# SYSPRO 8 SYSPRO and SQL Server Encryption Configuration

## Technical Guide

Last Published:

January 2020



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## SYSPRO and SQL Server Encryption Configuration

### **INTRODUCTION**

This document contains detailed technical information about how to configure SYSPRO, SQL Server and your Windows Server operating system to use **Data Encryption at Rest** and **Data Encryption in Motion** technologies.

A companion document – **SYSPRO and SQL Server Encryption Overview** – introduces data encryption relating to SYSPRO and SQL Server. It summarizes the ability to configure SYSPRO and SQL Server for **Data Encryption at Rest** and **Data Encryption in Motion**. Benchmarks included in the document demonstrate that these technologies have a negligible effect on system performance.

We should also mention that the subject of data encryption and security is moving rapidly in the modern highly regulated world. Technologies that seemed secure a few years ago are now considered vulnerable to eavesdroppers and hackers. This document serves a moment-in-time, but we recommend that you remain vigilant in protecting your data and are aware of newly developing technologies and their implications.

**Note**: This document includes screenshots to clarify the steps taken. Remember that your version of SYSPRO, SQL Server and/or Windows operating systems may mean that the exact steps or screen images differ. Please consult the relevant resources when setting up your system.

### AUDIENCE

This document is aimed at those requiring a detailed explanation about how to configure SYSPRO, SQL Server and Windows to work with **Data Encryption at Rest (TDE)** and/or **Data Encryption in Motion (TLS)**.

For an overview of these technologies and how they relate to SYSPRO (or to see SYSPRO benchmarks relating to these technologies) then see the companion document: **SYSPRO and SQL Server Encryption Overview**.

## Setting up Data Encryption at Rest using TDE

**Data Encryption at Rest** describes the technique of configuring SQL Server so that the physical database files stored on the Windows file system are encrypted.

This ensures that in the event of a network or other security breach, even if someone is able to access the physical database data or log files (or a backup of these files) the information remains secure.

To set up Data Encryption at Rest using TDE (Transparent Data Encryption):

- 1. Create a Database Master Key (DMK) in the **master** database.
- 2. Create a certificate in the **master** database to secure the Database Encryption Key (DEK).
- 3. Create a Database Encryption Key (DEK) in each of your SYSPRO databases to be encrypted.
- 4. Enable Transparent Data Encryption (TDE) on your SYSPRO databases.

It's critical that you backup the System Master Key, Database Master Key and certificates. If anything goes wrong and you need to restore or move an encrypted database, you will need those keys or certificates. This is covered in the topic below: <u>Backing up Master and Private Keys and</u> <u>Certificates</u>

When working with Data Encryption at Rest using TDE (or reading additional documentation that relates to this subject) you will encounter many acronyms. This document mostly uses the full phrases, but for your information, some of the common acronyms include:

- TDE Transparent Data Encryption
- SMK Service Master Key
- DMK Database Master Key
- DEK Database Encryption Key

The examples use the following names:

- SYSPRO company database name: SysproCompanyLive
- Certificate name in the master database: **SYSPROCert**
- Certificate issuer: SYSPRO certificate

In addition, the placeholder password '**Pass1234!**' is used. It's critical that you replace this with a strong password.

It's assumed that before starting these steps, you already have a successfully running SYSPRO system and want to add Transparent Data Encryption (TDE).

### CREATE A DATABASE MASTER KEY (DMK)

This only needs to be performed once on your SQL Server instance.

Using a system administrative SQL login, execute the following SQL statement against your master database.

```
USE master
GO
```

```
CREATE MASTER KEY
ENCRYPTION BY PASSWORD = 'Pass1234!'
```

Remember to use a strong password instead of the one shown here.

You can validate that the Database Master Key has been created by querying the

sys.symmetric\_keys View.

For example:

```
SELECT
```

```
name KeyName,
symmetric_key_id KeyID,
key_length KeyLength,
algorithm_desc KeyAlgorithm
FROM sys.symmetric_keys
```

Example output:

KeyName	KeylD	KeyAlgorithm	KeyLength
##MS_DatabaseMasterKey##	101	256	AES_256
##MS_ServiceMasterKey##	102	256	AES_256

**Note**: The output includes both the Database Master Key (DMK) and Service Master Key (SMK). SQL Server creates the Service Master Key in the master database automatically (i.e. even before you have started the encryption process the row with the KeyName of ##MS\_DatabaseMasterKey## is returned). In this example, the two keys are based on the 256-bit AES encryption algorithm.

### **CREATE A CERTIFICATE**

Next, you need to create a certificate in the master database.

A SQL Server certificate is a digitally-signed, database-level securable binding public and private keys.

For demonstration purposes we are going to use a self-signed certificate – this is protected by the Database Master Key (DMK). However, you should typically use a certificate authority (CA) to issue and sign the certificate. This isn't covered here.

We will create the certificate as follows:

```
CREATE CERTIFICATE SYSPROCert
WITH SUBJECT = 'SYSPRO certificate'
```

Where **SYSPROCert** is the name of the certificate being created and 'SYSPRO certificate' is designed to be the certificate issuer name. For our purposes, we will use 'SYSPRO certificate'.

Once the CREATE CERTIFICATE statement has finished, we can verify that the certificate has been created using the sys.certificates view.

```
SELECT
   name CertName,
   certificate_id CertID,
   pvt_key_encryption_type_desc EncryptType,
   issuer_name Issuer
FROM sys.certificates
WHERE issuer_name = 'SYSPRO certificate'
```

Example output:

CertName	CertID	EncryptType	lssuer
SYSPROCert	258	ENCRYPTED_BY_MASTER_KEY	SYSPRO certificate

This confirms that SQL Server has used the Database Master Key (DMK) to encrypt the certificate.

### **CREATE THE DATABASE ENCRYPTION KEY (DEK)**

Now we are going to work with the SYSPRO databases.

You should repeat this process for each SYSPRO company database (don't forget the SYSPRO system-wide database).

Create the encryption key in your SYSPRO database.

```
USE SysproCompanyLive GO
```

CREATE DATABASE ENCRYPTION KEY WITH ALGORITHM = AES\_256 ENCRYPTION BY SERVER CERTIFICATE SYSPROCert

We specified to use the 256-bit AES encryption algorithm and the certificate named **SYSPROCert** used in the prior step.

You will receive the following warning:

Warning: The certificate used for encrypting the database encryption key has not been backed up. You should immediately back up the certificate and the private key associated with the certificate. If the certificate ever becomes unavailable or if you must restore or attach the database on another server, you must have backups of both the certificate and the private key or you will not be able to open the database.

The subject of key and certificate backup is covered later in this document (see: <u>Backing up Master</u> <u>and Private Keys and Certificates</u>).

We can verify the key by querying the sys.dm\_database\_encryption\_keys dynamic management view:

```
SELECT
DB_NAME(database_id) DbName,
encryption_state EncryptState,
key_algorithm KeyAlgorithm,
key_length KeyLength,
encryptor_type EncryptType
FROM sys.dm_database_encryption_keys
```

Example output:

DbName	EncryptState	KeyAlgorithm	KeyLength	EncryptType
SysproCompanyLive	1	AES	256	CERTIFICATE

Type CERTIFICATE confirms that a certificate was used to encrypt the Database Encryption Key (DEK).

The EncryptState value '1' means that the database is unencrypted.

Values can include:

Value	Description
0	No database encryption key present, no encryption
1	Unencrypted
2	Encryption in progress
3	Encrypted
4	Key change in progress
5	Decryption in progress
6	The certificate or asymmetric key encrypting the Database Encryption Key (DEK) isbeing changed

### ENABLE TDE ON THE SYSPRO DATABASE

Repeat the following for each SYSPRO database:

We recommend that you read the following Microsoft article about Transparent Data Encryption (TDE) for considerations and restrictions before using TDE.

https://docs.microsoft.com/en-za/sql/relational-databases/security/encryption/transparent-dataencryption?view=sql-server-2017

Ensure no one else is using, attempting to use, or backing-up the database.

Issue the following statement to encrypt the database:

## ALTER DATABASE SysproCompanyLive SET ENCRYPTION ON

For larger databases, this process can take a considerable time.

When completed we can query the sys.dm\_database\_encryption\_keys dynamic management view to see that the database encryption has a state of '3' – encrypted.

Example output:

DbName	EncryptState	KeyAlgorithm	KeyLength	EncryptType
tempdb	3	AES	256	ASYMMETRIC KEY
SysproCompanyLive	3	AES	256	CERTIFICATE

Note that when you implement TDE on any user table, SQL Server also encrypts the **tempdb** database.

This ensures that any temporary information, such as temporary user objects or internal objects (which can expose sensitive data) is also encrypted. This does mean that even if you encrypt a single SYSPRO database, all database access using the temporary database can be affected. However, according to Microsoft (and the SYSPRO benchmarks echo this) the overhead should be minimal.

From then onwards we can query, change data or transact against the TDE-encrypted database and everything will work seamlessly.

The database file itself is encrypted, along with the database log and all backup information.

### DISABLING TDE ON A SYSPRO DATABASE

If you decide to disable encryption on one or more SYSPRO databases, you can simply run the following SQL statement:

## ALTER DATABASE SysproCompanyLive SET ENCRYPTION OFF

You can verify that the encryption has been disabled by querying the sys.dm\_database\_encryption\_keys dynamic management view.

Example output:

DbName	EncryptState	KeyAlgorithm	KeyLength	EncryptType
tempdb	3	AES	256	ASYMMETRIC KEY
SysproCompanyLive	1	AES	256	CERTIFICATE

Note that even though all user databases are now unencrypted, the **tempdb** database is still encrypted. The temporary database **tempdb** will remain encrypted until it is re-created. This occurs when the **SQL Server (MSSQLSERVER)** service is restarted.

If you disable TDE on your SYSPRO database, you can drop the Database Master Key (DMK) and Database Encryption Key (DEK) using the following SQL statements.

The process to remove database encryption must have completed before using these statements:

DROP MASTER KEY DROP CERTIFICATE DROP DATABASE ENCRYPTION KEY

**Warning:** Even if your database is not encrypted, part of the transaction log may remain protected and the certificate may be needed for some operations until the full backup of the database is performed. In addition, the certificate will be needed to restore from the backups created at the time the database was encrypted. Only drop the certificate or encryption key when you are sure that they are no longer required.

### BACKING UP MASTER AND PRIVATE KEYS AND CERTIFICATES

It is critical that you backup and safely store your keys and certificates – preferably, immediately after you have created them and **before** you use them.

Failure to perform this adequately can lead to your database being unusable. In addition, you may be unable to restore a database from an encrypted backup.

### BACKUP A SERVICE MASTER KEY

To backup your Service Master Key (SMK) use the following SQL statement:

USE master GO

```
BACKUP SERVICE MASTER KEY
TO FILE = 'C:\BackupLocation\ServiceMasterKey.key'
ENCRYPTION BY PASSWORD = 'Pass1234!'
```

**Note**: You must use a full path when specifying the target backup file. This includes the file name and extension; otherwise, you may receive an error. If the file already exists, you will also receive an error.

### BACKUP UP A CERTIFICATE

You must backup the private key along with the certificate. Use the following SQL statement:

```
BACKUP CERTIFICATE SYSPROCert
TO FILE = 'C:\BackupLocation\SYSPROCert.cer'
WITH PRIVATE KEY(
  FILE = 'C:\BackupLocation\SYSPROCert.key',
  ENCRYPTION BY PASSWORD = 'Pass1234!'
)
```

This generates a file for both the certificate and private key, as well as providing a password for the private key.

Remember to store these files in a remote location separate from your database files – ensuring they are appropriately protected and that you have recorded the password used.

## Setting up Data Encryption in Motion using TLS

**Data Encryption in Motion** describes the technique of configuring SYSPRO and SQL Server so that all communication between SYSPRO and SQL is encrypted. This includes initial connection information, the issuing of SQL statements, and the actual data being passed to-and-from SQL Server.

Data Encryption in Motion ensures that eavesdroppers and hackers can't see what is transmitted. This is particularly useful for private and sensitive information, but also for all information sent between SYSPRO and SQL Server.

When setting up Data Encryption in Motion using TLS (Transport Layer Security) the process is:

- 1. Set up a certificate on you SQL Server and assign appropriate permissions.
- 2. Configure a SQL Server instance to use the certificate.
- 3. Configure SYSPRO to connect to the SQL Server instance using TLS.

The following screenshots were created from a system running Windows 10 and SQL Server 2017. In a real-world example, you would be using a Windows server operating system instead, so details, steps and screen images may differ.

The examples use the following names:

- SQL Server name: MSSSYSPRO8
- Domain name: sysproza.net
- Hostname: LEVIOUSD
- **Note:** At the time of creating this document (September 2019) the version of SYSPRO that supported TLS (SYSPRO 8 2020 R1) had not been made Generally Available (planned for GA during February 2020). However, the testing and benchmarking was completed with a pre-production version. The remainder of this topic continues as if SYSPRO 8 2020 R1 had already been released. If you require the capability described here, please contact your SYSPRO representative to investigate SYSPRO 8 2020 R1 when it becomes generally available.

### ADDING A CERTIFICATE USING MICROSOFT MANAGEMENT CONSOLE

The following steps demonstrate how to create a certificate using the Microsoft Management Console (MMC) and assign appropriate permissions:

**Note:** This must be performed on the Windows server on which SQL Server is running.

1. From Windows, open the Run dialog (Windows + R) and run MMC:

💷 Run	×
	Type the name of a program, folder, document, or Internet resource, and Windows will open it for you.
<u>O</u> pen:	MMC
	OK Cancel Browse

This opens the management console.

2. Select File > Add/Remove Snap-In... (Ctrl+M):



3. From the list of **Available snap-ins**, select **Certificates** and add to the list of **Selected snap-ins**.

terment ter	Vandan	~	Console Root	Edit Extensions
nap-in	Vendor		Console Root	Euri Extensions
🛓 ActiveX Control	Microsoft Cor			Remove
Authorization Manager	Microsoft Cor			
Certificates	Microsoft Cor			
Component Services	Microsoft Cor			Move Up
Computer Managem	Microsoft Cor			Mayo Dawa
Device Manager	Microsoft Cor		Add >	Move Down
<ul> <li>Disk Management</li> </ul>	Microsoft and			
Event Viewer	Microsoft Cor			
🖥 Folder	Microsoft Cor			
Group Policy Object	Microsoft Cor			
Internet Informatio	Microsoft Cor			
Internet Informatio	Microsoft Cor			
TD Committee Manitan	Microsoft Cor			Advanced

4. Select **Computer account** and **Next**.

Certificates snap-in	×
This snap-in will always manage certificates for: My user account Service account Computer account	
< <u>B</u> ack <u>N</u> ext >	Cancel

5. Select Local computer and Finish.

Select Computer	×
Select the computer you want this snap-in to manage. □ This snap-in will always manage: ④ Local computer: (the computer this console is running on)	
O Another computer: Browse	
Allow the selected computer to be changed when launching from the command line. This only applies if you save the console.	
	_
< Back Finish Cancel	

This adds the certificate on the Console Root.

6. Click **OK**.

Vendor	11	-		FULL EXTERNOOS
			Certificates (Local Compute	
Microsoft Cor			and the second s	Remove
Microsoft Cor				
Microsoft Cor				
Microsoft Cor				Move Up
Microsoft Cor				Mayo Dawa
Microsoft Cor		Add >		Move Down
Microsoft and		nud 2		
Microsoft Cor				Advanced
	Microsoft Cor Microsoft Cor	Microsoft Cor Microsoft Cor	Microsoft Cor Microsoft Cor	Microsoft Cor Microsoft Cor

7. From the **Console Root**, expand the **Personal** folder to view details:

Console1 - [Console Root\Certificates (Local Co	mputer)\Personal\Certificates]		_	
🚞 Console Root	Issued To	Issued By	E	xpiration Date
✓	192.168.56.1	192.168.56.1	0	7/17/2029
✓ <sup>™</sup> Personal	autorun8	Autorun8	0	8/28/2020
<ul> <li>Certificates</li> <li>Trusted Root Certification Authorities</li> </ul>	🛱 localhost	localhost	0	5/24/2024
> 📔 Enterprise Trust				
> 📔 Intermediate Certification Authorities				

You will then see a **Certificates** folder.

8. Right-click on Certificates and select All Tasks > Request New Certificate...



The **Certificate Enrollment** wizard is displayed.

9. Click Next at the Before You Begin dialog.



10. Click **Next** at the **Certificate Enrollment Policy** dialog.

	_		×
🙀 Certificate Enrollment			
Select Certificate Enrollment Policy			
Certificate enrollment policy enables enrollment for certificates based on predefined c Certificate enrollment policy may already be configured for you.	ertificate	e template	es.
Configured by your administrator			
Active Directory Enrollment Policy			~
Configured by you		Add N	ew
	Next	Can	cel

11. Select the **Computer** checkbox and click **Enroll**.

🗐 Ce	ertificate Enrollment		-		×
	Request Certificates				
	You can request the following ty click Enroll.	pes of certificates. Select the certificates you want to r	equest, a	and then	
	Active Directory Enrollment	Policy		Details	-
	SCOM Template	STATUS: Available required to enroll for this certificate. Click here to conf	figure se	Details v ttings.	-

This will take a few seconds.

12. Click **Finish** to complete the installation of the certificate.

		-		×
🔄 Certificate Enrollment				
Certificate Installation Re	sults			
The following certificates have b	een enrolled and installed on this computer.			
Active Directory Enrollment	Policy			
Computer	🖌 STATUS: Succeeded		Details	<b>~</b>
			Fin	ish

You will see the certificate with the **Issued To**, **Issued By** and **Expiration Date** information:

Sonsole1 - [Console Root\Certificates (Local Computer)\Personal\Certificates] X				
🔚 🚟 File Action View Favorites Window He	lp		_ 8 ×	
🗢 🔿 🙇 📷 🤞 👘 🔭			,,	
📔 Console Root	Issued To	Issued By	Expiration Date	
🗸 🖙 Certificates (Local Computer)	192,168,56,1	192,168,56,1	07/17/2029	
🗸 🚞 Personal	C Autorun8	Autorun8	08/28/2020	
Certificates	LEVIOUSD.sysproza.net	SYSPROCA	09/04/2020	
> C Enterprise Trust	2 Liocainost	localnost	05/24/2024	
> 📔 Intermediate Certification Authorities				
> Trusted Publishers				

The **Issued To** value is the fully qualified domain name (FQDN) and consists of the hostnamedot-domain name (in our example: **LEVIOUSD.sysproza.net**).

13. Right-click the newly issued certificate and select All Tasks > Manage Private Keys...

🚡 Console1 - [Console Root\Certificates (Local Computer)\Personal\Certificates] - 🗆 🗙					
🚟 File Action View Favorites Window He	🚡 File Action View Favorites Window Help				
🗢 🔿 🙇 🖬 🔏 🛍 🗙 🖼 🗟 🖬					
📔 Console Root	Issued To		Issued By		Expiration Date
✓ ☐ Certificates (Local Computer)	192.168.56.1		192.168.56.	1	07/17/2029
V Personal	🛱 Autorun8		Autorun8		08/28/2020
Certificates	LEVIOUSD.sysprom	not	SVSDBOCA	N Contraction of the second seco	09/04/2020
Enterprise Trust	🔄 localhost	Open	t		05/24/2024
Intermediate Certification Authorities		All Tasks	>	Open	
> 📔 Trusted Publishers		Cut		Paguast Cartificate w	th New Key
> iii Untrusted Certificates		Cut		Request Certificate w	In New Key
> Third-Party Root Certification Authorities		Сору		Renew Certificate wit	h New Key
Trusted People		Delete		Manage Private Keys.	
Client Authentication Issuers		Properties		Advanced Operations	
> Preview Build Roots		ropentes		Advanced operations	
> 🔛 Other People		Help		Export	
SIM Certification Authorities	-				

You will be prompted to assign permissions.

14. Select **Add** and then apply the required Users or Groups.

Permissions for LEVIOUSD.sy	/sproza.net priva	te keys 🛛 🗙
Security		
SYSTEM	Administrators)	
	Add	Remove
Permissions for SYSTEM	Allow	Deny
Full control Read Special permissions		
For special permissions or advanc click Advanced.	ced settings,	Advanced
ОК	Cancel	Apply

In the example shown, we are giving a specific SQL Instance named **MSSSYSPRO8** access to the newly created certificate.

First, we enter the object name (this requires you to type the full service name) then validate using the **Check Names** function. In our example the full service name is: **NT Service\MSSQL\$MSSSYSPR08** 

Select Users, Computers, Service Accounts, or Grou	ps X
Select this object type:	
Users, Groups, or Built-in security principals	Object Types
From this location:	
sysproza.net	Locations
Enter the object names to select (examples):	
NT Service\MSSQL\$MSSSYSPRO8	Check Names
Advanced	OK Cancel

If you don't know the service name, locate your Windows Services and select the SQL Server instance name, double-click or right-click and select **Properties**.



Under the General tab you can see the Service name. In this case: MSSQL\$MSSSYSPRO8

SQL Server (MSSSY	SPRO8) Properties (Local Computer)	×
General Log On	Recovery Dependencies	
Service name:	MSSQL\$MSSSYSPRO8	
Display name:	SQL Server (MSSSYSPRO8)	
Description:	Provides storage, processing and controlled access of data, and rapid transaction processing.	
Path to executable ''C:\Program Files\	e: Microsoft SQL Server\MSSQL14.MSSSYSPRO8\MSSQ	ı
Startup type:	Automatic ~	
Service status:	Running	
You can specify th from here.	e start parameters that apply when you start the service	
Start parameters:		
	OK Cancel Apply	

#### 15. Back to the **Select User and Groups** dialog.

Enter the object name (in this case the SQL Service name); validate it using the **Check Names** function; then click **OK**. When validated, it is shown underlined.

Select Users or Groups	×
Select this object type:	
Users, Groups, or Built-in security principals	Object Types
From this location:	
LEVIOUSD	Locations
Enter the object names to select (examples):	
MSSQL\$MSSSYSPRO8	Check Names
Advanced OK	Cancel

Next, we need to define the location.

16. Click on **Location** and select the computer hostname **LEVIUOSD** (as this is a local certificate not a domain certificate) and click **OK**.

Locations	×
Select the location you want to search.	
Location:	
-	OK Cancel

At this stage, we have defined valid Location and Object names, so click **OK**.

Select Users or Groups	×
Select this object type:	
Users, Groups, or Built-in security principals	Object Types
From this location:	
LEVIOUSD	Locations
Enter the object names to select (examples):	
MSSQL\$MSSSYSPRO8	Check Names
1	
Advanced	OK Cancel

17. Ensure that the permissions allow **Full control** and click **OK**.

Group or user names:		
SYSTEM	( decision (	
MSSQL\$MSSSYSPRO8	Administrators (	
	Add	Remove
Permissions for MSSQL\$MSSSYSPRO8	Allow	Deny
Full control	$\checkmark$	
Read Special permissions		
For special permissions or advan click Advanced.	ced settings,	Advanced

You have now configured the certificate ready for use.

### CONNECTING TO SSMS USING THE CERTIFICATE

Once you have created a certificate and set up access control, you can connect to SQL Server Management Studio (SMSS) using the fully qualified domain name and SQL Server name.

 Run SQL Server Management Studio and select your SQL Server Instance. You must use the fully qualified SQL Server instance name. For example:

모 <sup>를</sup> Connect to Server		×					
	SQL Server						
Server type:	Database Engine	~					
Server name:	LEVIOUSD.sysproza.net\MSSSYSPRO8						
Authentication:	SQL Server Authentication	$\sim$					
Login:	sa	$\sim$					
Password:							
Remember password							
	Connect Cancel Help Option	s >>					

You are then connected to your SQL Server instance:

2,	Microsoft SQL Server Management Studio
File	Edit View Debug Tools Window Help
	3 - 〇  裕 - ~ 二 - ~ 二 🎬 📲   🎒 New Query 🏮 🕅 🕅 👭 🕅 🎧   月
Tool	Object Explorer 🔹 부 🗙
box	Connect 🕶 🛱 🎽 🛒 🖒 🧄
	🖃 🔀 LEVIOUSD.sysproza.net\MSSSYSPRO8 (SQL Server 14.0.2027.2 - sa)
	🕀 📃 Databases
	🕀 💼 Security
	Server Objects
	Epication
	🗄 🔜 PolyBase
	Always on High Availability
	XEvent Profiler

2. To confirm that a SQL Server connection is encrypted, see the topic later in this document: <u>How can I verify that a SQL Server connection is encrypted?</u>

### VERIFY YOU HAVE A DRIVER NAMED: ODBC DRIVER 17 FOR SQL SERVER

Check that you have installed the appropriate ODBC Driver. In our example, we are using **ODBC Driver 17 for SQL Server**.

In a 3-tier environment (where SQL Server and the SYSPRO Application server are different servers) you may have to install the ODBC Driver 17 for SQL Server manually on the SYSPRO application server.

To check the available ODBC drivers:

- 1. From your SYSPRO Application server, use Windows to find and run the application: **ODBC Data Sources (64-bit)**.
- 2. Select the **Drivers** tab.

In the following example, the driver named **ODBC Driver 17 for SQL Server** has been installed:



3. If the driver isn't displayed, search the web to locate and download it. See the following link: <u>https://www.microsoft.com/en-us/download/details.aspx?id=56567</u>

### CONFIGURING SYSPRO TO CONNECT TO SQL SERVER USING TLS

The last step is to set up SYSPRO to connect to the SQL Server instance that was configured and enable a secure connection.

1. Login to SYSPRO as a system administrator:

SYSPRO		- [	×
SYSPRO <sup>-</sup>	8		
User name			
ADMIN			~
ADMIN - SYSPRO Adm	inistrator		
Password			
************			
Company LIVE Company password			√ Q
******			
	Login		
Forgot password?	View users	Exit	SYSPRO
Program protected	d as described in Help	About SYSF	RO

- 2. From the SYSPRO menu, run the **System Setup** program (*Ribbon bar: Setup* > *General Setup* > *System Setup*) and select the **Database** tab.
- 3. At the **SQL Server name** caption, enter the fully qualified SQL Server instance name.
- 4. Select the **ODBC Driver 17 for SQL Server** driver.

5. Select the **Encrypted connection string** checkbox and ensure that the **Self-signed server certificate** checkbox is unchecked.

System Setup Save and Exit Configure e.net License Edit Client Confi Database	guration				- □ × *
Rules Engine/Harmony Artificial Intelligence Email/SMTP	settings	Password definition	n Avanti	Multi-Factor Authenticat	ion Single Sign-On
General Login Dialog Database × Date Format	Folder	rs Reporting	Espresso	E.Net Service Details	Office Integration
<ul> <li>Database connection</li> <li>Authentication</li> </ul>		<ul> <li>SQL authentication</li> <li>Windows authentication</li> </ul>			
SQL Server name		LEVIOUSD.sysproza.net\MSSSYSPRO8			
SQL Driver to use		ODBC Driver 17 for SQL Server			
Encrypted connection string					
Self-signed server certificate					
MultiSubNetFailover property					

6. Save and Exit SYSPRO.

When next you login to SYSPRO, it will be connecting using the Encryption in Motion (TLS) technology.

## Troubleshooting

The following answers common questions relating to SYSPRO and SQL Server encryption.

### IF I HAVE PROBLEMS CAN I UNDO THE SECURE CONNECTION?

If you have configured your SYSPRO **System Setup** to use a secure connection, but then find that you are no longer able to login to SYSPRO because the SQL connection has failed, you can manually override the secure connection. This allows you to fix the problem and re-enable the secure connection later.

- **Warning**: Take care when editing your IMPACT.INI file manually. Preferably, backup or copy the file before changing it. Some combinations of settings may be invalid and cause further connection issues. You should only edit the IMPACT.INI when necessary.
  - 1. Locate your IMPACT.INI file in the SYSPRO application server WORK folder.

The entry that starts SQLCSO= contains information relating to the SQL Server driver, encryption and failover settings. In the examples used earlier, the IMPACT.INI file was as follows:

```
[Database Settings]
SQLLGN=SQLSERVER
SQLSSN=LEVIOUSD.sysproza.net\MSSSYSPR08
SQLDBN=Syspro80db
SQLADM=U4sJt5orj8qIxs0zfCMU8RL+ogjzQjYIHT0r8KcILjXLsLUIA30vwX+BDec/
SQLSTD=htbZS++x3aLRVdMOPSd8HqK6/yQQMy1Fhh5ltZgzyMwWKZXogtrd958p2g6f
SQLBLK=C:\Temp
SOLCPG=01252
SQLCSO=2,1,0,0
; End of IMPACT.INI
```

The first digit of the **sqlcso=** entry represents the **SQL Driver to use** setting:

- 0 SQL Server
- 1 ODBC Driver 13 for SQL Server
- 2 ODBC Driver 17 for SQL Server

The second digit stores the **Encrypted connection string** option:

- 0 Unchecked (no encryption)
- 1 Checked (encrypted)

#### The third digit stores the **Self-signed server certificate** option:

- 0 Unchecked (requires provided certificate)
- 1 checked (no certificate provided less secure)

The fourth digit is the **MultiSubNetFailover property** (and is not discussed in this document):

0 – Unchecked

1 – Checked

If you are having problems connecting to SQL Server once you have enabled the **Encrypted connection string** option in the **System Setup** program, you can edit your IMPACT.INI file and change the SQLCSO entry to:

SQLCSO=2,0,0,0

Save the IMPACT.INI file and immediately attempt to login to SYSPRO as normal.
 Once you can login successfully you should use the System Setup program to make any subsequent changes to your setup options rather than edit this file directly.

### HOW CAN I VERIFY THAT A SYSPRO DATABASE IS ENCRYPTED?

SYSPRO contains a SQL Health Dashboard that lets you view various aspects of SYSPRO and SQL Server.

From SYSPRO 8 2020 R1, the SQL Health Dashboard (*Ribbon bar: Administration > SQL Health Dashboard*) shows whether the selected SYSPRO database is encrypted using Transparent Data Encryption (TDE).

Select the required database, view the Database Details and look for the TDE encryption status as shown below (in this example the database is not encrypted).

🛃 SQL Health Dashboard				
<b>]</b> ∂Refresh				
SYSPRO Databases		Database Details		
Company Name	Database	Repair Issues		
System System database	Syspro80db	Auto create statistics	$\checkmark$	^
EDU1 The OUTDOORS Compa	ny Syspro80Edu1	Auto update statistics	$\checkmark$	
		Status	ONLINE	
		Read only		
		Last full backup	2019/09/27 13:15:39.000	- 11
		Last log backup	2019/09/27 13:15:39.000	
		TDE encryption status	No database encryption key present, no encryption	
				~

### HOW CAN I VERIFY THAT A SQL SERVER CONNECTION IS ENCRYPTED?

SYSPRO contains a SQL Health Dashboard that lets you view various aspects of SYSPRO and SQL Server.

From SYSPRO 8 2020 R1, the SQL Health Dashboard (*Ribbon bar: Administration* > *SQL Health Dashboard*) shows whether the current SQL connection is encrypted.

View the **SQL Instance Information** tab and look for the connection information, as shown below:

SQL Instance Information			
Instance name	RUSSELLH		
SQL Version	Microsoft SQL Server 2016 (RTM-GDR) (KB4019088) - 13.0.1742.0 (X64) Jul 5 2017 23:41:17		
Collation	Latin1_General_BIN		
Minimum server memory (MB)	0		
Maximum server memory (MB)	1,147,483,647		
Logical processors (CPU)	4		
Physical memory (MB)	16,048		
Date SQL started	2019/08/23 14:18:42.940		
Connection time (seconds)	0.03		
Connection driver	ODBC Driver 17 for SQL Server		
Connection encrypted	TRUE		
Connection protocol	ТСР		

In addition, you can use SQL Server Management Studio (SMSS) to query the current connection status of any process.

For example, you can run the following SQL statement using SMSS to identify each SYSPRO process connected to SQL Server and return whether it's using an encrypted connection and which ODBC driver is being used.

```
SELECT
   a.connect_time,
   a.session_id,
   b.login_name,
   b.program_name,
   a.connect_time,
   a.net_transport as Connect_Protocol,
   a.encrypt_option as Encrypted_Connection,
   a.auth_scheme,
   a.protocol_type,
   CASE SUBSTRING(CAST(a.protocol_version as binary(4)),1,1)
      WHEN 0x71 then 'SQL Server Driver'
      WHEN 0x74 then 'ODBC Driver nn for SQL Server'
      ELSE 'Unknown'
   END as Driver Used
FROM sys.dm_exec_connections a
left join sys.dm_exec_sessions b ON (a.session_id = b.session_id)
WHERE b.program_name IN ('SYSPRO')
```

Example results:

	connect_time	session_id	login_name	program_name	connect_time	Connect_Protocol	Encrypted_Connection	auth_scheme	protocol_type	Driver_Used
1	2019-09-05 12:00:47.413	53	syspro	SYSPRO	2019-09-05 12:00:47.413	TCP	TRUE	SQL	TSQL	ODBC Driver nn for SQL Serve
2	2019-09-05 14:31:57.233	101	sa	SYSPRO	2019-09-05 14:31:57.233	TCP	FALSE	SQL	TSQL	SQL Server Driver
	2019-09-05 13:45:31.690	103	syspro	SYSPRO	2019-09-05 13:45:31.690	TCP	TRUE	SQL	TSQL	ODBC Driver nn for SQL Serve
	2019-09-05 14:59:53.730	107	syspro	SYSPRO	2019-09-05 14:59:53.730	TCP	TRUE	SQL	TSQL	ODBC Driver nn for SQL Serve
	2019-09-05 15:24:44.130	108	syspro	SYSPRO	2019-09-05 15:24:44.130	TCP	TRUE	SQL	TSQL	ODBC Driver nn for SQL Serve
	2019-09-05 15:24:44.283	109	syspro	SYSPRO	2019-09-05 15:24:44.283	TCP	TRUE	SQL	TSQL	ODBC Driver nn for SQL Server

Note: The Encrypted\_Connection column shows whether the SYSPRO connection to SQL Server is encrypted. In this example (used to demonstrate SQL Encryption) we have a combination of SYSPRO 7 and SYSPRO 8 users connected to the same SQL Server instance. The SYSPRO 7 connection is the one shown as FALSE under the Encrypted\_Connection column.



#### AFRICA

SYSPRO South Africa Block A Sunninghill Place 9 Simba Road Sunninghill Johannesburg 2191 South Africa Tel: +27 (0) 11 461 1000 Email: info@za.syspro.com

#### **SYSPRO South Africa**

Block A Lagoon Beach Office Park Cnr Marine & Boundary Rd Milnerton Cape Town 7435 South Africa Tel: +27 (0) 21 552 2220 Email: info@za.syspro.com

#### **SYSPRO South Africa**

4 Nollsworth Crescent Nollsworth Park La Lucia Ridge La Lucia Durban North 4019 South Africa Tel: +27 (0) 31 566 4240 Email: info@za.syspro.com

#### **SYSPRO East Africa**

Ground Floor – Office No.1 E Panari Sky Centre Mombasa Road Nairobi Kenya Tel: +254 720 909 644 +254 720 909 530 Email: info@za.syspro.com

#### ASIA-PACIFIC

SYSPRO Australia Suite 1102, Level 12 201 Miller Street North Sydney NSW 2060 Australia Tel: +61 (2) 9870 5555 Toll free: +1 300 882 311 Email: info@au.syspro.com

#### SYSPRO Australia

1/14 Business Park Drive Notting Hill Victoria Melbourne 3168 Australia Tel: +1300 882 311 E-mail: info@au.syspro.com

#### SYSPRO Asia

8 Eu Tong Sen Street #19-91 The Central Singapore 059818 Tel: +65 6256 1921 E-mail: info@sg.syspro.com

#### CANADA

SYSPRO Canada 4400 Dominion Street Suite 215 Burnaby Vancouver British Columbia Canada V5G 4G3 Tel: +1 (604) 451 8889 Toll free: +1 888 259 6666 Email: info@ca.syspro.com

#### SYSPRO Canada

5995 Avebury Road Suite 902 Mississauga Toronto Ontario Canada L5R 3P9 Tel: +1 905 502 5502 Email: info@ca.syspro.com

#### SYSPRO Canada

6080 Young Street Suite 1002 Halifax Nova Scotia Canada B3K 5L2 Tel: +1 902 423 1256 Toll free: +1 866 979 7776 Email: info@ca.syspro.com

#### EUROPE

SYSPRO United Kingdom Baltimore House 50 Kansas Avenue Salford Quays Manchester United Kingdom M50 2GL Tel: +44 161 876 4498 Email: info@uk.syspro.com

#### USA

SYSPRO USA and Americas 959 South Coast Drive Suite 100 Costa Mesa California 92626 USA Tel: +1 (714) 437 1000 Toll free: +1 800 369 8649 Email: info@us.syspro.com

#### www.syspro.com

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