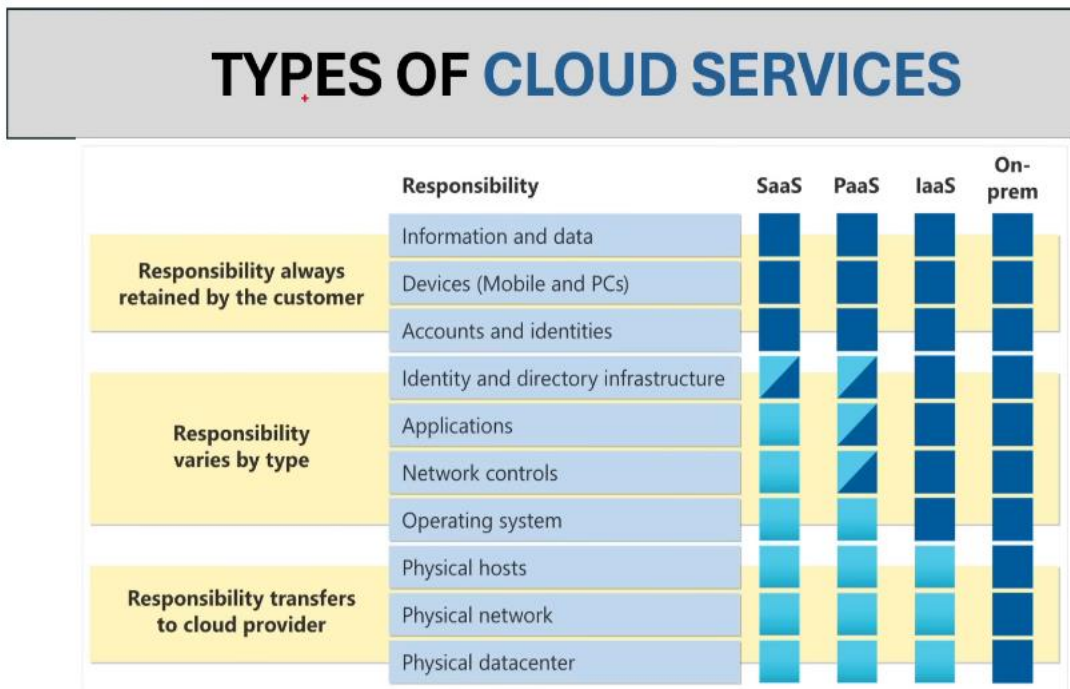


Azure

What is Cloud → central location to store data (store huge volume of data in a location and access it from anywhere in the world)

Cloud Computing → provides on demand computing resources (Pay as you go → pay for the services we are using)

Cloud has Data Centres (have remote servers and based on the Endpoint provided by Cloud we access the resources, highly secure)



On-premises : self-owned

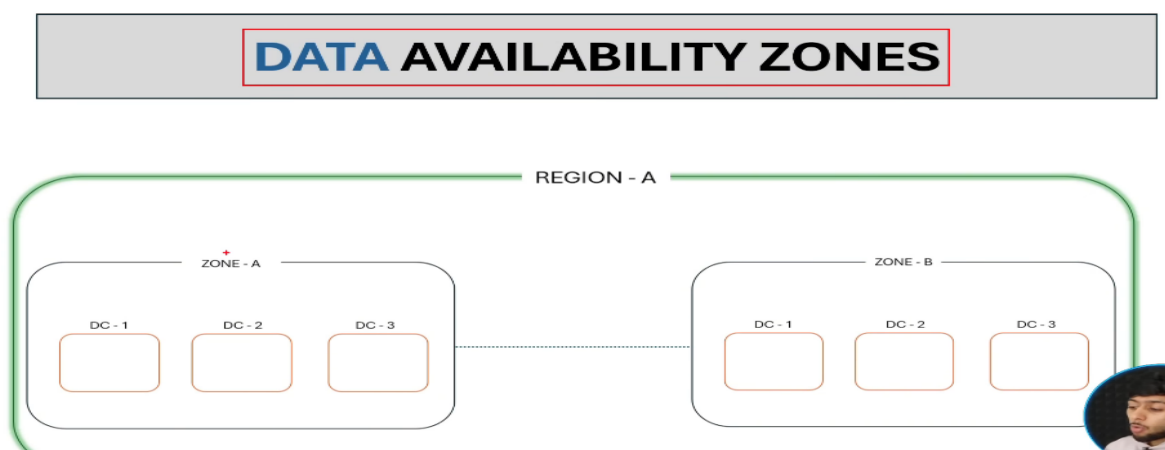
IaaS : Infrastructure as a service → Azure will simply provide the infrastructure eg. Virtual Machines, so once the VMs are ready Azure will not be responsible for any kind of upgrades or maintenance

PaaS: Platform as a Service → requesting for platform/application eg. Az SQL db (Managed by both Azure and us); we can configure the networking

SaaS: Software as a Service → We only have to manage data, devices rest all by cloud eg. Fabric

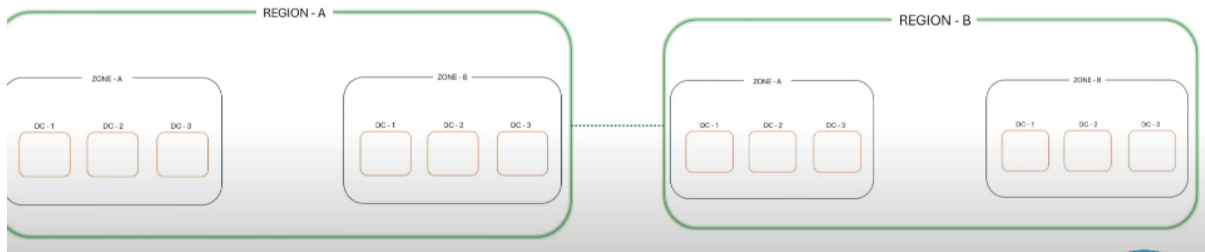
Fault Tolerance

Azure replicates data to multiple Data Centers



If one zone is effected, then another zone will be active

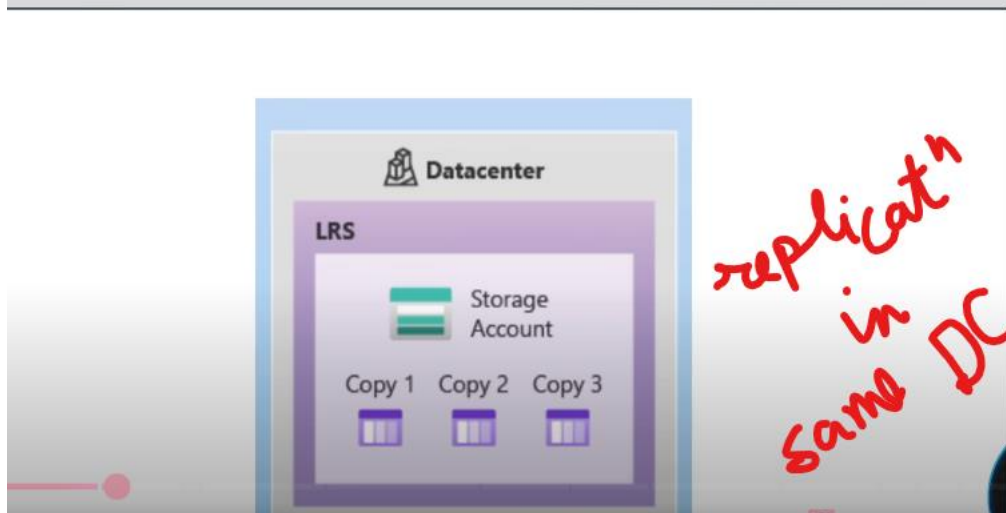
REGION PAIRS



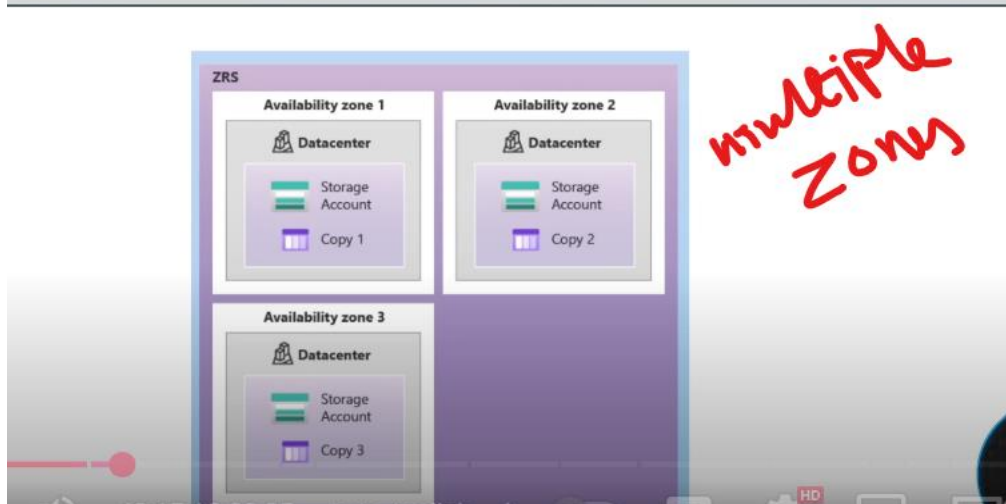
If entire region gets affected

That's the reason Azure gives 99.99% data availability

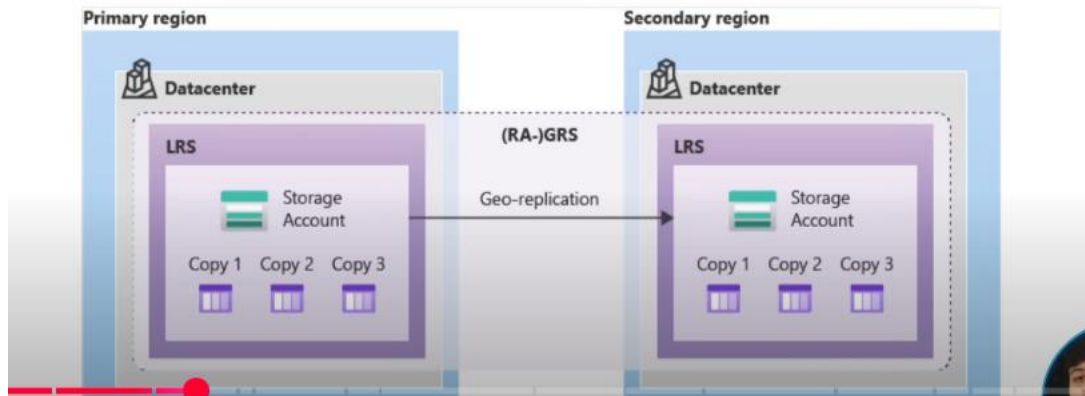
LRS – Locally Redundant Storage



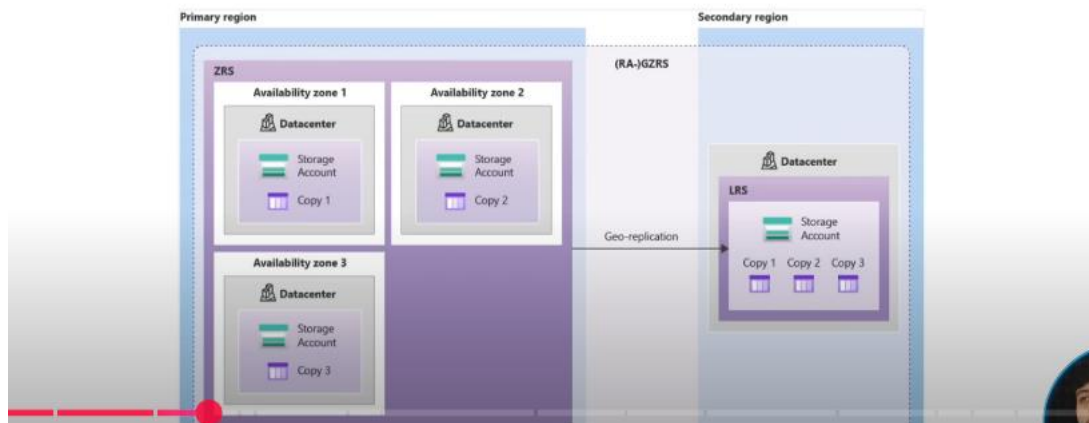
ZRS – Zone Redundant Storage



GRS – Geo Redundant Storage



GZRS – Geo Zone Redundant Storage



Now lets create Azure SQL database (for Structured data)

Search with Azure SQL → SQL databases

Home > azurefundamentals > Marketplace > Azure SQL >

Select SQL deployment option

Microsoft

Feedback

How do you plan to use the service?

SQL Database Hyperscale: Low price, high scalability, and best feature set. [Learn more](#)

SQL databases

Best for modern cloud applications. Hyperscale and serverless options are available.

Resource type

Single database

Create Show details

SQL managed instances

Best for most migrations to the cloud. Lift-and-shift ready.

Resource type

Single instance

Create Show details

SQL virtual machines

Best for migrations and applications requiring OS-level access. Lift-and-shift ready.

Image

Create Show details High availability

SQL managed instances: PaaS, SQL VM: IaaS

Home > azurefundamentals > Marketplace > Azure SQL > Select SQL deployment option > Create SQL Database >

Create SQL Database Server

Microsoft

Server details

Enter required settings for this server, including providing a name and location. This server will be created in the same subscription and resource group as your database.

Server name *

azurefundamentals

.database.windows.net

Location *

(US) East US

- ✓ Server name should not contain reserved words.
- ✓ The specified server name is available.
- ✓ Your server name can't start or end with hyphens '-', nor can it have two hyphens '--' in third and fourth places of the name.

Authentication

📘 Azure Active Directory (Azure AD) is now Microsoft Entra ID. [Learn more](#)

Home > azurefundamentals > Marketplace > Azure SQL > Select SQL deployment option > Create SQL Database >

Create SQL Database Server

Microsoft

Select your preferred authentication methods for accessing this server. Create a server admin login and password to access your server with SQL authentication, select only Microsoft Entra authentication [Learn more](#) or using an existing Microsoft Entra user, group, or application as Microsoft Entra admin [Learn more](#), or select both SQL and Microsoft Entra authentication.

Authentication method

- ☐ Use Microsoft Entra-only authentication
- ☒ Use both SQL and Microsoft Entra authentication
- ☐ Use SQL authentication

Set Microsoft Entra admin

anshlambaaz_gmail.com#EXT#@anshlambaazgmail.onmicrosoft.com
Admin Object/App ID: 20212ef0-9267-4eea-b4b8-3ebe0af4557a
[Set admin](#)

Server admin login *

ansh

Password *

.....

Confirm password *

.....

Home > azurefundamentals > Marketplace > Azure SQL > Select SQL deployment option >

Create SQL Database

Microsoft

Resource group * ⓘ RG_Azure_Car_Project
[Create new](#)

Database details

Enter required settings for this database, including picking a logical server and configuring the compute and storage resources

Database name *

azurefundadb

Server * ⓘ

(new) azurefundamentals (East US)

[Create new](#)

Compute + storage * ⓘ

General Purpose - Serverless
Standard-series (Gen5), 2 vCores, 32 GB storage
[Configure database](#)

Behavior when free offer limit reached

Backup storage redundancy

Choose how your PITR and LTR backups are replicated. Geo restore or ability to recover from regional outage is only available when geo-redundant storage is selected.

Backup storage redundancy ⓘ

- ☒ Locally-redundant backup storage +
- ☐ Zone-redundant backup storage
- ☐ Geo-redundant backup storage
- ☐ Geo-Zone-redundant backup storage [Preview]

Home > azurefundamentals > Marketplace > Azure SQL > Select SQL deployment option >

Create SQL Database ...

Microsoft

server 'azurefundamentals' and all databases it manages. Learn more ⓘ

Network connectivity

Choose an option for configuring connectivity to your server via public endpoint or private endpoint. Choosing no access creates with defaults and you can configure connection method after server creation. Learn more ⓘ

Connectivity method * ⓘ

- ☐ No access
- ☒ Public endpoint
- ☐ Private endpoint

Firewall rules

Setting 'Allow Azure services and resources to access this server' to Yes allows communications from all resources inside the Azure boundary, that may or may not be part of your subscription. Learn more ⓘ
Setting 'Add current client IP address' to Yes will add an entry for your client IP address to the server firewall.

Allow Azure services and resources to access this server *

No Yes

Add current client IP address *

No Yes

Now lets create Azure Cosmos db (for SemiStructured data/No SQL db→ Non Relational data)

Home > Resource groups > azurefundamentals > Marketplace > Azure Cosmos DB >

Create an Azure Cosmos DB account ...

Which API best suits your workload?

Azure Cosmos DB is a fully managed NoSQL and relational database service for building scalable, high performance applications. Learn more

To start, select the API to create a new account. The API selection cannot be changed after account creation.

Recommended APIs Others

Azure Cosmos DB for NoSQL

Azure Cosmos DB's core, or native API for working with documents. Supports fast, flexible development with familiar SQL query language and client libraries for .NET, JavaScript, Python, and Java.

Create Learn more

Azure Cosmos DB for MongoDB

Fully managed database service for apps written for MongoDB. Recommended if you have existing MongoDB workloads that you plan to migrate to Azure Cosmos DB.

Create Learn more

Azure Cosmos DB for NoSQL (previously Azure Core SQL) → mostly data in key value pair

arn mor : { +
"id" : 01,
"name" : "abc"
}

& we can use select query to operate on this data

Azure Cosmos DB for MongoDB : special type of Azure Cosmos DB for NoSQL

tions. Learn more

{
"cust1" : {"id":01,"name":"abc"},
"cust2" : {"id : 02, "nme" : "xyz"}
}

ritten for
ing MongoDB
e Cosmos DB.

Value is form of another child JSON

Recommended APIs Others

Azure Cosmos DB for Table

Fully managed database service for apps written for Azure Table storage. Recommended if you have existing Azure Table storage workloads that you plan to migrate to Azure Cosmos DB.

Create Learn more

Azure Cosmos DB for Apache Gremlin

Fully managed graph database service using the Gremlin query language, based on Apache TinkerPop project. Recommended for new workloads that need to store relationships between data.

Create Learn more

Azure Cosmos DB for Apache Cassandra

Fully managed Cassandra database service for apps written for Apache Cassandra. Recommended if you have existing Cassandra workloads that you plan to migrate to Azure Cosmos DB.

Create Learn more

Azure Cosmos DB for PostgreSQL

Fully-managed relational database service for PostgreSQL with distributed query execution, powered by the Citus open source extension. Build new apps on single or multi-node clusters—with support for JSONB, geospatial, rich indexing, and high-performance scale-out.

Create Learn more

Azure Cosmos DB for Apache Gremlin : Graph databases (relation between nodes)

Azure Cosmos DB for Apache Cassandra: Hierarchy of columns within our data

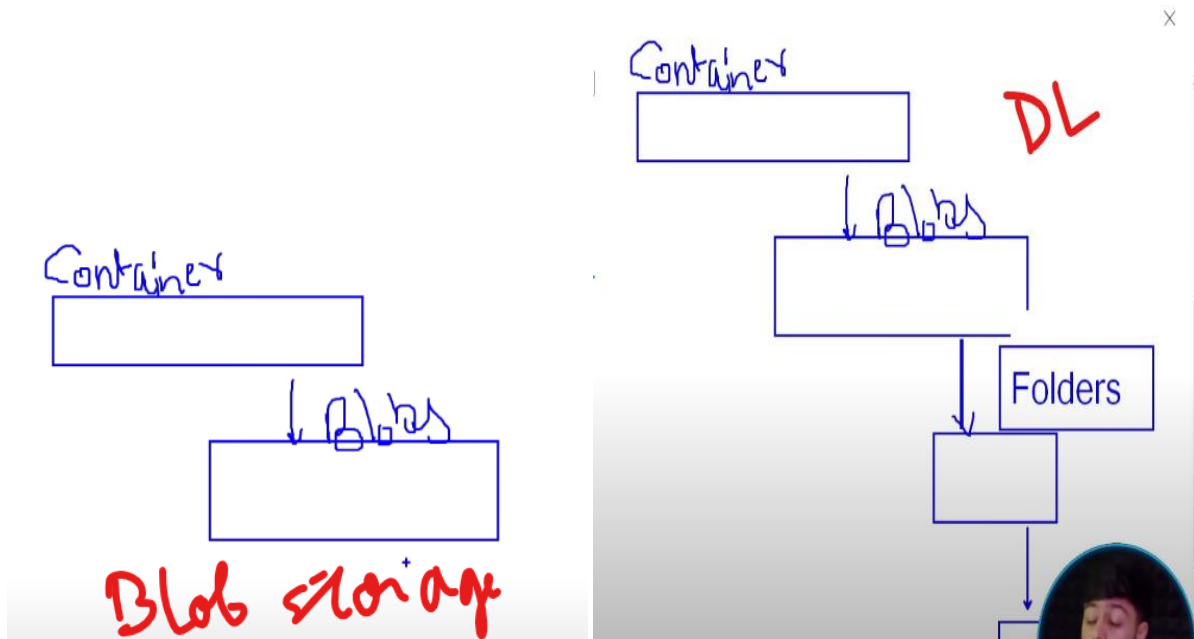
| id | customers | | |
|----|-----------|-------|--|
| | fname | lname | |
| 1 | as | xy | |

family of columns

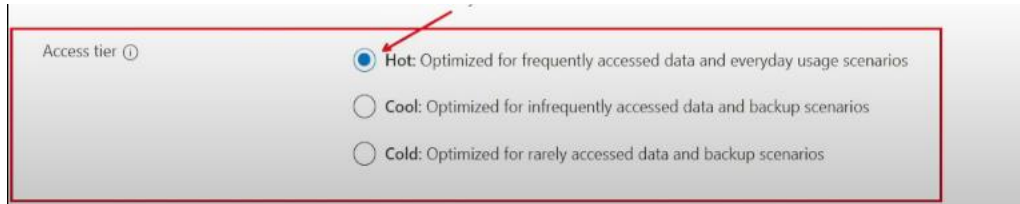
Unstructured Data - Blocks Blobs Files

Blocks: when we store data in hard drive, it gets saved in form of Blocks, in Azure its get saved in Disks

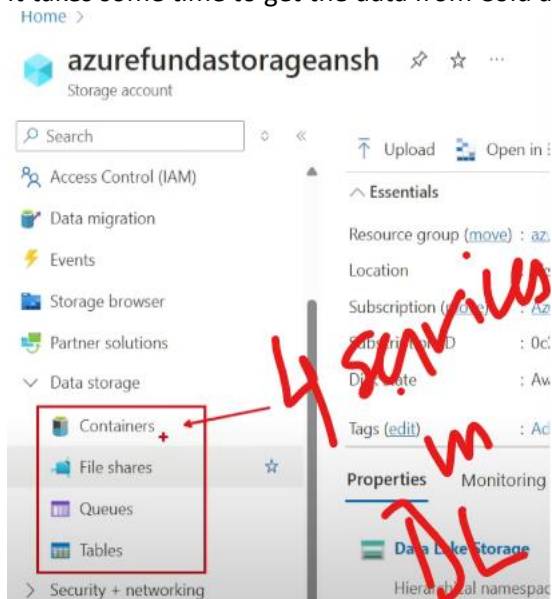
Blobs: Data Lake is built on top of Blob Storage



In Blobs, we cant create a directory under Blobs, in DL we can create hierarchy of folders



It takes some time to get the data from Cold and read it from there.



Containers : Data Lake

File Shares: lets say our org has 10-15 VMs, manager will push the files in central repository, to access the file for anyone in the team.

Queues: messaging service/real time data from IOT/sensors, data will come in Queues in form of packets in FIFO

Tables: semi structured data(key value data)

Lets create a Table

Home > azurefundastorageansh

azurefundastorageansh | Tables

Storage account

Search

Access Control (IAM)

Data migration

Events

Storage browser

Partner solutions

Data storage

Containers

File shares

Queues

Tables

Security + networking

Table

Refresh

Delete

Give feedback

Add table

Table name *

sales

OK

Cancel

Successfully created storage table

Successfully created storage table 'sales'

Authentication method: Access key (Switch to Microsoft Entra user account)

Search tables by prefix

| Table | Url |
|--------------------------------|--|
| <input type="checkbox"/> sales | https://azurefundastorageansh.table.core.windows.net/sales |

But we cant do anything over here, we have to go to Storage Browser

Home > azurefundastorageansh

azurefundastorageansh | Storage browser

Storage account

Search

Tags

Diagnose and solve problems

Access Control (IAM)

Data migration

Events

Storage browser

Partner solutions

Data storage

azurefundastorageansh

Favorites

Recently viewed

Blob containers

File shares

Queues

Tables

sales

View all

Tables

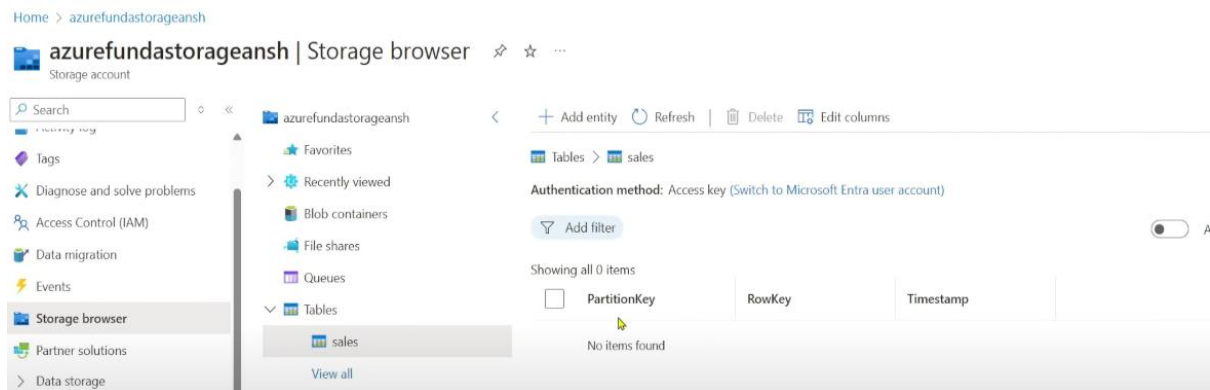
Authentication method: Access key (Switch to Microsoft Entra user account)

Search tables by prefix

Show system-generated tables

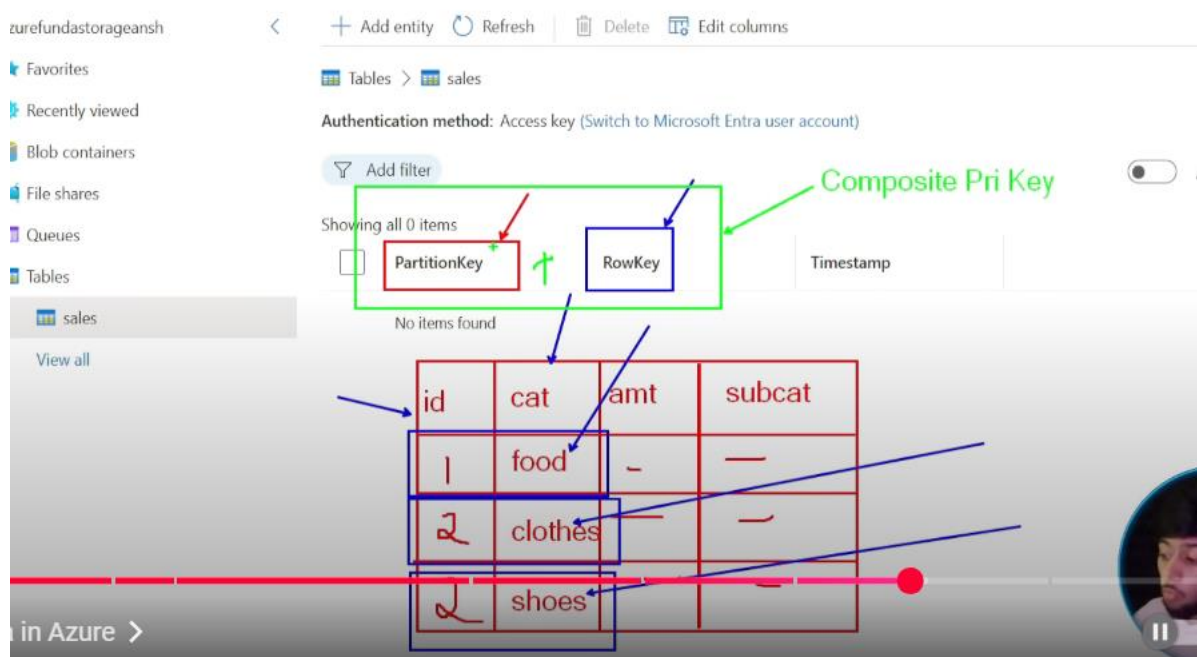
Showing all 1 items

| Name | Url |
|--------------------------------|--|
| <input type="checkbox"/> sales | https://azurefundastorageansh.table.core.windows.net/sales |

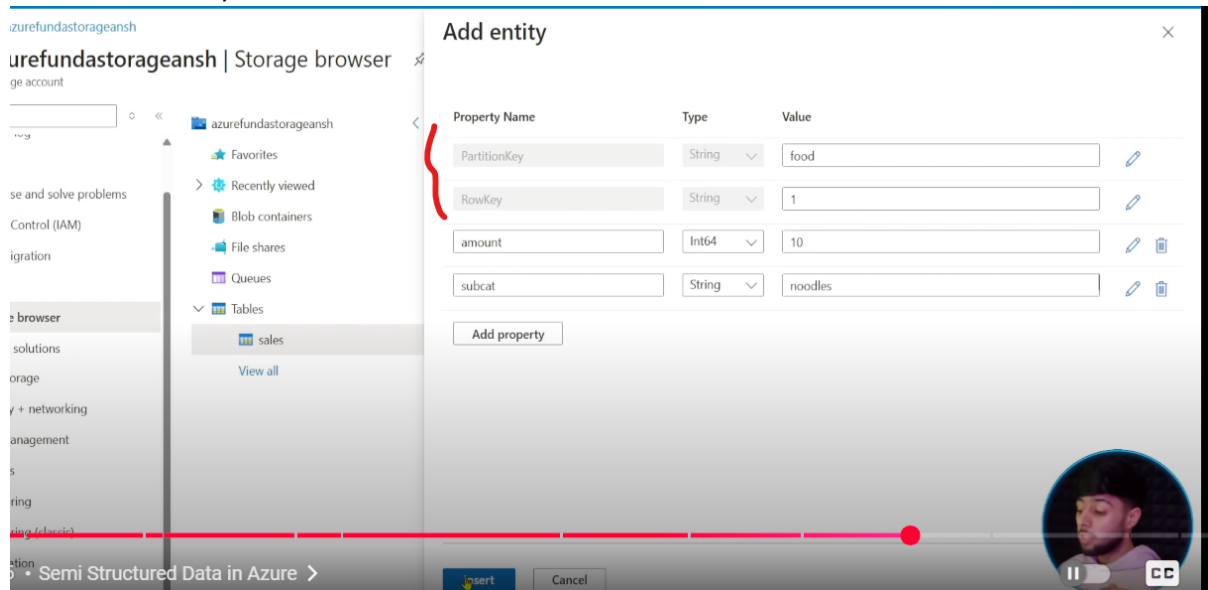


Rowkey : primary key for each partitions , combination of both PartitionKey and RowKey are treated as Composite Primary Key

Lets say PartitionKey is cat and RowKey is id



Click on Add Entity



ne > azurefundastorageansh

azurefundastorageansh | Storage browser

Storage account

search

Tags

Diagnose and solve problems

Access Control (IAM)

Data migration

Events

Storage browser

Partner solutions

Data storage

azurefundastorageansh

Favorites

Recently viewed

Blob containers

File shares

Queues

Tables

sales

View all

+ Add entity Refresh Delete Edit columns

Tables > sales

Authentication method: Access key (Switch to Microsoft Entra user account)

Add filter

Showing all 1 items

| PartitionKey | RowKey | Timestamp | amount | subcat |
|--------------|--------|---------------------------|--------|---------|
| food | 1 | 2025-03-08T22:35:15.72... | 10 | noodles |

ansh | Storage browser

+ Add entity Refresh Delete Edit columns

Tables > sales

Authentication method: Access key (Switch to Microsoft Entra user account)

Add filter

Showing all 2 items

| RowKey | Timestamp | amount | subcat |
|--------|---------------------------|--------|---------|
| 1 | 2025-03-08T22:35:15.72... | 10 | noodles |
| 2 | 2025-03-08T22:36:09.18... | 15 | |

Successfully added entity

Successfully added entity 'food-2'.

Add entity

| Property Name | Type | Value |
|---------------|--------|-------|
| PartitionKey | String | food |
| RowKey | String | 3 |
| amount | Int64 | 20 |

Add property

changing schema

< + Add entity Refresh Delete Edit columns

Tables > sales

Authentication method: Access key (Switch to Microsoft Entra user account)

Add filter Advanced filters

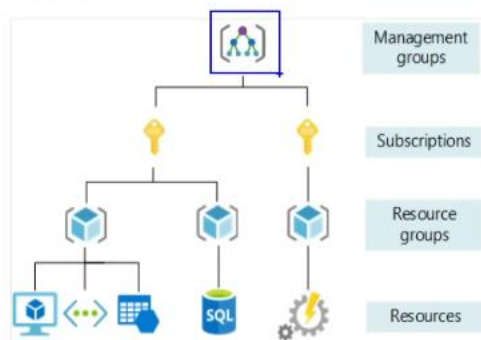
Showing all 3 items

| <input type="checkbox"/> | PartitionKey | RowKey | Timestamp | amount | subcat |
|--------------------------|--------------|--------|---------------------------|--------|---------|
| <input type="checkbox"/> | food | 1 | 2025-03-08T22:35:15.72... | 10 | noodles |
| <input type="checkbox"/> | food | 2 | 2025-03-08T22:36:09.18... | 15 | |
| <input type="checkbox"/> | food | 3 | 2025-03-08T22:36:55.09... | 20 | |

beauty of NoSQL

Management levels and hierarchy

Azure provides four levels of management: management groups, subscriptions, resource groups, and resources. The following diagram shows the relationship between these levels.

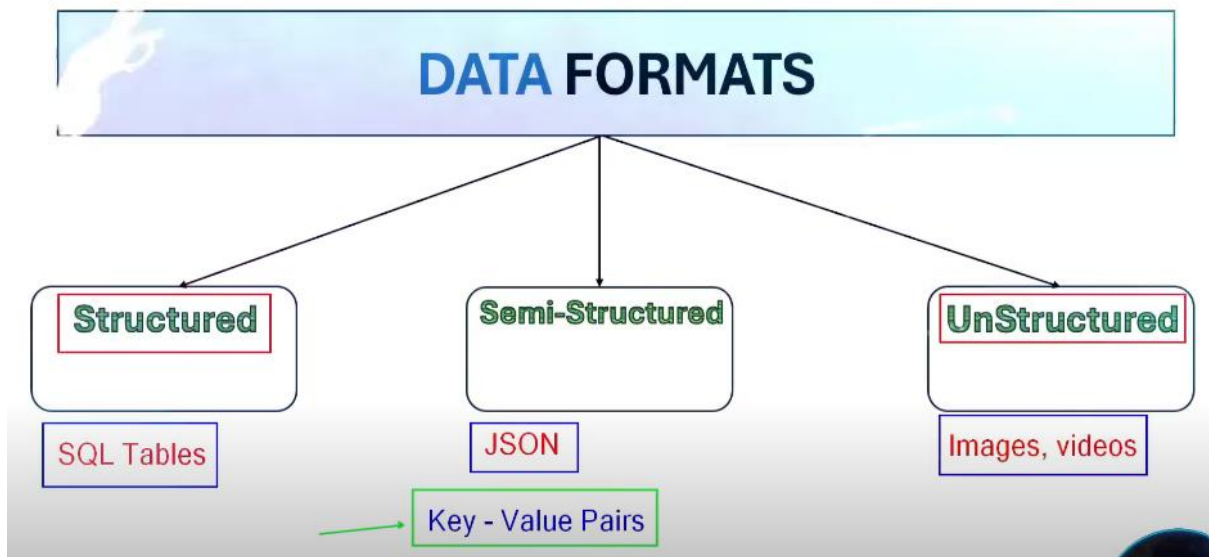


Management Groups/Tenants: Owner of the platform/Domain

Subscriptions: Purpose → To have different bills for different departments of the company

RG: folder to hold those resources

Entra ID: kind of Admin portal where we can manage users/MI/SPN

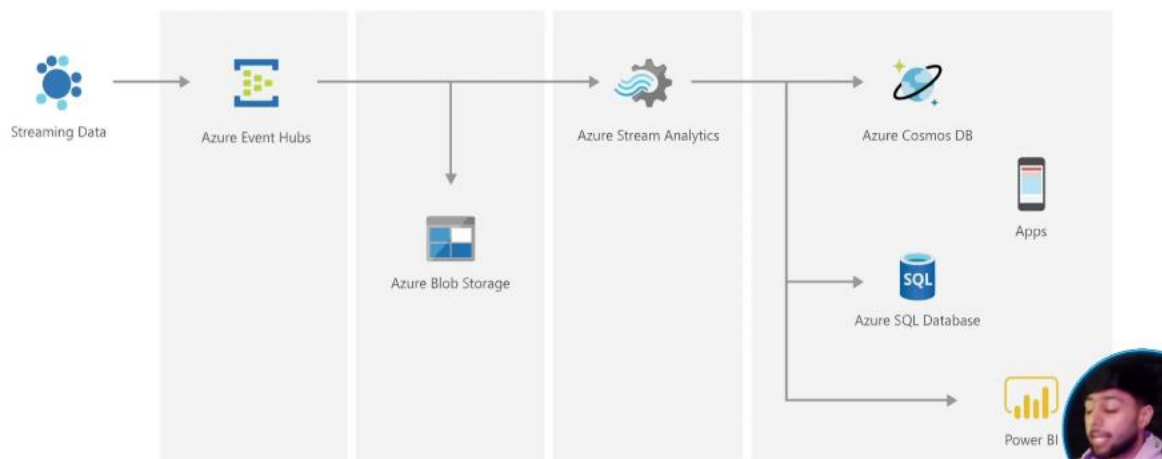


Structured: columns/rows, proper schema or structure

Semi-Structured: structure which is not fixed

UnStructured: mostly using in AI

AZURE EVENTS HUB



Event Hubs ingest data in real time manner and also provides us a temporary solution to store the data (for few days), these data will be consumed by Stream Analytics & Blob Storage.

Event Hubs are alternative to Apache Kafka, EV holds data in form of Events whereas AK holds data in form of Messages.

Stream Analytics → processing tool for data transformation

Home > Resource groups > azurefundamentals > Marketplace > Event Hubs >

Create Namespace

Event Hubs

Subscription * Azure subscription 1

Resource group * azurefundamentals
[Create new](#)

Instance Details

Enter required settings for this namespace, including a price tier and configuring the number of units (capacity).

Namespace name * azurefundaansh ✓
servicebus.windows.net

Location * Canada Central
The region selected supports Availability zones. Your namespace will have Availability Zones enabled. [Learn more](#).

Pricing tier * Basic (~\$11 USD per TU per Month) ✓
[Browse the available plans and their features](#)

Throughput Units * 1

Microsoft Azure Search resources, services, and docs (G+/f) Copilot anshlambaaz@...
DEFAULT

Home >

azurefundaansh

Event Hubs Namespace

Search + Event Hub Delete Refresh Give feedback

Overview

- Activity log
- Access control (IAM)
- Tags
- Diagnose and solve problems
- Data Explorer
- Events
- Settings
- Entities
- Monitoring
- Automation
- Help

Essentials

You can start generating test data or inspect data that has already been sent with the new Azure Event Hubs Data Explorer. Click on this message to try the feature!

| | | | |
|---|---|-----------------------------|--|
| Resource group (move) | : azurefundamentals | Created | : Saturday 8 March, 2025 at 19:30:33 GMT-4 |
| Status | : Active | Updated | : Saturday 8 March, 2025 at 19:30:55 GMT-4 |
| Location | : Canada Central | Zone Redundancy | : Enabled |
| Subscription (move) | : Azure subscription 1 | Pricing tier | : Basic |
| Subscription ID | : 0c02fec8-befb-4569-98ee-ef57af6ad257 | Throughput Units | : 4 units |
| Host name | : azurefundaansh.servicebus.windows.net | Auto-inflate throughput ... | : Not Supported |
| Tags (edit) | : Add tags | Local Authentication | : Enabled |

NAMESPACE CONTENTS 0 EVENT HUBS **KAFKA SURFACE** NOT SUPPORTED **ZONE REDUNDANCY** ENABLED

Home > azurefundaansh >

Create Event Hub

Event Hubs

Basics Capture Review + create

Event Hub Details

Enter required settings for this event hub, including partition count and message retention.

Name * ① anshihub ✓

Partition count ① 1

Retention

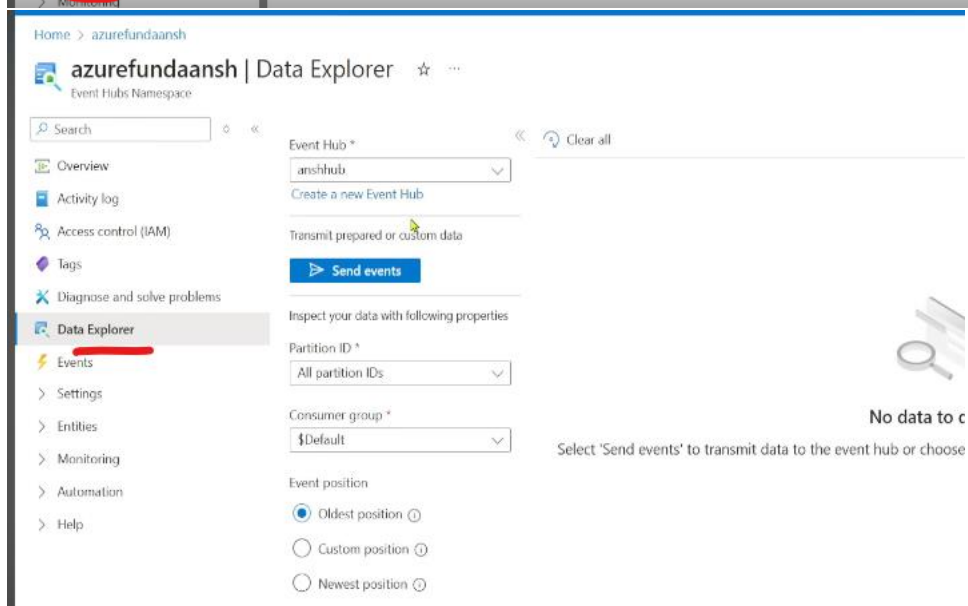
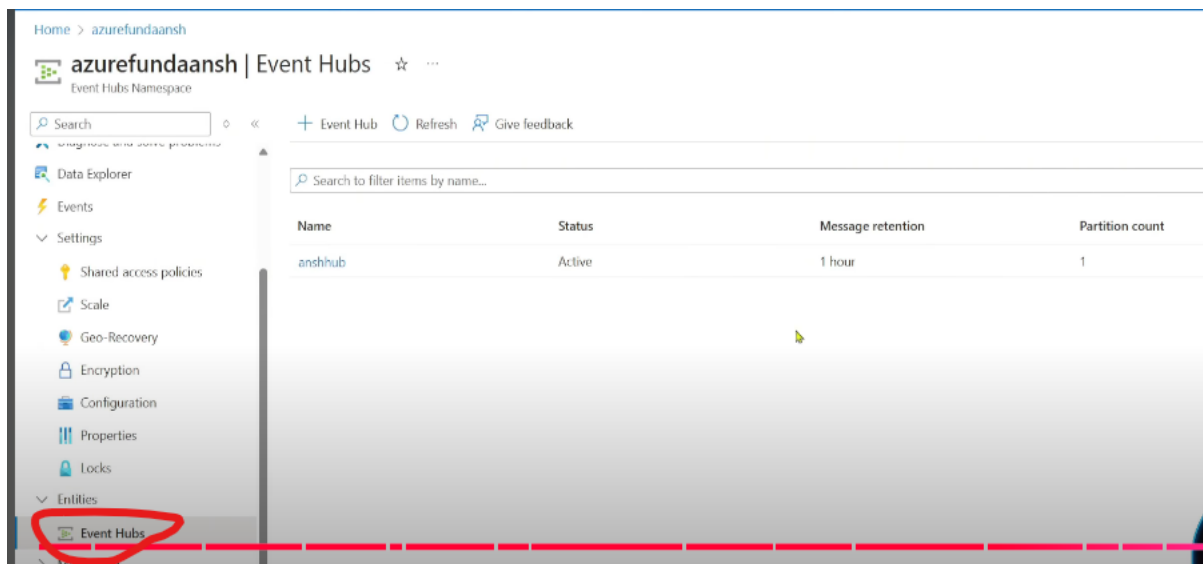
Configure retention settings for this Event Hub. [Learn more](#)

Cleanup policy ① Delete

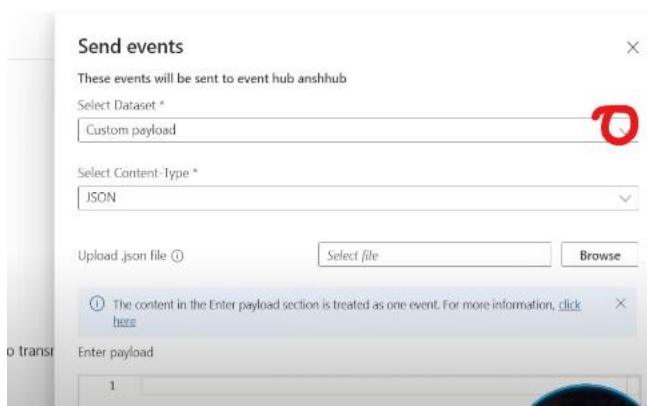
Retention time (hrs) * ① 1 min. 1 hour, max. 24 hours (1day)

[Review + create](#) < Previous Next: Capture >

Retention time : time the data will stay in EH



Send Events : provide a Streaming source and create a data to get ingested



Choose a sample template

Send events

Sample event

```
1 {
2   "country": "USA",
3   "city": "New York",
4   "date": "2023-05-11",
5   "temperature": 20,
6   "humidity": 60,
7   "windSpeed": 10,
8   "windDirection": "NW",
9   "precipitation": 0,
10  "cloudCover": 20,
11  "visibility": 10,
12  "pressure": 1013,
13  "dewPoint": 10,
14  "uvIndex": 5,
15  "sunrise": "05:30",
16  "sunset": "20:15",
17 }
```

> System properties

> Custom Properties

Send Cancel

Home > azurefundaansh | Event Hubs > anshhub (azurefundaansh/anshhub)

anshhub (azurefundaansh/anshhub) | Data Explorer

Event Hubs Instance

Search

Event Hub **anshhub**

Transmit prepared or custom data

Send events

Inspect your data with following properties

Partition ID *
All partition IDs

Consumer group *
SDefault

Event position

☒ Oldest position

☐ Custom position

☐ Newest position

> Advanced properties

View events

to see the events

Receiving events...

Microsoft Azure

Search resources, services, and docs (G+)

Copilot

anshlambaz@gmail.com

Home > azurefundaansh | Event Hubs > anshhub (azurefundaansh/anshhub)

anshhub (azurefundaansh/anshhub) | Data Explorer

Event Hubs Instance

Search

Event Hub **anshhub**

Transmit prepared or custom data

Send events

Inspect your data with following properties

Partition ID *
All partition IDs

Total received events: 1 → View next events

Export events

| Sequence Nu... | Offset | Partition ID | Enqueued Time | Content Type | Message ID |
|----------------|--------|--------------|----------------------------------|------------------|-----------------|
| 0 | 0 | 0 | Sat, Mar 08, 25, 07:44:05 PM AST | application/json | EHExplorer-ae0. |

event