AZ 203 Azure Developer - Part 2

09 March 2020

16:09

App Services - much like containers.

* Web apps and app services are same. Mobile apps and api apps are also same and there is not much difference and are different names of same thing.
* Less control than IAAS but good in terms of not much responsibility of hardware.
* For windows based web apps we don’t have choice of underlying runtime stack but for linux we have to select from various stacks like PHP /ubuntu etc.
* Application Insights - can be enabled in webapps which will show app level insights onto the portal for monitoring and controls.
* We can push the code OR we can push docker images which will then be used in the webapp. Docker images can be put in ACR ie, azure container registry OR AKS and then used from there.
* App Service Plan - basically a hosting plan - we can have many apps running in same hosting plan where then they will all share same underlying hardware.

Machine generated alternative text:
OS/Software 
Windows 
Web. mobile, or API apps 
Disk space 
Maximum instances 
Custom domain 
Auto Scale 
Region: 
East US 2 
Currency. 
I us Dollar (s) 
Display pricing by: 
FREE 
Try for free 
10 
SHARED 
Environment for 
dev/test 
100 
Supported 
BASIC 
Dedicated 
environment for 
dev/test 
Unlimited 
10 GB 
up to 3 
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STANDARD 
Run production 
workloads 
Unlimited 
50 GB 
up to 10 
Supported 
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Unlimited 
250 GB 
up to 20 
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* Service plan has location/region and Pricing Tier as stated above.

Design wise - app should have same location as users location.

* Pricing Tiers
  + Separated into Dev/test - Prod - Isolated categories. Dev/test based plans have basic machines like B series + F1 and D1. Prod based have Standard and Premium machines ie S series and P series. Isolated plans where only single org apps should be running and is dedicated hardware and individual network only for the org. I series.

For Isolated Category apart from cost mentioned with the pricing tier there is additional cost of dedicated hardware which is not mentioned directly. So it becomes expensive

Eg: 1000 USD per month for isolated hardware + XX per month \* Number of instance running for a given machine(based on scaling)

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Recommended pricing tiers 
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* Very basic tiers like F1 don’t have custom domains option.
* Based on pricing we have features like manual or Auto scaling/custom domains/ slots/ Backups per day/ traffic manager etc. scaling level also depends.

ACU - azure compute units - it’s a number used to measure the performance of a service plan but only in comparison with other plans.

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* Web app once deployed has a default page shown by MS. Post updating code its replaced.
* There are options for ftp for code or we can deploy using Visual Studio.
* There are option for Custom Domains, Backups, Application settings, Deployment slots etc based on the app service plan.

Web Jobs - is a feature in web apps itself to run some code as a batch job without user intervention. So web job is associated with webapp under it and it runs in same context as web app.

It’s a background process.

Type can be triggered or continuous. If triggered then it can be a webhook URL OR a schedule.

* Author used a simple PST file containing one liner write-output "hello world" but we can have web jobs reading logs and pushing to some place etc.

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Triggers 
• CRON Expression 
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\*\* CRON is a language and CRON expressions are used in Linux and we can use online tools for cron expression generator.

??how to manage logs with web apps.

Enabling Diagnostic Logs in web apps -

* Monitoring section - alerts/ we can run matrices like CPU/memory/data usage etc for a given interval and generate real time charts.
* Diagnostic logs - we can enable application level logs like errors/warnings etc/ underlying web server logs etc. These need storage account and container.

Under diagnostic logs there are 2 kind of application logs with one being for FileSystem and other for blob.

Filesystem type is the logs which are generated real time while app is running and we can view them under Log Stream settings. This will hold all the traces from our app and is used in association with Log Stream for real time testing and diagnostics. This is a temp storage for logs and is used with streaming features for logs.

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1. What about handled logs and handled exceptions in the web app - if we are sending them some file or Eventviewer - how will that work?

\*\*to check the logs generated- we can go to storage account and check and download the logs generated in blob container.

OR

Using Log Stream for real time logs and these are not part of storage account logs.

Code for App Service (web app)

<https://github.com/Azure-Samples/app-service-web-dotnet-get-started>

Mobile Apps -

* It’s a backend app for the front app mobile app running on the phone. Its more optimized for mobile functionalities but overall its same as web app.

Things like Notification Hubs comes under this.

Notification Hub - each mobile platform has its own notification system. These notifications systems makes it easy to send notifications to the mobile apps running on user's devices. Notification hub act as a central system where it will call all these underlying systems and send notifications to the hosted apps across platforms.

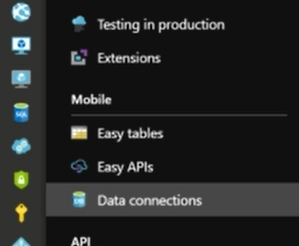
Machine generated alternative text:
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Supported Notification Vendors shown below - organizations/app developers need to get the details from individual mobile platforms to sign up for notification hub and integrate with it. As an app developers/organizations developing these apps they can use Notification Hub SDK to integrate their platform code to send notifications to various systems and platforms.

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Mobile Apps - creation is similar to Web App but its has Mobile section post creation where we can connect to database or storage account for storage of data.

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Documentation 
Service Overview 
Pricing Details 



Code for Notification Hubs

<https://github.com/Azure-Samples/event-hubs-dotnet-user-notifications>

API Apps -

* Creation process - similar to web apps.
* They are not for html but are for programs to talk to each other.

API apps have a specific feature for CORS where we can set what all applications should be able to access our APIs by setting the origins.

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Another imp setting is for API definitions where we can tell location of API metadata for external parties. Basically we add swagger URL for our APIs or API app.

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\*Swagger - is a standard for API documentation - it allows testing of API within the swagger document page as well as provide all details of headers and body.

There are many Swagger nuget packages available and we and install one which will automatically create all documentation for our APIs and make them discoverable for 3rd parties.

Code

<https://github.com/Azure-Samples/dotnet-core-api>

Azure Functions

* Consumption plan - serverless plan . Very cheap for repeatable work.
* App service plan - like PAAS offering.
* Are generally to perform short work and then complete itself.
* Can be created in-portal or using IDEs.
* There are many templates like
  + Webhook and API - which has public URL and will be called via http call.
  + Timer - based on schedule.
  + Trigger based functions- where they can be based on triggers from other services and resources.

Ultimately all are trigger based only.

* We have various input and output integrations with other services in azure. To manage this we use integration options in functions.

And to send data to output integration use same name for the variable in implementation as variable parameter name set for output binding . Author used output as push something to blob storage.

Machine generated alternative text:
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azsjdnewfunction 
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Inputs O 
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O Manage 
Q Monitor 
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Machine generated alternative text:
azsjdnewfunction - TimerTrigger1 
_ Function Apps 
azsjdnewfunction 
Functions 
using System; 
public static void out string Outputezob, log) 
log.LogInforution(S-c• trigger function executed •t: 
Outputeiob type of text here " ; 

* There can be needs of more complex functions as well - for this we have durable functions. Here we can chain the function calls ie

Durable Function Started ---> Calls Durable Function Orchestrator --> which then calls actual Durable Function Activity having some code.

This can be used for many complex scenarios where we want to call different functions to perform different operations based on some orchestration.

Similar to Logic Apps a bit.

Microsoft docs have Durable Function documentation explaining it more and certain design patterns which are applicable for these.

* Using visual Studio for functions - VS has Azure Functions as a template under Cloud category
* In VS when we add new azure functions in empty function shell project - it will ask for security as well as we can create function key based functions OR anonymous
* Post building a test example --publish to new or existing function app --select subscription and account details -->VS GUIs will ask for necessary function app details--done.
* Functions created via VS are not available for code change inside portal and is available only in compiled format as shown below.

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"generatedBy- 
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"disabled": f al •ae, 
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* IMP - Table storage is not a trigger for azure functions but blob storage can be.

Durable function sample

<https://github.com/Azure-Samples/durablefunctions-apiscraping-dotnet>

Azure Storage Account -

* General purpose v2 is the recommended model for ARM . V1 version works both with ARM and ASM models and is less costly as well but is not recommended.
* Blog storage type is only for block blobs and it comes with access tiers like public anonymous or private etc.

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Account O 
Access (default) 
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Access Tier -

* Cool - cost more to access the data but cheaper to keep or store it and customer promises MS to keep that data in there for 30 days. Good for backup operations.
* Hot - default and means standard R/W operations with standard performance.
* Security options in storage account - TLS based or not. Also from what networks allowed ie internal or selected VNETs for controlled connectivity.

Machine generated alternative text:
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Tagging - can be things like Teams/ Billing Codes/ Owners/ Environment Names etc

* Each service inside storage account will have a unique URI and URLs are like

StorageAccName.ServiceName.core.windows.net/{Entity}

* We have options for encryption, SAS tokens and also Access Keys as well.
* IMP - we can also storage static html with related files and run our static website directly from storage account. This is a new addition

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grots g.psxxted in Azure learn mote 
Static website 

Azure Table Storage

* Key-value based
* To use in .net , need nugets installed like azure.storage etc.

Machine generated alternative text:
Microsoft Storage; 

* Initialize CloudStorageAccount first using a connection string(under access keys we have conn string) ---
* Initialize TableClient to connect to table storage
* Get the table needed for Read/Write
* If we are writing something to table, we need to create an entity deriving from TableEntity
* Every table entity need to have a partition key which is for partition the data based on something eg: region for Office Locations etc and a RowKey which is kind of primary key for the record.
* Working with Table need to have TableOperation defined.
* Finally execute on Table this operation.

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using Microsoft .KindowsAzur.. Storage. Table; 
namespace ConsoleApp1 
class Program 
static void args) 
CloudStorageAccount storageAccount CloudStorageAccount. parse( 
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CloudTableClient tableclient storageAccount .CreateC10udTab1eClient(); 
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TableOperation insertop 
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public class EmployeeEntity : TableEntity 
public EmployeeEntity(string lastnane) 
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Output

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* Query the table storage

Machine generated alternative text:
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IMP

Machine generated alternative text:
What is the difference between Managed Storage and Storage Account when it comes to pricing? 
O Managed Storage is provisioned to a size, and you pay for that size whether or not you use it all. 
C) Storage Account is provisioned to a size, and you pay for that size whether or not you use it all. 
O 
You can easily grow and shrink a Manages Storage account for exactly what you need 
You pay for Storage Accounts per GB, and can read and write data to it an unlimited amount for no 
O 
extra charge. 

<https://github.com/Azure-Samples/storage-table-dotnet-getting-started>

CosmosDB - it’s a multi-model database service. Earlier termed as documentdb - enterprise grade with guaranteed performance SLAs and recommended for high performance environments.

* Better table storage experience which is more production ready and is alternative to using storage account.
* It has ability to scale to very large # of transactions like in case of mobile apps - it has guaranteed SLAs with geographical reach.
* For using this we create an account which gets unique URL like xxxx.documents.azure.com (can also use custom domains) - and select what API we want to use like SQL (for sql like data but its not relational data) and querying capabilities are like t-sql. Similarly other options.

Machine generated alternative text:
core 
Cognos 08 API 
Azure 
Multi-region Wiites O 

* Security - we can enable for global access or from inside of Vnets based on network settings done.
* Pricing - based on storage used and request units/sec

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* IMP - after initial settings on replication, we can add other regions as well later for geo replication from within the portal itself.

Once created it shows below details

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Congratulations! Your Azure Cosmos DB account was created. 
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Download and run your .NET app 
a .NET to ntr*t. run. 

* In Cosmos DB - we first create a Database and then add Collections to it.

Database has database ID and Collection is identified with collection id like employee etc

Throughput can be set for RU/s - this is critical for pricing aspects and need caution.

We also need partition key for our data - similar to Table storage ie uses to divide the data based on this key. We should choose a column/attribute which has wide range of values and data will be divided across it uniformly.

We can add unique key as well.

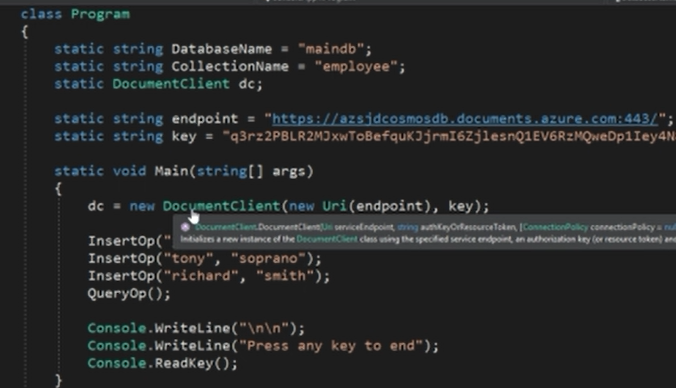
SQL API with cosmos DB provided T-SQL like data access capabilities

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* Interacting using Visual Studio
  + Nuget package needed for cosmosdb ie MS.azure.documentDB



* Here we have documentClient class which use end point URI and also need access key to connect in this case. Connection string doesn’t work with APIs at this stage for cosmos db.



Inserting data

Machine generated alternative text:
static void Insertop(string first, string last) 
EmployeeEntity e.pioyeenu•berl • EmployeeEntity(); 
enployeenunberl. FirstName first; 
epioyeenu.berl. LastNa.e last; 
var result z dc. CreateDocumentAsync( 
uri F ac tory. •c t ionuri (DatabaseName, 
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) . GetAwai ter( ) . GetResu1t() ; 
static void Queryop();;; 
public c lass EmployeeEntity 
public string FirstName { get; Set; 
public string LastNane get; set; ) 
public override string Tostring() 
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Querying data - passing feedoptions is mandatory.

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"jack"); 
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foreach (EnployeeEntity enpioyee in query) 
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IMP - there are many 3rd party libraries also available which makes cosmosdb management very easy as well.

* Data Consistency Options with Cosmos DB -
  + There are many Data Consistency options available under cosmos DB. Session consistency is default.

Machine generated alternative text:
SIRONG 

* Strong - all regions will get same data at exact same moment. There will be a very small delay but all will have data available in stable state all regions.
* Bounded Staleness - we define min/max lag times in replication - but order of data at all regions remains same.
* Session - for a given user in a single session data write and read will be consistent across regions but for other users In their sessions there will be undefined delay in working with same data.
* Consistent Prefix - order of data will always remains same in all regions but no guarantee when data will be available in other regions.
* Eventual consistency - order of data is also not guaranteed. Good for cases when order doesn’t matter.

Machine generated alternative text:
What is the downside for setting "strong consistency" on a Cosmos DB database with a lot of replicas? 
O 
Some locations will have data available to read that is more recent than other locations 
O There might be delays in reading data as it waits for the data to be replicated. 
O 
Some data may never be available in some locations. 
If data is read in Sydney and New York at exactly the same time, that data might not match as we 
O 
wait for replication to catch up. 

Machine generated alternative text:
What is one major advantage that Cosmos DB offers over a Storage Account table storage? 
C) Pricing, Cosmos DB is much cheaper than Table Storage 
O 
The ability to store key-value pairs 
O Sub 10ms latency guaranteed 
O 
Data row capacity. Cosmos DB supports a lot of data (GB) for each row 

<https://github.com/Azure-Samples/dotnet-cosmosdb-quickstart>

Azure SQL -

* We can use IAAS based SQL Server virtual machine OR we can use Azure SQL as PAAS offering. These options will be available under Database category in marketplace.
* If we are using very specific advanced features in SQL Server or fine tuning its memory/CPU usage for max performance ie where we need full hardware control then we can go with VM based approach OR else azure sql should suffice most needs.
* In PAAS we have 2 options with managed option where we just move DB and performance/scaling is all managed by microsoft OR SQL Database option where performance and upgrading the plan is in our control.
* Sql datawarehouse is for handling huge de-normalized databases.
* Machine generated alternative text:
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  Azure Database for PostgreSQL 
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Various settings while creating azure sql db -

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* Elastic Pool - multiple databases share same set of underlying resources. Makes it cheap but design wise should be used when all databases are not going to get surge in IO and CPU/RAM usage at the same time.
* Pricing - many tiers ie basic/standard/premium
* Pricing is based on
  + Performance ie basic/standard/premium which tells about DTU/s OR
  + # of cores and Storage based - here performance is not guaranteed but cores and storage is guaranteed.
* Collation is limited in Azure SQL. If we want other collations then we can use IAAS model.
* Geo-Replication - settings present in azure sql database blade.
  + We can setup secondary server and database in a secondary region for replication and it will be a readonly database.
  + Apps can be made intelligent - apps should call secondary region for Read operations if that is near to the app hosting environment.
  + Also in case of DR, we can firse Failover and secondary region becomes primary till the time primary is again up.
* Under Azure SQL Server settings - we can set up security based on firewall settings
  + Need to add Client IP if trying to connect to sql locally.
  + Need to add necessary rules for VNETs/SubNets as needed.

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• Create rww virtual 
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* Mostly apps will connect to azure sql database via service accounts and for that we can setup Azure AD admin as well.

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Cmada Ext 
+ data 
Impat database 
Server admin 
firewalls arri virtual 
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Not configured 
Delete 
Feedbxk 

* Can connect using SSMS
* Working with azure sql - exactly same as regular sql database.
* System.data.sqlclient ie same ns as well.

<https://github.com/Azure-Samples/dotnet-sqldb-tutorial>