



Enable Encryption on SQL Server Database with Always on

Database file encryption occurs at the page level. In an encrypted database, pages are encrypted before being written to disk and decrypted when loaded into memory. Transparent Data Encryption (TDE) does not increase the size of the database.

Transparent Data Encryption (TDE) safeguards data at rest, including both data and log files. It helps organizations comply with various industry laws, regulations, and standards. TDE enables software developers to encrypt data using AES or 3DES encryption algorithms without the need to modify existing applications.

How to encrypt (TDE) in SQL Server

- | | |
|---|-------------------------------|
| 1. Create Master Key in Database Server (Primary Node) | |
| 2. Create Certificate | (Primary Node) |
| 3. Backup Certificate | (Primary Node) |
| 4. Copy Certificate Backup File to Other Secondary Server of Always | (if you are using always on). |
| 5. Create Master Key in Database Server (Secondary Node) | (if you are using always on). |
| 6. Restore Certificate on Secondary. | (if you are using always on). |
| 7. Create Database Encryption Key on Database | (Primary Node) |
| 8. Enable Database Encryption Database | (Primary Node) |

Types of Database Encryption

- Database Level - Encrypts data at rest (data and log files).
- Backup Level
 - Database Backup Level
 - Transaction Log Backup Level



Database Level - Encrypts data at rest (data and log files).

Scripts for Encryptions

Execute on Database Primary Node

```
select * from sys.symmetric_keys;
```

```
USE Master;
```

```
GO
```

```
CREATE MASTER KEY ENCRYPTION
```

```
BY PASSWORD='fdr3#edgSar345#drDS';
```

```
GO
```

```
CREATE CERTIFICATE TDE_Cert
```

```
WITH
```

```
SUBJECT='Database_Encryption';
```

```
GO
```

```
SELECT name, certificate_id, principal_id, pvt_key_encryption_type_desc, start_date, expiry_date
```

```
FROM sys.certificates;
```

```
mkdir -p C:\Database\Backup\TDE
```

```
BACKUP CERTIFICATE TDE_Cert TO FILE = 'C:\Database\Backup\TDE\TDE_Cert' WITH PRIVATE KEY  
(file='C:\Database\Backup\TDE\TDE_Cert_Key.pvk', ENCRYPTION BY  
PASSWORD='fdr3#edgSar345#drDS')
```

Copy Backup of TDE File on same Directory

Execute on Database Secondary Nodes

```
select * from sys.symmetric_keys;
```

```
USE Master;
```

```
GO
```

```
CREATE MASTER KEY ENCRYPTION
```

```
BY PASSWORD='fdr3#edgSar345#drDS';
```

```
GO
```

```
CREATE CERTIFICATE TDE_Cert
```

```
FROM FILE = 'C:\Database\Backup\TDE\TDE_Cert'
```

```
WITH PRIVATE KEY (FILE = 'C:\Database\Backup\TDE\TDE_Cert_Key.pvk',
```

```
DECRYPTION BY PASSWORD = 'fdr3#edgSar345#drDS');
```

```
select * from sys.symmetric_keys;
```

```
SELECT name, certificate_id, principal_id, pvt_key_encryption_type_desc, start_date, expiry_date
```

```
FROM sys.certificates;
```

Execute on Database Primary Nodes

```
USE DB1
```

```
GO
```

```
CREATE DATABASE ENCRYPTION KEY
```

```
WITH ALGORITHM = AES_256
```

```
ENCRYPTION BY SERVER CERTIFICATE TDE_Cert;
```



```
GO
ALTER DATABASE Db1 SET ENCRYPTION ON;
GO
USE DB1READY
GO
CREATE DATABASE ENCRYPTION KEY
WITH ALGORITHM = AES_256
ENCRYPTION BY SERVER CERTIFICATE TDE_Cert;
GO
ALTER DATABASE DB1READY SET ENCRYPTION ON;
GO
```

Execute and Verify on All Database Nodes

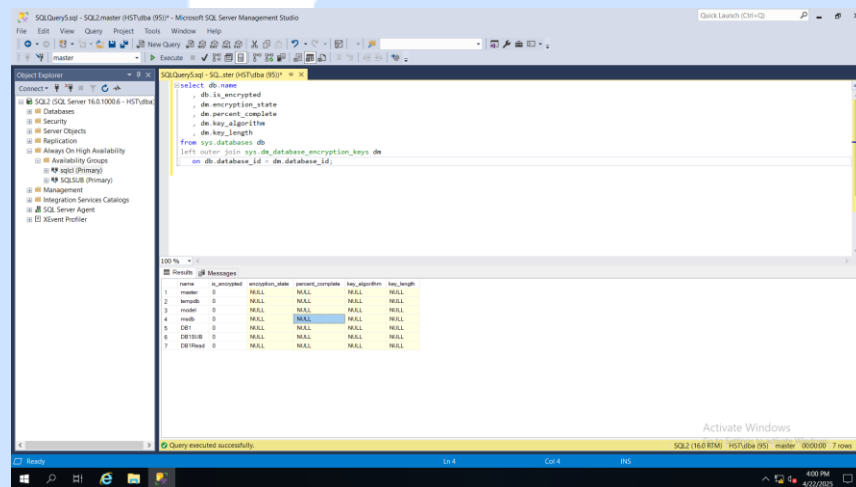
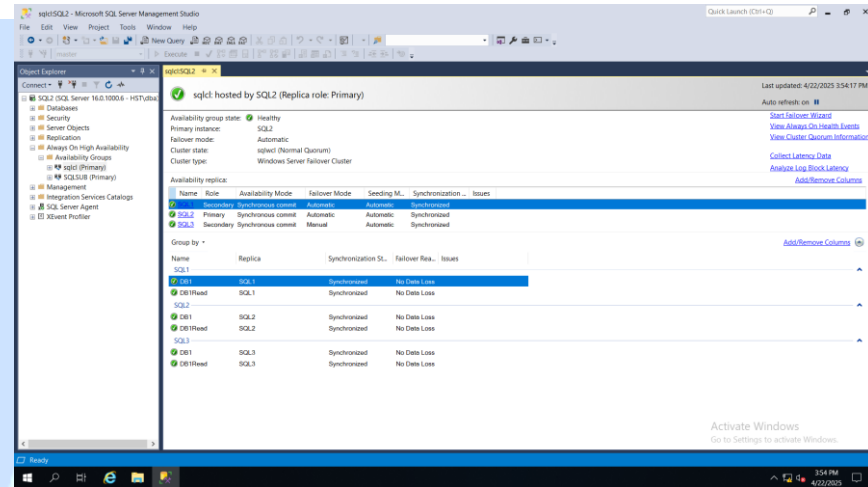
```
select db.name
, db.is_encrypted
, dm.encryption_state
, dm.percent_complete
, dm.key_algorithm
, dm.key_length
from sys.databases db
left outer join sys.dm_database_encryption_keys dm
on db.database_id = dm.database_id
```

The logo for Hum Sub ECHNO, featuring a stylized 'H' in blue and green, with the text 'Hum Sub ECHNO' in white.

Hum Sub
ECHNO



Scripts for Encryptions with Screenshots

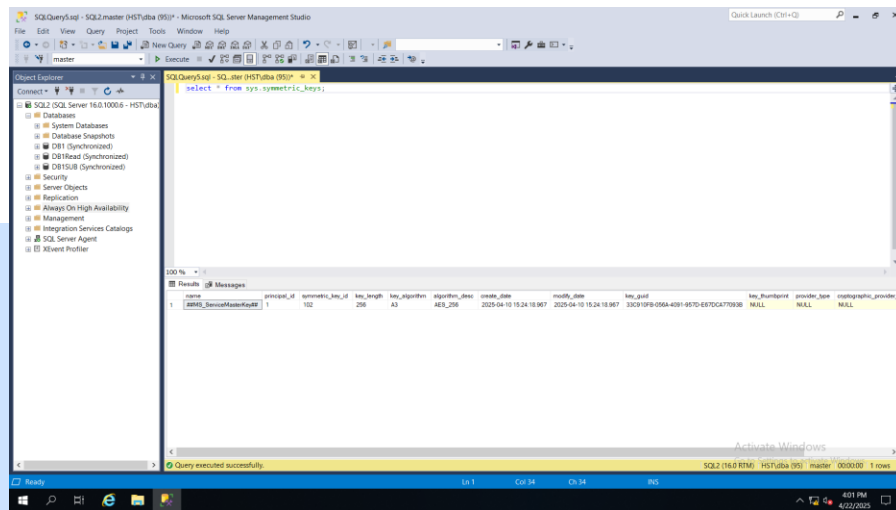


Database for Encryption

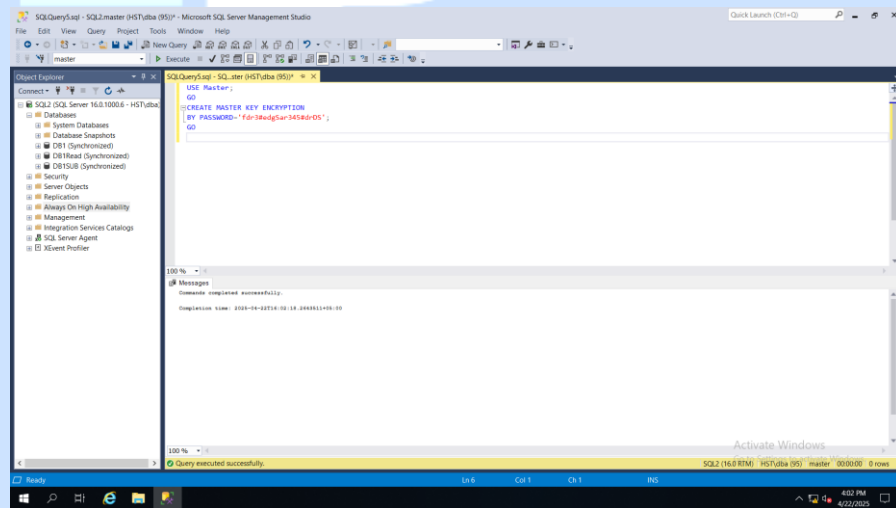
1. DB1
2. DB1Read

Execute on Database Primary Node

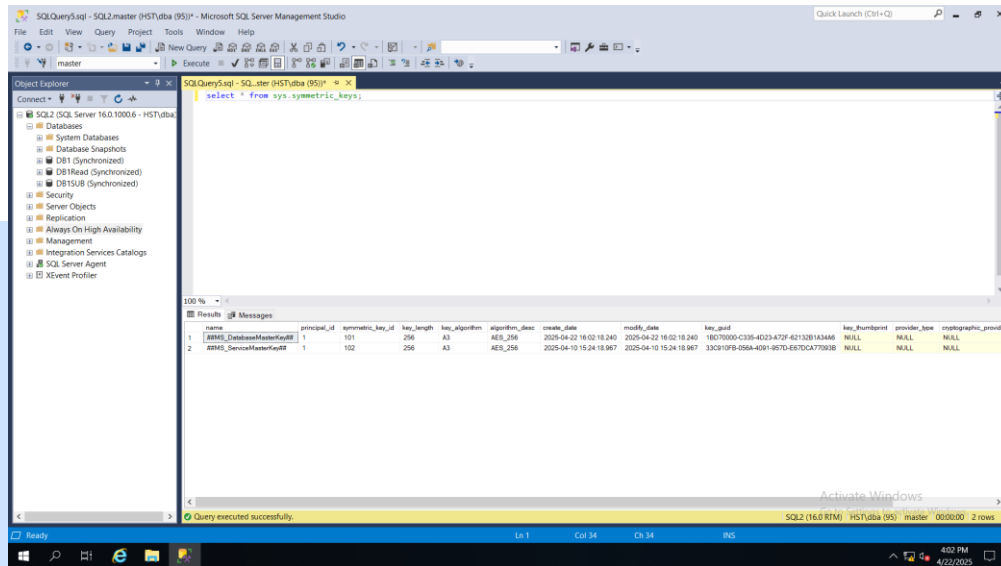
```
select * from sys.symmetric_keys;
```



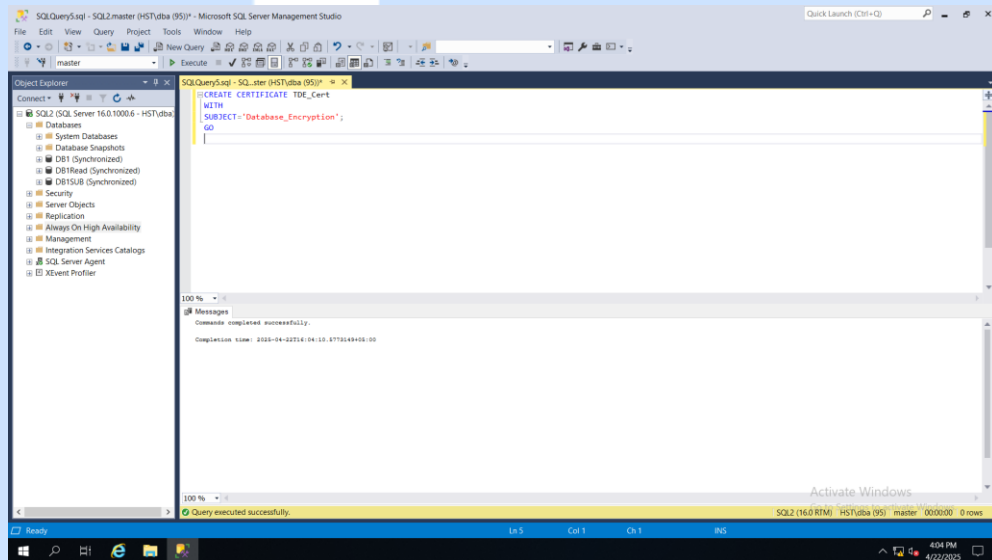
USE Master;
GO
CREATE MASTER KEY ENCRYPTION
BY PASSWORD='fdr3#edgSar345#drDS';
GO



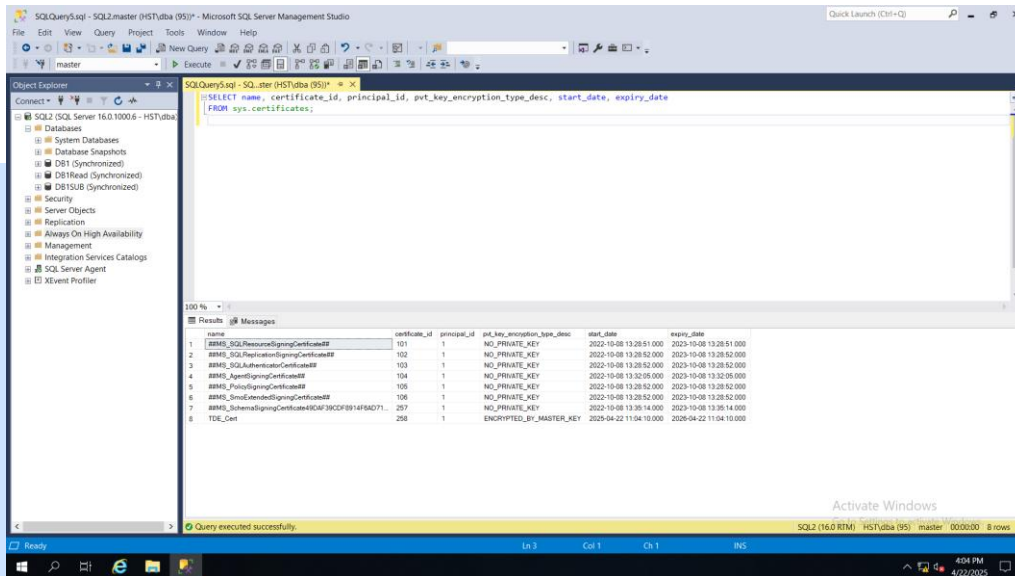
select * from sys.symmetric_keys;



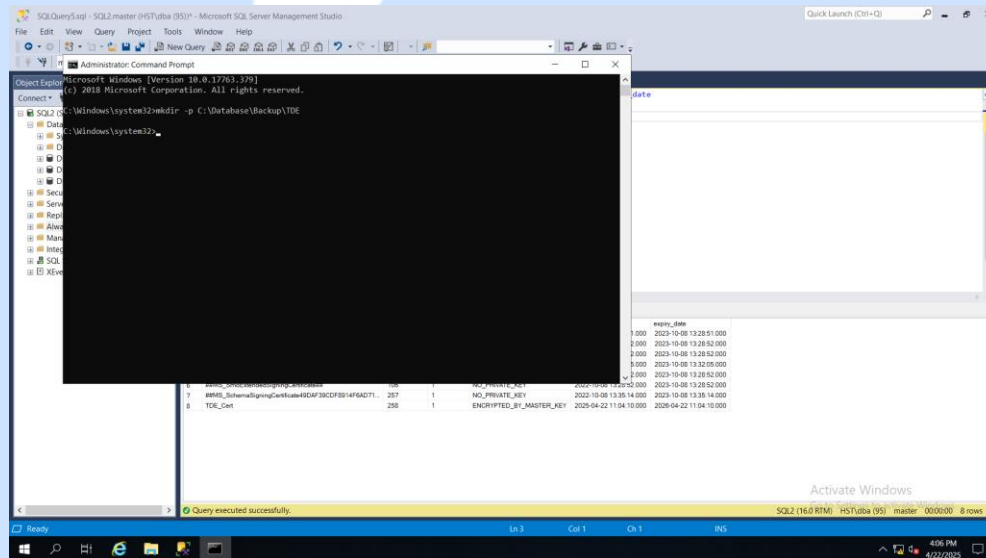
CREATE CERTIFICATE TDE_Cert
WITH
SUBJECT='Database_Encryption';
GO



SELECT name, certificate_id, principal_id, pvt_key_encryption_type_desc, start_date, expiry_date
FROM sys.certificates;

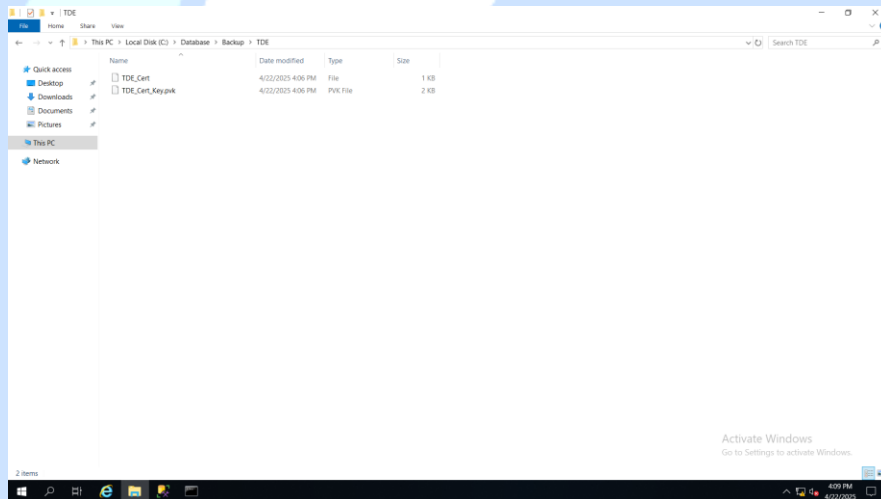
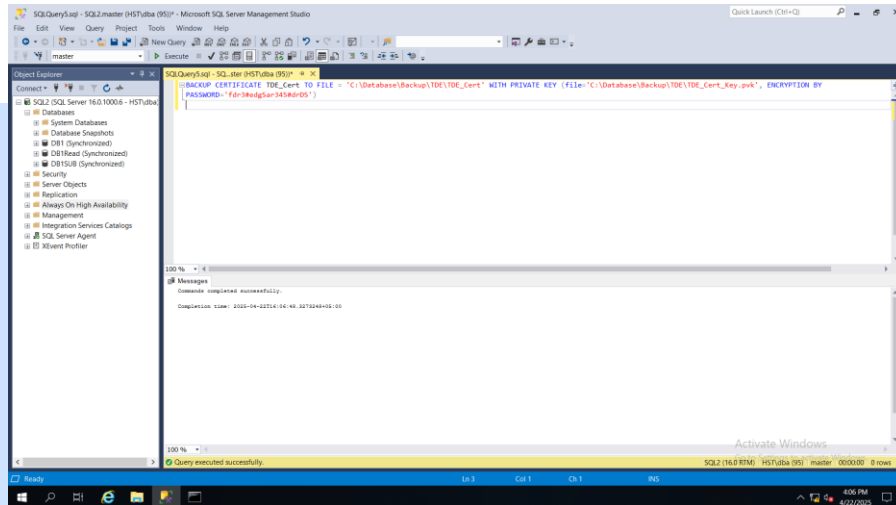


mkdir -p C:\Database\Backup\TDE



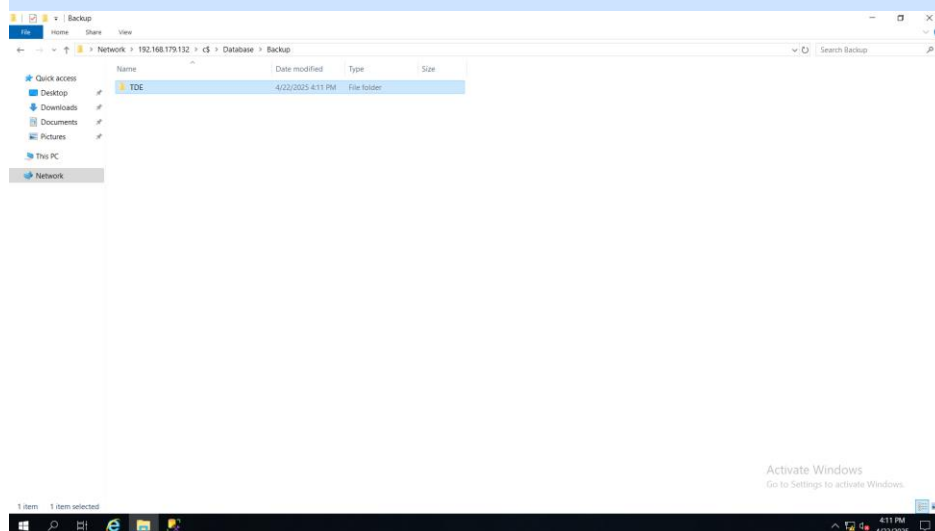
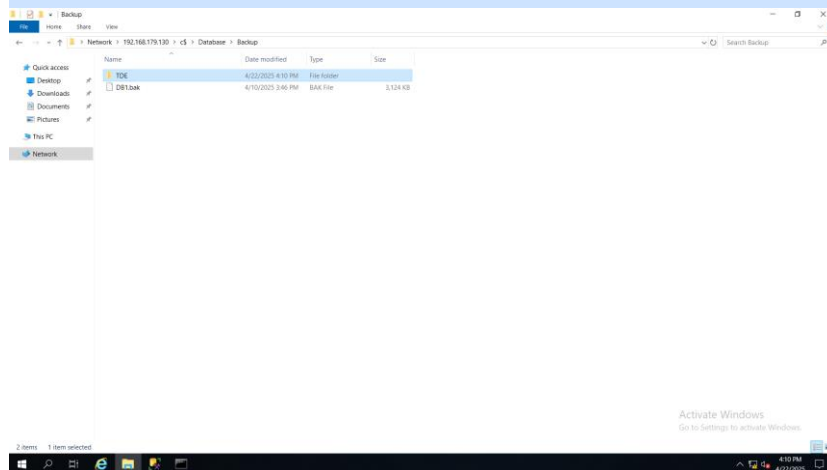
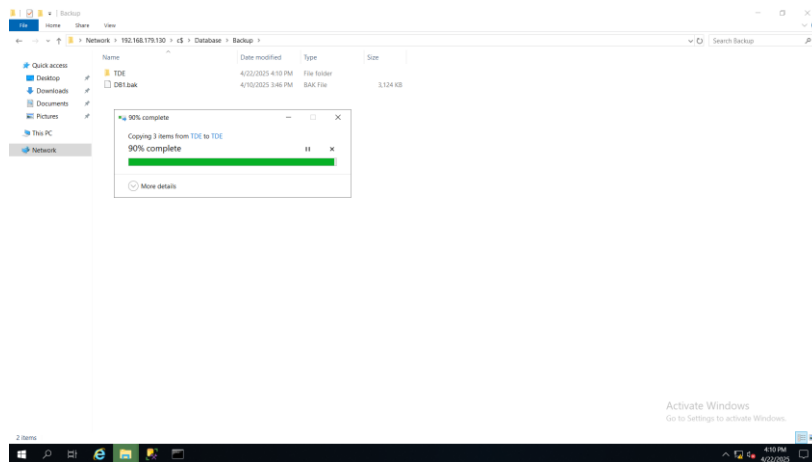


BACKUP CERTIFICATE TDE_Cert TO FILE = 'C:\Database\Backup\TDE\TDE_Cert' WITH PRIVATE KEY
(file='C:\Database\Backup\TDE\TDE_Key.pvk', ENCRYPTION BY
PASSWORD='fdr3#edgSar345#drDS')





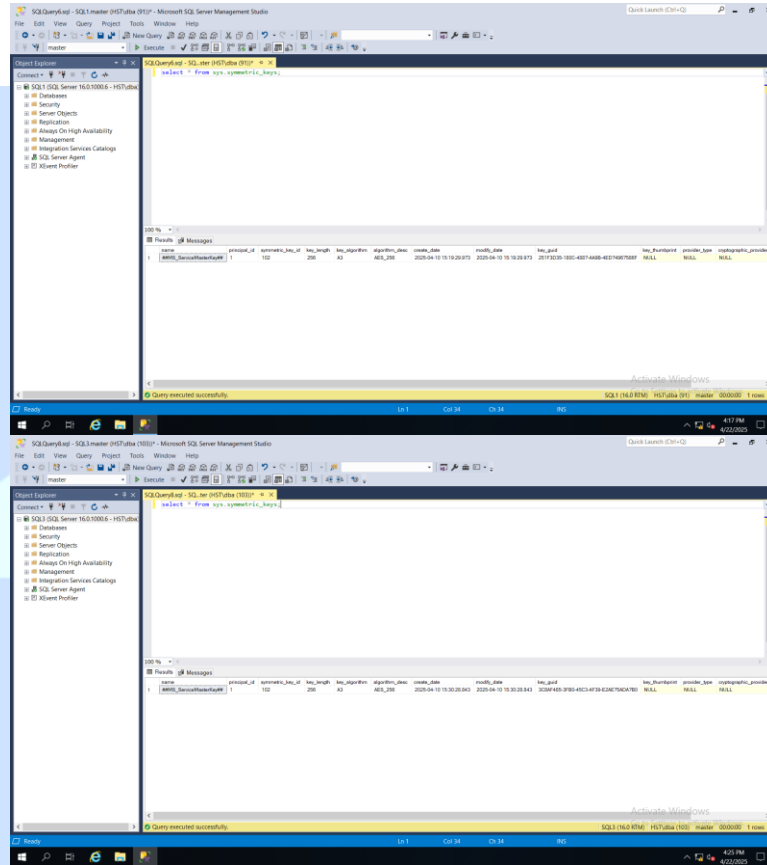
Copy Backup of TDE File on same Directory to other Secondary Nodes



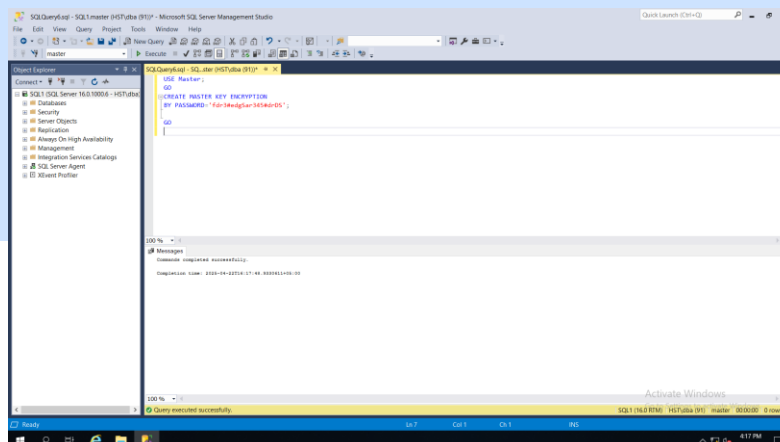
Sub
NO

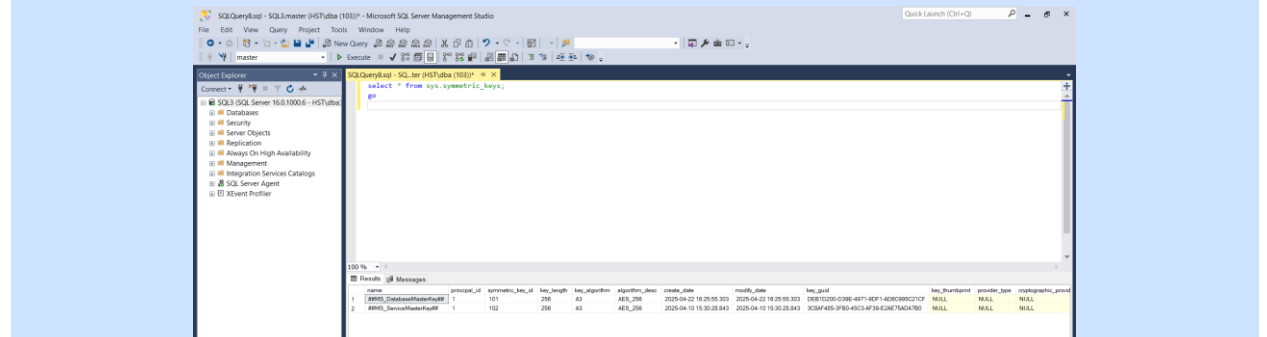
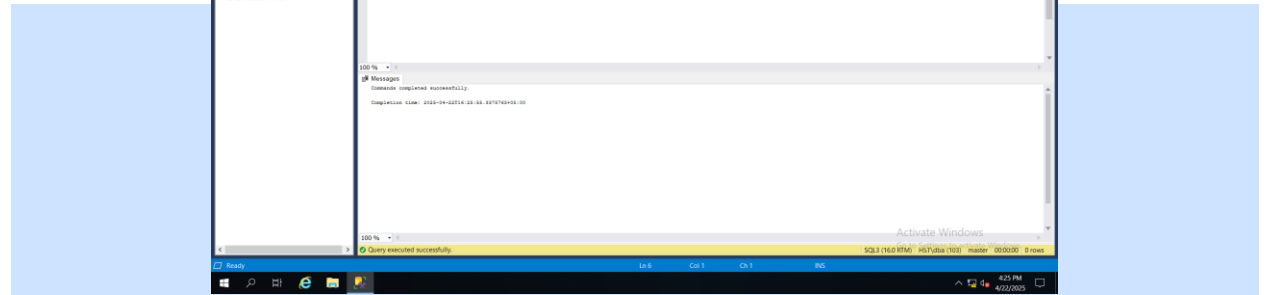
Execute on Database Secondary Nodes

select * from sys.symmetric_keys;



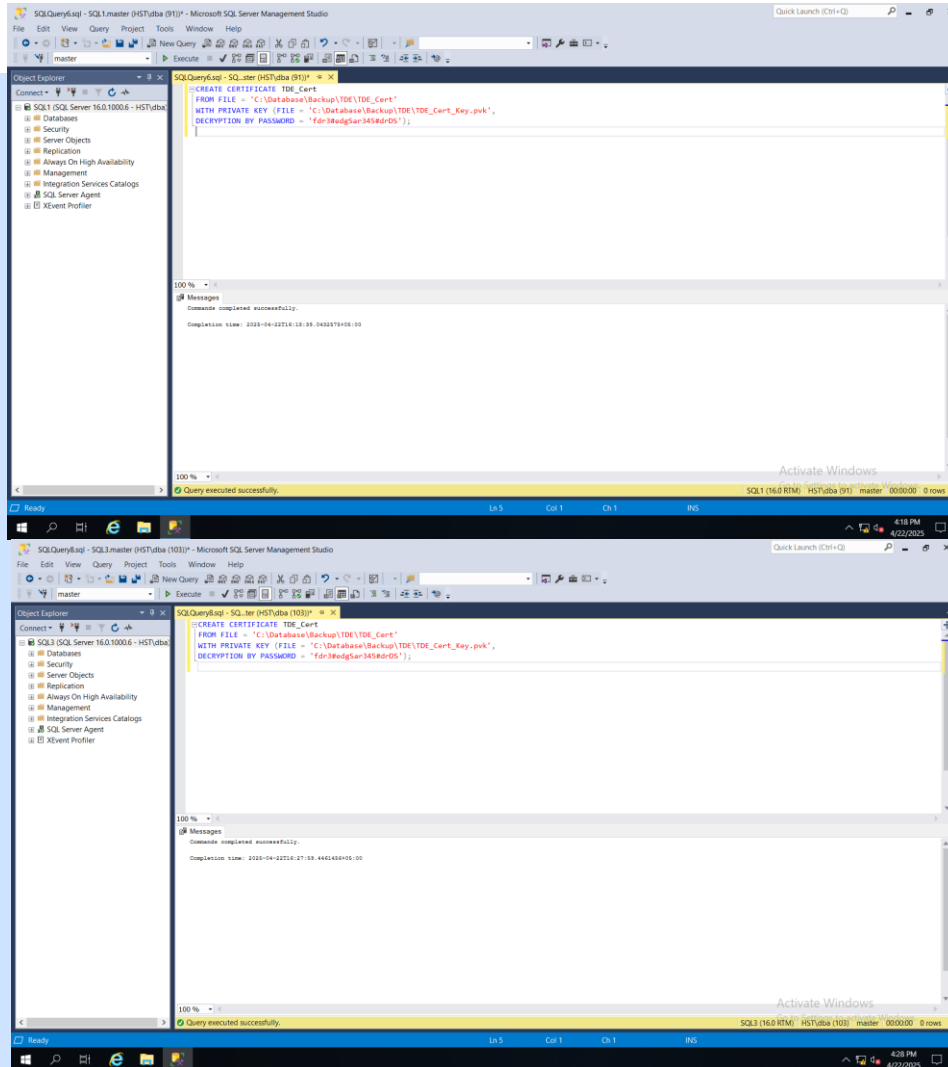
USE Master;
GO
CREATE MASTER KEY ENCRYPTION
BY PASSWORD='fdr3#edgSar345#drDS';
GO





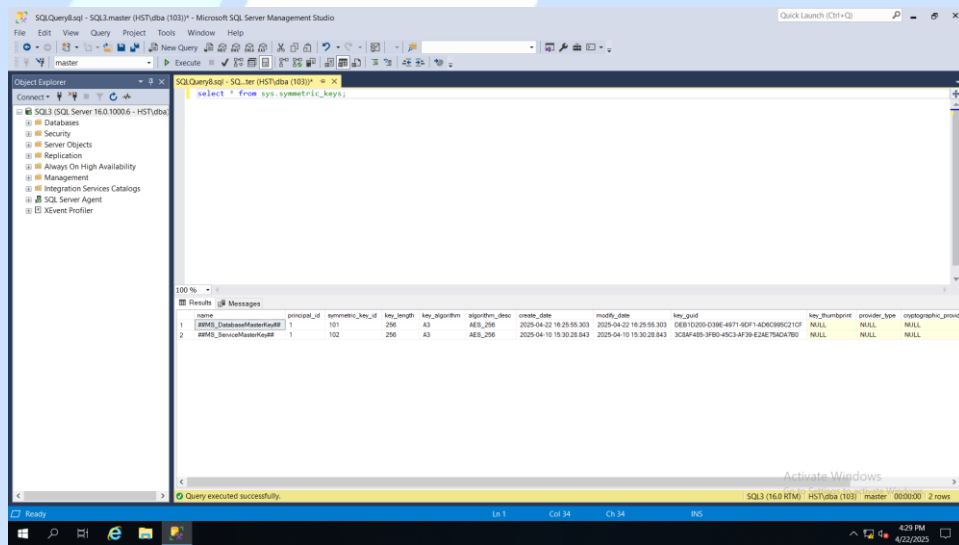
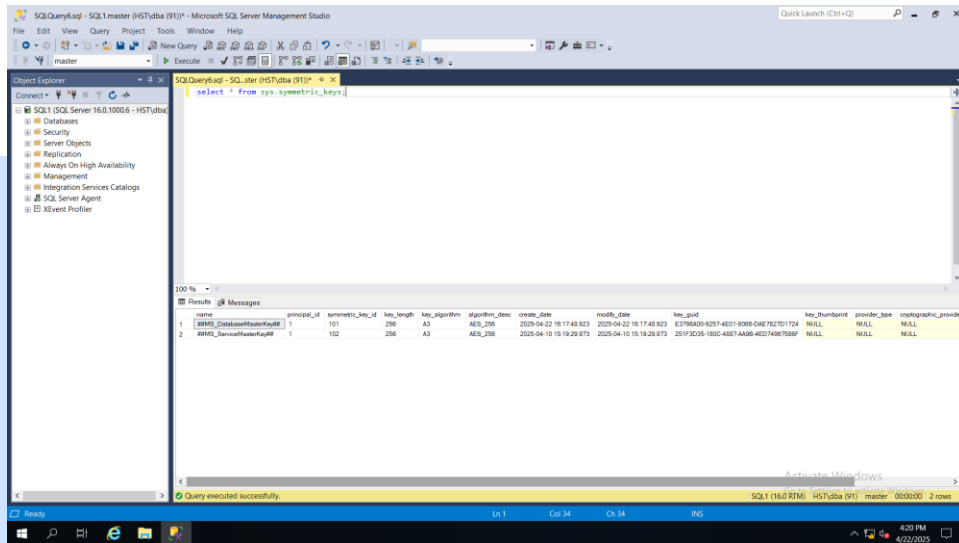


```
CREATE CERTIFICATE TDE_Cert
FROM FILE = 'C:\Database\Backup\TDE\TDE_Cert'
WITH PRIVATE KEY (FILE = 'C:\Database\Backup\TDE\TDE_Cert_Key.pvk',
DECRYPTION BY PASSWORD = 'fdr3#edgSar345#drDS');
```





select * from sys.symmetric_keys;





```
SELECT
    name,
    subject,
    expiry_date,
    pvt_key_encryption_type_desc,
    issuer_name,
    thumbprint
FROM sys.certificates;
GO
```

name	subject	expiry_date	pvt_key_encryption_type_desc	issuer_name	thumbprint
##MS_SQLResourceSigningCertificate	MS_SQLResourceSigningCertificate	2023-10-08 13:28:52.000	NO_PRIVATE_KEY	MS_SQLResourceSigningCertificate	0478C58C3C8C0202
##MS_SQLReplicationSigningCertificate	MS_SQLReplicationSigningCertificate	2023-10-08 13:28:52.000	NO_PRIVATE_KEY	MS_SQLReplicationSigningCertificate	5c164477795074C5
##MS_SQLAuthenticatingCertificate	MS_SQLAuthenticatingCertificate	2023-10-08 13:28:52.000	NO_PRIVATE_KEY	MS_SQLAuthenticatingCertificate	0A3541C7C0B9466
##MS_AgentSigningCertificate	MS_AgentSigningCertificate	2023-10-08 13:28:52.000	NO_PRIVATE_KEY	MS_AgentSigningCertificate	047818C58C3C8C0202
##MS_FullTextSigningCertificate	MS_FullTextSigningCertificate	2023-10-08 13:28:52.000	NO_PRIVATE_KEY	MS_FullTextSigningCertificate	5c164477795074C5
##MS_SmtpEndorsingCertificate	MS_SmtpEndorsingCertificate	2023-10-08 13:28:52.000	NO_PRIVATE_KEY	MS_SmtpEndorsingCertificate	0A3541C7C0B9466
##MS_SchemaSigningCertificate	MS_SchemaSigningCertificate	2023-10-08 13:28:52.000	NO_PRIVATE_KEY	MS_SchemaSigningCertificate	047818C58C3C8C0202
TDE_Cert	Database_Encryption	2026-04-22 11:54:10.000	ENCRYPTED_BY_MASTER_KEY	Database_Encryption	04C9177C0B820206

name	subject	expiry_date	pvt_key_encryption_type_desc	issuer_name	thumbprint
##MS_SQLResourceSigningCertificate	MS_SQLResourceSigningCertificate	2023-10-08 13:28:51.000	NO_PRIVATE_KEY	MS_SQLResourceSigningCertificate	0478C58C3C8C0202
##MS_SQLReplicationSigningCertificate	MS_SQLReplicationSigningCertificate	2023-10-08 13:28:52.000	NO_PRIVATE_KEY	MS_SQLReplicationSigningCertificate	5c164477795074C5
##MS_SQLAuthenticatingCertificate	MS_SQLAuthenticatingCertificate	2023-10-08 13:28:52.000	NO_PRIVATE_KEY	MS_SQLAuthenticatingCertificate	0A3541C7C0B9466
##MS_AgentSigningCertificate	MS_AgentSigningCertificate	2023-10-08 13:28:52.000	NO_PRIVATE_KEY	MS_AgentSigningCertificate	047818C58C3C8C0202
##MS_FullTextSigningCertificate	MS_FullTextSigningCertificate	2023-10-08 13:28:52.000	NO_PRIVATE_KEY	MS_FullTextSigningCertificate	5c164477795074C5
##MS_SmtpEndorsingCertificate	MS_SmtpEndorsingCertificate	2023-10-08 13:28:52.000	NO_PRIVATE_KEY	MS_SmtpEndorsingCertificate	0A3541C7C0B9466
##MS_SchemaSigningCertificate	MS_SchemaSigningCertificate	2023-10-08 13:28:52.000	NO_PRIVATE_KEY	MS_SchemaSigningCertificate	047818C58C3C8C0202
TDE_Cert	Database_Encryption	2026-04-22 11:54:10.000	ENCRYPTED_BY_MASTER_KEY	Database_Encryption	04C9177C0B820206



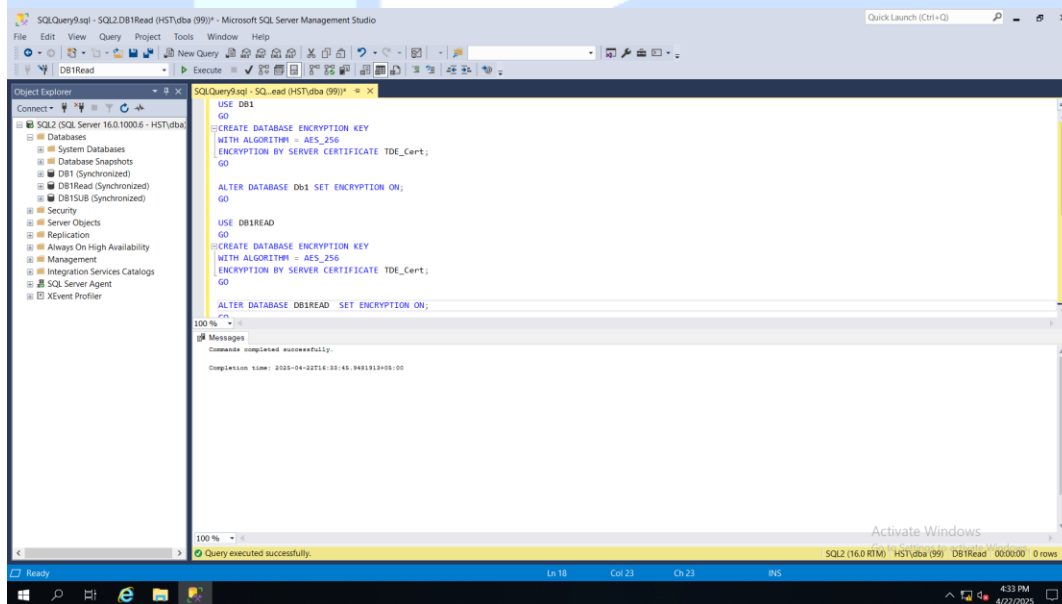
Execute on Database Primary Nodes

```
USE DB1
GO
CREATE DATABASE ENCRYPTION KEY
WITH ALGORITHM = AES_256
ENCRYPTION BY SERVER CERTIFICATE TDE_Cert;
GO
```

```
ALTER DATABASE Db1 SET ENCRYPTION ON;
GO
```

```
USE DB1READ
GO
CREATE DATABASE ENCRYPTION KEY
WITH ALGORITHM = AES_256
ENCRYPTION BY SERVER CERTIFICATE TDE_Cert;
GO
```

```
ALTER DATABASE DB1READ SET ENCRYPTION ON;
GO
```

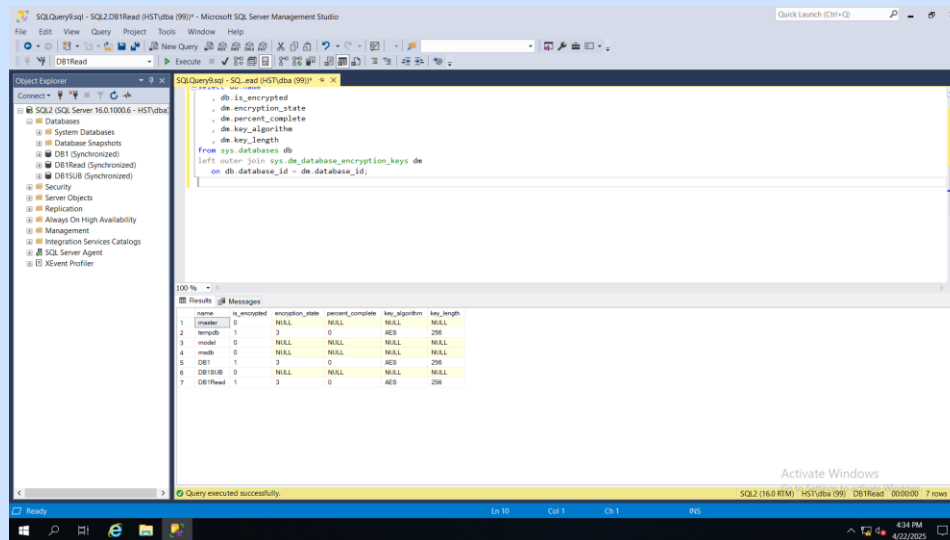


Execute and Verify on All Database Nodes

```

select db.name
      , db.is_encrypted
      , dm.encryption_state
      , dm.percent_complete
      , dm.key_algorithm
      , dm.key_length
from sys.databases db
left outer join sys.dm_database_encryption_keys dm
on db.database_id = dm.database_id;

```



The screenshot displays the Microsoft SQL Server Enterprise Manager interface. The left pane shows the 'Object Explorer' with the 'Databases' folder expanded. The right pane shows the 'SQL Query Editor' with the following query:

```

select db.name
      , db.is_encrypted
      , dm.encryption_state
      , dm.percent_complete
      , dm.key_algorithm
      , dm.key_length
from sys.databases db
left outer join sys.dm_database_encryption_keys dm
on db.database_id = dm.database_id;

```

The 'Results' pane shows the output of the query, which is a table with 7 rows and 7 columns. The columns are: name, is_encrypted, encryption_state, percent_complete, key_algorithm, and key_length. The rows represent the following databases: master, tempdb, model, msdb, DB1, DB1SUB, and DB1Head.

name	is_encrypted	encryption_state	percent_complete	key_algorithm	key_length
master	0	NULL	NULL	NULL	NULL
tempdb	1	3	0	AES	256
model	0	NULL	NULL	NULL	NULL
msdb	0	NULL	NULL	NULL	NULL
DB1	1	3	0	AES	256
DB1SUB	0	NULL	NULL	NULL	NULL
DB1Head	1	3	0	AES	256

The status bar at the bottom indicates 'Query executed successfully.' and '7 rows'.



Configure Encrypted Database Backup

- Database Backup
- Transaction Log Backup

The screenshot shows the SQL Server Enterprise Manager interface. The Object Explorer on the left displays the server hierarchy. The central pane shows a query window with the following SQL code:

```
select db_name,
       db_is_encrypted,
       dm.encryption_state,
       dm.percent_complete,
       dm.key_algorithm,
       dm.key_length
from sys.databases db
left outer join sys.dm_database_encryption_keys dm
on db.database_id = dm.database_id;
```

The Results pane at the bottom displays the following data:

name	is_encrypted	encryption_state	percent_complete	key_algorithm	key_length
master	0	NULL	NULL	NULL	NULL
tempdb	1	3	0	AES	256
model	0	NULL	NULL	NULL	NULL
msdb	0	NULL	NULL	NULL	NULL
DB1	1	3	0	AES	256
DB1SUB	0	NULL	NULL	NULL	NULL
DB1Read	1	3	0	AES	256

The status bar at the bottom indicates "Query executed successfully." and "SQL2 (16.0 RTM) HST\dba (99) DB1Read 00:00:00 7 rows".

The screenshot shows the same SQL Server Enterprise Manager interface as the previous one, but with the "Maintenance Plan Wizard" dialog box open. The wizard is titled "SQL Server Maintenance Plan Wizard" and contains the following text:

This wizard helps you create a maintenance plan that SQL Server Agent can run on a regular basis. With this wizard you can perform routine database administration tasks such as:

- Check database integrity
- Perform index maintenance
- Update database statistics
- Perform database backups

This wizard will create maintenance plans that can be edited in SQL Server Management Studio. Edit maintenance plans to add new tasks or define workflow among the tasks.

Below the text, there is a checkbox labeled "Do not show this starting page again." and buttons for "Help", "Back", "Next >", "Finish", and "Cancel".

The background query results are still visible, showing the same data as the previous screenshot.



SQLQuery9.sql - SQL2.DB1Read (HST\tdba (99)) - Microsoft SQL Server Management Studio

File Edit View Project Tools Window Help

Object Explorer

- Connect
- SQL2 (SQL Server 16.0.1000.6 - HST\tdba)
- Databases
- Security
- Server Objects
- Replication
- Always On High Availability
- Management
- Policy Management
- Data Collection
- Resource Governor
- Extended Events
- Maintenance Plans
- SQL Server Logs
- Database Mail
- Distributed Transaction Coordinator
- Integration Services Catalogs
- SQL Server Agent
- XEvent Profiler

SQLQuery9.sql - SQL2.DB1Read (HST\tdba (99))

```
select db_name
, db_is_encrypted
, dm.encryption_state
, dm.percent_complete
, dm.key_algorithm
, dm.key_length
from sys.databases db
left outer join sys.dm_database_encryption_keys dm
on db.database_id = dm.database_id
```

Results

name	is_encrypted	encryption_state
master	0	NULL
tempdb	1	3
model	0	NULL
msdb	0	NULL
DB1	1	3
DB1SUB	0	NULL
DB1Read	1	3

Maintenance Plan Wizard

Select Plan Properties

How do you want to schedule your maintenance tasks?

Name: DatabaseBackup

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](#)

Query executed successfully.

SQL2 (16.0 RTM) HST\tdba (99) DB1Read 00:00:00 7 rows

Ready

5:01 PM 4/22/2025

SQLQuery9.sql - SQL2.DB1Read (HST\tdba (99)) - Microsoft SQL Server Management Studio

File Edit View Project Tools Window Help

Object Explorer

- Connect
- SQL2 (SQL Server 16.0.1000.6 - HST\tdba)
- Databases
- Security
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- Integration Services Catalogs
- SQL Server Agent
- XEvent Profiler

SQLQuery9.sql - SQL2.DB1Read (HST\tdba (99))

```
select db_name
, db_is_encrypted
, dm.encryption_state
, dm.percent_complete
, dm.key_algorithm
, dm.key_length
from sys.databases db
left outer join sys.dm_database_encryption_keys dm
on db.database_id = dm.database_id
```

Results

name	is_encrypted	encryption_state
master	0	NULL
tempdb	1	3
model	0	NULL
msdb	0	NULL
DB1	1	3
DB1SUB	0	NULL
DB1Read	1	3

New Job Schedule

Name: DatabaseBackup

Schedule type: Recurring ☒ Enabled

One-time occurrence

Date: 4/22/2025 Time: 5:02:08 PM

Frequency

Occurs: Daily

Recur every: 1 day(s)

☒ 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: 4/22/2025 End date: 4/22/2025

☒ No end date

Summary

Description: Occurs every day at 12:00:00 AM. Schedule will be used starting on 4/22/2025.

[OK](#) [Cancel](#) [Help](#)

Query executed successfully.

SQL2 (16.0 RTM) HST\tdba (99) DB1Read 00:00:00 7 rows

Ready

5:02 PM 4/22/2025



SQLQuery9.sql - SQL2.DB1Read (HST\dtba (99)) - Microsoft SQL Server Management Studio

File Edit View Project Tools Window Help

Object Explorer

- Connect
- SQL2 (SQL Server 16.0.1000.6 - HST\dtba)
- Databases
- Security
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SQLQuery9.sql - SQL2.DB1Read (HST\dtba (99))

```
select db_name
, db.is_encrypted
, dm.encryption_state
, dm.percent_complete
, dm.key_algorithm
, dm.key_length
from sys.databases db
left outer join sys.dm_database_encryption_keys dm
on db.database_id = dm.database_id
```

Results

	name	is_encrypted	encryption_state
1	master	0	NULL
2	tempdb	1	3
3	model	0	NULL
4	msdb	0	NULL
5	DB1	1	3
6	DB1SUB	0	NULL
7	DB1Read	1	3

100 %

Messages

Maintenance Plan Wizard

Select Plan Properties

How do you want to schedule your maintenance tasks?

Name: DatabaseBackup

Description:

Run as: SQL Server Agent service account

☐ Separate schedules for each task

☒ Single schedule for the entire plan or no schedule

Schedule: Occurs every day at 12:00:00 AM. Schedule will be used starting on 4/22/2025. [Change...](#)

[Help](#) [Back](#) [Next >](#) [Finish](#) [Cancel](#)

Query executed successfully.

SQL2 (16.0 RTM) HST\dtba (99) DB1Read 00:00:00 7 rows

Ready

5:02 PM 4/22/2025

SQLQuery9.sql - SQL2.DB1Read (HST\dtba (99)) - Microsoft SQL Server Management Studio

File Edit View Project Tools Window Help

Object Explorer

- Connect
- SQL2 (SQL Server 16.0.1000.6 - HST\dtba)
- Databases
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SQLQuery9.sql - SQL2.DB1Read (HST\dtba (99))

```
select db_name
, db.is_encrypted
, dm.encryption_state
, dm.percent_complete
, dm.key_algorithm
, dm.key_length
from sys.databases db
left outer join sys.dm_database_encryption_keys dm
on db.database_id = dm.database_id
```

Results

	name	is_encrypted	encryption_state
1	master	0	NULL
2	tempdb	1	3
3	model	0	NULL
4	msdb	0	NULL
5	DB1	1	3
6	DB1SUB	0	NULL
7	DB1Read	1	3

100 %

Messages

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 (Transaction Log) task allows you to specify the source databases, destination files or tapes, and overwrite options for a transaction log backup.

[Help](#) [Back](#) [Next >](#) [Finish](#) [Cancel](#)

Query executed successfully.

SQL2 (16.0 RTM) HST\dtba (99) DB1Read 00:00:00 7 rows

Ready

5:03 PM 4/22/2025



SQLQuery9.sql - SQL2.DB1Read (HST\dtba (99)) - Microsoft SQL Server Management Studio

File Edit View Project Tools Window Help

Object Explorer

- SQL2 (SQL Server 16.0.1000.6 - HST\dtba)
- Databases
- Security
- Server Objects
- Replication
- Always On High Availability
- Management
 - Policy Management
 - Data Collection
 - Resource Governor
 - Extended Events
 - Maintenance Plans
 - SQL Server Logs
 - Database Mail
 - Distributed Transaction Coordinator
- Integration Services Catalogs
- SQL Server Agent
- XEvent Profiler

SQLQuery9.sql - SQL2.DB1Read (HST\dtba (99))

```
select db_name
, db.is_encrypted
, dm.encryption_state
, dm.percent_complete
, dm.key_algorithm
, dm.key_length
from sys.databases db
left outer join sys.dm_database_encryption_keys dm
on db.database_id = dm.database_id
```

Results

	name	is_encrypted	encryption_state
1	master	0	NULL
2	tempdb	1	3
3	model	0	NULL
4	msdb	0	NULL
5	DB1	1	3
6	DB1SUB	0	NULL
7	DB1Read	1	3

Maintenance Plan Wizard

Select Maintenance Task Order

Select the order for the tasks to execute:

- Back Up Database (Full)
- Back Up Database (Transaction Log)

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

Query executed successfully.

SQL2 (16.0 RTM) HST\dtba (99) DB1Read 00:00:00 7 rows

Ready

5:03 PM 4/22/2025

Database Backup

Hum Sub

SQLQuery9.sql - SQL2.DB1Read (HST\dtba (99)) - Microsoft SQL Server Management Studio

File Edit View Project Tools Window Help

Object Explorer

- SQL2 (SQL Server 16.0.1000.6 - HST\dtba)
- Databases
- Security
- Server Objects
- Replication
- Always On High Availability
- Management
 - Policy Management
 - Data Collection
 - Resource Governor
 - Extended Events
 - Maintenance Plans
 - SQL Server Logs
 - Database Mail
 - Distributed Transaction Coordinator
- Integration Services Catalogs
- SQL Server Agent
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SQLQuery9.sql - SQL2.DB1Read (HST\dtba (99))

```
select db_name
, db.is_encrypted
, dm.encryption_state
, dm.percent_complete
, dm.key_algorithm
, dm.key_length
from sys.databases db
left outer join sys.dm_database_encryption_keys dm
on db.database_id = dm.database_id
```

Results

	name	is_encrypted	encryption_state
1	master	0	NULL
2	tempdb	1	3
3	model	0	NULL
4	msdb	0	NULL
5	DB1	1	3
6	DB1SUB	0	NULL
7	DB1Read	1	3

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: Disk

Not scheduled (On Demand) Change

Help < Back Next > Finish >> Cancel

Query executed successfully.

SQL2 (16.0 RTM) HST\dtba (99) DB1Read 00:00:00 7 rows

Ready

5:03 PM 4/22/2025



SQLQuery9.sql - SQL2.DB1Read (HST\tdba (99)) - Microsoft SQL Server Management Studio

File Edit View Project Tools Window Help

Object Explorer

- SQL2 (SQL Server 16.0.1000.6 - HST\tdba)
- Databases
- Security
- Server Objects
- Replication
- Always On High Availability
- Management
 - Policy Management
 - Data Collection
 - Resource Governor
 - Extended Events
 - Maintenance Plans
- SQL Server Logs
- Database Mail
- Distributed Transaction Coordinators
- Integration Services Catalogs
- SQL Server Agent
- XEvent Profiler

SQLQuery9.sql - SQL2.DB1Read (HST\tdba (99))

```
select db_name
, db.is_encrypted
, dm.encryption_state
, dm.percent_complete
, dm.key_algorithm
, dm.key_length
from sys.databases db
left outer join sys.dm_database_encryption_keys dm
on db.database_id = dm.database_id
```

Results

	name	is_encrypted	encryption_state
1	master	0	NULL
2	tempdb	1	3
3	model	0	NULL
4	msdb	0	NULL
5	DB1	1	3
6	DB1SUB	0	NULL
7	DB1Read	1	3

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

Back up to: Files and filegroups

Back up to: All databases, System databases, All user databases (excluding master, model, msdb, tempdb), These databases: DB1, DB1Read, DB1SUB, Ignore databases where the state is not online

Not scheduled (On Demand)

Query executed successfully.

SQL2 (16.0 RTM) HST\tdba (99) DB1Read 00:00:00 7 rows

Ready

5:03 PM 4/22/2025

SQLQuery9.sql - SQL2.DB1Read (HST\tdba (99)) - Microsoft SQL Server Management Studio

File Edit View Project Tools Window Help

Object Explorer

- SQL2 (SQL Server 16.0.1000.6 - HST\tdba)
- Databases
- Security
- Server Objects
- Replication
- Always On High Availability
- Management
 - Policy Management
 - Data Collection
 - Resource Governor
 - Extended Events
 - Maintenance Plans
- SQL Server Logs
- Database Mail
- Distributed Transaction Coordinators
- Integration Services Catalogs
- SQL Server Agent
- XEvent Profiler

SQLQuery9.sql - SQL2.DB1Read (HST\tdba (99))

```
select db_name
, db.is_encrypted
, dm.encryption_state
, dm.percent_complete
, dm.key_algorithm
, dm.key_length
from sys.databases db
left outer join sys.dm_database_encryption_keys dm
on db.database_id = dm.database_id
```

Results

	name	is_encrypted	encryption_state
1	master	0	NULL
2	tempdb	1	3
3	model	0	NULL
4	msdb	0	NULL
5	DB1	1	3
6	DB1SUB	0	NULL
7	DB1Read	1	3

Maintenance Plan Wizard

Define Back Up Database (Full) Task

Configure the maintenance task.

General Destination Options

Back up databases across one or more files:

If backup files exist: Append

Create a backup file for every database

Create a sub-directory for each database

Folder: C:\Database\Backup

SQL credential: Create...

Azure storage container:

URL prefix: https://<storageaccount>.blob.core.windows.net/

Backup file extension: bak

This backup type is not supported on a secondary replica and this task will fail if the task runs on a secondary replica. For more information, see <http://go.microsoft.com/fwlink/?id=208213>

Schedule: Not scheduled (On Demand)

Query executed successfully.

SQL2 (16.0 RTM) HST\tdba (99) DB1Read 00:00:00 7 rows

Ready

5:04 PM 4/22/2025



SQLQuery3.sql - SQL2.DB1Read (HST\dtba (99)) - Microsoft SQL Server Management Studio

File Edit View Project Tools Window Help

Object Explorer

Connect

SQL2 (SQL Server 16.0.1000.6 - HST\dtba)

Databases

Security

Server Objects

Replication

Always On High Availability

Management

Policy Management

Data Collection

Resource Governor

Extended Events

Maintenance Plans

SQL Server Logs

Database Mail

Distributed Transaction Coordinator

Integration Services Catalogs

SQL Server Agent

XEvent Profiler

SQLQuery3.sql - SQL2.DB1Read (HST\dtba (99))

```
select db_name
, db.is_encrypted
, dm.encryption_state
, dm.percent_complete
, dm.key_algorithm
, dm.key_length
from sys.databases db
left outer join sys.dm_databases_encryption dm
on db.database_id = dm.database_id
```

Results

	name	is_encrypted	encryption_state
1	master	0	NULL
2	tempdb	1	3
3	model	0	NULL
4	msdb	0	NULL
5	DB1	1	3
6	DB1SUB	0	NULL
7	DB1Read	1	3

Messages

100 %

Query executed successfully.

Maintenance Plan Wizard

Define Back Up Database (Full) Task

Configure the maintenance task.

General Destination Options

Set backup compression: Compress backup

Backup set will expire: 14 days 5/ 6/2025

Copy-only backup

Verify backup integrity

Backup encryption

Algorithm: AES 128

Certificate or Asymmetric key: TDE_Cert(Certificate)

For availability databases, ignore replica priority for backup and backup on primary settings

Block size 65536 bytes

Max transfer size 65536 bytes

This backup type is not supported on a secondary replica and this task will fail if the task runs on a secondary replica. Note: Ignoring the backup priority and availability group settings may result in simultaneous parallel backups if the maintenance plan is cloned on all replicas. For more information, see <https://msdn.microsoft.com/library/dd293119>.

Schedule: Not scheduled (On Demand)

Help < Back Next > Finish Cancel

SQL2 (16.0 RTM) HST\dtba (99) DB1Read 00:00:00 7 rows

Ready

Windows Taskbar: 5:05 PM 4/22/2025

Hum Sub
ECHNO



Transaction Logs Backup

The screenshot shows the SQL Server Enterprise Manager interface. The Object Explorer on the left displays the server hierarchy. The central pane shows a query window with the following SQL code:

```
select db_name
, db.is_encrypted
, dm.encryption_state
, dm.percent_complete
, dm.key_algorithm
, dm.key_length
from sys.databases db
left outer join sys.dm_database_encryption_keys dm
on db.database_id = dm.database_id
```

The Results pane shows the following data:

name	is_encrypted	encryption_state
master	0	NULL
tempdb	1	3
model	0	NULL
msdb	0	NULL
DB1	1	3
DB1SUB	0	NULL
DB1Read	1	3

The Maintenance Plan Wizard is open, showing the "Define Back Up Database (Transaction Log) Task" configuration. The "General" tab is selected. The "Backup type" is set to "Transaction Log". The "Database(s)" dropdown is set to "<Select one or more>". The "Backup component" is set to "Database". The "Back up to:" dropdown is set to "Disk". The "Not scheduled (On Demand)" checkbox is checked. The "OK" button is highlighted.

The screenshot shows the same SQL Server Enterprise Manager interface. The query window and Results pane are the same as in the previous screenshot. The Maintenance Plan Wizard is open, showing the "Define Back Up Database (Transaction Log) Task" configuration. The "General" tab is selected. The "Backup type" is set to "Transaction Log". The "Database(s)" dropdown is set to "Specific databases". The "Backup component" is set to "Database". The "Back up to:" dropdown is set to "Disk". The "Not scheduled (On Demand)" checkbox is checked. The "Next >" button is highlighted.



SQLQuery9.sql - SQL2.DB1Read (HST\tdba (99)) - Microsoft SQL Server Management Studio

File Edit View Project Tools Window Help

Object Explorer

Connect -> SQL2 (SQL Server 16.0.1000.6 - HST\tdba (99))

Databases

Security

Server Objects

Replication

Always On High Availability

Management

Policy Management

Data Collection

Database Mail

Distributed Transaction Coordinator

Integration Services Catalogs

SQL Server Agent

XEvent Profiler

SQLQuery9.sql - SQL2.DB1Read (HST\tdba (99))

```
select db_name
, db_is_encrypted
, dm_encryption_state
, dm_percent_complete
, dm_key_algorithm
, dm_key_length
from sys.databases db
left outer join sys.dm_database_encryption_keys dm
on db.database_id = dm.database_id
```

Results

name	is_encrypted	encryption_state
master	0	NULL
tempdb	1	3
model	0	NULL
msdb	0	NULL
DB1	1	3
DB1SUB	0	NULL
DB1Read	1	3

Messages

100 %

Query executed successfully.

SQL2 (16.0 RTM) HST\tdba (99) DB1Read 00:00:00 7 rows

Maintenance Plan Wizard

Define Back Up Database (Transaction Log) Task

Configure the maintenance task.

General Destination Options

☐ Back up databases across one or more files:

☒ Create a backup file for every database

☒ Create a sub-directory for each database

Folder: C:\Database\Backup

SQL credential:

Azure storage container:

URL prefix: https://<storageaccount>-blob.core.windows.net/

Backup file extension: .tm

Not scheduled (On Demand)

Help < Back Next > Finish >> Cancel

Activate Windows

SQLQuery9.sql - SQL2.DB1Read (HST\tdba (99)) - Microsoft SQL Server Management Studio

File Edit View Project Tools Window Help

Object Explorer

Connect -> SQL2 (SQL Server 16.0.1000.6 - HST\tdba (99))

Databases

Security

Server Objects

Replication

Always On High Availability

Management

Policy Management

Data Collection

Database Mail

Distributed Transaction Coordinator

Integration Services Catalogs

SQL Server Agent

XEvent Profiler

SQLQuery9.sql - SQL2.DB1Read (HST\tdba (99))

```
select db_name
, db_is_encrypted
, dm_encryption_state
, dm_percent_complete
, dm_key_algorithm
, dm_key_length
from sys.databases db
left outer join sys.dm_database_encryption_keys dm
on db.database_id = dm.database_id
```

Results

name	is_encrypted	encryption_state
master	0	NULL
tempdb	1	3
model	0	NULL
msdb	0	NULL
DB1	1	3
DB1SUB	0	NULL
DB1Read	1	3

Messages

100 %

Query executed successfully.

SQL2 (16.0 RTM) HST\tdba (99) DB1Read 00:00:00 7 rows

Maintenance Plan Wizard

Define Back Up Database (Transaction Log) Task

Configure the maintenance task.

General Destination Options

Set backup compression: Compress backup

☐ Backup set will expire:

☒ Copy-only backup

☐ Verify backup integrity

☒ Backup encryption

Algorithm: AES 128

Certificate or Asymmetric key: TDE_Cert(Certificate)

☒ For availability databases, ignore replica priority for backup and backup on primary settings

Block size: 65536 bytes

Note: Ignoring the backup priority and availability group settings may result in simultaneous parallel backups if the maintenance task is scheduled.

Schedule:

Not scheduled (On Demand)

Help < Back Next > Finish >> Cancel

Activate Windows



SQLQuery9.sql - SQL2.DB1Read (HST\tdba (99)) - Microsoft SQL Server Management Studio

File Edit View Project Tools Window Help

Object Explorer

SQL2 (SQL Server 16.0.10006 - HST\tdba)

Databases

Security

Server Objects

Replication

Always On High Availability

Management

Policy Management

Data Collection

Resource Governor

Extended Events

Maintenance Plans

SQL Server Logs

Database Mail

Distributed Transaction Coordinates

Integration Services Catalogs

SQL Server Agent

XEvent Profiler

SQLQuery9.sql - SQ_ead (HST\tdba (99))

```
select db_name
, db.is_encrypted
, dm.encryption_state
, dm.percent_complete
, dm.key_algorithm
, dm.key_length
from sys.databases db
left outer join sys.dm_database_encryption_keys dm
on db.database_id = dm.database_id
```

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: C:\Database\Data\MSSQL16\MSSQLSERVER\MSSQL\Log

☐ E-mail report

To:

Help < Back Next > Finish >> Cancel

Results

	name	is_encrypted	encryption_state
1	master	0	NULL
2	tempdb	1	3
3	model	0	NULL
4	msdb	0	NULL
5	DB1	1	3
6	DBISUB	0	NULL
7	DB1Read	1	3

100 %

Query executed successfully.

SQL2 (16.0 RTM) HST\tdba (99) DB1Read 00:00:00 7 rows

Ready

5:12 PM 4/22/2025

SQLQuery9.sql - SQL2.DB1Read (HST\tdba (99)) - Microsoft SQL Server Management Studio

File Edit View Project Tools Window Help

Object Explorer

SQL2 (SQL Server 16.0.10006 - HST\tdba)

Databases

Security

Server Objects

Replication

Always On High Availability

Management

Policy Management

Data Collection

Resource Governor

Extended Events

Maintenance Plans

SQL Server Logs

Database Mail

Distributed Transaction Coordinates

Integration Services Catalogs

SQL Server Agent

XEvent Profiler

SQLQuery9.sql - SQ_ead (HST\tdba (99))

```
select db_name
, db.is_encrypted
, dm.encryption_state
, dm.percent_complete
, dm.key_algorithm
, dm.key_length
from sys.databases db
left outer join sys.dm_database_encryption_keys dm
on db.database_id = dm.database_id
```

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 'DatabaseBackup'
- Define Back Up Database (Full) Task
- Define Back Up Database (Transaction Log) Task
- Selected reporting options

Help < Back Next > Finish Cancel

Results

	name	is_encrypted	encryption_state
1	master	0	NULL
2	tempdb	1	3
3	model	0	NULL
4	msdb	0	NULL
5	DB1	1	3
6	DBISUB	0	NULL
7	DB1Read	1	3

100 %

Query executed successfully.

SQL2 (16.0 RTM) HST\tdba (99) DB1Read 00:00:00 7 rows

Ready

5:12 PM 4/22/2025



SQLQuery9.sql - SQL2.DB1Read (HST\tdba (99)) - Microsoft SQL Server Management Studio

File Edit View Project Tools Window Help

Object Explorer

- Connect
- SQL2 [SQL Server 16.0.1000.6 - HST\tdba (99)]
- Databases
- Security
- Server Objects
- Replication
- Always On High Availability
- Management
- Policy Management
- Data Collection
- Resource Governor
- Extended Events
- Maintenance Plans
- SQL Server Logs
- Database Mail
- Distributed Transaction Coordinator
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SQLQuery9.sql - SQL2.DB1Read (HST\tdba (99))

```
select db_name
, db.is_encrypted
, dm.encryption_state
, dm.percent_complete
, dm.key_algorithm
, dm.key_length
from sys.databases db
left outer join sys.dm_database_encryption_keys dm
on db.database_id = dm.database_id;
```

Maintenance Plan Wizard

Maintenance Plan Wizard Progress

Click Stop to interrupt the operation.

Success

Action	Status	Message
Creating maintenance plan "DatabaseBackup"	Success	
Adding tasks to the maintenance plan	Success	
Adding scheduling options	Success	
Adding reporting options	Success	
Saving maintenance plan "DatabaseBackup"	Success	

Results

name	is_encrypted	encryption_state
master	0	NULL
tempdb	1	3
model	0	NULL
msdb	0	NULL
DB1	1	3
DB1SUB	0	NULL
DB1Read	1	3

Query executed successfully.

SQL2 (16.0 RTM) HST\tdba (99) DB1Read 00:00:00 7 rows

SQLQuery9.sql - SQL2.DB1Read (HST\tdba (99)) - Microsoft SQL Server Management Studio

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- Connect
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- Databases
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- Always On High Availability
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- Resource Governor
- Extended Events
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SQLQuery9.sql - SQL2.DB1Read (HST\tdba (99))

```
select db_name
, db.is_encrypted
, dm.encryption_state
, dm.percent_complete
, dm.key_algorithm
, dm.key_length
from sys.databases db
left outer join sys.dm_database_encryption_keys dm
on db.database_id = dm.database_id;
```

Results

name	is_encrypted	encryption_state	percent_complete	key_algorithm	key_length
master	0	NULL	NULL	NULL	NULL
tempdb	1	3	0	AES	256
model	0	NULL	NULL	NULL	NULL
msdb	0	NULL	NULL	NULL	NULL
DB1	1	3	0	AES	256
DB1SUB	0	NULL	NULL	NULL	NULL
DB1Read	1	3	0	AES	256

Query executed successfully.

SQL2 (16.0 RTM) HST\tdba (99) DB1Read 00:00:00 7 rows