## USE MSSQL AS PRODUCT DATABASE

## 1. Install MSSQL

As per wso2 documentation WSO2 APIM only Microsoft SQL Server 2017. Tested with MSSQL Server 2022 too.

Ref:

https://apim.docs.wso2.com/en/4.0.0/install-and-setup/setup/reference/product-compatibi lity/#api-m-runtime-compatibility

1.1 Windows environment

- Download and install SQL Server from
   <u>https://www.microsoft.com/en-us/sql-server/sql-server-downloads</u>
- Once the installation is completed, install Microsoft SQL Server Management Studio (Microsoft SSMS)

1.2 Linux environment

https://learn.microsoft.com/en-us/sql/linux/quickstart-install-connect-ubuntu?view=sql-ser ver-ver16

2. Download the latest mssql jdbc driver and put it inside <pack>/repository/components/lib

Can be downloaded here.

https://learn.microsoft.com/en-us/sql/connect/jdbc/download-microsoft-jdbc-driver-for-sql -server?view=sql-server-ver16

Tested driver: mssql-jdbc-12.4.1.jre8.jar

- 3. Create a new database for device management in your mysql database
  - 3.1 Windows environment

Enable TCP/IP protocols

• Open SQL Server Configuration Manager



Enable TCP/IP and disable Named Pipes from all protocols



 Double click TCP/IP to open the TCP/IP properties window and set Listen All to Yes on the protocol tab

1100	ocorrane	Status			
TCP,	/IP Properties			?	$\times$
Pro	tocol IP Addresses				
G	General				
	Enabled	Ye	es		
	Keep Alive	30	0000		
	Listen All	Ye	es		

• On the IP Address tab, disable TCP Dynamic Ports by leaving it blank and give a valid TCP Port, so that Microsoft SQL server will listen on that port

_	IP1	
	Active	Yes
	Enabled	No
	IP Address	fe80::428c:46d5:7c85:b2a4%8
	TCP Dynamic Ports	
	TCP Port	1433
Θ	IP10	
	Active	Yes
	Enabled	No
	IP Address	127.0.0.1
	TCP Dynamic Ports	
	TCP Port	1433
Ξ	IP2	
	Active	Yes
	Enabled	No
	IP Address	169.254.75.25
	TCP Dynamic Ports	
	TCP Port	1433
Θ	IP3	

## Restart Microsoft SQL server

Create the database and user

• Open Microsoft SQL Server Management Studio and connect to SQL server

교 <sup>문</sup> Connect to Server		×		
SQL Server				
Server type:	Database Engine	~		
Server name:	DESKTOP-KG1FCBI	~		
Authentication:	Windows Authentication	$\sim$		
User name:	DESKTOP-KG1FCBI\ravin	$\sim$		
Password:				
	Remember password			
	Connect Cancel Help Op	tions >>		

 Right click on Databases option in Object Explorer in left corner and create databases DM\_DB, APPM\_DB, APIM\_DB & SHARED\_DB



 Right click on Security > Logins option in Object Explorer and create a new user to access DM\_DB, APPM\_DB, APIM\_DB & SHARED\_DB



- Note: When creating a user make sure to untick the below options
  - 1. Enforce Password Policy
  - 2. Enforce Password Expiration
  - 3. User must change password at next login

Login name:	root1			Search
O Windows authentication				
SQL Server authentication				
Password:	•••••			
Confirm password:	•••••			
Specify old password				
Old password:				
Enforce password policy	/			
Enforce password expira	ation			
User must change pass	word at next login			
<ul> <li>Mapped to certificate</li> </ul>			$\sim$	
<ul> <li>Mapped to asymmetric key</li> </ul>			$\sim$	
Map to Credential			$\sim$	
Mapped Credentials	Credential	Provider		
			[	Remove
Default database:	DM_DB		~	
Default language:	English - us_english		~	
	Login name: Windows authentication SQL Server authentication Password: Confirm password: Specify old password Old password: Enforce password expira User must change pass Mapped to certificate Mapped to asymmetric key Map to Credential Mapped Credentials Default database: Default language:	Login name:       root1         Windows authentication       SQL Server authentication         Password:       ••••••••••••••••••••••••••••••••••••	Login name:       root1         Windows authentication       Password:         Password:       ••••••••••••••••••••••••••••••••••••	Login name:       root 1         Windows authentication <ul> <li>SQL Server authentication</li> <li>Password:</li> <li>Confirm password:</li> <li>Specify old password</li> <li>Old password:</li> <li>Enforce password policy</li> <li>Enforce password expiration</li> <li>User must change password at next login</li> <li>Mapped to certificate</li> <li>Mapped to asymmetric key</li> <li>Mapped Credential</li> <li>Credential</li> <li>Provider</li> </ul> Default database:         DM_DB            Default database:         DM_DB

• Click on User mapping option in Login Properties of the user and tick before DM\_DB, APPM\_DB, APIM\_DB & SHARED\_DB.

• • • • • • • • • • • • • • • • • • • •							
Select a page 🎾 General	🖵 Script	👻 😯 Help					
<ul> <li>Server Roles</li> <li>User Mapping</li> </ul>	Users ma	Users mapped to this login:					
Securables	Map	Database	User	Default Schema	3		
> Status	$\checkmark$	APPM_DB	root 1				
		DM_DB	root 1				
		master					
		model					
		msdb					
		tempdb					
		test					
Connection			NA D2				
Connection Server: DESKTOP-KG1FCBI\MSSQLS	Gues Gues	st account enabled for: D se role membership for: D	M_DB				
Connection Server: DESKTOP-KG1FCBI\MSSQLS Connection: DESKTOP-KG1FCBI\vavin	SER Databas	st account enabled for: D se role membership for: D accessadmin packupoperator	M_DB M_DB				
Connection Server: DESKTOP-KG1FCBI\MSSQLS Connection: DESKTOP-KG1FCBI\ravin Y Mew connection propertier	SER Databas	st account enabled for: D se role membership for: D accessadmin backupoperator datareader	M_DB M_DB				
Connection Server: DESKTOP-KG1FCBI\MSSQLS Connection: DESKTOP-KG1FCBI\vavin Y View connection properties	Gues Ger Databas db_d db_d db_d db_d	st account enabled for: E se role membership for: D accessadmin backupoperator datareader datareine	M_DB M_DB				
Connection Server: DESKTOP-KG1FCBI\MSSQLS Connection: DESKTOP-KG1FCBI\ravin Y View connection properties	Gues GER Databas db_d db_d db_d db_d db_d db_d db_d db_	st account enabled for: D e role membership for: D accessadmin backupoperator datareader datawriter ddladmin denvdatareader	M_DB M_DB				
Connection Server: DESKTOP-KG1FCBI\MSSQLS Connection: DESKTOP-KG1FCBI\ravin Y# View connection properties	Gues GER Databas db_a db_d db_d db_d db_d db_d db_d db_d	st account enabled for: D se role membership for: D accessadmin backupoperator datareader datawriter datladmin denydatareader denydatawriter	M_DB M_DB				
Connection Server: DESKTOP-KG1FCBI\MSSQLS Connection: DESKTOP-KG1FCBI\vavin YT View connection properties	SER Databas	st account enabled for: D accessadmin backupoperator datareader datawitter datladmin denydatareader denydatawiter bwner	M_DB M_DB				
Connection Server: DESKTOP-KG1FCBI\MSSQLS Connection: DESKTOP-KG1FCBI\vavin Y <sup>III</sup> View connection properties View connection properties Progress Ready	SER Databas db_a db_d	st account enabled for: D accessadmin backupoperator datareader datawriter ddladmin denydatareader denydatawriter bwner securityadmin ic	M_DB M_DB				

• Right click on the database server and go to properties. Select Security page. And Select option SQL server and Windows Authentication mode under server authentication section

Server Properties - DESKTOP-	TQGACP7	_		$\times$
Select a page General	⊥ Script 👻 😧 Help			
<ul> <li>Memory</li> <li>Processors</li> <li>Security</li> <li>Connections</li> <li>Database Settings</li> <li>Advanced</li> <li>Permissions</li> </ul>	Server authentication			
	<ul> <li>None</li> <li>Failed logins only</li> <li>Successful logins only</li> <li>Rath failed and successful logins</li> </ul>			
Connection	Even raised and succession logins  Server proxy account  Proxy account:  Proxy account:  Proxy account:  Proxy account:  Proxy account:  Proxy account:  Proxy account: Proxy account			
Server: DESKTOP-TQGACP7	Options			
Connection: DESKTOP-TQGACP7\Gajoothren	Enable Common Criteria compliance     Enable C2 audit tracing			
YT view connection properties	Cross database ownership chaining			
Progress				
Ready				
		ОК	Can	cel

Grant permission to user

 Write click on DM\_DB and select new Query and execute the following command to give access to the created user. Do the same for all other dbs too. USE DM\_DB;

> SET ANSI\_PADDING OFF GO

GRANT INSERT, UPDATE, SELECT, DELETE TO <root1>;

In here root1 is the user

## 3.2 Linux environment

 Connect to mssql db using sqlcmd sqlcmd -U sa -P {PASSWORD}

Note:-

There can be a error occurring like below:

Sqlcmd: Error: Microsoft ODBC Driver 18 for SQL Server : SSL Provider: [error:1416F086:SSL routines:tls\_process\_server\_certificate:certificate verify failed:self signed certificate]. Sqlcmd: Error: Microsoft ODBC Driver 18 for SQL Server : Client unable to establish connection. For solutions related to encryption errors, see https://go.microsoft.com/fwlink/?linkid=2226722.

Use sqlcmd -U sa -P {PASSWORD} -C to overcome.

- Create databases for DM\_DB, APPM\_DB CREATE DATABASE DM\_DB; CREATE DATABASE APPM\_DB; CREATE DATABASE APIM\_DB; CREATE DATABASE SHARED\_DB;
- 4. Create tables in the database
  - Go to <pack>/dbscripts/cdm/ (as for application management db, the path is <pack>/dbscripts/cdm/application-mgt) and execute the mssql.sql in the database you created at step 3.

DM_DB	<ul> <li><pack>/dbscripts/cdm/mssql.sql</pack></li> <li><pack>/dbscripts/cdm/plugins/android/mssql.sql</pack></li> <li><pack>/dbscripts/cdm/plugins/ios/mssql.sql</pack></li> <li><pack>/dbscripts/cdm/plugins/windows/mssql.sql</pack></li> </ul>
APPM_DB APIM_DB SHARED_DB	<ul> <li><pack>/dbscripts/cdm/application-mgt/mssql.sql</pack></li> <li><pack>/dbscripts/apimgt/mssql.sql</pack></li> <li><pack>/dbscripts/mssql.sql</pack></li> </ul>

- 4.1 Windows environment
  - Open SSMS
  - Right click on the DM\_DB and select New query. Then copy paste the DM\_DB sql script and execute it. (as for application management db, the path is <pack>/dbscripts/cdm/application-mgt)
  - Do the same for APPM\_DB, APIM\_DB & SHARED\_DB
- 4.2 Linux environment
  - Can use this command to run mssql script file
     sqlcmd -U root -P root -i {FILE\_PATH}/mssql.sql
- 5. Add database configs to <pack>/repository/conf/deployment.toml
  - Add configs for device\_mgt, app\_mgt, device\_mgt\_plugins, APIM\_DB and SHARED\_DB (User\_mgt & Registry tables are added to same SHARED\_DB)

```
[database.device_mgt]
type = "mssql"
url =
"jdbc:sqlserver://localhost:1433;databaseName=DM_DB;SendStringParametersAsUnicode=false;
encrypt=true;trustServerCertificate=true;"
username = "root"
password = "root"
[database.app_mgt]
type = "mssql"
url =
"jdbc:sglserver://localhost:1433;databaseName=APPM_DB;SendStringParametersAsUnicode=fal
se;encrypt=true;trustServerCertificate=true;"
username = "root"
password = "root"
[database.android]
type = "mssql"
url =
"jdbc:sqlserver://localhost:1433;databaseName=DM_DB;SendStringParametersAsUnicode=false;
encrypt=true;trustServerCertificate=true;"
username = "root1"
password = "root1"
driver = "com.microsoft.sqlserver.jdbc.SQLServerDriver"
[database.ios]
type = "mssql"
url =
"jdbc:sqlserver://localhost:1433;databaseName=DM_DB;SendStringParametersAsUnicode=false;
encrypt=true;trustServerCertificate=true;"
username = "root1"
password = "root1"
driver = "com.microsoft.sqlserver.jdbc.SQLServerDriver"
[database.windows]
type = "mssql"
url =
"jdbc:sqlserver://localhost:1433;databaseName=DM_DB;SendStringParametersAsUnicode=false;
encrypt=true;trustServerCertificate=true;"
username = "root1"
password = "root1"
driver = "com.microsoft.sqlserver.jdbc.SQLServerDriver"
[database.apim db]
type = "mssql"
url =
"jdbc:sqlserver://localhost:1433;databaseName=APIM_DB;SendStringParametersAsUnicode=fals
e;encrypt=true;trustServerCertificate=true;"
```

```
username = "root1"
password = "root1"
driver = "com.microsoft.sqlserver.jdbc.SQLServerDriver"
validationQuery = "SELECT 1"
[database.shared_db]
type = "mssql"
url =
"jdbc:sqlserver://localhost:1433;databaseName=SHARED_DB;SendStringParametersAsUnicode
=false;encrypt=true;trustServerCertificate=true;"
username = "root1"
password = "root1"
driver = "com.microsoft.sqlserver.jdbc.SQLServerDriver"
validationQuery = "SELECT 1"
```

6. Start the pack

Windows	<ul> <li>Open iot-server.bat</li> </ul>
Linux	<ul> <li>iot-server.sh start</li> </ul>