ANKARA ÜNİVERSİTESİ

MÜHENDİSLİK FAKÜLTESİ
BİLGİSAYAR MÜHENDİSLİĞİ BÖLÜMÜ

BLM4522 – Ağ Tabanlı Paralel Dağıtım Sistemleri Final Proje Raporu

Özge Çelik - 21290514

Ali Furkan Şahin - 20290289

Github Linki : https://github.com/ozgecelk01/AgTabanliParalelDagitimSistemleri

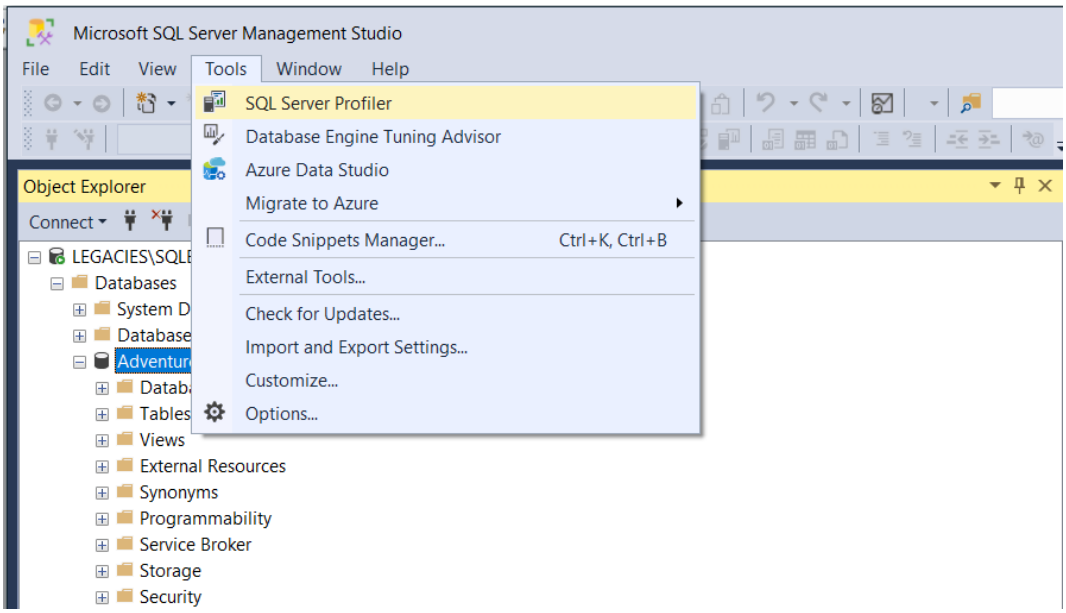
Videoların Linki :
https://drive.google.com/drive/folders/1jzcKZxc0JJgpMMAvAYSh1A65dZU1qt5d

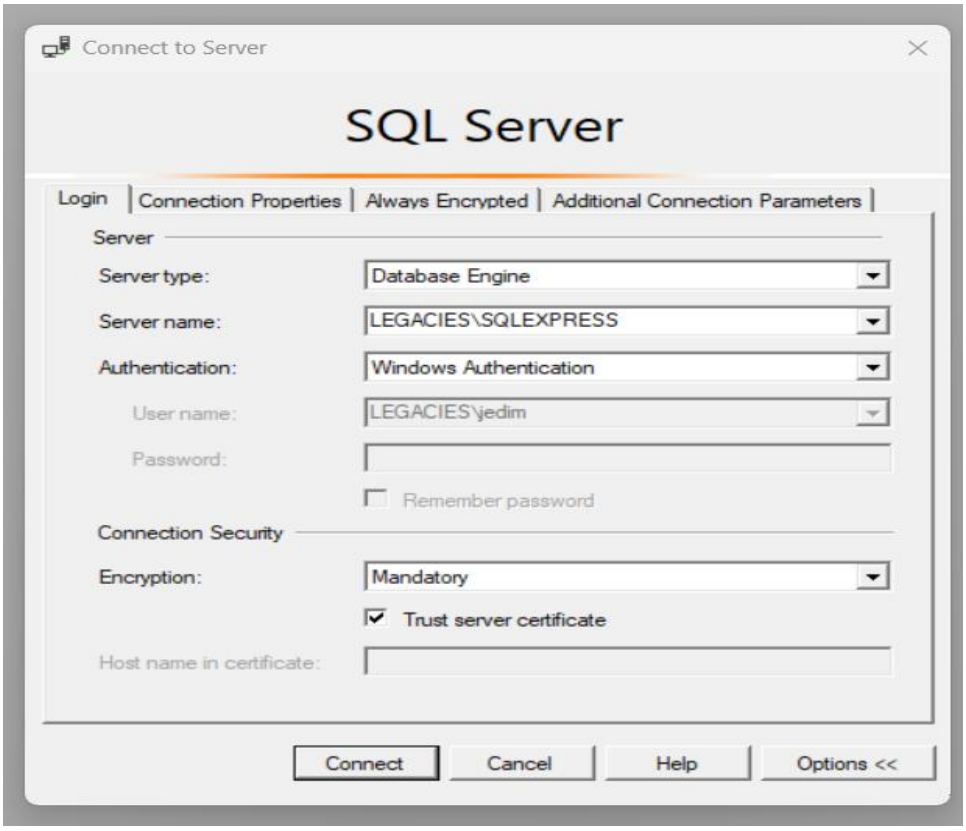
İçindekiler:

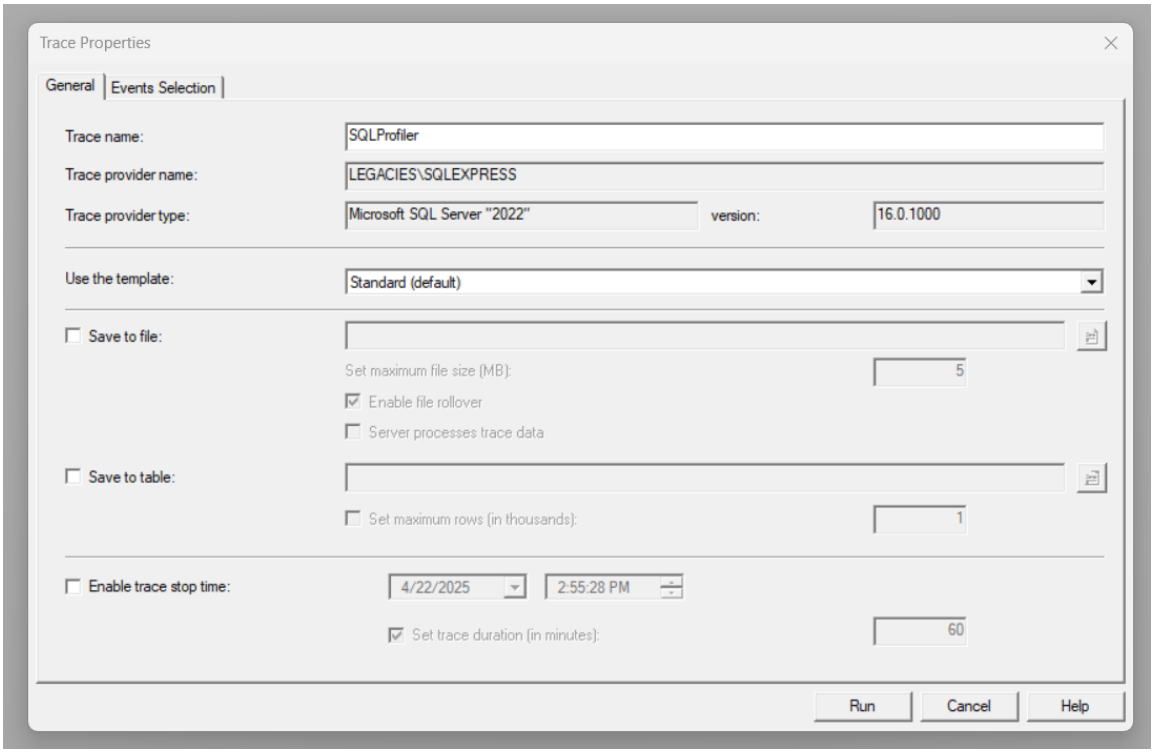
b. Yedekleme Raporları Oluşturma
c. Otomatik Yedekleme Uyarıları

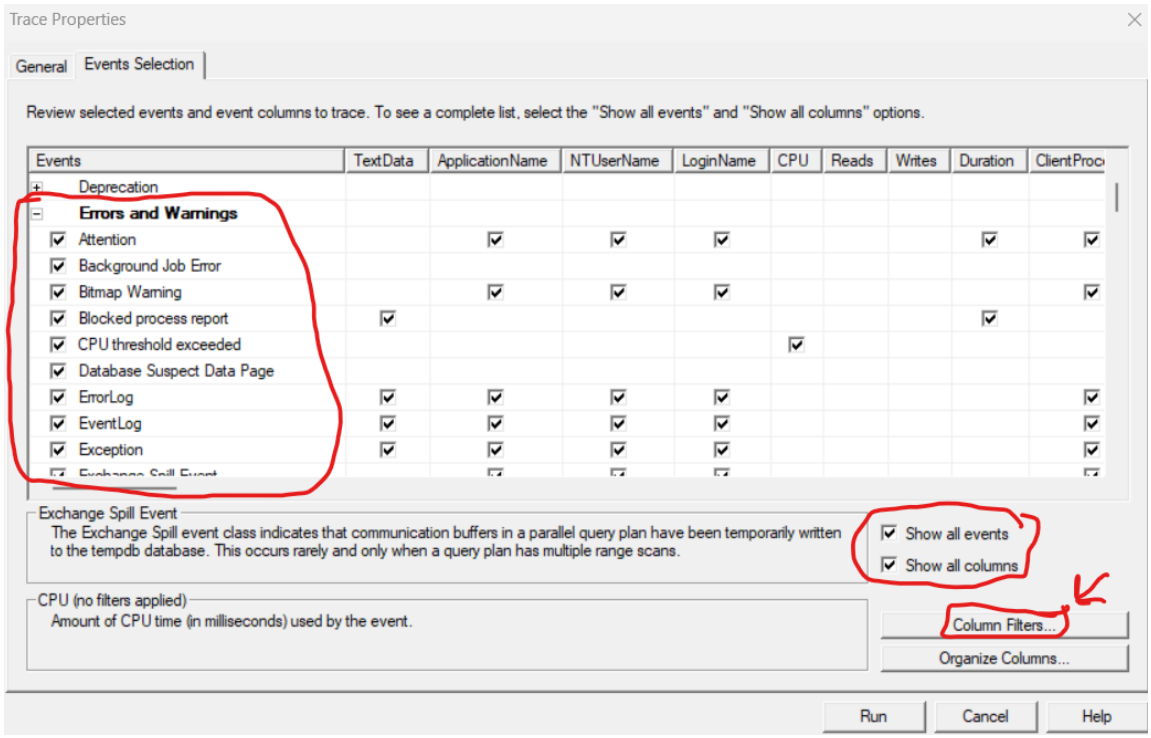
1. Veritabanı Performans Optimizasyonu ve İzleme

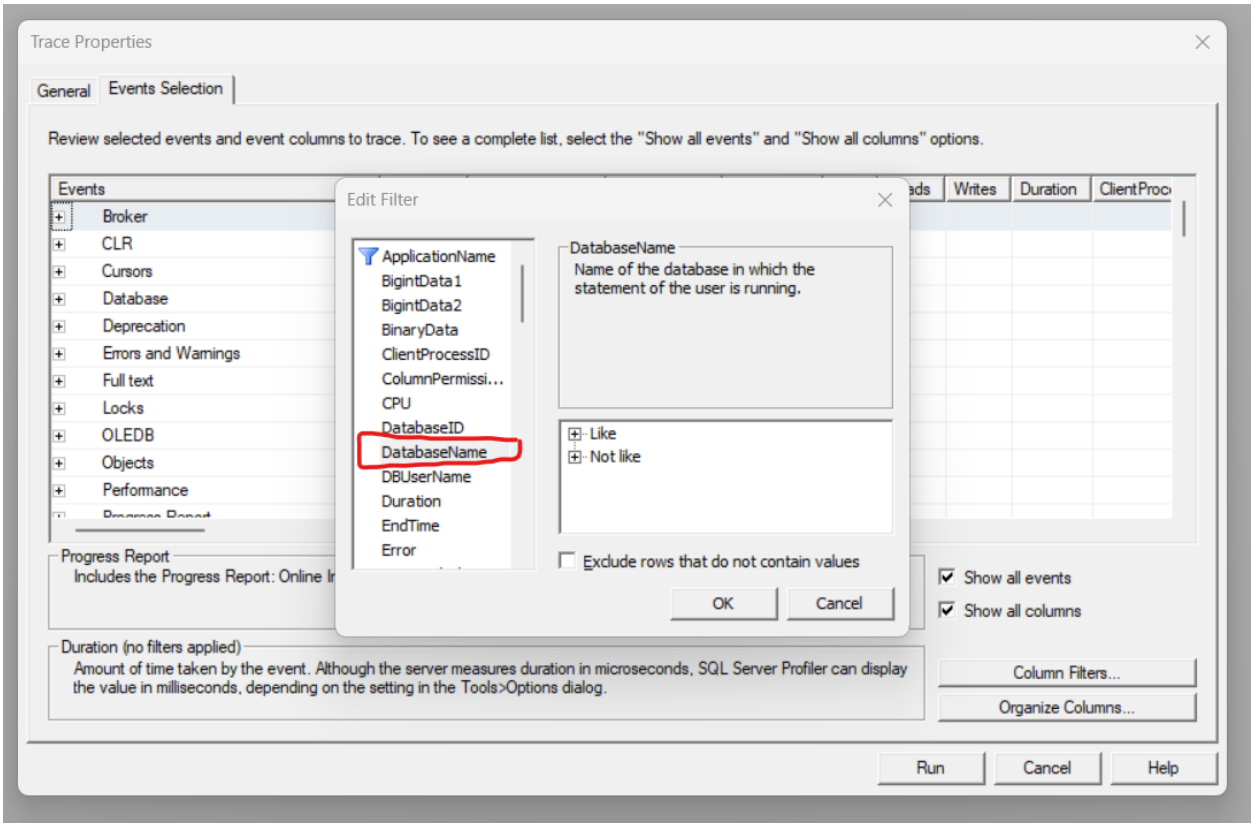
a. Veritabanı İzleme:

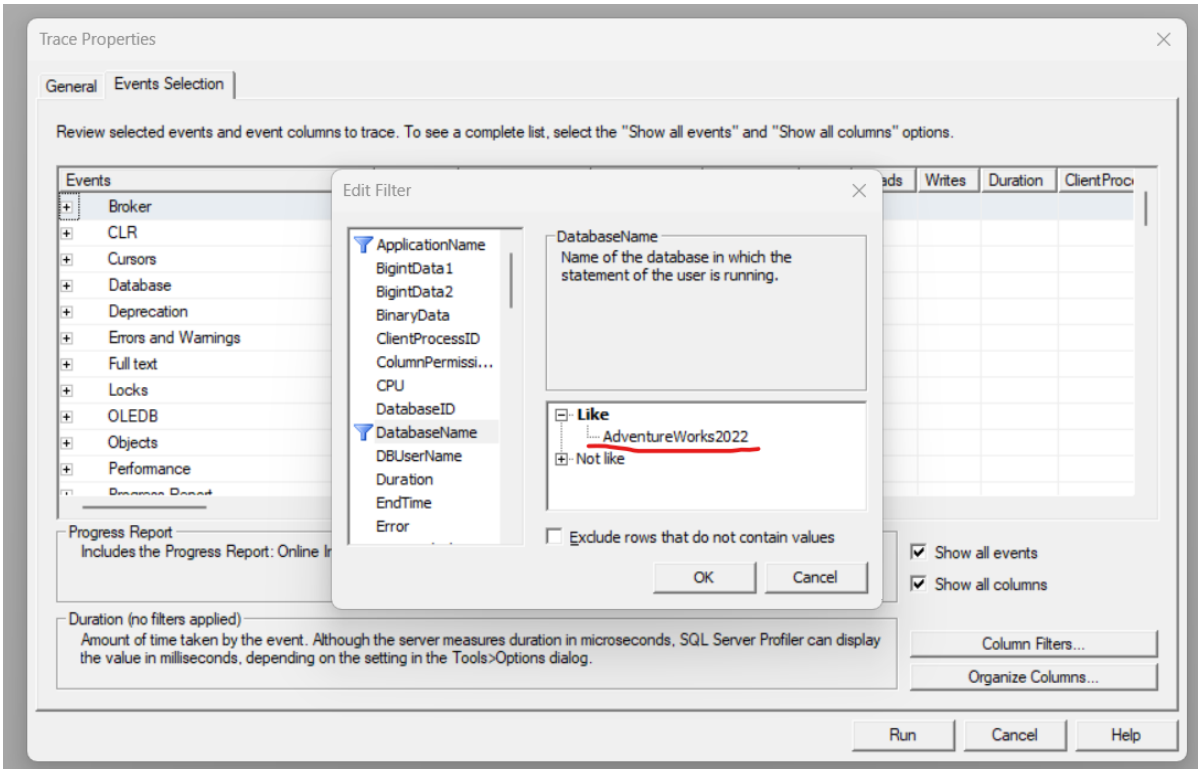


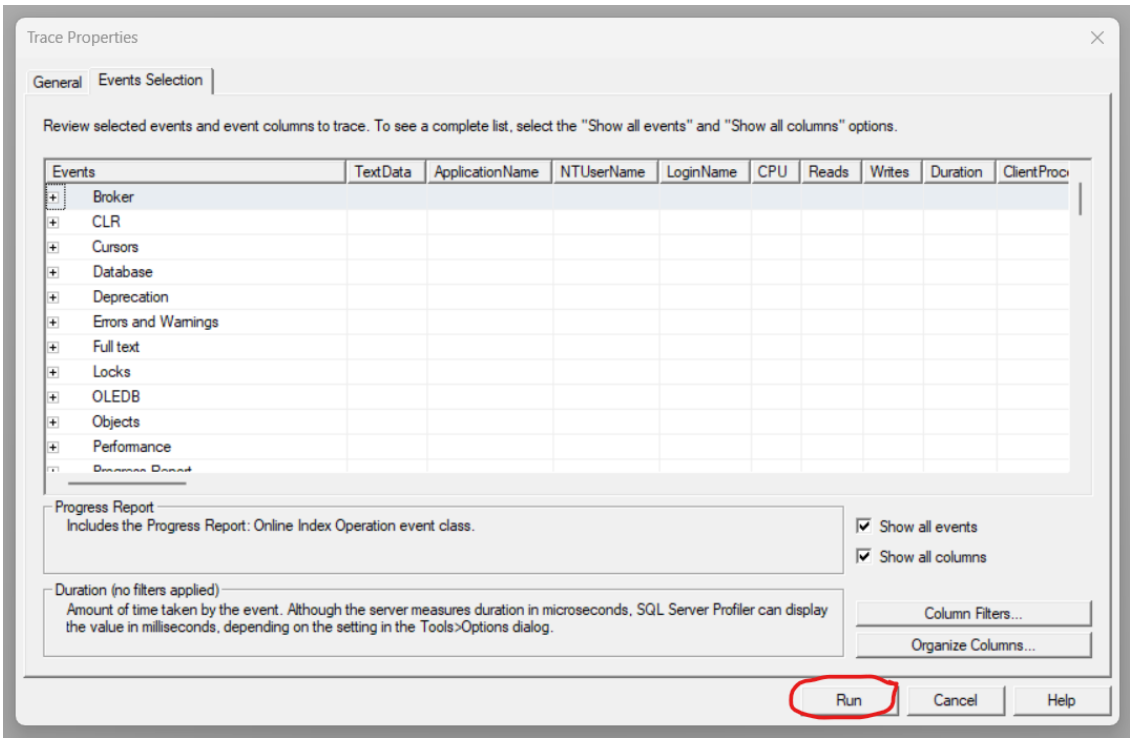

Connect to Server
SQL Server
Login
Connection Properties
Always Encrypted
Additional Connection Parameters
Server
Server type:
Database Engine
Server name:
LEGACIES\SQLEXPRESS
Authentication:
Windows Authentication
User name:
LEGACIES\jedim
Password:
Remember password
Connection Security
Encryption:
Mandatory
Trust server certificate
Host name in certificate:
Connect
Cancel
Help
Options <<


Trace Properties
General
Events Selection
Trace name:
SQLProfiler
Trace provider name:
LEGACIES\SQLEXPRESS
Trace provider type:
Microsoft SQL Server "2022"
version:
16.0.1000
Use the template:
Standard (default)
Save to file:
Set maximum file size (MB):
5
Enable file rollover
Server processes trace data
Save to table:
Set maximum rows (in thousands):
1
Enable trace stop time:
4/22/2025
2:55:28 PM
Set trace duration (in minutes):
60
Run
Cancel
Help


Trace Properties
General
Events Selection
Review selected events and event columns to trace. To see a complete list, select the "Show all events" and "Show all columns" options.
Events
TextData
ApplicationName
NTUserName
LoginName
CPU
Reads
Writes
Duration
ClientProc
Deprecation
Errors and Warnings
Attention
Background Job Error
Bitmap Warning
Blocked process report
CPU threshold exceeded
Database Suspect Data Page
ErrorLog
EventLog
Exception
Exchange Spill Event
The Exchange Spill event class indicates that communication buffers in a parallel query plan have been temporarily written to the tempdb database. This occurs rarely and only when a query plan has multiple range scans.
Show all events
Show all columns
CPU (no filters applied)
Amount of CPU time (in milliseconds) used by the event.
Column Filters...
Organize Columns...
Run
Cancel
Help


Trace Properties
General
Events Selection
Review selected events and event columns to trace. To see a complete list, select the "Show all events" and "Show all columns" options.
Events
Broker
CLR
Cursors
Database
Deprecation
Errors and Warnings
Full text
Locks
OLEDB
Objects
Performance
Writes
Duration
ClientProc
Edit Filter
ApplicationName
BigintData1
BigintData2
BinaryData
ClientProcessID
ColumnPermissi...
CPU
DatabaseID
DatabaseName
DBUserName
Duration
EndTime
Error
DatabaseName
Name of the database in which the statement of the user is running.
Like
Not like
Exclude rows that do not contain values
OK
Cancel
Progress Report
Includes the Progress Report: Online
Show all events
Show all columns
Duration (no filters applied)
Amount of time taken by the event. Although the server measures duration in microseconds, SQL Server Profiler can display the value in milliseconds, depending on the setting in the Tools>Options dialog.
Column Filters...
Organize Columns...
Run
Cancel
Help


Trace Properties
General
Events Selection
Review selected events and event columns to trace. To see a complete list, select the "Show all events" and "Show all columns" options.
Events
Broker
CLR
Cursors
Database
Deprecation
Errors and Warnings
Full text
Locks
OLEDB
Objects
Performance
Writes
Duration
ClientProc
Edit Filter
ApplicationName
BigintData1
BigintData2
BinaryData
ClientProcessID
ColumnPermissi...
CPU
DatabaseID
DatabaseName
DBUserName
Duration
EndTime
Error
DatabaseName
Name of the database in which the statement of the user is running.
Like
AdventureWorks2022
Not like
Exclude rows that do not contain values
OK
Cancel
Progress Report
Includes the Progress Report: Online
Show all events
Show all columns
Duration (no filters applied)
Amount of time taken by the event. Although the server measures duration in microseconds, SQL Server Profiler can display the value in milliseconds, depending on the setting in the Tools>Options dialog.
Column Filters...
Organize Columns...
Run
Cancel
Help



SQLQuery1.sql - LE...GACIES\jedim (73))*

```
SELECT * FROM HumanResources.Department
```

100 %

Results | Messages

	DepartmentID	Name	GroupName	ModifiedDate
1	1	Engineering	Research and Development	2008-04-30 00:00:00.000
2	2	Tool Design	Research and Development	2008-04-30 00:00:00.000
3	3	Sales	Sales and Marketing	2008-04-30 00:00:00.000
4	4	Marketing	Sales and Marketing	2008-04-30 00:00:00.000
5	5	Purchasing	Inventory Management	2008-04-30 00:00:00.000
6	6	Research and Development	Research and Development	2008-04-30 00:00:00.000
7	7	Production	Manufacturing	2008-04-30 00:00:00.000
8	8	Production Control	Manufacturing	2008-04-30 00:00:00.000
9	9	Human Resources	Executive General and Administration	2008-04-30 00:00:00.000
10	10	Finance	Executive General and Administration	2008-04-30 00:00:00.000
11	11	Information Services	Executive General and Administration	2008-04-30 00:00:00.000
12	12	Document Control	Quality Assurance	2008-04-30 00:00:00.000
13	13	Quality Assurance	Quality Assurance	2008-04-30 00:00:00.000
14	14	Facilities and Maintenance	Executive General and Administration	2008-04-30 00:00:00.000
15	15	Shipping and Receiving	Inventory Management	2008-04-30 00:00:00.000
16	16	Executive	Executive General and Administration	2008-04-30 00:00:00.000

SQL:BatchStarting	SELECT * FROM HumanResources.Departm...	Microsoft SQ...	jedim	Legaci...					18480	73	2025-04-23 13:32:03...	
SQL:BatchCompleted	SELECT * FROM HumanResources.Departm...	Microsoft SQ...	jedim	Legaci...	0	67	0	6	18480	73	2025-04-23 13:32:03...	2
SQL:BatchStarting	SELECT * FROM HumanResources.Departm...	Microsoft SQ...	jedim	Legaci...					18480	73	2025-04-23 13:32:43...	

```
SELECT * FROM HumanResources.Department
```

SQLQuery1.sql - LE...GACIES\jedim (73))*

```
SELECT * FROM HumanResources.Department WHERE DepartmentID == 300
```

100 %

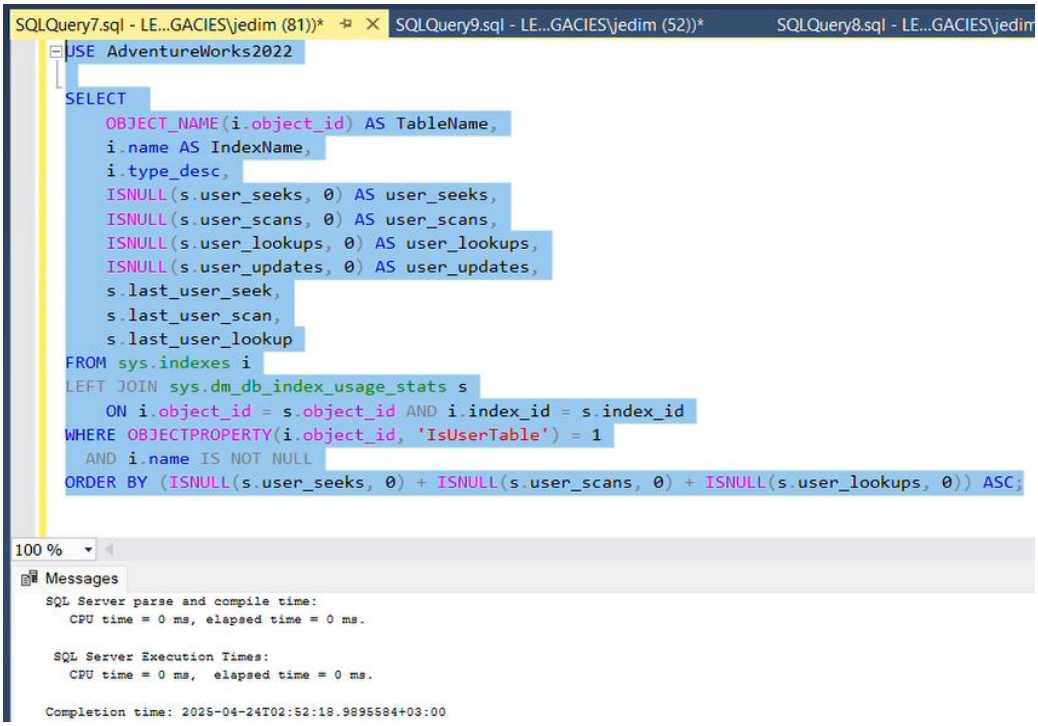
Messages

```
Msg 102, Level 15, State 1, Line 1
Incorrect syntax near '='.

Completion time: 2025-04-23T13:32:51.7250204+03:00
```

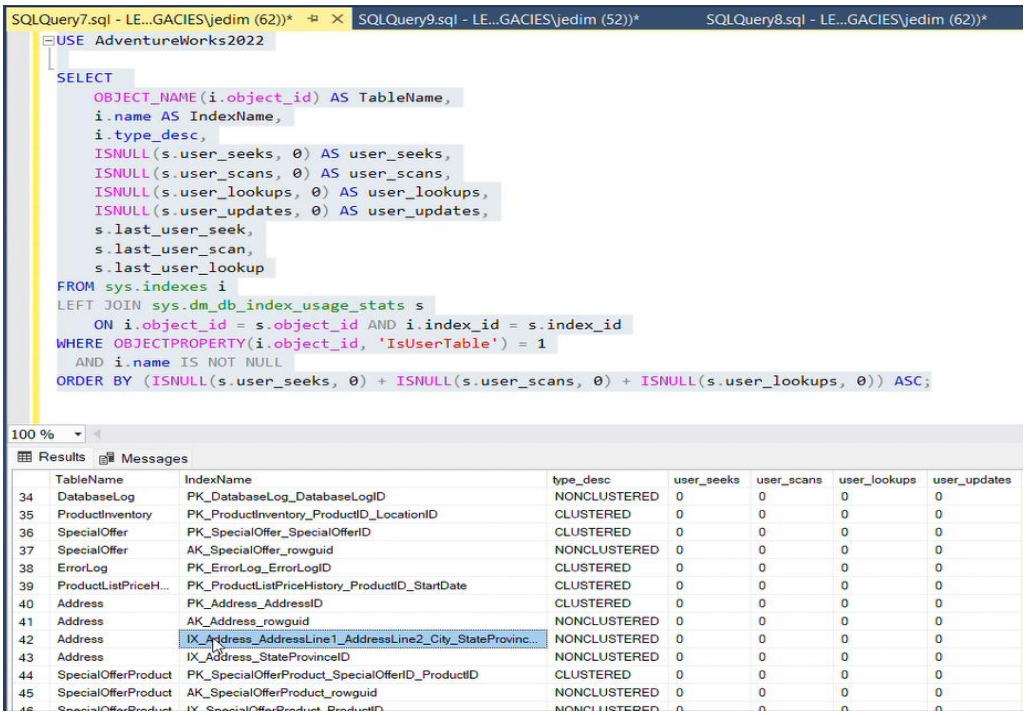
Exception	Incorrect syntax near '='.	Microsoft SQ...	jedim	Legaci...					18480	73	2025-04-23 13:32:51...	
User Error Message	Incorrect syntax near '='.	Microsoft SQ...	jedim	Legaci...					18480	73	2025-04-23 13:32:51...	
SQL:BatchStarting	SELECT * FROM HumanResources.Departm...	Microsoft SQ...	jedim	Legaci...					18480	73	2025-04-23 13:32:51...	

```
Incorrect syntax near '='.
```

b. İndeks Yönetimi:



Sistemde kullanılmayan ve gereksiz olan indeksleri bulmayı sağlayan sql kodudur.



İndeksleri kaldırırken PK ve AK olmayanları seçmeliyiz çünkü PK ve AK database'lerde constraint olarak tutulmaktadır. Bu tarz indeksleri silerken permission hatası alırsın. Bu yüzden ismi IX olanların kaldırılması mümkündür. Aşağıdaki iki resimde, kaldırmak için IX olarak seçilenler ve indeks kaldırma kodları yer almaktadır.

```
DROP INDEX IX_ShoppingCartItem_ShoppingCartID_ProductID ON Sales.ShoppingCartItem;
```

```
DROP INDEX IX_Address_AddressLine1_AddressLine2_City_StateProvinceID_PostalCode ON Person.Address;
```

Bu iki tane indeks kaldırma komutunu çalıştırmadan önce iki tane base query belirleyip. Bu iki base query'i indeks kaldırma öncesi ve sonrası olmak üzere her biri için 2 defa çalıştırıp Sql profiler kısmından duration süresindeki düşüşü (hız artışı) gözlemleyeceğiz.

SQL:BatchStarting	USE AdventureWorks2022 SELECT * F...	Microsoft SQ...	jedim	Legaci...				
SQL:BatchCompleted	USE AdventureWorks2022 SELECT * F...	Microsoft SQ...	jedim	Legaci...	0	210	0	3
SQL:BatchStarting	DROP INDEX IX_ShoppingCartItem_Shopp...	Microsoft SQ...	jedim	Legaci...				
SQL:BatchCompleted	DROP INDEX IX_ShoppingCartItem_Shopp...	Microsoft SQ...	jedim	Legaci...	0	114	15	4
SQL:BatchStarting	SELECT * FROM Sales.ShoppingCartItem	Microsoft SQ...	jedim	Legaci...				
SQL:BatchCompleted	SELECT * FROM Sales.ShoppingCartItem	Microsoft SQ...	jedim	Legaci...	0	24	0	2

```
ELECT * FROM Sales.ShoppingCartItem
```

Sorgunun 3 tane sonucu olduğu için bu kadar az sample'ın bulunduğu bir query yerine AddressLine için query yazıp fazlaca büyük sample sayısına sahip query'lerdeki performans artışını gözlemleyeceğiz.

SQL:BatchCompleted	SELECT * FROM Person.Address	Microsoft SQ...	jedim	Legaci...	31	666	0	273
SQL:BatchStarting	DROP INDEX IX_Address_AddressLine1...	Microsoft SQ...	jedim	Legaci...				
SQL:BatchCompleted	DROP INDEX IX_Address_AddressLine1...	Microsoft SQ...	jedim	Legaci...	0	253	10	4
SQL:BatchStarting	SELECT * FROM Person.Address	Microsoft SQ...	jedim	Legaci...				
SQL:BatchCompleted	SELECT * FROM Person.Address	Microsoft SQ...	jedim	Legaci...	16	364	0	146

```
SELECT * FROM Person.Address
```

Yaklaşık 2 kat kadar hız artışı vardır. (273 → 146)

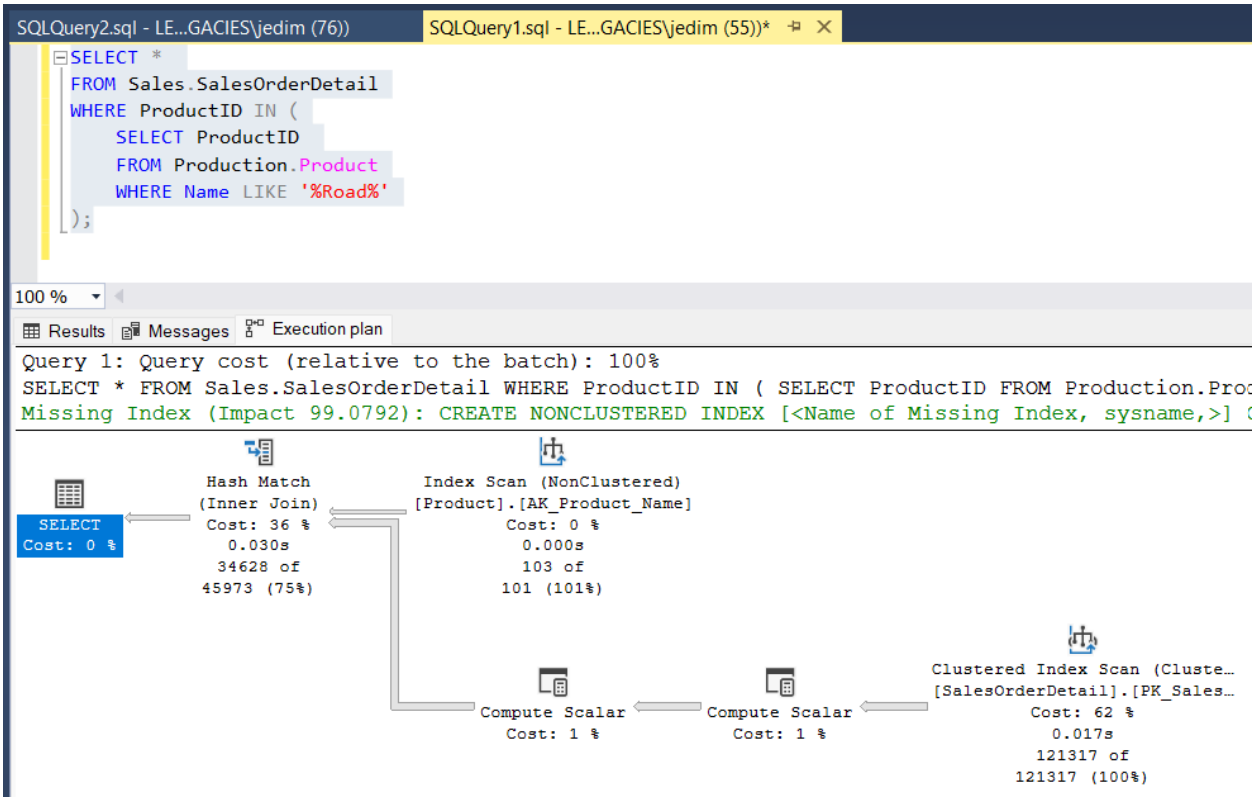
c. Sorgu İyileştirme:

Sql'de bir query'de kullanılabilir her keyword'ün database'de oluşturduğu sistem yükleri vardır.

Keyword 1	**Keyword 2**	**Hangisi daha hızlı?**
Where	Having	Where
Select *	Select col1, col2 …	Select col1, col2, …
In	Join	Join

Aşağıdaki tüm query'lerin sonuçları birebir aynıdır!

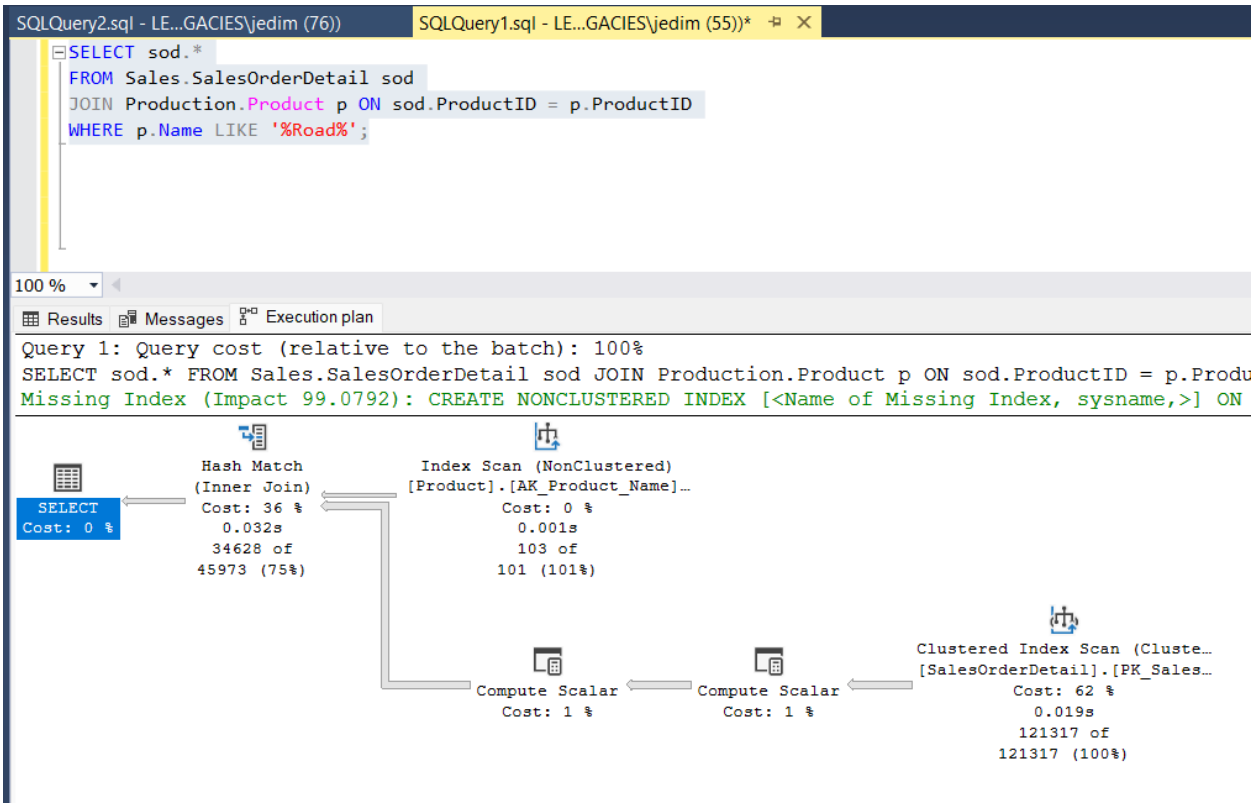
1. **Sorgu (in kullanımı)**



SQL:BatchStarting	SELECT * FROM Sales.SalesOrderDeta...	Microsoft SQ...	jedim	Legaci...				
SQL:BatchCompleted	SELECT * FROM Sales.SalesOrderDeta...	Microsoft SQ...	jedim	Legaci...	78	1769	0	245
SQL:BatchStarting	SET STATISTICS XML OFF	Microsoft SQ...	jedim	Legaci...				

```
SELECT *
FROM Sales.SalesOrderDetail
WHERE ProductID IN (
    SELECT ProductID
    FROM Production.Product
    WHERE Name LIKE '%Road%'
);
```

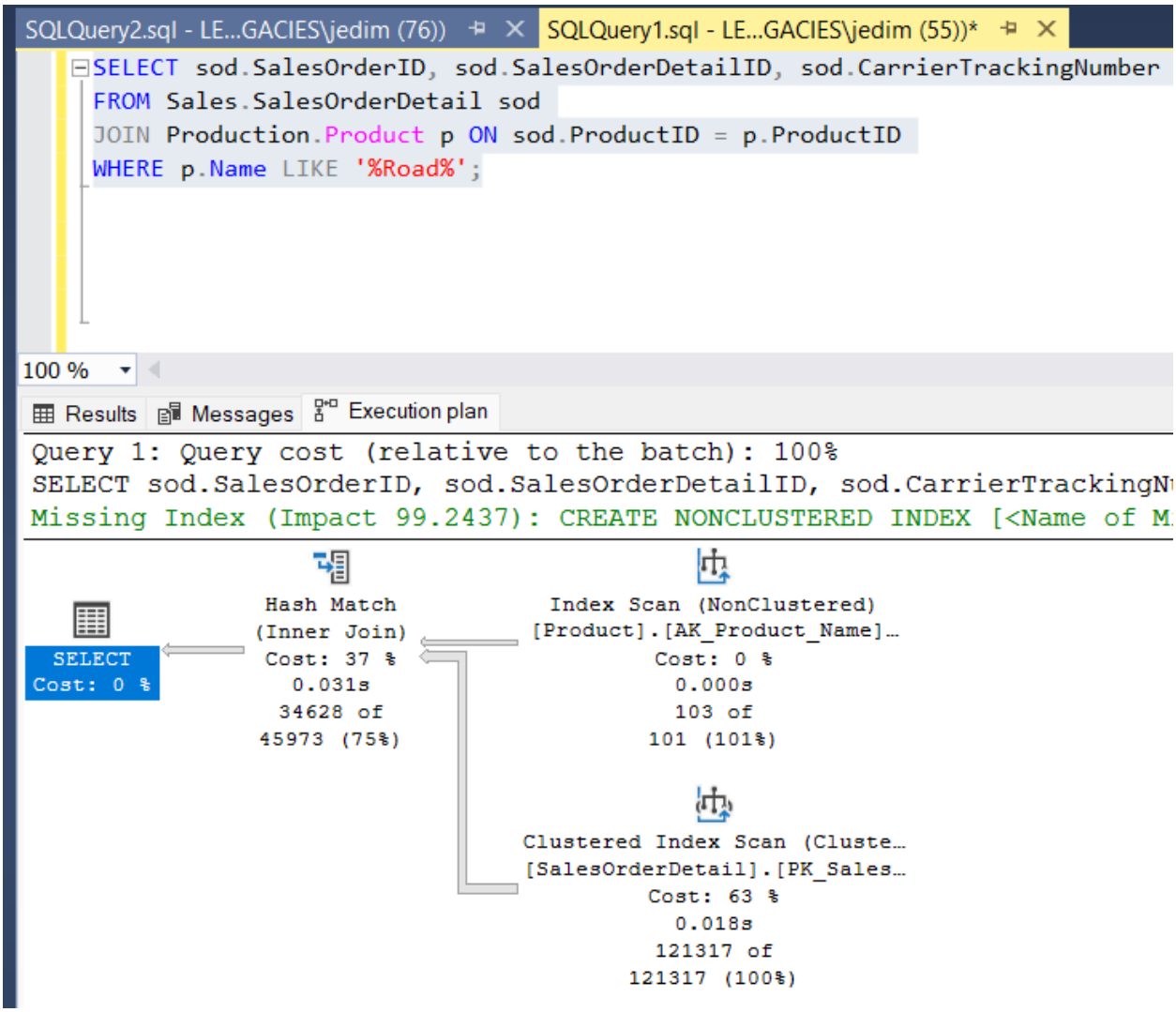
2. Sorgu (Join kullanımı)

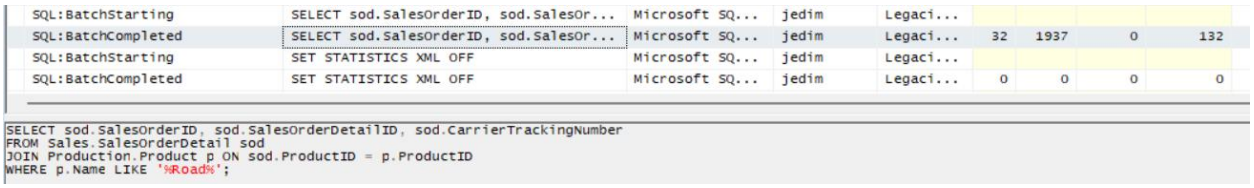


SQL:BatchStarting	SELECT sod.* FROM Sales.SalesOrderD...	Microsoft SQ...	jedim	Legaci...				
SQL:BatchCompleted	SELECT sod.* FROM Sales.SalesOrderD...	Microsoft SQ...	jedim	Legaci...	109	1937	0	233
SQL:BatchStarting	SET STATISTICS XML OFF	Microsoft SQ...	jedim	Legaci...				
SQL:BatchCompleted	SET STATISTICS XML OFF	Microsoft SQ...	jedim	Legaci...	0	0	0	0

```
SELECT sod.*
FROM Sales.SalesOrderDetail sod
JOIN Production.Product p ON sod.ProductID = p.ProductID
WHERE p.Name LIKE '%Road%';
```

3. **Sorgu (Join + Select col1, col2, …)**

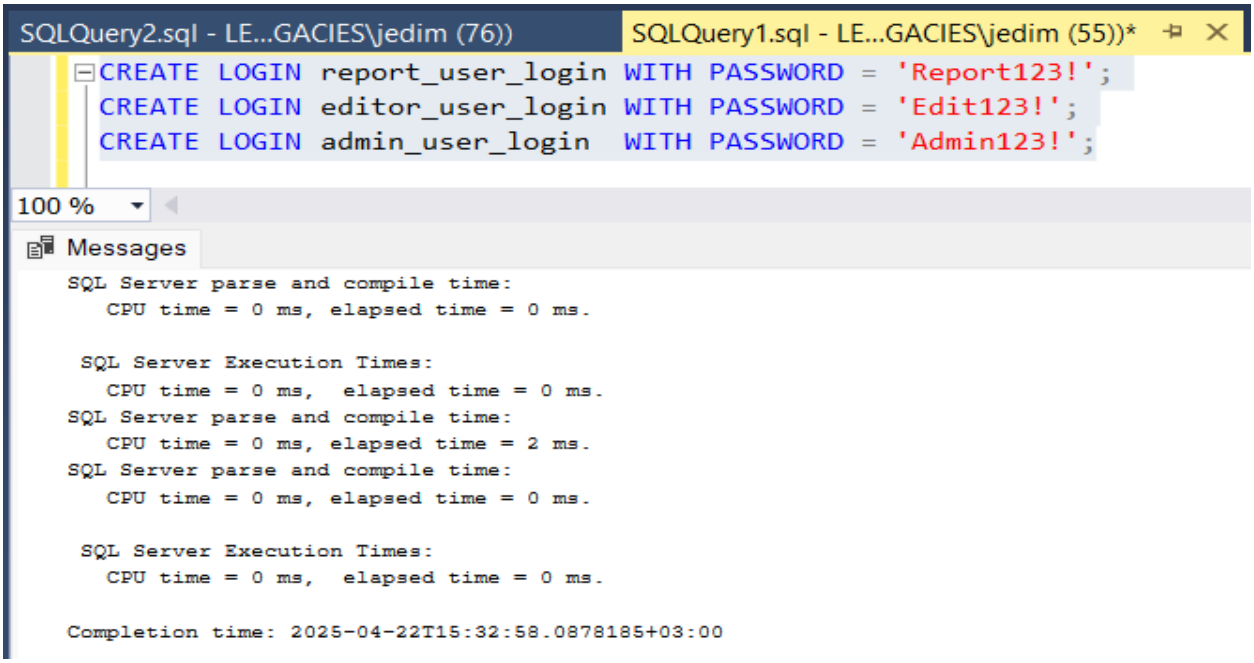




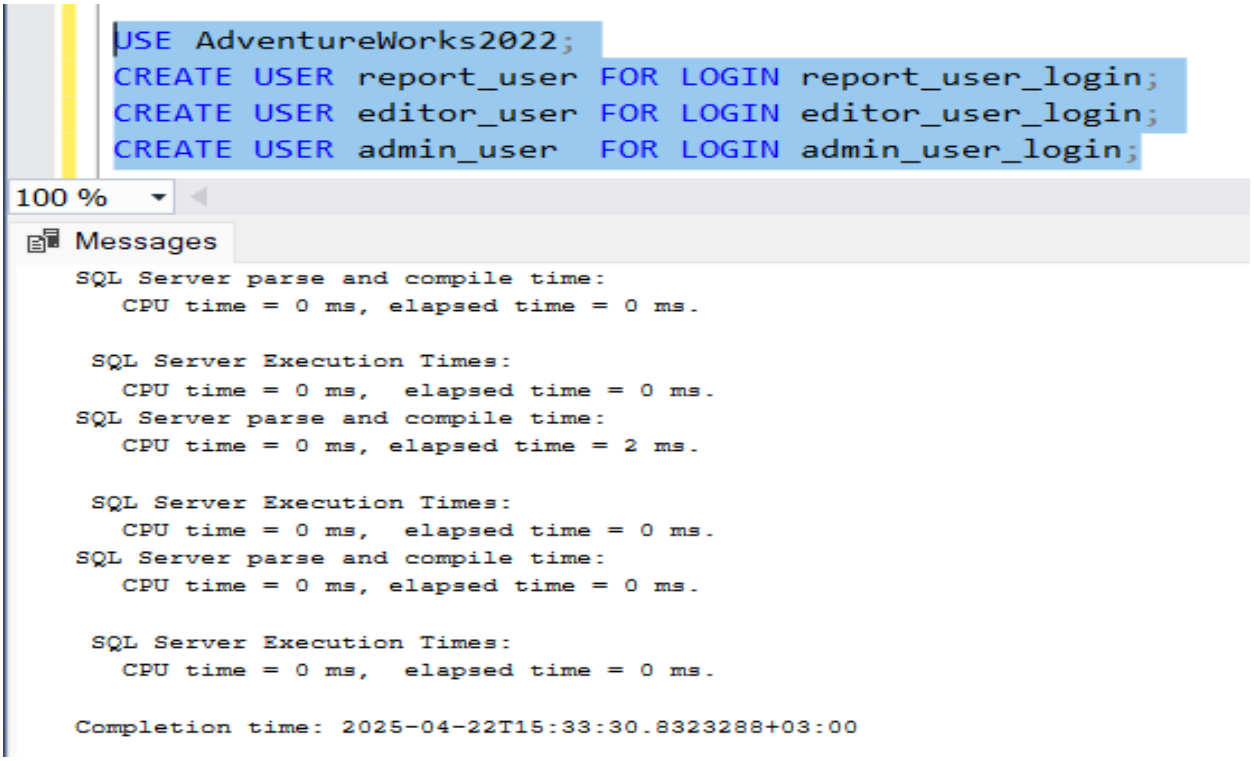
SQL:BatchStarting	SELECT sod.SalesOrderID, sod.SalesOr...	Microsoft SQ...	jedim	Legaci...				
SQL:BatchCompleted	SELECT sod.SalesOrderID, sod.SalesOr...	Microsoft SQ...	jedim	Legaci...	32	1937	0	132
SQL:BatchStarting	SET STATISTICS XML OFF	Microsoft SQ...	jedim	Legaci...				
SQL:BatchCompleted	SET STATISTICS XML OFF	Microsoft SQ...	jedim	Legaci...	0	0	0	0

```
SELECT sod.SalesOrderID, sod.SalesOrderDetailID, sod.CarrierTrackingNumber
FROM Sales.SalesOrderDetail sod
JOIN Production.Product p ON sod.ProductID = p.ProductID
WHERE p.Name LIKE '%Road%';
```

d. Veri Yöneticisi Rolleri:



Sql server authentication için login oluşturulması lazım.



Sonrasında kullanıcılar oluşturulmalı ve login'e bağlanmalı.

```
CREATE ROLE report_role;
CREATE ROLE editor_role;
CREATE ROLE admin_role;
```

100 %

Messages

```
Commands completed successfully.
```

Veritabanına bu kullanıcılara yetkilendirme verebilmek için roller oluşturulmalı.

```
GRANT SELECT ON SCHEMA::Sales TO report_role;
GRANT SELECT, UPDATE ON SCHEMA::Sales TO editor_role;
GRANT SELECT, INSERT, UPDATE, DELETE ON SCHEMA::Sales TO admin_role;
```

100 %

Messages

```
SQL Server parse and compile time:
   CPU time = 0 ms, elapsed time = 0 ms.

 SQL Server Execution Times:
   CPU time = 0 ms,  elapsed time = 0 ms.
SQL Server parse and compile time:
   CPU time = 0 ms, elapsed time = 0 ms.
SQL Server parse and compile time:
   CPU time = 0 ms, elapsed time = 0 ms.

 SQL Server Execution Times:
   CPU time = 0 ms,  elapsed time = 0 ms.

Completion time: 2025-04-22T15:37:05.9096362+03:00
```

Rollere yetkilendirme verilmeli.

```
EXEC sp_addrolemember 'report_role', 'report_user';
EXEC sp_addrolemember 'editor_role', 'editor_user';
EXEC sp_addrolemember 'admin_role', 'admin_user';
```

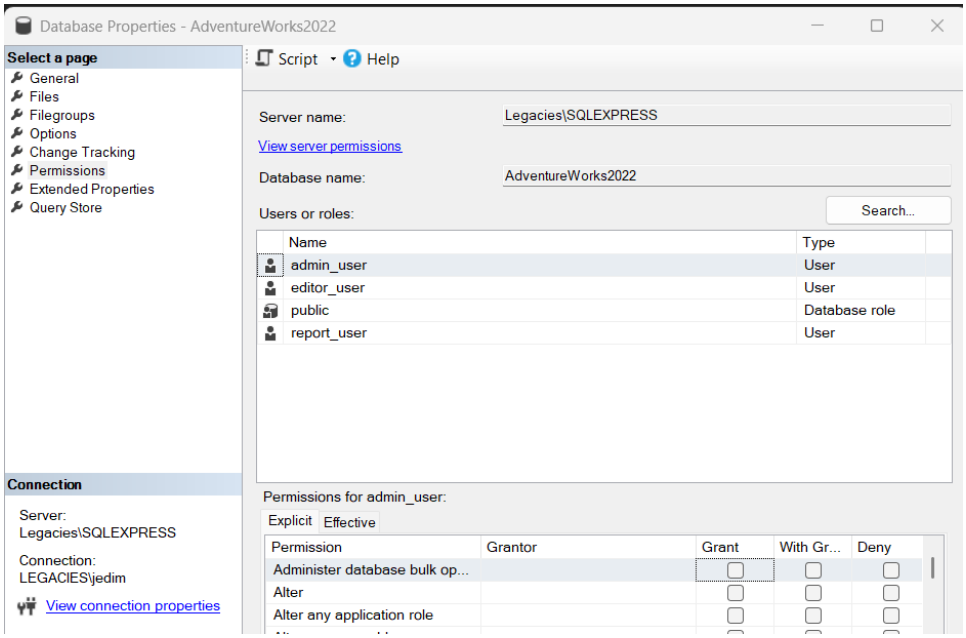
100 %

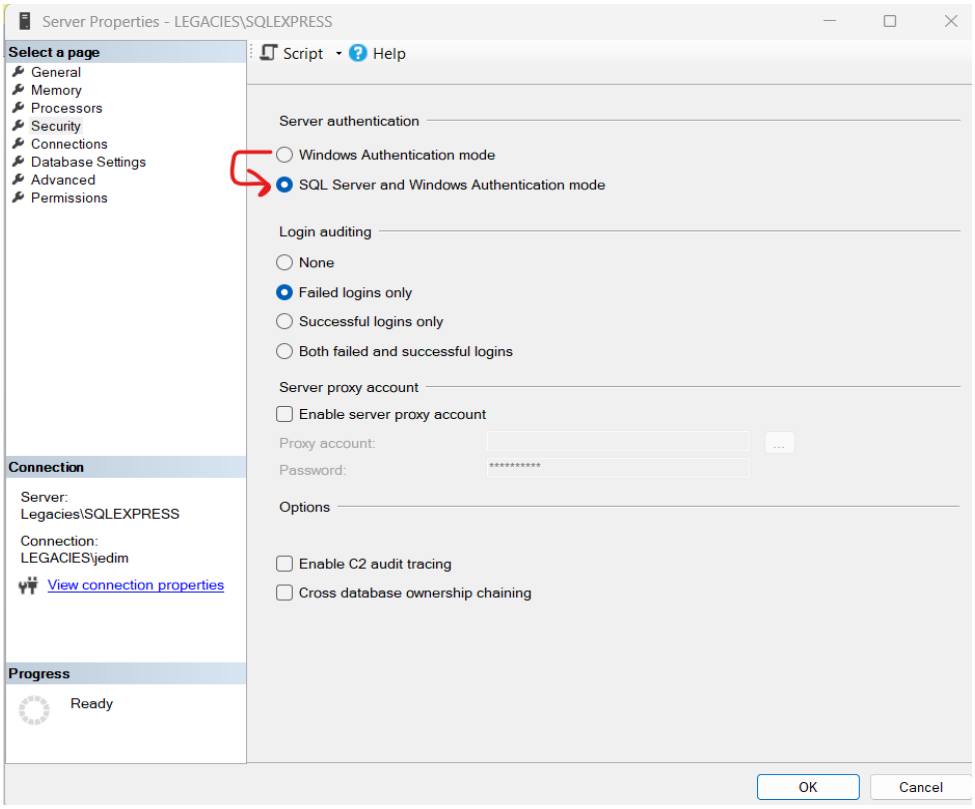
Messages

```
SQL Server parse and compile time:
   CPU time = 0 ms, elapsed time = 0 ms.

 SQL Server Execution Times:
   CPU time = 0 ms,  elapsed time = 0 ms.
SQL Server parse and compile time:
   CPU time = 0 ms, elapsed time = 2 ms.
SQL Server parse and compile time:
   CPU time = 0 ms, elapsed time = 2 ms.
```

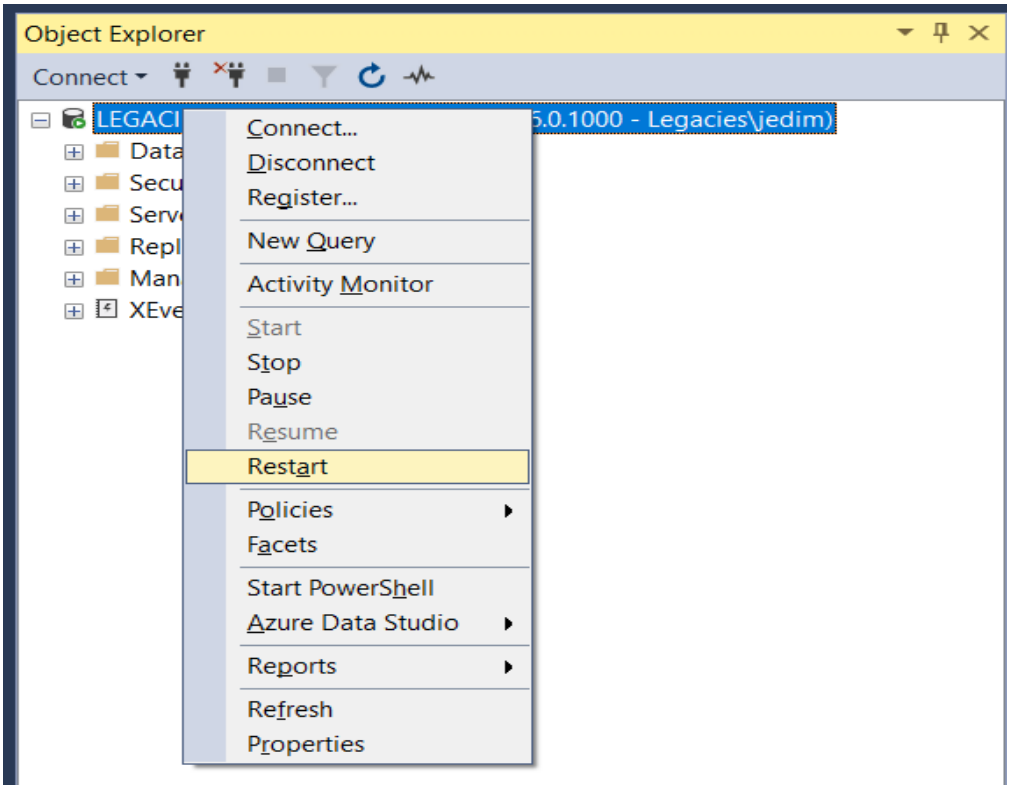
Roller veritabanına sp_addrolemember komutu ile assign edilmeli.

Hata almamak için database ayarlarından sql server authentication özelliğinin aktif edilmesi lazım.



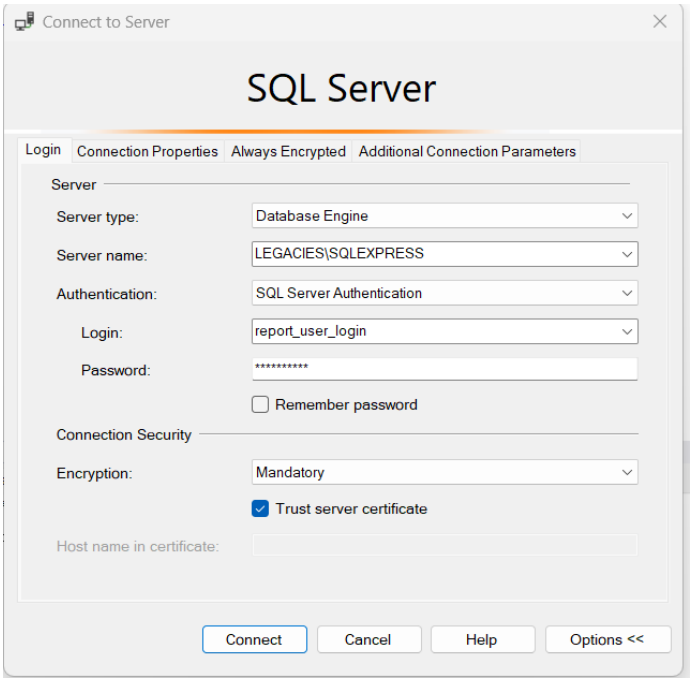


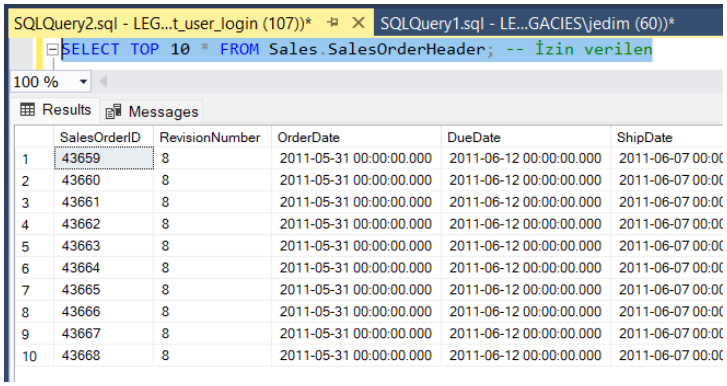
Aktif olduğundan emin olmak için server'ın aktif edilmesi lazım.



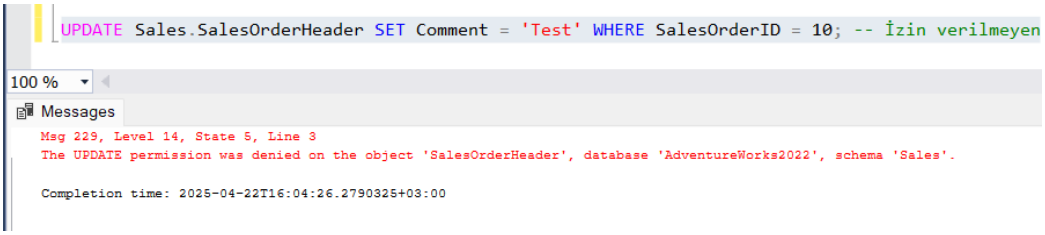
Eklenen kullanıcılarla giriş yapıp yetkilendirmelerinin doğru çalışıp çalışmadığını test edelim.

Report Kullanıcısı için:

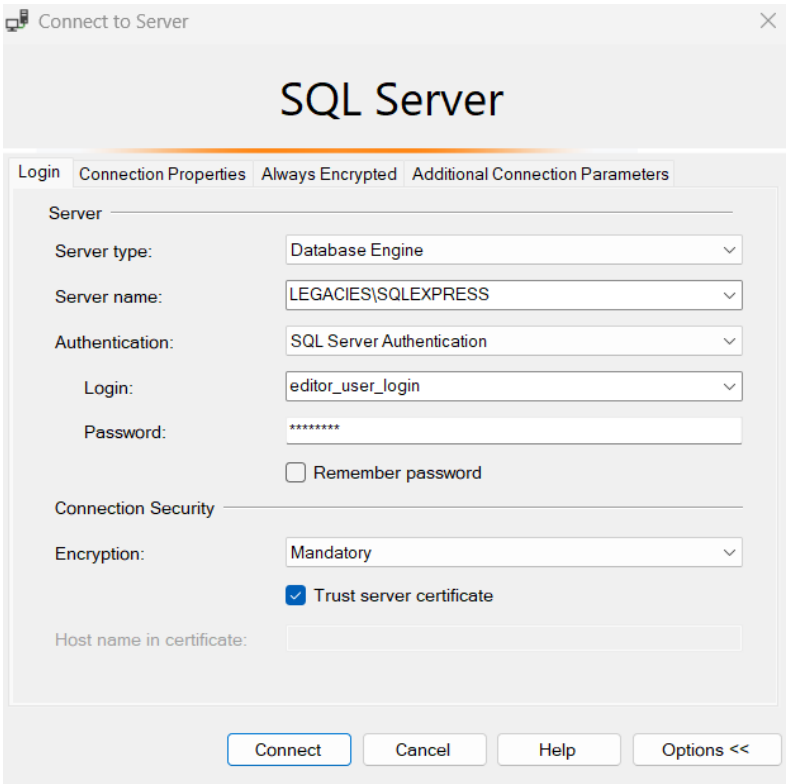




	SalesOrderID	RevisionNumber	OrderDate	DueDate	ShipDate
1	43659	8	2011-05-31 00:00:00.000	2011-06-12 00:00:00.000	2011-06-07 00:0(
2	43660	8	2011-05-31 00:00:00.000	2011-06-12 00:00:00.000	2011-06-07 00:0(
3	43661	8	2011-05-31 00:00:00.000	2011-06-12 00:00:00.000	2011-06-07 00:0(
4	43662	8	2011-05-31 00:00:00.000	2011-06-12 00:00:00.000	2011-06-07 00:0(
5	43663	8	2011-05-31 00:00:00.000	2011-06-12 00:00:00.000	2011-06-07 00:0(
6	43664	8	2011-05-31 00:00:00.000	2011-06-12 00:00:00.000	2011-06-07 00:0(
7	43665	8	2011-05-31 00:00:00.000	2011-06-12 00:00:00.000	2011-06-07 00:0(
8	43666	8	2011-05-31 00:00:00.000	2011-06-12 00:00:00.000	2011-06-07 00:0(
9	43667	8	2011-05-31 00:00:00.000	2011-06-12 00:00:00.000	2011-06-07 00:0(
10	43668	8	2011-05-31 00:00:00.000	2011-06-12 00:00:00.000	2011-06-07 00:0(



Editor Kullanıcısı için:



SQLQuery3.sql - LEG...or_user_login (67))*

```
SELECT * FROM Sales.SalesOrderHeader;
```

100 %

Results | Messages

	SalesOrderID	RevisionNumber	OrderDate	Du
1	43659	8	2011-05-31 00:00:00.000	20
2	43660	8	2011-05-31 00:00:00.000	20
3	43661	8	2011-05-31 00:00:00.000	20
4	43662	8	2011-05-31 00:00:00.000	20
5	43663	8	2011-05-31 00:00:00.000	20
6	43664	8	2011-05-31 00:00:00.000	20
7	43665	8	2011-05-31 00:00:00.000	20
8	43666	8	2011-05-31 00:00:00.000	20
9	43667	8	2011-05-31 00:00:00.000	20
10	43668	8	2011-05-31 00:00:00.000	20
11	43669	8	2011-05-31 00:00:00.000	20
12	43670	8	2011-05-31 00:00:00.000	20

```
SELECT SalesOrderID, Comment FROM Sales.SalesOrderHeader WHERE SalesOrderID = 43659;
UPDATE Sales.SalesOrderHeader SET Comment = 'Updated' WHERE SalesOrderID = 43659;
SELECT SalesOrderID, Comment FROM Sales.SalesOrderHeader WHERE SalesOrderID = 43659;
```

100 %

Results | Messages

	SalesOrderID	Comment
1	43659	NULL

	SalesOrderID	Comment
1	43659	Updated

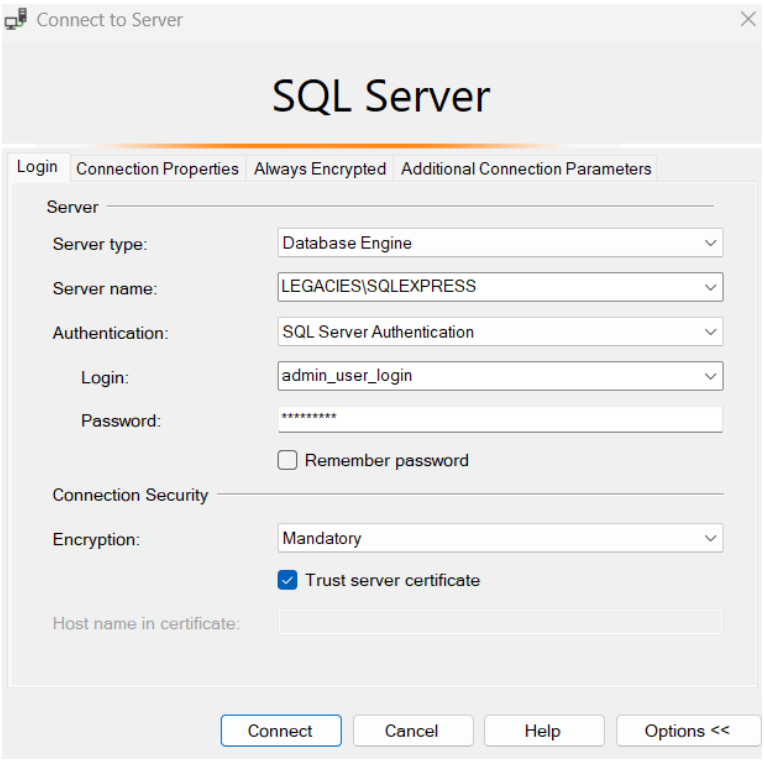
```
DELETE FROM Sales.SalesOrderHeader WHERE SalesOrderID = 43659;
```

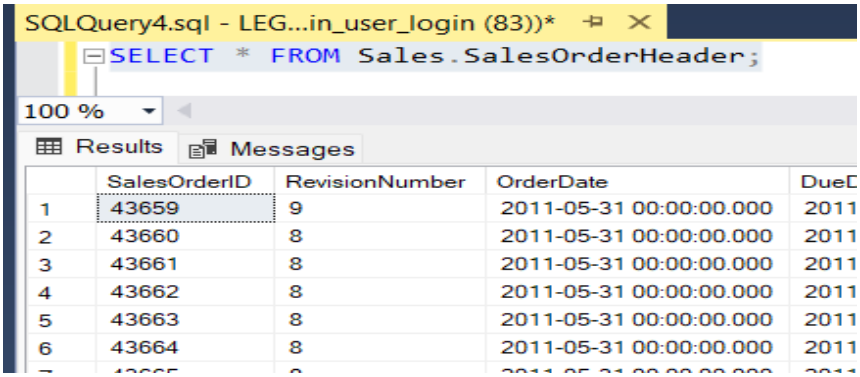
00 %

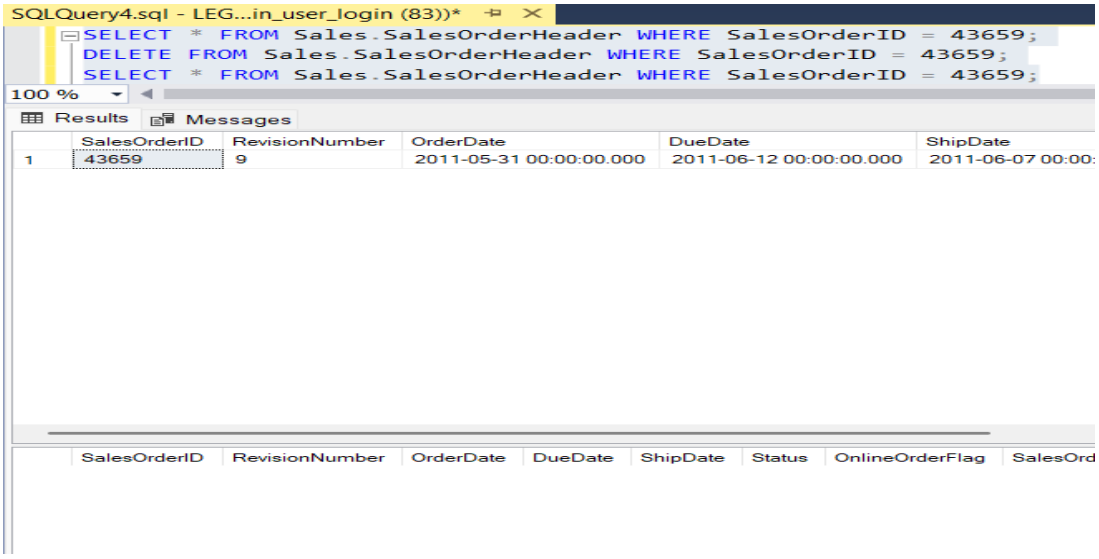
Messages

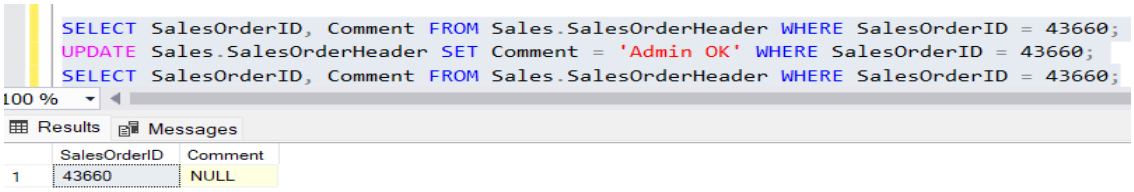
```
Msg 229, Level 14, State 5, Line 7
The DELETE permission was denied on the object 'SalesOrderHeader', database 'AdventureWorks2022', schema 'Sales'.

Completion time: 2025-04-22T16:12:23.6185134+03:00
```

Admin Kullanıcısı için:

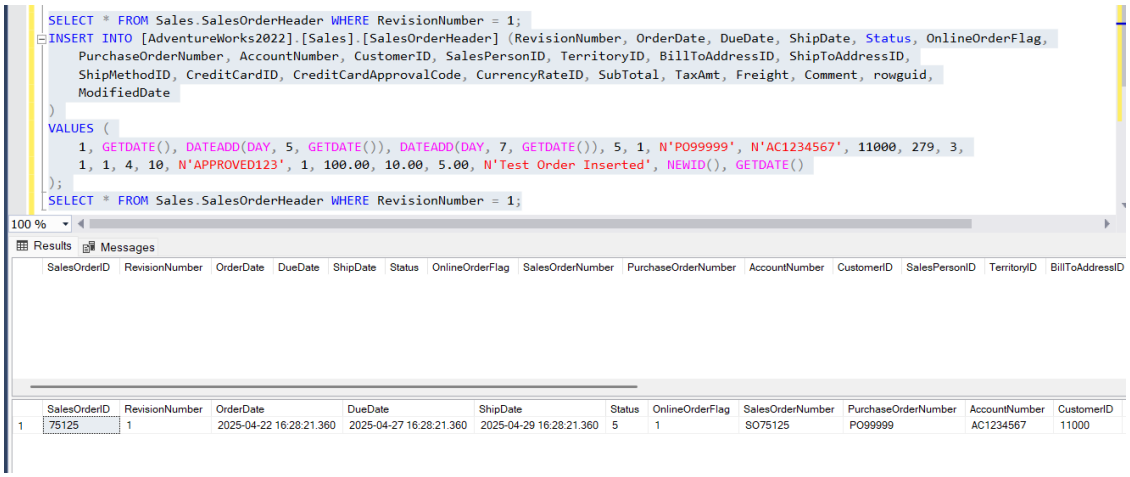





SQLQuery4.sql - LEG...in_user_login (83))*
SELECT * FROM Sales.SalesOrderHeader WHERE SalesOrderID = 43659;
DELETE FROM Sales.SalesOrderHeader WHERE SalesOrderID = 43659;
SELECT * FROM Sales.SalesOrderHeader WHERE SalesOrderID = 43659;
100 %
Results
Messages
SalesOrderID RevisionNumber OrderDate DueDate ShipDate
1 43659 9 2011-05-31 00:00:00.000 2011-06-12 00:00:00.000 2011-06-07 00:00:
SalesOrderID RevisionNumber OrderDate DueDate ShipDate Status OnlineOrderFlag SalesOrd


SELECT SalesOrderID, Comment FROM Sales.SalesOrderHeader WHERE SalesOrderID = 43660;
UPDATE Sales.SalesOrderHeader SET Comment = 'Admin OK' WHERE SalesOrderID = 43660;
SELECT SalesOrderID, Comment FROM Sales.SalesOrderHeader WHERE SalesOrderID = 43660;
100 %
Results
Messages
SalesOrderID Comment
1 43660 NULL

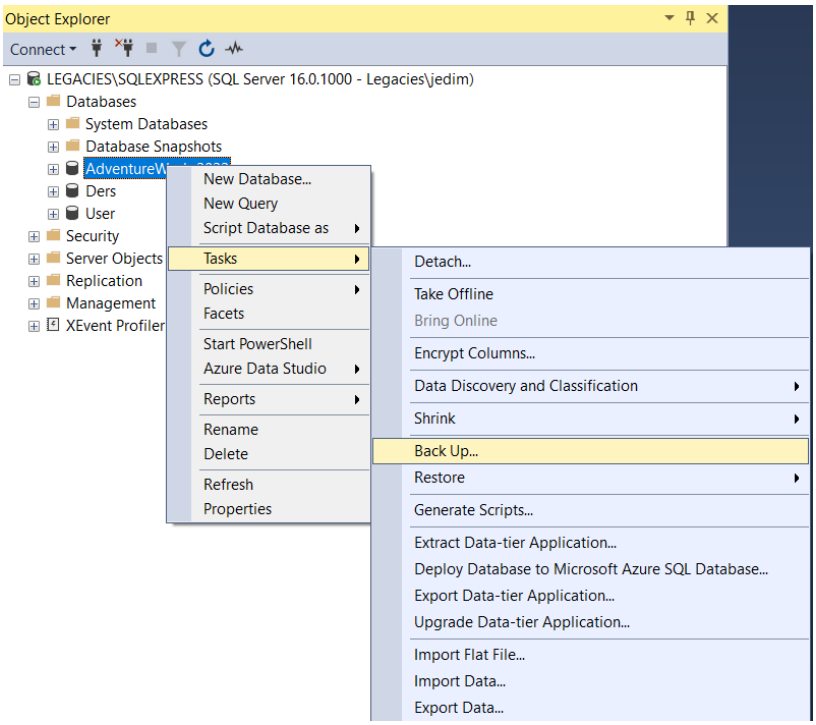

SalesOrderID Comment
1 43660 Admin OK

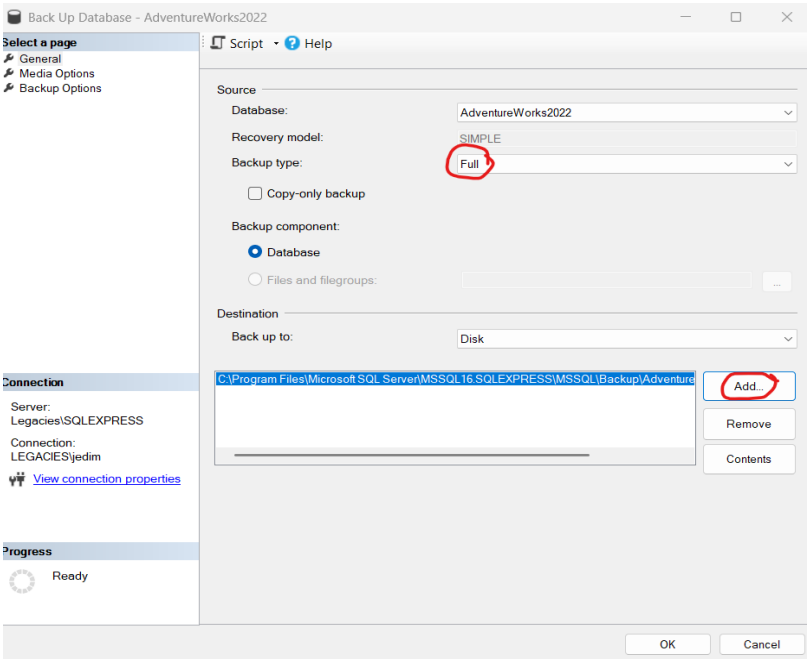

SELECT * FROM Sales.SalesOrderHeader WHERE RevisionNumber = 1;
INSERT INTO [AdventureWorks2022].[Sales].[SalesOrderHeader] (RevisionNumber, OrderDate, DueDate, ShipDate, Status, OnlineOrderFlag,
PurchaseOrderNumber, AccountNumber, CustomerID, SalesPersonID, TerritoryID, BillToAddressID, ShipToAddressID,
ShipMethodID, CreditCardID, CreditCardApprovalCode, CurrencyRateID, SubTotal, TaxAmt, Freight, Comment, rowguid,
ModifiedDate
)
VALUES (
1, GETDATE(), DATEADD(DAY, 5, GETDATE()), DATEADD(DAY, 7, GETDATE()), 5, 1, N'PO99999', N'AC1234567', 11000, 279, 3,
1, 1, 4, 10, N'APPROVED123', 1, 100.00, 10.00, 5.00, N'Test Order Inserted', NEWID(), GETDATE()
);
SELECT * FROM Sales.SalesOrderHeader WHERE RevisionNumber = 1;
100 %
Results
Messages
SalesOrderID RevisionNumber OrderDate DueDate ShipDate Status OnlineOrderFlag SalesOrderNumber PurchaseOrderNumber AccountNumber CustomerID SalesPersonID TerritoryID BillToAddressID
SalesOrderID RevisionNumber OrderDate DueDate ShipDate Status OnlineOrderFlag SalesOrderNumber PurchaseOrderNumber AccountNumber CustomerID
1 75125 1 2025-04-22 16:28:21.360 2025-04-27 16:28:21.360 2025-04-29 16:28:21.360 5 1 SO75125 PO99999 AC1234567 11000

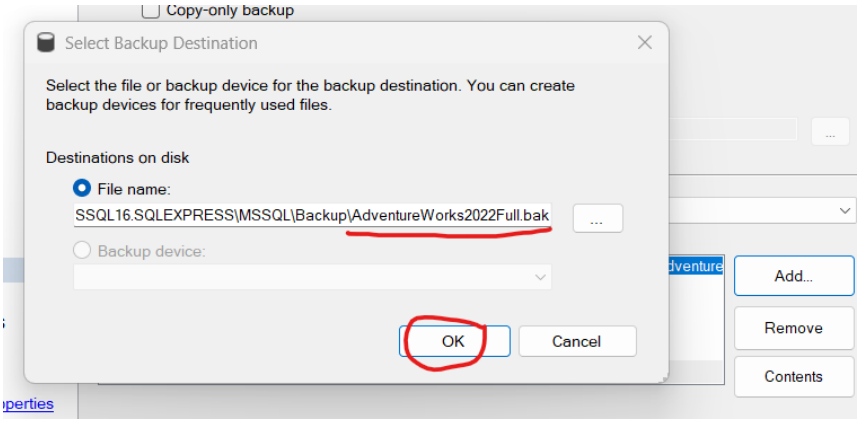
2. Veritabanı Yedekleme ve Felaketten Kurtarma Planı

a. Tam, Artık ve Fark Yedeklemeleri:

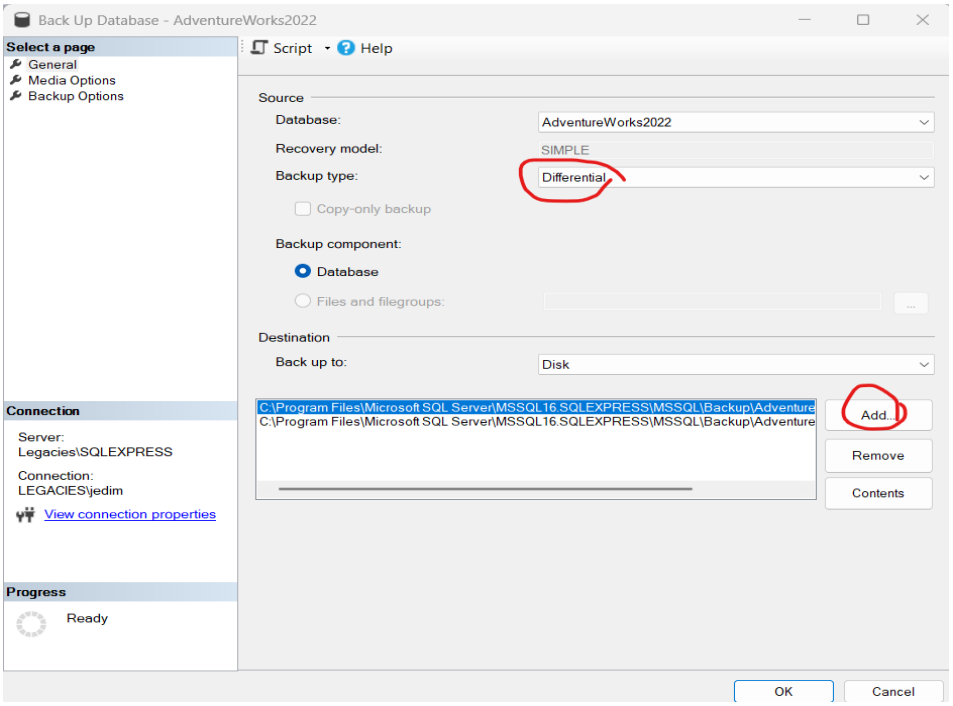
Tam Yedekleme:

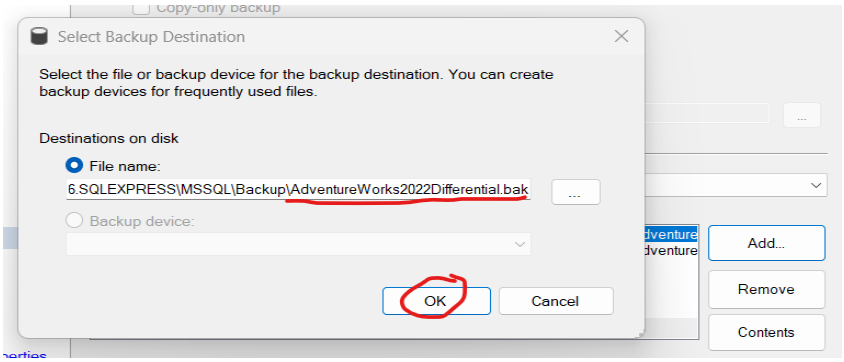




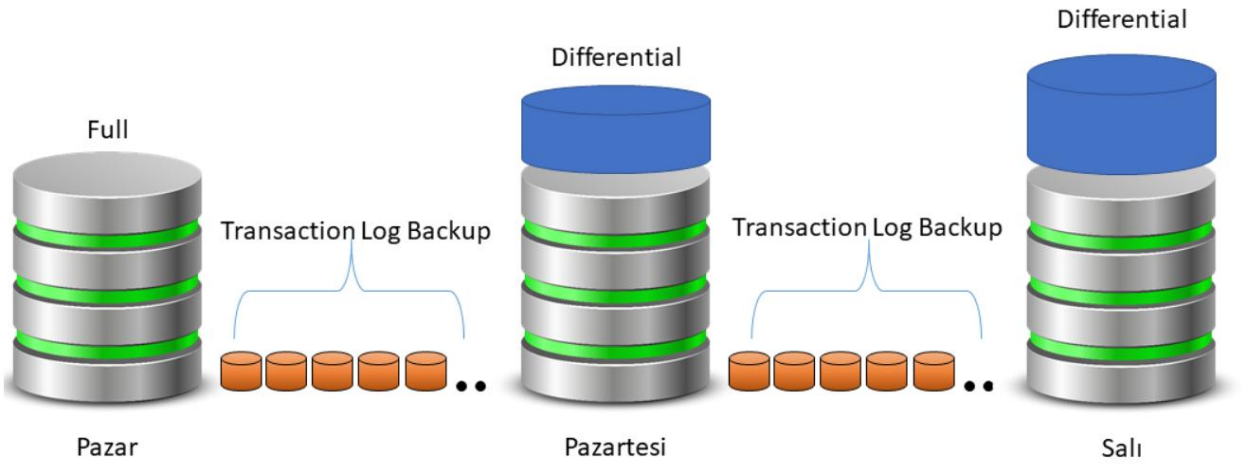


Fark Yedekleme:

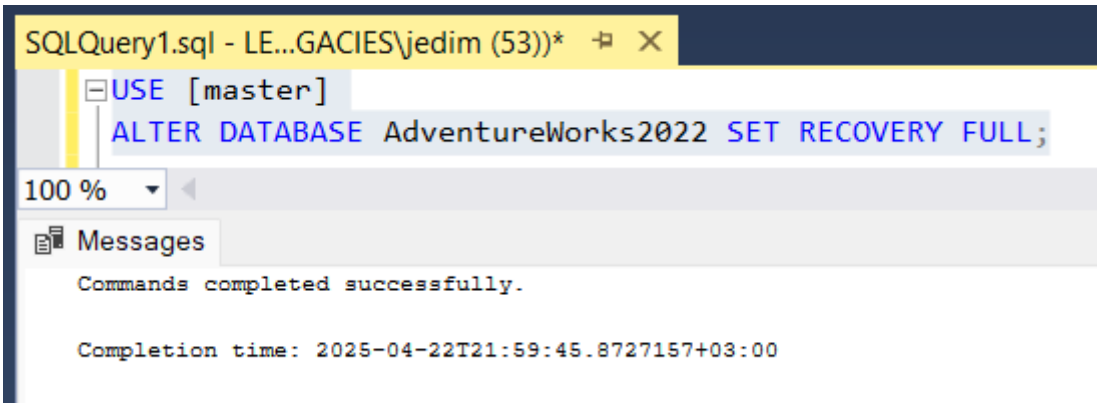


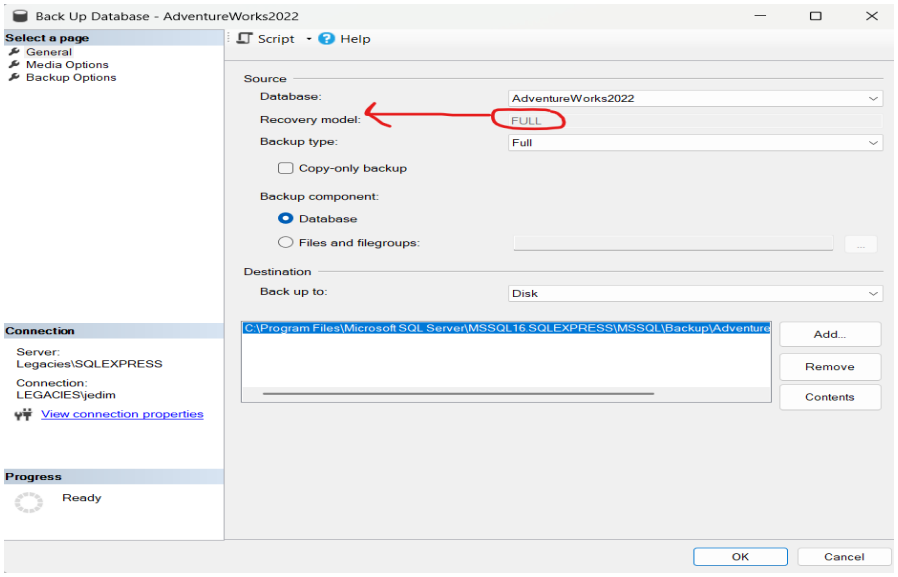


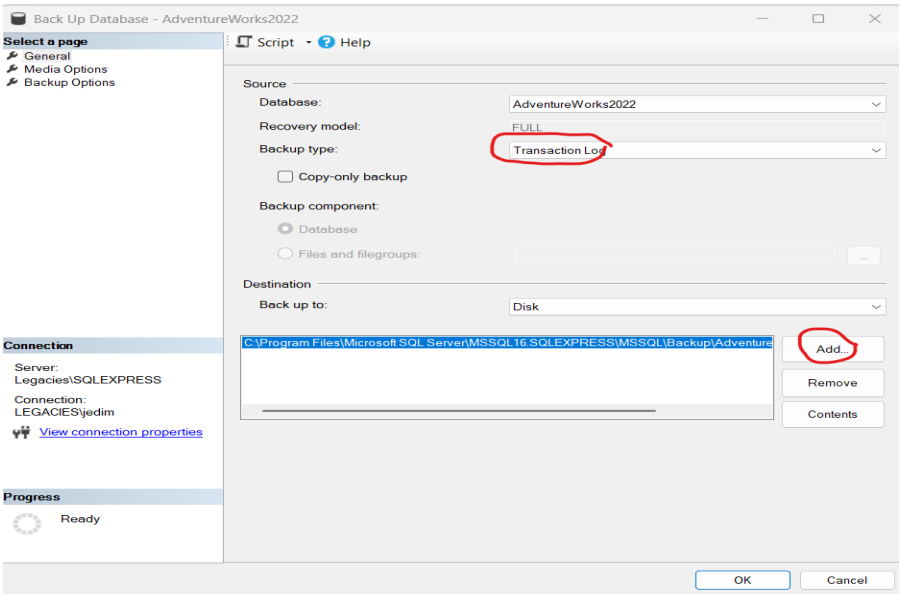
Artık Yedekleme:

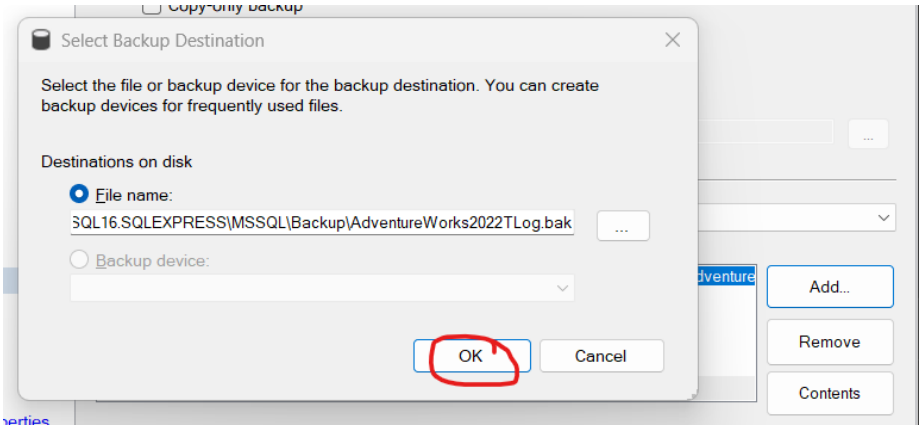


Artık yedekleme yapabilmek için öncesinde full yedeklemenin yapılmış olması lazım ve recovery modun FULL olması lazım çünkü artık yedeklemede

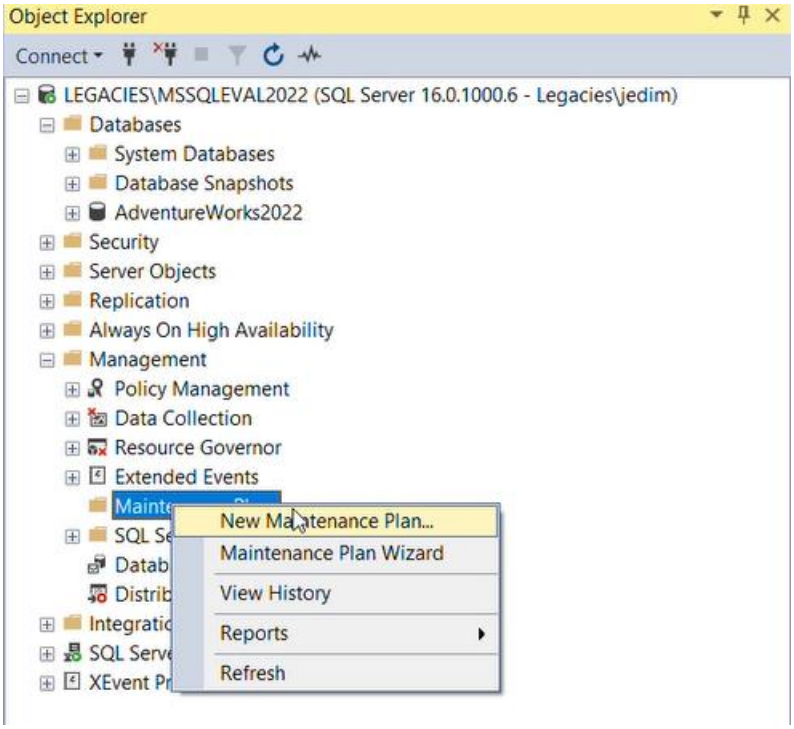


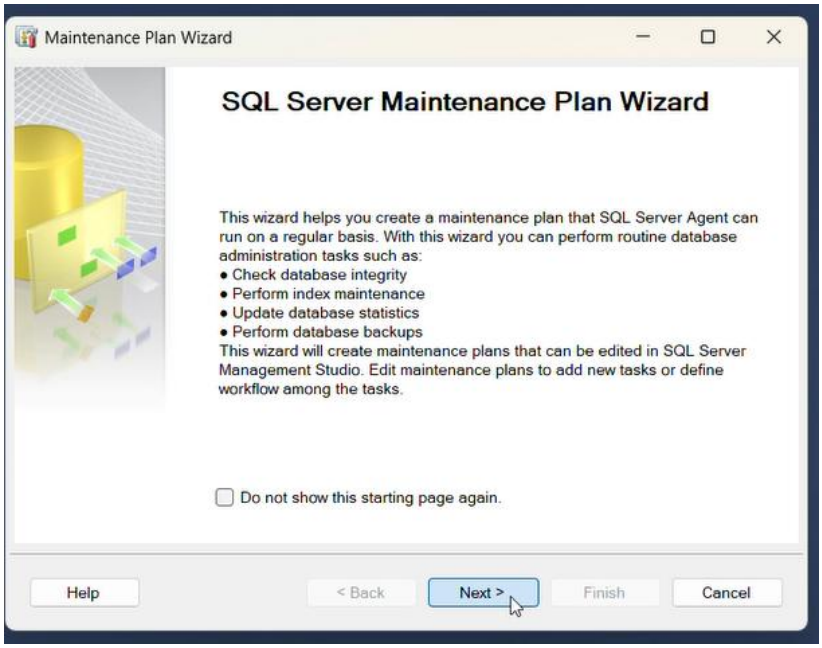


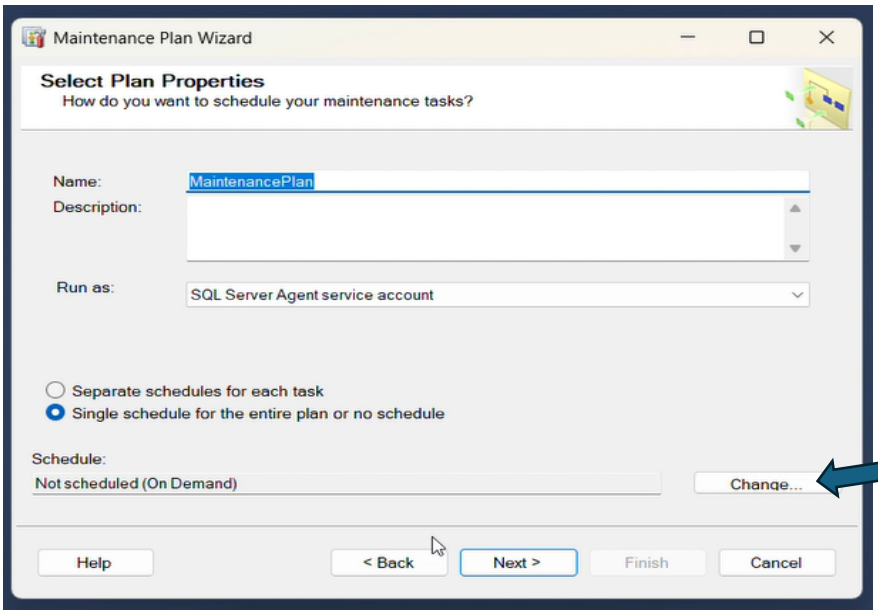

Back Up Database - AdventureWorks2022
Select a page
General
Media Options
Backup Options
Script
Help
Source
Database:
AdventureWorks2022
Recovery model:
FULL
Backup type:
Transaction Log
Copy-only backup
Backup component:
Database
Files and filegroups:
Destination
Back up to:
Disk
C:\Program Files\Microsoft SQL Server\MSSQL16.SQLEXPRESS\MSSQL\Backup\Adventure
Add...
Remove
Contents
Connection
Server:
Legacies\SQLEXPRESS
Connection:
LEGACIES\jedim
View connection properties
Progress
Ready
OK
Cancel

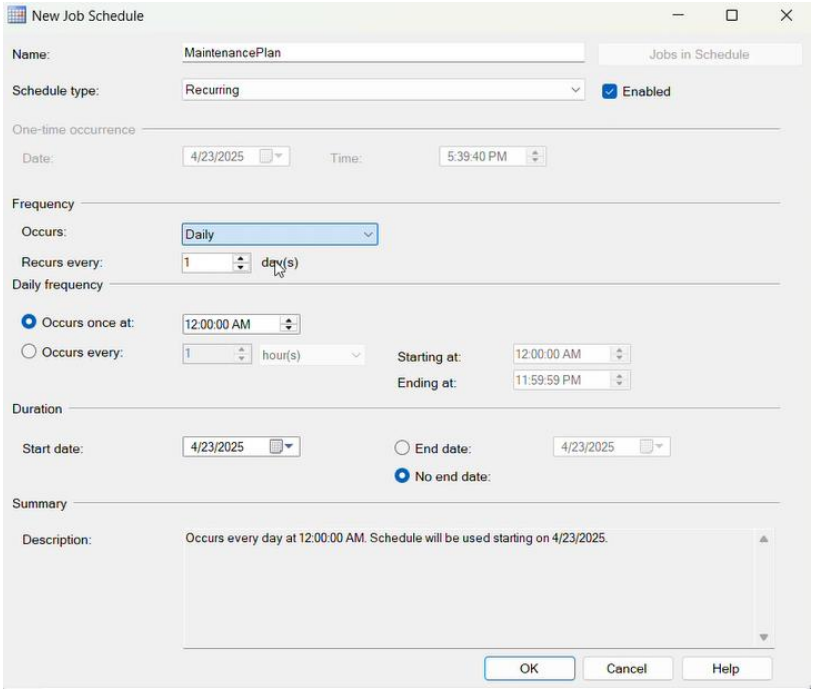

Select Backup Destination
Select the file or backup device for the backup destination. You can create backup devices for frequently used files.
Destinations on disk
File name:
SQL16.SQLEXPRESS\MSSQL\Backup\AdventureWorks2022TLog.bak
...
Backup device:
OK
Cancel
Add...
Remove
Contents

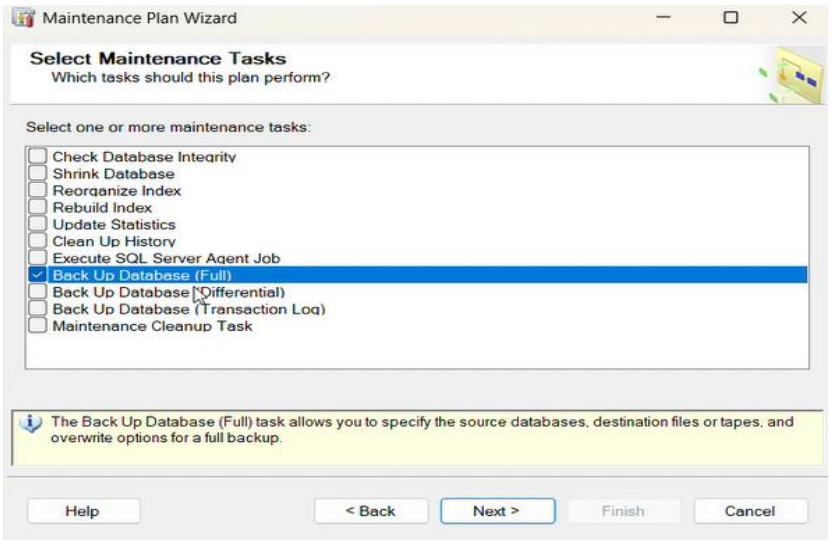
b. Zamanlayıcılarla Yedeklemeleri:

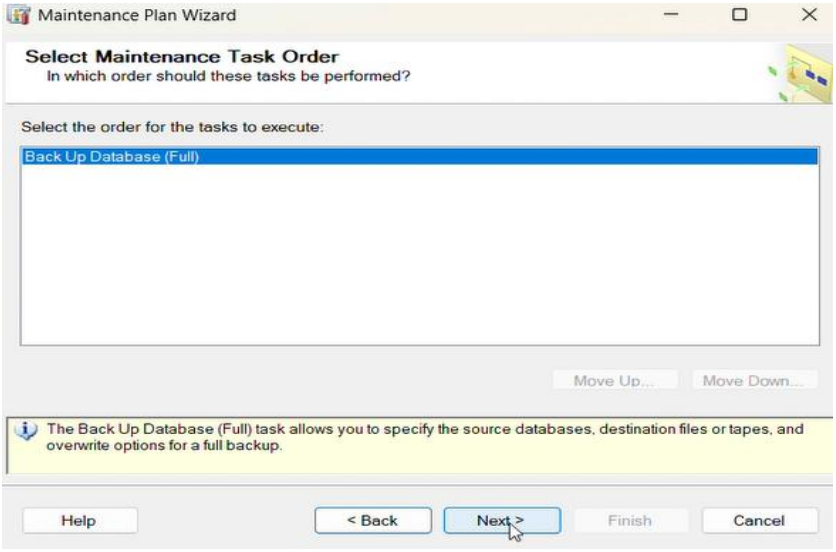


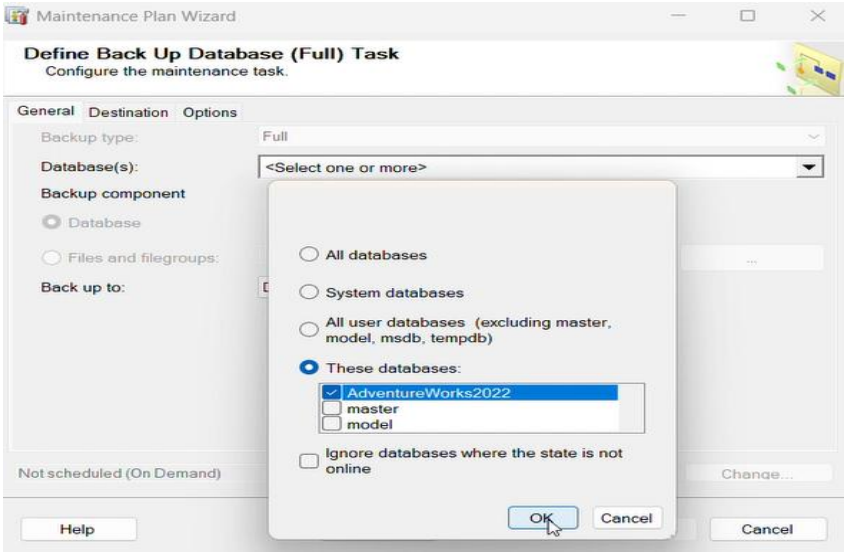


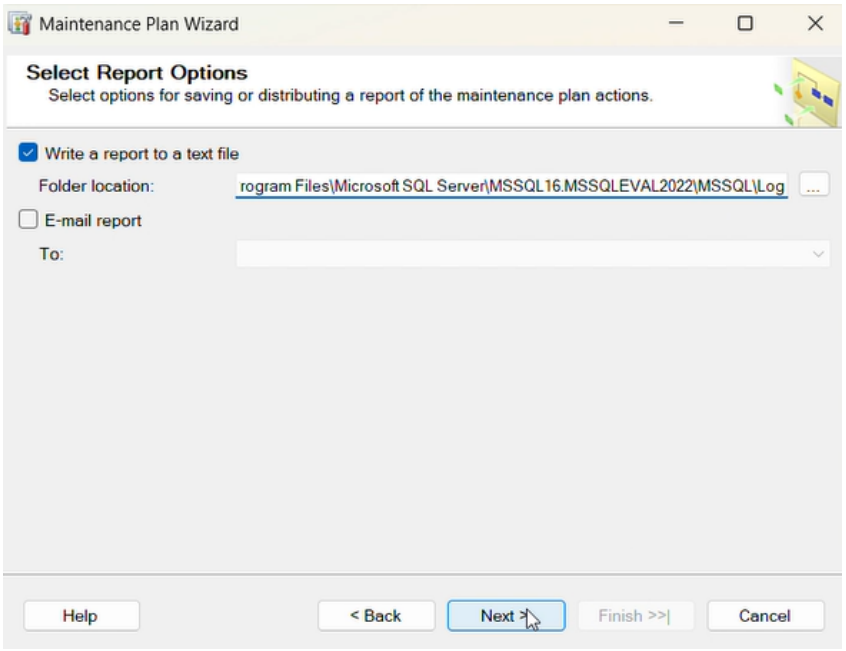

Maintenance Plan Wizard
Select Plan Properties
How do you want to schedule your maintenance tasks?
Name:
MaintenancePlan
Description:
Run as:
SQL Server Agent service account
Separate schedules for each task
Single schedule for the entire plan or no schedule
Schedule:
Not scheduled (On Demand)
Change...
Help
< Back
Next >
Finish
Cancel

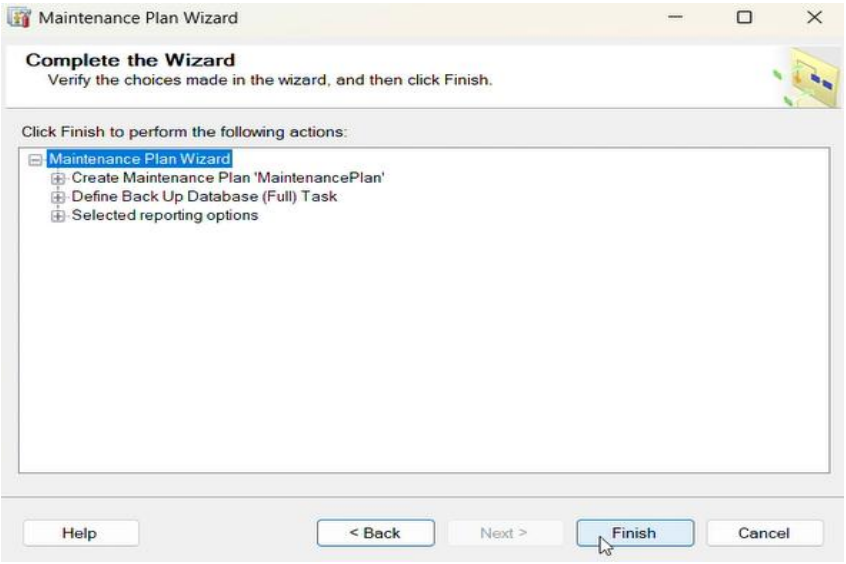

New Job Schedule
Name:
MaintenancePlan
Jobs in Schedule
Schedule type:
Recurring
Enabled
One-time occurrence
Date:
4/23/2025
Time:
5:39:40 PM
Frequency
Occurs:
Daily
Recurs every:
1
day(s)
Daily frequency
Occurs once at:
12:00:00 AM
Occurs every:
1
hour(s)
Starting at:
12:00:00 AM
Ending at:
11:59:59 PM
Duration
Start date:
4/23/2025
End date:
4/23/2025
No end date:
Summary
Description:
Occurs every day at 12:00:00 AM. Schedule will be used starting on 4/23/2025.
OK
Cancel
Help

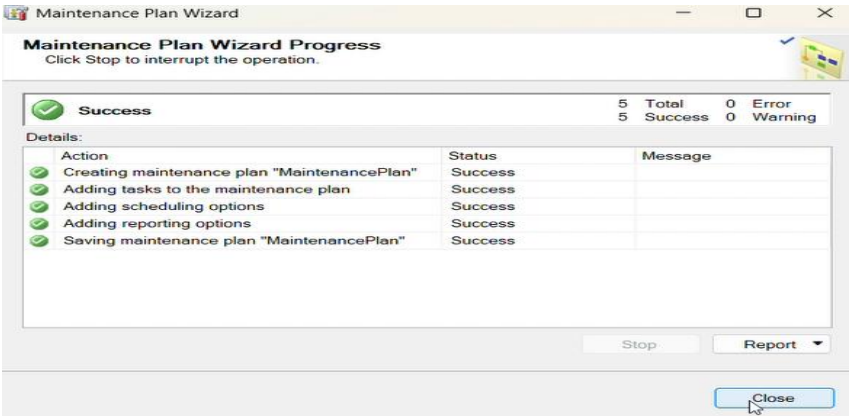

Maintenance Plan Wizard
Select Maintenance Tasks
Which tasks should this plan perform?
Select one or more maintenance tasks:
Check Database Integrity
Shrink Database
Reorganize Index
Rebuild Index
Update Statistics
Clean Up History
Execute SQL Server Agent Job
Back Up Database (Full)
Back Up Database (Differential)
Back Up Database (Transaction Log)
Maintenance Cleanup Task
The Back Up Database (Full) task allows you to specify the source databases, destination files or tapes, and overwrite options for a full backup.
Help
< Back
Next >
Finish
Cancel


Maintenance Plan Wizard
Select Maintenance Task Order
In which order should these tasks be performed?
Select the order for the tasks to execute:
Back Up Database (Full)
Move Up...
Move Down...
The Back Up Database (Full) task allows you to specify the source databases, destination files or tapes, and overwrite options for a full backup.
Help
< Back
Next >
Finish
Cancel


Maintenance Plan Wizard
Define Back Up Database (Full) Task
Configure the maintenance task.
General
Destination
Options
Backup type:
Full
Database(s):
<Select one or more>
Backup component
Database
Files and filegroups:
Back up to:
All databases
System databases
All user databases (excluding master, model, msdb, tempdb)
These databases:
AdventureWorks2022
master
model
Ignore databases where the state is not online
OK
Cancel
Not scheduled (On Demand)
Change...
Help
Cancel

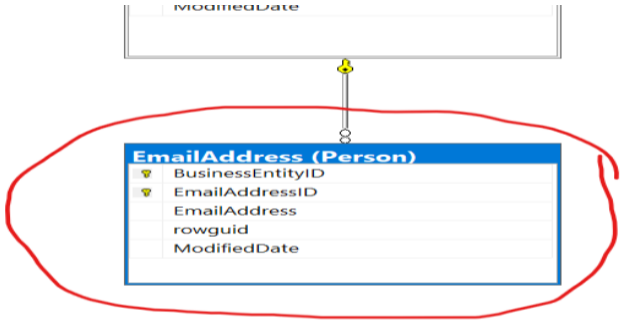

Maintenance Plan Wizard
Select Report Options
Select options for saving or distributing a report of the maintenance plan actions.
Write a report to a text file
Folder location:
rogram Files\Microsoft SQL Server\MSSQL16.MSSQLEVAL2022\MSSQL\Log
E-mail report
To:
Help
< Back
Next >
Finish >>|
Cancel


Maintenance Plan Wizard
Complete the Wizard
Verify the choices made in the wizard, and then click Finish.
Click Finish to perform the following actions:
Maintenance Plan Wizard
Create Maintenance Plan 'MaintenancePlan'
Define Back Up Database (Full) Task
Selected reporting options
Help
< Back
Next >
Finish
Cancel

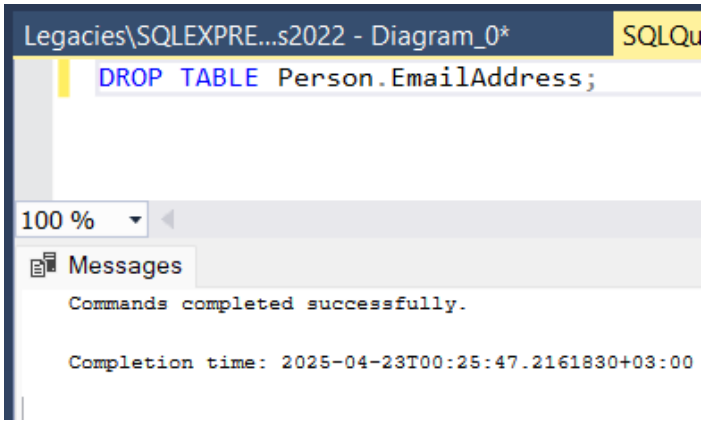

Maintenance Plan Wizard
Maintenance Plan Wizard Progress
Click Stop to interrupt the operation.
Success
5 Total 0 Error
5 Success 0 Warning
Details:
Action
Status
Message
Creating maintenance plan "MaintenancePlan"
Success
Adding tasks to the maintenance plan
Success
Adding scheduling options
Success
Adding reporting options
Success
Saving maintenance plan "MaintenancePlan"
Success
Stop
Report
Close

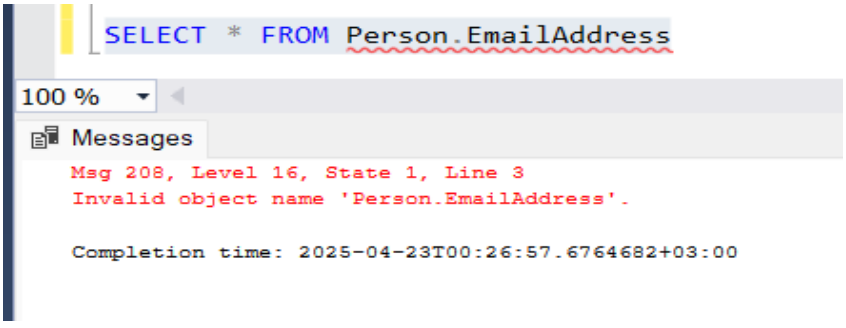
c. Felaketten Kurtarma Senaryoları:

Burada yanlışlıkla Person.EmailAddress table'ını sildiğimiz senaryoyu ele alıyoruz. Normal şartlarda kendisinden pk alınan bir tabloyu silemeyiz ama bu senaryoda herhangi bir fk bağımlılığı olmayan Person.EmailAddress tablosunu siliyoruz.

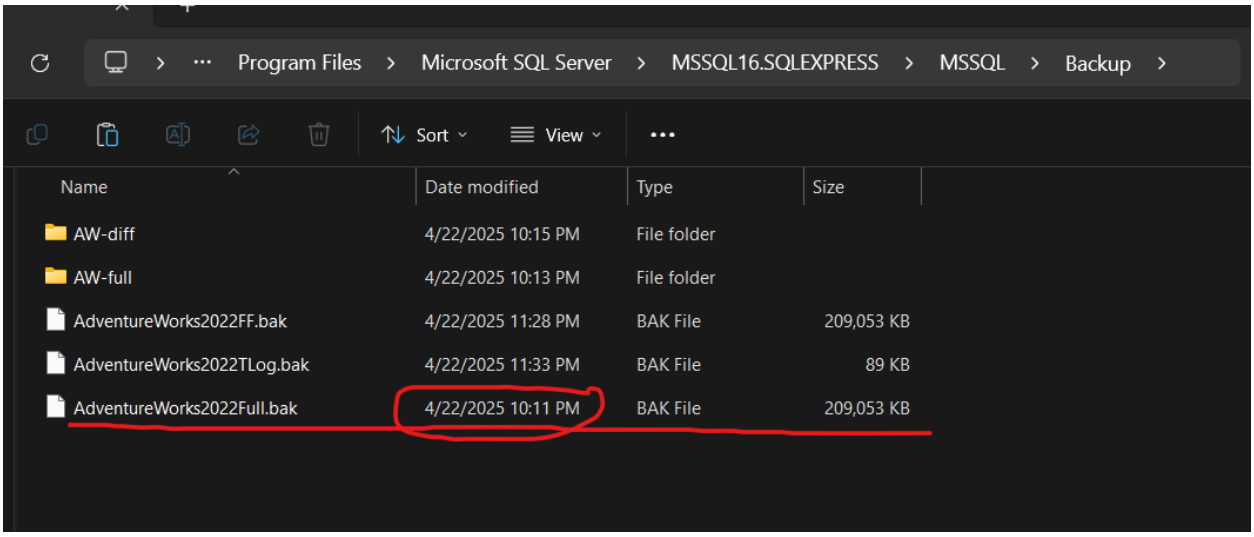


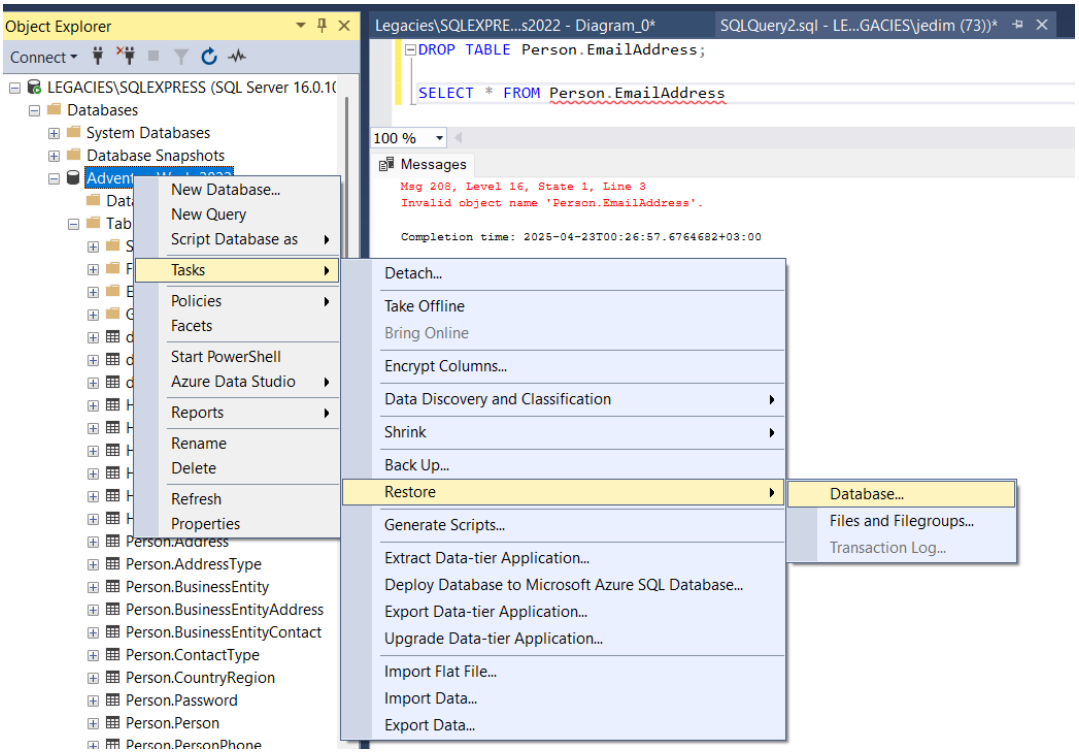
Tabloyu siliyoruz.

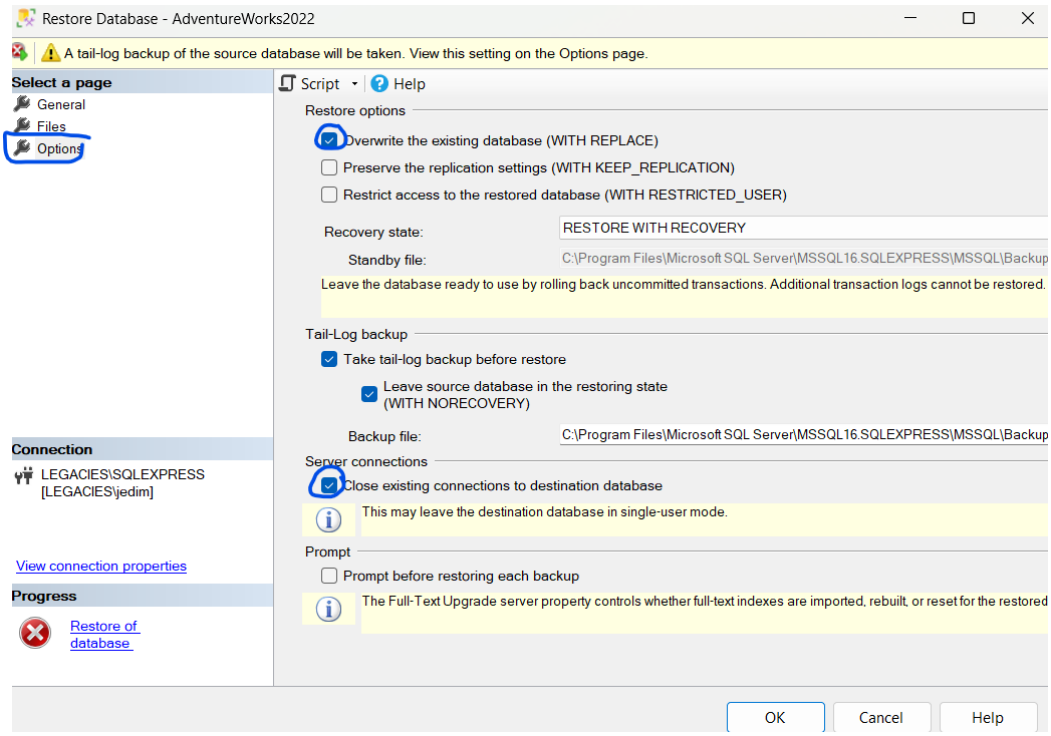




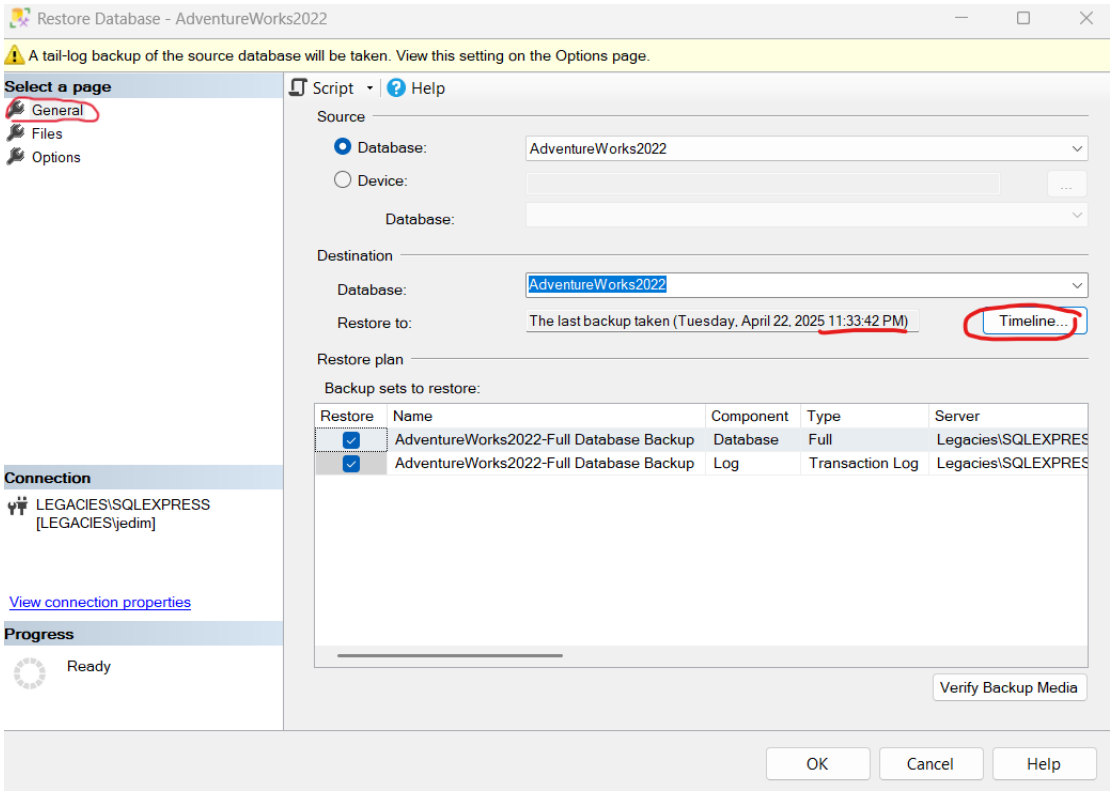
Silinen tabloyu geri getirmek için backup yaptığımız dosyadan restore ediyoruz.

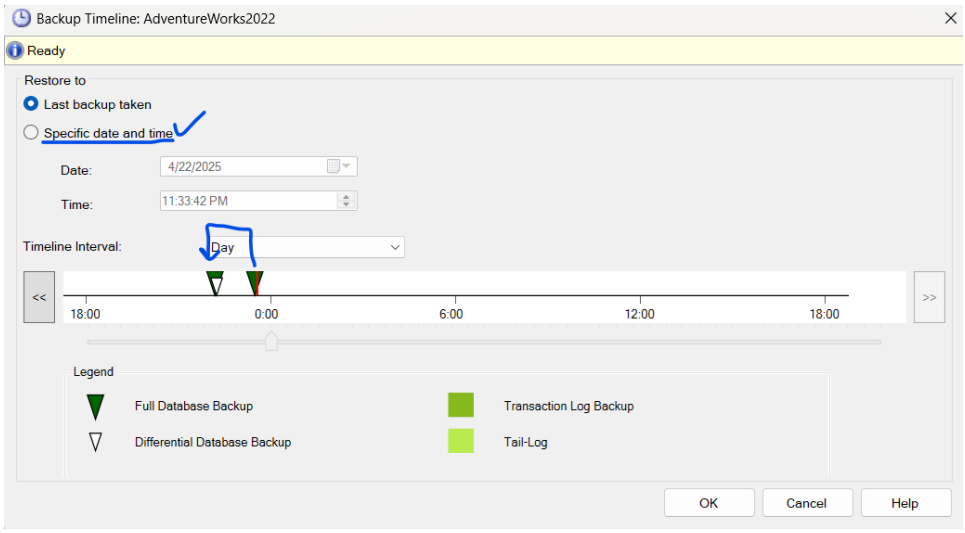


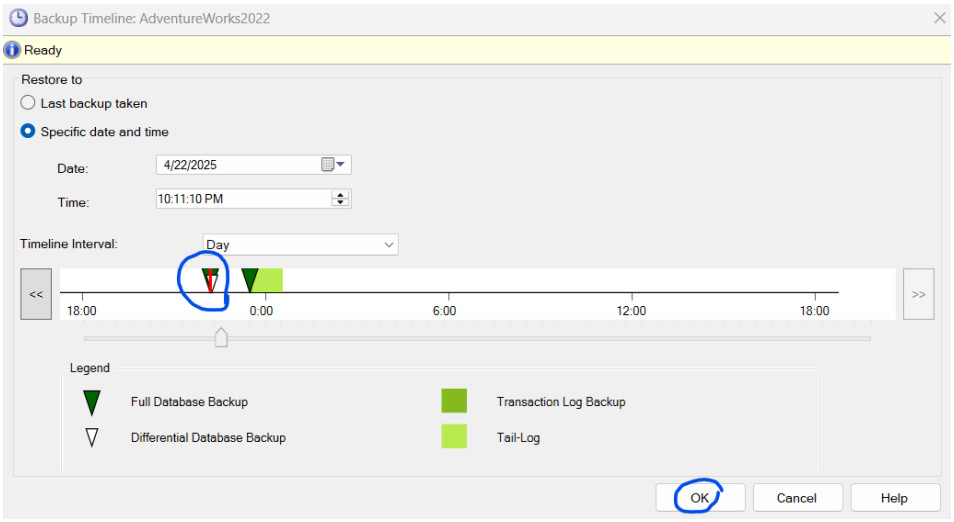


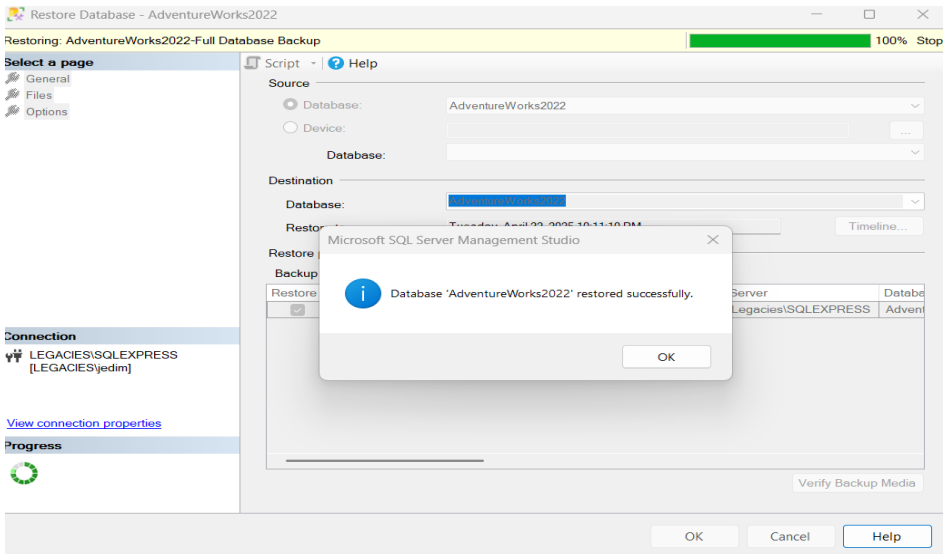


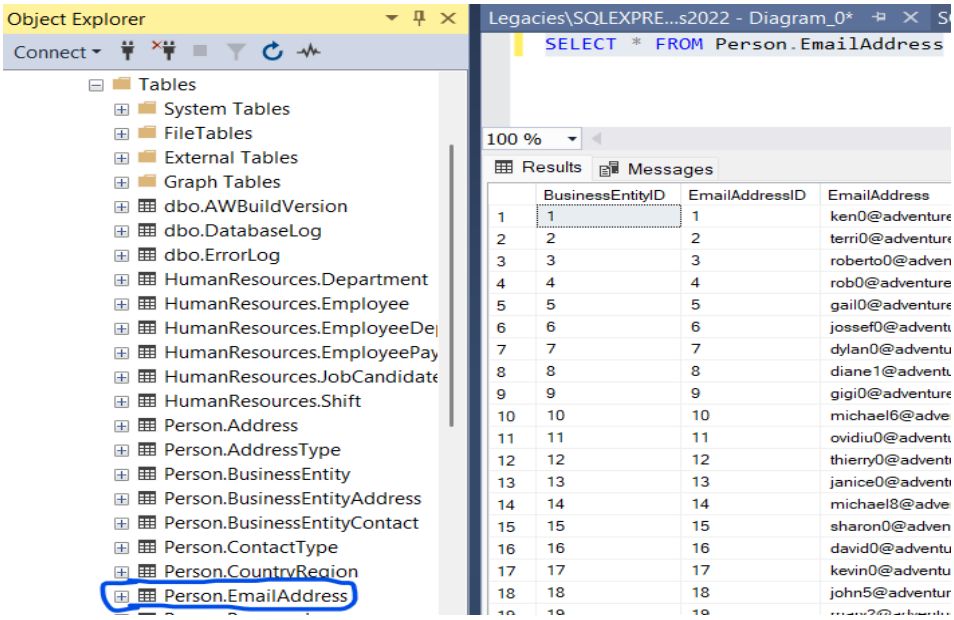
Yukarıdaki seçeneklerden, destination database'ın bağlantısını kopartmazsak hata alırız.




Backup Timeline: AdventureWorks2022
Ready
Restore to
Last backup taken
Specific date and time
Date:
4/22/2025
Time:
11:33:42 PM
Timeline Interval:
Day
<<
18:00
0:00
6:00
12:00
18:00
>>
Legend
Full Database Backup
Differential Database Backup
Transaction Log Backup
Tail-Log
OK
Cancel
Help


Backup Timeline: AdventureWorks2022
Ready
Restore to
Last backup taken
Specific date and time
Date:
4/22/2025
Time:
10:11:10 PM
Timeline Interval:
Day
<<
18:00
0:00
6:00
12:00
18:00
>>
Legend
Full Database Backup
Differential Database Backup
Transaction Log Backup
Tail-Log
OK
Cancel
Help

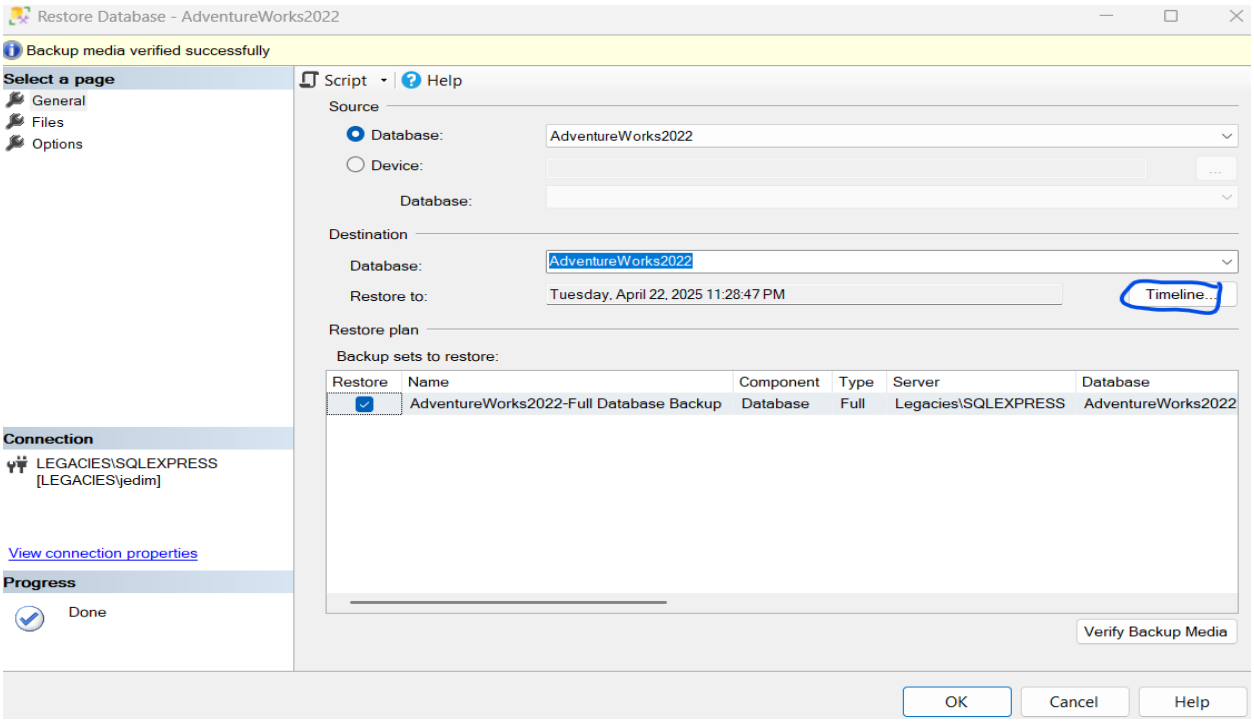

Restore Database - AdventureWorks2022
Restoring: AdventureWorks2022-Full Database Backup
100%
Stop
Select a page
General
Files
Options
Script
Help
Source
Database:
AdventureWorks2022
Device:
Database:
Destination
Database:
Timeline...
Microsoft SQL Server Management Studio
Database 'AdventureWorks2022' restored successfully.
OK
Connection
LEGACIES\SQLEXPRESS
[LEGACIES\jedim]
View connection properties
Progress
Verify Backup Media
OK
Cancel
Help



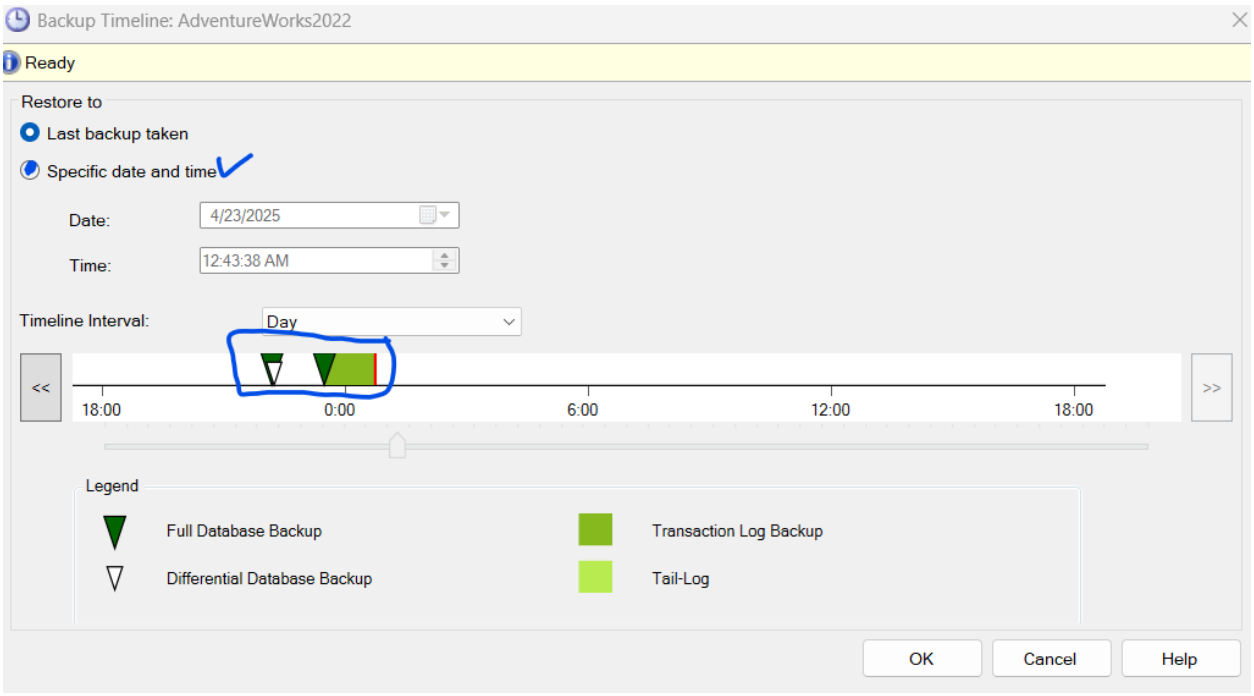
d. Test Yedekleme Senaryoları:

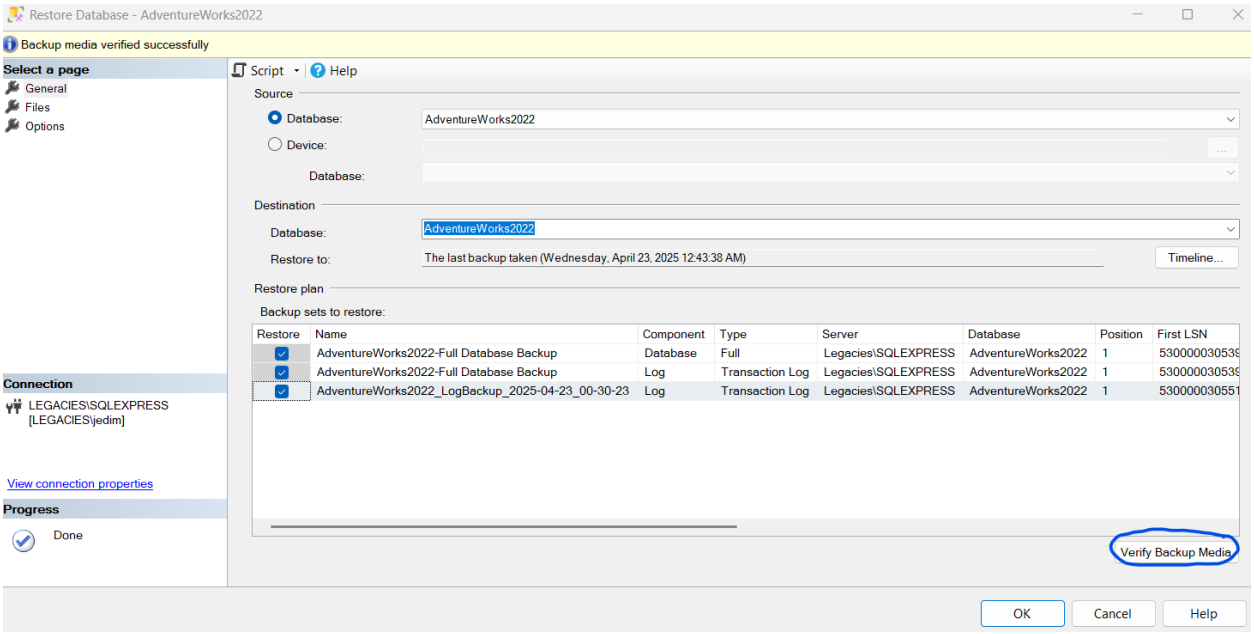
Bu kısımda hem sql kodu ile hem de ssms'in ui'ı ile nasıl yapılacağını ele alacağız.

Database'e sağ tıklayıp backup kısmına tıklayacağız.

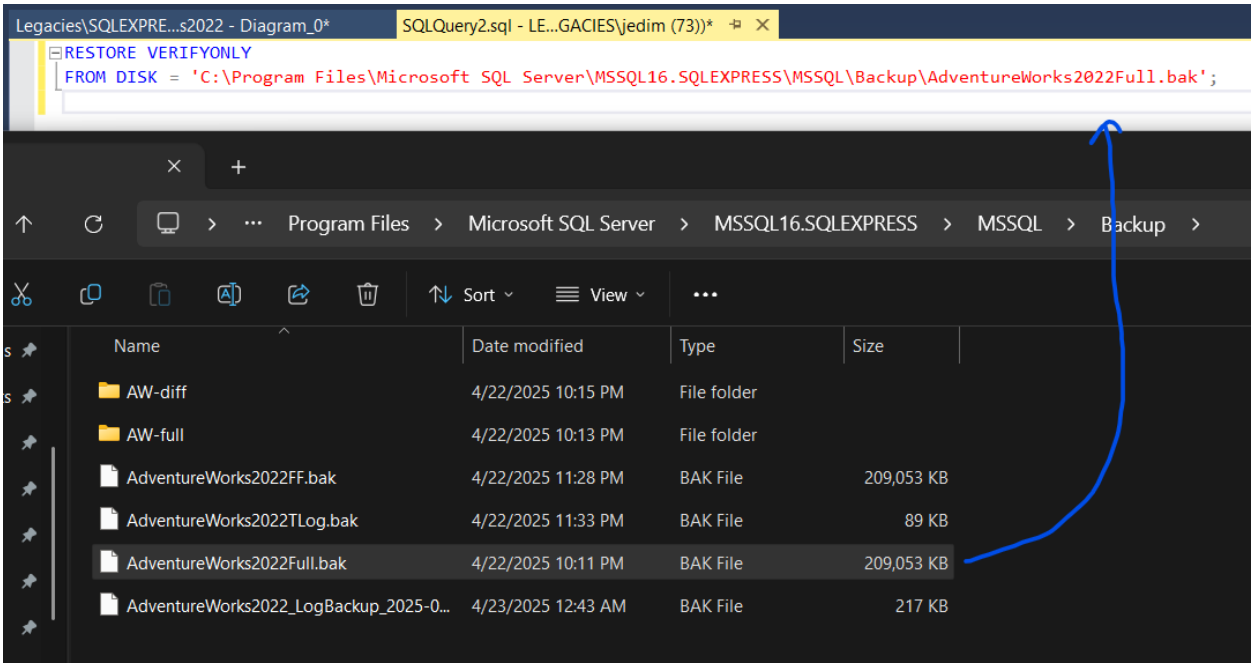


Verify etmek istediğimiz database backup'ını ve üzerinde daha önce yapılmış backup geçmişini seçip verify edebiliriz.





Buraya kadar olan kısım ssms'in ui'ı ile öncesinde backup ettiğimiz database'in verify edilmesini içeriyordu. Şimdi ise kod ile nasıl yapılacağını ele alacağız. Kod ile yapması çok daha hızlı ve basittir.



3. Veritabanı Güvenliği ve Erişim Kontrolü

a. Erişim Yönetimi:

Bu kısmı, "Veritabanı Performans Optimizasyonu ve İzleme" projesinin "Veri Yöneticisi Rolleri" kısmında ele aldığımız için burada tekrardan yazmaya gerek yoktur. Bu kısımla ilgili her şey, ilk projede detaylıca ele alınmıştır.

b. Veri Şifreleme:

```
/* https://learn.microsoft.com/en-us/sql/relational-databases/security/
USE master;
GO

CREATE MASTER KEY ENCRYPTION BY PASSWORD = '<UseStrongPasswordHere>';
GO
```

Veritabanını şifrelemeden önce ilk aşamada, master veritabanında bir veritabanı anahtarı diğer bir deyişle Database Master Key (DMK) oluşturmalıyız. Bu master key, sertifikaları ve şifrelemek için kullanılacak anahtarı korumak için ön koruma sağlar.

```
CREATE CERTIFICATE MyServerCert
    WITH SUBJECT = 'My DEK Certificate';
GO
```

İkici aşama olarak master veritabanı içinde bir sertifika oluşturulur. Bu sertifika, veriyi şifrelemek için kullanılacak anahtarı şifrelemeyi sağlayacak.

```
USE AdventureWorks2022;
GO

CREATE DATABASE ENCRYPTION KEY
    WITH ALGORITHM = AES_256
    ENCRYPTION BY SERVER CERTIFICATE MyServerCert;
GO
```

Şifreleme yapmak istediğimiz database için, bir veritabanı şifreleme anahtarı oluşturur. AES'in 128, 192, 256 bitlik şifreleme seçeneklerinden en güçlü olan 256 bitlik olanı seçiyoruz ve öncesinde oluşturduğumuz sertifika ile bu anahtarı birbirine bağlıyoruz. Böylece veritabanı şifreleme anahtarı (DEK) sertifika ile korunmuş oluyor.

```
ALTER DATABASE AdventureWorks2022
    SET ENCRYPTION ON;
GO
```

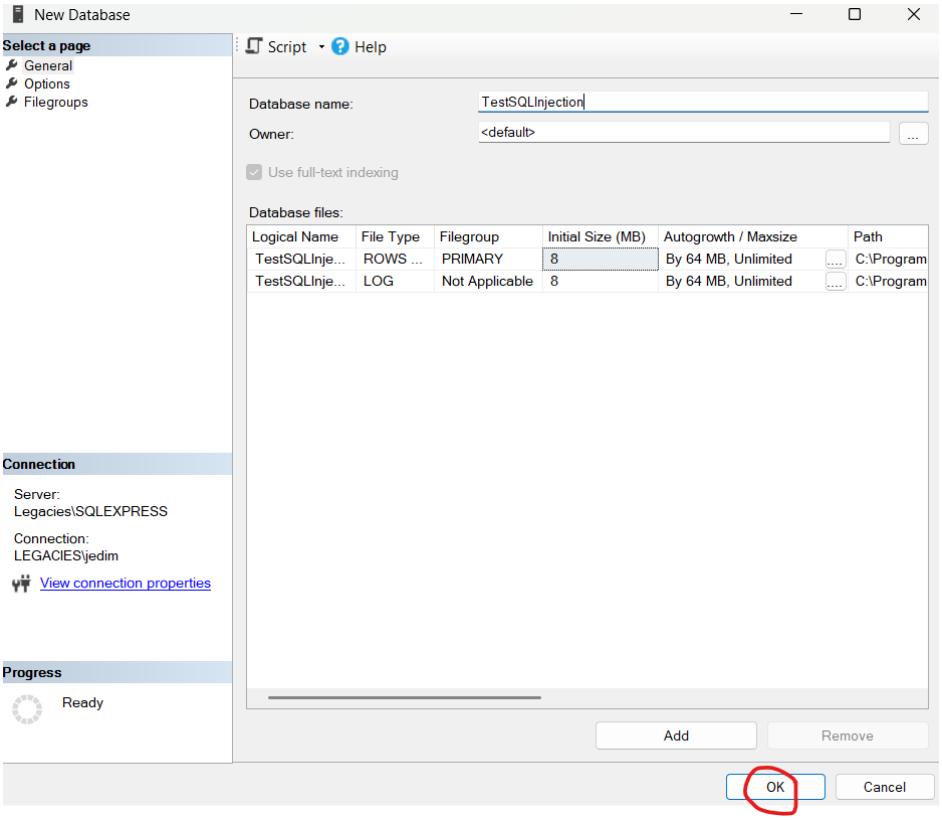
Oluşturduğumuz DEK ile veritabanını şifreliyoruz.

```
/* https://learn.microsoft.com/en-us/sql/relationa
USE AdventureWorks2022;
GO

/* The value 3 represents an encrypted state
   on the database and transaction logs. */
SELECT *
FROM sys.dm_database_encryption_keys
WHERE encryption_state = 3;
```

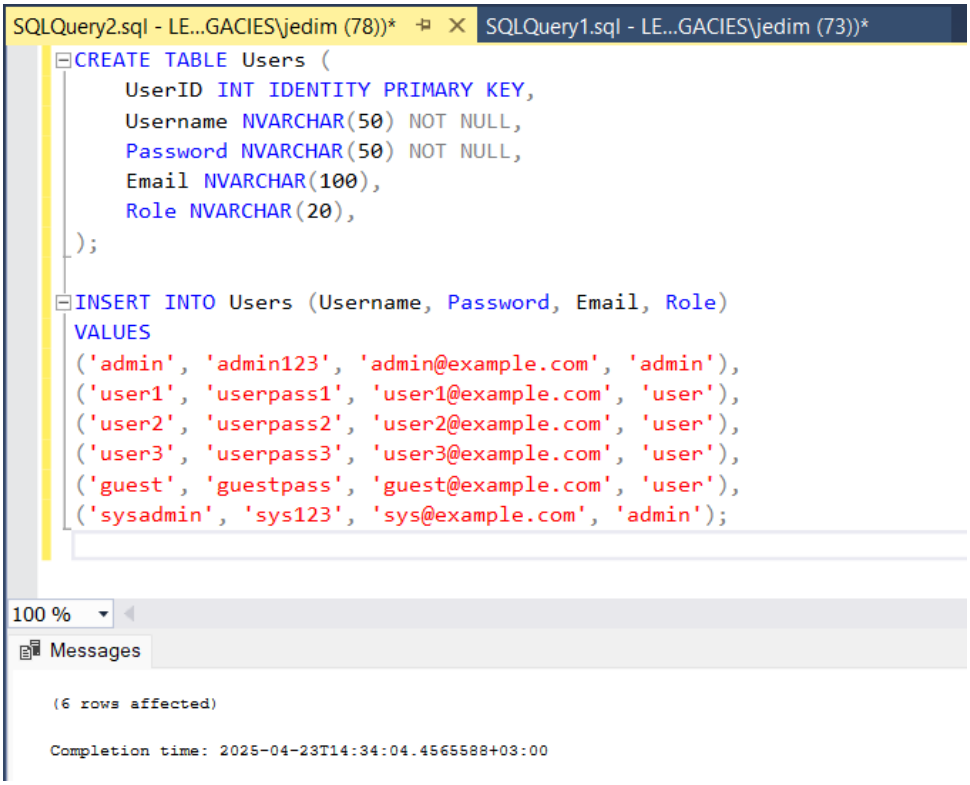
Şifreleme durumunu görmek için microsoft'un sql server encryption web sitesindeki sql komutlarını kullanarak veritabanının doğru bir şekilde şifrelenip şifrelenmediğini gözlemliyoruz.

c. SQL Injection Testleri:

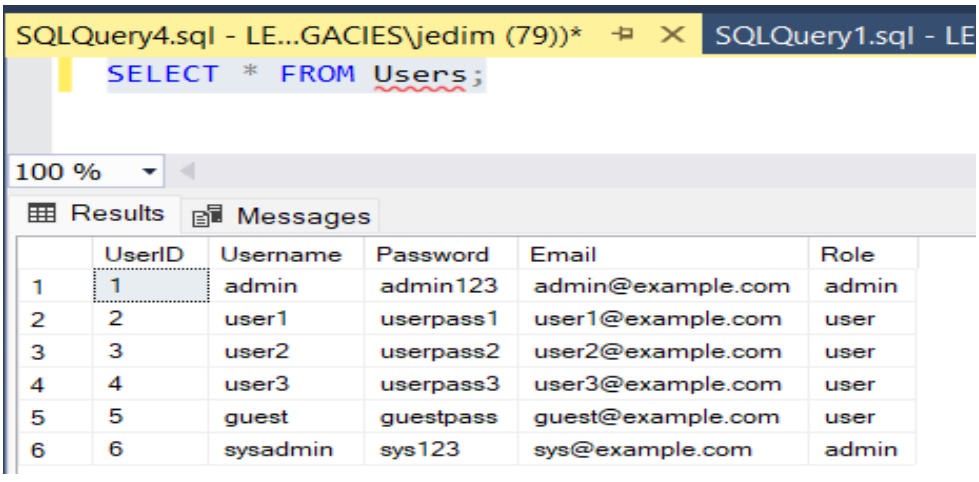
Normal şartlarda select komutu dışındaki diğer komutlar ile uygulanabilecek sql injection saldırısına karşı herhangi bir koruması yoktur. Select komutu dışındaki komutları ise constraint ekleyerek engelleyebilmektedir. Select kısmından gelecek bir saldırının MSSQL veritabanı düzeyinde, dışarıdan log kayıtlarını izleyip müdahale edilmediği sürece otomatik olarak engellenebilmesi pek mümkün değildir. Bu yüzden, sql injection saldırısına karşı client bazlı bir koruma yapılması gerekmektedir. Normal sorgular yerine parametreli sorgular kullanarak saldırganın, query'lerin açıklarını kullanmasının önüne geçilir. SQL injection kısmı için bir test ortamı oluşturulmuştur. Yeni bir veritabanı oluşturulup içerisine mock user data'ları (yapay kullanıcı verileri) eklenmiştir. Flask üzerinden bir client hazırlanmış olup parametresiz ve parametreli sorgulardaki farklar ele alınmıştır.



TestSQLInjection isminde bir veritabanı oluşturuldu.



Örnek bir user tablosu ve mock user verileri oluşturuldu. Password bilgileri, bilerek hashlenmemiş bir şekilde tutuldu. Best case'de kesinlikle password'ları veritabanlarında hashlenmiş bir şekilde tutulması gerekmektedir ama saldırgaların genellikle password yerine veritabanındaki hassas bilgilere erişmek istediğinden ötürü bu şekilde test ortamı oluşturuldu.



	UserID	Username	Password	Email	Role
1	1	admin	admin123	admin@example.com	admin
2	2	user1	userpass1	user1@example.com	user
3	3	user2	userpass2	user2@example.com	user
4	4	user3	userpass3	user3@example.com	user
5	5	guest	guestpass	guest@example.com	user
6	6	sysadmin	sys123	sys@example.com	admin

Tablonun başarılı bir şekilde oluşturulup oluşturulmadığını test etmek için basit bir sorgu yazıldı.

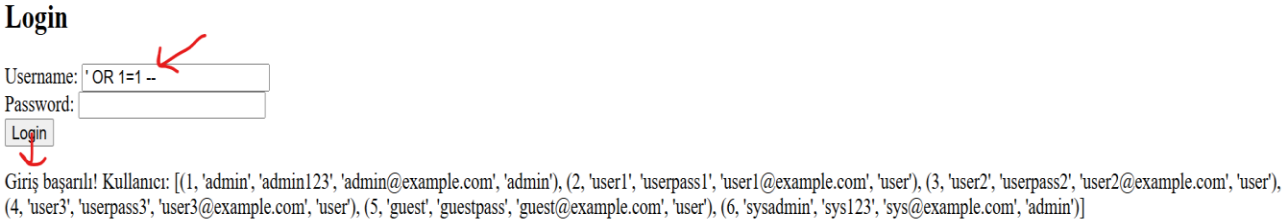
Parametresiz Query Senaryosu:

```python
app = Flask(__name__)

# Veritabanı bağlantısı
connection_string = (
    "Driver={ODBC Driver 17 for SQL Server};"
    "Server=LEGACIES\\SQLEXPRESS;"
    "Database=TestSQLInjection;"
    "Trusted_Connection=yes;"
)

@app.route('/', methods=['GET', 'POST'])
def login():
    result = ''
    if request.method == 'POST':
        username = request.form['username']
        password = request.form['password']
        query = f"SELECT * FROM Users WHERE Username = '{username}' AND Password = '{password}'"

        try:
            conn = pyodbc.connect(connection_string)
            cursor = conn.cursor()
            cursor.execute(query)
            rows = cursor.fetchall()
            if rows:
                result = f'Giriş başar□□! Kullan□c□: {rows}'
```

Problems Output Debug Console **Terminal** Ports Postman Console

```
 * Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
 * Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
tion WSGI server instead.
 * Running on http://127.0.0.1:5000
```

Burada flask projesi yer almaktadır. Connection string değişkeni, ilgili veritabanına erişmek için yazıldı. Query değişkeninde ise parametresiz bir sorgu yazılmıştır. Client, 5000 portunda başlatıldı.



Görüldüğü üzere saldırgan username'e "- OR 1=1" yazıp password kısmını boş bıraktığı zaman, client'teki parametresiz query'de şöyle gözükmektedir:

"SELECT * FROM WHERE Username = '' OR 1=1 -- ' AND Password"

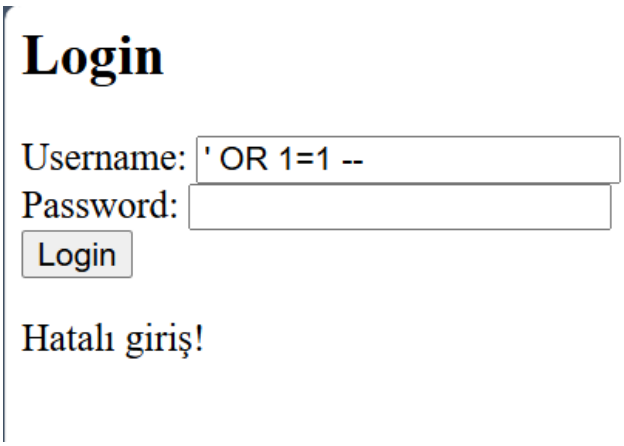
Sql'de comment line – işareti ile atıldığı için " ' AND Password " kısmı comment line içerisine alınmış olur. Böylece aslında tüm kullanıcı bilgileri getirilmiş olunur.

Bunu önlemenin birkaç basit yolu var. Username ve password data class'ında validation annotation kullanarak bu durum rahatlıkla çözülür. Bunlara literatürde middleware denir. Bir endpoint'e atılan post isteğinden gelen veriler, veritabanında işlem yapmayı sağlamadan önce middleware katmanı ile validate edilir. Diğer bir yöntem ise parametreli yöntem kullanmaktır. Bu sayede, bu ve bunun gibi komutlarla sql syntax'ını manipüle edilemez durumda olur.

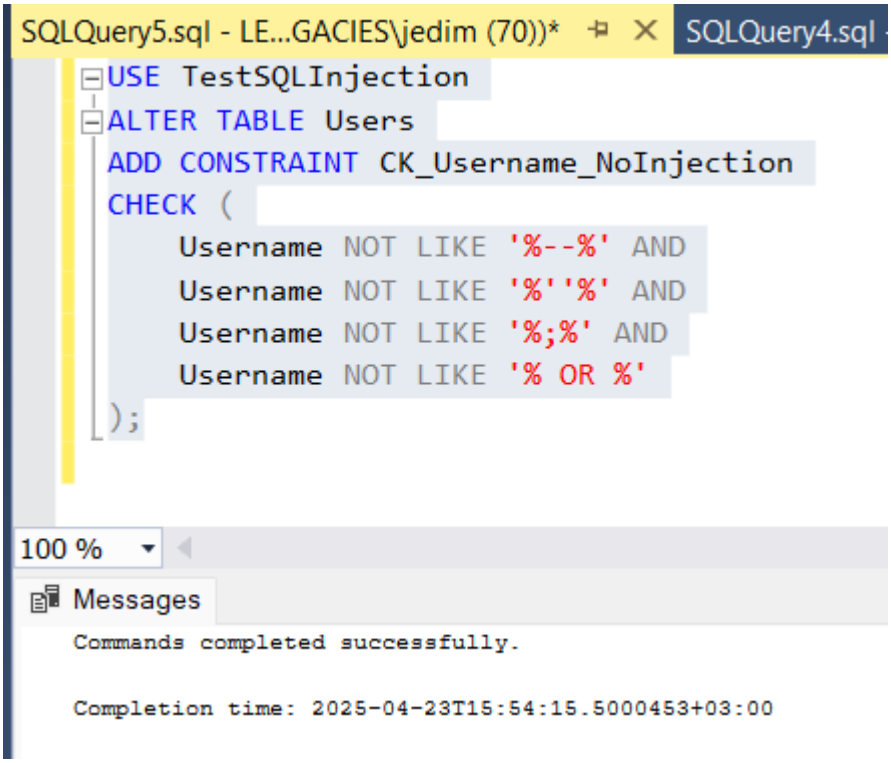
Parametreli Query Senaryosu:

```python
@app.route('/', methods=['GET', 'POST'])
def login():
    result = ''
    if request.method == 'POST':
        username = request.form['username']
        password = request.form['password']
        #query = f"SELECT * FROM Users WHERE Username = '{username}' AND Password = '{password}'"
        query = "SELECT * FROM Users WHERE Username = ? AND Password = ?"
        try:
            conn = pyodbc.connect(connection_string)
            cursor = conn.cursor()
            cursor.execute(query, (username, password))
            rows = cursor.fetchall()
            if rows:
                result = f'Giriş başar□l□! Kullan□c□: {rows}'
            else:
                result = 'Hatal□ giriş!'
        except Exception as e:
            result = f'Hata oluştu: {e}'

    return render_template_string("""
        <h2>Login</h2>
```

Burada ise parametreli bir query ile sql injection'a karşı bir koruma sağlandı.



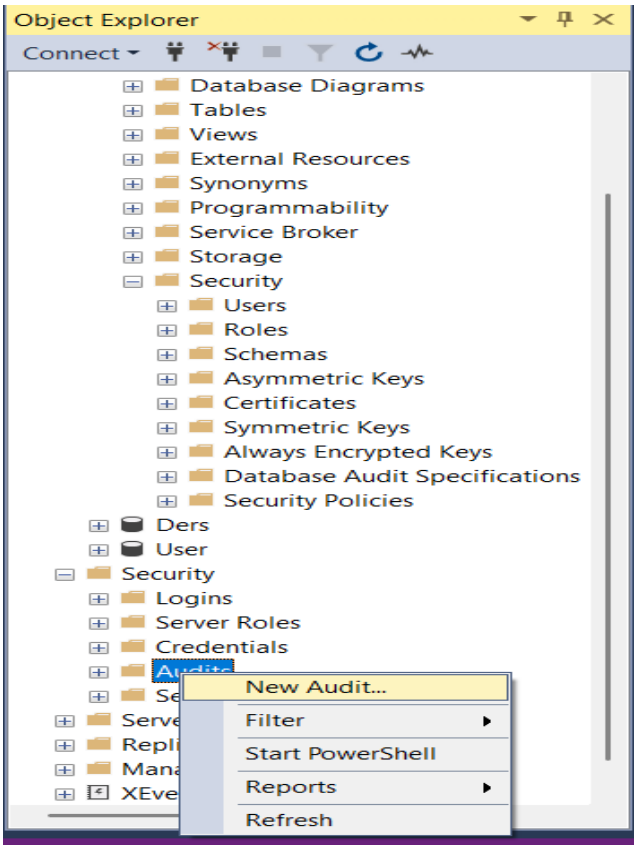
Veritabanı düzeyinde sql injection komut türlerini Insert, Delete ve Update gibi işlemler için bloklamak için veritabanı için constraint açılabilir:

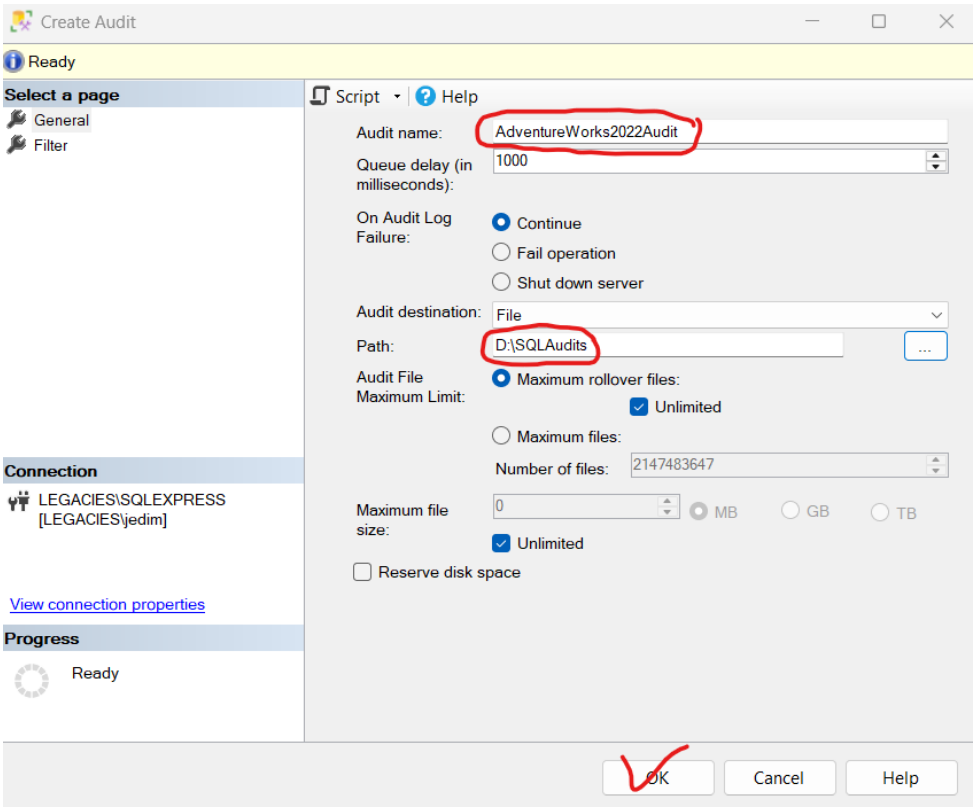


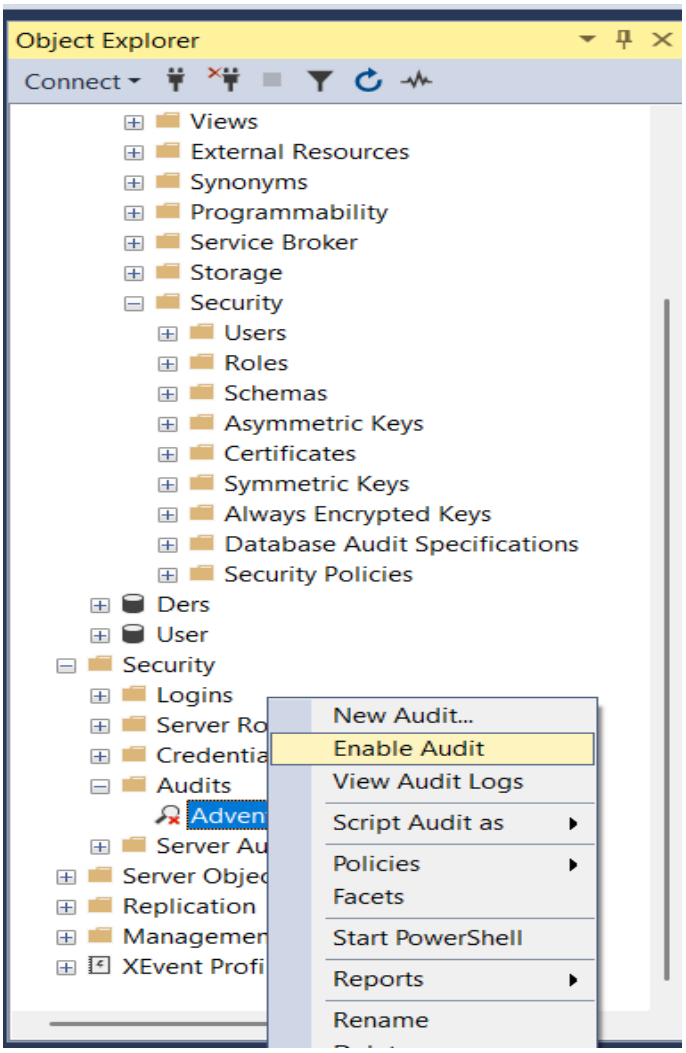
d. Audit Logları:

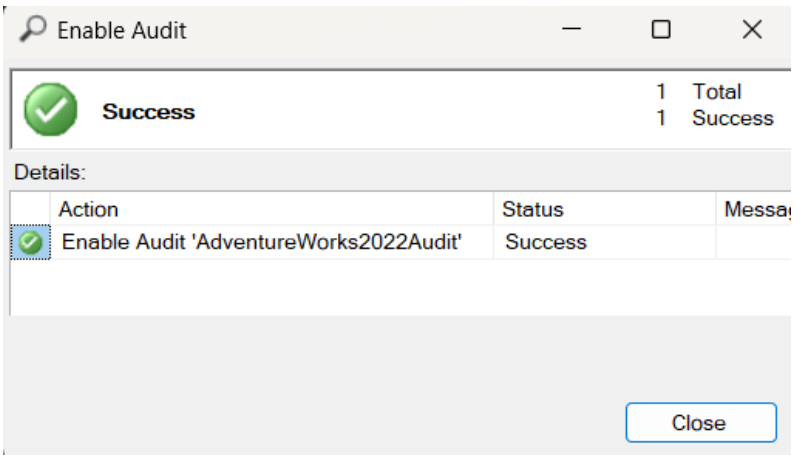
Audit logları ssms'teki kullanıcıların veritabanı/veritabanları üzerindeki aktivitesini gözlemlemek için kullanılır. Ssms'teki bazi audit log bilgileri,

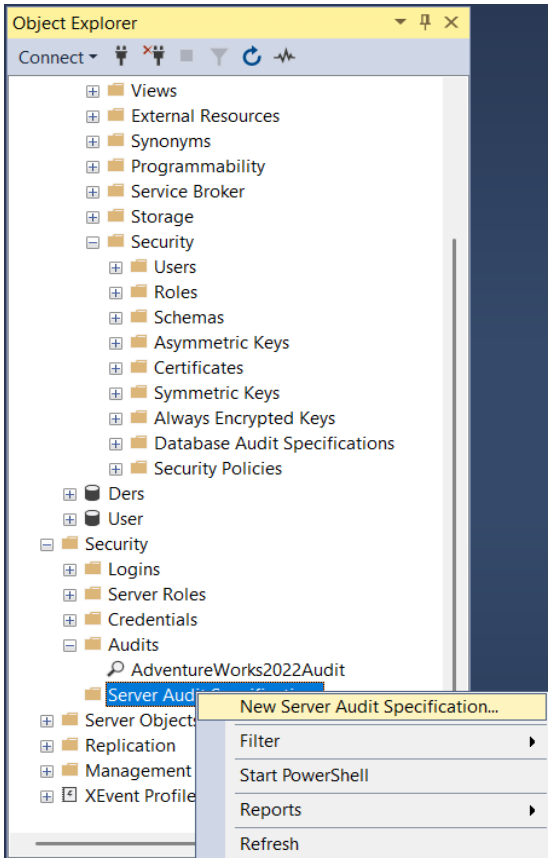
Column Name	Description
Event time	Olayın gerçekleşme saati
Sequence number	Olay sırası
Permission bitmask	Yapılan işlemin izin tipi
Is column permission	Column seviyesinde mi işlem izni verildi?
Database principal id	Sorgu hangi yetki id'si ile veritabanında yapıldı?
Server principal id	Bağlantıyı başlatanın id'si


Object Explorer
Connect
Database Diagrams
Tables
Views
External Resources
Synonyms
Programmability
Service Broker
Storage
Security
Users
Roles
Schemas
Asymmetric Keys
Certificates
Symmetric Keys
Always Encrypted Keys
Database Audit Specifications
Security Policies
Ders
User
Security
Logins
Server Roles
Credentials
New Audit...
Filter
Start PowerShell
Reports
Refresh


Create Audit
Ready
Select a page
General
Filter
Script
Help
Audit name:
AdventureWorks2022Audit
Queue delay (in milliseconds):
1000
On Audit Log Failure:
Continue
Fail operation
Shut down server
Audit destination:
File
Path:
D:\SQLAudits
Audit File Maximum Limit:
Maximum rollover files:
Unlimited
Maximum files:
Number of files:
2147483647
Maximum file size:
0
MB
GB
TB
Unlimited
Reserve disk space
Connection
LEGACIES\SQLEXPRESS
[LEGACIES\jedim]
View connection properties
Progress
Ready
OK
Cancel
Help


Object Explorer
Connect
Views
External Resources
Synonyms
Programmability
Service Broker
Storage
Security
Users
Roles
Schemas
Asymmetric Keys
Certificates
Symmetric Keys
Always Encrypted Keys
Database Audit Specifications
Security Policies
Ders
User
Security
Logins
Server Ro
Credentia
Audits
Adven
Server Au
Server Objec
Replication
Managemer
XEvent Profi
New Audit...
Enable Audit
View Audit Logs
Script Audit as
Policies
Facets
Start PowerShell
Reports
Rename


Enable Audit
Success
1 Total
1 Success
Details:
Action
Status
Enable Audit 'AdventureWorks2022Audit'
Success
Close


Object Explorer
Connect
Views
External Resources
Synonyms
Programmability
Service Broker
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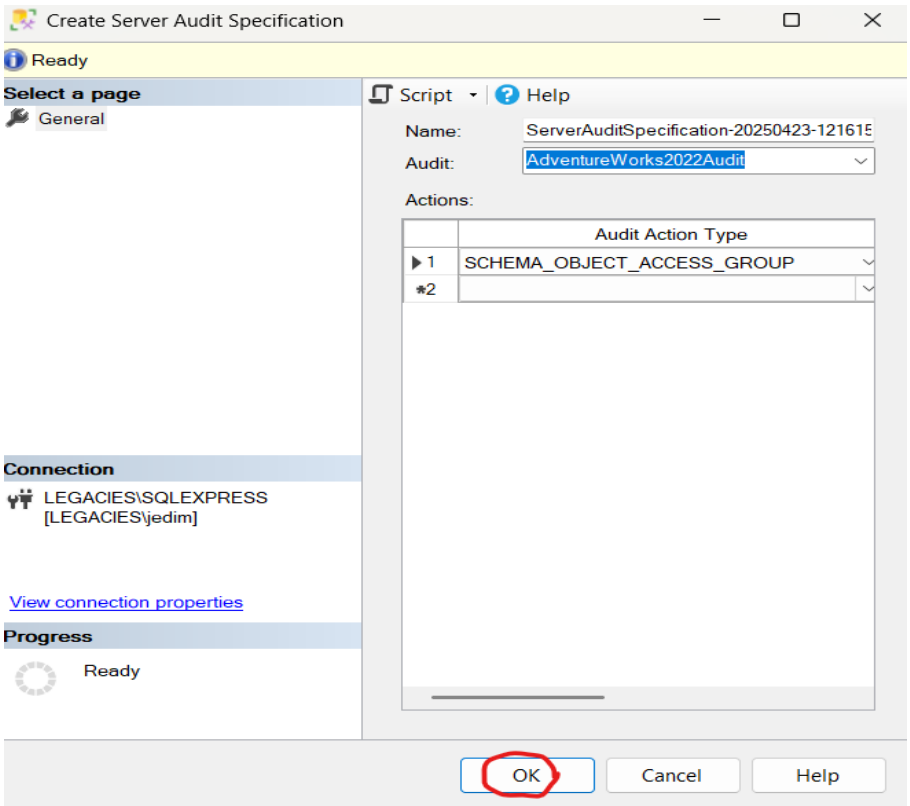
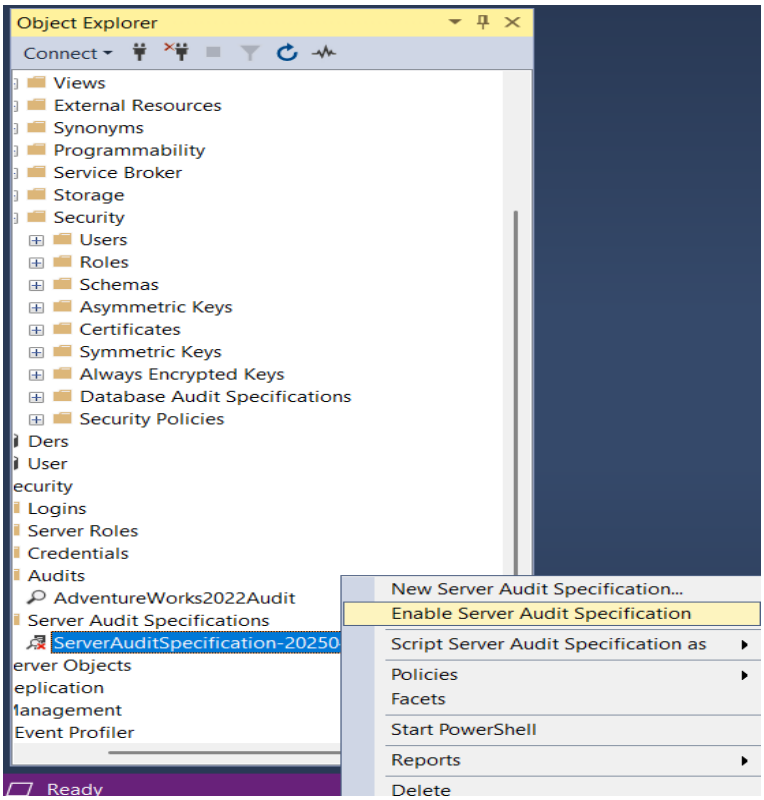
Security
Users
Roles
Schemas
Asymmetric Keys
Certificates
Symmetric Keys
Always Encrypted Keys
Database Audit Specifications
Security Policies
Ders
User
Security
Logins
Server Roles
Credentials
Audits
AdventureWorks2022Audit
Server Audi
Server Objects
Replication
Management
XEvent Profile
New Server Audit Specification...
Filter
Start PowerShell
Reports
Refresh


Create Server Audit Specification
Ready
Select a page
General
Script
Help
Name:
ServerAuditSpecification-20250423-121615
Audit:
AdventureWorks2022Audit
Actions:
Audit Action Type
1
SCHEMA_OBJECT_ACCESS_GROUP
*2
Connection
LEGACIES\SQLEXPRESS
[LEGACIES\jedim]
View connection properties
Progress
Ready
OK
Cancel
Help


Object Explorer
Connect
Views
External Resources
Synonyms
Programmability
Service Broker
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Roles
Schemas
Asymmetric Keys
Certificates
Symmetric Keys
Always Encrypted Keys
Database Audit Specifications
Security Policies
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Enable Server Audit Specification
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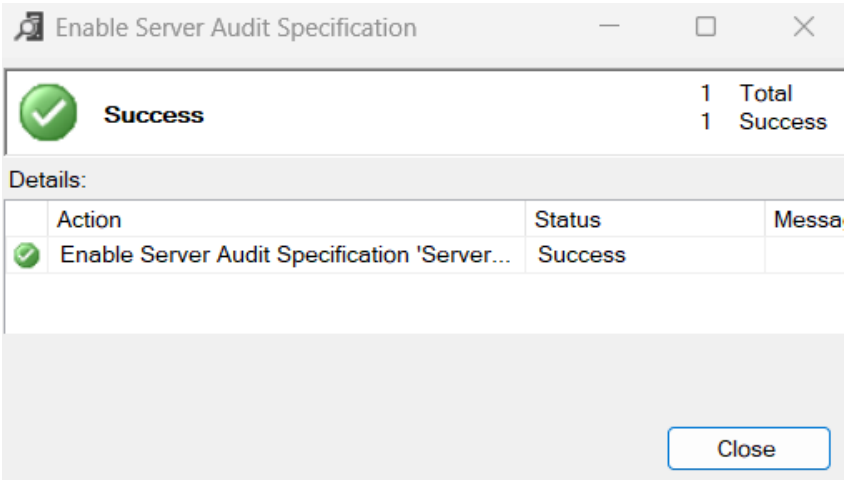
Policies
Facets
Start PowerShell
Reports
Delete


Enable Server Audit Specification
Success
1 Total
1 Success
Details:
Action
Status
Messa
Enable Server Audit Specification 'Server...
Success
Close

SQLQuery1.sql - LE...GACIES\jedim (73))*

```
SELECT *
FROM sys.fn_get_audit_file('D:\SQLAudits\AdventureWorks2022Audit_9290E345-40DC-491E-BAAE-E5D8D259E754_0_133898732858930000.sqlaudit',
    NULL,
    NULL);
```

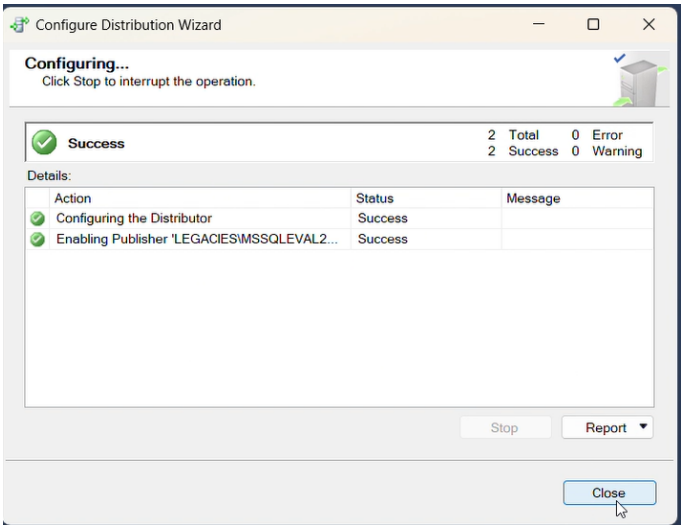
100 %

Results | Messages

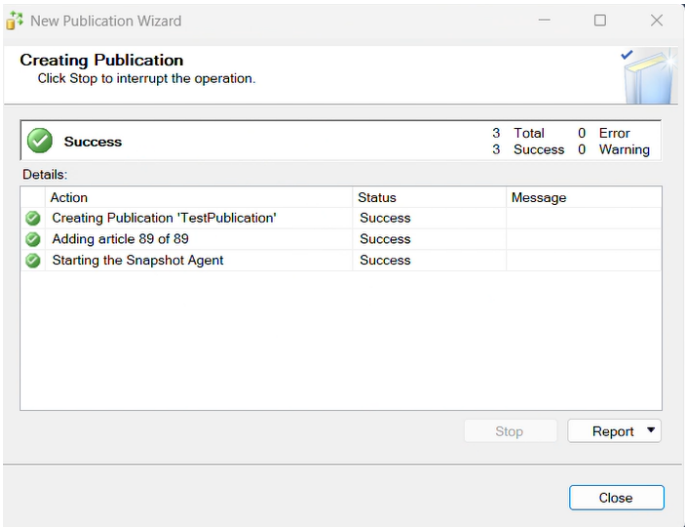
	event_time	sequence_number	action_id	succeeded	permission_bitmask	is_column_permission	session_id	server_principal_id	database_principal_id	target_ser
1	2025-04-23 09:14:45.9992023	1	AUSC	1	0x00000000000000000000000000000000	0	74	259	0	0
2	2025-04-23 09:19:02.1561275	1	SL	1	0x00000000000000000000000000000001	1	78	259	1	0
3	2025-04-23 09:19:02.1561275	1	SL	1	0x00000000000000000000000000000001	1	78	259	1	0
4	2025-04-23 09:19:02.1561275	1	SL	1	0x00000000000000000000000000000001	1	78	259	1	0
5	2025-04-23 09:19:02.1561275	1	SL	1	0x00000000000000000000000000000001	1	78	259	1	0
6	2025-04-23 09:19:02.1561275	1	SL	1	0x00000000000000000000000000000001	1	78	259	1	0
7	2025-04-23 09:19:02.1561275	1	SL	1	0x00000000000000000000000000000001	1	78	259	1	0
8	2025-04-23 09:21:50.3406771	1	SL	1	0x00000000000000000000000000000001	1	59	259	1	0
9	2025-04-23 09:21:50.3497835	1	SL	1	0x00000000000000000000000000000001	1	67	259	1	0
10	2025-04-23 09:22:46.3905517	1	SL	1	0x00000000000000000000000000000001	1	71	259	1	0
11	2025-04-23 09:22:46.4000953	1	SL	1	0x00000000000000000000000000000001	1	72	259	1	0
12	2025-04-23 09:22:48.5312250	1	SL	1	0x00000000000000000000000000000001	1	73	259	1	0
13	2025-04-23 09:22:48.5475683	1	SL	1	0x00000000000000000000000000000001	1	73	259	1	0
14	2025-04-23 09:22:48.5530863	1	EX	1	0x00000000000000000000000000000020	0	73	259	1	0

4. Veritabanı Yük Dengeleme ve Dağıtık Veritabanı Yapıları

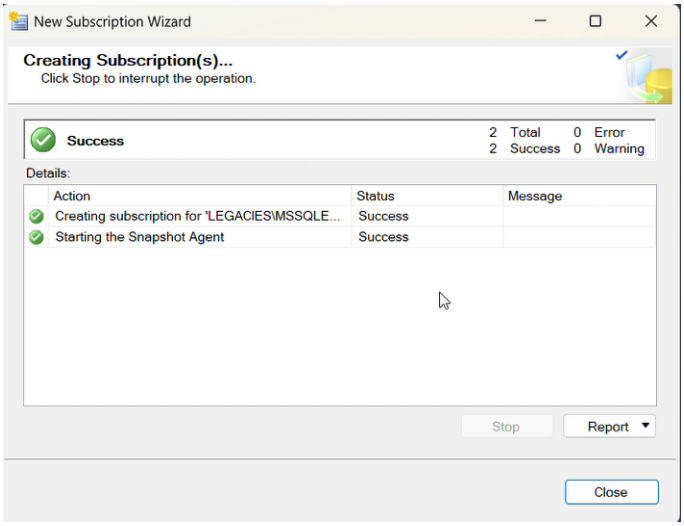
a. Veritabanı Replikasyonu:



b. Yük Dengeleme:



c. Failover Senaryoları:



5. Veri Temizleme ve ETL Süreçleri Tasarımı

a. Veri Temizleme:

Eksik, hatalı veya uygunsuz veriler tespit edip düzeltildi.

```sql
SELECT BusinessEntityID, FirstName, LastName
FROM Person.Person
WHERE FirstName IS NULL OR FirstName = ''
   OR LastName IS NULL OR LastName = '';

UPDATE Person.Person
SET FirstName = 'Unknown'
WHERE FirstName IS NULL OR FirstName = '';

UPDATE Person.Person
SET LastName = 'Unknown'
WHERE LastName IS NULL OR LastName = '';
```

```sql
SELECT BusinessEntityID, EmailPromotion
FROM Person.Person
WHERE EmailPromotion NOT IN (0, 1, 2);

UPDATE Person.Person
SET EmailPromotion = 0
WHERE EmailPromotion NOT IN (0, 1, 2);
```

b. Veri Dönüştürme:

Verileri daha okunabilir ve tutarlı hale getirildi.

```
UPDATE Person.Person
SET FirstName = UPPER(LEFT(FirstName, 1)) + LOWER(SUBSTRING(FirstName, 2, LEN(FirstName) - 1));

UPDATE Person.Person
SET LastName = UPPER(LEFT(LastName, 1)) + LOWER(SUBSTRING(LastName, 2, LEN(LastName) - 1));
```

```
SELECT BusinessEntityID, FirstName, LastName, EmailPromotion
FROM Person.Person
ORDER BY BusinessEntityID;
```

c. Veri Yükleme:

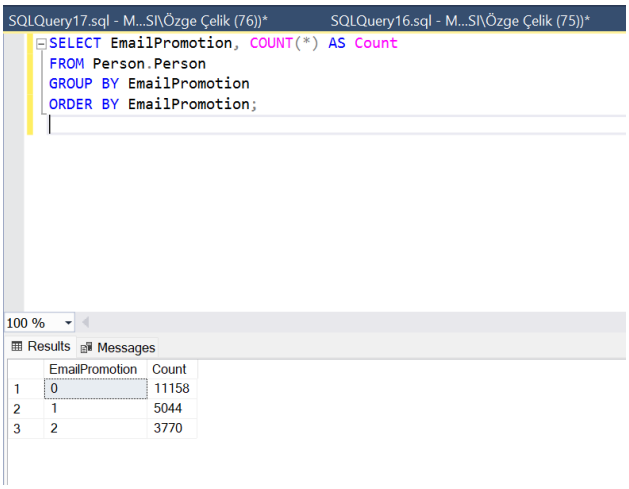
Hedef tablo oluşturuldu ve veriler yüklendi.

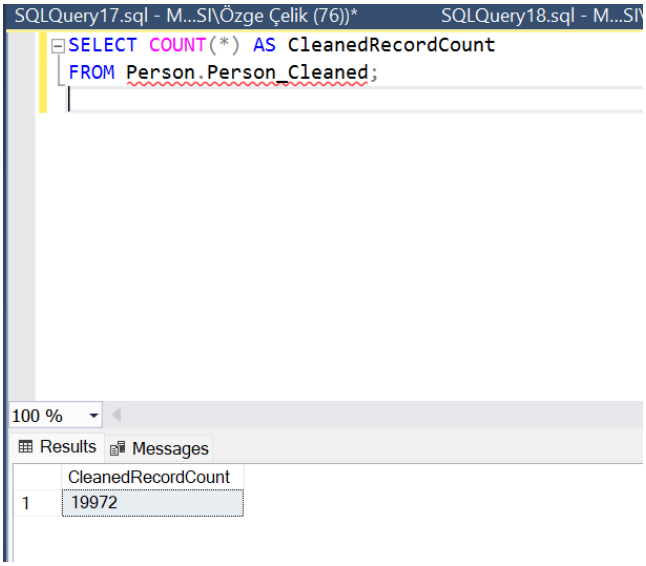
```
IF OBJECT_ID('Person.Person_Cleaned', 'U') IS NOT NULL
    DROP TABLE Person.Person_Cleaned;

CREATE TABLE Person.Person_Cleaned (
    BusinessEntityID INT PRIMARY KEY,
    FirstName NVARCHAR(50),
    LastName NVARCHAR(50),
    EmailPromotion INT
);
```

```
INSERT INTO Person.Person_Cleaned (BusinessEntityID, FirstName, LastName, EmailPromotion)
SELECT BusinessEntityID, FirstName, LastName, EmailPromotion
FROM Person.Person;
```

d. Veri Kalitesi Raporları:

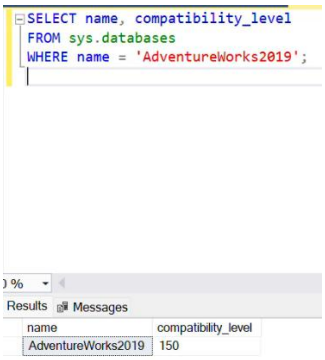
```
SELECT
    SUM(CASE WHEN FirstName = 'Unknown' THEN 1 ELSE 0 END) AS UnknownFirstNames,
    SUM(CASE WHEN LastName = 'Unknown' THEN 1 ELSE 0 END) AS UnknownLastNames
FROM Person.Person;
```





6. Veritabanı Yükseltme ve Sürüm Yönetimi

a. Veritabanı Yükseltme Planı:



Geçerli uyumluluk seviyesi kontrol edildi.

```
BACKUP DATABASE AdventureWorks2019
TO DISK = 'C:\Users\Özge\Documents\AdventureWorks2019_PreUpgrade.bak'
WITH INIT, COMPRESSION;
```

Yedek alındı.

```
ALTER DATABASE AdventureWorks2019
SET COMPATIBILITY_LEVEL = 160;
```

Uyumluluk seviyesi güncellendi.

b. Sürüm Yönetimi:

```
CREATE TABLE dbo.SchemaChangeLog (
    ID INT IDENTITY PRIMARY KEY,
    EventType NVARCHAR(100),
    EventDDL NVARCHAR(MAX),
    EventTime DATETIME,
    ChangedBy NVARCHAR(100)
);
```

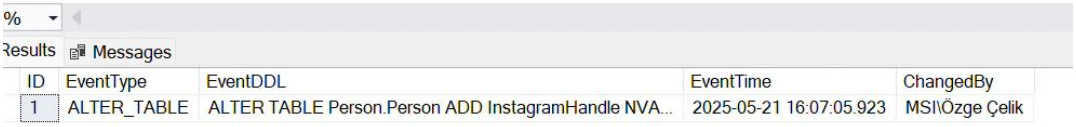
Log tablosu oluşturuldu.

```
CREATE TRIGGER trg_DDL_Change_Log
ON DATABASE
FOR DDL_DATABASE_LEVEL_EVENTS
AS
BEGIN
    INSERT INTO dbo.SchemaChangeLog(EventType, EventDDL, EventTime, ChangedBy)
    SELECT EVENTDATA().value('(/EVENT_INSTANCE/EventType)[1]', 'NVARCHAR(100)'),
           EVENTDATA().value('(/EVENT_INSTANCE/TSQLCommand/CommandText)[1]', 'NVARCHAR(MAX)'),
           GETDATE(),
           SYSTEM_USER;
END;
```

DDL Trigger oluşturuldu.

```
ALTER TABLE Person.Person ADD InstagramHandle NVARCHAR(100);
```

```
SELECT * FROM dbo.SchemaChangeLog ORDER BY EventTime DESC;
```



ID	EventType	EventDDL	EventTime	ChangedBy
1	ALTER_TABLE	ALTER TABLE Person.Person ADD InstagramHandle NVA...	2025-05-21 16:07:05.923	MSI\Özge Çelik

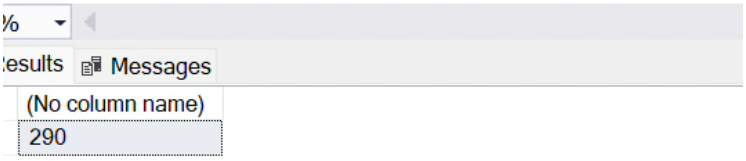
Test edildi.

c. Test ve Geri Dönüş Planı:

```
EXEC dbo.uspGetEmployeeManagers @BusinessEntityID = 1;
```

Stored procedure, view ve function'lar test edildi.

```
SELECT COUNT(*) FROM HumanResources.Employee;
```



(No column name)
290

Veri bütünlüğü control edildi.

```
SELECT * FROM sys.dm_db_missing_index_details;
```

Execution plan'ları izlendi. Sorguların yavaşladığı yerlerde indeks önerisi alındı.

```
RESTORE DATABASE AdventureWorks2019
FROM DISK = 'C:\Backup\AdventureWorks2019_PreUpgrade.bak'
WITH REPLACE;
```

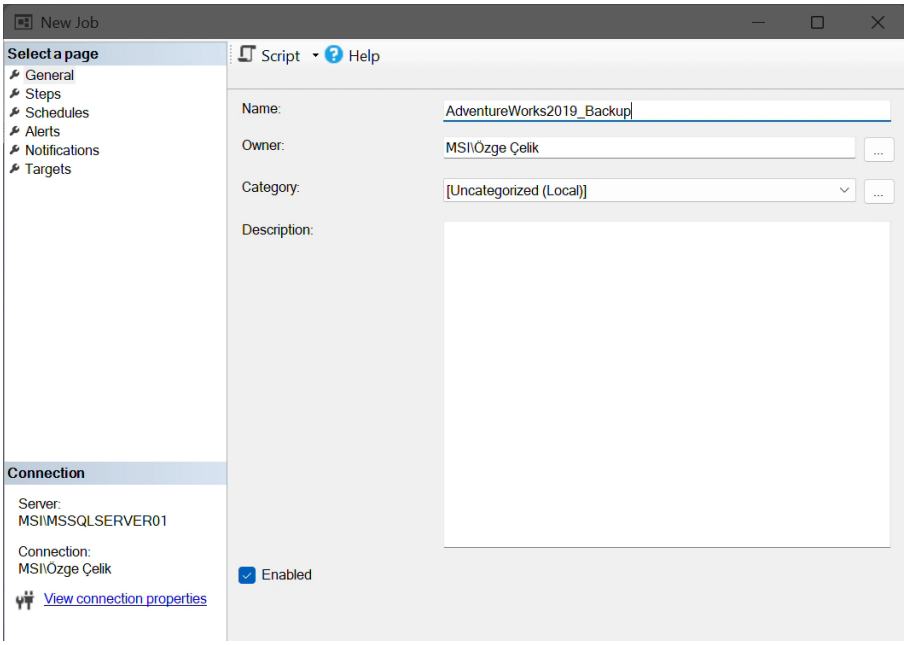
Önceden alınan yedek geri yüklendi.

```
DROP TRIGGER trg_DDL_Change_Log ON DATABASE;
```

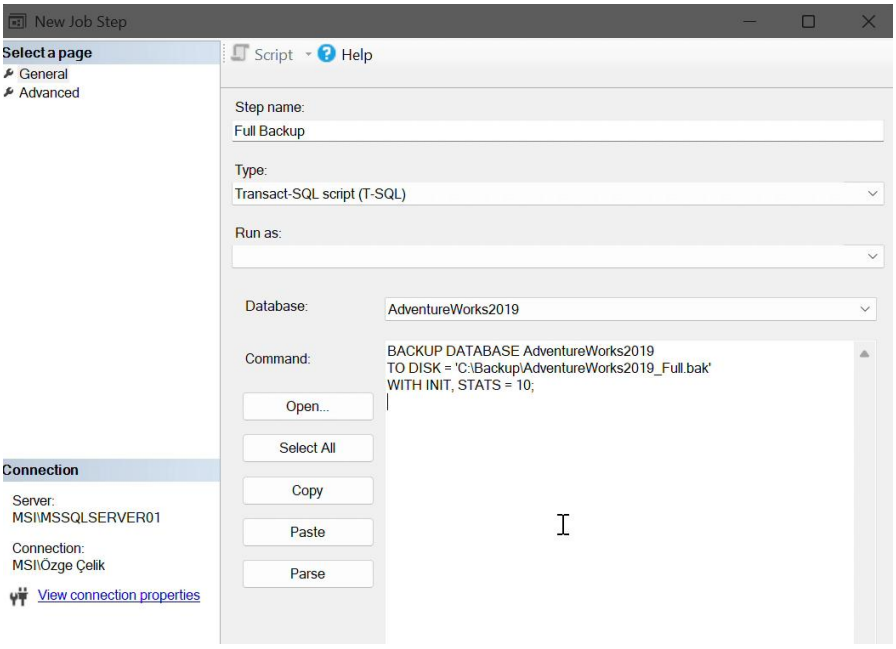
DDL trigger silindi.

7. Veritabanı Yedekleme ve Otomasyon Çalışması

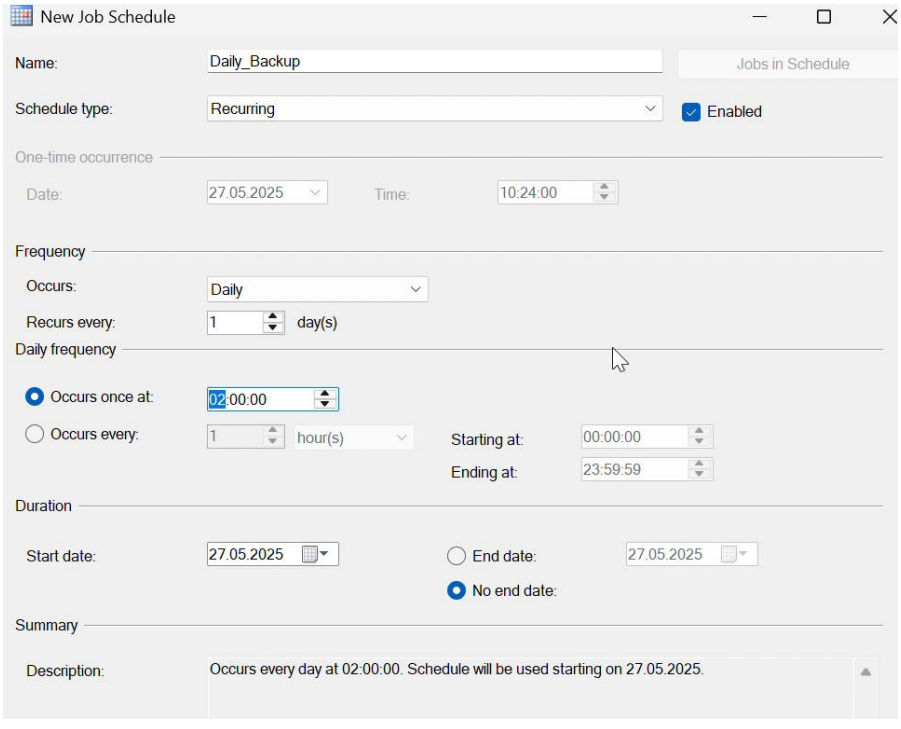
a. Yedekleme Süreçlerini Otomatikleştirme:



Yeni bir job oluşturuldu.

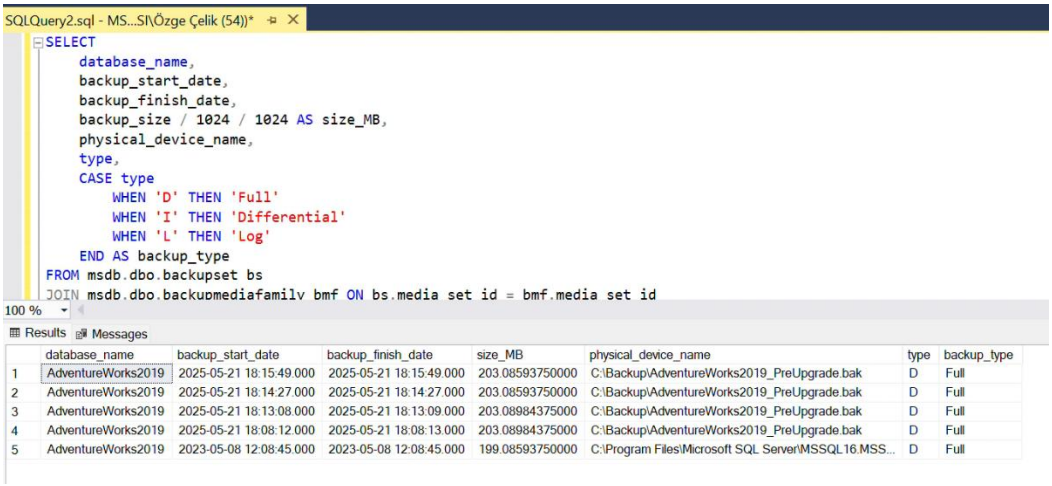


Job’a step eklendi.



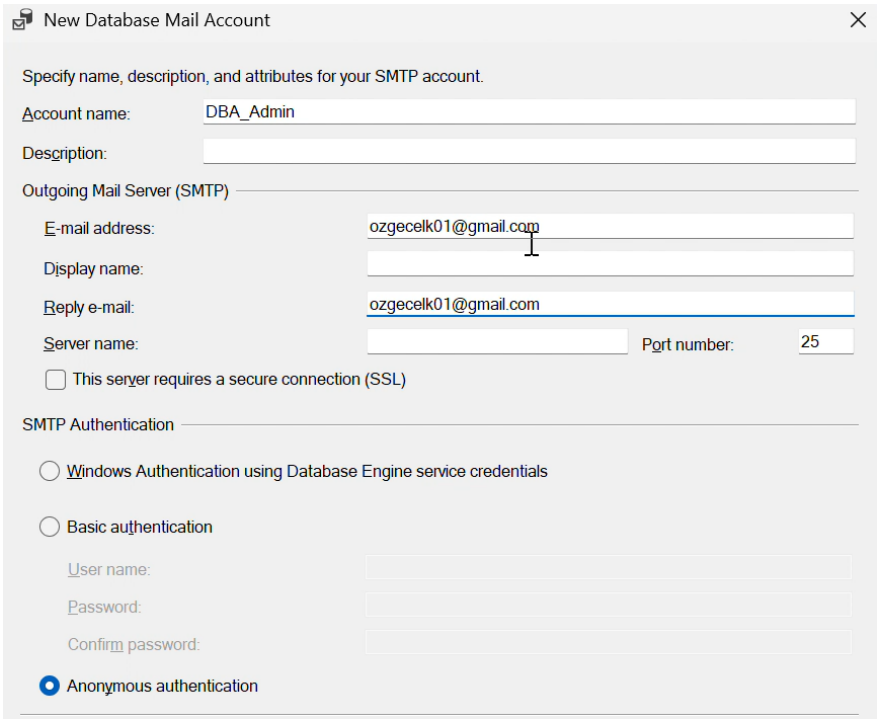
Zamanlama oluşturuldu.

b. Yedekleme Raporları Oluşturma:



	database_name	backup_start_date	backup_finish_date	size_MB	physical_device_name	type	backup_type
1	AdventureWorks2019	2025-05-21 18:15:49.000	2025-05-21 18:15:49.000	203.08593750000	C:\Backup\AdventureWorks2019_PreUpgrade.bak	D	Full
2	AdventureWorks2019	2025-05-21 18:14:27.000	2025-05-21 18:14:27.000	203.08593750000	C:\Backup\AdventureWorks2019_PreUpgrade.bak	D	Full
3	AdventureWorks2019	2025-05-21 18:13:08.000	2025-05-21 18:13:09.000	203.08984375000	C:\Backup\AdventureWorks2019_PreUpgrade.bak	D	Full
4	AdventureWorks2019	2025-05-21 18:08:12.000	2025-05-21 18:08:13.000	203.08984375000	C:\Backup\AdventureWorks2019_PreUpgrade.bak	D	Full
5	AdventureWorks2019	2023-05-08 12:08:45.000	2023-05-08 12:08:45.000	199.08593750000	C:\Program Files\Microsoft SQL Server\MSSQL16.MSS...	D	Full

c. Otomatik Yedekleme Uyarıları:



Yedekleme başarısız olduğunda yönetici e-posta ile uyarılacak.