Lab 9

CST8912_011

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degu0055

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Submitted to :

Prof. Tanishq Bansal

Lab Report Format

Title

Managing Data Encryption in Azure for Compliance

Introduction or Purpose

Microsoft Azure offers tools to protect data and ensure compliance. Encryption at Rest is a key security feature that allows organizations to encrypt stored data without the need for custom key management. Azure can fully manage this process or provide options for more control over encryption and keys.

Encryption uses symmetric keys to quickly secure and decrypt data. Data can be partitioned with separate keys, and encryption keys are stored securely with access control and audit policies.

Encryption at Rest protects data from physical attacks and is often required by regulations like HIPAA, PCI, and FedRAMP to ensure compliance and safeguard data.

Steps covered in the lab

Task 1: Deploy an Azure SQL Database

Method 1:

1. In Azure, create an Azure SQL database in the Canada Central region under resource group CST8912-demo, with the database name db8912.
2. Create a new server with a unique name (e.g., db8912demo) and use SQL authentication.
3. Set up the firewall rules to allow access from Azure services and your current IP.
4. Choose "Sample" for the database and proceed to review and create the database.

Method 2:

1. Search for "Deploy a custom template" in the Azure portal.
2. Load the azuredeploy.json file from the provided link.
3. Set subscription, resource group, and location to Canada Central, then review and create the database.

Task 2: Configure Advanced Data Protection

1. In the SQL server settings, enable Microsoft Defender for SQL.
2. Review pricing and settings for vulnerability assessment and threat protection.
3. Check recommendations and security alerts.

Task 3: Configure Data Classification

1. In the SQL server settings, go to Data Discovery & Classification.
2. Review columns with classification recommendations and select "Accept Selected Recommendations."
3. Save the changes.

Task 4: Configure Auditing

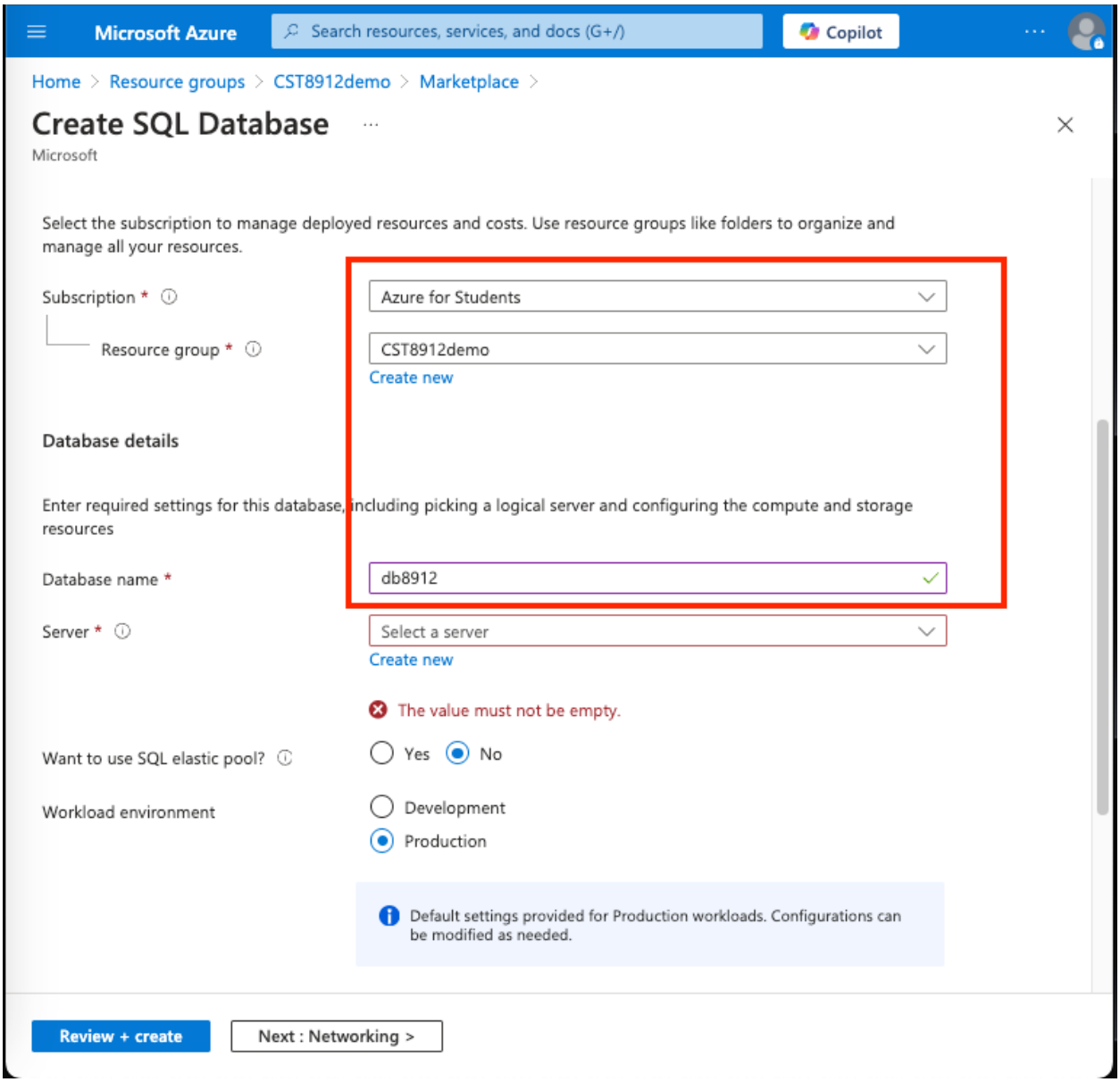
1. In the SQL Server settings, enable auditing and select "Create new storage account" if needed.
2. Set retention to 5 days and save.
3. On the SQL database settings, enable database-level auditing and check audit logs for activities like logins and queries.

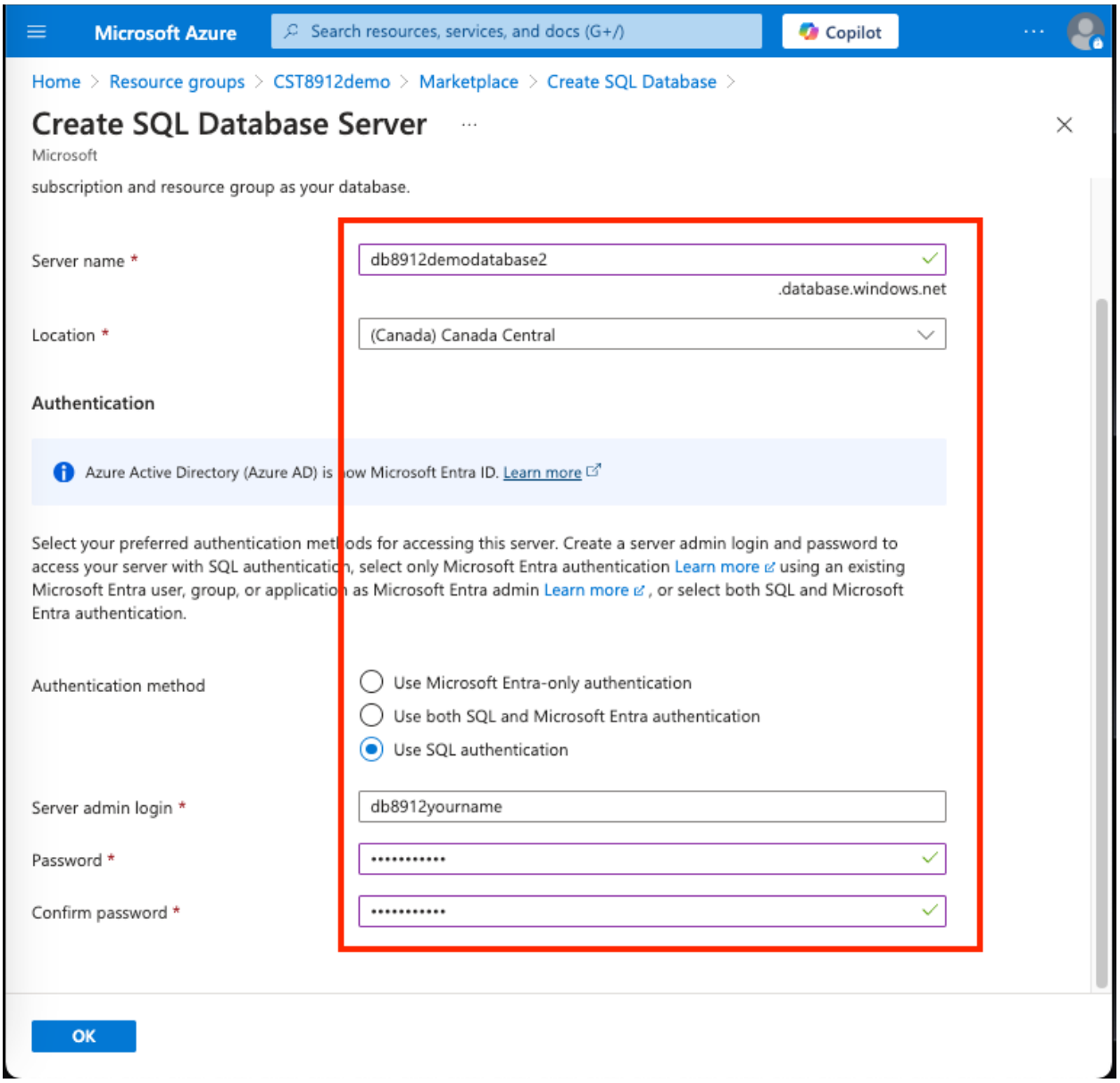
Task 5: Clean up Resources

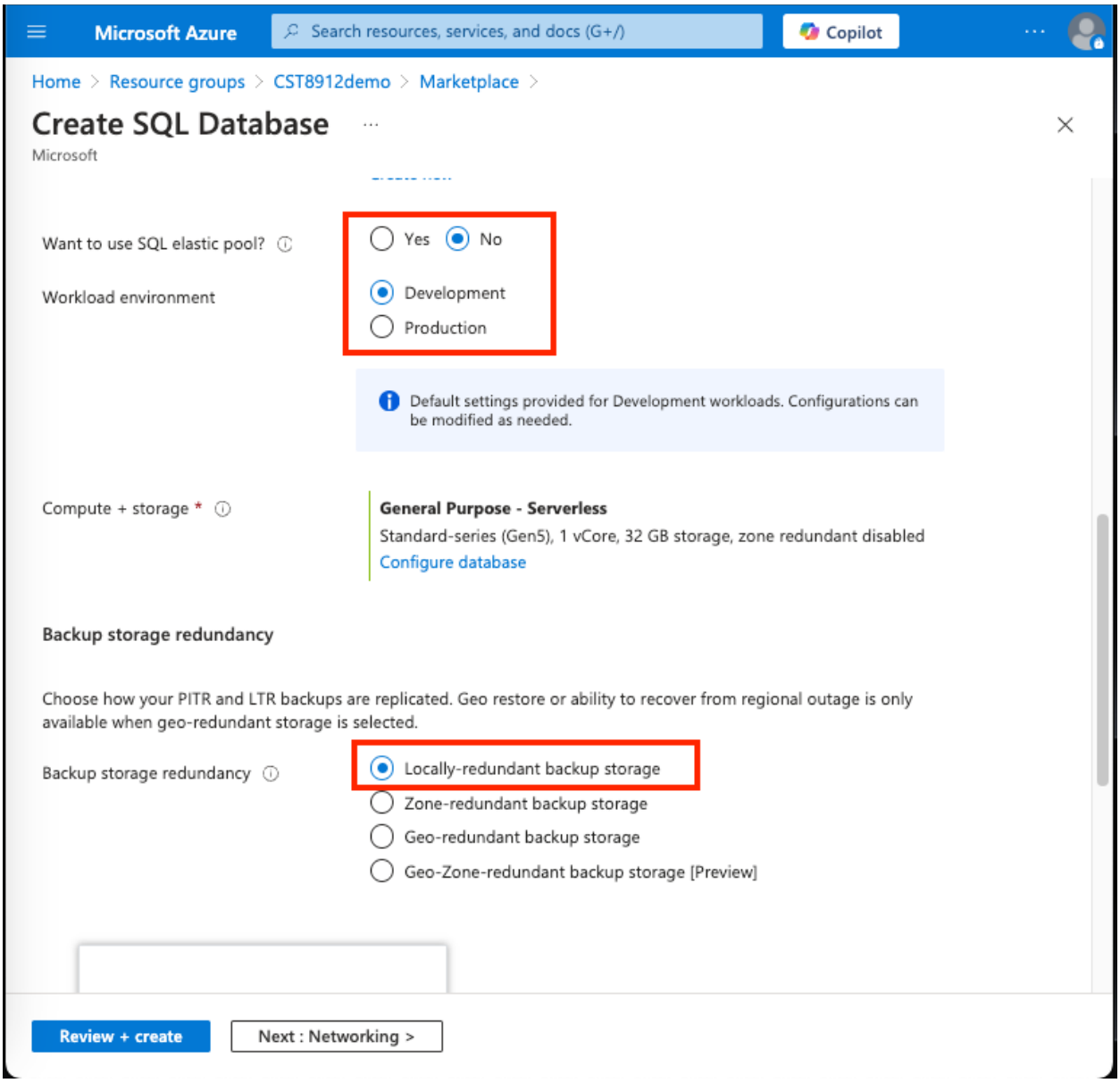
1. Delete all resources created during this lab and document the steps with screenshots for the lab report.

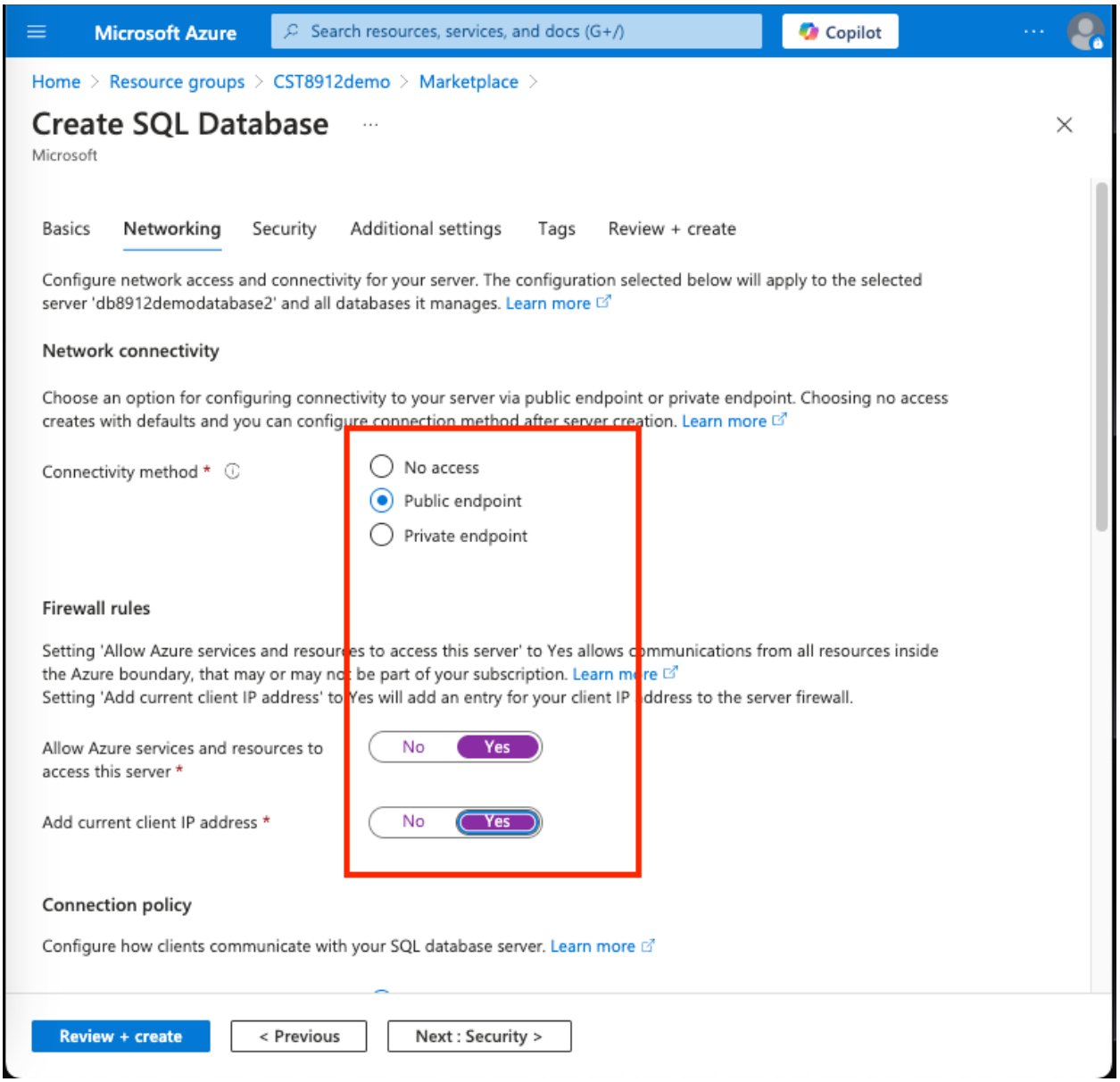
Results

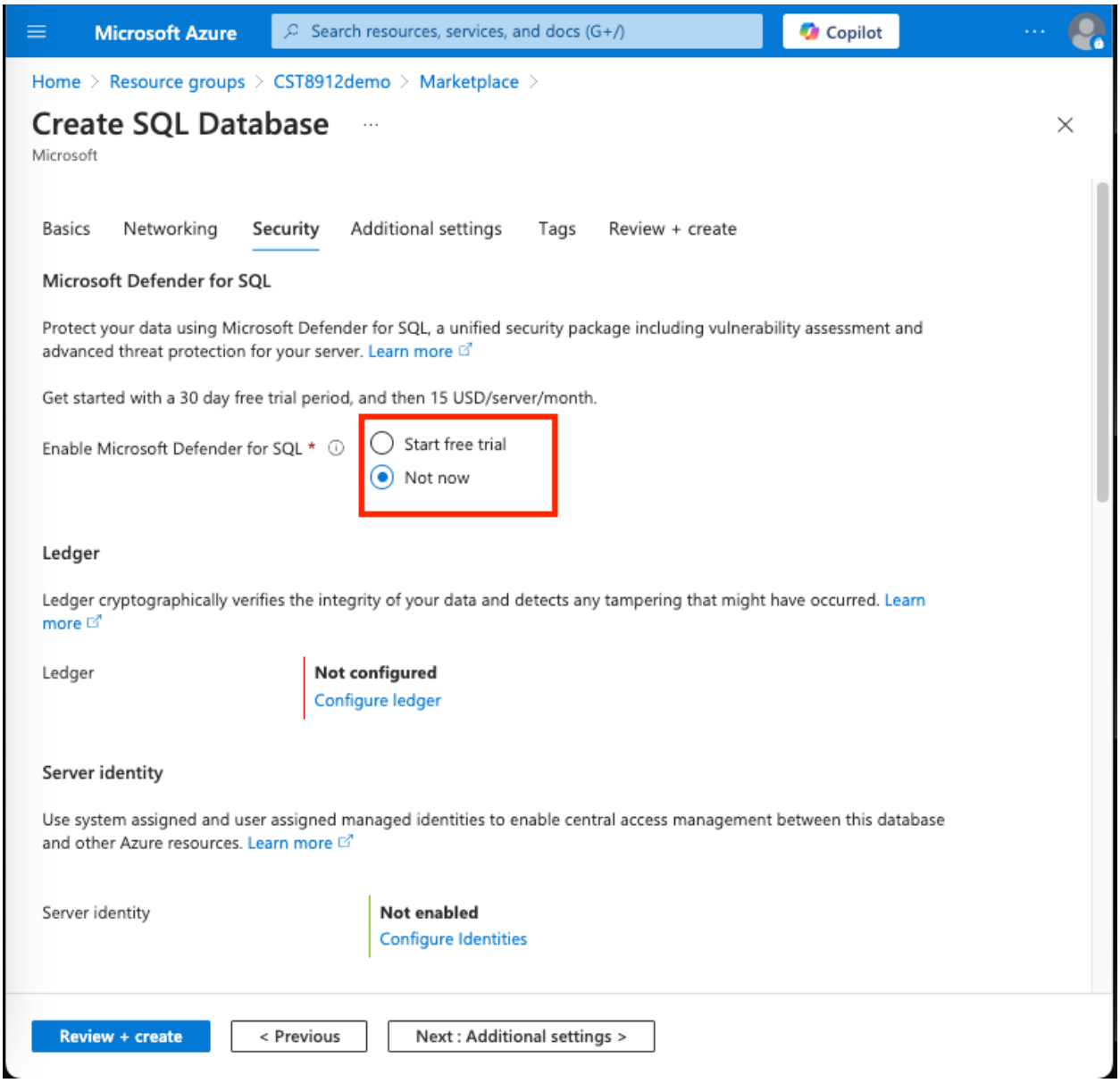
Task 1 - Deploy an Azure SQL Database

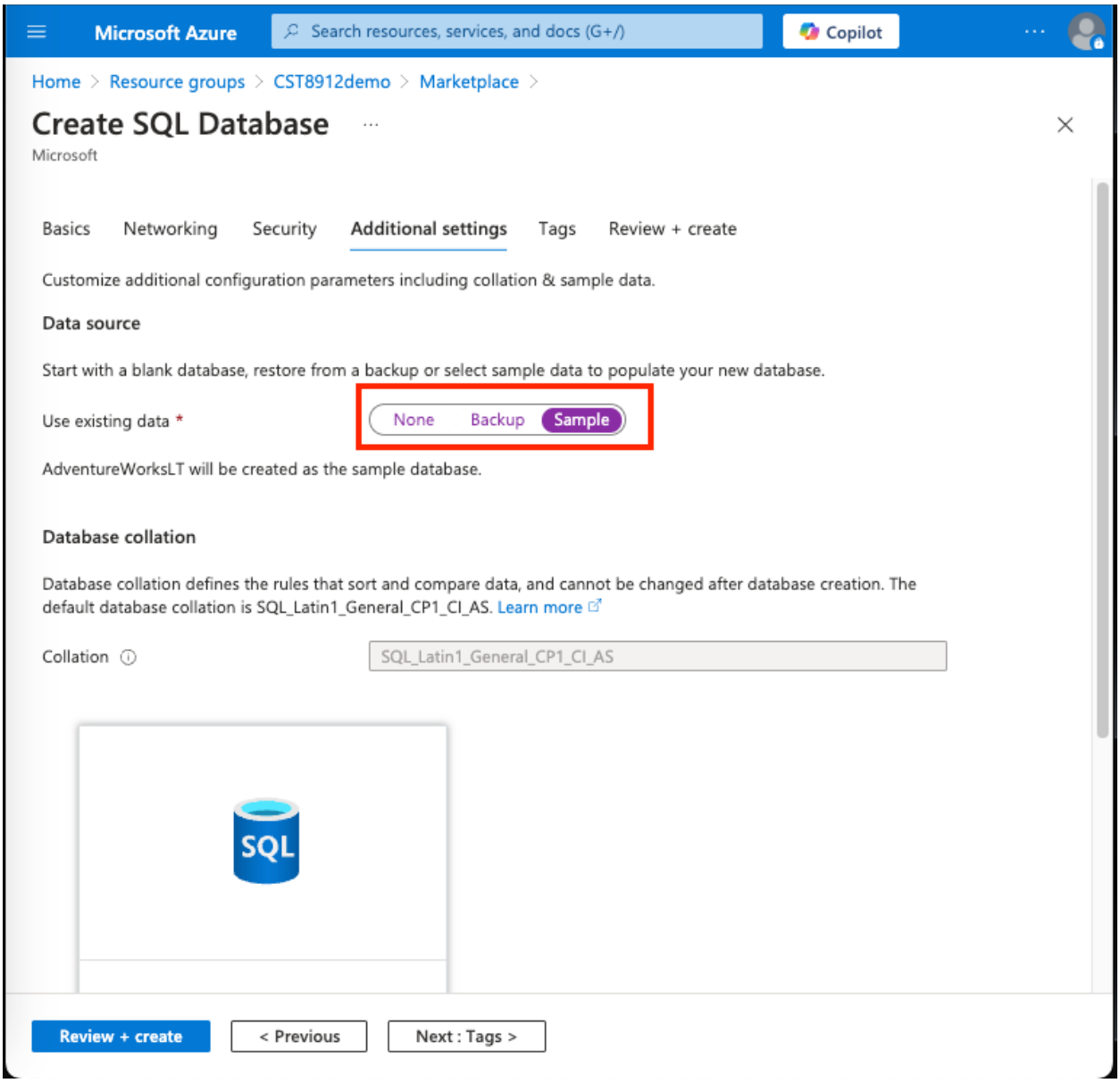

Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home > Resource groups > CST8912demo > Marketplace >
Create SQL Database
Microsoft
Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.
Subscription *
Azure for Students
Resource group *
CST8912demo
Create new
Database details
Enter required settings for this database, including picking a logical server and configuring the compute and storage resources
Database name *
db8912
Server *
Select a server
Create new
The value must not be empty.
Want to use SQL elastic pool?
Yes
No
Workload environment
Development
Production
Default settings provided for Production workloads. Configurations can be modified as needed.
Review + create
Next : Networking >

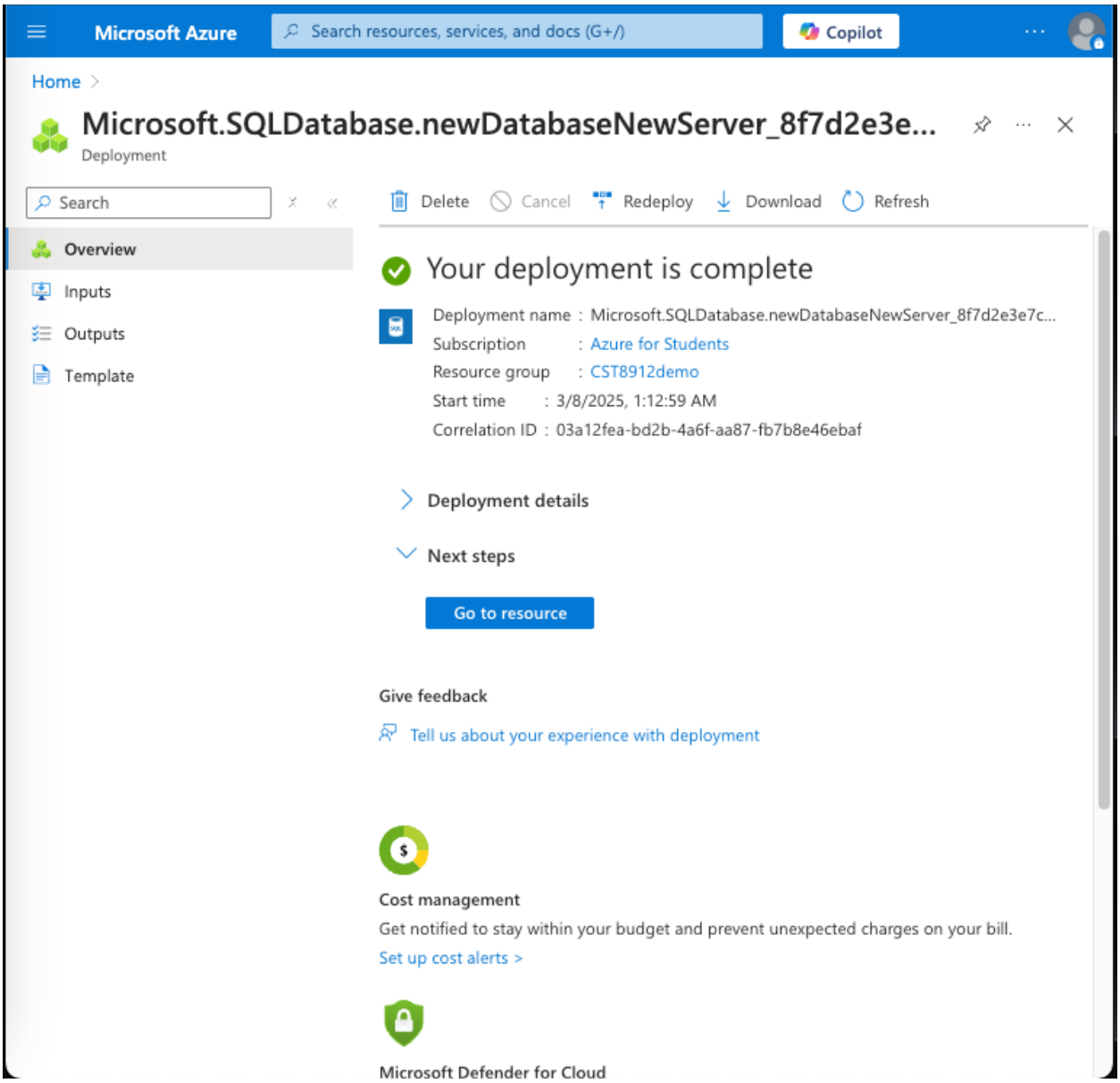

Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home > Resource groups > CST8912demo > Marketplace > Create SQL Database >
Create SQL Database Server
Microsoft
subscription and resource group as your database.
Server name *
db8912demodatabase2
.database.windows.net
Location *
(Canada) Canada Central
Authentication
Azure Active Directory (Azure AD) is now Microsoft Entra ID. Learn more
Select your preferred authentication methods for accessing this server. Create a server admin login and password to access your server with SQL authentication, select only Microsoft Entra authentication Learn more using an existing Microsoft Entra user, group, or application as Microsoft Entra admin Learn more, or select both SQL and Microsoft Entra authentication.
Authentication method
Use Microsoft Entra-only authentication
Use both SQL and Microsoft Entra authentication
Use SQL authentication
Server admin login *
db8912yourname
Password *
Confirm password *
OK

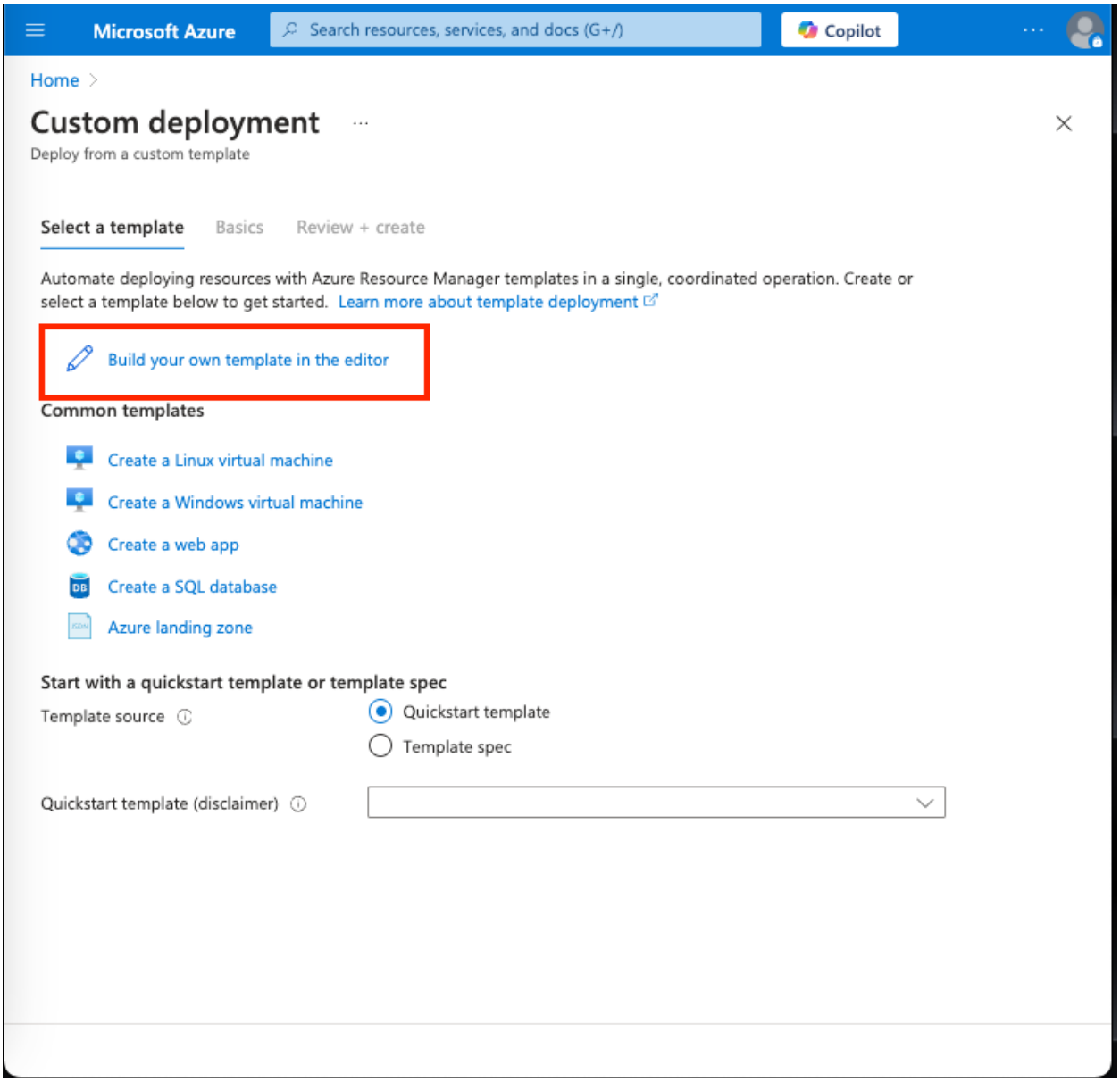

Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home > Resource groups > CST8912demo > Marketplace >
Create SQL Database
Microsoft
Want to use SQL elastic pool?
Yes
No
Workload environment
Development
Production
Default settings provided for Development workloads. Configurations can be modified as needed.
Compute + storage *
General Purpose - Serverless
Standard-series (Gen5), 1 vCore, 32 GB storage, zone redundant disabled
Configure database
Backup storage redundancy
Choose how your PITR and LTR backups are replicated. Geo restore or ability to recover from regional outage is only available when geo-redundant storage is selected.
Backup storage redundancy
Locally-redundant backup storage
Zone-redundant backup storage
Geo-redundant backup storage
Geo-Zone-redundant backup storage [Preview]
Review + create
Next : Networking >

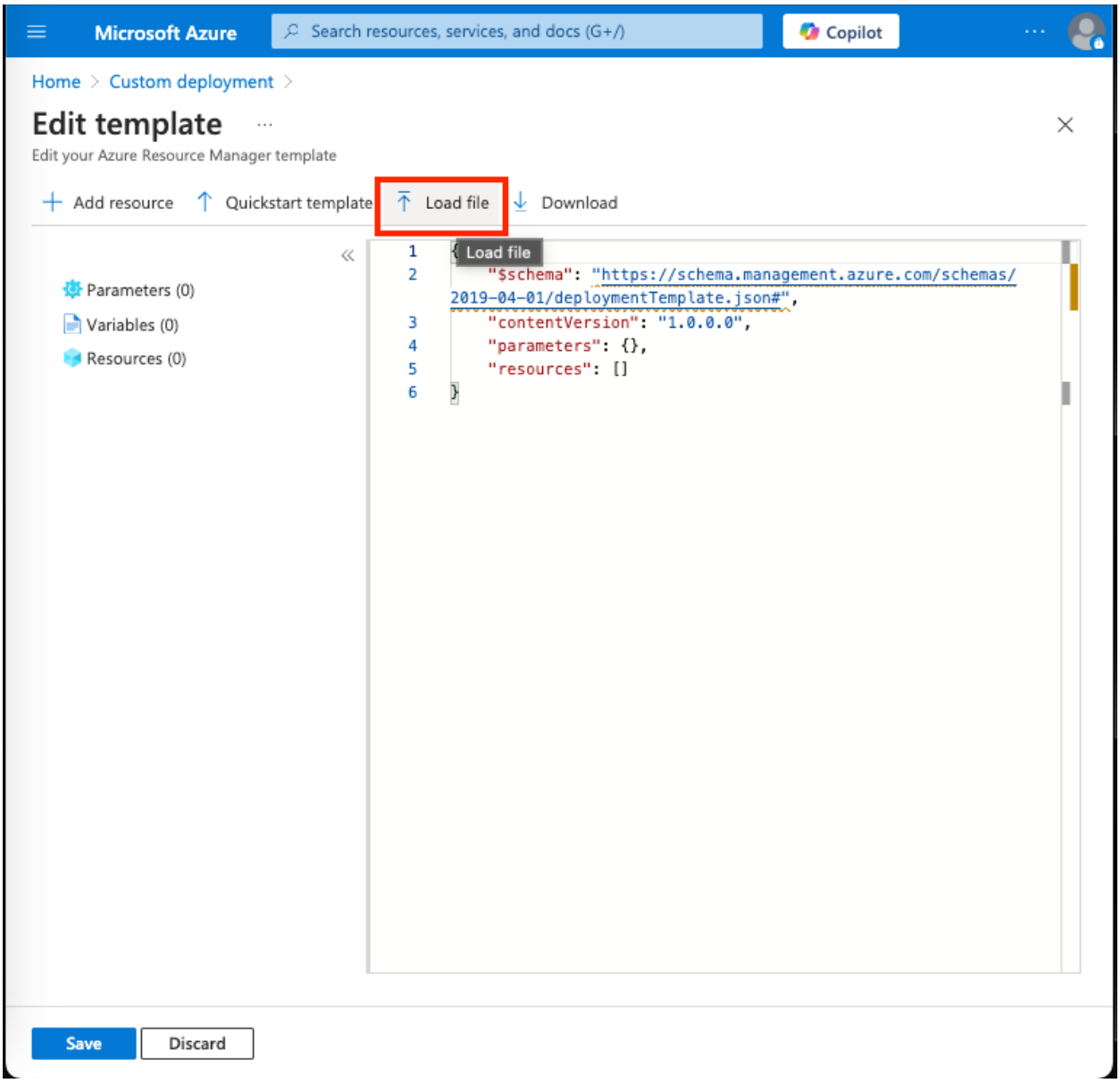

Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home > Resource groups > CST8912demo > Marketplace >
Create SQL Database
Microsoft
Basics
Networking
Security
Additional settings
Tags
Review + create
Configure network access and connectivity for your server. The configuration selected below will apply to the selected server 'db8912demodatabase2' and all databases it manages. Learn more
Network connectivity
Choose an option for configuring connectivity to your server via public endpoint or private endpoint. Choosing no access creates with defaults and you can configure connection method after server creation. Learn more
Connectivity method *
No access
Public endpoint
Private endpoint
Firewall rules
Setting 'Allow Azure services and resources to access this server' to Yes allows communications from all resources inside the Azure boundary, that may or may not be part of your subscription. Learn more
Setting 'Add current client IP address' to Yes will add an entry for your client IP address to the server firewall.
Allow Azure services and resources to access this server *
No
Yes
Add current client IP address *
No
Yes
Connection policy
Configure how clients communicate with your SQL database server. Learn more
Review + create
< Previous
Next : Security >

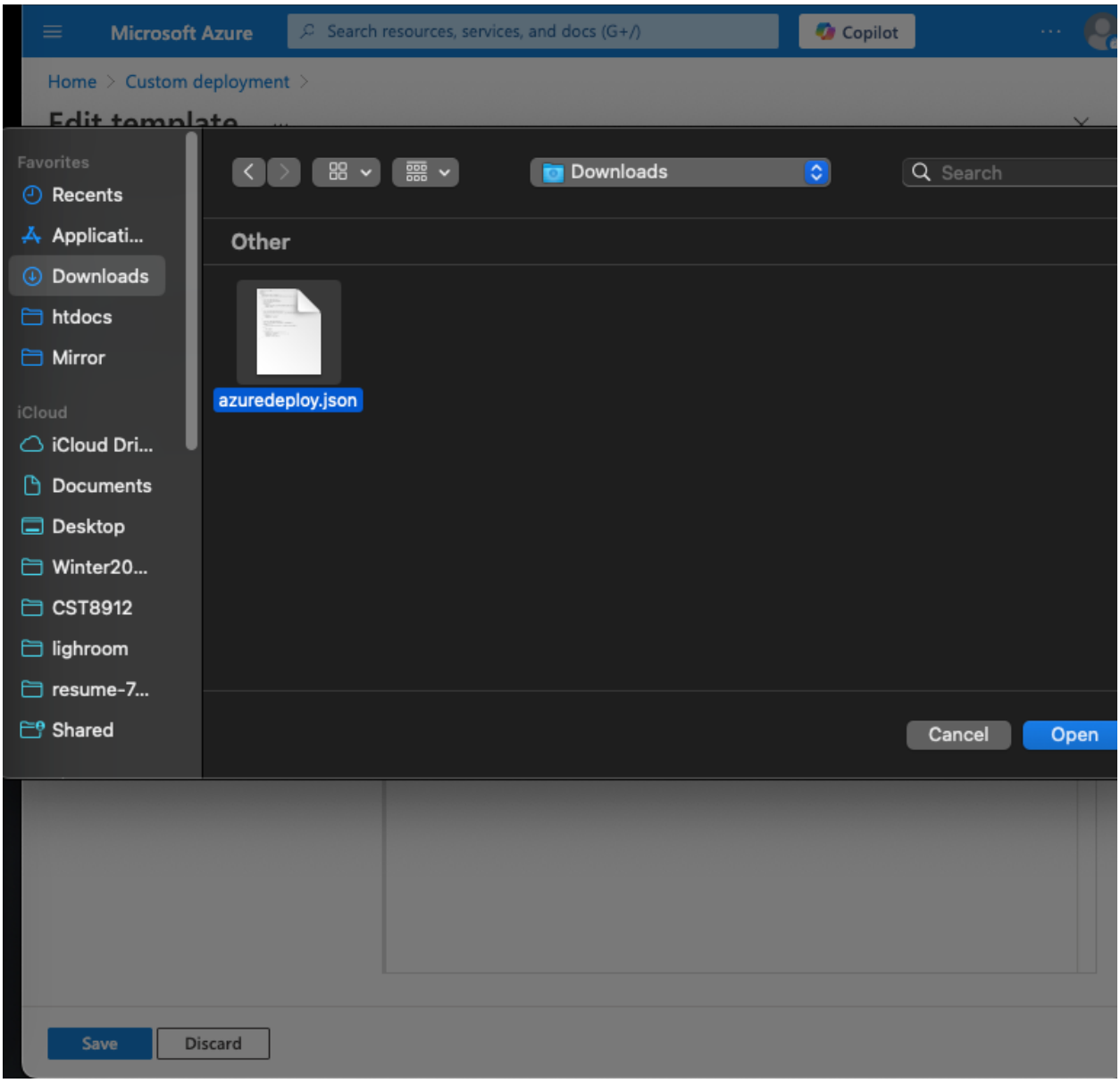

Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home > Resource groups > CST8912demo > Marketplace >
Create SQL Database
Microsoft
Basics
Networking
Security
Additional settings
Tags
Review + create
Microsoft Defender for SQL
Protect your data using Microsoft Defender for SQL, a unified security package including vulnerability assessment and advanced threat protection for your server. Learn more
Get started with a 30 day free trial period, and then 15 USD/server/month.
Enable Microsoft Defender for SQL *
Start free trial
Not now
Ledger
Ledger cryptographically verifies the integrity of your data and detects any tampering that might have occurred. Learn more
Ledger
Not configured
Configure ledger
Server identity
Use system assigned and user assigned managed identities to enable central access management between this database and other Azure resources. Learn more
Server identity
Not enabled
Configure Identities
Review + create
< Previous
Next : Additional settings >

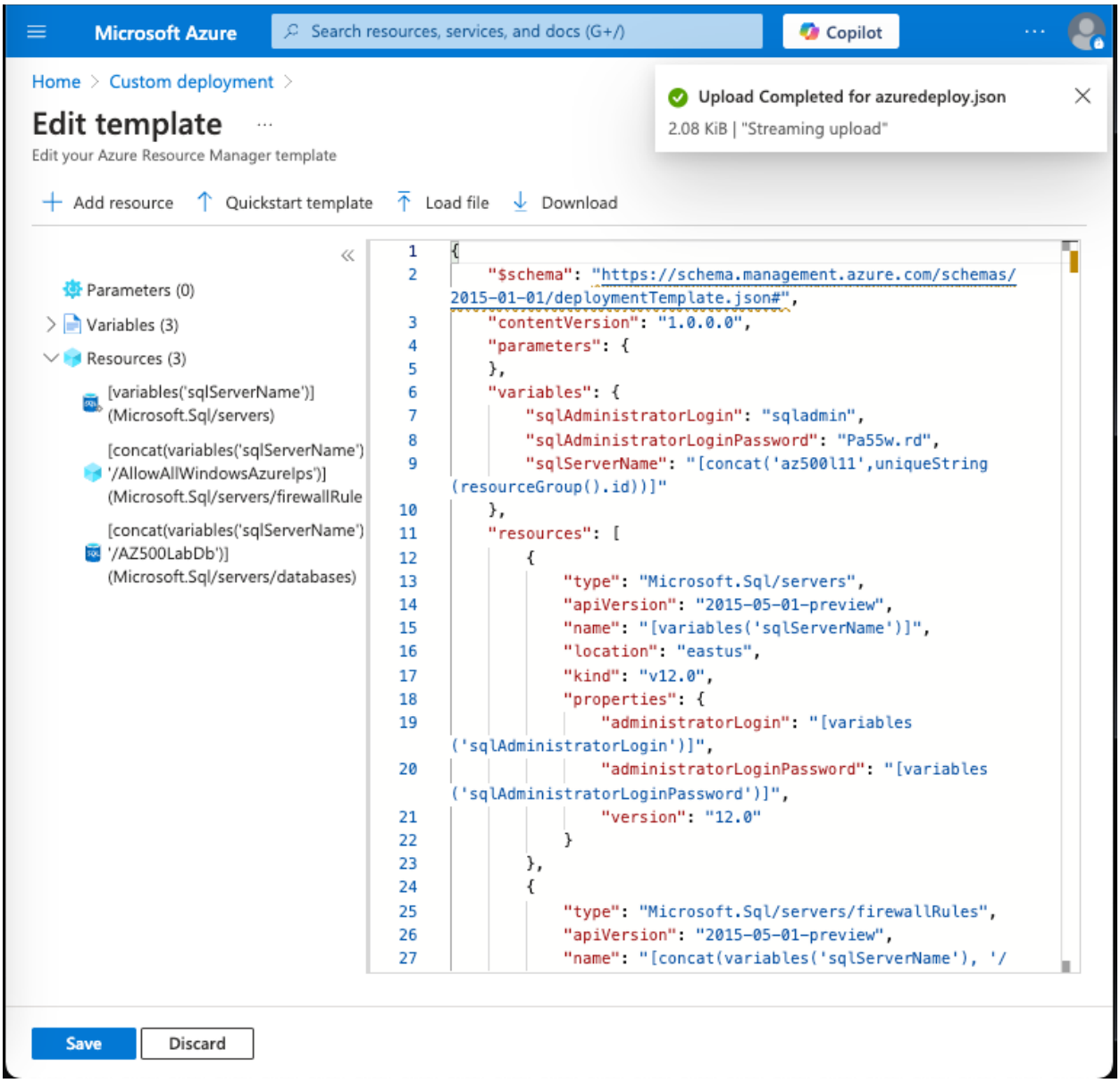

Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home > Resource groups > CST8912demo > Marketplace >
Create SQL Database
Microsoft
Basics
Networking
Security
Additional settings
Tags
Review + create
Customize additional configuration parameters including collation & sample data.
Data source
Start with a blank database, restore from a backup or select sample data to populate your new database.
Use existing data *
None
Backup
Sample
AdventureWorksLT will be created as the sample database.
Database collation
Database collation defines the rules that sort and compare data, and cannot be changed after database creation. The default database collation is SQL_Latin1_General_CP1_CI_AS. Learn more
Collation
SQL_Latin1_General_CP1_CI_AS
SQL
Review + create
< Previous
Next : Tags >

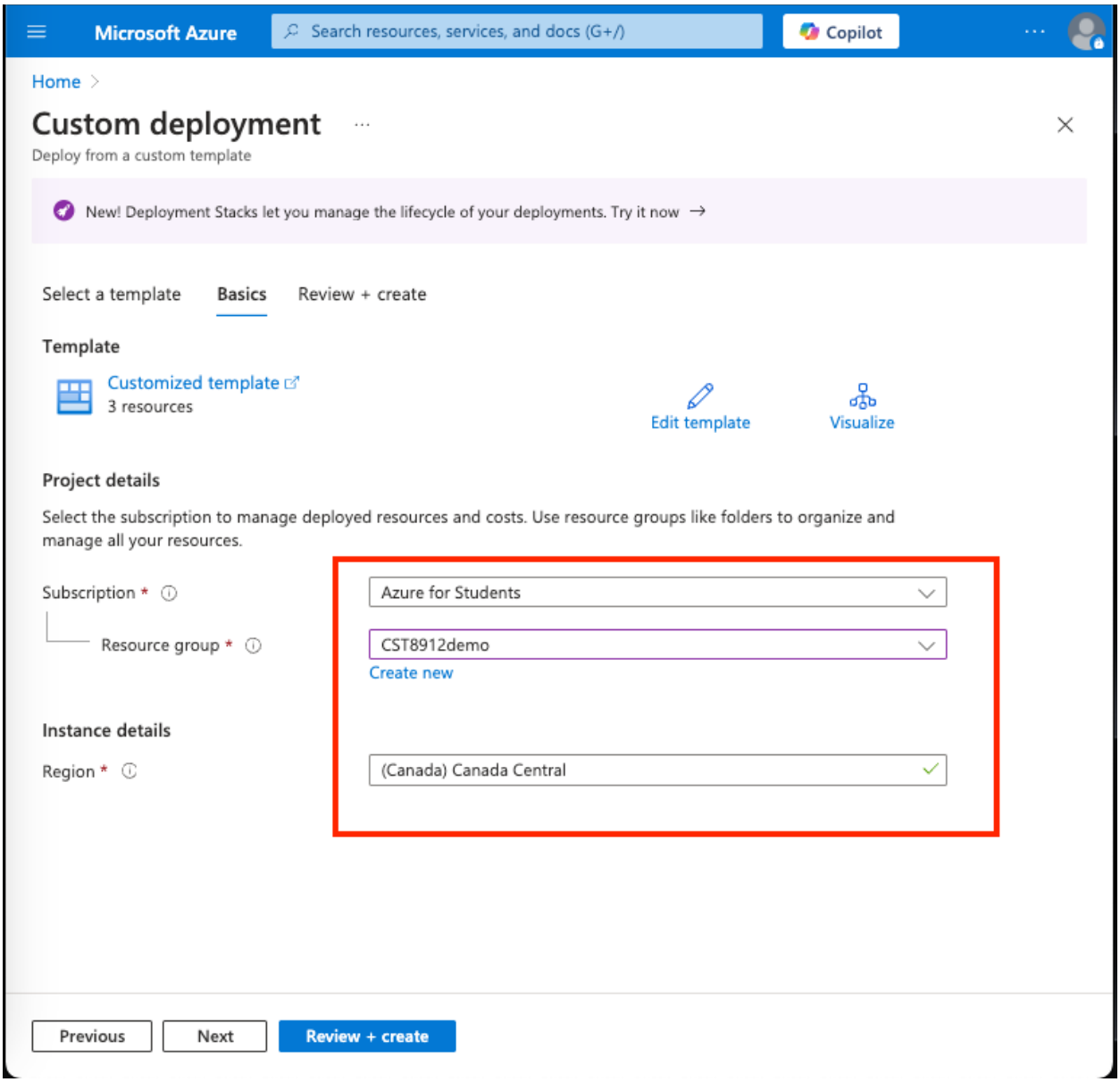

Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home
Microsoft.SQLDatabase.newDatabaseNewServer_8f7d2e3e...
Deployment
Search
Overview
Inputs
Outputs
Template
Delete
Cancel
Redeploy
Download
Refresh
Your deployment is complete
Deployment name : Microsoft.SQLDatabase.newDatabaseNewServer_8f7d2e3e7c...
Subscription : Azure for Students
Resource group : CST8912demo
Start time : 3/8/2025, 1:12:59 AM
Correlation ID : 03a12fea-bd2b-4a6f-aa87-fb7b8e46ebaf
Deployment details
Next steps
Go to resource
Give feedback
Tell us about your experience with deployment
Cost management
Get notified to stay within your budget and prevent unexpected charges on your bill.
Set up cost alerts >
Microsoft Defender for Cloud

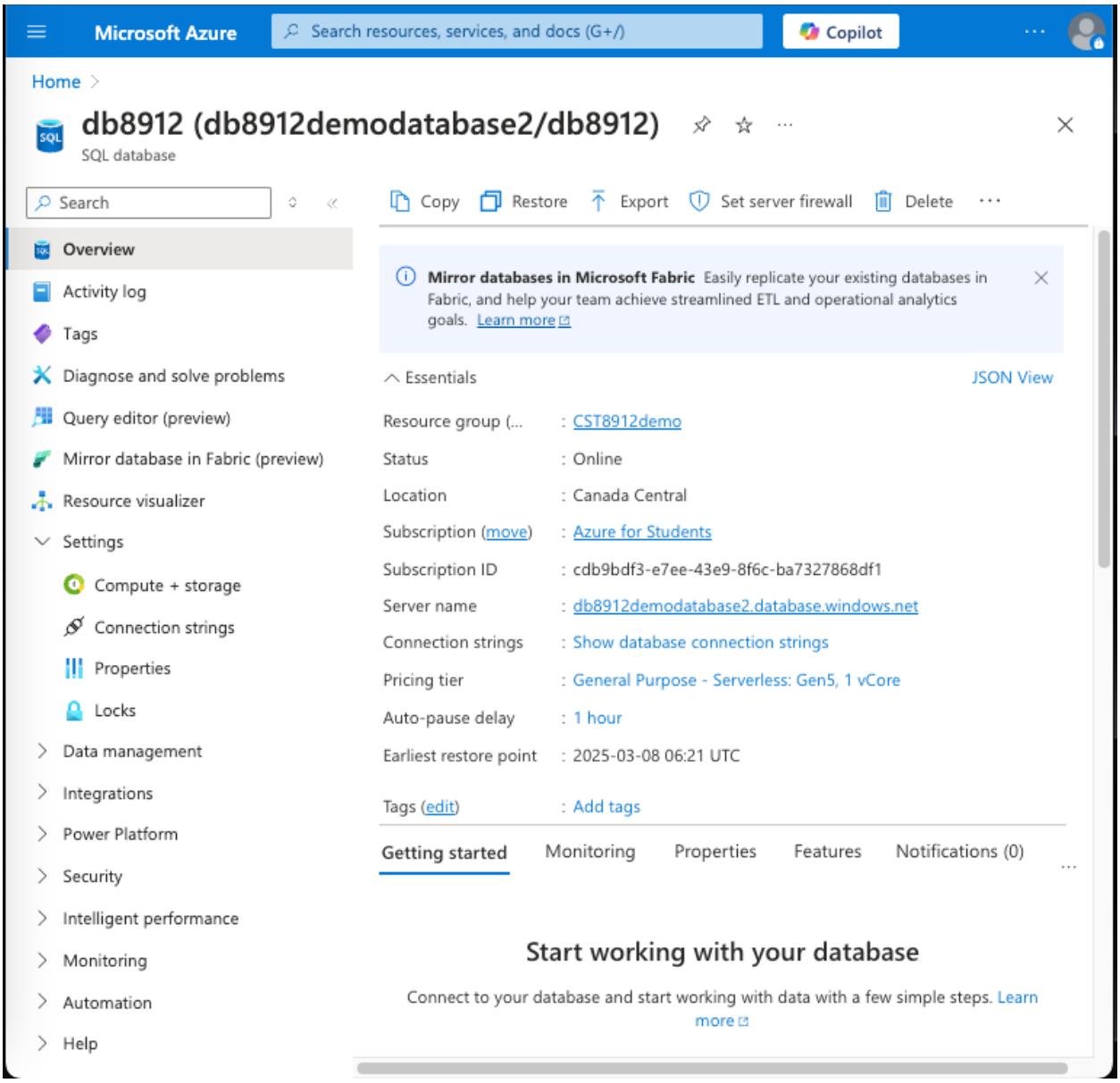

Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home
Custom deployment
Deploy from a custom template
Select a template
Basics
Review + create
Automate deploying resources with Azure Resource Manager templates in a single, coordinated operation. Create or select a template below to get started. Learn more about template deployment
Build your own template in the editor
Common templates
Create a Linux virtual machine
Create a Windows virtual machine
Create a web app
Create a SQL database
Azure landing zone
Start with a quickstart template or template spec
Template source
Quickstart template
Template spec
Quickstart template (disclaimer)


Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home
Custom deployment
Edit template
Edit your Azure Resource Manager template
Add resource
Quickstart template
Load file
Download
Parameters (0)
Variables (0)
Resources (0)
Load file
{
"$schema": "https://schema.management.azure.com/schemas/2019-04-01/deploymentTemplate.json#",
"contentVersion": "1.0.0.0",
"parameters": {},
"resources": []
}
Save
Discard

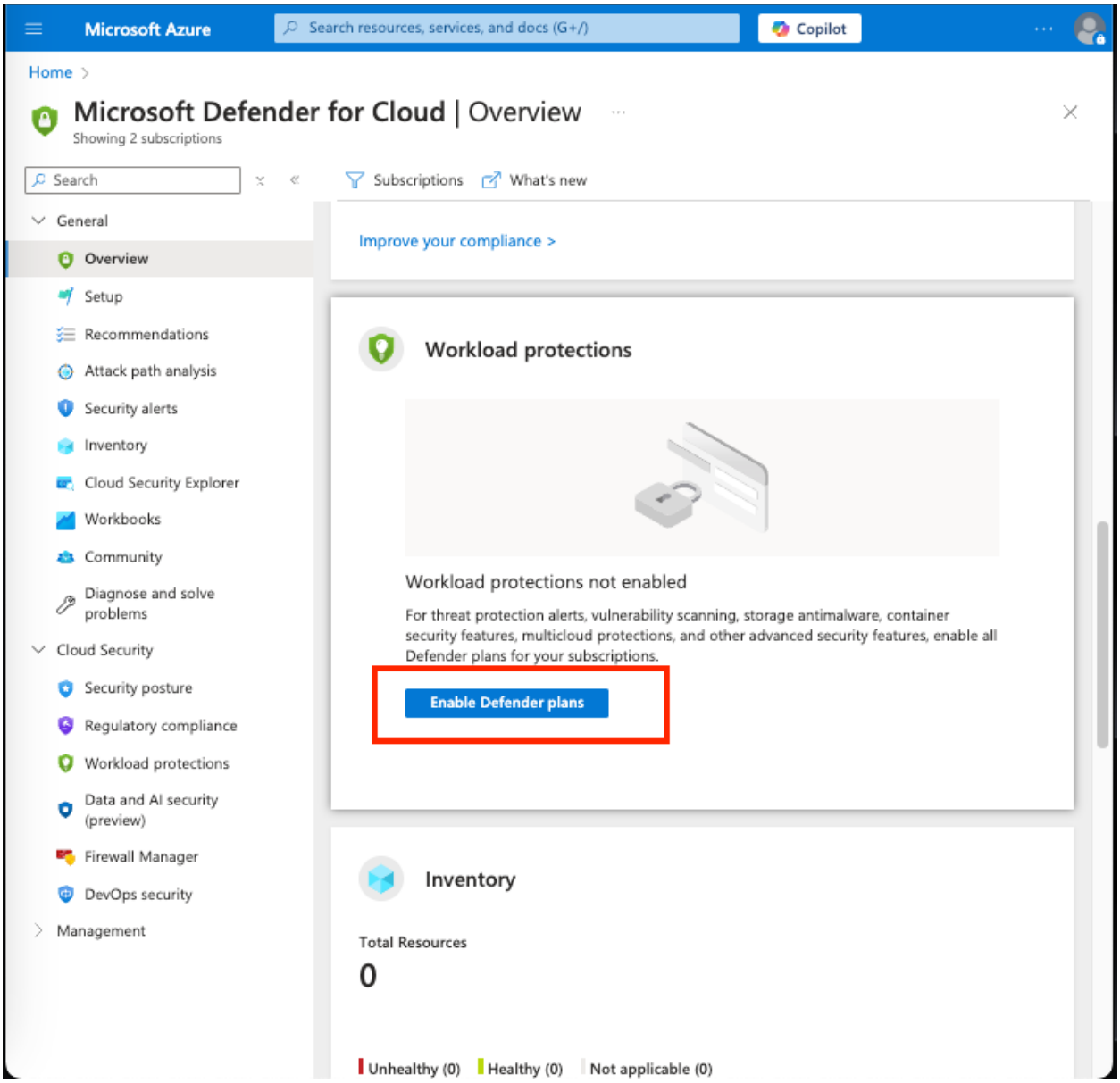

Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home
Custom deployment
Edit template
Favorites
Recents
Applicati...
Downloads
htdocs
Mirror
iCloud
iCloud Dri...
Documents
Desktop
Winter20...
CST8912
lighroom
resume-7...
Shared
Downloads
Search
Other
azuredeploy.json
Cancel
Open
Save
Discard

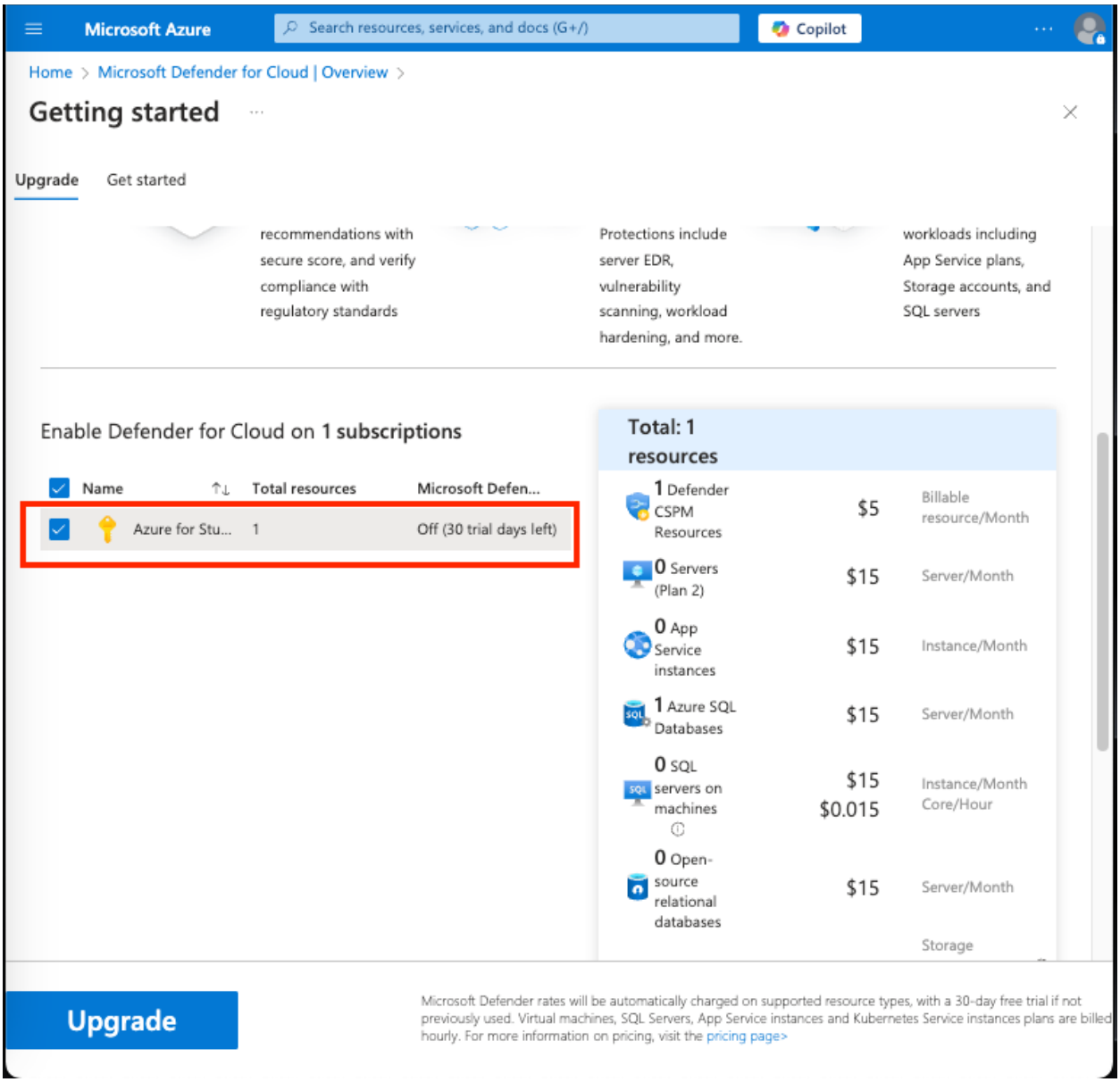

Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home > Custom deployment >
Upload Completed for azuredeploy.json
2.08 KiB | "Streaming upload"
Edit template
Edit your Azure Resource Manager template
Add resource
Quickstart template
Load file
Download
Parameters (0)
Variables (3)
Resources (3)
[variables('sqlServerName')] (Microsoft.Sql/servers)
[concat(variables('sqlServerName') '/AllowAllWindowsAzureIps')] (Microsoft.Sql/servers/firewallRule
[concat(variables('sqlServerName') '/AZ500LabDb')] (Microsoft.Sql/servers/databases)
{
"$schema": "https://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json#",
"contentVersion": "1.0.0.0",
"parameters": {
},
"variables": {
"sqlAdministratorLogin": "sqladmin",
"sqlAdministratorLoginPassword": "Pa55w.rd",
"sqlServerName": "[concat('az500l11',uniqueString(resourceGroup().id))]"
},
"resources": [
{
"type": "Microsoft.Sql/servers",
"apiVersion": "2015-05-01-preview",
"name": "[variables('sqlServerName')]",
"location": "eastus",
"kind": "v12.0",
"properties": {
"administratorLogin": "[variables('sqlAdministratorLogin')]",
"administratorLoginPassword": "[variables('sqlAdministratorLoginPassword')]",
"version": "12.0"
}
},
{
"type": "Microsoft.Sql/servers/firewallRules",
"apiVersion": "2015-05-01-preview",
"name": "[concat(variables('sqlServerName'), '/
Save
Discard

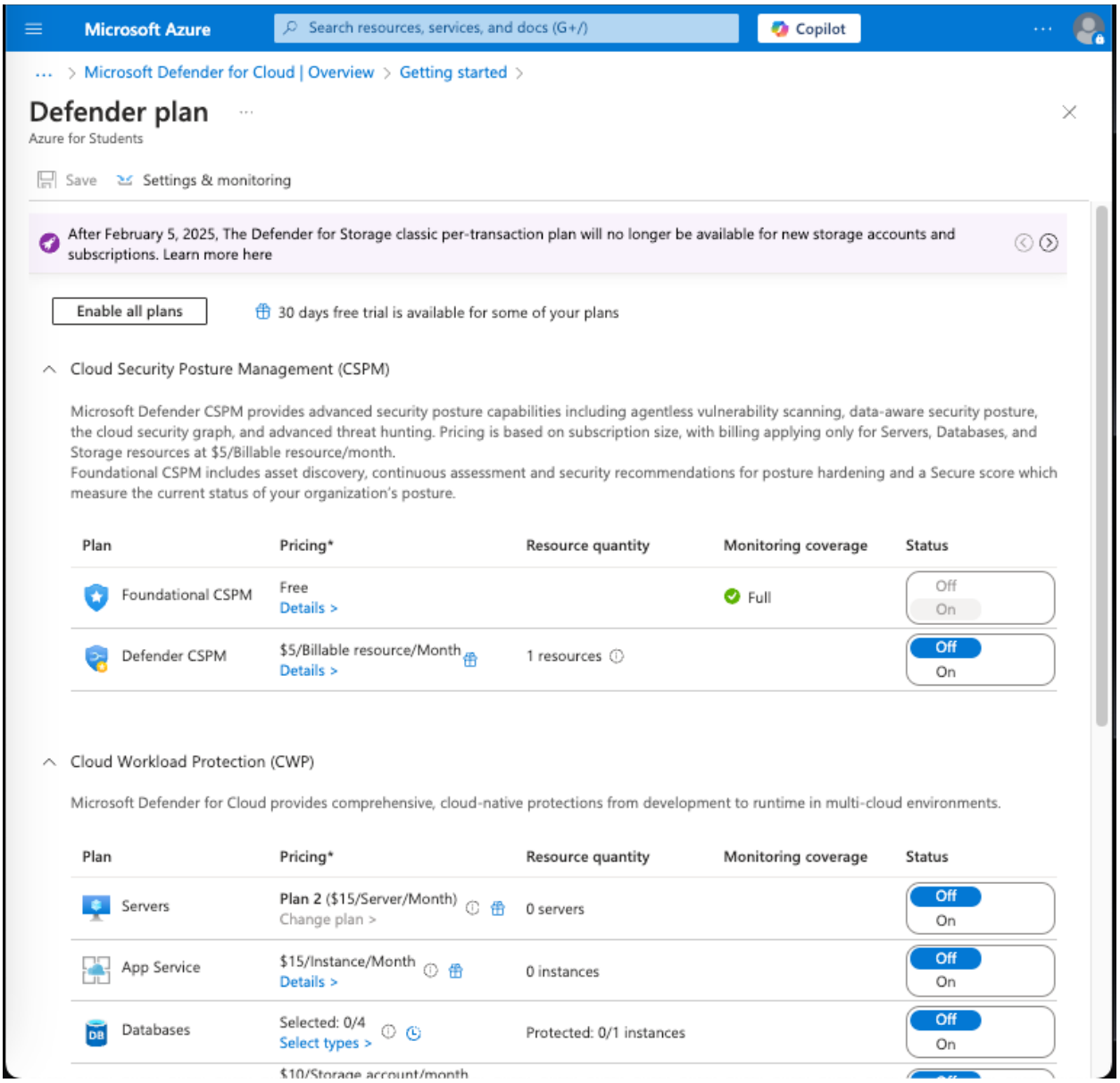

Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home
Custom deployment
Deploy from a custom template
New! Deployment Stacks let you manage the lifecycle of your deployments. Try it now →
Select a template
Basics
Review + create
Template
Customized template
3 resources
Edit template
Visualize
Project details
Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.
Subscription *
Azure for Students
Resource group *
CST8912demo
Create new
Instance details
Region *
(Canada) Canada Central
Previous
Next
Review + create



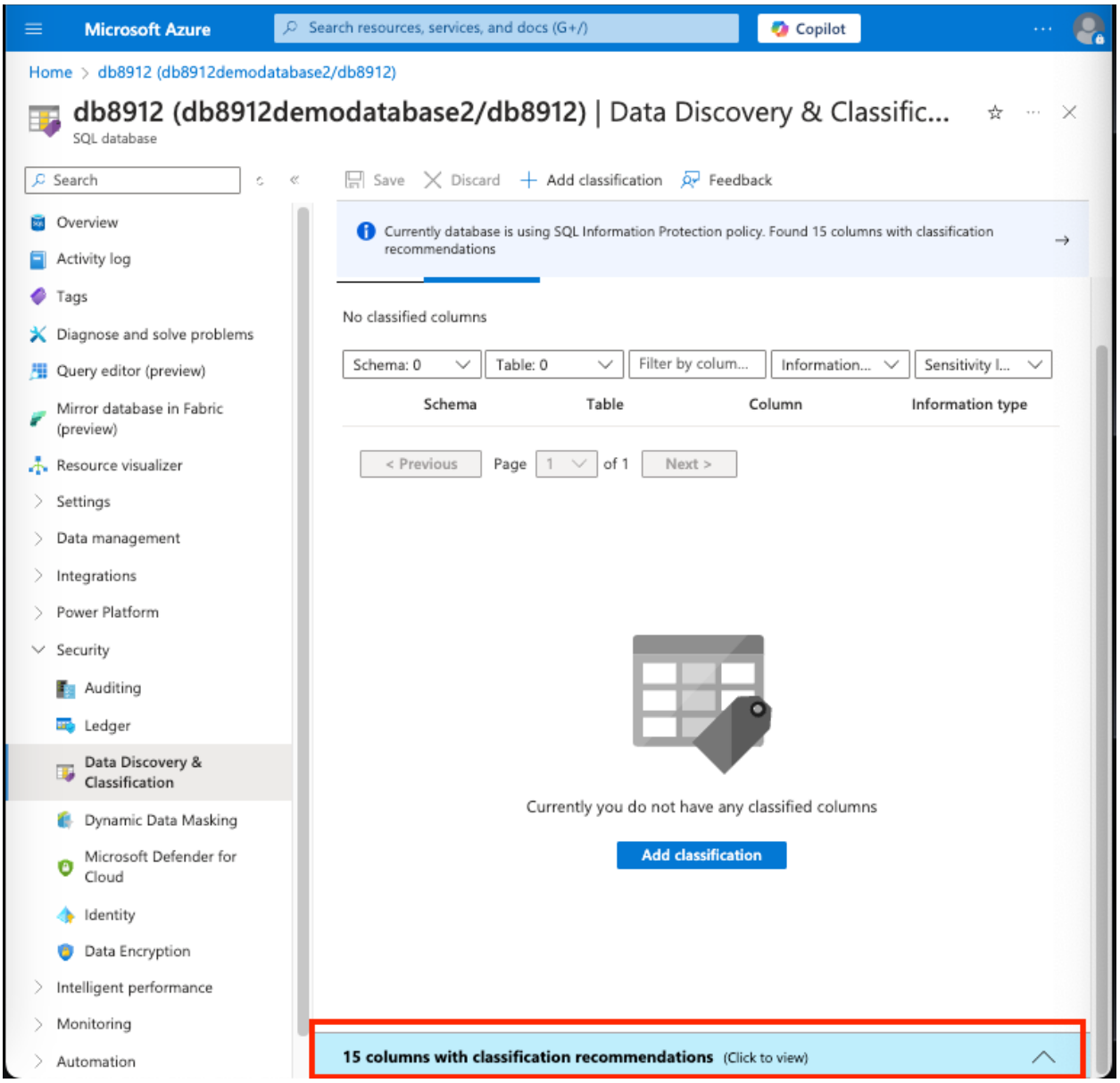
Task 2 - Configure Advanced Data Protection

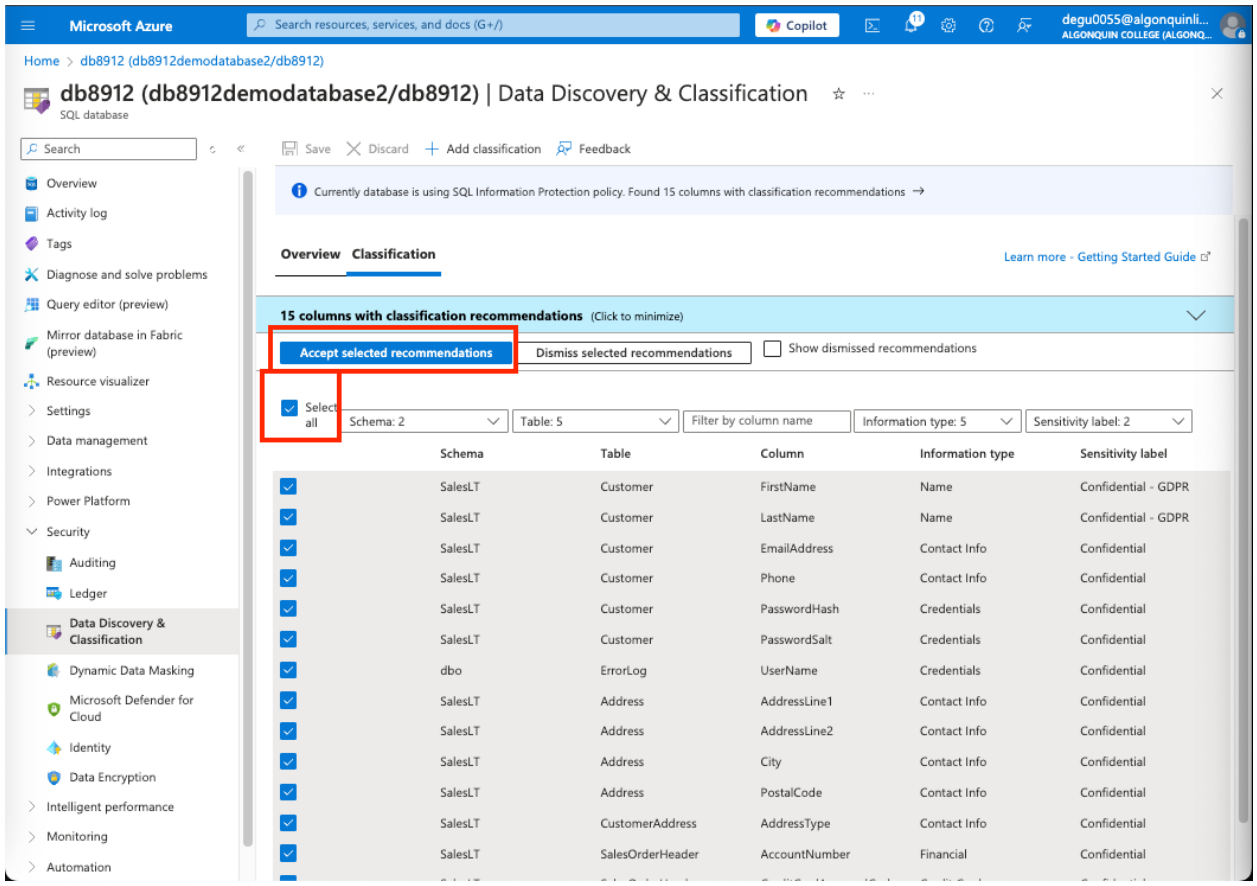

Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home
Microsoft Defender for Cloud | Overview
Showing 2 subscriptions
Search
Subscriptions
What's new
General
Overview
Setup
Recommendations
Attack path analysis
Security alerts
Inventory
Cloud Security Explorer
Workbooks
Community
Diagnose and solve problems
Cloud Security
Security posture
Regulatory compliance
Workload protections
Data and AI security (preview)
Firewall Manager
DevOps security
Management
Improve your compliance >
Workload protections
Workload protections not enabled
For threat protection alerts, vulnerability scanning, storage antimalware, container security features, multicloud protections, and other advanced security features, enable all Defender plans for your subscriptions.
Enable Defender plans
Inventory
Total Resources
0
Unhealthy (0)
Healthy (0)
Not applicable (0)


Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home > Microsoft Defender for Cloud | Overview >
Getting started
Upgrade
Get started
recommendations with secure score, and verify compliance with regulatory standards
Protections include server EDR, vulnerability scanning, workload hardening, and more.
workloads including App Service plans, Storage accounts, and SQL servers
Enable Defender for Cloud on 1 subscriptions
Name
Total resources
Microsoft Defen...
Azure for Stu...
1
Off (30 trial days left)
Total: 1 resources
1 Defender CSPM Resources
$5
Billable resource/Month
0 Servers (Plan 2)
$15
Server/Month
0 App Service instances
$15
Instance/Month
1 Azure SQL Databases
$15
Server/Month
0 SQL servers on machines
$15
$0.015
Instance/Month
Core/Hour
0 Open-source relational databases
$15
Server/Month
Storage
Upgrade
Microsoft Defender rates will be automatically charged on supported resource types, with a 30-day free trial if not previously used. Virtual machines, SQL Servers, App Service instances and Kubernetes Service instances plans are billed hourly. For more information on pricing, visit the pricing page>



Task 3 - Configure Data Classification


Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home > db8912 (db8912demodatabase2/db8912)
db8912 (db8912demodatabase2/db8912) | Data Discovery & Classific...
SQL database
Search
Overview
Activity log
Tags
Diagnose and solve problems
Query editor (preview)
Mirror database in Fabric (preview)
Resource visualizer
Settings
Data management
Integrations
Power Platform
Security
Auditing
Ledger
Data Discovery & Classification
Dynamic Data Masking
Microsoft Defender for Cloud
Identity
Data Encryption
Intelligent performance
Monitoring
Automation
Save
Discard
Add classification
Feedback
Currently database is using SQL Information Protection policy. Found 15 columns with classification recommendations
No classified columns
Schema: 0
Table: 0
Filter by colum...
Information...
Sensitivity l...
Schema
Table
Column
Information type
< Previous
Page 1 of 1
Next >
Currently you do not have any classified columns
Add classification
15 columns with classification recommendations (Click to view)


Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
degu0055@algonquinli...
ALGONQUIN COLLEGE (ALGONQ...
Home > db8912 (db8912demodatabase2/db8912)
db8912 (db8912demodatabase2/db8912) | Data Discovery & Classification
SQL database
Search
Save
Discard
Add classification
Feedback
Overview
Activity log
Tags
Diagnose and solve problems
Query editor (preview)
Mirror database in Fabric (preview)
Resource visualizer
Settings
Data management
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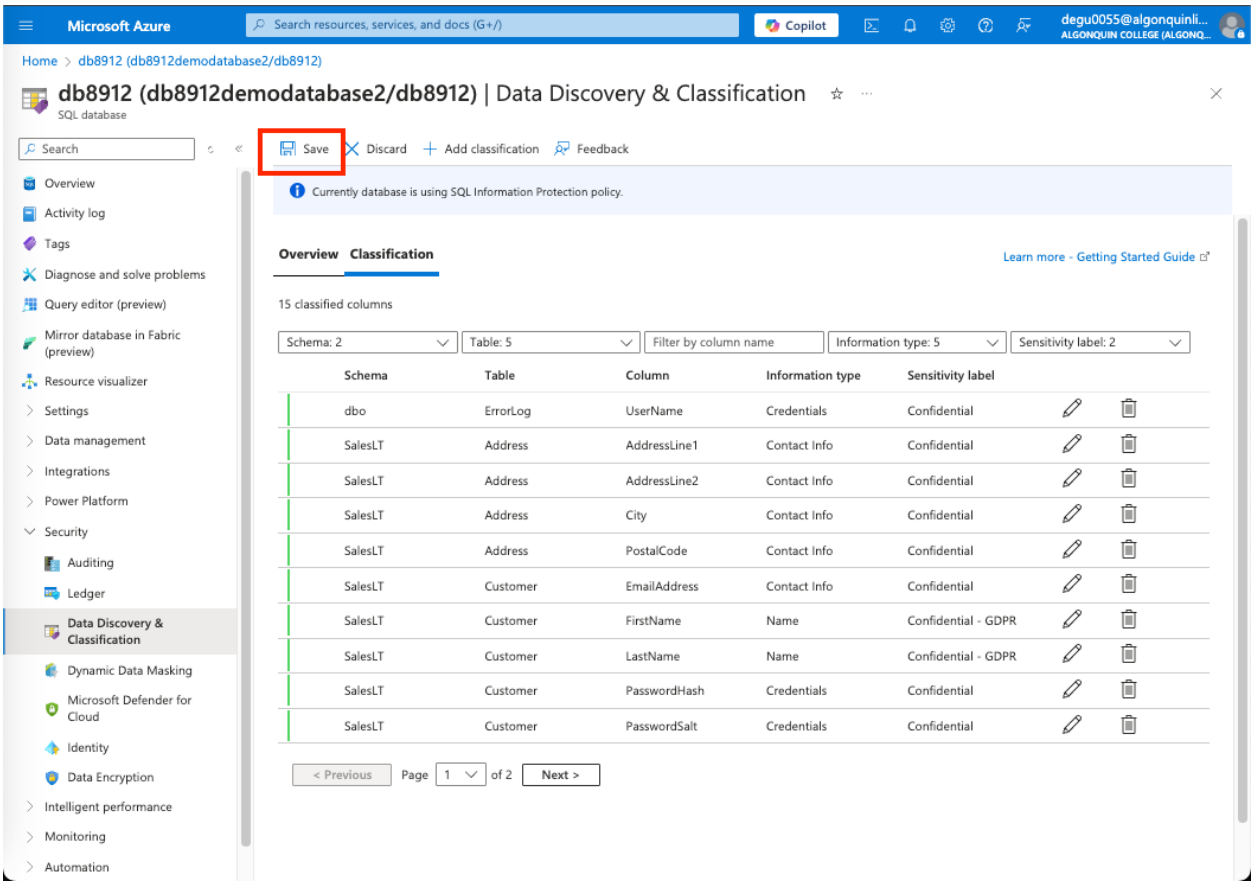
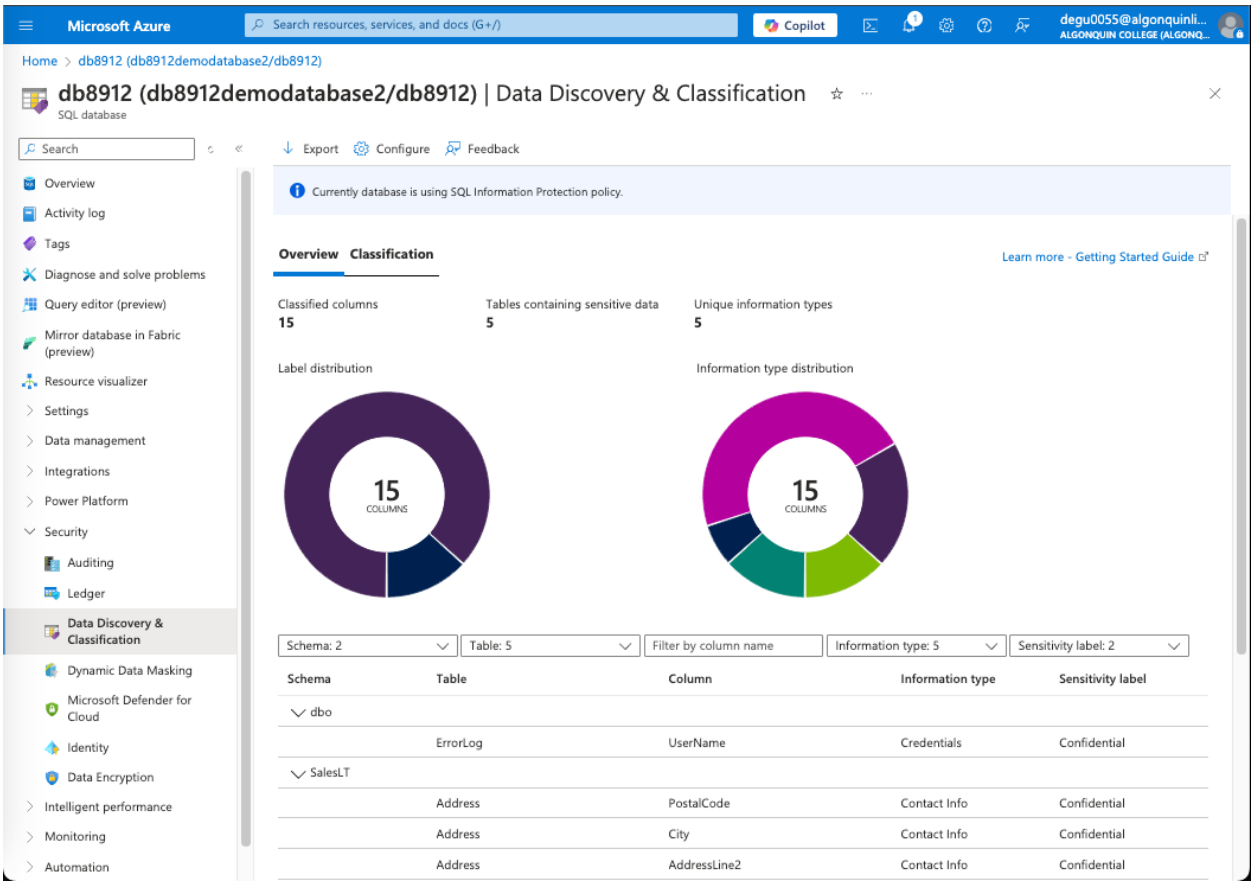
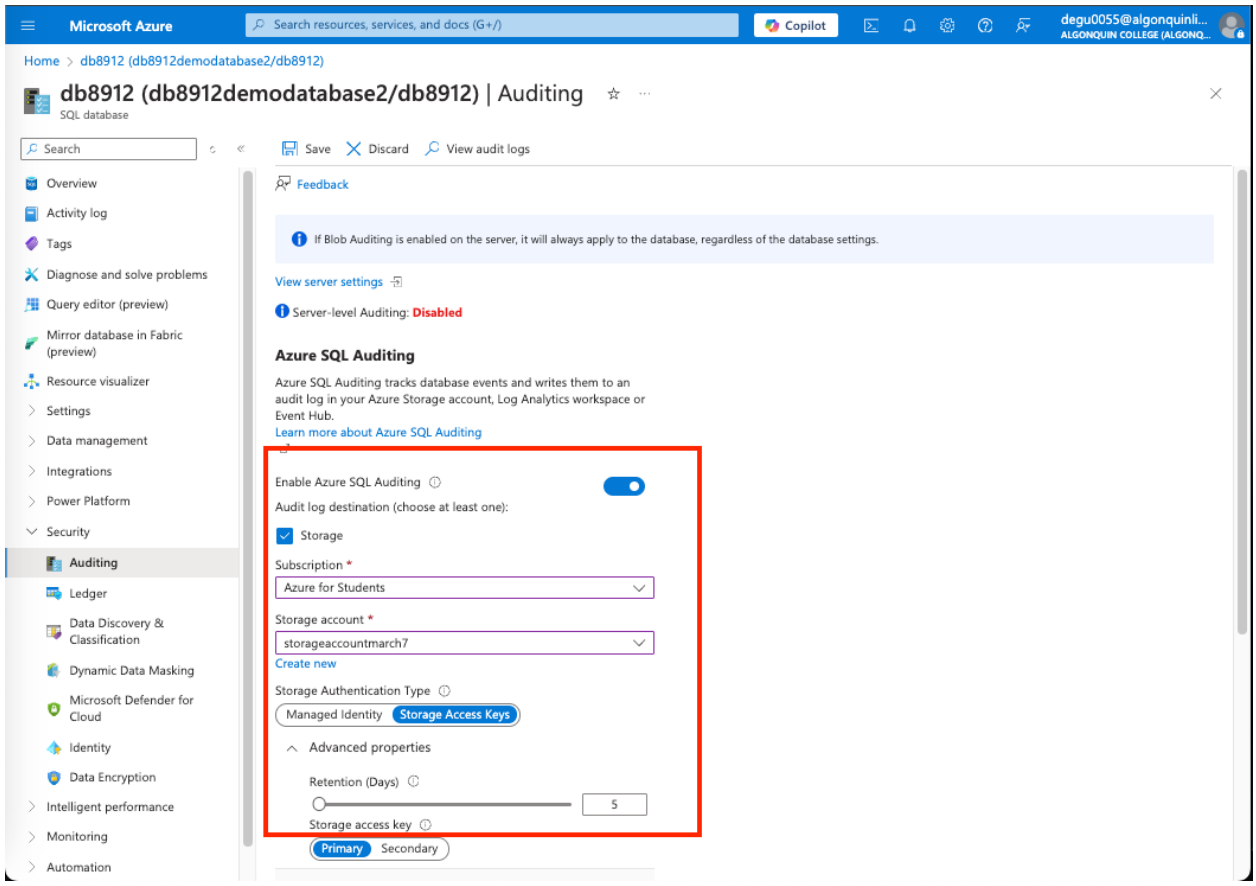
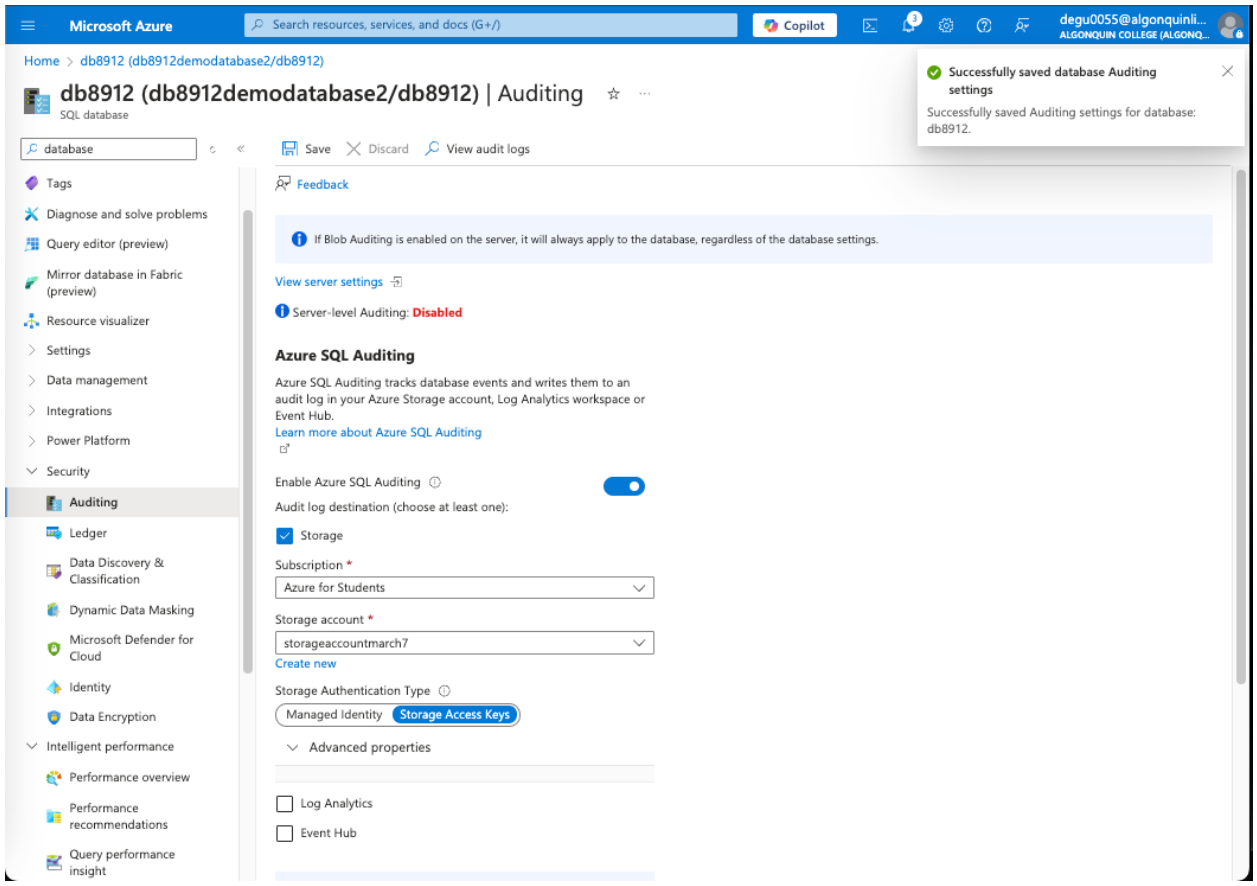
Power Platform
Security
Auditing
Ledger
Data Discovery & Classification
Dynamic Data Masking
Microsoft Defender for Cloud
Identity
Data Encryption
Intelligent performance
Monitoring
Automation
Currently database is using SQL Information Protection policy. Found 15 columns with classification recommendations
Overview
Classification
Learn more - Getting Started Guide
15 columns with classification recommendations (Click to minimize)
Accept selected recommendations
Dismiss selected recommendations
Show dismissed recommendations
Select all
Schema: 2
Table: 5
Filter by column name
Information type: 5
Sensitivity label: 2
Schema
Table
Column
Information type
Sensitivity label
SalesLT Customer FirstName Name Confidential - GDPR
SalesLT Customer LastName Name Confidential - GDPR
SalesLT Customer EmailAddress Contact Info Confidential
SalesLT Customer Phone Contact Info Confidential
SalesLT Customer PasswordHash Credentials Confidential
SalesLT Customer PasswordSalt Credentials Confidential
dbo ErrorLog UserName Credentials Confidential
SalesLT Address AddressLine1 Contact Info Confidential
SalesLT Address AddressLine2 Contact Info Confidential
SalesLT Address City Contact Info Confidential
SalesLT Address PostalCode Contact Info Confidential
SalesLT CustomerAddress AddressType Contact Info Confidential
SalesLT SalesOrderHeader AccountNumber Financial Confidential


Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
degu0055@algonquinli...
ALGONQUIN COLLEGE (ALGONQ...
Home > db8912 (db8912demodatabase2/db8912)
db8912 (db8912demodatabase2/db8912) | Data Discovery & Classification
SQL database
Search
Save
Discard
Add classification
Feedback
Overview
Activity log
Tags
Diagnose and solve problems
Query editor (preview)
Mirror database in Fabric (preview)
Resource visualizer
Settings
Data management
Integrations
Power Platform
Security
Auditing
Ledger
Data Discovery & Classification
Dynamic Data Masking
Microsoft Defender for Cloud
Identity
Data Encryption
Intelligent performance
Monitoring
Automation
Currently database is using SQL Information Protection policy.
Overview
Classification
Learn more - Getting Started Guide
15 classified columns
Schema: 2
Table: 5
Filter by column name
Information type: 5
Sensitivity label: 2
Schema
Table
Column
Information type
Sensitivity label
dbo
ErrorLog
UserName
Credentials
Confidential
SalesLT
Address
AddressLine1
Contact Info
Confidential
SalesLT
Address
AddressLine2
Contact Info
Confidential
SalesLT
Address
City
Contact Info
Confidential
SalesLT
Address
PostalCode
Contact Info
Confidential
SalesLT
Customer
EmailAddress
Contact Info
Confidential
SalesLT
Customer
FirstName
Name
Confidential - GDPR
SalesLT
Customer
LastName
Name
Confidential - GDPR
SalesLT
Customer
PasswordHash
Credentials
Confidential
SalesLT
Customer
PasswordSalt
Credentials
Confidential
< Previous
Page
1
of 2
Next >



Task 4 - Configure Auditing


Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
degu0055@algonquinli...
ALGONQUIN COLLEGE (ALGONQ...
Home > db8912 (db8912demodatabase2/db8912)
db8912 (db8912demodatabase2/db8912) | Auditing
SQL database
Search
Save
Discard
View audit logs
Overview
Activity log
Tags
Diagnose and solve problems
Query editor (preview)
Mirror database in Fabric (preview)
Resource visualizer
Settings
Data management
Integrations
Power Platform
Security
Auditing
Ledger
Data Discovery & Classification
Dynamic Data Masking
Microsoft Defender for Cloud
Identity
Data Encryption
Intelligent performance
Monitoring
Automation
Feedback
If Blob Auditing is enabled on the server, it will always apply to the database, regardless of the database settings.
View server settings
Server-level Auditing: Disabled
Azure SQL Auditing
Azure SQL Auditing tracks database events and writes them to an audit log in your Azure Storage account, Log Analytics workspace or Event Hub.
Learn more about Azure SQL Auditing
Enable Azure SQL Auditing
Audit log destination (choose at least one):
Storage
Subscription *
Azure for Students
Storage account *
storageaccountmarch7
Create new
Storage Authentication Type
Managed Identity
Storage Access Keys
Advanced properties
Retention (Days)
5
Storage access key
Primary
Secondary


Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
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ALGONQUIN COLLEGE (ALGONQ...
Home > db8912 (db8912demodatabase2/db8912)
db8912 (db8912demodatabase2/db8912) | Auditing
SQL database
Successfully saved database Auditing settings
Successfully saved Auditing settings for database: db8912.
database
Save
Discard
View audit logs
Tags
Diagnose and solve problems
Query editor (preview)
Mirror database in Fabric (preview)
Resource visualizer
Settings
Data management
Integrations
Power Platform
Security
Auditing
Ledger
Data Discovery & Classification
Dynamic Data Masking
Microsoft Defender for Cloud
Identity
Data Encryption
Intelligent performance
Performance overview
Performance recommendations
Query performance insight
Feedback
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Audit log destination (choose at least one):
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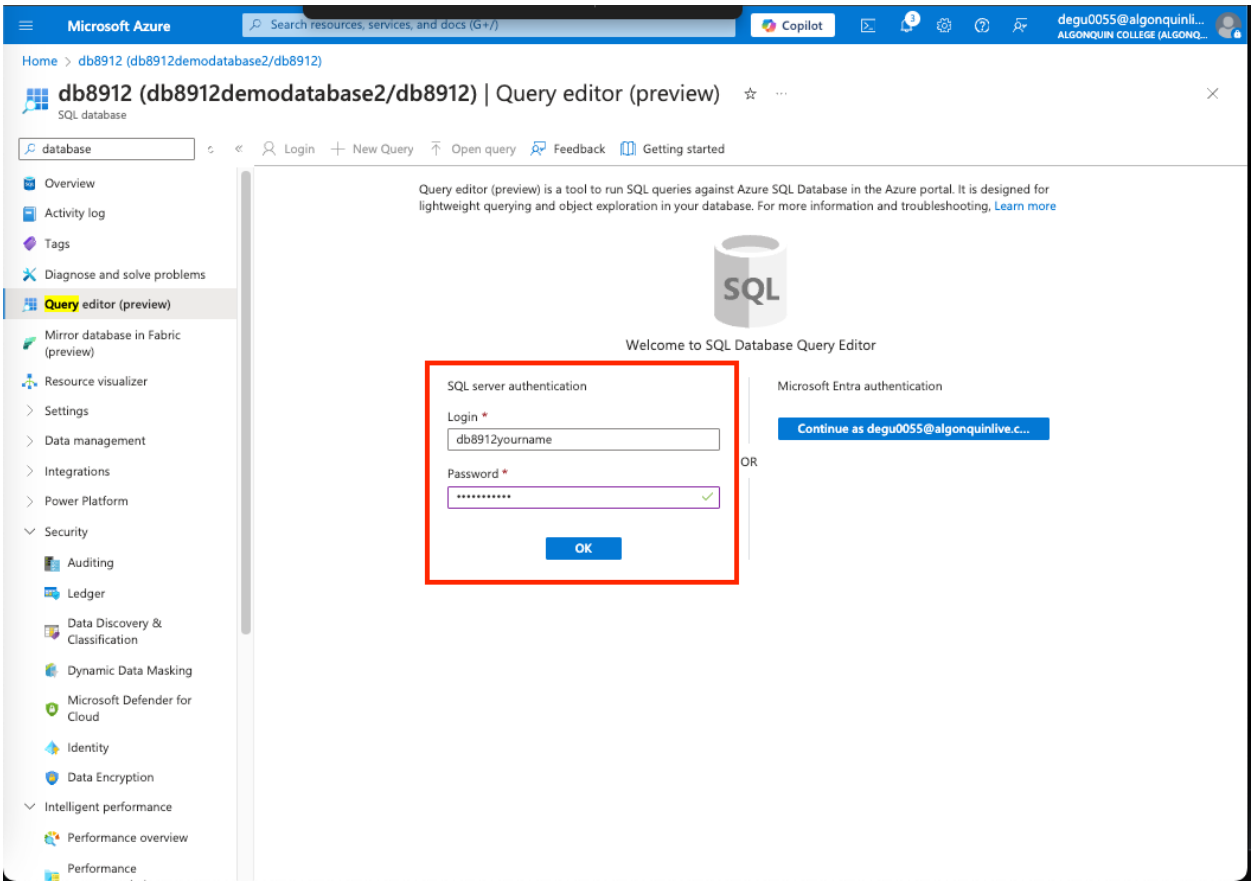
Subscription *
Azure for Students
Storage account *
storageaccountmarch7
Create new
Storage Authentication Type
Managed Identity
Storage Access Keys
Advanced properties
Log Analytics
Event Hub


Microsoft Azure
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Copilot
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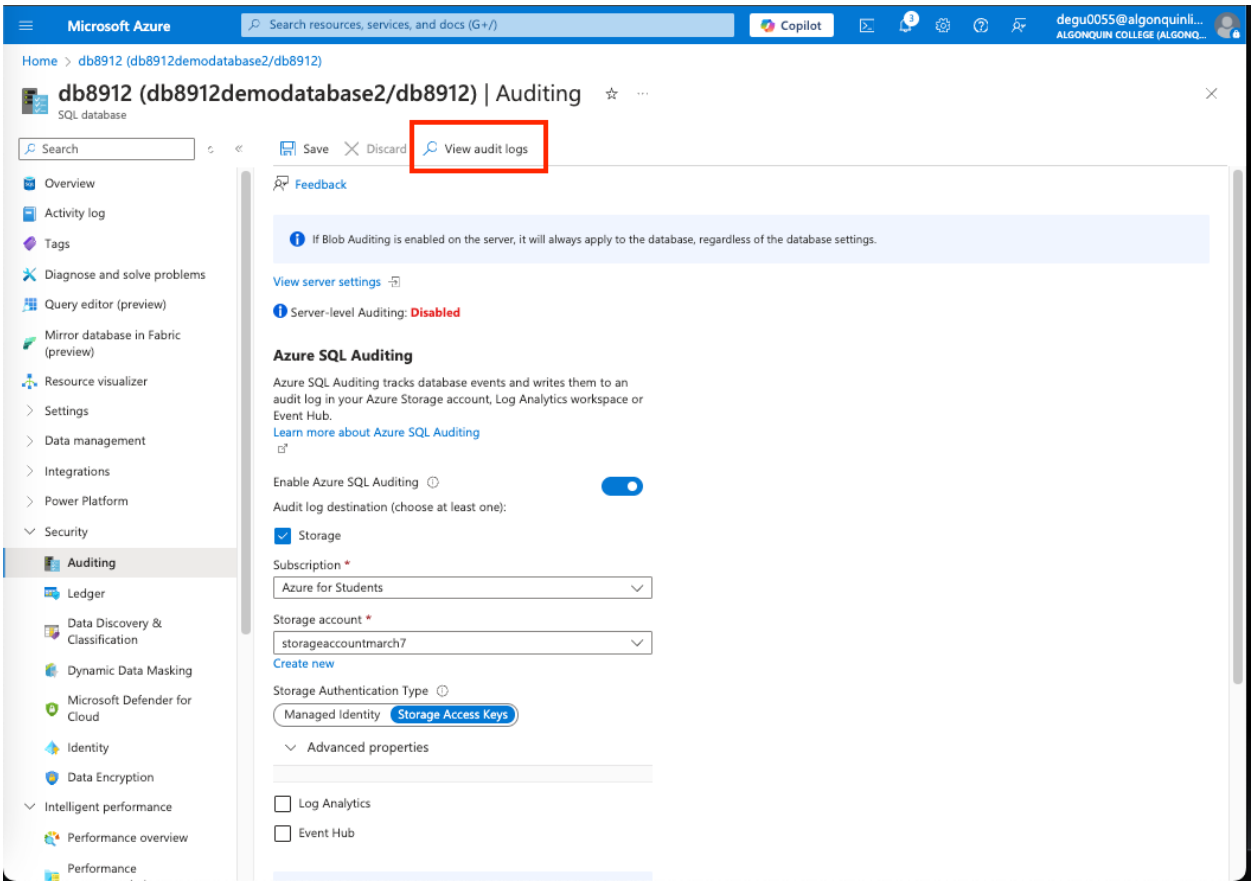
ALGONQUIN COLLEGE (ALGONQ...
Home > db8912 (db8912demodatabase2/db8912)
db8912 (db8912demodatabase2/db8912) | Query editor (preview)
SQL database
database
Login
New Query
Open query
Feedback
Getting started
Overview
Activity log
Tags
Diagnose and solve problems
Query editor (preview)
Mirror database in Fabric (preview)
Resource visualizer
Settings
Data management
Integrations
Power Platform
Security
Auditing
Ledger
Data Discovery & Classification
Dynamic Data Masking
Microsoft Defender for Cloud
Identity
Data Encryption
Intelligent performance
Performance overview
Performance
Query editor (preview) is a tool to run SQL queries against Azure SQL Database in the Azure portal. It is designed for lightweight querying and object exploration in your database. For more information and troubleshooting, Learn more
SQL
Welcome to SQL Database Query Editor
SQL server authentication
Login *
db8912yourname
Password *
OK
OR
Microsoft Entra authentication
Continue as degu0055@algonquinlive.c...


Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
degu0055@algonquinli...
ALGONQUIN COLLEGE (ALGONQ...
Home > db8912 (db8912demodatabase2/db8912)
db8912 (db8912demodatabase2/db8912) | Auditing
SQL database
Search
Overview
Activity log
Tags
Diagnose and solve problems
Query editor (preview)
Mirror database in Fabric (preview)
Resource visualizer
Settings
Data management
Integrations
Power Platform
Security
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Performance
Save
Discard
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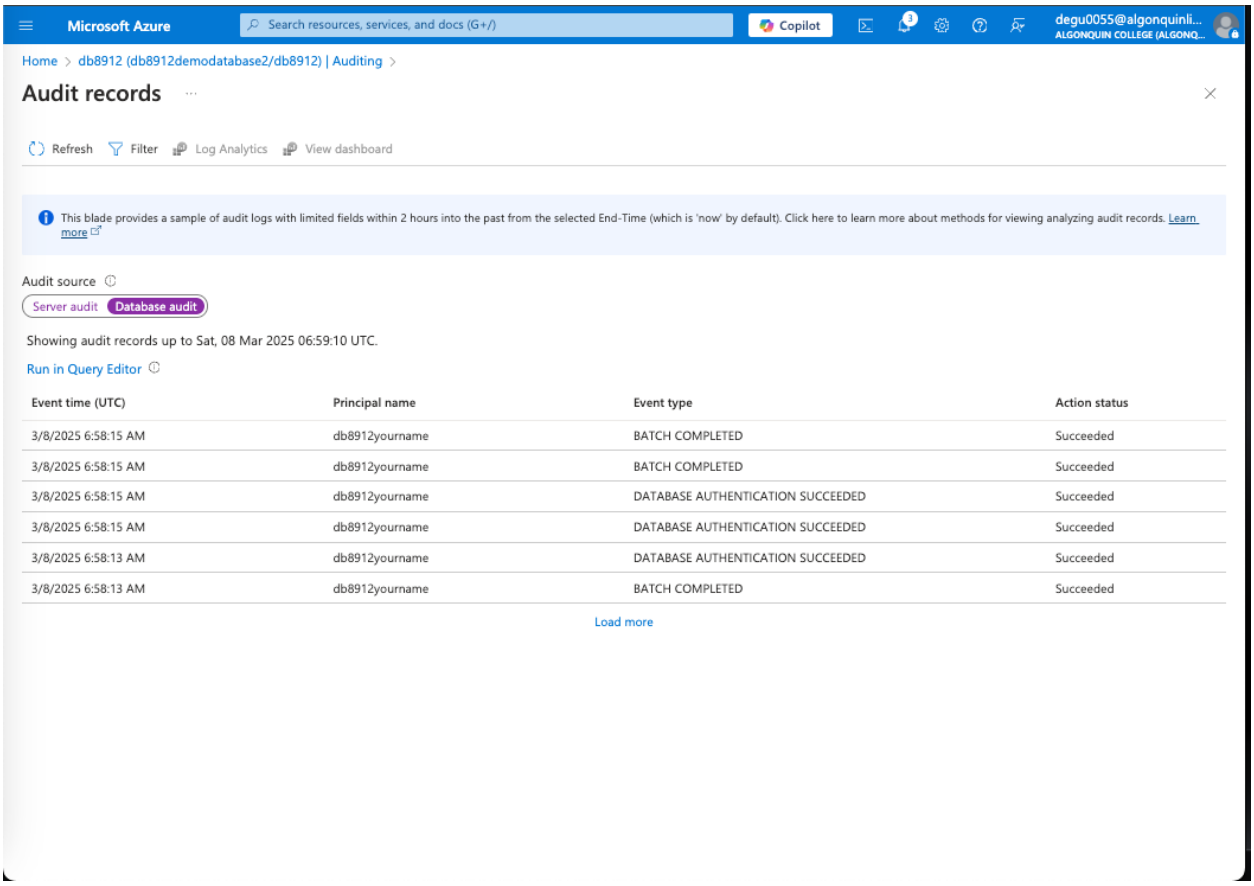
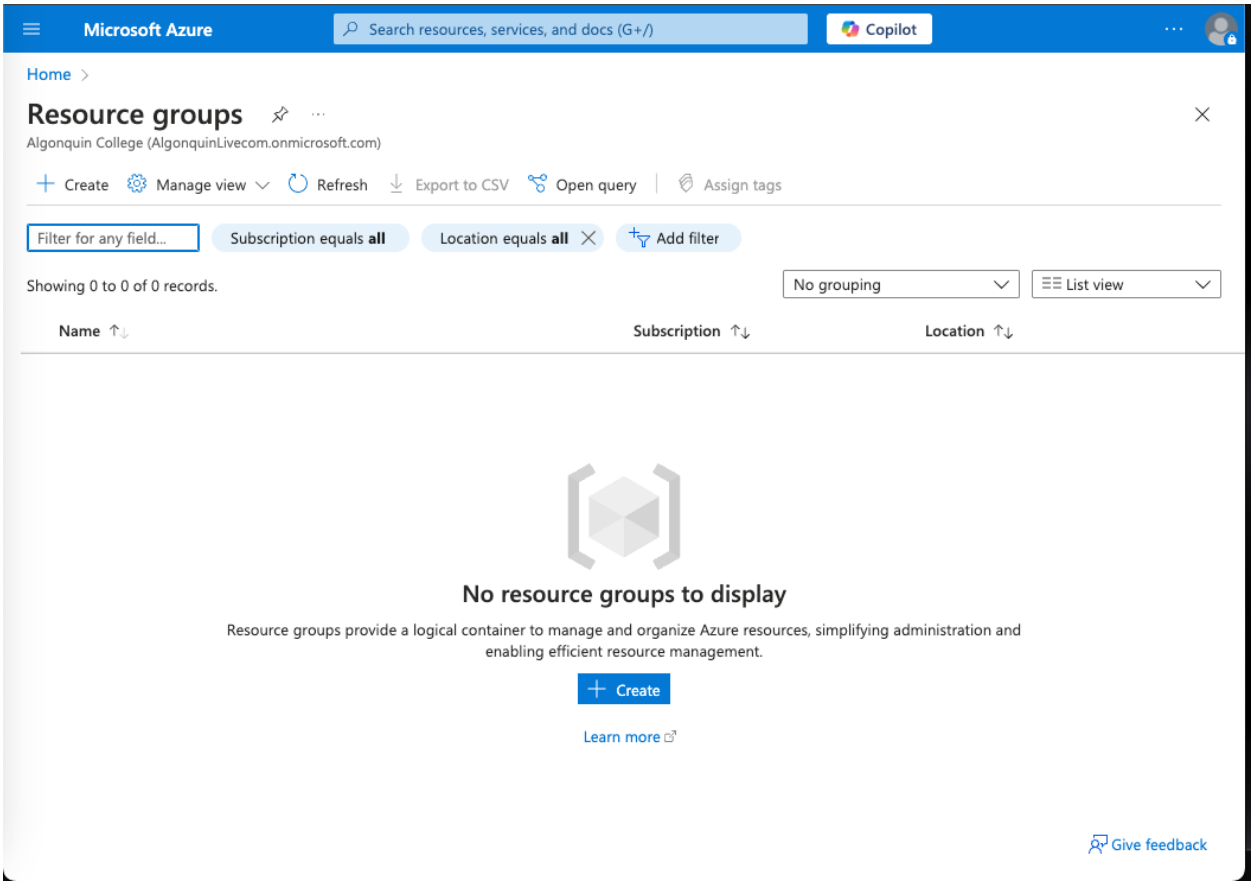
Subscription *
Azure for Students
Storage account *
storageaccountmarch7
Create new
Storage Authentication Type
Managed Identity
Storage Access Keys
Advanced properties
Log Analytics
Event Hub


Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
degu0055@algonquinli...
ALGONQUIN COLLEGE (ALGONQ...
Home > db8912 (db8912demodatabase2/db8912) | Auditing >
Audit records
Refresh
Filter
Log Analytics
View dashboard
This blade provides a sample of audit logs with limited fields within 2 hours into the past from the selected End-Time (which is 'now' by default). Click here to learn more about methods for viewing analyzing audit records. Learn more
Audit source
Server audit
Database audit
Showing audit records up to Sat, 08 Mar 2025 06:59:10 UTC.
Run in Query Editor
Event time (UTC)
Principal name
Event type
Action status
3/8/2025 6:58:15 AM
db8912yourname
BATCH COMPLETED
Succeeded
3/8/2025 6:58:15 AM
db8912yourname
BATCH COMPLETED
Succeeded
3/8/2025 6:58:15 AM
db8912yourname
DATABASE AUTHENTICATION SUCCEEDED
Succeeded
3/8/2025 6:58:15 AM
db8912yourname
DATABASE AUTHENTICATION SUCCEEDED
Succeeded
3/8/2025 6:58:13 AM
db8912yourname
DATABASE AUTHENTICATION SUCCEEDED
Succeeded
3/8/2025 6:58:13 AM
db8912yourname
BATCH COMPLETED
Succeeded
Load more

Task 5 - Clean resources created during lab