FORTANIX TECHNICAL DOCUMENTATION

# **Fortanix**<sup>®</sup>

# Integration Guide

## USING DATA SECURITY MANAGER WITH MSSQL SERVER TDE – BACKUP AND RESTORE

**VERSION 1.0** 



#### TABLE OF CONTENTS

1.0		2
2.0	BACKING UP THE DATA FROM SOURCE	3
3.0	CONFIGURING TDE ON TARGET SERVER	5
3.1	Enabling SQL Features	5
3.2	Creating Cryptographic Provider	6
3.3	Creating Credentials	7
3.4	Creating Asymmetric Key	10
3.5	Creating Credentials (DB Engine)	11
3.6	Creating Login (DB Engine)	12
4.0	RESTORING THE ENCRYPTED DATABASE	13
5.0	DOCUMENT INFORMATION	14
5.1	Document Location	14
5.2	Document Updates	14

## **Fortanix**

#### 1.0 INTRODUCTION

This document describes the step-by-step procedure to backup and restore the Microsoft SQL server Transparent Data Encryption (TDE) enabled database, which is protected by Fortanix Data Security Manager (DSM).

To perform the restoration, the target database MSSQL server must point to the same asymmetric key, which was previously created on the source database MSSQL server.

When transparent data encryption is enabled in the database, the database backup files are encrypted as well. The following error appears on the screen when the user tries to restore a TDE enabled database backup to a different server:

A	🔀 Restore Database -				(
	An exception occurred while executing	a Transact-SQL statement	or batch.		
	Select a page	🗐 Script 🕞 🕜 Help			
Y	<ul> <li>General</li> <li>Files</li> <li>Options</li> </ul>	Source O Database:	C:\Program Files\Micros	v of	
		Database		~	
N	/licrosoft SQL Server Management Stud	dio			×
	<ul> <li>(Microsoft.SqlServer.Connection)</li> <li>Additional information:         <ul> <li>Cannot find server asymmetric RESTORE HEADERONLY is</li> </ul> </li> <li>Weilp          <ul> <li>Copy message              <ul> <li>Sh</li> </ul> </li> </ul> </li> </ul>	nfo) key with thumbprint '0x02B5 terminating abnormally. (Mic ow details	3B13A08E34694A7371755058B rosoft SQL Server, Error: 33111)	BCC9A'. ) OK	
0	View connection properties Progress				
	Done	٢	Verify	> Backup Media	
			OK Cancel	Help	

FIGURE 1: ERROR DIALOG BOX

#### 2.0 BACKING UP THE DATA FROM SOURCE

This section lists the steps for taking a backup of your database from the source server. This backup contains the data in encrypted format, which also contains the Data Encryption Key (DEK) protected by the Fortanix master key.

In the given example, we will use the database name as **employee** and we are backing it up from the Object Explorer or T-SQL command.

- 1. Right-click the desired database (Company).
- 2. Select **Tasks** and click the **Back Up** option from the context menu.



FIGURE 2: TAKE BACKUP OF SOURCE SERVER



a) Select the backup path.

SQLQuery2.sql - SQL1.master (SQL1\SQL1 File Edit View Project Tools Wine	l (69))* - Microsoft SQL Server Managemer	it Studio (Administrator)				Quic	k Launch (Ctrl+Q)	- م	đ	×
G • 0   🕄 • 🖕 🛀 🔐 🖉 🔊 N	ew Query 🗿 🗟 📾 📾 📾 🐇 🗗	a) 🤊 - ୯ - 🕅 - 📕		a 🔑 🛳 🗈 - 🖕						
iii ₩ 1 master - >	Execute III 🗸 🖓 🗐 🔒 🖓 🖓	🗑 Back Up Database - Compa	ny		- 🗆	$\times$				
Object Explorer	SQLQuery2.sql - SQer (SQL1\SQL1 (59)) BALTER DATABASE Company	Select a page	🗊 Script 👻 😧 Help							÷
SQL1 (SQL Server 15.0.4053.23 - SQL1\S     Databases	GO	Backup Options	Source	6						Ê
🗈 💼 System Databases			Recovery model:	FILL						11
Database Snapshots     Gompany			Backup type:	Full		~				
Security End to a construct of the security			Copy-only backup							
E Server Roles			Backup component:							
Bu ekm_tde_cred			Database							
aŭ sa_ekm_tde_cred ⊡ 📁 Cryptographic Providers			O Files and filegroups:							
EKM_Prov			Destination							4
Server Audit Specifications			Back up to:	Dak		$\sim$				
Server Objects     Replication	100 % +	Connection	C:\Program Files\Microsoft SQL Server\N	ISSQL15.MSSQLSERVER\/MSSQL\Backup\Company.bak	Add				÷	
🗉 📁 PolyBase 🗄 📕 Always On High Availability	Commands completed successfu	Server: SOL1			Barrow					
	Completion time: 2020-10-207	Connection:								П
SQL Server Agent		Wew connection properties			Conten	3				Ш
Le Acvent Profiler										Ш
										Ш
		Progress								
		Oneady								Ш
					OK Can	cel				-
	100 %								÷	

FIGURE 3: SELECT THE BACKUP PATH

b) Backup completed successfully.

SQLQuery2.sql - SQL1.mester (SQL1)SC           File         Edit         View         Project         Tools         W           Image: Solution of the second seco	L1 (69))* - Microsoft SQL Server Manageme indow Help New Query ▲ A A A A A D ▷ Execute ■ √ 88 🖨 日 89 89	nt Studio (Administrator)	ا <b>م ا</b>	• 🕅 🌶 🏛 D • -	- 1	Quick Lau	inch (Ctrl+Q)	Р = 8 ×
Object Explorer         ●           Connect         ♥         ♥         ●         ●         Scill Scient 15.4.05323-Scill N           ●         Scill Scient Distabases         ●         Databases         ●         Databases           ●         Databases         ●         Outbases         ●         Outbases           ●         Databases for provides         ●         Outbases         ●         Outbases           ●         Database for provides         ●         Outbases         ●         Outbases         ●         Outbases         ●         ○         Outbases         ●	SGLOWNY 2019 SGLOW (SGLORDALI (07) SGLOWNY 2019 SGLOWNY 2019 SGLOWNY 20	Sefect anon	Copy message	Company FUL Ful ful on/ completed successfully.		V V V V V V V V V V V V V V V V V V V		• € • •
	100 % • • • •	Progress Executing (100%) Stop action now			OK SC	Cancel	DL1\SOL1 (69) matter	000000 0 rows

FIGURE 4: BACKUP COMPLETED

- 3. Move the backup database to the target server.
- 4. Log in to the secondary target server.

#### 3.0 CONFIGURING TDE ON TARGET SERVER

#### 3.1 ENABLING SQL FEATURES

Run the following commands if Extensible Key Management (EKM) is not supported or enabled in the SQL server edition:

```
sp_configure 'show advanced', 1
GO
RECONFIGURE
GO
sp_configure 'EKM provider enabled', 1
GO
RECONFIGURE
GO
```



FIGURE 5: RUN COMMANDS FOR ERROR SCENARIO

#### 3.2 CREATING CRYPTOGRAPHIC PROVIDER

Run the following commands to use the correct location of the EKM DLL:

```
CREATE CRYPTOGRAPHIC PROVIDER EKM_Prov
FROM FILE = 'C:\Program Files\Fortanix\KmsClient\FortanixKmsEkmProvi
der.dll';
G0
```

#### Where,

• EKM Prov refers to the name of the provider defined by the user.



FIGURE 6: CREATE CRYPTOGRAPHIC PROVIDER

#### 3.3 CREATING CREDENTIALS

This section describes the steps to create the credentials to generate the master key on the Fortanix DSM using the SQL admin.

The SQL admin requires permission to connect to Fortanix DSM to generate the key.

- 1. Perform the following steps to get the API key:
  - a. Log in to the Fortanix DSM.
  - b. From the UI left panel, click the **Apps** tab.
  - c. Click **COPY API KEY** to copy the API key of your application and then paste the DSM API key as the value for the SECRET parameter in the next command.

≡	<b>₩Fortanix</b>				🚇 MSSQL-Test 🗸	amit.thakur@fortanix.com ~
Ø	MSSQL-Test / Apps					
뿂	Apps 🔸		Q Search			
E						😸 DOWNLOAD CSV
<b>6</b> ₩	Name 🔺	Credentials	Cert Expires 🔺	Groups 🔺	Security Object	s - Description
	test-app Rest API	COPY API KEY	N/A	2014-test	0	
B						
٩						
ß	Version 2.9.7254 🚯 Report a problem					(Fortanix
6						

FIGURE 7: COPY API KEY

 Run the following commands to create a credential using the copied API key in your SQL Server Studio that will be used by the system administrators:

```
CREATE CREDENTIAL sa_ekm_tde_cred
WITH IDENTITY = 'Identity1',
SECRET = '<DSM API KEY>'
FOR CRYPTOGRAPHIC PROVIDER EKM_Prov ;
GO
```



#### DSM WITH MSSQL TDE INTEGRATION - BACKUP & RESTORE

State with the state of the sta	<b>•</b>
CREATE CREDENTIAL sa_ekm_tde_cred	÷
WITH IDENTITY = 'Identity1',	Î
SECRET = 'NTEyMDJmN2QtNTkyMi00ZDdhLTg0MDUt0Dg1MTYzYmYxZDhi01Q2N3FaU2JGdFUwRDRVZWtKdXN	(
FOR CRYPTOGRAPHIC PROVIDER EKM Prov ;	
GO	11
• (**)	Ш
	-
150 % - 4	
<b>B</b> <sup>™</sup> Messages	1
Commands completed successfully.	
	11
150.94	•
Query executed successfully.     MSSQL2017 (14.0 RTM) MSSQL2017/MSSQL2017 (53) MSSQLLAB 00:00:00 10 row.	5

FIGURE 8: CREATE CREDENTIAL

3. Add the credential to a high privileged user such as your own domain login in the

format [DOMAIN\login]:

```
ALTER LOGIN EC2AMAZ-1RDPAEU\Administrator
ADD CREDENTIAL "sa_ekm_tde_cred";
GO
```

Run the following commands in case there is no domain, and the machine is part of a workgroup or standalone:

ALTER LOGIN LOCALHOST\Administrator ADD CREDENTIAL "sa\_ekm\_tde\_cred"; GO

8 Page



#### DSM WITH MSSQL TDE INTEGRATION - BACKUP & RESTORE

Object Explorer 👻 👎 🗙	SQLQuery10.sql17\MSSQL2017 (63))* + × SQLQuery9.sql - MS)) - not connected*	SQLQuery7.sql - M17\MSSQL2017 (53))*
Connect -	ALTER LOGIN MSSQL2017	
MSSQL2017 (SQL Server 14.0.3238.1 - MSSQL2017/MSSQL2017)     Databases     Databases     Databases     MSSQL4B     Server Objects     Replication     PolyBase     Mosy On High Availability	ADD CREDENTIAL "sa_ekm_tde_cred"; GO	
🕢 💼 Management	150 % -	÷
Integration Services Catalogs      Sol Server Agent	B Messages	
II XEvent Profiler	Commands completed successfully.	
	150 % - 4	×
	Query executed successfully.	MSSQL2017 (14.0 RTM) MSSQL2017\MSSQL2017 (63) master 00:00:00 0 rows
Output		- † ×
Show output from: Debug	<ul> <li>  을   을   볼   禪</li> </ul>	
Auto-attach to process (3308) [SQL] HSSQL2017 on mach. The thread 'HSSQL2017 [G3]' (0x126) has exited with co The thread 'HSSQL2017 [G5]' (0x1126) has exited with co The thread 'HSSQL2017 [G3]' (0x1260) has exited with co The thread 'HSSQL2017 [G3]' (0x1260) has exited with co The program '[3308] [SQL] HSSQL2017: MSSQL2017' has exit	Ine 'M5SQL2017' succeeded. de (0κ0). de (0κ0). de (0κ0). de (0κ0). de (0κ0). de (0κ0).	
Contract (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (19977) (19977) (1997) (1997) (1997) (1997) (1997) (1		

FIGURE 9: COMMAND FOR NO DOMAIN

If you are not an administrator and hence unable to alter the login, open the Object

Explorer and map the credentials as shown in the following image:

2. 52.172.32.101 (ms2014ent)	3. 52.172.140.254 (MSSQL2017)	0								6
🔀 Detach tab 🔍 Toggle scaling 👯 Fulscr	reen  Fit to window size 🔍 Set conne	ction password 🕴 Hide bar	X Disconnect							
16	SQLQuerv15.sq	- SQL2014Enterpr.master (	SQL2014Enterpr\ms2014er	nt (58))* - Microsoft S	QL Server Mana	agement Studio	(Administrator)			_ 0 X
File Edit View Project Debug Tools	Window Help									
🗄 🐂 🗉 = 🚅 🛃 🐊 🔔 New Query 📑	- 19 - 10 - 13 al	🖾 - 🖾 🖾 🕨		- 2	-	🔊 🕾 🎾 🖬 •				
1 (9) (1) master - ?	Execute 🕨 Debug 🔲 🗸 👯 🚽	124000133	進建 私。							
Object Explorer - + + ×	SQLQuery15.sql - Srpr\ms2014ent (58))	1	Login Properties - SQL2	014Enterpr\ms2014er	nt	_ 🗆 X		-	Properties	≁ ù ×
Connect * 🛃 🚼 💷 🍸 🛃 🍒	ALTER LOGIN "SQL2014Enterp	Select a page	Script 💌 🚺 Help					÷	Current connectio	n parameters •
QL2014Enterpr (SQL Server 12.0.6329.1 - SQL A	G0	Server Roles						Ê	22 24 🖾 🛛	
Security		🚰 User Mapping	Login name:	SQL2014Enterpr\ms2014er	72	Search			▲ Aggregate Sta	tus
E Logins		Securables	<ul> <li>Windows authentication</li> </ul>						Connection fail	lun
A ##MS_PolicyEventProcessingLogin		ing - Status	O SQL Server authentication					=	Elapsed time	00:00:00.015
##MS_PolicyTsqlExecutionLogin#4			Password:			1			Finishtime	12/24/2019 8:00:18 AM
NT AUTHORITY/SYSTEM NT Sension MSSCI SERVER			Confirm paramond-			-			Rows returned	0
NT Service\SOLlaaSExtensionOuen			Specify old operational			_			Start time	12/24/2019 8:00:18 AM
NT SERVICE\SQLSERVERAGENT						-			State	Open
A NT SERVICE\SQLWriter	100.86		Cid password.			_		×	▲ Connection	
A NT SERVICE\Winmgmt				5Y					Connection nar	me SQL2014Enterpr (SQL20
SOL2014Enternr\ms2014ent	Mag 33042 Level 16 State 1		User mut chance pass	ration					4 Connection De Connection elu	/tails
E Server Roles	Cannot add credential becau		User must change pass     Manaad to oostiliante	sword as next login				Ê	Connection eia	ish 12/24/2019 8-00-18 AM
3 🗀 Credentials			O Mapped to Certificate			2			Connection ror	ws 0
essekm_tde_cred			Mapped to asymmetric key			<u> </u>		=	Connection sta	rt t 12/24/2019 8:00:18 AM
Cryptographic Providers     EVM Reput		Connection	Map to Credential			<ul> <li>Add</li> </ul>		-	Connection star	te Open
Audits		Server:	Mapped Credentials	Credential P	rovider				Display name	SQL2014Enterpr
🛛 🦢 Server Audit Specifications		SQL2014Enterpr		sa_ekm_tde_cred E	EKM_Prov				Login name	SQL2014Enterpr\ms2014
Server Objects		Connection: SOI 2014Enterry/ms2014ent						~	Server name	12.0.6320
Replication	100 % ~ <	Wew connection properties						>	Session Tracing	a ID
< III >	Query completed with errors.	- The sectors and a sector					ns2014e master 00:00:00	0 rows	SPID	58
Output		Progress				Remove		- 4 ×		
Show output from: Debug	-   Q   Q	Ready	Default database:	master		•				
Auto-attach to process '[2936] [SQ	L] SQL2014Enterpr' on machine 'S	1445 C	Default language:	English	,	-		^		
The thread 'SQL2014Enterpr [55]' (	0x4dc) has exited with code 0 (0 0x4dc) has exited with code 0 (0									
The program '[2936] [SQL] SQL2014E	nterpr: SQL2014Enterpr' has exit				OK	Cancel		=		
						111				
									Name	
								~	The name of the co	innection.
<								>		
Ready										
💶 🔔 🗩 🚞 🦉									• Ba 9	h ENG 8:01 AM
	× – – ×									12/24/2019

FIGURE 10: MAP CREDENTIALS

#### 3.4 CREATING ASYMMETRIC KEY

The MSSQL admin has the credentials associated with creating the Master Encryption Key (MEK) on Fortanix DSM. This section describes the steps to create the asymmetric key from the existing key in the Fortanix DSM.

Run the following commands to create an asymmetric key stored inside the EKM provider:

```
USE master
CREATE ASYMMETRIC KEY ekm_login_key FROM PROVIDER EKM_Prov
WITH PROVIDER_KEY_NAME='SQL_Server_Key',
CREATION_DISPOSITION = OPEN_EXISTING;
GO
```

## 

- ekm login key is the key name on SQL server created on the source server.
- SQL Server Key is the key name on Fortanix DSM created on the source server.



FIGURE 11: CREATING ASYMMETRIC KEY

#### 3.5 CREATING CREDENTIALS (DB ENGINE)

Run the following commands to create a credential that will be used by the database engine:

```
USE master;
CREATE CREDENTIAL ekm_tde_cred
WITH IDENTITY = 'Identity2',
SECRET = '<DSM API KEY>'
FOR CRYPTOGRAPHIC PROVIDER EKM_Prov;
```

#### Where,

- ekm tde cred refers to the name of the credentials.
- Identity2 refers to the identity name. The value can be any name.
- EKM\_Prov refers to the Fortanix EKM Provider.
- SECRET refers to the Fortanix DSM API key.

Бу.	SQLQuery16.sql - SQL2014Enterpr.master (SQL2014Ent	erpr\ms2014ent (59))* - Microsoft SQL Server Ma	anagement Studio (Administrator)
File Edit View Query Project Debug	Tools Window Help		
🗄 🛐 👻 📨 🌌 🎜 🍠 🔔 New Query	🗅 🔁 🔁 🕹 🕹 🗳 🖉 🔹 🗢 🔸 🖓 🖓 🖓 🖓 🖓 🖓 🖓	- 29	• 🗠 🕾 🔊 • 🗉 • 🖕
master -	: Execute 🕨 Debug 😑 🗸 🎇 🚽 🔜 🏋 🐴 🙆 🦉 🍈 🚍 역 (建) 建 建 😤		
Object Explorer • 4	SOLQuery16.sql - Smithms2014ent (59))* X SOLQuery15.sql - Smithms2014ent (58))*	SQLQuery11.sal - Surnt\ms2014ent (55))* SQLQuer	v/20.sal - Srar\ms2014ent (61))*
Connect • 2 2 2 = 7 2 3 Connect • 2 2 = 7 2 3 Connect • 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	GUGE master : GRRAFT CREDENTIAL ekm_tde_cred MITH IDENTITY - 'Identity2', SECRET - 'ITE9HOJMKI2QUTKYKH08QDDHLTg8HDUtODg1HTYzYWYXZDhiolQ2N FOR CRYTOGRAPHIC PROVIDER EKW_Frov ;	3FaU23GdFUwRDRVZW±KdXNOZXg4anVfYwU4NU03cW83LXI	spQmdBWDRvRWtqSF9ucUB40FIIN1h6SHE4QUNGaDRwcWVKW
master     master     master     model     model     master     master     master     made     master     master			
ENCRYPTION KEY			
🗉 🚞 Security			
🖃 🧰 Logins	100 % • (		>
##MS_PolicyEventProces	🛅 Messages		
##MS_PolicyTsqlExecutic	Command(s) completed successfully.		_
A NTAUTHORITY\SYSTEM			
M Service\MSSQLSERVE			
NT Service\SQLiaaSExten			
NT SERVICE\SQLSERVERA			-
NT SERVICE\SQLWriter			
NT SERVICE\Winmgmt			
Sa Sa SOL 2014E-taura Aug 2014			
SQL2014Enterpr\ms2014e			v
Geredentials			3
< III >	Query executed successfully.	SQL2014Enterpr (12.0 S	P3) SQL2014Enterpr\ms2014e master 00:00:00 0 rows
Output	-		<b>→</b> ¤ ;
Show and and formal Dataset			
Show output from: Debug			
Auto-attach to process '[2936] [ The thread 'SOL2014Enterpr [551]'	<pre>wull sylzesteterpr: on machine 'syl2014Enterpr' succeeded. (0x4dc) has exited with code 0 (0x0)</pre>		
The thread 'SQL2014Enterpr [55]'	(0x4dc) has exited with code 0 (0x0).		
The program '[2936] [SQL] SQL201	Enterpr: SQL2014Enterpr' has exited with code 0 (0x0).		
1			
1			
1			
			>

FIGURE 12: CREATE CREDENTIAL FOR DATABASE ENGINE

## **Fortanix**

#### 3.6 CREATING LOGIN (DB ENGINE)

Run the following commands to add a login used by TDE and add the new credential to the login:

```
CREATE LOGIN EKM_Login
FROM ASYMMETRIC KEY ekm_login_key;
GO
ALTER LOGIN EKM_Login
ADD CREDENTIAL ekm_tde_cred;
GO
```

Where,

- ekm\_login\_key refers to the master key alias on the MSSQL database. This key is already
  created in "Section 3.4- Creating Asymmetric Keys".
- EKM Login refers to the login name.
- ekm\_tde\_cred refers to the key created on the Fortanix DSM. This credential is already created in "Section 3.3- Creating Credentials".



FIGURE 13: ADD NEW CREDENTIAL TO LOGIN

#### 4.0 **RESTORING THE ENCRYPTED DATABASE**

This section describes the steps for restoring the encrypted backup on the target server. When the backup is encrypted with TDE at the time of restoration, the database tries to unlock the DEK using MEK. The SQL server starts the restoration process only if the respective master key is available on the database.

Restoring: employee-Full Database Bac	kup								100%	Stop
Select a page	🗊 Script 🕞	😮 Help								
W General	Source -									
W Files	O Data	abase:								~
options	0 544									~
	Dev	ice:	C:\Program File	es\Microsoft SC	L Serve	r\MSSQL15.I	MSSQLSER\	/ER\MSSQ	L\Backup	
		Database:	employee							$\sim$
	Destination	n ———								
	Databa	se:	employee							$\sim$
	Restore	to:	The last backu	ıp taken (Tuesd	lay, Febr	uary 7, 2023	11:07:49 AM	)	Timeline.	
	Restore pl	an								
	Backup s	ets to restore:								
	Restore	Name		Component	Туре	Server	Database	Position	First LSN	
		employee-Full	Database Backup	Database	Full	sql-db-fips	employee	1	370000003280	0001
				Dat	tabase '	employee' re	stored succ	essfully.		
Connection								OK	]	
<b>y₩</b> sql-db-fips [sql-db-fips\dev]			L							
View connection properties										
Progress	SOLOuerv2.scil - scilL-db-fips\dev (53))* SOLOuerv2.scil - scilL-db-fips\dev (59))* Solouerv2.scil - scilL-db-fips\dev (59) Database: employee Destination Database: employee Destination Backup sets to restore: Restore to: The last backup taken (Tuesday, February 7, 2023 11:07.49 AM) Timelne. Restore lo: Restore Name Component Type Server Database Postion Pirst LSN employee-full Database Backup Database Full scildb-fips employee 1 3700000032800 Microsoft SQL Server Management Studio Cox Verify Backup Med Verify Backup Med OK Cancel Help									
0	<								Verify Backup Med	> lia
							OK	Car	ncel Help	

FIGURE 14: RESTORING DATABASE

#### 5.0 DOCUMENT INFORMATION

#### 5.1 DOCUMENT LOCATION

The latest published version of this document is located at the URL: <u>https://support.fortanix.com/hc/en-us/articles/12782302548500-Data-Security-Manager-with-</u> <u>Microsoft-SQL-Server-TDE-Guide-Backup-Restore</u>

#### 5.2 DOCUMENT UPDATES

This document will typically be updated on a periodic review and update cycle. For any urgent document updates, please send an email to: <a href="mailto:support@fortanix.com">support@fortanix.com</a>

© 2016 – 2023 Fortanix, Inc. All Rights Reserved.

Fortanix® and the Fortanix logo are registered trademarks or trade names of Fortanix, Inc. All other trademarks are the property of their respective owners.

**NOTICE**: This document was produced by Fortanix, Inc. (Fortanix) and contains information which is proprietary and confidential to Fortanix. The document contains information that may be protected by patents, copyrights, and/or other IP laws. If you are not the intended recipient of this material, please destroy this document and inform <u>info@fortanix.com</u> immediately.