

Data Management for ViPER Anlytx

Abstract:

This knowledge base article provides comprehensive guidance on effectively managing the SQL Server database, central to the ViPER system's functionality. This document covers crucial aspects such as backing up and restoring the VPTData database, ensuring data integrity and recoverability. Additionally, it includes steps for migrating the SQL Server and associated database to a network environment, streamlining access and scalability.

Applicability:

This document is designed for users of the ViPER system who are responsible for the administration and maintenance of the underlying SQL Server database. It is particularly relevant for individuals seeking to:

- Implement a data management strategy for the ViPER system.
- Understand the fundamentals of backing up and restoring data for ViPER.
- Migrate the SQL Server and server database to a network environment for enhanced accessibility and scalability.

Users should possess a basic understanding of SQL Server Management Studio (SSMS) and general database management concepts before applying the information provided in this article.

I. Introduction to ViPER Data Storage

The ViPER System relies on a robust data management system powered by Microsoft SQL Server. At its core, this system revolves around a database typically set as **VPTData**. Understanding the fundamentals of how ViPER manages data in this database is essential for effectively harnessing its capabilities. In the instance of a disaster recovery event, the SQL server database must be backed up and restored. It is the responsibility of the customer to implement a database backup procedure.

What is a SQL Database?

An SQL (Structured Query Language) database is a relational database management system used for storing, retrieving, and managing structured data. Unlike the SoloVPE and Kinetics software flat files (.BVP, .MVP, .BKN, etc.), a type of Cary WinUV file that exists in a folder on the PC and contains VPT system activity, SQL databases organize information into tables with defined relationships, allowing for querying and manipulation.

Tools for Database Management

1. **ViPER DB Backup Application (optional)** - The ViPER DB Backup Application is an in-house developed tool tailored for the ViPER System. It allows automation of the backup process of the SQL Server database, offering users the capability to set the frequency and scheduling of backups.
2. **Microsoft SQL Server Management Studio** - Microsoft SQL Server Management Studio, commonly referred to as SSMS, is a comprehensive integrated environment for managing SQL Server databases. It enables tasks such as database design, querying, administration, and maintenance.
3. **DB Browser for SQLite (or a similar application)** - DB Browser for SQLite is an open-source tool designed for creating, designing, and managing SQLite databases. It allows users to perform tasks such as viewing, editing, and executing SQL queries.

II. Backing Up Your Data

Efficient data management begins with a robust backup strategy. This section explains the critical aspects of backing up the VPTData SQL database, ensuring the safety and accessibility of your valuable information.

Understanding the Importance of Backups

Regular backups are the cornerstone of data security and recovery. They act as a safety net, allowing you to restore your database to a previous state in case of unexpected events, such as hardware failures, data corruption, or human errors. Without backups, the risk of permanent data loss is significantly higher.

Performing a Full Backup

A full backup captures the entirety of the database at a specific point in time, providing a comprehensive snapshot of all stored data. This type of backup is essential for creating a baseline for recovery.

There are two common methods to performing a full backup:

1. Utilize the ViPER backup program. For more information on this program, please see *CTech™ ViPER™ ANLYTX Software SQL Server Backup Procedure KB22002*.
2. Utilize the backup capabilities of Microsoft SQL Server Management Studio. If performing your backup through this application, follow these steps:
 1. Launch SQL Server Management Studio (SSMS) and connect to the database server with the proper credentials. If you do not know the credentials to connect to your database, please reach out to Repligen Process Analytics Support team at analytics-support@repligen.com.
 2. Navigate to the Object Explorer and locate the Databases node.
 3. Right-click on the VPTData database and select Tasks > Back Up...
 4. In the Back Up Database window, select Full under Backup type.
 5. Specify the destination for the backup file and provide a meaningful name.
 6. Review the settings and click OK to initiate the backup process. This will create a .BAK file in the location you chose.

Automating Backups

To streamline the backup process and ensure consistency, consider automating regular backups.

One method to automate your backups is to use the ViPER backup program. For more information on automating backups with the ViPER backup program, please refer to Step 6. in *CTech™ ViPER™ ANLYTX Software SQL Server Backup Procedure KB22002*. It should be noted that this method will only create .BAK files on your local PC. It is advised to copy these files to a secure location, like a network drive.

Another method is to create your own scheduler to perform the automated backups at regular intervals. The steps to do this include:

1. Creating a Backup Script:
 - a. Open a text editor (like Notepad) and create a backup script.
 - b. The script should include SQLCMD command to perform a full backup of the VPTData database. For example:

```
sqlcmd -S ServerName\InstanceName -U Username -P Password -Q "BACKUP DATABASE [VPTData] TO DISK = N'C:\BACKUP\VPTData.bak'"
```

- c. Save the document with a .bat extension (ex., AutomatedBackup.bat).
2. Setting Up Windows Task Scheduler:
 - a. Open the Windows Task Scheduler.
 - b. Create a new task and specify a name and description.
 - c. In the Triggers tab, set the schedule (ex., daily, weekly) for the automated backup.
 - d. In the Actions tab, create a new action and select the AutomatedBackup.bat file as the program/script to run.
3. Configure Security Credentials
 - a. Ensure that the account running the task has the necessary permissions to access and back up the database.

III. Restoring the Database

This section outlines the steps for restoring the database, whether it's on the same PC, a new PC, or a virtual machine.

Restoring to the Same PC

Restoring the database to the same PC involves retrieving a previously backed-up version of the database and reinstating it to its original location.

If you are using the ViPER backup program, see the section entitled, "How to Restore the SQL Server Database" in *CTech™ ViPER™ ANLYTX Software SQL Server Backup Procedure KB22002* for more information on restoring the database from the .bak file.

Otherwise, follow these steps:

1. Launch SQL Server Management Studio (SSMS) and connect to the database server with a sys_admin account (ex. using the 'sa' username and password).
2. Navigate to the Object Explorer and locate the Databases node.
3. Right-click on the VPTData database and select Tasks > Restore > Database....
4. In the General page of the Restore Database window, select Device under the Source section.
5. Click the ellipses (...) button to browse for the backup file.
6. Select the relevant backup file (ex. VPTData.bak) and click OK.
7. Back in the General page, ensure the To database field is set to VPTData.
8. Review the settings and click OK to initiate the restoration process.

Restoring to a New PC

When moving to a new PC, it's essential to transfer the database backup file and perform the restoration process to maintain your existing data and settings. However, due to PC-tied aspects of the software, the steps are slightly altered.

Steps to Restore on the New PC:

1. Installing ViPER and SQL Server Express

If needed, Repligen Support will assist remotely in installing the appropriate software packages on the new computer. This includes the ViPER Package and SQL Server Express software, along with setting up the SQL server.

2. Restoring the Database in Microsoft SQL Server Management Studio

- a. Navigate to the Object Explorer and locate the Databases node.
- b. Right-click on the Databases node and select Restore Database....

- c. In the General page of the Restore Database window, select Device under the Source section.
- d. Click the ellipses (...) button to browse for the backup file.
- e. Select the relevant backup file (ex. VPTData.bak) and click OK.
- f. Review the settings and click OK to initiate the restoration process.

3. Configuring the Shortcut Files

To configure ViPER to recognize the new database, either edit or replace the VipSys.db and ViPERConfig.db files. If editing the connection string is required, you will need a browser for SQLite database files. We recommend downloading DB Browser for SQLite. This application can be installed on the PC, or a .zip file containing the application files can be downloaded from <https://sqlitebrowser.org/dl/>.

Note: If your server is located in the same location (i.e., you are not migrating to a network location from localhost or vice versa), you may alternatively replace all SQLite databases in the path with copies from the original computer. If editing the SQLite files, the steps are as follows:

- a. Open VipSys.db in DB Browser for SQLite.
- b. Click Browse Data
- c. Change the table to ConnectionString
- d. In the DataSource column write the location of your server. For example, if it's on the local PC, write **localhost**
- e. Click Write Changes.
- f. Close the database.
- g. Open ViPERConfig.db and perform the exact same steps.

4. Restart the PC

5. Reach out to Analytics Support for Next Steps

The software will need to be licensed before you are able to launch the application.

- a. License the application with the assistance of Repligen Analytics Support.
- b. Launch the Core.
- c. Launch the ViPER application.

Note: the Cary 60 USB is required to be plugged into the new PC for the Core to finish initializing. If the new PC transfer is a test and you will not have access to plug in the Cary 60 (and, if applicable, the FlowVPX), you will need to switch your instrument to a Mock system. Follow the instructions in the section below, *Restoring to a Virtual Machine*, for instructions on how to switch your instrument to Mock or FlowMock for testing.

Restoring to a Virtual Machine (Same Image)

Restoring the database to a virtual machine with a mirrored image follows a process similar to restoring to the same PC, with additional considerations for virtualization platforms.

1. Switch your instrument to a “Mock” Instrument in VPTData

Because the system is not on physical machine, the VPT system USBs are not able to be plugged in. For ViPER to fully launch, you will need to change your instrument to a “Mock” instrument in the SQL Server database and in the VipSys.db file.

- a. Navigate to the Object Explorer and locate the Databases node.
- b. Click the (+) on the VPTData database
- c. Click the (+) on Tables
- d. Find the table named dbo.VPTDevices > right-click > Edit Top 200 Rows
- e. The alteration you perform will depend on your instrument:
 - i. SoloVPE:

1. In the VPTDeviceTypeID column, write **4**
2. In the SerialNumber column, write **MCK1712345-0.0**
3. In the Name column, write **Mock**
- ii. FlowVPE or FlowVPX:
 1. In the VPTDeviceTypeID column, write **9**
 2. In the SerialNumber column, write **FMK1712345-0.0**
 3. In the Name column, write **FlowMock**
- f. Click Save All at the top of the window.

2. Configuring the Shortcut Files

To configure ViPER to recognize the new database, either edit or replace the VipSys.db and ViPERConfig.db files. If editing the files is required, you will need a browser for SQLite database files. We recommend downloading DB Browser for SQLite. This application can be installed on the PC, or a .zip file containing the application files can be downloaded from <https://sqlitebrowser.org/dl/>.

- a. Open VipSys.db in DB Browser for SQLite.
- b. Click Browse Data
- c. Change the table to ConnectionString
- d. In the DataSource column write the location of your server. For example, if it's on the local PC, write **localhost**
- e. In the User column, write **sa**
- f. Change the table to **SysConfig**
- g. In the InUseInstrument column write **Mock** or **FlowMock**, depending on what you wrote in the database.
- h. Click Write Changes
- i. Close the database.
- j. Open ViPERConfig.db and perform the exact same steps.

3. Restart the PC

4. Reach out to Analytics Support for Next Steps

The software will need to be licensed before you are able to launch the application.

- a. License the application with the assistance of Repligen Analytics Support.
- b. Launch the Core.
- c. Launch the ViPER application.

Restoring to a Virtual Machine (New Image)

Restoring the database to a virtual machine with a new image follows a similar process to restoring to a new PC, with additional considerations for virtualization platforms.

1. Installing ViPER and SQL Server Express

If needed, Repligen Support will assist remotely in installing the appropriate software packages on the new computer. This includes the ViPER Package and SQL Server Express software, along with setting up the server.

2. Restoring the Database in Microsoft SQL Server Management Studio

- a. Navigate to the Object Explorer and locate the Databases node.
- b. Right-click on the Databases node and select Restore Database....
- c. In the General page of the Restore Database window, select Device under the Source section.
- d. Click the ellipses (...) button to browse for the backup file.
- e. Select the relevant backup file (ex. VPTData.bak) and click OK.
- f. Review the settings and click OK to initiate the restoration process.

3. Switch your instrument to a “Mock” Instrument In VPTData

Because the system is not on a physical machine, the VPT system’s USB cables are not able to be plugged in. In order for ViPER to fully launch, you will need to change your instrument to a “Mock” instrument in the SQL Server database and in the VipSys.db file.

- a. Navigate to the Object Explorer and locate the Databases node.
- b. Click the (+) on the VPTData database.
- c. Click the (+) on Tables.
- d. Find the table named “dbo.VPTDevices” > right-click > Edit Top 200 Rows
- e. The alteration you perform will depend on your instrument:
 - i. SoloVPE:
 1. In the VPTDeviceTypeID column, write **4**
 2. In the SerialNumber column, write **MCK1712345-0.0**
 3. In the Name column write **Mock**
 - ii. FlowVPE or FlowVPX:
 1. In the VPTDeviceTypeID column, write **9**
 2. In the SerialNumber column, write **FMK1712345-0.0**
 3. In the Name column, write **FlowMock**
- f. Click Save All at the top of the window.

4. Configuring the Shortcut Files

To configure ViPER to recognize the new database, either edit or replace the VipSys.db and ViPERConfig.db files. If editing is required, you will need a browser for SQLite database files. We recommend downloading DB Browser for SQLite. This application can be installed on the PC, or a .zip file containing the application files can be downloaded from <https://sqlitebrowser.org/dl/>.

- a. Open VipSys.db in DB Browser for SQLite.
- b. Click Browse Data.
- c. Change the table to **ConnectionString**
- d. In the DataSource column, write the location of your server. For example, if it’s on the local PC, write **localhost**
- e. In the User column, write **sa**
- f. Change the table to **SysConfig**
- g. In the InUseInstrument column, write **Mock** or **FlowMock**, depending on what you wrote in the database.
- h. Click Write Changes.
- i. Close the database.
- j. Open ViPERConfig.db and repeat steps a through i.

5. Restart the PC

6. Reach out to Analytics Support for Next Steps

The software must be licensed before you are able to launch the application.

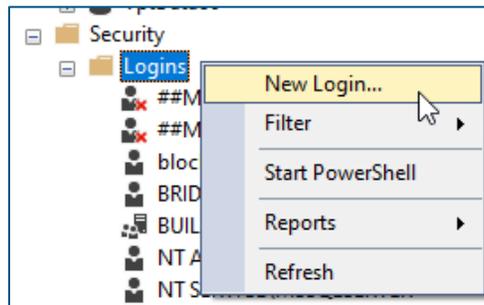
- a. License the application with the assistance of Repligen Analytics Support.
- b. Launch the Core.
- c. Launch the ViPER application.

IV. Migrating the Server and Database to Your Domain

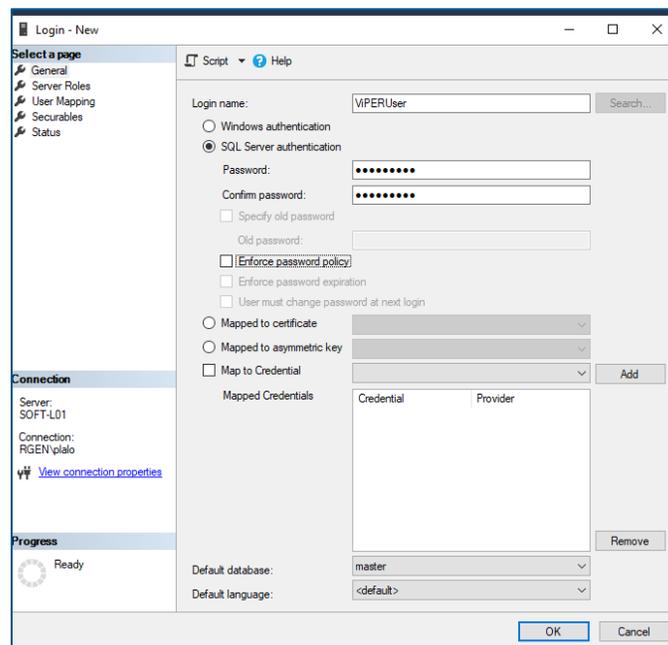
Moving the SQL Server and associated database to the network allows for centralized access and enhanced scalability. This section covers the process of migrating the database and configuring for seamless operation.

1. Create the new network server with SQL Server Express

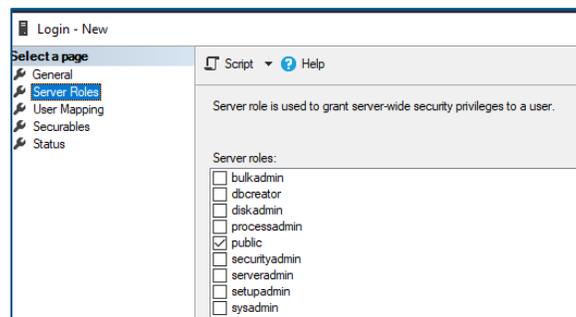
- a. Connect to SQL Server Instance with an account that has sys_admin permissions (i.e. sa).
- b. Expand Security > right-click on Logins > choose New Login.



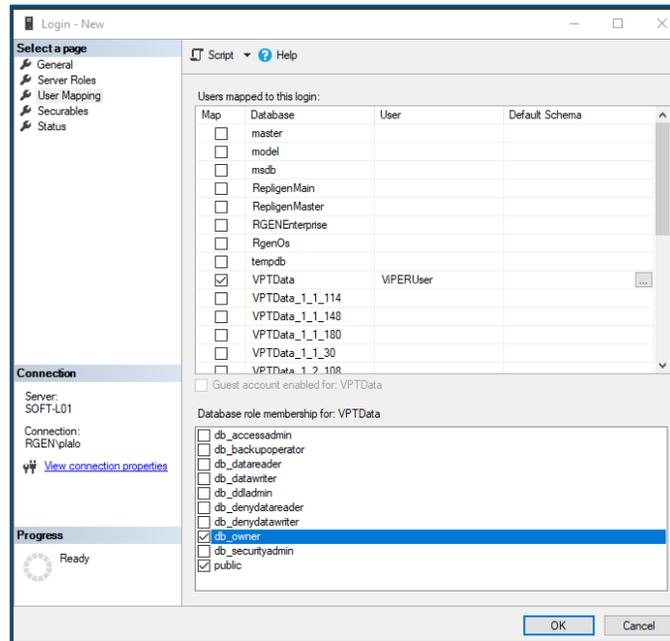
- c. Enter the Login name.
- d. Choose SQL Server Authentication and set the desired password.
 - i. (Optional) Enable the policies. **Note:** if the password expires, the VipSys.db SQLite file in ViPER must also be updated with the new password.



- e. Under Server Roles, only **public** is required.



- f. In User Mapping, select VPTData (or ViPER-related database) and assign **db_owner** and **public** permissions.



- g. Securables and Status permissions can remain unmodified.
- h. Ensure that the ViPER server is completely shut down.
- i. Backup and restore VPTData on the new network server.

2. Updating VipSys.db SQLite File

- a. Open VipSys.db in DB Browser for SQLite.
 - b. Click Browse Data.
 - c. Change the table to **ConnectionString**
 - d. In the DataSource column write the location of your network server.
 - e. Click Write Changes
 - f. Close the database.
3. Clear cache and cookies in Google Chrome & Reboot the PC.
 4. Launch the ViPER Application.

V. Common Connection Issues

Below are some commonly encountered issues along with suggested solutions:

1. VPT Core application Cannot Create a Connection to the SQL Server

- a. Symptom:
 - i. Inability to establish a connection with the SQL Server.
- b. Possible Causes:
 - i. SQL Server (MSSQLSERVER) service is not set to Automatic and Running.
 - ii. SQL Server Agent (MSSQLSERVER) is Disabled.
- c. Troubleshooting:
 - i. Open Services as an Administrator.
 - ii. Ensure that the SQL Server (MSSQLSERVER) service is set to start automatically and is running.
 - iii. Verify that the SQL Server Agent (MSSQLSERVER) service is set to Manual and manually start it if necessary.

2. VPT Core application Cannot Connect Due to a Logon Error

- a. Symptom:
 - i. The OPC Server encounters a logon error.
- b. Possible Causes:
 - i. Insufficient permissions for the ViPERUser on the server or database.
- c. Troubleshooting:
 - i. Access the VipSys.db SQLite file.
 - ii. Navigate to the ConnectionString table.
 - iii. Locate the User column and change it to **sa**.
 - iv. Click Write Changes.
 - v. Close the database.
 - vi. Attempt to launch VptOpcServerForm.exe again.

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