https://github.com/MicrosoftLearning/DP-900T00A-Azure-Data-Fundamentals/tree/master/Instructions

https://github.com/MicrosoftLearning/DP-900T00A-Azure-Data-Fundamentals/tree/master/Instructions/Labs

All DP-900 Labs

DP-900 trainer lab mapping

This course, DP-900: Microsoft Azure Data Fundamentals, has a set of labs designated for instructorled training.

DP-900 module mapping to labs

Module	Lab	Markdown file
02-Explore relational data in Azure	Explore Azure SQL Database	dp900-01-sql-lab.md
03-Explore non-relational data in Azure	Explore Azure Storage	<u>dp900-02-storage-</u> <u>lab.md</u>
03-Explore non-relational data in Azure	Explore Azure Cosmos DB	<u>dp900-03-cosmos-</u> <u>lab.md</u>
04-Explore data analytics in Azure	Explore Azure Synapse Analytics	<u>dp900-04-synapse-</u> lab.md
04-Explore data analytics in Azure	Explore Azure Stream Analytics	<u>dp900-05-stream-</u> <u>lab.md</u>
04-Explore data analytics in Azure	Visualize data with Power Bl	dp900-pbi-06-lab.md

https://github.com/MicrosoftLearning/DP-900T00A-Azure-Data-Fundamentals/blob/master/Instructions/01-Provision-Azure-relational-database-services.md

Instructions

As part of your role at Contoso as a data engineer, you've been asked to create and **configure SQL** Server, PostgreSQL, and MySQL servers for Azure.

In this lab you'll create and configure one of the following servers for Azure: SQL Server, PostgreSQL, or MySQL.

1. Go to the Microsoft Learn exercise at https://aka.ms/dp900lab01 and complete the unit in the browser:

Exercise: Provision Azure relational database services

Completed100 XP

• 15 minutes

Now it's your opportunity to explore relational database services in Azure.

This exercise can be completed using a Microsoft Learn *sandbox*, which provides a temporary Azure subscription. To activate the sandbox subscription, you must sign in using a Microsoft account. The sandbox subscription will be automatically deleted when you complete this module. After the sandbox has been activated, <u>sign into the Azure portal using the credentials for your sandbox</u> <u>subscription</u>. Ensure you're working in the **Microsoft Learn Sandbox** directory - indicated at the top right of the portal under your user ID. If not, select the user icon and switch directory.

The free sandbox allows you to create resources in a subset of the Azure global regions. Select a region from the following list when you create resources:

- West US 2
- South Central US
- Central US
- East US
- West Europe
- Southeast Asia
- Japan East
- Brazil South
- Australia Southeast
- Central India

Lab 01

Provision an Azure SQL Database resource

In this exercise, you'll provision and test an Azure SQL Database resource.

1. In the Azure portal, select + **Create a resource** from the upper left-hand corner and search for *Azure SQL*. Then in the resulting **Azure SQL** page, select **Create**.



 Review the Azure SQL options that are available, and then in the SQL databases tile, ensure Single database is selected and select Create.

Microsoft Azure P Search	esources, services, and docs (G+/)	\sum	P	Û	ŝ	?	ନ୍ଦି	arohmvpm365(arohmvp365 (aro
 Create a resource Home Dashboard All services revortes 	Home > Create a resource > Azure SQL > Select SQL deployment option							
All resources Cognitive Services Cognitive Services Resource groups Aure Active Directory App Services Function App SQL databases Anne German DB	SQL databases SQL managed instances Best for modern cloud applications. Hyperscale and serverless options are available. Best for most migrations to the cloud. Lift-and-shift ready. Resource type Single database Create Show details]	SQ	L S4 Be le	QL virt	ual ma nigratic ess. Lift-	schines ons and a and-shit Show d	applications requiri ft ready. letails

- 3. Enter the following values on the Create SQL Database page:
 - **Subscription**: If you're using a *sandbox*, select *Concierge Subscription*. Otherwise, select your Azure subscription.

- **Resource group**: If you're using a *sandbox* subscription, select the existing resource group (which will have a name like *learn-xxxx*...). Otherwise, create a new resource group with a name of your choice.
- Database name: AdventureWorks

Microsoft Azure P Search r	resources, services, and docs (G+/)		Σ] [7	Q	ŝ	?	ନ୍ଦ	aroh AROH
«	Home > Create a resource > Azure S	QL > Select SQL deployment option >							
+ Create a resource	Create SQL Database								
숨 Home	Witrosoft	1							
📶 Dashboard	Project details								
⊟ All services	Select the subscription to manage deplo manage all your resources.	yed resources and costs. Use resource groups like folders to organize and							
★ FAVORITES	Subscription * 🕕	Microsoft Azure Sponsorship	\sim						
All resources	Bessurge group * ①								
🚳 Cognitive Services	Resource group * ()	Create new	~						
(Resource groups									
Azure Active Directory	Database details								
📀 App Services	Enter required settings for this database resources	, including picking a logical server and configuring the compute and storage	Ē	🗸 Data	base nar	ne shoi	ıld not ı	natch sr	pecial r
ntion App	Database name *	AdventureWorkd	_	The v	value has	a leng	th of at	most 12	28.
sQL databases	Database name		Ť.	Data	base nar	ne shou	ild not o	contain r	reserve
🧭 Azure Cosmos DB	Server * 🛈	Select a server	\sim		latabase	with th	e same	name ex	asts in
못 Virtual machines		The value must not be empty							
💠 Load balancers									
Storage accounts	want to use SQL elastic pool? * ()								
↔ Virtual networks	Compute + storage * (i)	Please select a server first.							
		Configure database							

• Server: Select Create new and create a new server with a unique name in any available location. Use SQL authentication and specify your name as the server admin login and a suitably complex password (remember the password - you'll need it later!)

Home > Create a resource > Azure S	QL > Select SQL d	eployment option > Create SQL Database >	
Create SQL Database	Server		
Server name *	azsqlserversg	database.windows.net	
Location *	(US) East US	v	
Authentication			
Select your preferred authentication met access your server with SQL authenticatic user, group, or application as Azure AD a	nods for accessing th n, select only Azure a dmin Learn more & ,	is server. Create a server admin login and password to AD authentication Learn more ∉ using an existing Azure AD or select both SQL and Azure AD authentication.	
Authentication method	Use SQL auth	entication re Active Directory (Azure AD) authentication .and Azure AD authentication	
Server admin login *	azsqlserversg	~	
Password *	•••••	 ₽∕	
Confirm password *	•••••	®⁄	
ок			

• Want to use SQL elastic pool?: No

- **Compute + storage**: Leave unchanged
- **Backup storage redundancy**: Locally-redundant backup storage

Microsoft Azure 🔎 Search	resources, services, and docs (G+/)		\searrow	Ģ	ې کې
«	Home > Create a resource > Azure SC	ℓL > Select SQL deployment option >			
+ Create a resource	Create SQL Database				
🛉 Home	Microsoft				
🖾 Dashboard	Enter required settings for this database, resources	including picking a logical server and configuring the compute and storage			
🗮 All services	Database name *	AdventureWorks	7		
★ FAVORITES	Somer * (i)	(now) azerleonyorg (East LIS)	-		
All resources	Server ()	Create new			
🚯 Cognitive Services					
Resource groups	Want to use SQL elastic pool? $*$ ①	🔿 Yes 💿 No			
🚸 Azure Active Directory	Compute + storage * 🕕	General Purpose			
🎨 App Services		Gen5, 2 vCores, 32 GB storage, zone redundant disabled			
intersection App		Compute database			
🧧 SQL databases	Backup storage redundancy				
🧭 Azure Cosmos DB	Choose how your PITR and LTR backups a	are replicated. Geo restore or ability to recover from regional outage is only			
🝷 Virtual machines	available when geo-redundant storage is	selected.			
🚸 Load balancers	Backup storage redundancy ①	Locally-redundant backup storage			
Storage accounts		Zone-redundant backup storage			
 Virtual networks 		Geo-redundant backup storage			
Amitor					
Advisor	Review + create Next : Netw	orking >			
Microsoft Defender for					

 On the Create SQL Database page, select Next :Networking >, and on the Networking page, in the Network connectivity section, select Public endpoint. Then select Yes for both options in the Firewall rules section to allow access to your database server from Azure services and your current client IP address.

Home > Create a resource > Azure SQL > Select SQL deployment option >
Create SQL Database Microsoft
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 ය්
Connectivity method * ①
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 G [*] 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 *
Add current client IP address *
Connection policy Configure how clients communicate with your SQL database server. Learn more 더
Connection policy ①
Review + create < Previous

5. Select **Next: Security** > and set the **Enable Microsoft Defender for SQL** option to **Not now**.

Microsoft Azure 🔎 Search	resources, services, and docs (G+/)					
×	Home > Create a resource > Azure SQL > Select SQL deployment option >					
+ Create a resource	Create SQL Database					
숨 Home	Microsoft					
🌌 Dashboard						
⊨ All services	Basics Networking Security Additional settings Tags Review + create					
* FAVORITES	Microsoft Defender for SQL					
All resources	Protect your data using Microsoft Defender for SQL, a unified security package including vulnerability assessment and					
🚯 Cognitive Services	advanced threat protection for your server. Learn more ${\bf C}^{\prime}$					
(Resource groups	Get started with a 30 day free trial period, and then 15 USD/server/month.					
🚸 Azure Active Directory	Enable Microsoft Defender for SQL * ①					
🎨 App Services	Not now					
n Function App	Ledger (preview)					
SQL databases	Ledger cryptographically verifies the integrity of your data and detects any tampering that might have occurred. Lear more 🕫					
🧭 Azure Cosmos DB	ledger (preview) Not configured					
못 Virtual machines	Configure ledger					
🚸 Load balancers	Identity					
Storage accounts	Use system-assigned and user-assigned managed identifies to enable central access management between this data					
↔ Virtual networks						
😁 Monitor	Identity Not enabled					
🔷 Advisor	Review + create < Previous Next : Additional settings >					
Microsoft Defender for Cloud						

 Select Next: Additional Settings > and on the Additional settings tab, set the Use existing data option to Sample (this will create a sample database that you can explore later)



Home > Create a resource > Azure SQL > Select SQL deployment option >

Create SQL Database

Microsoft

Basics Networking Security Additional settings Tags Review + create

Tags are name/value pairs that enable you to categorize and view consolidated billing by applying the same tag to multiple resources and resource groups. Learn more $\[mathbb{C}^n\]$

Note that if you create tags and then change resource settings on other tabs, your tags will be automatically updated.

Name 🛈	Value 🛈	Resource	
Server	: azsqlserversg	2 selected	✓ 🗓
	:	2 selected	\sim

< Previous Next : Review + create	
-----------------------------------	--

7. Select **Review + Create**, and then select **Create** to create your Azure SQL database.



8. Wait for deployment to complete. Then go to the resource that was deployed, which should look like this:

Microsoft Azure 🔎 Search r	resources, services, and docs (G+/)		। 🗗 🖉 🎯 🔗 arohmypm365@arohm 🅘
Create a resource	Home > Microsoft.SQLDatabase.newDatabase	eNewServer_90e1788530d04f80b91e6 > zsqlserversg/AdventureWorks) ۶ …	>
🕮 Dashboard		🗋 Copy 🍤 Restore T Export 🏮 Set server firewall 📋 De	lete 🧷 Connect with 🗸 🔊 Feedback
≡ All services	Overview	∧ Essentials	JSON View
★ FAVORITES All resources	Activity log	Resource group (maxe) DP900rg	Server name azsglserversg.database.windows.net
👶 Cognitive Services	Diagnose and solve problems	Status Online	Elastic pool No elastic pool
(Resource groups	 Quick start 	Location East US	Connection strings Show database connection strings
Azure Active Directory	ana 🗯 Query editor (preview)	Subscription (<u>move</u>) <u>Microsoft Azure Sponsorship</u>	Pricing tier General Purpose: Gen5. 2 vCores
App services t	un Power Platform	Subscription ID c76bf684-ce47-483d-b01d-d7dae99567f7	Earliest restore point 2022-03-27 15:01 UTC
🧕 SQL databases	Power Bi	Tags (<u>edit</u>)	
🨻 Azure Cosmos DB	Power Automate	Server : azsqlserversg	
🟆 Virtual machines 🛛	oft	Channel data fare laste (1 hourse) 24 hourse - 7 dours	Aggregation type: Max 🗸
Load balancers	licr Settings	Show data for last:	max •
Storage accounts	Compute + storage	Compute utilization	\$2
↔ Virtual networks	Connection strings	100%	
😁 Monitor	Properties	90%	
Advisor	Locks	300/	,

9. In the pane on the left side of the page, select **Query editor (preview)**, and then sign in using the administrator login and password you specified for your server.

If an error message stating that the client IP address isn't allowed is displayed, select the **Allowlist IP** ... link at the end of the message to allow access and try to sign in again (you previously added you own computer's client IP address to the firewall rules, but the query editor may connect from a different address depending on your network configuration.)

The query editor looks like this:



- 10. Expand the **Tables** folder to see the tables in the database.
- 11. In the **Query 1** pane, enter the following SQL code:

SELECT * FROM SalesLT.Product;

«	\bigcirc Login $+$ New Query \uparrow Open query	🛜 Feedback
	AdventureWorks (azsqlserversg)	$\frac{\text{Query 1} \times 3}{2}$
	Showing limited object explorer here. For full capability please open SSDT.	1 SELECT * FROM SalesLT.Product;
	✓□ Tables > □ dbo.BuildVersion > □ dbo.ErrorLog	

12. Select ▷ **Run** above the query to run it and view the results, which should include all columns for all rows in the *SalesLT.Product* table as shown here:

Adventure)Merks (azcalsonversa)		Query 1 $ imes$		
Adventureworks (azsqiserversg)	Ö	▶ Run □ Cancel query	\downarrow Save query \downarrow Export data as \smallsetminus	🖉 🛄 Show only Editor
Showing limited object explorer her full capability please open SSDT.	re. For	1 SELECT * FROM Sa	lesLT.Product;	
✓ 🗖 Tables				
> 🖽 dbo.BuildVersion				
> 🖽 dbo.ErrorLog				
SalesLT.Address				
> 🖽 SalesLT.Customer				
> 📰 SalesLT.CustomerAddress		<		
> 🖽 SalesLT.Product		Results Messages		
> 🖽 SalesLT.ProductCategory				
> 🖽 SalesLT.ProductDescription		Search to filter items		
> 🖽 SalesLT.ProductModel		ProductID	Name	ProductNumber
> 🖬 SalesLT.ProductModelProductE	esc ···	680	HL Road Frame - Black, 58	FR-R92B-58
> 🖽 SalesLT.SalesOrderDetail		706	HI Road Frame - Red 58	FR-R92R-58
> 🖽 SalesLT.SalesOrderHeader				TR ROER DO
Views		/0/	Sport-100 Helmet, Red	HL-U509-R
Stored Procedures		708	Sport-100 Helmet, Black	HL-U509
		700	Mountain Piko Socks M	SO BOOD M
		Ouer susseeded L6s		

13. Replace the SELECT statement with the following code, and then select **Run** to run the new query and review the results (which includes only the **ProductID**, **Name**, **ListPrice**, **ProductCategoryID** columns):

🞗 Login 🕂 New Query 🕇 Open	query 🌾	🖓 Feedback			
AdventureWorks (azsqlserversg)	Ö	Query 1× 2	ery 🞍 Save query 🞍 Export d	ata as 🗸 📕 Shc	ow only Editor
Showing limited object explorer here full capability please open SSDT.	e. For	1 2 SELECT Produc 3 FROM SalesLT.	tID, Name, ListPrice, Produ Product;	uctCategoryID	1
∽ 🗗 Tables					
> 🖽 dbo.BuildVersion					
> 🖽 dbo.ErrorLog					
> 🖽 SalesLT.Address					
> 🖽 SalesLT.Customer					
> 🖽 SalesLT.CustomerAddress		<			
> 🖽 SalesLT.Product		Results Messages			
> 🖽 SalesLT.ProductCategory					
> 🖽 SalesLT.ProductDescription		\mathcal{P} Search to filter iten	ns		
> 🖽 SalesLT.ProductModel		ProductID	Name	ListPrice	Produc
> 🖽 SalesLT.ProductModelProductD	esc ···	680	HL Road Frame - Black, 58	1431.5000	18
> 🖽 SalesLT.SalesOrderDetail		706	LU Dead Frame Ded 50	1421 5000	10
> 🖽 SalesLT.SalesOrderHeader		/06	HL KOAD Frame - Ked, 58	1431.5000	18
> 🖆 Views		707	Sport-100 Helmet, Red	34.9900	35
Stored Procedures		708	Sport-100 Helmet, Black	34.9900	35
		709	Mountain Bike Socks, M	9.5000	27
		Query succeeded 0s			



14. Close the query editor pane, discarding your edits.

15.

- 1. Which deployment option offers the best compatibility when migrating an existing SQL Server on-premises solution?
 - a. Azure SQL Managed Instance

Correct. Azure SQL Managed Instance offers **near 100% compatibility** with SQL Server.

200

- 2. Which of the following statements is true about Azure SQL Database?
 - a. Most database maintenance tasks are automated Azure SQL Database automates most maintenance tasks.
- 3. Which database service is the simplest option for migrating a LAMP application to Azure?

a. Azure Database for MySQL

Correct. LAMP standard for Linux, Apache, MySQL, and PHP.

Knowledge check

Choose the best response for each of the questions below. Then select Check your answers.

1. Which deployment option offers the best compatibility when migrating an existing SQL Server on-premises solution

- O Azure SQL Database (single database)
- O Azure SQL Database (elastic pool)
- Azure SQL Managed Instance

✓ Correct. Azure SQL Managed Instance offers near 100% compatibility with SQL Server.

2. Which of the following statements is true about Azure SQL Database?

Most database maintenance tasks are automated

- ✓ Correct. Azure SQL Database automates most maintenance tasks.
- \bigcirc $\;$ You must purchase a SQL Server license
- \bigcirc $\,$ It can only support one database

3. Which database service is the simplest option for migrating a LAMP application to Azure?

•	Azure SQL Managed Instance
	X Incorrect. LAMP standard for Linux, Apache, MySQL, and PHP.
0	Azure Database for MySQL
	 Correct. LAMP standard for Linux, Apache, MySQL, and PHP.
0	Azure Database for PostgreSQL

Labs

https://github.com/MicrosoftLearning/DP-900T00A-Azure-Data-Fundamentals/tree/master/Instructions/Labs

Q	Product ∨ Team Enterprise Explore ∨ Market	place Pricing \vee	Search 7 Sign	n in Sign up
Generated from MicrosoftLearning/IN	DP-900T00A-Azure-Data-Fundamentals Public P99X-SampleCourse		لِ Notifica	tions & Fork
<> Code 🕑 Issues	🏠 Pull requests 💿 Actions 🖽 Projects 🖽 Wiki	③ Security 🗠 Insights		
	\$ ⁹ master ▼ DP-900T00A-Azure-Data-Fundamental	s / Instructions / Labs /		Go to file
	GraemeMalcolm Register providers		✓ 3503aab 10 days ago	🕄 History
	images	Modev, renamed, and reformatted labs		11 days ago
	D 00-Lab-mapping.md	Update 00-Lab-mapping.md		11 days ago
	dp900-01-sql-lab.md	Fixed links		11 days ago
	dp900-02-storage-lab.md	Register providers		10 days ago
	dp900-03-cosmos-lab.md	Fixed links		11 days ago
	🗅 dp900-04-synapse-lab.md	Fixed links		11 days ago
	🗅 dp900-05-stream-lab.md	Register providers		10 days ago
	🗅 dp900-pbi-06-lab.md	Minor update		10 days ago

Exercise: Explore Azure Storage

Provision an Azure Storage account

The first step in using Azure Storage is to provision an Azure Storage account in your Azure subscription.

 If you haven't already done so, sign into the <u>Azure portal</u> at https://portal.azure.com. Then on the Azure portal home page, select + Create a resource from the upper left-hand corner and search for *Storage account*. Then in the resulting Storage account page, select Create.



- 2. Enter the following values on the Create a storage account page:
 - **Subscription**: If you're using a sandbox, select *Concierge Subscription*. Otherwise, select your Azure subscription.

- **Resource group**: If you're using a sandbox, select the existing resource group (which will have a name like *learn-xxxx*...). Otherwise, create a new resource group with a name of your choice.
- **Storage account name**: Enter a unique name for your storage account using lower-case letters and numbers.
- **Region**: Select any available location.
- **Performance**: *Standard*
- **Redundancy**: *Locally-redundant storage (LRS)*

Microsoft Azure	, P Search resources, services, and docs (G+/)	D 🖓	Q	ŝ
«	Home > Create a resource > Storage account >			
+ Create a resource	× Create a storage account			
👚 Home				
Dashboard	Basics Advanced Networking Data protection Encryption Tags Review + crea	te		
🗮 All services				
★ FAVORITES	Subscription * Microsoft Azure Sponsorship	~	1	
All resources			L 1	
🚯 Cognitive Services	Resource group * DP900rg	\sim		
Resource groups	Create new		1	
lactive Directory				
🎨 App Services	Instance details			
🎸 Function App				
👼 SQL databases	If you need to create a legacy storage account type, please click here.			
🧭 Azure Cosmos DB	Storage account name ① * azstoragesgp			
Virtual machines				
💠 Load balancers	Region () *			
Storage accounts	Deformance () *			
↔ Virtual networks	Standard: Recommended for most scenarios (general-pur	oose v2 account)		
😁 Monitor	Premium: Recommended for scenarios that require low la	ency.		
🤿 Advisor	Redundancy ① * Locally-redundant storage (LRS)	\sim		
Microsoft Defender for Cloud				
Ocst Management + Billing				
Help + support	Review + create < Previous Next : Advanced >			

Select Next: Advanced > and view the advanced configuration options. In particular, note that this is where you can enable hierarchical namespace to support Azure Data Lake Storage Gen2. Leave this option <u>unselected</u> (you'll enable it later), and then select Next: Networking > to view the networking options for your storage account.

Create a storage account

Basics	Advanced	Networking	Data protection	Encryption	Tags	Review + create
Securit	у					
Configu	re security setti	ings that impact y	our storage account.			
Require operatic	secure transfer	for REST API	 Image: A start of the start of			
Enable b	blob public acce	ess 🛈	\checkmark			
Enable s	torage account	t key access 🛈	\checkmark			
Default authoriz	to Azure Active ation in the Az	Directory ure portal ①				
Minimur	m TLS version	0	Version 1.2			

Data Lake Storage Gen2

The Data Lake Storage Gen2 hierarchical namespace accelerates big data analytics workloads and enables file-level access control lists (ACLs). Learn more

Enable hierarchical namespace	
Blob storage	
Enable SFTP ①	To enable SFTP, 'hierarchical namespace' must be enabled.
Enable network file system v3 ①	 To enable NFS v3 'hierarchical namespace' must be enabled. Learn more about NFS v3
Allow cross-tenant replication (i)	
Access tier ①	Hot: Frequently accessed data and day-to-day usage scenarios Cool: Infrequently accessed data and backup scenarios
Azure Files	

Enable large file shares 🕕

Microsoft Azure	∠ Search resources, services, and docs (G+/)			
*	Home > Create a resource > Storage account >			
+ Create a resource	Create a storage account			
숨 Home				
🖾 Dashboard	Basics Advanced Networking Data protection Encryption Tags Review + create			
All services				
* FAVORITES	Network connectivity			
All resources	You can connect to your storage account either publicly, via public IP addresses or service endpoints, or privately, using			
🐟 Cognitive Services	private endpoint.			
Resource groups	Connectivity method * Public endpoint (all networks)			
Azure Active Directory	Public endpoint (selected networks)			
📀 App Services				
nterion App	All networks will be able to access this storage account. We recommend using			
👼 SQL databases	Private endpoint for accessing this resource privately from your network. Lear			
🧭 Azure Cosmos DB	more			
👤 Virtual machines				
💠 Load balancers	Network routing			
Storage accounts				
Virtual networks	Determine how to route your traffic as it travels from the source to its Azure endpoint. Microsoft network routing is recommended for most customers.			
😁 Monitor				
🤿 Advisor	Microsoft network routing			
Microsoft Defender for Cloud	Internet routing			
Oost Management + Billing				
Help + support	Review + create Previous Next : Data protection >			

 Select Next: Data protection > and then in the Recovery section, <u>de</u>select all of the Enable soft delete... options. These options retain deleted files for subsequent recovery, but can cause issues later when you enable hierarchical namespace.

Microsoft Azure	∠ Search resources, services, and docs (G+/)
«	Home > Create a resource > Storage account >
+ Create a resource	Create a storage account
肻 Home	
🚰 Dashboard	Basics Advanced Networking Data protection Encryption Tags Review + create
All services	
★ FAVORITES	
All resources	Enable point-in-time restore for containers
🚯 Cognitive Services	change feed, and blob soft delete must also be enabled. Learn more
Resource groups	Enable soft delete for blobs
Azure Active Directory	Soft delete enables you to rect and the previously marked for deletion, including blobs that were overwritten. Learn more
🎨 App Services	
Sunction App	Soft delete enables you to recover containers that were previously marked for deletion. Learn more
SOL databases	Enable soft delete for file shares
Azure Cosmos DB	Soft delete enables you to recover file shares that were previously marked for deletion. Learn more
Virtual machines	
	Tracking
	······································
	Manage versions and keep track of changes made to your blob data.
Virtual networks	Enable versioning for blobs
Monitor	Use versioning to automatically maintain previous versions of your blobs for recovery and restoration. Learn more
🧛 Advisor	Enable blob change feed
Microsoft Defender for Cloud	Keep track of create, modification, and delete changes to blobs in your account. Learn more
💿 Cost Management + Billing	
A Help + support	Review + create Previous Next : Encryption >

Microsoft Azure	> Search resources, services, and docs (G+/)			
«	Home > Create a resource > Storage account >			
+ Create a resource	Create a storage account			
숨 Home				
Dashboard	Basics Advanced Networking Data protection Encryption Tags Review + create			
≡ All services				
★ FAVORITES	Encryption type ① * O Microsoft-managed keys (MMK)			
All resources	Customer-managed keys (CMK)			
💩 Cognitive Services				
Resource groups	Enable support for customer-managed keys ① Blobs and files only			
Azure Active Directory	All service types (blobs, files, tables, and queues)			
🎨 App Services	A This option cannot be changed after this storage account is created.			
sunction App	Enable infrastructure encryption			
SQL databases				
🧟 Azure Cosmos DB				
못 Virtual machines				
💠 Load balancers				
Storage accounts				
 Virtual networks 				
🔗 Monitor				
💠 Advisor				
Microsoft Defender for Cloud				
Ost Management + Billing				
A Help + support	Review + create < Previous			

Microsoft Azure	∠ Search resources, services, and docs (G+/)
«	Home > Create a resource > Storage account >
+ Create a resource	Create a storage account
肻 Home	
🚈 Dashboard	Basics Advanced Networking Data protection Encryption Tags Review + create
All services	
★ FAVORITES	Tags are name/value pairs that enable you to categorize resources and view consolidated billing by applying the same tag to multiple resources and resource groups. Learn more about tags
All resources	Note that if you create tags and then change resource settings on other tabs, your tags will be automatically updated.
n Cognitive Services	
Resource groups	Name Value Resource
Azure Active Directory	Server V : storageaccount V All resources selected V
🔅 App Services	All resources selected
sunction App	
🧧 SQL databases	
🧭 Azure Cosmos DB	
👤 Virtual machines	
💠 Load balancers	
Storage accounts	
Virtual networks	
🕙 Monitor	
🧔 Advisor	
Microsoft Defender for Cloud	
Oost Management + Billing	
Help + support	Review + create Next : Review + create >

 Continue through the remaining Next > pages without changing any of the default settings, and then on the Review + Create page, wait for your selections to be validated and select Create to create your Azure Storage account.

Microsoft Azure	∠ Search resources, services, and docs (G+/)
«	Home > Create a resource > Storage account >
+ Create a resource	Create a storage account
肻 Home	
🖾 Dashboard	Basics Advanced Networking Data protection Encryption Tags Review + create
All services	
★ FAVORITES	Tags are name/value pairs that enable you to categorize resources and view consolidated billing by applying the same tag to multiple resources and resource groups. Learn more about tags
All resources	Note that if you create tags and then change resource settings on other tabs, your tags will be automatically updated.
Cognitive Services	
Resource groups	Name Value Resource
Azure Active Directory	Server \checkmark : storageaccount \checkmark All resources selected \checkmark
📀 App Services	All resources selected
🎸 Function App	
🧧 SQL databases	
🬌 Azure Cosmos DB	
👤 Virtual machines	
💠 Load balancers	
Storage accounts	
Virtual networks	
😌 Monitor	
🤿 Advisor	
Microsoft Defender for Cloud	
Ost Management + Billing	
Help + support	Review + create Previous Next : Review + create >

6. Wait for deployment to complete. Then go to the resource that was deployed.





Explore blob storage

Now that you have an Azure Storage account, you can create a container for blob data.

1. Download the <u>product1.json</u> JSON file from https://aka.ms/product1.json and save it on your computer (you can save it in any folder - you'll upload it to blob storage later).

If the JSON file is displayed in your browser, save the page as **product1.json**.

https://raw.githubusercontent.com/MicrosoftLearning/DP-900T00A-Azure-Data-Fundamentals/master/storage/product1.json



2. In the Azure portal page for your storage container, on the left side, in the **Data storage** section, select **Containers**.

Microsoft Azure	∠ Search resources, services, and docs (G+/)	
«	Home > azstoragesgp_1648434300883 > azstoragesgp	
+ Create a resource	💳 azstoragesgp Containers 🛷 …	
숨 Home	Storage account	
🖾 Dashboard	A Search (Ctrl+/) ≪ + Container Change access level P Rest	tore containers 🗸 🏷 Refresh 🛛 🛅 Delete
All services	Search containers by prefix	
★ FAVORITES	Activity log	
All resources	Vame	Last modified
Cognitive Services	Diagnose and solve problems	3/28/2022, 10:25:41 AM
Resource groups	Access Control (IAM)	
Azure Active Directory	💕 Data migration	
App Services	🗲 Events	
ntion App	Storage browser (preview)	
👼 SQL databases	Data storage	
🬌 Azure Cosmos DB		
Virtual machines	A File shares	

3. In the **Containers** page, select + **Container** and add a new container named **data** with a public access level of **Private (no anonymous access)**.

Microsoft Azure	9	> Search resources, services, and docs (G+/)		E 6 🖓 🎯	@ Arohmvpm365@arohm агоhmvp365.@arohm
«	Home > azstoragesgp_164843430	300883 > azstoragesgp			New container ×
+ Create a resource	😑 azstoragesgp 🛛	Containers 🖉 🖤			
👚 Home	Storage account				Name *
Dashboard	P Search (Ctrl+/)] « Container Change access level 🤊 Restore container	ainers 🗸 🏷 Refresh 🗐 Delete		data 🗸
≡ All services	Overview	Search containers by prefix			S Public access level ①
★ FAVORITES	Activity log				Private (no anonymous access)
All resources	🗳 Tags	Name	Last modified	Public access level	× Advanced
lognitive Services	Diagnose and solve problems	\$logs	3/28/2022, 10:25:41 AM	Private	
Resource groups	Access Control (IAM)				
Azure Active Directory	💕 Data migration				
App Services	Events				
Function App	Storage browser (preview)				
🗧 SQL databases	Data storage				
💐 Azure Cosmos DB	Containers				
Virtual machines	Eile shares				
💠 Load balancers	Queues				
Storage accounts	Tables				
Virtual networks	inductor in the second				
📀 Monitor	Security + networking				
🥎 Advisor	Networking				
Microsoft Defender for Cloud	 Azure CDN 				
	Access keys				
Cost Management + Billing	 Shared access signature 				
Help + support	Encryption				Create Discard
	10 A A				

4. When the **data** container has been created, verify that it's listed in the **Containers** page.

Microsoft Azure	م	Search resources, services	, and docs (G+/)		
«	Home > azstoragesgp_164843430)0883 > azstoragesgp			
+ Create a resource	💻 azstoragesgp 🛛 🔾	ontainers 🖈			
肻 Home	Storage account				
🖾 Dashboard	Search (Ctrl+/)	« + Container	A Change access level 5 Restore containe	ers 🗸 💍 Refresh 🕴 🛍 Delete	
🗮 All services	Cverview	Search containe	rs by prefix		
★ FAVORITES	Activity log				
All resources	🗳 Tags	Name		Last modified	Pu
n Cognitive Services	Diagnose and solve problems	\$logs		3/28/2022, 10:25:41 AM	Pri
Resource groups	Access Control (IAM)	data		3/28/2022, 10:33:49 AM	Pri
line contractive Directory	Data migration				
🎨 App Services	Events				
Function App	Storage browser (preview)				
🧧 SQL databases					
🧭 Azure Cosmos DB	Data storage				
Virtual machines	Containers				
	📫 Filo charac				

5. In the pane on the left side, in the top section, select **Storage browser (preview)**. This page provides a browser-based interface that you can use to work with the data in your storage account.

Microsoft Azure	∠P Search resources, services, and docs (G+/)
	Home > azstoragesgp_1648434300883 > azstoragesgp
+ Create a resource	🗕 azstoragesgp Containers 🖉 …
🟫 Home	Storage account
🖾 Dashboard	P Search (Ctrl+/) ≪ + Container A Change access level ♡ Restore containers ∨ ♡
E All services	Overview Search containers by prefix
★ FAVORITES	Activity log
All resources	♦ Tags
🐟 Cognitive Services	Diagnose and solve problems
Resource groups	Access Control (IAM)
line contractive Directory	
📀 App Services	🗲 Events
🎸 Function App	🔛 Storage browser (preview)
🧧 SQL databases	Data storage
🧭 Azure Cosmos DB	
Virtual machines	File shares

6. In the storage browser page, select **Blob containers** and verify that your **data** container is listed.

Microsoft Azure	∠ Search resources, services, and docs (G+/)
Microsoft Azure	
 Function App SQL databases Azure Cosmos DB Virtual machines Load balancers Storage accounts 	Storage browser (preview) Data storage Containers File shares Queues Queues

7. Select the **data** container, and note that it's empty.

5 51 =	5 51	
azstoragesgp Sto	rage browser (preview)	x ···
	🛅 azstoragesgp	< + Add container Upload 🖒 Refresh 🛛 💼
Overview	🖈 Favorites	Blob containers
Activity log	> 🔅 Recently viewed	Q Search containers by prefix
🗳 Tags	✓ ☐ Blob containers	Showing all 2 items
Diagnose and solve problems	🛅 \$logs	Name
Access Control (IAM)	🔳 data	
💕 Data migration	View all	
🗲 Events	🛋 File shares	✓ data
🔝 Storage browser (preview)	0 Queues	
Data storage	== Tables	
Containers		

8. Select + Add Directory and read the information about folders before creating a new directory named **products**.

Home > azstoragesgp_1648434300883	> azstoragesgp		
azstoragesgp Stora	age browser (preview)	Ŷ	
✓ Search (Ctrl+/) «	🚞 azstoragesgp	<	+ Add Directory TUpload 🔒 Change access level 💍 Refresh
Overview	🔺 Favorites		Blob containers > 🗖 data
Activity log	> 🔅 Recently viewed		Authentication method: Access key (Switch to Azure AD User Account)
Tags	∨ 🗖 Blob containers		☆ Add filter
Diagnose and solve problems	\$logs		Search blobs by prefix (case-sensitive)
Access Control (IAM)	🗖 data		Showing all 0 items
💕 Data migration	View all		Name Last modified Access tier
🗲 Events	🛋 File shares		
Storage browser (preview)	TTT Queues		No items found
D-44	Tablas		

Home > azstoragesgp_1648434300883 > azstoragesgp

Microsoft Azure
Hicrosoft Azure

- 9. In storage explorer, verify that the current view shows the contents of the products folder you just created observe that the "breadcrumbs" at the top of the page reflect the path Blob containers > data > products.
- 10. In the breadcrumbs, select **data** to switch to the **data** container, and note that it does <u>not</u> contain a folder named **products**.

Home > azstoragesgp_164843430088	3 > azstoragesgp				
azstoragesgp Stor	rage browser (previev	V) 🖈			
Search (Ctrl+/) «	📷 azstoragesgp	<	+ Add Directory ↑ U	Ipload 🔒 Change access le	vel 💍 Refresh
Cverview	🖈 Favorites		Blob containers	data	
Activity log	> 🔅 Recently viewed		Authentication method: A	ccess key (Switch to Azure AD)	User Account)
🗳 Tags	✓ 🔳 Blob containers		Add filter		
Diagnose and solve problems	\$logs		Search blobs by prefi	x (case-sensitive)	
Access Control (IAM)	🗖 data		Showing all 0 items		
Data migration	View all		Name	Last modified	Access tier
🗲 Events	📫 File shares				
Storage browser (preview)	III Queues		No items found		
Data storage	Tables				
Containers					
🛋 File shares					
Oueues					

Folders in blob storage are virtual, and only exist as part of the path of a blob. Since the **products** folder contained no blobs, it isn't really there!

11. Use the **T Upload** button to open the **Upload blob** panel.

me > azstoragesgp_164843430088	83 > azstoragesgp			Upload blob
azstoragesgp Sto	orage browser (preview)	Ŷ		3
> Search (Ctrl+/) «	azstoragesgp	<	🕂 Add Directory T Upload 🔒 Change access 🛙	
Overview	Favorites		Blob containers C data	රො
Activity log	> 🌼 Recently viewed		Authentication method: Access key (Switch to Azure AD	Drag and drop files here
Tags	✓		√ Add filter	Browse for files
Diagnose and solve problems	\$logs		Search blobs by prefix (case-sensitive)	
Access Control (IAM)	🗖 data 🔢 🚺		Showing all 0 items	Overwrite if files already exist
Data migration	View all		Name Last modified	4
Events	- File shares			Advanced
Storage browser (preview)	ueues		No items found	Blob type 🕕
ta storage	Tables			Block blob
Containers				Upload .vhd files as page blobs (recommended)
File shares				Block size ①
Queues				4 MiB
Tables				Access tier ()

12. In the **Upload blob** panel, select the **product1.json** file you saved on your local computer previously.

me > azstoragesgp_1648434300883	> azstoragesgp			Upload blob
azstoragesgp Stora	age browser (preview)	Ŷ		3
> Search (Ctrl+/) «	🛅 azstoragesgp	<	🕂 Add Directory Upload 🔒 Change access k	
Overview	🖈 Favorites		Blob containers > data	С Ф
Activity log	> 🔅 Recently viewed		Authentication method: Access key (Switch to Azure AD	Drag and drop files here
Tags	✓ ☐ Blob containers		√ Add filter	4 Browse for files
Diagnose and solve problems	\$logs		Search blobs by prefix (case-sensitive)	
Access Control (IAM)	🗖 data 🛛 🚺		Showing all 0 items	Overwrite if files already exist
Data migration	View all		Name Last modified	
Events	🛋 File shares			∧ Advanced
Storage browser (preview)	0 Queues		No items found	Blob type 🕕
ta storage	Tables			Block blob
Containers				Upload .vhd files as page blobs (recommended)
File shares				Block size ①
Queues				4 MiB
Tables				Access tier ①

🔁 Open						×
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Organize • New	folder				≣ •	□ ?
		Name	Date modified)22 10:04 am	Type Adobe Acrobat D	Size 367 KB	
)22 10:05 am	Adobe Acrobat D	183 KB	
	C)22 10:04 am	Adobe Acrobat D	341 KB	I
	o)22 10:04 am	Adobe Acrobat D	187 KB	
	lc)22 10:05 am	Compressed (zipp	13,110 KB	
~)22 10:04 am	Adobe Acrobat D	14,426 KB	
>	ą 🛛)22 10:05 am	Adobe Acrobat D	199 KB	
>	n)22 10:05 am	Microsoft PowerPo	8,848 KB	
>	er	DP-900T00A-ENU-Virtual_Educator_Prep	24/3/2022 10:05 am	VTT File	63 KB	
> •		1) produts.json	28/3/2022 10:46 am	JSON Source File	1 KB	
Fil	e name: produts.json			 ✓ All fil 	es (*.*)	~
					Open	Cancel

Then in the **Advanced** section, in the **Upload to folder** box, enter **product_data** and select the **Upload** button.

Upload blob		×
	−ı− 1 file(s) selected: produts.ison	
Drag	and drop files here or Browse for files	
Overwrite if files alread	/ avict	
	, chist	
∧ Advanced		
Blob type 🛈		
Block blob		\sim
🔽 Upload .vhd files	as page blobs (recommended)	
Block size 🕕		
4 MiB		\sim
Access tier (1)		
Hot (Inferred)		\sim
Upload to folder	1	
product_data		
Blob index tags ()		
Key	Value	
Encryption scope		
💿 Use existing defa	ault container scope	
🔵 Choose an existi	ng scope	
Retention policy (i)		
No retention		
Choose custom	retention period	

13. Close the **Upload blob** panel if it's still open, and verify that a **product_data** virtual folder has been created in the **data** container.

Storage account	Storage browser (preview	N) 🖈 …
✓ Search (Ctrl+/)	« 📷 azstoragesgp	< 🕂 Add Directory Upload 🔒 Change access level 🕻
 Overview Activity log Tags Diagnose and solve problems Access Control (IAM) Data migration Events 	 ▲ Favorites > ♣ Favorites > ♣ Recently viewed ■ Blob containers Slogs I ata view aii ♣ File shares 	Blob containers I data Authentication method: Access key (Switch to Azure AD User Ac Add filter Search blobs by prefix (case-sensitive) Showing all 1 items Name product_data
Data storage Containers	Tables	
 File shares Queues Tables 		
Security + networking		
Networking Azure CDN		

14. Select the **product_data** folder and verify that it contains the **product1.json** blob you uploaded.

🚞 azstoragesgp 🧹	+ Add Directory ↑ Upload	🔒 Change access level 💍 R	efresh 📗	Delete 🗋 Copy 🛅 Paste	🗐 Clone 🖉
🚖 Favorites	Blob containers >				
> 🎄 Recently viewed	Authentication method: Access key	(Switch to Azure AD User Accou	nt)		
✓ ■ Blob containers	√ Add filter				
\$logs	Search blobs by prefix (case-s	ensitive)			
🔁 data	Showing all 1 items				
View all	Name			Last modified	Access
📫 File shares	product data				
🔟 Queues					
🎫 Tables					
×	azstoragesgp Storage account Storage account Search (Ctrl+/) Overview Activity log Tags Comparison	asstorages browser (previewed) asstoragesgp asstoragesgp asstoragesgp browsed	ew) ☆ … <	Add Directory ↑ Upload ○ Blob containers > data > Authentication method: Access key (5) Search blobs by prefix (case-sense)	Refresh III product_data witch to Azure AD itive)
6	Diagnose and solve problems Access Control (IAM)	slogs		Showing all 1 items	
Cost Management Get notified to stay within your budget and prevent unexpected charges on your bill. Set up cost alerts >	P Data migration Events Storage browser (preview)	View all File shares Cueues		Name	
0	Data storage	Tables			
Microsoft Defender for Cloud Secure your apps and infrastructure Go to Microsoft Defender for Cloud >	Containers File shares Queues Tables				
Start learning today >	Security + networking				
Work with an expert	2 Networking				

15. On the left side, in the **Data storage** section, select **Containers**.

Microsoft Azure		$\mathcal P$ Search resources, services, and docs (G+/)	
~ ~	Home > azstoragesgp_1648434300883	> azstoragesgp	
+ Create a resource	📥 azstoragesgp Con	tainers 🖈 …	
🏫 Home	Storage account		
🖾 Dashboard	✓ Search (Ctrl+/) «	+ Container 🔒 Change access level 🦻 Restore containers	✓ 🕐 Refresh 🛍 Delete
E All services	Overview	Search containers by prefix	
★ FAVORITES	 Activity log 		
All resources	Tags	Name	Last modified
n Cognitive Services	Diagnose and solve problems	\$logs	3/28/2022, 10:25:41 AM
() Resource groups	Access Control (IAM)	data	3/28/2022, 10:33:49 AM
Azure Active Directory	💕 Data migration		
📀 App Services	🗲 Events		
Function App	🛅 Storage browser (preview)		
🗟 SQL databases	Data storage		
🧭 Azure Cosmos DB			
Virtual machines			
🚸 Load balancers	rile snares		

16. Open the **data** container, and verify that the **product_data** folder you created is listed.

Microsoft Azure		\mathcal{P} Search resources, services, and doc
Create a resource Home	Home > azstoragesgp_1648434300883	> azstoragesgp >
Dashboard All services	 Search (Ctrl+/) « Overview 	↑ Upload ▲ Change access level ▲ Nefresh ▲ Authentication method: Access key (Switch to Azure AD Use) ▲ ▲ ▲ ▲
 ★ FAVORITES # All resources Cognitive Services 	Diagnose and solve problems Access Control (IAM) Settings	Location: data Search blobs by prefix (case-sensitive)
 Resource groups Azure Active Directory App Services 	 Shared access tokens Access policy Properties 	Name
 Function App SQL databases Azure Cosmos DB 	 Metadata 	
Virtual machines		

17. Select the ••• icon at the right-end of the folder, and note that it doesn't display any options. Folders in a flat namespace blob container are virtual, and can't be managed.

Container							>	<
	🕈 Upload Change access level 💍 Refresh 🏢	Delete $ ~~ ext{ }$ Change tier $ ~~ { m { }} { m { }} { m { }} { m { Acquire lease }} ~~ { m { }}$	S ^{or} Break lease 🔹 View s	snapshots 🛛 🗐 Create snapsho	ot			
Overview	Authentication method: Access key (Switch to Azure AD User	Account)						
Diagnose and solve problems	Location: data							
Access Control (IAM)	Search blobs by prefix (case-sensitive)				Show de	eleted blobs		
Settings	⁺⊋ Add filter							
Shared access tokens	Name	Modified	Access tier	Archive status	Blob type	Size	Lease state	
Access policy	🔽 📜 product_data							
Properties								
 Metadata 								

18. Use the **X** icon at the top right in the **data** page to close the page and return to the **Containers** page.

Microsoft Azure		\mathcal{P}^{-} Search resources, services, and docs (G+/)				E 5 () © 0 R	arohmvpm365@ar Алонмv9365 (Алонму	rohm 🇿
«	Home > azstoragesgp_1648434300883	azstoragesgp >							
+ Create a resource	💳 data \cdots								×
😭 Home	Container								
2 Dashboard	P Search (Ctrl+/) ≪	🕈 Upload 🔒 Change access level 💍 Refresh 🕴 🗐 Delete	$ ~~ ~~$ Change tier $ ~~ \mathscr{G}~~$ Acquire lease	S ^d Break lease 🔿 View sr	apshots 🛛 Create snapshot				
All services	C Overview	Authentication method: Access key (Switch to Azure AD User Account)							
* FAVORITES	Diagnose and solve problems	Location: data							
All resources	Access Control (IAM)	Search blobs by prefix (case-sensitive)				Show de	leted blobs		
lognitive Services	Settings	*y Add filter							
Resource groups	Ch. Flored successful								
Azure Active Directory	Shared access tokens	Name	Modified	Access tier	Archive status	Blob type	Size	Lease state	
😨 App Services	Access policy	product_data							
Function App	Properties								
SOL databases	Metadata								

Explore Azure Data Lake Storage Gen2

Azure Data Lake Store Gen2 support enables you to use **hierarchical folders to organize** and manage **access to blobs**. It also enables you to use **Azure blob storage** to host **distributed file systems** for common big data analytics platforms.

- Download the product2.json JSON file from https://aka.ms/product2.json and save it on your computer in the same folder where you downloaded product1.json previously - you'll upload it to blob storage later).
- 2. In the Azure portal page for your storage container, on the left side, scroll down to the **Settings** section, and select **Data Lake Gen2 upgrade**.

Microsoft Azure	
Create a resource	Home > azstoragesgp_1648434300883 > azstoragesgp azstoragesgp bata Lake Gen2 upgrade
 Dashboard All services FAVORITES 	 Search (Ctrl+/) Encryption If you're looking to use your storage account for data analytics and big data storage, Data Lake Storage Gen2, which will enable hierarchical namespace on the account. Le
 All resources Cognitive Services Resource groups Azure Active Directory 	Data management Progress may be lost if you leave this page. @ Geo-replication
 App Services Function App SQL databases 	Object replication Object replicatio
 Azure Cosmos DB Virtual machines Load balancers axultaria 	Azure search Settings Configuration
 Storage accounts Virtual networks Monitor Advisor 	 Data Lake Gen2 upgrade Resource sharing (CORS) Advisor recommendations
Microsoft Defender for Cloud	Endpoints

 In the Data Lake Gen2 upgrade page, expand and complete each step to upgrade your storage account to enable hierarchical namespace and support Azure Data Lake Storage Gen
 This may take some time.



Microsoft Azure		$\mathcal P$ Search resources, services, and docs
«	Home > azstoragesgp	
+ Create a resource	📑 azstoragesgp 🛛	Data Lake Gen2 upgrade
숨 Home	Storage account	
🚈 Dashboard	✓ Search (Ctrl+/)	K
≡ All services	📥 Azure CDN	If you're looking to use your storage account for data apalytic
★ FAVORITES	📍 Access keys	Data Lake Storage Gen2, which will enable hierarchical name:
All resources	 Shared access signature 	Progress may be lost if you leave this page.
🐵 Cognitive Services	Encryption	🔿 Star 1. Bruing and all and a large starting
🚺 Resource groups	Security	 Step 1: Neview account changes before upgrading
Azure Active Directory	Data management	\wedge \bigcirc Step 2: Validate account before upgrading - Not s
🎨 App Services		All features that are not supported with Azure Data Lak
🎺 Function App	Geo-replication	of discrepancies (if any) will be available as a blob in a p
🧧 SQL databases	Data protection	Start validation
还 Azure Cosmos DB	Object replication	
Yirtual machines	Blob inventory	Ctep 3: Upgrade account Not started
🚸 Load balancers	🔤 Static website	



4. When the upgrade is complete, in the pane on the left side, in the top section, select **Storage browser (preview)** and navigate back to the root of your **data** blob container, which still contains the **product_data** folder.

Microsoft Azure	${\cal P}$ Search resources, services, and docs (G+/)				
Create a resource Home	Home > azstoragesgp azstoragesgp Stor Storage account	rage browser (preview)	Å		
Dashboard All services FAVORITES All resources	Search (Ctrl+/) « Overview Activity log Tans	azstoragesgp Ar Favorites Bracently viewed Compared to a second seco	<	+ Add Directory ↑ Upload Blob containers > ■ data > Authentication method: Acceased	 C Refresh □ Delete □ Copy □ Paste =□ Clone Ø, product_data y (Switch to house AD User Account)
Cognitive Services Resource groups Azure Active Directory	 ✓ rays Ø Diagnose and solve problems ⁸Access Control (IAM) ● Data migration 	 Blob containers \$logs data View all 		Search blobs by prefix (case Showing all 1 items Name	sensitive) Last modifie
 App Services Function App SQL databases 	Events Storage browser (preview) Data storage	- File shares III Queues IIII Tables		produts.json	3/28/2022, 1
 Azure Cosmos DB Virtual machines Load balancers 	Containers				

- 5. Select the **product_data** folder, and verify it still contains the **product1.json** file you uploaded previously.
- 6. Use the **T Upload** button to open the **Upload blob** panel.

∠ Search resource	es, services, and docs (G+/)	드 🐺 다 🛞 🕐 📈 arohmvpm365
age browser (preview)	4	Upload blob
axstoragesgp Ar Favorites	 Add Directory ↑ Upload ○ Refresh □ Delete □ Copy □ Paste □ Clone Ø Acquire Blob containers > □ data > □ product_data Authentication method: Access key (Switch to Azure AD User Account) Ø Search blobs by prefix (case-sensitive) Search blobs by prefix (case-sensitive) Search blobs by prefix (case-sensitive) 	1 file(s) selected: products2.json Drag and drop files here or Browse for files
 ☐ data ✓ View all 	Image: Sinorming and Less modified Image: Sinorming and the sinorming and Less modified	Overwrite if files already exist Advanced Upload

- 7. In the **Upload blob** panel, select the **product2.json** file you saved on your local computer. Then select the **Upload** button.
- 8. Close the **Upload blob** panel if it's still open, and verify that a **product_data** folder now contains the **product2.json** file.

🚬 azstoragesgp	<	+ Add Directory Upload 🖒	Refresh 🗍 🗍 Delete 🗍	🖹 Copy 🛅 Paste 🛋	Clone 🖋 Acquire lease	ø [⊄] Break lease 🚦	Edit columns		
🐋 Favorites		🗖 Blob containers 🗦 🗖 data 🗦 📒	product_data						
> 🔅 Recently viewed		Authentication method: Access key (Sw	vitch to Azure AD User Accou	nt)					
Blob containers		Search blobs by prefix (case-sense)	tive)					Only show	active blobs
🗂 \$logs		Showing all 2 items							
🔁 data		Name			Last modified	Access tier	Blob type	Size	Lease state
View all		— []							
🛋 File shares		products2.json			3/28/2022, 1:03:00 PM	Hot (Inferred)	Block blob	255 B	Available
🔟 Queues		D produts.json			3/28/2022, 10:51:16 AM	Hot (Inferred)	Block blob	248 B	Available
📰 Tables									

9. On the left side, in the Data storage section, select Containers.

10. Open the **data** container, and verify that the **product_data** folder you created is listed.

Microsoft Azure		$\mathcal P$ $$ Search resources, services, and docs (G+/) $$
Wilcrosoft Azure	Home > azstoragesgp > Container Search (Ctrl+/) « Search (Ctrl+/) « Overview Diagnose and solve problems A Access Control (IAM) Settings Shared access tokens	✓ Search resources, services, and docs (s+r) ✓ Upload + Add Directory C Refresh C Rename Delete Authentication method: Access key (Switch to Azure AD User Account) Location: data / product_data Search blobs by prefix (case-sensitive) Name []
 Azure Active Directory App Services Function App SQL databases Azure Cosmos DB Virtual machines 	Anage ACL Access policy Properties Metadata	products2;son products;son

11. Select the ••• icon at the right-end of the folder, and note that with hierarchical namespace enabled, you can perform configuration tasks at the folder-level; including renaming folders and setting permissions.

search blobs by prefix (case-sensitive)				Show deleted objects		
Name	Modified	Access tier	Archive status	Blob type	Size	Lease state
i]						
📄 products2.json	3/28/2022, 1:03:00 PM	Hot (Inferred)		Block blob	255 B	Alternatio
Produtsjaon	3/28/2022, 10:51:16 AM	Hot (Inferred)		Block blob	248 B	View/edit
						Download
						Converte SAS
						Ro Manage ACI
						→ Channage ACE
						Change tier
						Acquire lease
12. Use the **X** icon at the top right in the **data** page to close the page and return to the **Containers** page.

Explore Azure Files

Azure Files provides a way to create cloud-based file shares.

1. In the Azure portal page for your storage container, on the left side, in the **Data storage** section, select **File shares**.



- 2. In the File shares page, select + File share and add a new file share named files using the Transaction optimized tier.
- 3. In the File shares, open your new files share.

	New file share	×
	Name *	
	Thes	<u> </u>
	Tier () Transaction optimized	\sim
_	Performance Maximum IO/s ① 1000	
	Egress Rate 🛈 60 MiB / s	
	Ingress Rate ① 60 MiB / s	
	Maximum capacity 5 TiB	
	Large file shares Disabled	
	You can improve performance and maximum share capacity by enabling large file share this storage account. <u>Learn more</u>	s for
	To use the SMB protocol with this share, check if you can communicate over port 445. T scripts for <u>Windows clients</u> and <u>Linux clients</u> can help. Learn how to <u>circumvent port 44</u> ; <u>issues.</u>	'hese 5
	Create	

4. Click on Files



5. At the top of the page, select **Connect**. Then in the **Connect** pane, note that there are tabs for common operating systems (Windows, Linux, and macOS) that contain scripts you can run to connect to the shared folder from a client computer.



Port 445

6. Close the **Connect** pane and then close the **files** page to return to the **File shares** page for your Azure storage account.

Explore Azure Tables

Azure Tables provide a key/value store for applications that need to store data values, but don't need the full functionality and structure of a relational database.

1. In the Azure portal page for your storage container, on the left side, in the **Data storage** section, select **Tables**.



2. On the **Tables** page, select **+ Table** and create a new table named **products**.



3. After the **products** table has been created, in the pane on the left side, in the top section, select **Storage browser (preview)**.

Tables
Security + netwo
Retworking
Azure CDN

Access keys
 Shared access s
 Encryption
 Security
Data management
 Geo-replication
 Data protection
 Object replicati
 Blob inventory

Micro Close 4. In storage explorer, select **Tables** and verify that the **products** table is listed.



- 5. Select the **products** table.
- 6. In the **product** page, select **+** Add entity.



- 7. In the Add entity panel, enter the following key values:
 - PartitionKey: 1
 - **RowKey**: 1
- 8. Select Add property, and create a new property with the following values:

Property name	Туре
Name	String
Add a second property with the follow	ing values:
Property name	Туре
Price	Double
	Property name Name Add a second property with the follow Property name Price

10. Select **Insert** to insert a row for the new entity into the table.

Home > azstoragesgp azstoragesgp Sto	rage browser (preview)	A	Add entity		×
P Search (Ctrl+/) «	📷 azstoragesgp	< + Add entity D Refresh 🛛 🗊 Delete 🖽 Edit columns	Property Name	Type Value	
Cverview	🖈 Favorites	Tables > D products	PartitionKey	String V 1	0
Activity log	> 🎄 Recently viewed	Authentication method: Access key (Switch to Azure AD User Accou			
🔷 Tags	Blob containers	Query builder	RowKey	string V 1	0
Diagnose and solve problems	📫 File shares	The query builder supports simple queries with AND/OR. For features	Name	String V Enter value to keep property	1
Access Control (IAM)	1 Queues	⇒ Switch to advanced text editor	Price	Double V Enter value to keep property	A =
💕 Data migration	V 🔤 Tables	V Add filter		ever lease to well higher (6
🗲 Events	m products		Add property		
Storage browser (preview)	View all	Showing all 0 items			
Data storage		PartitionKey RowKey			
Containers		No items found			
🛋 File shares					
🔲 Queues					
Tables					
Security + networking					
🧟 Networking					
📥 Azure CDN					
📍 Access keys					
Shared access signature					
Encryption					
Security					
Data management					
Geo-replication					
💎 Data protection					
Object replication			lacert Cancel		
Blob inventory			Cancel		

11. In storage browser, verify that a row has been added to the **products** table, and that a **Timestamp** column has been created to indicate when the row was last modified.

browser (preview)	\$	2			
 azstoragesgp Favorites Recently viewed Blob containers File shares Queues Tables 	← Add d Tables Authentica Query buil The query → Switch ✓ Add	entity C Refresh > products ition method: Access der builder supports sim to advanced text ec filter	Delete Delete Edit	t columns User Account) For features like grouping and other advanced setting:	s, use the ac
View all	Showing al	l 1 items PartitionKey 1	RowKey 1	Timestamp 2022-03-28T05:17:14.18 ····	

12. Add another entity to the **products** table with the following properties:

Property name	Туре
PartitionKey	String
RowKey	String

Property name	Туре
Name	String
Price	Double
Discontinued	Boolean

13. After inserting the new entity, verify that a row containing the discontinued product is shown in the table.

			Ααα enuty			Х
je browser (preview)	\$P					
📔 azstoragesgp	<	+ Add entity 🕐 Refresh 📋 Delete 🖽 Edit columns	Property Name	Туре	Value	
📺 Favorites		Tables > Comproducts	PartitionKey	String 🗸 🗸	Enter identifier value	1
Recently viewed Rich container:		Authentication method: Access key (Switch to Azure AD User Accour	RowKey	String \checkmark	Enter identifier value	1
File shares		Query builder The query builder supports simple queries with AND/OR. For features	Name	String \lor	Enter value to keep property	2 🗊
🔲 Queues		$\overrightarrow{\leftarrow}$ Switch to advanced text editor	Price	Double \lor	Enter value to keep property	2 🛍
Tables Improducts			Discontinued	Boolean \lor	Enter value to keep property	2 1
View att		Showing all 1 items PartitionKey RowKey 1 1	Add property			
			Insert			

14.

You have manually entered data into the table using the storage browser interface. In a real scenario, application developers can use the Azure Storage Table API to build applications that read and write values to tables, making it a cost effective and scalable solution for NoSQL storage.

Exercise: Explore Azure Cosmos DB

https://docs.microsoft.com/en-gb/learn/modules/explore-non-relational-data-stores-azure/4exercise-explore-cosmos-db#create-a-cosmos-db-account

Create a Cosmos DB account

To use Cosmos DB, you must provision a Cosmos DB account in your Azure subscription. In this exercise, you'll provision a Cosmos DB account that uses the core (SQL) API.

1. In the Azure portal, select + Create a resource at the top left, and search for Azure Cosmos DB. In the results, select Azure Cosmos DB and select Create.

Microsoft Azure	℅ Search resources, services, and docs (G+/)
«	Home > Create a resource >
+ Create a resource	Azure Cosmos DB 🖈 ···
肻 Home	Microsoft
📶 Dashboard	
E All services	Azure Cosmos DB 🗢 Add to Favorites
★ FAVORITES	Microsoft
All resources	🛪 3.6 (668 Azure ratings)
n Cognitive Services	Plan
() Resource groups	
🚸 Azure Active Directory	
🔅 App Services	Overview Plans Usage Information + Support Reviews
🍜 Function App	Anura Cormer DR is a fully managed plobally-distributed beginnetally estable in storage and throughout multi-model database regine backed up by comprehensive SI Ar
👼 SQL databases	Azure Cosmos DB is a half manager, globally difficult of the strategy and introduced and a strategy and the
🧭 Azure Cosmos DB	regions by transparently scaling and replicating your data wherever your users are. You can elastically scale throughput and storage wondwide and pay only for the throughput and storage you need. Cosmos DB guarantees single-digit millisecond latencies at the 99th percentile anywhere in the world, offers multiple well-defined
못 Virtual machines	consistency models to fine-tune for performance and guaranteed high availability with multi-homing capabilities – all backed by industry leading service level agreements (SLAs),
💠 Load balancers	Cosmos DB is truly schema-agnostic – it automatically indexes all the data without requiring you to deal with schema and index management. Cosmos DB is multi-model – it
Storage accounts	natively supports document, key-value, graph and columnar data models. With Cosmos DB, you can access your data using the APIs of your choice. Cosmos DB is a fully managed, enterprise ready and trustworthy service. All your data is fully and transparently encrypted and secure by default. Cosmos DB is ISO, FedRAMP, EU, HIPAA, and PCI
Virtual networks	compliant as well.
🕙 Monitor	Media
🧔 Advisor	Image: Section Sectio
Microsoft Defender for Cloud	
Ost Management + Billing	The second secon

2. In the Core (SQL) - Recommended tile, select Create.

Microsoft Azure	ළ Sea	rch resources, services, and docs (G+/)	
«	Home > Create a resource > Azure Cosmos DB >		
+ Create a resource	Select API option		
👚 Home	· · · ·		
🔤 Dashboard	Which API best suits your workload?		
🗮 All services	Azure Cosmos DB is a fully managed NoSQL database service for building s	scalable, high performance applications. Learn more	
* FAVORITES	To start, select the API to create a new account. The API selection cannot be	e changed after account creation.	
All resources			
🐟 Cognitive Services	Core (SQL) - Recommended	Azure Cosmos DB API for MongoDB	Cassandra
😥 Resource groups	Azure Cosmos DB's core, or native API for working with documents. Supports fast, flexible development with familiar	Fully managed database service for apps written for MongoDB. Recommended if you have existing MongoDB	Fully managed Cassandra database service for apps written for Apache Cassandra. Recommended if you have existing
Azure Active Directory	SQL query language and client libraries for .NET, JavaScript, Python, and Java.	workloads that you plan to migrate to Azure Cosmos DB.	Cassandra workloads that you plan to migrate to Azure Cosmos DB.
📀 App Services			
Function App	Create .earn more	Create Learn more	Create Learn more
👼 SQL databases			
还 Azure Cosmos DB	Anure Table	Cremlin (Crenh)	
捏 Virtual machines	AZURE TABLE	Gremlin (Graph)	
💠 Load balancers	Table storage. Recommended if you have existing Azure Table	query language, based on Apache TinkerPop project.	
Storage accounts	DB, but do not want to re-write your application to use the	relationships between data.	
♦ Virtual networks	SQL API.		
🔗 Monitor	Create Learn more	Create Learn more	
🏟 Advisor			
Microsoft Defender for Cloud			

- 3. Enter the following details, and then select **Review + Create**:
 - **Subscription**: If you're using a sandbox, select *Concierge Subscription*. Otherwise, select your Azure subscription.
 - **Resource group**: If you're using a sandbox, select the existing resource group (which will have a name like *learn-xxxx*...). Otherwise, create a new resource group with a name of your choice.
 - Account Name: Enter a unique name
 - **Location**: Choose any available location

- **Capacity mode**: Provisioned throughput
- Apply Free-Tier Discount: Select Apply if available
- Limit total account throughput: Unselected
- 4. When the configuration has been validated, select **Create**.
- 5. Wait for deployment to complete. Then go to the deployed resource.

Microsoft Azure					
«	Home > Create a resource > Azure C	Home > Create a resource > Azure Cosmos DB > Select API option >			
- Create a resource	Create Azure Cosmos	Create Azure Cosmos DB Account - Core (SQL)			
🏫 Home					
🕮 Dashboard					
🗮 All services	Basics Global Distribution Net	tworking Backup Policy Encryption Tags Review + create			
★ FAVORITES	Azure Cosmos DB is a fully managed No	oSQL database service for building scalable, high performance applications. Try it for free, for 30 days with unlimited renewals. Go to production starting at \$24/month per data			
All resources	Project Details				
🐟 Cognitive Services	Select the subscription to manage deplo	oyed resources and costs. Use resource groups like folders to organize and manage all your resources.			
Resource groups	Subscription *	Manual Anna Canadala			
Azure Active Directory	Subscription *	Microsoft Azure sponsorship			
🔕 App Services	Resource Group *	DP900rg Create new			
nterion App					
👼 SQL databases	Instance Details				
还 Azure Cosmos DB	Account Name *	azcosmosdbsgp			
못 Virtual machines	Location *	(US) West US			
💠 Load balancers	Capacity mode ①	Provisioned throughput O Serverless			
Storage accounts		Learn more about capacity mode			
Virtual networks	With Azure Cosmos DB free tier, you wil	Il get the first 1000 RU/s and 25 GB of storage for free in an account. You can enable free tier on up to one account per subscription. Estimated \$64/month discount per account			
🔭 Monitor	Apply Free Tier Discount	Apply O Do Not Apply			
🤿 Advisor	limit total account throughout	Limit the total amount of throughout that can be provisioned on this account			
Microsoft Defender for Cloud	enne otal account anoughput	1 This limit will prevent unexpected charges related to provisioned throughput. You can update or remove this limit after your account is created.			
Oost Management + Billing					
Help + support					
	Review + create Pres	vious Next: Global Distribution			

Microsoft Azure		β Search resources, services and docs (G+/)			
«	Home > Create a resource > Azure (Cosmon DR > Select API ontion >			
- Create a resource	Create Azure Cosmos	Create Azura Cosmos DR Account - Core (SOL)			
숨 Home	create Azure cosmos	DD Account - core (SQL)			
🕮 Dashboard					
🗮 All services	Basics Global Distribution Ne	tworking Backup Policy Encryption Tags Review + create			
★ FAVORITES	Azure Cosmos DB is a fully managed N	oSQL database service for building scalable, high performance applications. Try it for free, for 30 days with unlimited renewals. Go to production starting at \$24/month per data			
All resources	Designt Dataile				
🐟 Cognitive Services	Select the subscription to manage depl	loved resources and costs. Use resource groups like folders to organize and manage all your resources.			
Resource groups					
🚸 Azure Active Directory	Subscription *	Microsoft Azure Sponsorship			
📀 App Services	Resource Group *	DP900rg			
ntion App		Under men			
👼 SQL databases	Instance Details				
🬌 Azure Cosmos DB	Account Name *	azcosmosdbsgp			
👤 Virtual machines	Location *	(US) West US			
💠 Load balancers	Capacity mode ①	Provisioned throughput O Serverless			
Storage accounts		Learn more about capacity mode			
↔ Virtual networks	With Azure Cosmos DB free tier, you wi	ill get the first 1000 RU/s and 25 GB of storage for free in an account. You can enable free tier on up to one account per subscription. Estimated \$64/month discount per account			
😁 Monitor	Apply Free Tier Discount	Appl Do Not Apply			
🔷 Advisor	Limit total account throughput	Limit the total amount of throughout that can be provisioned on this account			
Microsoft Defender for Cloud		This limit will prevent unexpected charges related to provisioned throughput. You can update or remove this limit after your account is created.			
💿 Cost Management + Billing					
A Help + support					
	Review + create Pre	evious Next: Global Distribution			

Create a sample database

1. On the page for your new Cosmos DB account, in the pane n the left, select **Data Explorer**.

Home > Microsoft.Azure.Cosmos	DB-20	0220328185440 > azcosmo	sdbsgp		
Azure Cosmos DB account	D	ata Explorer 🦷			
	~~	📘 New Container 🗸	这 Enable Azure Synapse Link	🗐 New Notebook 🗸 🔘 Connec	t to GitHub
🧑 Overview		SQL API	<u> </u>	1	
Activity log		▼ DATA			Welcome to (
Access control (IAM)					
🧳 Tags		Notebooks is currently not	available. We are working on it.		Globally distributed, multi-model d
Diagnose and solve problems					
💿 Cost Management					
👛 Quick start					+ Start with Sample
Notifications					Get started with a sample provided by
🕅 Data Explorer					Cosmos DB
Settings					
🚔 Features				Common Tasks	Pecents
Replicate data globally				Common Tasks	Recents
Default consistency				New Database	
ackup & Restore					
😚 Firewall and virtual networks					

2. In the **Data Explorer** page, select **Start with Sample** and then observe the status in the panel at the bottom of the screen until the **SampleDB** database and the sample **Persons** container has been created (which may take a minute or so).



3. Select **Close** on the notification message.

Microsoft Azure		PS	earch resources, services, and docs	i (G+/)			© ⑦ 🖓 arohmvpm:	365@arohm аконмурз65
«	Home > azcosmosdbsgp							
+ Create a resource	A azcosmosdbsgp	Data Explorer						×
🛉 Home	Azure Cosmos DB account							
Dashboard	Search (Ctrl+/)	« New Container V	😒 Enable Azure Synapse Link	🗒 New Notebook 🧹 🔘 Connect t	o GitHub			0 🖬 😳
All services	🗶 Overview	SQL API	0 <					
* FAVORITES	Activity log	▼ DATA			Welcome to	Cosmos DR		
All resources	Access control (IAM)	SampleDB			welcome to	COSITIOS DD		
Cognitive Services	Tags	▼ NOTEBOOKS			Globally distributed, multi-mode	el database service for any scale		
Resource groups	Diagnose and solve problems	Notebooks is currently not	available. We are working on it.		,,			
Azure Active Directory	Cost Management							
😨 App Services	📣 Quick start				+ Start with Sample	New Container		
Function App	Notifications				Get started with a sample provided by	Create a new container for storage	and	
🧧 SQL databases	Data Explorer				Cosmas D8	throughput		
🢐 Azure Cosmos DB	Settings							
Yirtual machines	Features							
Load balancers	Replicate data globally			Common Tasks	Recents		Tips	
Storage accounts	Default consistency			New Database			Data Modeling	
Virtual networks	Backup & Restore						Cean more account opening	
Monitor	Firewall and virtual networks						Learn more about cost calculation	
Advisor	Private Endpoint Connections						Configure automatic failover	
Microsoft Defender for Cloud	S CORS						Ceam more about Cosmos De rign-avarability	
O Cost Management + Billing	📯 Dedicated Gateway						See more Cosmos DB documentation	
Help + support	🕈 Keys							
	Advisor Recommendations							
	Ø Microsoft Defender for Cloud							
	🐁 Identity							
	🔒 Locks							
	Integrations							
	Power BI							
		• QO 00 QO						^ •

View and create items

1. In the Data Explorer page, expand the **SampleDB** database and the Persons container, and select **Items** to see a list of items in the container. The items represent people, each with a unique id, a firstname, an age, and other properties.

2. Select any of the items in the list to see a JSON representation of the item data.



3. At the top of the page, select New Item to create a new blank item.

Microsoft Azure	${\cal P}$. Search resources, services, an	d docs (G+/)
Create a resource	Home > azcosmosdbsgp azcosmosdbsgp Data Explorer Azure Cosmos DB account	2
🖾 Dashboard	P Search (Ctrl+/) ≪ □ ⊗ □ ~ ○	🗱 🗸 📄 🗋 New Item 🗍 Upload Item
★ FAVORITES	SQL API	Items × Scale & Settin
All resources	Access control (IAM) ▼ I SampleDB	SELECT * FROM c Edit Filter
🐟 Cognitive Services	Tags	id /firstnar
Resource groups	Diagnose and solve problems Items	
Azure Active Directory	Cost Management Stored Procedures	Load more
🧔 App Services	Quick start	
🎸 Function App	Notifications Triggers	
👼 SQL databases	Data Explorer NOTEBOOKS	
还 Azure Cosmos DB	Notebooks is currently not available. We are working on i	t,
🝷 Virtual machines	Features	
💠 Load balancers	Replicate data globally	
Storage accounts	Default consistency	
Virtual networks	Backup & Restore	
🔭 Monitor	General and virtual networks	
🤿 Advisor	Private Endpoint Connections	
Microsoft Defender for Cloud	S CORS	
Oost Management + Billing	📯 Dedicated Gateway	
A Help + support	📍 Keys	

4. Modify the JSON for the new item as follows, and then select Save.

JSONCopy

```
{
```

```
"id": "123",
```

"firstname": "Bob",

"age": 54

}

5. After **saving** the new item, notice that additional metadata properties are added automatically.

New Item 🗟 Save 🤈 Discard 🛧 Upload Item	
× Scale & Settin	
c Edit Filter	1 "id": "123", "firstname": "Bob", "age": 54

Query the database

1. In the Data Explorer page, select the New SQL Query icon.



2. In the SQL Query editor, review the default query (SELECT * FROM c) and use the **Execute Query** button to run it.

- 3. Review the results, which includes the full JSON representation of all items.
- 4. Modify the query as follows:

SQLCopy

SELECT c.id, c.firstname, c.age

FROM c

WHERE c.age > 40



5. Use the **Execute Query** button to run the revised query and review the results, which includes JSON containing the id, firstname, and age fields for person items with an age greater than 40.

Microsoft Azure	, P Search resources, services, and docs (G+/)
+ Create a resource	e azesmesdean Deta Evalorer
合 Home	
🔤 Dashboard	🔎 Search (Ctrl+A) 🦿 👘 👘 👘 👘 👘 👘 👘 🖓 🖉 👘 🖓 🖉 Seventie Query 🗮 Seventie Query
🗮 All services	
* FAVORITES	SQL API O C Query 1 ×
All resources	DATA SELECT c.id, c.firstname, c. ge
new Cognitive Services	Access conduct (out) Access conduct (out) Meere c.age > 48
Resource groups	Togs Togs
Azure Active Directory	Cast Management Scale & Settings
App Services	Cost management Stored Procedures
Function App	User Defined Functions
SQL databases	
🤕 Azure Cosmos DB	Notebooks is currently not available. We are working on it.
Virtual machines	Settings
-	🚔 Features
Storage accounts	Replicate data globally
Virtual networks	Default consistency
🕙 Monitor	Backup & Results Query Stats
Advisor	Firewall and virtual networks
Microsoft Defender for	A Private Endpoint Connections
Cloud	S CORS
💿 Cost Management + Billing	♀ Dedicated Gateway "firstname": "Bob",
Help + support	Y Keys
	Advisor Recommendations
	Microsoft Defender for Cloud
	% Identity
	A Locks

6. Close the SQL Query editor, discarding your changes.

You've seen how to create and query JSON entities in a Cosmos DB database by using the data explorer interface in the Azure portal.

In **a real scenario**, an application developer would use one of the many programming language specific software development kits (SDKs) to call the core (SQL) API and work with data in the database.

Exercise: Explore Azure Synapse Analytics

https://docs.microsoft.com/en-gb/learn/modules/examine-components-of-modern-datawarehouse/5-exercise-azure-synapse#provision-an-azure-synapse-analytics-workspace

In this exercise, you'll create an **Azure Synapse Analytics workspace** and use it to **ingest** and **analyze** some data.

The exercise is designed to **familiarize you with some key elements of a modern data warehousing solution**, not as a comprehensive guide to performing advanced data analysis with Azure Synapse Analytics. The exercise should take around 30 minutes to complete.

Provision an Azure Synapse Analytics workspace

To use Azure Synapse Analytics, you must provision an Azure Synapse Analytics Workspace resource in your Azure subscription.

1. Open the Azure portal at <u>https://portal.azure.com</u>, and sign in using the credentials associated with your Azure subscription.

Тір

Ensure you are working in the directory containing your subscription - indicated at the top right under your user ID. If not, select the user icon and switch directory. Note that if you previously used a Microsoft Learn sandbox subscription, the portal may have defaulted to the *Microsoft Learn Sandbox* directory. If so, you'll need to switch to your own directory.

2. In the Azure portal, on the **Home** page, use the **+ Create a resource** icon to create a new resource.



- 3. Search for *Azure Synapse Analytics*, and create a new **Azure Synapse Analytics** resource with the following settings:
 - Subscription: Your Azure subscription
 - Resource group: Create a new resource group with a suitable name, like "synapse-rg"
 - Managed resource group: Enter an appropriate name, for example "synapse-managed-rg".
 - **Workspace name**: Enter a unique workspace name, for example "synapse-ws-<your_name>".

- **Region**: Select any of the following regions:
 - Australia East
 - Central US
 - East US 2
 - North Europe
 - South Central US
 - Southeast Asia
 - UK South
 - West Europe
 - West US
 - WestUS 2
- Select Data Lake Storage Gen 2: From subscription
 - Account name: Create a new account with a unique name, for example "datalake<your_name>".
 - File system name: Create a new file system with a unique name, for example "fs<your_name>".

Note

A Synapse Analytics workspace requires two resource groups in your Azure subscription; one for resources you explicitly create, and another for managed resources used by the service. It also requires a Data Lake storage account in which to store data, scripts, and other artifacts.

4. When you've entered these details, select **Review + create**, and then select **Create** to create the workspace.

Home > Create a resource > Azure Synapse Analytics >

Create Synapse workspace

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all of your resources.

Subscription * ①	Microsoft Azure Sponsorship		\sim
	The Synapse and SQL resource pro subscription.	widers are now registered with this	
Resource group * ①	DP900rg Create new		\sim
Managed resource group ①	synapse-managed-rg		\checkmark

Workspace details

Name your workspace, select a location, and choose a primary Data Lake Storage Gen2 file system to serve as the default location for logs and job output. .

Workspace name *	synapse-ws-aroh	~
Region *	East US	~
Select Data Lake Storage Gen2 * ①	• From subscription O Manually via URL	
Account name * ①	azstoragesgp Create new	\checkmark
File system name *	(New) fsaroh Create new Assign myself the Storage Blob Data Contributor Storage Gen2 account to interactively query it in t	role on the Data Lake the workspace.
	 We will automatically grant the workspace identity specified Data Lake Storage Gen2 account, using th <u>Contributor</u> role. To enable other users to use this s create your workspace, perform these tasks: Assign other users to the Contributor role Assign other users the appropriate <u>Synapse</u> Studio 	data access to the le <u>Storage Blob Data</u> :torage account after you on workspace <u>:RBAC roles</u> using Synapse
Review + create < Previ	ous Next: Security >	

5. Wait for the workspace to be created - this may take five minutes or so.



6. When deployment is complete, go to the resource group that was created and notice that it contains your **Synapse Analytics workspace** and a **Data Lake storage account**.

Microsoft Azure		
«	K Home >	
Create a resource	Microsoft.Azure.SynapseAnalytics-20220328211206 Overview	\$ ² ····
Thome	Deployment	
Dashboard	Search (Ctrl+/) Cancel 🚹 Redeploy 🖒 Refresh	
Ξ All services	A Overview Ø We'd love your feedback! →	
★ FAVORITES	📮 Inputs	
All resources	🗉 Outputs 🥑 Your deployment is complete	
🐟 Cognitive Services	Template Deployment name: Microsoft.Azure.SynapseAnalytics-20220328211	Start time: 3/28/2022. 9:41:25 PM
Resource groups	Subscription: Microsoft Azure Sponsorship	Correlation ID: 5cf71ace-fc6a-42be-ac7f-57b7b5d64a7a
🚸 Azure Active Directory	Resource group. Dresong	
🎨 App Services	 Deployment details (Download) 	
🦑 Function App	∧ Next steps	
🔞 SQL databases	Go to resource group	
🨻 Azure Cosmos DB		
못 Virtual machines		
💠 Load balancers		
Storage accounts		
Virtual networks		
🔭 Monitor		
🔷 Advisor		
Microsoft Defender for Cloud		
Oost Management + Billing		
A Help + support		

 Select your Synapse workspace, and in its Overview page, in Open Synapse Studio card, select Open to open Synapse Studio in a new browser tab. Synapse Studio is a web-based interface that you can use to work with your Synapse Analytics workspace.

Home > Microsoft.Azure.SynapseAnalytic	s-20220328211206 > DP900rg >		
Synapse -ws-aroh			
P Search (Ctrl+/)	+ New dedicated SQL pool + New Apache Spark pool + Ne	w Data Explorer pool (preview) 💍 Refresh 🖉 Reset SQL ad	min password 🛛 📋 Delete
🔕 Overview 🔷 🔺	↑ Essentials		
 Activity log 	Resource group (move) : DP900rg	3	Networking : Show firewall settings
Access control (IAM)	Status : Succeeded	-	Primary ADLS Gen2 acco : https://azstoragesgp.dfs.core.windows.net
Tags	Location : East US		Primary ADLS Gen2 file s : fsaroh
Diagnose and solve problems	Subscription (move) : Microsoft Azure Sponsorship		SQL admin username : sqladminuser
,,	Subscription ID : c76bf684-ce47-483d-b01d-d7dae99567f	7	SQL Active Directory ad : arohmvpm365@arohmvp365.onmicrosoft.com
Settings	Managed virtual network : No		Dedicated SQL endpoint : synapse-ws-aroh.sql.azuresynapse.net
Azure Active Directory	Managed Identity object : 472e3e89-3058-48a4-b411-da950c2af94	a	Serverless SQL endpoint : synapse-ws-aroh-ondemand.sql.azuresynapse.net
III Properties	Workspace web URL : <u>https://web.azuresynapse.net?workspace</u>	=%2fsubscriptions%2fc76bf684-ce47-483d-b01d	Development endpoint : https://synapse-ws-aroh.dev.azuresynapse.net
A Locks	Tags (<u>edit</u>) : <u>Click here to add tags</u>		
Analytics pools	Getting started		
SQL pools	Open Synapse Studio Start building your fully-integrated analytics solution and unlock new Exp	ad documentation am how to be productive quickly. Jore concepts, tutorials, and	
Data Explorer pools (preview) Security	Open G ² 5	nples. am more B	
Encryption			
Networking	Analytics pools		
💲 Identity	Search to filter items		
Private endpoint connections	Name	Туре	Size
Approved Azure AD tenants	SQL pools		
Azure SQL Auditing	📸 Built-in	Serverless	Auto
Ø Microsoft Defender for Cloud	Apache Spark pools		
Monitoring	No pools provisioned		
Alerts	Data Explorer pools		

8. On the left side of Synapse Studio, use the >> icon to expand the menu - this reveals the different pages within Synapse Studio that you'll use to manage resources and perform data analytics tasks, as shown here:



Microsoft Azure	synapse-ws-aroh	𝒫 Search
	≪ 😒 Synapse live ∨ 🖌 Validate all	↑ Publish all
合 Home	Data + × «	
📄 Data	Workspace Linked	
Develop	 ✓ Filter resources by name ▲ Azure Data Lake Storage Gen2 2]
) Integrate	synapse-ws-aroh (Primary - azstora	
Monitor	➡ fsaroh (Primary)➡ data	
🗮 Manage	▲	

Microsoft Azure synapse-ws-	aroh	✓ Search
«	🔕 Synapse live 🗸 🗸	Validate all 📋 Publish all
1 Home	Develop	+ * «
Data	∇ Filter resources by name	🗕 🖳 SQL script
		🖉 KQL script
Develop		Notebook
) Integrate		😚 Data flow
		🔀 Apache Spark job definition
Monitor		🕞 Browse gallery
Manage		← Import

Keyword Query Language (KQL) syntax reference

Keyword Query Language (KQL) syntax reference | Microsoft Docs

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$\leftarrow \ \ \rightarrow \ \ G$	https://web.azuresynapse.net/en/home?workspace=%2Fsubscriptions%2Fc76bf684-ce47-483d-b01d-d7dae99567	F7%2FresourceGroups A 🏠 🚺 🖉 <table-cell> 🔤</table-cell>
Microsoft Azure	synapse-ws-aroh	🕄 🕄 🗘 🚳 ? 🖓 arohmvpm365@a
• We use optional	cookies to provide a better experience. Learn more 🖸	Accept Reject
A Home	Synapse Analytics workspace	
📕 Data	synapse-ws-aroh	
Develop	New \vee	
) Integrate		
(9) Monitor		
🔄 Manage	Ingest Explore and analyze 🖸	Visualize
L	Perform a one-time or scheduled data load.	Build interactive reports with Power BI capabilities.



Microsoft Azure synapse-ws-	aroh				
«	«	Pipeline runs			
HomeData	Analytics pools	Triggered Debug ₽ Rerun ▼ Filter by run ID or name	Cancel ✓ Č Re Kuala Lumpur, Singa :	efresh =	
Develop	🖸 Data Explorer pools (preview	Runs : Latest runs Triggere	ed by : All 🛛 🏹 Add fi	lter	
 Integrate Monitor Manage 	Activities Image: SQL requests Image: SQL requests </th <th>Showing 0 - 0 items Pipeline name</th> <th>Run start ↑↓</th> <th>R</th> <th></th>	Showing 0 - 0 items Pipeline name	Run start ↑↓	R	
Microsoft Azure synapse-ws-arch			if:	you expect	i arohmvpm365@arohn
« (3)	Synapse live 🗸 🖌 Validate all 🖄	Publish all		ω : <u>Λ</u>	
Home Data Develop	QL pools packe Spark pools	ss SQL pool, Built-in, is immediately available for	your workspace. Dedicated SQL po	ols can be configured to ada	pt to team or organizational re
Monitor	hat Explorer pools (pre	y name 1 of 1 items (1 Serverless, 0 Dedicated)			
≪ M	Aicrosoft Purview Name		Туре	Status	Size
Manage Integr In	ation Built-in Built-in riggers tegration runtimes ity ccess control redentials Anaged private endpoi		Serverless	Online	Auto

Ingest data

One of the key tasks you can perform with Azure Synapse Analytics is to define *pipelines* that transfer (and if necessary, transform) data from a wide range of sources into your workspace for analysis.

1. In Synapse Studio, on the Home page, select Ingest to open the Copy Data tool

Microsoft Azure	synapse-ws-aroh	I	Q ©	?	<u>ক্</u> ব	arohmv
() We use optional	cookies to provide a better experience. Learn more 🖸				A	ccept
Home Data Develop Hotgrate	« Synapse Analytics workspace synapse-ws-aroh New ♥					
Monitor Manage	Ingest Explore and analyze C Perform a one-time or scheduled data load. Learn how to get insights from your data. C	Visualize Build inte with Pow	e eractive repo rer BI capabi	orts ilities.		0
	Discover more Image: Construction of the second s					

2. In the Copy Data tool, on the **Properties** step, ensure that **Built-in copy task** and **Run once now** are selected, and click **Next** >.

Micro	osoft Azure synapse-ws-aroh	🕹 🕫 🗘
0	Copy Data tool	
\$	• Properties	Use Copy Data Tool to perform a one-time or scheduled data load from 90+ data sources. Follow the wizard experience to specify your data loading settings, and let the Copy Data Tool generate the artifacts for you, including p
Ũ	② Source	Properties Select copy data task type and configure task schedule
	③ Target	Task type Built-in copy task Metadata-driven copy task
Ø	④ Settings	You will get single pipeline to copy data from 90+ data source easily. You data source easily.
	5 Review and finish	You will get single pipeline to quickly copy objects from data source store to destination in a very intuitive manner.
		Task cadence or task schedule * Run once now Schedule Tumbling window
		Next >

3. On the **Source** step, in the **Dataset** substep, select the following settings:

Source type: HTTP

Micro	osoft Azure synapse-ws-aroh					J	鸮	Û	ŵ
0	Copy Data tool								
\$	Properties	Source data store	ore for the copy task. You can use	an existing data store connec	tion or specify a new da	ata store	2		
	2 Source	Source type	HTTP						
	 Dataset 	Connection *	Select	~ + New o	connection				
))	O Configuration								
0	③ Target								

- **Connection**: *Create a new connection with the following properties:*
 - Name: AdventureWorks Products
 - Description: Product list via HTTP
 - Connect via integration runtime: AutoResolveIntegrationRuntime
 - Base URL: https://raw.githubusercontent.com/MicrosoftLearning/DP-900T00A-Azure-Data-Fundamentals/master/Azure-Synapse/products.csv
 - Server Certificate Validation: Enable
 - Authentication type: Anonymous

New connection

ITTP Learn more		
Choose a name for your linked set	rvice. This name cannot be updat	ed later.
Name *		
AdventureWorks Products		
Description		
		G
Connect via integration runtime * 🛈	1	
AutoResolveIntegrationRuntime		~ 🖉
Base URL *		
https://raw.githubusercontent.com/Micro	osoftLearning/DP-900T00A-Azure	-Data-Fundamer
Server Certificate Validation ① ② Enable ① Disable		
Authentication type *		
Anonymous		~
Auth headers ①		
+ New		
Annotations		
> Parameters		
Create Cancel		🖉 Test connection

New connection	
HTTP Learn more 🖸	
() Choose a name for your linked service. This name cannot be update	ed later.
Name *	
AdventureWorks Products	
Description	
	G
Connect via integration runtime * ①	
AutoResolveIntegrationRuntime	~ 🖉
Base URL *	
https://raw.githubusercontent.com/MicrosoftLearning/DP-900T00A-Azure	-Data-Fundamer
Server Certificate Validation ①	
Enable Disable	
Authentication type *	
Anonymous	~
Auth headers ①	
+ New	
Annotations	
+ New	•
	Connection successful
Create Cancel	\land Test connection

- 4. After creating the connection, on the **Source/Dataset** substep, ensure the following settings are selected, and then select **Next** >:
 - **Relative URL**: *Leave blank*
 - Request method: GET
 - Additional headers: Leave blank
 - **Binary copy**: <u>Un</u>selected
 - **Request timeout**: *Leave blank*

• **Max concurrent connections**: *Leave blank*

Micro	osoft Azure synapse-ws-aroh	د د
0	Copy Data tool	
^	Properties	Source data store
	2 Source	Source type HTTP V
E.	 Dataset 	Connection *
()==)	O Configuration	Integration runtime * 🛛 🖉 AutoResolveIntegrationRuntime 🗸 🧷 Edit
0	③ Target	https://raw.githubusercontent.com/MicrosoftLearning/DP-900T00#
	④ Settings	Request method O
	③ Review and finish	Additional headers O

5. On the **Source** step, in the **Configuration** substep, select **Preview data** to see a preview of the product data your pipeline will ingest, then close the preview.

Micro	osoft Azure synapse-ws-aroh	
0	Copy Data tool	
\$	Properties	File format ©
	2 Source	DelimitedText V Detect text format Preview data
	• Dataset	Column delimiter Comma () Fdit
	• Configuration	Row delimiter
0	③ Target	Default (\r,\n, or \r\n) Edit Z First row as beader ()
	④ Settings	> Advanced
	(5) Review and finish	Compression type None Additional columns ^O

Preview data								
Linked service: Ad	ventureWorks Products							
Preview Sch	ema			^				
ProductID	ProductName	Category	ListPrice					
771	Mountain-100 Silver, 38	Mountain Bikes	3399.9900					
772	Mountain-100 Silver, 42	Mountain Bikes	3399.9900					
773	Mountain-100 Silver, 44	Mountain Bikes	3399.9900					
774	Mountain-100 Silver, 48	Mountain Bikes	3399.9900					
775	Mountain-100 Black, 38	Mountain Bikes	3374.9900					
776	Mountain-100 Black, 42	Mountain Bikes	3374.9900					
777	Mountain-100 Black, 44	Mountain Bikes	3374.9900					
				*				
				//				

- 6. After previewing the data, on the **Source/Configuration** step, ensure the following settings are selected, and then select **Next** >:
 - File format: DelimitedText
 - Column delimiter: Comma (,)
 - **Row delimiter**: Line feed (\n)
 - First row as header: Selected

o Compression type: None

Micro	osoft Azure synapse-ws-aroh	🧶
0	Copy Data tool	
\$	Properties	File format settings
	2 Source	Delimited Text
	 Dataset 	Column delimiter
	Configuration	Edit Row delimiter
Ø	3 Target	Line feed (\n)
	④ Settings	 First row as header U > Advanced
	(5) Review and finish	Compression type None Additional columns U Now
		< Previous Next >

- 7. On the Target step, in the Dataset substep, select the following settings:
 - **Target type**: Azure Data Lake Storage Gen 2 = **Connection**: *Create a new connection with the following properties:*

Micro	soft Azure synapse-ws-aroh	٩	83	¢
0	Copy Data tool			
1	Properties	Destination data store Specify the destination data store for the copy task. You can use an existing data store connection or specify a new data	store.	
	 Source Target 	Target type Image: Azure Data Lake Storage Gen2 Connection * Select		
	Dataset			
8	Configuration Settings			
	 Review and finish 			

- Name: Products
- **Description**: Product list
- Connect via integration runtime: AutoResolveIntegrationRuntime
- Authentication method: Account key
- Account selection method: From subscription
 - Azure subscription: select your subscription

- Storage account name: Select your storage account
- Test connection: To linked service

New connection

🗳 Azure Data Lake Storage Gen2 🛛 Learn more 🗋

Name *	A
Products	
Description	
Product list 1	
	G
Connect via integration runtime * (1)	
AutoResolveIntegrationRuntime	~ 0
Authentication method	
Account Key	~
Account selection method	
From Azure subscription C Enter manually	
Azure subscription ①	
Microsoft Azure Sponsorship (c76bf684-ce47-483d-b01d-d7c	dae99567f7) ~
Storage account name *	
azstoragesgp	~ Ŭ
To linked convice	
lo initied service of to the path	
Annotations	
+ New	
	-
) Daramatarr	
5	Connection successful
Create Cancel	🔨 🧖 Test connection

- 8. After creating the connection, on the **Target/Dataset** step, ensure the following settings are selected, and then select **Next** >:
 - **Folder path**: *Browse to your file system folder*

icro	soft Azure synapse-ws-aroh			P 🗈 🗘 🐵
	Copy Data tool			
	Properties	Destination data st	ore	
		Specify the destination dat	a store for the copy task. You can use an existing data store connection or specify a new da	ta store.
	Source	Target type	Azure Data Lake Storage Gen2	
		Connection *	Products	
	3 Target	Integration runtime *	🛛 AutoResolveIntegrationRuntime 🗸 🧷 Edit	
	 Dataset 	Ealder noth		
	O Configuration	If the identity you use to account, specify the path to	cess the data store only has permission to subdirectory instead of the entire	
			E Brows	se
	④ Settings	File name		_
	(5) Review and finish	Copy behavior ① None	~	
		Max concurrent connectio	ns O	
		Block size (MB)		
		Metadata ①		
		+ New		
		< Previous Next	>	
cro	osoft Azure synapse-ws-arc	h		🚽 🖽 🗳 🍪 ? 🔊 arohm
	Copy Data tool			Browse
		Destination dat	a store	Select a file or folder.
	Toperaes		n data store for the copy task. You can use an existing data store connection or spec	Root folder
	Source	Target type	Azure Data Lake Storage Gen2	C data
		Connection *	Products Y C Edit + New conner	E fsaroh
	3 Target	connection		
	Datasat	Integration runtime '	🔮 AutoResolveIntegrationRuntime 🛛 🗸 🖉 Edit	
	Dataset	Folder path		
		account, specify the p	to access the data store only has permission to subdirectory instead of the entire ath to browse.	
		File name		
		Copy behavior U		
		Max concurrent conr	ections O	
		Block size (MB)		
		Metadata ①		
		New		Showing 1 - 2 of 2 items
			Next 3	OK
		< Previous	Next 2	Cancer

- **File name**: products.csv
- Copy behavior: None
- **Max concurrent connections**: *Leave blank*

• Block size (MB): Leave blank

Properties	Destination data s	tore	
	Specify the destination da	ita store for the copy task. You can use an existing data store connection or specify a r	new data sto
Source	Target type	Azure Data Lake Storage Gen2	
	Connection *	Products Y C Edit H New connection	
3 Target			
	Integration runtime *	🔮 AutoResolveIntegrationRuntime 🗸 🖉 Edit	
 Dataset 	Folder nath		
O Configuration	If the identity you use to a account, specify the path t	access the data store only has permission to subdirectory instead of the entire to browse.	
O Configuration	If the identity you use to a account, specify the path t	access the data store only has permission to subdirectory instead of the entire to browse.	Browse
 Configuration ④ Settings 	If the identity you use to a account, specify the path t fsaroh	access the data store only has permission to subdirectory instead of the entire to browse.	Browse
Configuration Settings	If the identity you use to a account, specify the path t fsaroh File name products.csv	access the data store only has permission to subdirectory instead of the entire to browse.	Browse
 Configuration Settings Review and finish 	If the identity you use to a account, specify the path to fsaroh File name products.csv	access the data store only has permission to subdirectory instead of the entire to browse.	Browse
 Configuration Settings Review and finish 	If the identity you use to a account, specify the path 1 fsaroh File name products.csv Copy behavior () None	access the data store only has permission to subdirectory instead of the entire to browse.	Browse
Configuration Settings Review and finish	If the identity you use to a account, specify the path 1 fsaroh File name products.csv Copy behavior None Max concurrent connection	access the data store only has permission to subdirectory instead of the entire to browse.	Browse
Configuration Settings Review and finish	If the identity you use to a account, specify the path 1 fsaroh File name products.csv Copy behavior None Max concurrent connection	access the data store only has permission to subdirectory instead of the entire to browse.	Browse
Configuration Settings Review and finish	f the identity you use to a account, specify the path 1 fsaroh File name products.csv Copy behavior None Max concurrent connection Block size (MB)	access the data store only has permission to subdirectory instead of the entire to browse.	Browse
Configuration Settings Review and finish	f the identity you use to a account, specify the path 1 fsaroh File name products.csv Copy behavior None Max concurrent connection Block size (MB)	access the data store only has permission to subdirectory instead of the entire to browse.	Browse
 Configuration 4 Settings (3) Review and finish 	If the identity you use to a account, specify the path t fsarch File name products.csv Copy behavior ① None Max concurrent connection Block size (MB) ①	access the data store only has permission to subdirectory instead of the entire to browse.	Browse

- 9. On the **Target** step, in the **Configuration** substep, ensure that the following properties are selected. Then select **Next** >:
 - **File format**: DelimitedText
 - Column delimiter: Comma (,)
 - **Row delimiter**: Line feed (\n)
 - Add header to file: Selected
 - Compression type: None
 - Max rows per file: Leave blank
 - File name prefix: Leave blank

Copy Data tool	
 Properties 	File format settings
Source	DelimitedText
3 Target	Column delimiter Comma (.) Edit
 Dataset 	Row delimiter
Configuration	Line teed (In)
④ Settings	Add header to file
5 Review and finish	Compression type None >
	Max rows per file File name prefix

10. On the **Settings** step, enter the following settings and then click **Next** >:

- Task name: Copy products
- Task description Copy products data
- Fault tolerance: *Leave blank*
- Enable logging: Unselected
- Enable staging: <u>Un</u>selected

Micro	Microsoft Azure synapse-ws-aroh				
0	Copy Data tool				
♠	Properties	Settings			
	Source	Task name *			
)	🕗 Target	Task description Copy products data			
0	3 Settings	Fault tolerance O			
Ē	(5) Review and finish	Enable staging			
		< Previous Next >			
11. On the **Review and finish** step, on the **Review** substep, read the summary and then click **Next >**.

Micros	soft Azure	synapse-ws-aroh				I	¢	@	?	ন্দ	arohmvpm36
0	Copy Da	ata tool									
\$	🗸 Prope	erties	Summary You are running pipeline to	copy data from HTTP to Azure Data Lake Stor	rage Gen2.						
	 Source 	ce	нттр нттр -	>	Azure Data Lake Sto	rage Gen2	1				
()==)	🥑 Targe	t				5	1				
Ø	 Settin 	ngs	Properties				6	8 Edit			
2	5 Revie	w and finish	Task name Task description	Copy products Copy products data							
	Review	v	Source				6	8 Edit			
	O Deploy	yment	Connection name Dataset name	AdventureWorks Products SourceDataset_ahx							
			Column delimiter Row delimiter	,							
			Escape character	λ.							
			Quote char								
			First row as header	true							
			Target				6	8 Edit			
			< Previous Next	>							

12. On the **Deployment** step, wait for the pipeline to be deployed and then click **Finish**.

Micro	osoft Azure synapse-ws-aroh		🕄 🛱 🕲 ?
0	Copy Data tool		
♠	Properties		
Ĩ	Source		Azure Data Lake Storage Gen2
)	🕑 Target	Deployment complete	0
Ø	Settings	Deployment step	Status
	5 Review and finish	Validating copy runtime environment	Succeeded
	Review	> Creating datasets	Succeeded
	neview .	> Creating pipelines	Succeeded
	Deployment	> Running pipelines	O Succeeded
		Datasets and pipelines have been created. You can now monitor an	nd edit the copy pipelines or click finish to close Copy Data Tool.
		Finish Edit pipeline Monitor	

13. In Synapse Studio, select the Monitor page, and in the Pipeline runs tab, wait for the Copy products pipeline to complete with a status of Succeeded (you can use the U Refresh button on the Pipeline runs page to refresh the status).

Microsoft Azure	synapse-ws-aroh			e a (2 🎯 ? R	arohmvpm365@aro	hmvp365.onmicrosoft. аконм	.com VP365
We use optional	I cookies to provide a better experience. Le	earn more 🖾				Accept Reject	More options	
	~	[«] Pipeline runs						
1 Home	Analytics pools	Triggered Dahur	Rerun O Cancel X O Refre	sh == Edit columns	t Gantt			
~	🐴 SQL pools	à SQL pools						
Data	🕄 Apache Spark pools	♀ Filter by run ID or name	Kuala Lumpur, Singa : La	st 24 hours Pipeline nam	e : Copy products	Status : All	D	Сору
Develop	Data Explorer pools	(preview) Runs : Latest runs	Triggered by : All 🛛 🏹 Add filter				-0	filters
	Activities	Showing 1 - 1 items						
, integrate	SQL requests	Pipeline name	Run start 🗇	Run end	Duration	Triggered by	Status	Erro
Monitor	KQL requests	Copy products	3/28/22, 10:38:39 PM	3/28/22, 10:38:50 PM	00:00:10	Manual trigger	Succeeded	
	🗮 Apache Spark applic	cations		.,				
Manage	🗳 Data flow debug							
	Integration							
	00 Pipeline runs							
	7 Trigger runs							
	Integration runtimes	5						

14. On the Data page, select the Linked tab and expand the Azure Data Lake Storage Gen
2 hierarchy until you see the file storage for your Synapse workspace. Then select the file storage to verify that a file named products.csv has been copied to this location, as shown here:



Microsoft Azure synapse-ws	-aroh	୍ନ Search 😴 ଅ
() We use optional cookies to pro	ovide a better experience. Learn more 🗅	
«	🛇 Synapse live 🗸 🖌 Validate all 🖄	Publish all
1 Home	Data + × «	🚔 fsaroh X
📄 Data	Workspace Linked	🖳 New SQL script 🗸 📋 New notebook 🗸 🔗 New data flow 🖽 New in
	∀ Filter resources by name	$\leftarrow \rightarrow \lor \uparrow$ fsaroh
Develop	Azure Data Lake Storage Gen2 2	Name ^ Last Modified
) Integrate	synapse-ws-aroh (Primary - azstora	products.csv 3/28/2022, 10:38:47 PM
Monitor	fsaroh (Primary)	
📑 Manage	(Attached Containers)	
	Integration datasets 2	

Use a SQL pool to analyze data

Now that you've ingested some data into your workspace, you can use Synapse Analytics to query and analyze it. One of the most common ways to query data is to use SQL, and in Synapse Analytics you can use a *SQL pool* to run SQL code.

1. In Synapse Studio, right-click the **products.csv** file in the file storage for your Synapse workspace, point to **New SQL script**, and select **Select TOP 100 rows**.



2. In the **SQL Script 1** pane that opens, review the SQL code that has been generated, which should be similar to this:

SQLCopy

```
-- This is auto-generated code
```

SELECT

TOP 100 *

FROM

OPENROWSET(

BULK 'https://datalakexx.dfs.core.windows.net/fsxx/products.csv',

FORMAT = 'CSV',

PARSER_VERSION='2.0'

) AS [result]

This code opens a rowset from the text file you imported and retrieves the first 100 rows of data.

3. In the **Connect to** list, ensure **Built-in** is selected - this represents the built-in SQL Pool that was created with your workspace.

Microsoft Azure	synapse-ws-aroh	🔎 Search 🥥 🖓 😰 🗘 🖉 🖉 🖉	hmvpm365@arohmvp365.onmicrc Al
We use optional	cookies to provide a better experience. Learn more 🗅	Accept	Reject More options
A Home	 Synapse live ∨ ✓ Validate all Data + × ≪ 	Publish al Publish al SQL script 1	
📋 Data	Workspace Linked	▶ Run ♡ Undo ∨ ① Publish An Outry plan Connect to ● Built-in Use data 1 This is auto-generated code	ibase master 🗸 💍
Develop	 Filter resources by name Azure Data Lake Storage Gen2 	2 2 SELECT 3 TOP 100 * 4 FROM	General Related (0)
间 Integrate	synapse-ws-aroh (Primary - azstora	5 OPENROWSET(6 BULK 'https://azstoragesgp.dfs.core.windows.net/fsaroh/products.csv',	Name *
Monitor	 fsaroh (Primary) data 	7 FORMAT = 'CSV', 8 PARSER VERSION = '2.0' 9 JAS [result]	SQL script 1 Description
📑 Manage	 Integration datasets 	2	
		0	Type .sql script
			Size 226 bytes
			Results settings per query ③ First 5000 rows (default)
			All rows

4. On the toolbar, use the **▷ Run** button to run the SQL code, and review the results, which should look similar to this:

C1	c2	с3
ProductID	ProductName	Category
771	Mountain-100 Silver, 38	Mountain Bikes
772	Mountain-100 Silver, 42	Mountain Bikes



5. Note the results consist of four columns named C1, C2, C3, and C4; and that the first row in the results contains the names of the data fields. To fix this problem, add a HEADER_ROW = TRUE parameters to the OPENROWSET function as shown here (replacing *datalakexx* and *fsxx* with the names of your data lake storage account and file system), and then rerun the query:

SQLCopy

SELECT

TOP 100 *

FROM

OPENROWSET(

BULK 'https://datalakexx.dfs.core.windows.net/fsxx/products.csv',

FORMAT = 'CSV',

PARSER_VERSION='2.0',

HEADER_ROW = TRUE

) AS [result]

Now the results look like this:

ProductID	ProductName	Category
771	Mountain-100 Silver, 38	Mountain Bikes
772	Mountain-100 Silver, 42	Mountain Bikes

Microsoft Azure	synapse-ws-aroh	🛛 🖓 search 🥥 Search 🖉 Search 🖉 Search 🖉 Search 🖉 Search Se
We use optional	l cookies to provide a better experience. Learn more 🗅	Accept Reject More options ×
	< 😒 Synapse live 🗸 🛁 Validate all 🚺	Publish all 1
1 Home	Data + × «	🚔 fsaroh 🖉 SQL script 1 •
📋 Data	Workspace Linked	▷ Run ♡ Undo ✓ ① Publish ⊕ 0 Query plan Connect to O Built-in ✓ Use database master ✓ ○ E ····
Develop	Filter resources by name Azure Data Lake Storage Gen2 2	1 Inits is auto-generated code Properties 2 SELECT Properties 9 3 TOP 100 * General Related (0)
) Integrate	🖌 🧮 synapse-ws-aroh (Primary - azstora	<pre>5 ····OPENROWSET(6 ······BULK 'https://azstoragesgp.dfs.core.windows.net/fsaroh/products.csv', Name '</pre>
Monitor	🖨 fsaroh (Primary) 🚔 data	7
📑 Manage	Attached Containers) Integration datasets 2	10 Type
		Results Messages 226 bytes
		View Table Chart → Export results ✓ Results settings per query () (i) First 5000 rows (default) (ii) First 5000 rows (default)
		ProductID ProductName Category ListPrice
		771 Mountain-100 Silver, 38 Mountain Bikes 3399.99
		772 Mountain-100 Silver, 42 Mountain Bikes 3399.99
		773 Mountain-100 Silver, 44 Mountain Bikes 3399.99
		00:00:02 Query executed successfully.

6. Modify the query as follows (replacing *datalakexx* and *fsxx* with the names of your data lake storage account and file system):

SQLCopy

SELECT

Category, COUNT(*) AS ProductCount

FROM

OPENROWSET(

BULK 'https://datalakexx.dfs.core.windows.net/fsxx/products.csv',

FORMAT = 'CSV',

PARSER_VERSION='2.0',

HEADER_ROW = TRUE

) AS [result]

GROUP BY Category;

7. Run the modified query, which should return a resultset that contains the number products in each category, like this:

Category	ProductCount
Bib Shorts	3
Bike Racks	1

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Run	🏷 Undo 🖂 🖞 Publish 🖧 Query plan 🛛 Connect to 🥑 Built-in 💛 Use database master 💛 💍
1	This is auto-generated code
2	SELECT
3	Category, COUNT(*) AS ProductCount
4	FROM
5	OPENROWSET (
6	BULK 'https://azstoragesgp.dfs.core.windows.net/fsaroh/products.csv',
7	FORMAT = 'CSV',
8	PARSER_VERSION='2.0',
9	HEADER_ROW = TRUE
10)_AS_[result]
11	GROUP BY Category;

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♀ Search	
Category	ProductCount
Bib-Shorts	3
Bike Racks	1
Bike Stands	1
Bottles and Cages	3
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9. In the **Properties** pane for **SQL Script 1**, change the **Name** to **Count Products by Category**. Then in the toolbar, select **Publish** to save the script.

8.



1 Publishing (1)	Publish	all			
Count Products by >	You are abo	out to publish all pending changes to	o the live environment. Learn more 🗋		
▷ Run う Undo ~	Publish & Query plan Pending d	hanges (1)			
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8	HEADER_ROW = TRUE)AS[result]				
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- 10. Close the **Count Products by Category** script pane.
- 11. In Synapse Studio, select the **Develop** page, and notice that your published **Count Products by Category** SQL script has been saved there.

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12. Select the **Count Products by Category** SQL script to reopen it. Then ensure that the script is connected to the **Built-in** SQL pool and run it to retrieve the product counts.

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- 13. In the **Results** pane, select the **Chart** view, and then select the following settings for the chart:
 - Chart type: Column
 - Category column: Category
 - Legend (series) columns: ProductCount
 - Legend position: bottom center
 - Legend (series) label: Leave blank
 - Legend (series) minimum value: Leave blank
 - **Legend (series) maximum**: *Leave blank*
 - **Category label**: *Leave blank*

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The resulting chart should resemble this:



Use a Spark pool to analyze data

While **SQL is a common language for querying structured datasets**, many data analysts find languages like **Python useful to explore and prepare data** for analysis. In Azure Synapse Analytics, you can run Python (and other) code in a *Spark pool*; which uses a distributed data processing engine based on Apache Spark.

- 1. In Synapse Studio, select the Manage page.
- 2. Select the **Apache Spark pools** tab, and then use the **+ New** icon to create a new Spark pool with the following settings:
 - Apache Spark pool name: spark
 - Node size family: Memory Optimized
 - Node size: Small (4 vCores / 32 GB)
 - o Autoscale: Enabled
 - Number of nodes 3----3

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3. Review and create the Spark pool, and then wait for it to deploy (which may take a few minutes).



 When the Spark pool has been deployed, in Synapse Studio, on the Data page, browse to the file system for your Synapse workspace. Then right-click products.csv, point to New notebook, and select Load to DataFrame.

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- 5. In the **Notebook 1** pane that opens, in the **Attach to** list, select the **spark** Spark pool to created previously and ensure that the **Language** is set to **PySpark (Python)**.
- 6. Review the code in the first (and only) cell in the notebook, which should look like this:

```
PythonCopy
```

```
%%pyspark
```

```
df = spark.read.load('abfss://fsxx@datalakexx.dfs.core.windows.net/products.csv', format='csv'
```

If header exists uncomment line below

```
##, header=True
```

```
)
```

```
display(df.limit(10))
```

7. Use the ▷ icon to the left of the code cell to run it, and wait for the results. The first time you run a cell in a notebook, the Spark pool is started - so it may take a minute or so to return any results.

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📑 Manage	(Attached Containers)	6 display(df.limit(10)) [] Press shift + enter to execute cells
	 P Im Products (azstoragesgp) Integration datasets 	z + Code + Markdown

8. Eventually, the results should appear below the cell, and they should be similar to this:

...

с0	c1	c2
ProductID	ProductName	Category
771	Mountain-100 Silver, 38	Mountain Bikes
772	Mountain-100 Silver, 42	Mountain Bikes

...

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			772	Mountain-100 Silver, 42	Mountain Bikes	3399.9900	
			773	Mountain-100 Silver, 44	Mountain Bikes	3399.9900	
			774	Mountain-100 Silver, 48	Mountain Bikes	3399.9900	
			775	Mountain-100 Black, 38	Mountain Bikes	3374.9900	
			777	Mountain-100 Black, 42	Mountain Bikes	3374,9900	
			778	Mountain-100 Black, 44	Mountain Bikes	3374.9900	
			779	Mountain-200 Silver 38	Mountain Riker	2210.0000	

10. Uncomment the *header=True* line (because the products.csv file has the column headers in the first line), so your code looks like this:

PythonCopy

...

%%pyspark

df = spark.read.load('abfss://fsxx@datalakexx.dfs.core.windows.net/products.csv', format='csv'

If header exists uncomment line below

, header=True

)

display(df.limit(10))

11. Rerun the cell and verify that the results look like this:

ProductID	ProductName	Category
771	Mountain-100 Silver, 38	Mountain Bikes
772	Mountain-100 Silver, 42	Mountain Bikes

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				774	Mountain-100 Silver, 48	Mountain Bikes	3399.9900			
				775	Mountain-100 Black, 38	Mountain Bikes	3374.9900			
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				777	Mountain-100 Black, 44	Mountain Bikes	3374.9900			
			_	778	Mountain-100 Black, 48	Mountain Bikes	3374.9900			

12. Notice that running the cell again takes less time, because the Spark pool is already started.

13. Under the results, use the **+ Code** icon to add a new code cell to the notebook.

14. In the new empty code cell, add the following code:

PythonCopy

df_counts = df.groupby(df.Category).count()

display(df_counts)

15. Run the new code cell by clicking its ▷ icon, and review the results, which should look similar to this:

Category	count
Headsets	3
Wheels	14

16. In the results output for the cell, select the **Chart** view. The resulting chart should resemble this:



17. Close the **Notebook 1** pane and discard your changes.

Delete Azure resources

If you've finished exploring Azure Synapse Analytics, you should delete the resources you've created to avoid unnecessary Azure costs.

- 1. Close the Synapse Studio browser tab and return to the Azure portal.
- 2. On the Azure portal, on the Home page, select Resource groups.
- 3. Select the resource group for your Synapse Analytics workspace (not the managed resource group), and verify that it contains the Synapse workspace, storage account, and Spark pool for your workspace.
- 4. At the top of the **Overview** page for your resource group, select **Delete resource group**.
- 5. Enter the resource group name to confirm you want to delete it, and select **Delete**.

After a few minutes, your Azure Synapse workspace and the managed workspace associated with it will be deleted.

Explore Azure Stream Analytics

https://github.com/MicrosoftLearning/DP-900T00A-Azure-Data-Fundamentals/blob/master/Instructions/Labs/dp900-05-stream-lab.md

In this exercise you'll provision an Azure Cosmos DB database in your Azure subscription, and explore the various ways you can use it to store non-relational data.

Note: The exercise is part of a module on Microsoft Learn, and includes an option to use a *sandbox* Azure subscription. However, if you are completing this exercise as part of an instructor-led class, you should use the Azure subscription provided as part of the class instead of the sandbox.

Before starting the exercise on Microsoft Learn, you'll need to prepare a cloud shell environment for your Azure subscription.

- 1. Sign into your Azure subscription in the <u>Azure portal</u> at https://portal.azure.com, using your Azure subscription credentials.
- Use the [>_] button to the right of the search bar at the top of the page to create a new Cloud Shell in the Azure portal, selecting a *Bash* environment and creating storage if prompted. The cloud shell provides a command line interface in a pane at the bottom of the Azure portal, as shown here:

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graeme@Azure:~\$	

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Switch to Bash in Cloud Shell Switching will reconnect to the same container with a new Bash session. Any running processes in active PowerShell sessions will go to background.	
Confirm Cancel	

Note that you can resize the cloud shell by dragging the separator bar at the top of the pane, or by using the —, □, and X icons at the top right of the pane to minimize, maximize, and close the pane. For more information about using the Azure Cloud Shell, see the <u>Azure Cloud</u> <u>Shell documentation</u>.

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4. Now you're ready to complete the exercise on Microsoft Learn - just be use to use the cloud shell in your Azure portal instead of the (blank) one in the Learn module (which is provided for self-paced learners using a sandbox subscription).

Use the link below to open the exercise on Microsoft Learn.

https://docs.microsoft.com/en-gb/learn/modules/explore-fundamentals-stream-processing/5exercise-stream-analytics#create-azure-resources

Exercise: Analyze streaming data

Now it's your opportunity to explore **Azure Stream Analytics** in a sample solution that aggregates streaming data from a **simulated IoT device**.

This exercise can be completed using a free **Microsoft Learn** *sandbox* **subscription**, which provides an **Azure subscription and a Cloud Shell environment** integrated into this page. The **sandbox** *subscription* will be created when you click the button above, and automatically deleted when you complete this module.

Tip

If you prefer, you can use your own Azure subscription. To do this, before you start:

- 1. Sign into your Azure subscription in the <u>Azure portal</u>.
- 2. Ensure you are working in the directory containing your subscription indicated at the top right under your user ID. If not, select the user icon and switch directory.

- Use the [>_] button to the right of the search bar at the top of the page to create a new Cloud Shell in the Azure portal, creating storage if prompted and selecting a *Bash* environment.
- 4. Complete the exercise steps below in the Cloud Shell pane in the Azure portal.

For more information about using the Azure Cloud Shell, see the Azure Cloud Shell documentation

Create Azure resources

1. In the Azure Cloud Shell, enter the following command to download the files you'll need for this exercise.

Copy git clone <u>https://github.com/MicrosoftLearning/DP-900T00A-Azure-Data-Fundamentals</u> dp-900

git clone https://github.com/MicrosoftLearning/DP-900T00A-Azure-Data-Fundamentals dp-900



2. Wait for the command to complete, and then enter the following command to change the current directory to the folder containing the files for this exercise.

Copy cd dp-900/streaming

cd dp-900/streaming



3. Enter the following command to run a script that creates the Azure resources you will need in this exercise.

Copy bash setup.sh



Wait as the script runs and performs the following actions:

- 1. Installs the Azure CLI extensions needed to create resources (*you can ignore any warnings about experimental extensions*)
- **3.** Creates an *Azure IoT Hub* resource, which will be used to receive a stream of data from a simulated device.
- 4. Creates a *Azure Storage Account*, which will be used to store processed data.
- 5. Creates a *Azure Stream Analytics* job, which will process **the incoming device data in** real-time, and write the results to the storage account.



Explore the Azure resources

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- 2. Select the **learn-***xxxxxxxxxxxxxxx* resource group, and review the resources it contains, which should include:
 - An *IoT Hub* named **iothub***xxxxxxxx*, which is used to receive incoming device data.
 - A *Storage account* named **store***xxxxxxxx*, to which the data processing results will be written.
 - A *Stream Analytics job* named **stream***xxxxxxxx*, which will be used to process streaming data.

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If all three of these resources are not listed, click the **U** Refresh button until they appear.

Note

If you are using the learn sandbox, the resource group may also contain a second *Storage account* named **cloudshell***xxxxxxx*, which is used to store data for the Azure Cloud Shell you used to run the setup script.

3. Select the streamxxxxxxxxx Stream Analytics job

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and view the information on its **Overview** page, noting the following details:

- The job has one *input* named **iotinput**, and one *output* named **bloboutput**. These reference the IoT Hub and Storage account created by the setup script.
- The job has a *query*, which reads data from the **iotinput** input, and aggregates it by counting the number of messages processed every 10 seconds; writing the results to the **bloboutput** output.

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Use the resources to analyze streaming data

- 1. At the top of the **Overview** page for the Stream Analytics job, select the **▷ Start** button, and then in the **Start job** pane, select **Start** to start the job.
- 2. Wait for a notification that the streaming job started successfully.

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3. Switch back to the **Azure Cloud Shell**, and enter the following command to simulate a device that sends data to the IoT Hub.

Сору

bash iotdevice.sh

4. Wait for the simulation to start, which will be indicated by output like this:

Сору

Device simulation in progress: 6% | # | 7/120 [00:08<02:21, 1.26s/it]

- 5. While the simulation is running, back in the Azure portal, return to the page for the **learnxxxxxxxxxxxxxxxxx** storage account.
- 6. In the pane on the left of the storage account blade, select the **Containers** tab.
- 7. Open the **data** container.
- 8. In the **data** container, navigate through the folder hierarchy, which includes a folder for the current year, with subfolders for the month, day, and hour.

- 9. In the folder for the hour, select the file that has been created, which should have a name similar to **0_xxxxxxxxxxxxxx.json**.
- 10. On the page for the file, select **Edit**, and review the contents of the file; which should consist of a JSON record for each 10 second period, showing the number of messages received from IoT devices, like this:

```
Сору
```

{"starttime":"2021-10-23T01:02:13.2221657Z","endtime":"2021-10-23T01:02:23.2221657Z","device":"iotdevice","messages":2}

{"starttime":"2021-10-23T01:02:14.5366678Z","endtime":"2021-10-23T01:02:24.5366678Z","device":"iotdevice","messages":3}

{"starttime":"2021-10-23T01:02:15.7413754Z","endtime":"2021-10-23T01:02:25.7413754Z","device":"iotdevice","messages":4}

•••

- 11. Use the **U Refresh** button to refresh the file, noting that additional results are written to the file as Stream Analytics job processes the device data in real time as it is streamed from the device to the IoT Hub.
- 12. Return to the Azure Cloud Shell and wait for the device simulation to finish (it should run for around 3 minutes).
- 13. Back in the Azure portal, refresh the file one more time to see the full set of results that were produced during the simulation.
- 14. Return to the **learn-***xxxxxxxxxxxxxxxxxx*... resource group, and re-open the **stream***xxxxxxxxx* Stream Analytics job.
- 15. At the top of the Stream Analytics job page, use the Stop button to stop the job, confirming when prompted.

Тір

If you are using your own Azure subscription, and you have finished exploring the streaming solution, you can delete the **learn-***xxxxxxxxxxxxxxxx*... resource group.

https://docs.microsoft.com/en-gb/learn/modules/explore-fundamentals-data-visualization/5exercise-power-bi

Exercise - Visualize data with Power BI

Now it's your chance to explore data modelling and visualization with Microsoft Power BI.

Note

To complete this exercise, you will need a computer running Microsoft Windows.

Install Power BI Desktop (if necessary)

If Microsoft Power BI Desktop is not already installed on your Windows computer, you can download and install it for free.

- 1. Download the Power BI Desktop installer from https://aka.ms/power-bi-desktop.
- 2. When the file has downloaded, open it, and use the setup wizard to install Power BI Desktop on your computer. This may take a few minutes.

Import data

1. Open Power BI Desktop. The application interface should look similar to this:



Now you're ready to import the data for your report.

2. On the Power BI Desktop welcome screen, select **Get data**, and then in the list of data sources, select **Web** and then select **Connect**.



3. In the **From web** dialog box, enter the following URL and then select **OK**:

https://github.com/MicrosoftLearning/DP-900T00A-Azure-Data-Fundamentals/raw/master/powerbi/customers.csv

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4. Verify that the URL opens a dataset containing customer data, as shown below. Then select **Load** to load the data into the data model for your report.

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29489	Frances Adams	95354		Modesto	United States		
29490	Margaret Smith	83501		Lewiston	United States		
29492	lav Adams	64106		Kansas City	United States		
29492	Samuel Agcaoili	M4B 11	/5	Toronto	Canada		
29494	Robert Ablering	85701		Tucson	United States		
29490	François Ferrier	82601		Casper	United States		
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29506	Sean Jacobson	85233		Gilbert	United States		
29508	Marvin Allen	77478		Sugar Land	United States		
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29517	Ramona Antrim	48601		Saginaw	United States		
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5. In the main Power BI Desktop window, in the Get data menu, select Web:

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Page 1 of 1			

6. In the **From web** dialog box, enter the following URL and then select **OK**:

Сору

https://github.com/MicrosoftLearning/DP-900T00A-Azure-Data-Fundamentals/raw/master/powerbi/products.csv

- 7. Load the product data in this file into the data model.
- 8. Repeat the previous three steps to import a third dataset containing order data from the following URL:

Сору

https://github.com/MicrosoftLearning/DP-900T00A-Azure-Data-Fundamentals/raw/master/powerbi/orders.csv

Explore a data model

The three tables of data you've imported have been loaded into a data model, which you'll now explore and refine.

 In Power BI Desktop, on the left-side edge, select the Model tab, and then arrange the tables in the model so you can see them (you can hide the panes on the right side by using the >> icons):

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2. In the **orders** table, select the **Revenue** field and then in the **Properties** pane, set its **Format** property to **Currency**:

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This will ensure that revenue values are displayed as currency in report visualizations.

3. In the products table, right-click the **Category** field (or open its : menu) and select **Create hierarchy**. This creates a hierarchy named **Category Hierarchy** (you may need to expand or scroll in the **products** table to see this - you can also see it in the **Fields** pane)





 In the products table, right-click the ProductName field (or open its : menu) and select Add to hierarchy > Category Hierarchy. This adds the ProductName field to the hierarchy you created previously.





5. In the **Fields** pane, right-click **Category Hierarchy** (or open its ... menu) and select **Rename**. The rename the hierarchy to **Categorized Product**.
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- 6. On the left-side edge, select the **Data** tab, and then in the **Fields** pane, select the **customers** table.
- 7. Select the **City** column header, and then set its **Data Category** property to **City**:

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	29490	Margaret Smith	83501	Lewiston	United States	State or Province
	29492	Jay Adams	64106	Kansas City	United States	
	29496	Robert Ahlering	85701	Tucson	United States	Postal code
	29497	François Ferrier	82601	Casper	United States	Country
	29502	Paul Alcorn	82901	Rock Springs	United States	Continent
	29505	Michelle Alexander	89030	North Las Vegas	United States	
	29506	Sean Jacobson	85233	Gilbert	United States	Latitude
	29508	Marvin Allen	77478	Sugar Land	United States	Longitude
	29511	Oscar Alpuerto	80537	Loveland	United States	
	29517	Ramona Antrim	48601	Saginaw	United States	Web URL
	29521	Tom Johnston	89106	Las Vegas	United States	Image URL
	29522	Thomas Armstrong	90232	Culver City	United States	
	29523	John Arthur	77003	Houston	United States	Barcode
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This will ensure that the values in this column are interpreted as city names, which can be useful if you intend to include map visualizations.

Create a report

Now you're almost ready to create a report. First you need to check some settings to ensure all visualizations are enabled.

 On the File menu, select Options and Settings. Then select Options, and in the Security section, ensure that Use Map and Filled Map visuals is enabled and select OK.



This ensures that you can include map visualizations in reports.

2. On the left-side edge, select the Report tab and view the report design interface.

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3. In the ribbon, above the report design surface, select **Text Box** and add a text box containing the text **Sales Report** to the report. Format the text to make it bold with a font size of 32.

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4. Select any empty area on the report to de-select the text box. Then in the **Fields** pane, expand **Products** and select the **Categorized Products** field. This adds a table to the report.

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5. With the table still selected, in the **Fields** pane, expand **Orders** and select **Revenue**. A Revenue column is added to the table (you may need to expand the size of the table to see it).

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The revenue is formatted as currency, as you specified in the model. However, you didn't specify the number of decimal places, so the values include fractional amounts. It won't matter for the visualizations you're going to create, but you could go back to the **Model** or **Data** tab and change the decimal places if you wish!

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6. With the table still selected, in the **Visualizations** pane, select the **Stacked column chart** visualization. The table is changed to a column chart showing revenue by category.

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7. Above the selected column chart, select the ↓ icon to turn on drill-down. Then in the chart, select the second column (*Road Bikes*) to drill down and see the revenue for the individual products in this category. This capability is possible because you defined a hierarchy of categories and products.

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- 8. Use the \uparrow icon to drill back up to the category level. Then select the (\downarrow) icon to turn off the drill-down feature.
- 9. Select a blank area of the report, and then in the **Fields** pane, select the **Quantity** field in the **orders** table and the **Category** field in the **products** table. This results in another column chart showing sales quantity by product category.



10. With the new column chart selected, in the **Visualizations** pane, select **Pie chart** and then resize the chart and position it next to the revenue by category column chart.

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11. Select a blank area of the report, and then in the **Fields** pane, select the **City** field in the **customers** table and then select the **Revenue** field in the **orders** table. This results in a map showing sales revenue by city (rearrange and resize the visualizations as needed):



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12. In the map, note that you can drag, double-click, use a mouse-wheel, or pinch and drag on a touch screen to interact. Then select a specific city, and note that the other visualizations in the report are modified to highlight the data for the selected city.



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13. On the **File** menu, select **Save**. Then save the file with an appropriate .pbix file name. You can open the file and explore data modeling and visualization further at your leisure.

In this exercise, you have used Power BI Desktop to ingest data, create a data model, and use interactive visualizations to create a report. If you have a <u>Power BI service</u> subscription, you can sign into your account and publish the report to a Power BI workspace.