Tables support transaction for entities in the same table/table partition but not across tables
- Entities can have up to 255 properties including 3 system properties: PartitionKey, RowKey, and Timestamp
 - Timestamp is managed by the system and cannot be modified
 - PartitionKey and RowKey are the responsibility of the user
 - Composite, PartitionKey and RowKey, is the unique identifier for every entity
- Storage tables have a very particular portioning scheme defined, so when creating an entity we are required to provide information about following two keys:
 - Rowkey: key that should be unique w/in a partition key
 - Partitionkey: define what records should live close together because Azure is going to scale this table across multiple instances/geographies

PartitionKey	RowKey	Timestamp	ID	Name
Partition1	Row1	10/10/2016 5:24:54 PM	1	Chris1
Partition1	Row2	10/10/2016 5:23:35 PM	2	Jessie
Partition2	Row1	10/10/2016 5:23:35 PM	3	Christine
Partition2	Row2	10/10/2016 5:23:36 PM	4	Steven

- Every data structure of an entity could be unique and there is no inter dependent referential keys among entities
- Just like blobs, we can use SAS token to control access
- ~~Currently there is not PowerShell cmd to manage entities in the Tables. Moreover, only manageable via the Azure Storage client .NET library~~

(2.5) Queue Storage

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Storage Queues:

- Allows us to send messages in FIFO manner
- A single queue message can be up to 64 KB in size
- The maximum time that a message can remain in the queue is 7 days
- Common usage:
 - Creating a backlog of work to process asynchronously.
 - Passing messages from an Azure web role to an Azure worker role
- It doesn't guarantee order or ensures you only see the message Once
- While processing a message, it's hidden so others processes working against the queue don't process it again. Moreover, when the message is processed only then it is deleted

Note: As an app developer we need to be mindful of this ^^ and ensure application can handle use cases of possibly processing a previously processed message

(2.6) Azure SQL Storage

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Storage – SQL Database

Migration between tiers is possible (portal, PowerShell or REST API)



- Small dbs
- Single active operation
- Dev/Test
- Small scale apps
- 5 DTU

BASIC



- Great option for cloud apps
- Multiple operations
- Workgroup or web apps
- 10 – 100 DTU

STANDARD



- High transaction volumes
- Large number of users
- Multiple operations
- Mission critical apps
- 100 – 800 DTU

PREMIUM

- We've different tiers and each tiers with different features to be used base do the needs
 - Basic good for Dev/Test
 - Standard good for most use cases
 - Premium: well you will know :)

Storage – SQL Database Performance

Service Tier/Performance Level	DTU	MAX DB Size	Max Worker Threads	Max Sessions	Benchmark Transaction Rate	Predictability
Basic	5	2 GB	30	300	30,000 transactions per hour	Good
Standard/S0	10	250 GB	60	600	521 transactions per minute	Better
Standard/S1	20	250 GB	90	900	934 transactions per minute	Better
Standard/S2	50	250 GB	150	1,500	2,370 transactions per minute	Better
Standard/S1P	100	250 GB	200	2,000	3,100 transactions per minute	Better
Premium/P1	100	500 GB	200	2,400	105 transactions per second	Best
Premium/P2	200	500 GB	400	4,800	228 transactions per second	Best
Premium/P3	800	500 GB	1,600	19,200	715 transactions per second	Best

- **Pricing:**
The plans not determined based on CPU/Memory but rather on database size and Database Transaction Units (DTU)
 - DTUs are blend of memory, CPU, read, and writes
 - A relative comparison, representing combination of metrics in the database to help asses the different tiers

(2.7) Backup

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- Azure Backup service vault and Azure Recovery service vault
- Azure backup service can back up data either running in Azure cloud or on premise
- For VM snapshots the VM agent must be installed
- VMs created using Azure virtual images already have VM agent enabled. Other VMs, the agent needs to be installed
- Site recovery can be used to replicate data like SQL w/in the on premise data centers or on Azure
- Monitoring storage can be turned on for standard storage account and not for premium storage account
 - All the monitoring data is stored in Azure storage tables and there is cost associated with that

(2.8) Redis Caching

Saturday, June 3, 2017 10:38 AM

- Azure Redis Cache has 3 tiers:
 - Basic – Single node. Multiple sizes up to 53 GB.
 - Standard – Two-node Primary/Replica. Multiple sizes up to 53 GB. 99.9% SLA.
 - Premium – Two-node Primary/Replica with up to 10 shards. Multiple sizes from 6 GB to 530 GB. All Standard tier features and more including support for [Redis cluster](#), [Redis persistence](#), and [Azure Virtual Network](#). 99.9% SLA.
- .NET applications can use the `StackExchange.Redis` cache client which simplifies the configuration of cache client applications
- The connection to the Azure Redis Cache is managed by the `ConnectionMultiplexer` class.
 - This class should be shared and reused throughout your client application, and does not need to be created on a per operation basis.
- `// Connection` refers to a property that returns a `ConnectionMultiplexer` `//` as shown in the previous example. `IDatabase cache = Connection.GetDatabase();`
- `// Perform cache operations using the cache object...`
`// Simple put of integral data types into the`
`cache cache.SetString("key1", "value");`
`cache.SetString("key2", 25);`

`// Simple get of data types from the`
`cache string key1 = cache.StringGet("key1");`
`int key2 = (int)cache.StringGet("key2");`
- **Enhanced security and network isolation:** Azure Virtual Network (VNET) deployment provides enhanced security and isolation for your Azure Redis Cache, as well as subnets, access control policies, and other features to further restrict access. For more information, see [How to configure Virtual Network support for a Premium Azure Redis Cache](#).

(2.9) Azure Search

Saturday, June 3, 2017 10:39 AM

- Azure search provides natural language processing
- Geospatial searches
- While naming search service once could use pattern like

org-app-location-environment

- Once the search service is created, the location cannot be changed
- Indexes - are like tables in relational DB, one must create them before we can populate and use them
- Index would need to be removed and recreated if a change to an existing index requires re-indexing
- Updating limitations:

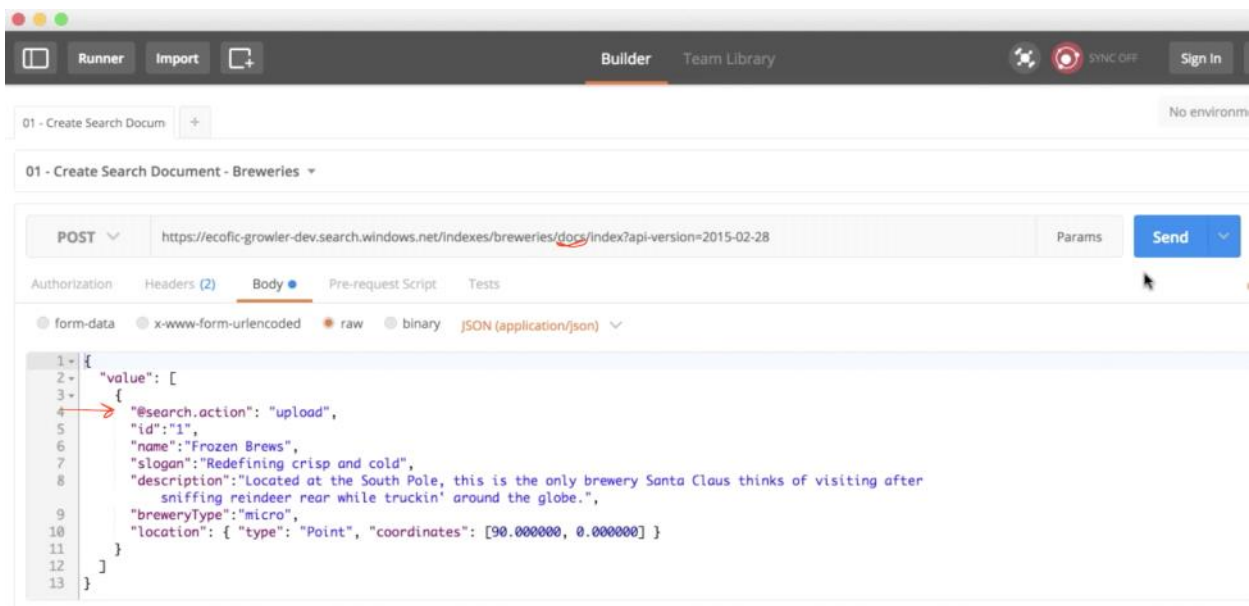
Updating
Search Indexes

Cannot rename fields

Cannot change field types

Cannot remove fields

- Adding data (documents) to the index



@search.action: upload, delete, merge, mergeOrUpload

- Searching an index

Builder Team Library SYNC OFF Sign In

02 - Execute a Query with Search Parameter

POST https://ecofic-growler-dev.search.windows.net/indexes/beers/docs/search?api-version=2015-02-28 Params Send Save

Authorization Headers (2) Body Pre-request Script Tests

form-data x-www-form-urlencoded raw binary JSON (application/json)

```
1 {
2   "search": "I*"
3 }
```

Body Cookies Headers (15) Tests Status: 200 OK Time

Pretty Raw Preview JSON

```
1 {
2   "@odata.context": "https://ecofic-growler-dev.search.windows.net/indexes('beers')/$metadata#docs(id,name,activelyBrewed,ibu,abv,averageRating,flavors,lastTappedOn,breweryId,breweryName,breweryLocation)",
3   "value": [
4     {
5       "@search.score": 0.4472136,
6       "id": "8",
7       "name": "Tangerine Blossom"
8     }
9   ]
10 }
```

(3) Identity, Apps, and Network Services

Saturday, June 3, 2017 9:57 AM

- Azure Active Directory (AAD)
 - AAD is a multi-tenant cloud-based directory and identity management system
 - AAD is a platform as a service
 - It can be integrated with on-premise AD
 - AAD has to be tied to a subscription. Now multiple subscription can trust the single AAD
 - It provides some advance features like
 - Multi-factor authentication (MFA)
 - Device registration
 - Self-service password management
 - Self-service group management
 - Privileged account management
 - Role-based access control (RBAC)
 - Application usage monitoring
 - Auditing and security alerts
 - AAD vs on-premise AD:
 - It does not have group policy settings - in AAD, computers can be registered but policy can't be enforced on computers out there
 - Organization unit - AAD a flat DB of user accounts
 - No support of forests
- AAD user account
 - Microsoft account (aka home/personal) could be something@hotmail/gmail/outlook etc. for which MS established a trust behind the scenes between the account and the AAD
 - Work or school account (aka organizational account): These are the accounts that had been created directly in the AAD
- AAD Basic vs Premium feature sets

Basic	Premium
99.9 percent uptime SLA	Self-service password reset with write-back
Self-service password reset	Includes Microsoft Identity Manager (MIM) 2016
Azure AD Join for Windows 10	Multi-factor authentication (MFA)
SSO for 10 apps/user	MDM auto-enrollment
	No SSO app limit

Also, premium allows for custom branding as well

- Specific Topics:
 - Integrating applications with Azure Active Directory ([LINK](#))

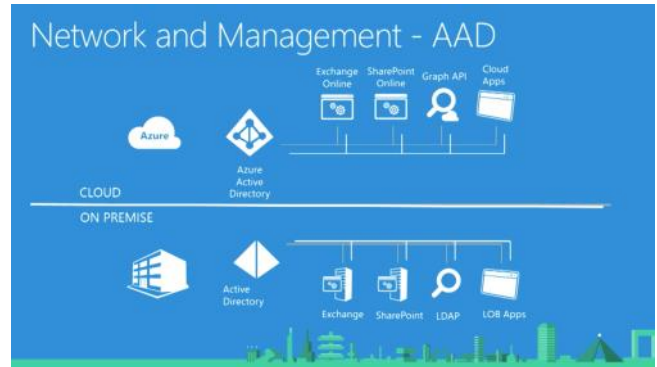
(4) Networks

Saturday, October 8, 2016 12:05 PM



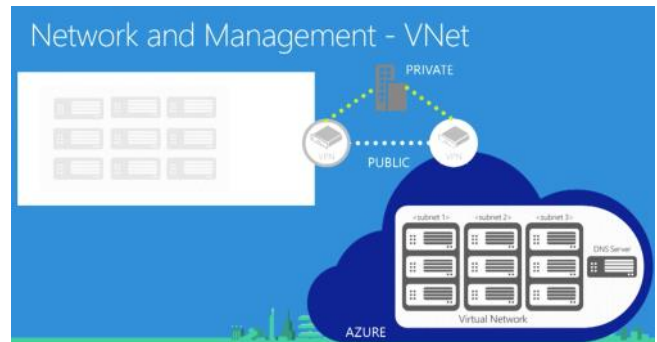
Azure Active Directory (AAD):

- ☐ AAD is NOT the on premise active directory in the cloud
- ☐ AAD is just an identity provider and only handles the Identity objects from the on premise AD example: Identity providers like Google, Twitter, MS, or Facebook where they would authenticate the user and provides the claims to your application, AAD does the same thing.
- ☐ If one needs the usual AD features like group policies etc. they would need to bring up a VM with AD in it.



Virtual Networks

- ☐ Helps create connections so different assets can talk to each other like on-premise --> cloud, cloud --> cloud etc.
- ☐ Once the Vnet is configured manually in the portal, we can export it and then re-use it going forward w/out requiring any manually intervention:
 - ☐ In classical portal, it's exported as XML
 - ☐ In new portal, this can be done via ARM inside a JSON file



Communication

- ☐ Service bus gives us connectivity b/t different applications
- ☐ Service bus queues are JUST different but not necessarily better than Storage queue
- ☐ Topics: basically applications publish a message and applications subscribing to the desired 'topics' would get that message

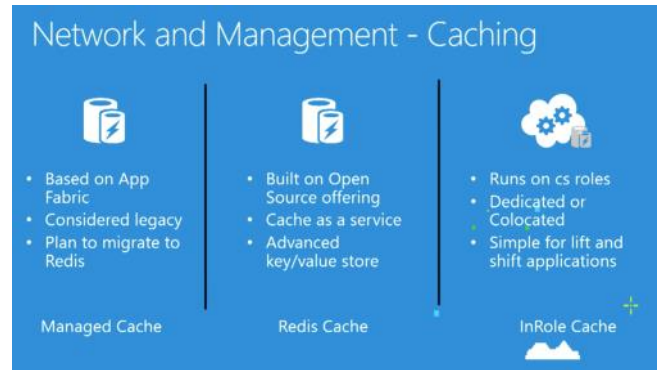


Cache:

- ☐ Azure cache is the 'Redis Cache' implementation. Yes you read that right because in Azure

documentation you will see 'Azure' cache which is actually 'Redis cache'

Note: Going forward only Redis cache should be used and other caches are listed here as FYI as these might be being used in legacy apps



(4.1) Additional Networking Notes

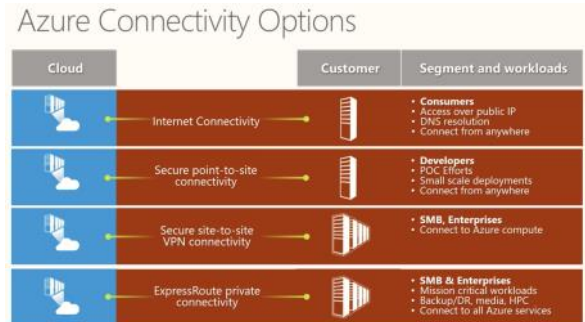
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Basics

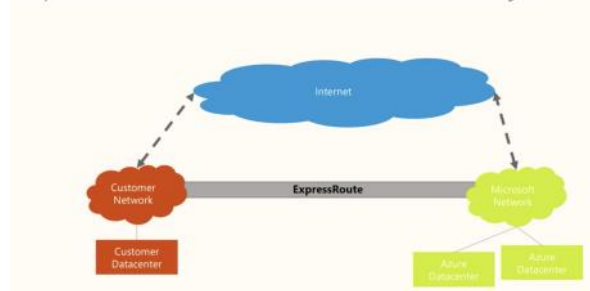
- Virtual Network defines an Organization's network in the cloud. Virtual Network provides full control over:
 - IP address assignments
 - Name resolution
 - Security settings
 - Routing rules
- Organizations can use virtual networks to connect resources like:
 - on premise <--> Azure
 - Resources (VM, load balancers etc.) w/in the virtual network
- Virtual network uses two types of IP addresses:
 - note:** IP used are from the defined scope of IP addresses in the Vnet
 - note:** Ensure IP address range defined for Vnet doesn't overlap with on premise; even for cloud only Vnet (e.g: later we want to VPN into the resource)
 - Private: for communication w/resources w/in the same virtual network; e.g: on-premises network communication like VPN gateway or ExpressRoute; can be assigned dynamically or statically
 - Public: for communication w/external clients and Azure public-facing services; IP assigned directly at the VM-NIC or to load balancer
- Network security groups (e.g. DMZ) to help define rules that control traffic to individual VMs or subnets
- ★ Play with & learn more about
 - Internal load balancers
 - Application Gateway
 - VPN gateway
 - User Defined Routes (UDRs)
 - CIRD notation representation of IP address

Specifics

- Cross Premises Network Connectivity
To connect to Azure Vnet, one must provision VPN gateway in Azure. It has following setups:
 - A point-to-site VPN: single on premise computer to Azure Vnet
 - A site-to-site VPN: on premise network to Azure VNet
 - ExpressRoute: dedicated service (private direct connection) to Azure Vnet; this setup does not go through the public internet (like VPN tunnel via public internet does)
 - Vnet-to-Vnet VPN: A VPN that connects two Azure virtual networks



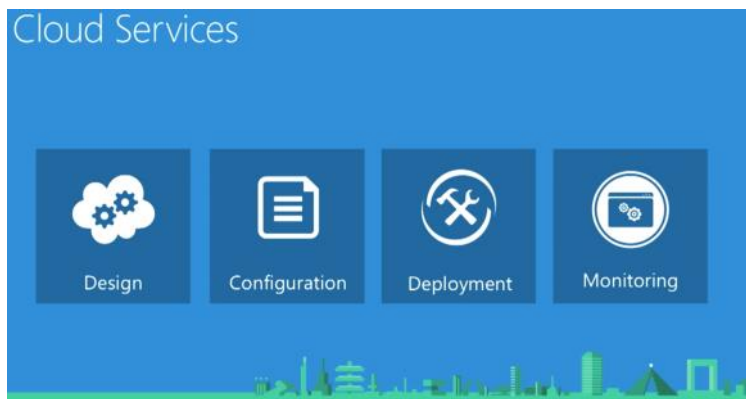
ExpressRoute is dedicated connectivity...



- Confirm whether an IP address range can/cannot be changed after Vnet has been created
- In Subnet range: first and last three IP addresses can't be used for VMs or cloud services

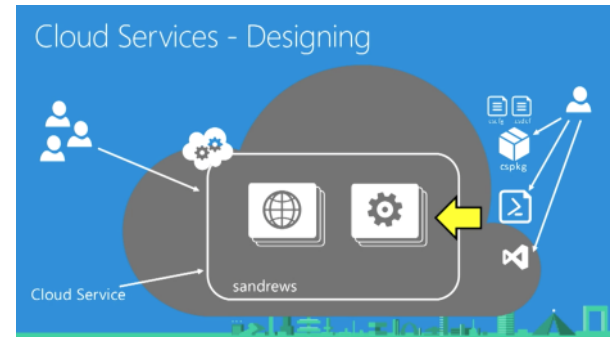
Cloud Service

Saturday, October 8, 2016 10:58 AM



Cloud Service (CS):

- ☐ CS is really a container in a virtual IP address
- ☐ It has web roles and worker roles
- ☐ Each role resides in a single VM with following differences:
 - ☐ Web role VM has IIS configured
 - ☐ Worker role VM Does not have IIS configured; like self-hosted apps
 - ☐ One could RDP to either of these roles



- ☐ Deployment options
- ☐ Note: both slots stay active unless you manually archive one, so after slot swapping be sure to shut one down
- ☐ Deployments, aside from web deploy, everytime create a new VM so the deployment will be 'slower' compared to let's say Web apps which is just deploying to the IIS instance on a Pass

