TruckMate

IBM DB2 11.5
Installation and Maintenance Guide

7/2024

TECHNOLOGY THAT transforms

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Revisions

Version	Amendment	By	Date
00	TM 2020.1 version	David Haines	Mar. 01, 2020
01	TM 2021.1 with DB2 11.1	David Haines	Apr. 16, 2021
02	TM 2021.1 with DB2 11.5	David Haines	Jan. 26, 2022
03	TM 2022.2 revs	David Haines	Aug. 21, 2022
04	TM-2022.3 revs	Kecia Lynn	Nov. 7, 2022
05	TM-2024.1 revs	Kecia Lynn	May 17, 2024
06	TM-2024.2 revs	Kecia Lynn	July 3, 2024

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IBM DB2 11.5 - Installation and Maintenance Guide

Contents

Introduction

The IBM DB2 11.5 Installation & Maintenance Guide includes instructions for new installations and upgrades to IBM DB2 11.5, as well as instructions to optimize database performance, configure automated maintenance, and perform other database maintenance tasks in a DB2 11.5 environment.

***Important**: You must ensure that you have the correct DB2 hardware and licenses before installing, migrating or upgrading a DB2 installation. It is imperative that the correct hardware is in place to ensure your users get acceptable performance from TruckMate. IBM licensing is directly tied to the hardware that your DB2 server uses. Even if you have previously purchased DB2, compliance is not guaranteed with your current hardware. IBM does audits from time to time and it is your responsibility to stay in compliance. Contact your Sales Representative for a DB2 license review if you are not sure if you are compliant or not.*

Intended Audience

This document is intended for users with administrator privileges with full domain access and with a working knowledge of database management products.

***Important**: If you feel that you do not have the expertise to do the tasks outlined in this document, please contact the Trimble TruckMate Support department at **truckmatesupport@trimble.com** to schedule an install/upgrade coordinator to do these tasks with you.*

Overview

For a new DB2 Server install, the basic steps are:

- Ensure prerequisites are met (i.e., hardware, IT infrastructure, server setup)
- Download the DB2 installation package and ensure the DB2 license has been arranged
- Create DB2 Administration users
- Install the DB2 11.5 Database Management software
- Create the TruckMate databases
- Install the TruckMate application > Database Server software
- Configure the TruckMate databases and DBMS Environment variables
- Contact TruckMate support to apply your permanent DB2 license key.
- Confirm DB2 Services are running with the Domain User
- Install additional TruckMate service applications on an Agent Server (i.e., EDI, Mileage Server, TM4Web, ART Server, Imaging, Mobile Comm)

Important Note about Database Backups

***Important**: The importance of a nightly backup, and testing those backups regularly, is absolutely imperative. Your TruckMate DB2 databases hold all the information to run your critical business operations. Do not get caught without a working backup.*

Here are some guidelines to consider regarding your backup/restore strategy.

- Set up the DB2 database backup to run every night.
- Ensure that the database backup file is created outside the live database directory.
- Ensure you backup to the DB2 server's local disks first and then copy the file to an alternate location for archiving if desired.
- Ensure that database backup files are being backed up to a removable drive, DVD, tape, etc. nightly.
- Ensure that the backup (and anti-virus) programs do not read from the live database and logs directories. This can cause database corruption.
- Store removable media offsite according to a removable media rotation schedule.
- Ensure that the removable media backup begins after the database backup is complete.

Please review the Database Backup and Restoration section in this document to learn more.

General Prerequisites for All Installations or Upgrades

The following is a list of recommendations you need to put in place prior to proceeding with the any of the procedures outlined in this document.

Server Hardware

It is strongly recommended that you review the latest Hardware and IT Infrastructure Guide for specific hardware requirements on DB2 Servers prior to installation. The document is part of the TruckMate ISO installation image and is found in the 'Docs' folder.

Note: If the hardware guide you have currently is older than 3 months, please contact TruckMate support or your account manager to make sure you have the latest Hardware and IT Infrastructure Guide.

Server Host Name

While the DB2 Server Host Name can include the text **DB2** (as in '**DB2SERVER**'), the server name cannot simply be named '**DB2**' nor have any periods or special characters other than hyphens (-) and underscores (_).

TruckMate Version Support for DB2

The most recent versions of TruckMate work with specific versions of DB2, as described in this table.

DB2 version	Compatible TruckMate version
DB2 11.5.9	2024.1 and higher
DB2 11.5.6	2022.x to 2023.x
DB2 11.1.3 and 11.5.6	2021.x

Installing or upgrading to the latest TruckMate version is highly recommended.

DB2 Server OS, Data, Log and Backup Folder Structure

As per the **TruckMate Infrastructure and Hardware Guide** section titled **Disk Drive Layout & Performance**, we strongly recommend having separate RAID arrays for different types of disk use. SANs have their own recommendations in the hardware document. Following the disk related recommendations can make a significant impact on the performance of your TruckMate system.

Here is a summary of the recommended RAID array layout, its recommended drive type and drive letter:

- Operating System – RAID 1 – SSD suggested– C: Drive
- DB2 Active Database Data – RAID 10 – SSD required - D: Drive
- Log Files /Backups – RAID 1 – 15K or SLC-SSD – L: Drive

Take special note that you can use the log file array to store backup images temporarily. The backup images and log files can be backed up to removable media or copied to a network location and then deleted from the local drives on a rotation schedule.

Logs and backups should be stored on local drive(s) before being copied anywhere else. This is a best practice aimed at mitigating any file corruption issues that can arise from using network UNC paths (i.e., packet loss, network target unavailable, etc.).

Important: The drives you place your backup files and archived logs on should be local to the DB2 server and should not be on the same drive as your active database files.

If you wish to place the backup files on a network path, copy the files from local disk to the network path after they are successfully stored on the local drives. You should not be backing up or archiving logs directly to UNC paths that start with "\\".

It is recommended that you:

- Install the DB2 server software on the C: drive in the default 64-bit Program Files location.
- Place all your databases on the D: drive.
- Create the following folder structure on your L: drive to store DB2 Log Files:
  - L:\DB2Logs\ - store log files in sub-directories organized by database name
  - L:\DB2Logs\<DBNAME>\Active - store all active log files in this directory
  - L:\DB2Logs\<DBNAME>\Archive - store all archive log files in this directory
- Create the following folder structure on your L: drive to store DB2 Backup Images:
  - L:\DB2backups\ - store backups in sub-directories organized by database name
  - L:\DB2backups\<DBNAME>\Offline\ - store offline backups in this directory
  - L:\DB2backups\<DBNAME>\Online\ - store online backups in this directory

Directories to Exclude in your Anti-Virus Software

To ensure optimal performance and the avoidance of database corruption, we recommend that you exclude the following directories and drives from the active file monitoring portion of your anti-virus software:

- DB2 Diagnostic Log folder - `C:\DB2DIAG\`
- DB2 installation folder - `C:\Program Files\IBM\`
- TruckMate DB Utilities Folder -

  `C:\Program Files (x86)\TruckMate <VERSION#>\`
- DB2 Database Drive - `D:\`
- DB2 Log File & Backup Drive - `L:\`

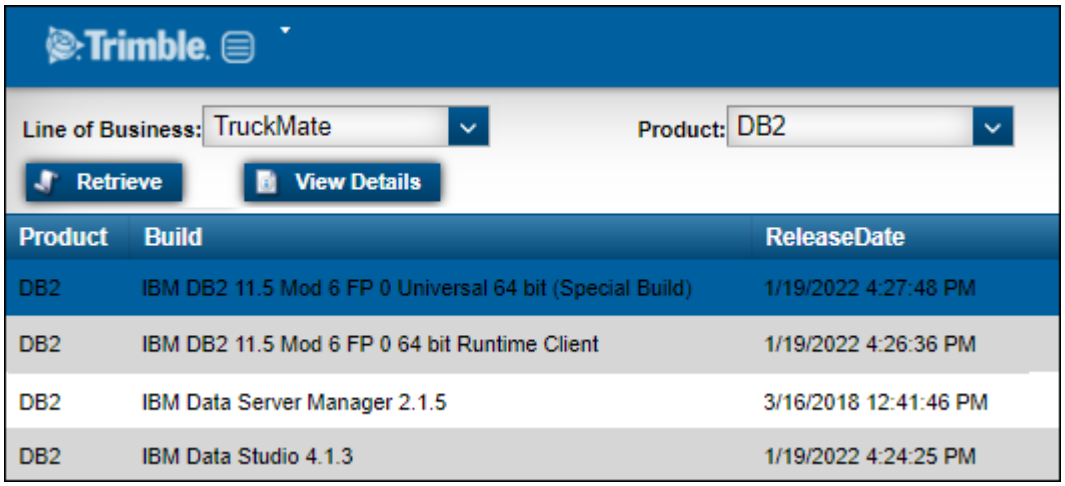
DB2 Installation Package Downloads and DB2 Licenses

In order to install DB2 11.5 on your database server, you will need the following installation packages:

- DB2 11.5 Server
- DB2 11.5 Run Time Client (for client machines connected to the server).
- IBM Data Server Manager
- Trimble TruckMate T&I (or Support) notified and on standby, ready to apply your entitled DB2 11.5 license key.

Tip: The latest DB2 Versions / Fix Packs and other database administration software are available at the Trimble Client Center website: https://clientcenter.tmwsystems.com/ClientCenter/Login/Login.aspx.

From the menu, navigate to Build Delivery > Downloads. Line of Business = **TruckMate**, Product = **DB2**.



DB2 11.5 Installations and Upgrades

This section describes:

- DB2 11.5 new installations
- DB2 10.5/11.1 to 11.5 migration upgrades
- DB2 Fix Pack updates

New Installation of DB2 11.5

This section is for administrators doing a NEW DB2 installation on a server that does NOT already have DB2 installed.

Prerequisite - Create DB2 administration users

Before installing DB2, as a minimum, you must create a Windows user group called **TMWWINGRP** with the **DB2ADMIN** (DB administrator) and **TMWIN** (schema owner) users as a Domain Administrator in this user group. The steps required to set up the DB2ADMIN and TMWIN users will depend on your specific environment.

User Names	Purpose	Group
DB2ADMIN	Database Administrators	Administrators, TMWINGRP
TMWIN	Schema Owner	Administrators, TMWINGRP
TMADMIN	TruckMate Administrator	TMWINGRP

The TruckMate Training and Implementation team will work with you to create additional users and groups for specific roles and focused permissions to access certain servers and applications. For example,

- TMW_MILE - Mileage Server
- TMW_COMM - Mobile Communications Manager
- TMW_DAWG - DAWG
- TMW_API - TruckMate ART Server REST API services

Tip: To confirm the environment you are running, navigate to System Properties. Click Start, and then point to Control Panel. In Control Panel, click System. Either your Workgroup or Domain name will be identified here.

To create users:

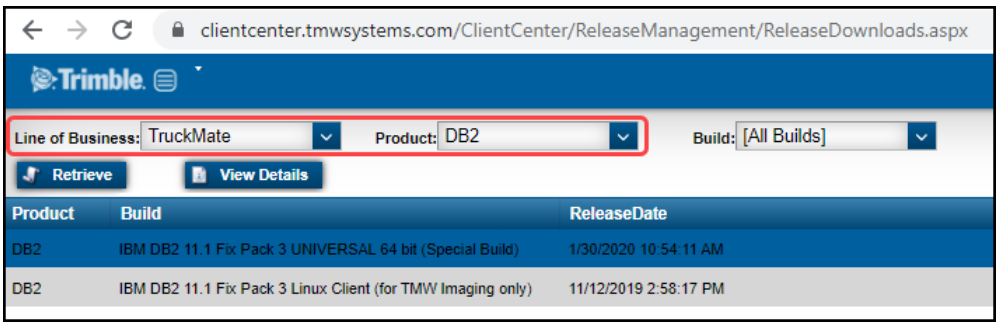
- In a Domain environment (strongly recommended):
  - Click **Start**, go to **Control Panel**, click **Administrative Tools**, and double-click **Active Directory Users and Computers**.
- Locally in a Workgroup/Peer-to- Peer environment (for isolated test environments):

- Click **Start**, go to **Control Panel**, click **Administrative Tools**, double-click **Computer Management** and click **Local User & Groups**.

***Important**: If you do not have a domain, DB2 will use your local server users and groups for authentication. In other words, you will have to setup all your users and groups on the local DB2 server. This can cause additional system administration overhead. Isolated DB2 test environments are normally the only exception.*

Download DB2 Install package

1. Go to the Trimble Transportation Client Center and download the DB2 Version 11.5 special build installer file for the version of TruckMate you are installing.



2. Move the installation EXE file to a local TEMP folder.

3. Launch the file and unzip it to a TEMP folder.

   For example: `C:\Temp`

   Recommendation: If you frequently download DB2 fix pack files, add a unique value to the end of the path (for example, `\11.5.9`) to ensure you are unzipping to a fresh target folder just in case there are other DB2 11.1 installation files already in the TEMP folder.

4. Make a note of the folder location where the DB2 installation files were unzipped.

Install the DB2 11.5 Database Management Software

This section describes how to install DB2 Workgroup edition.

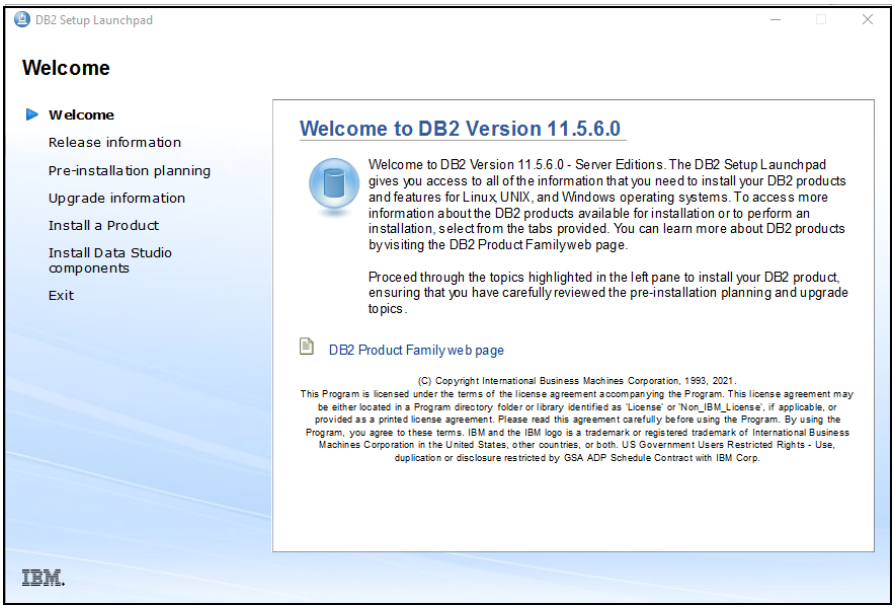
1. Login as the DB2ADMIN user you created in the previous section. The DB2ADMIN user should have full administrative rights on the Windows server where you are about to install DB2.

2. Run the DB2 installation.EXE package you downloaded from the Trimble Client Center to extract the DB2 11.5 installation image to a temporary directory location. (This will take about two minutes and typically creates a folder called `UNIVERSAL` in a default location like: `C:\Users\<USER>\AppData\Local\Temp\`.

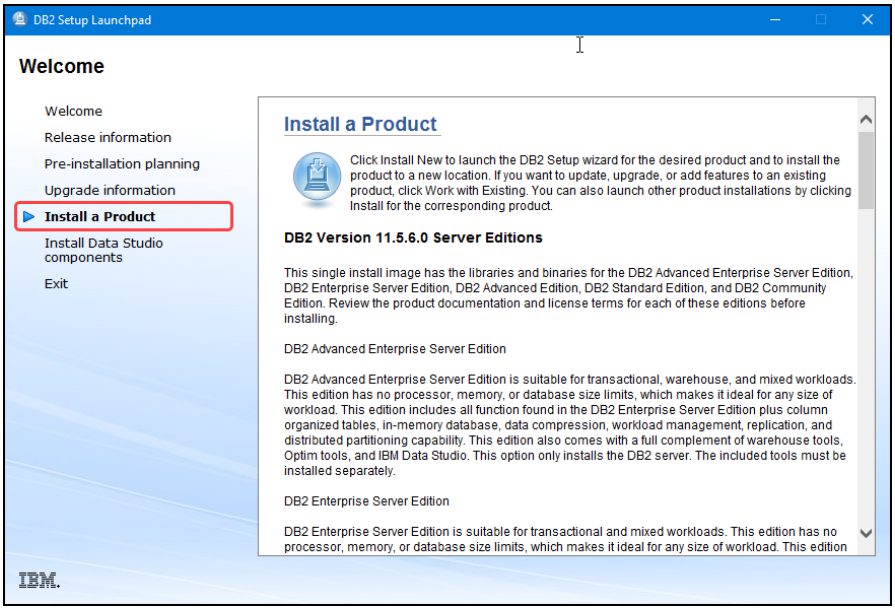
Note: During the installation, it is important that the default port setting is set to 50000 on the DB2 instance configuration form during steps 15/16.

3. Once the extraction has finished, double-click **Setup.exe** from the UNIVERSAL folder location where it was extracted.

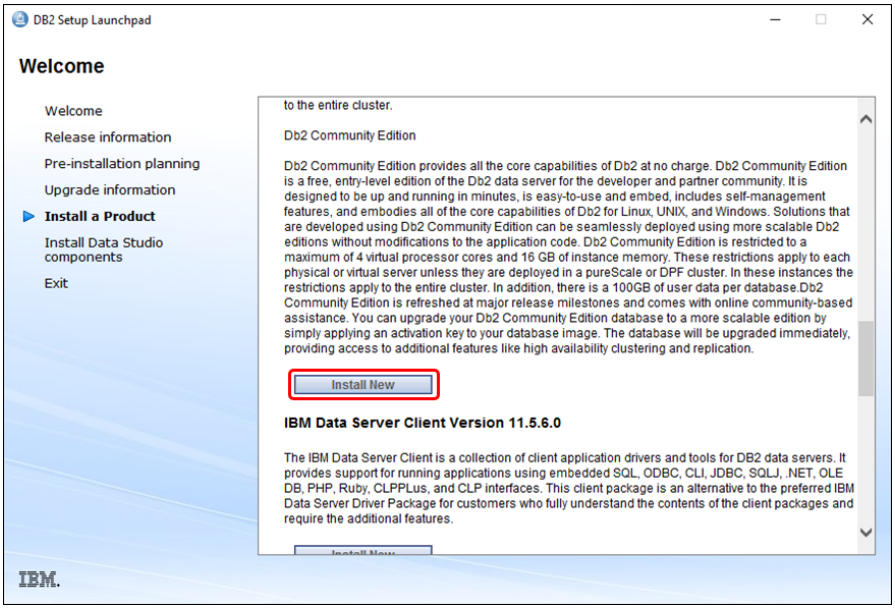
   The **IBM DB2 Setup Launchpad Wizard** is displayed, containing the installation options.



4. Click **Install a Product**.

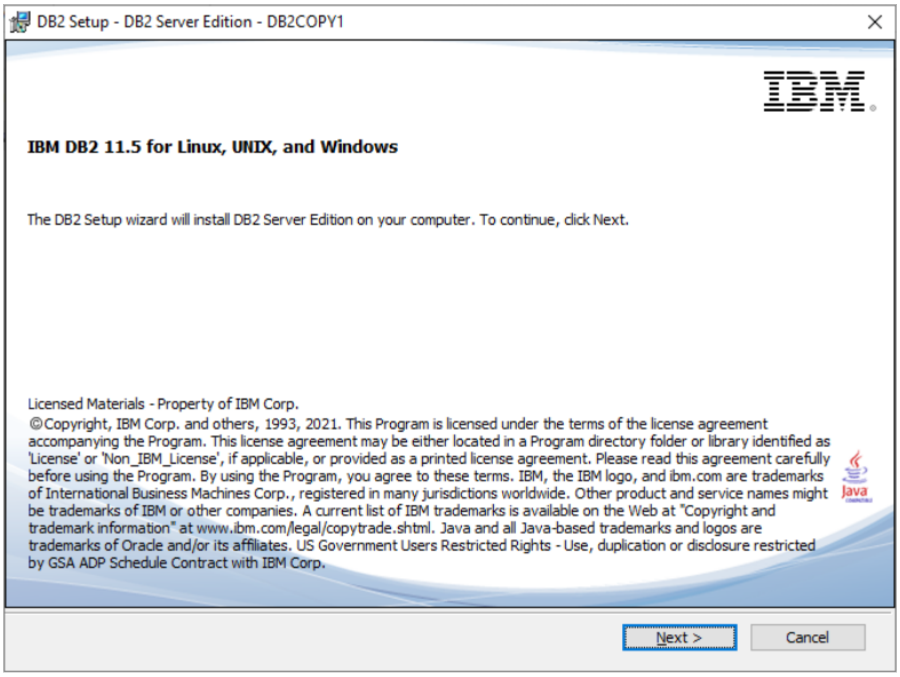


5. Scroll down to the *first* set of buttons (as shown in this illustration) and click **Install New.**

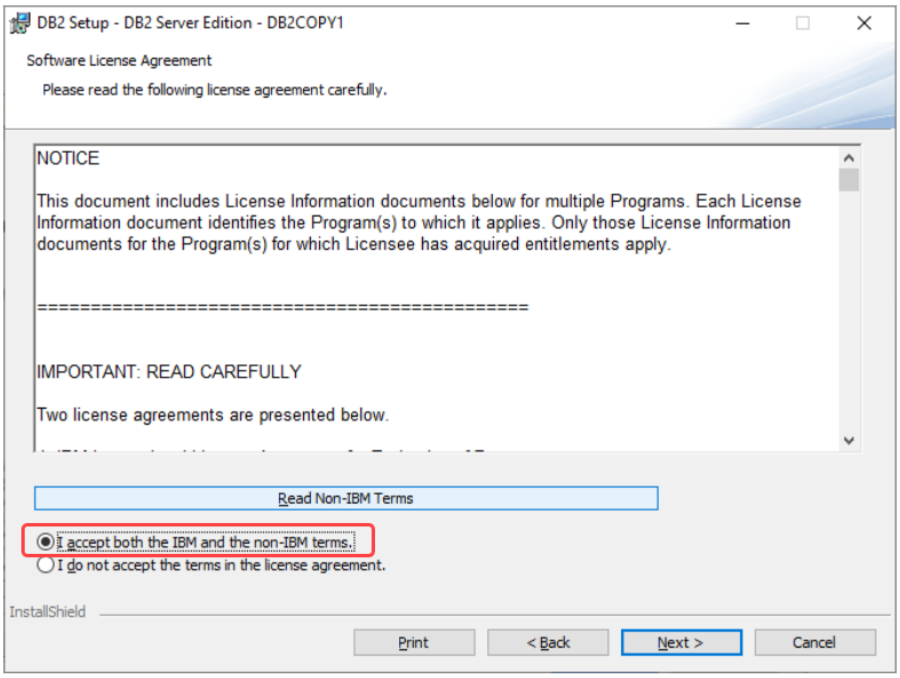


Warning: The edition you select to install is based on the license type you own. Be sure to install the correct edition so you do not need to uninstall and reinstall later. Check with a TruckMate Support DBA if you are unsure what license type you own, before starting the installation.

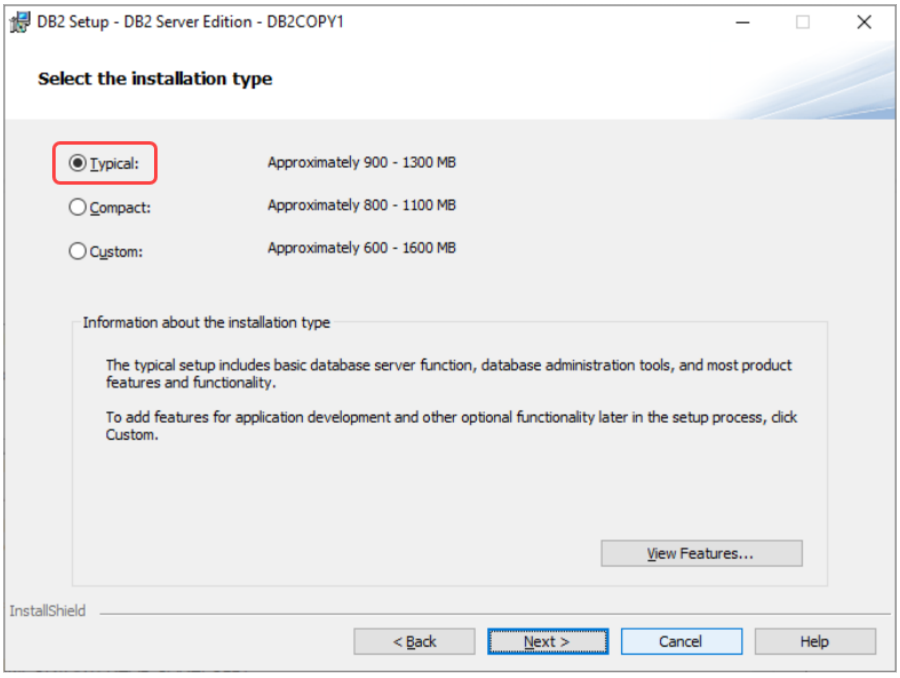
6. On the **DB2 Setup** wizard, click **Next**.



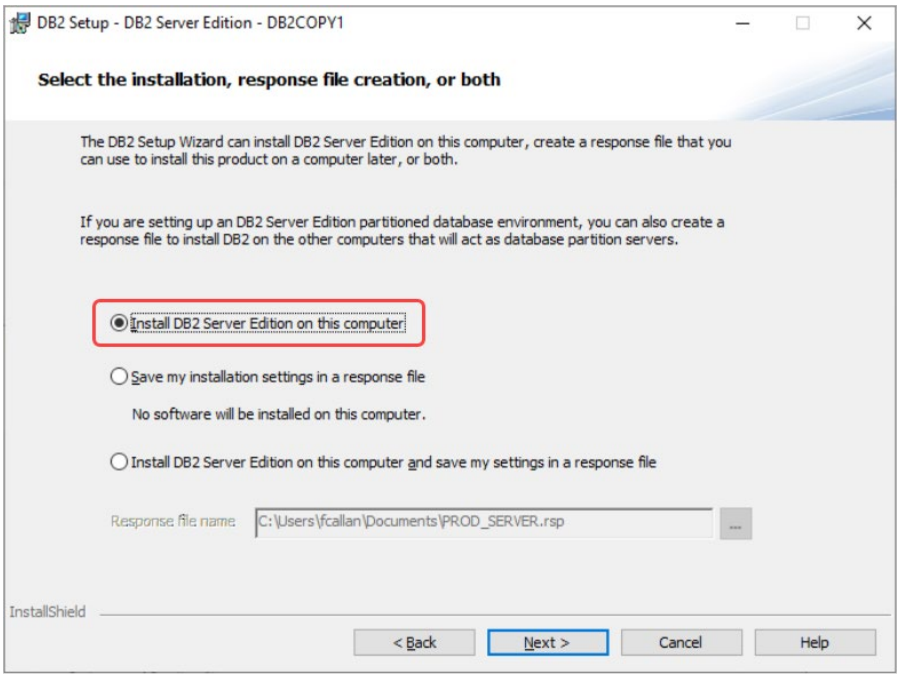
7. Review the **Software License Agreement**, select **I accept both IBM and non-IBM terms**, and click **Next**.



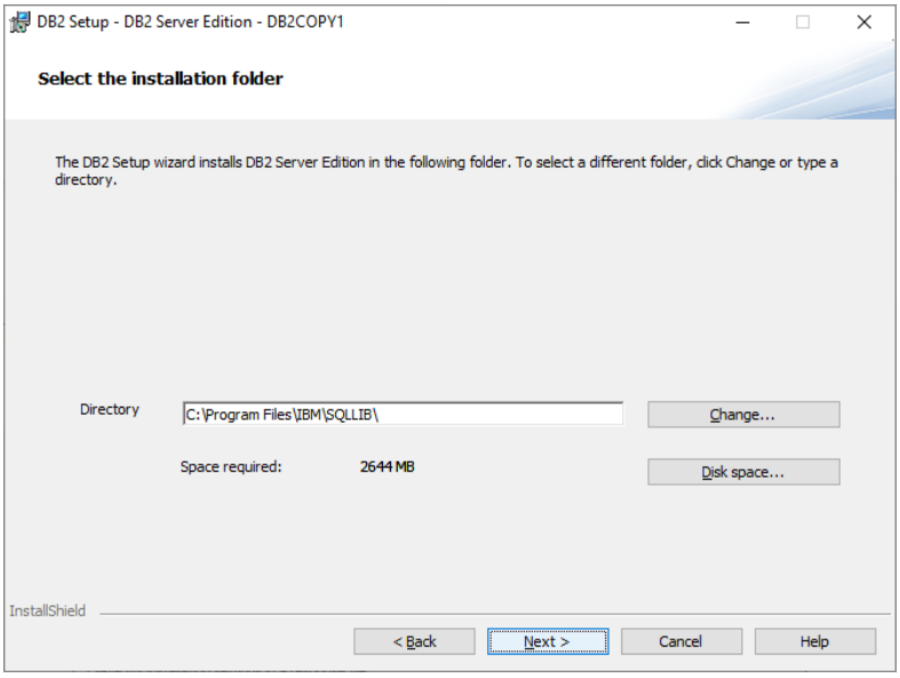
8. On the **Select the installation type** window, select **Typical** and click **Next**.



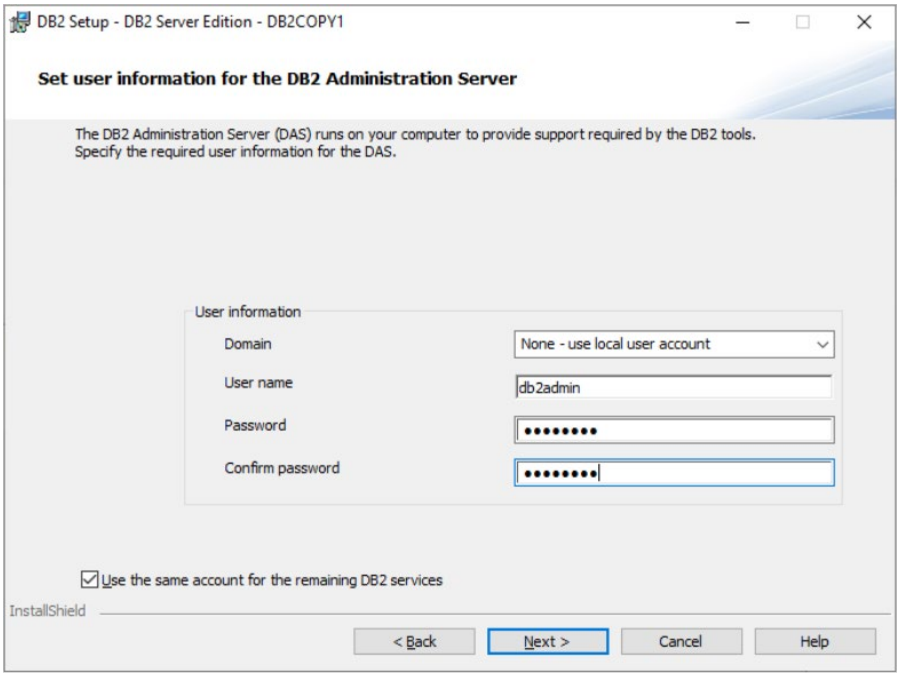
9. On the **Select the installation, response file creation or both** window, select the option to **Install DB2 Server Edition on this computer** and click **Next**.



10. Keep the default value to **Select the Installation folder** and click **Next**.



11. On the **Set user information for the DB2 Administration Server** form, accept the default and leave the **Use the same account for the remaining DB2 services** check box selected and provide db2admin credentials as per your configuration in the **Prerequisite - Create DB2 Administration Users** section above.

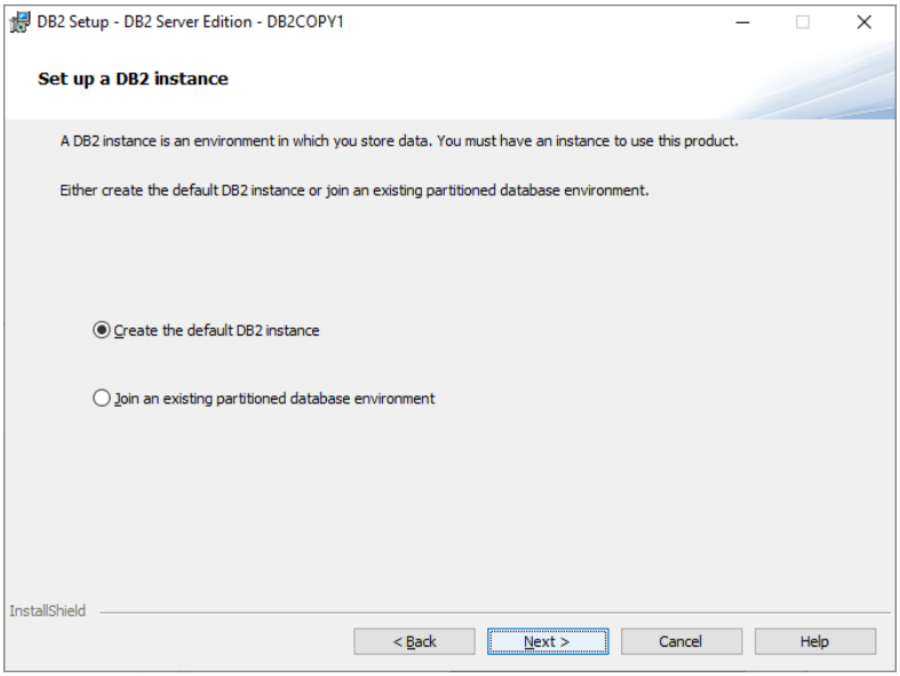


Use the following table as guidance:

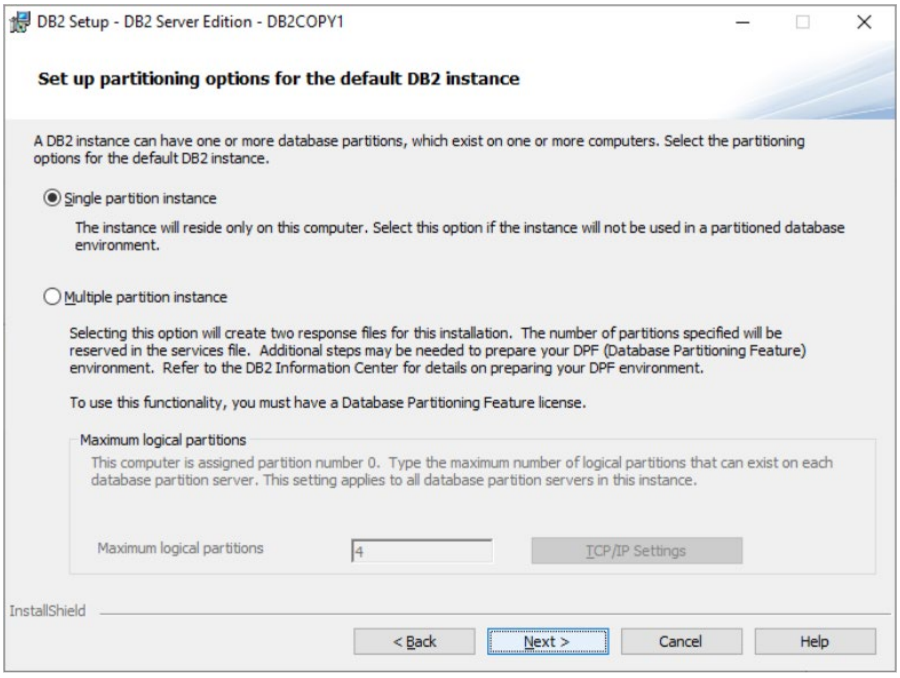
Domain	Select your Domain name from the Domain list. **Note**: The 'None' option is only used when you do not have a Domain Controller in your network, which is generally not recommended. DB2 Test environments are normally the only exception.
User Name	The User Name defaults to **db2admin**. Do not modify.
Password	Enter and confirm the **db2admin** user password.
Check Box	Ensure that **Use the same user name and password for the remaining DB2 services** check box is selected.

12. Click **Next**.

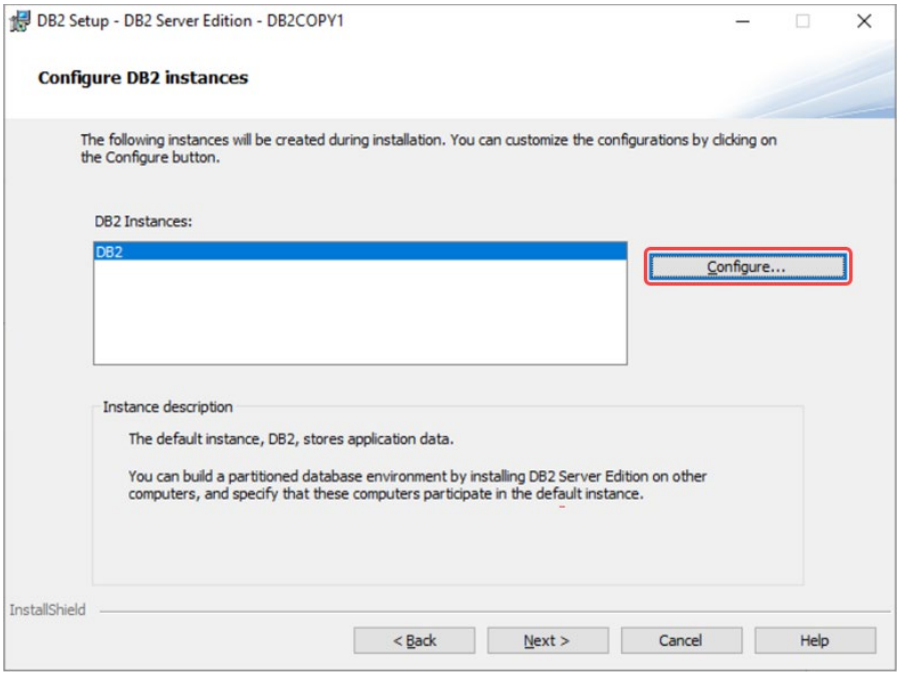
13. On the **Set up a DB2 instance** screen, select **Create the default DB2 instance** and click **Next.**



14. On the **Set up partitioning options for the default DB2 instance** screen, select **Single partition instance** and click **Next.**

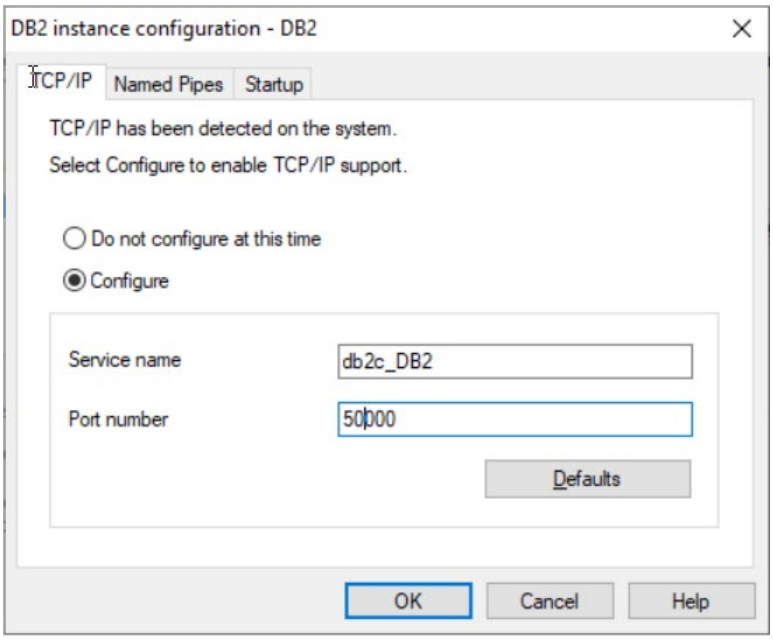


15. On the **Configure DB2 instances** screen, select the default **DB2** instance and click **Configure**.

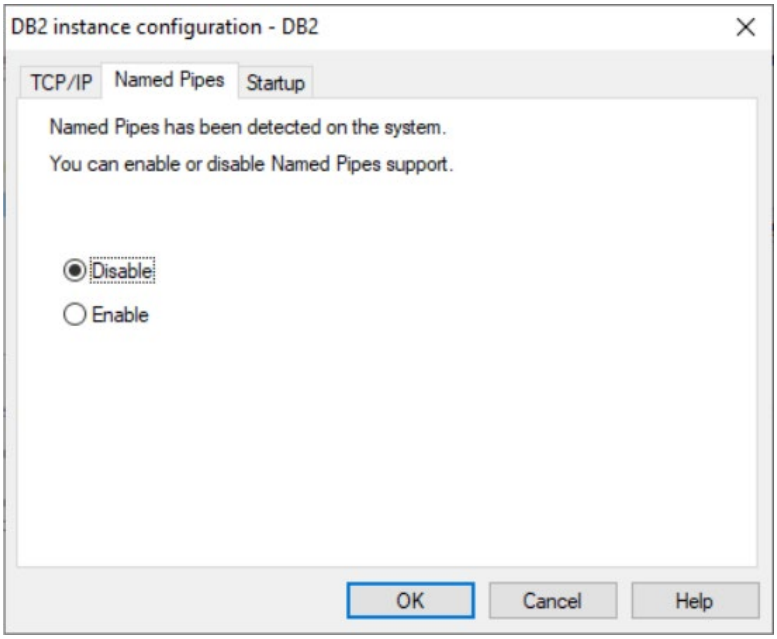


The **DB2 instance configuration – DB2** form will be displayed.

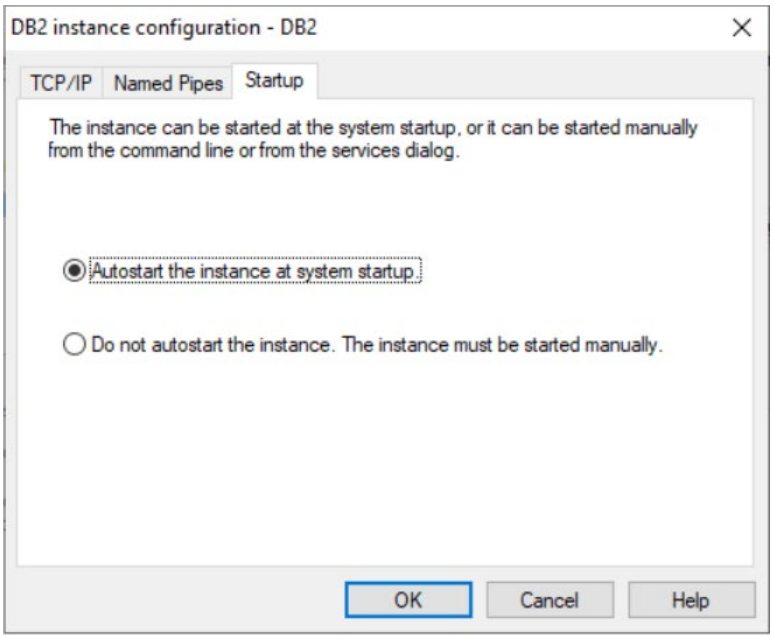
16. Go to the **TCP/IP** tab, select **Configure** and set the **Port number** to 50000.



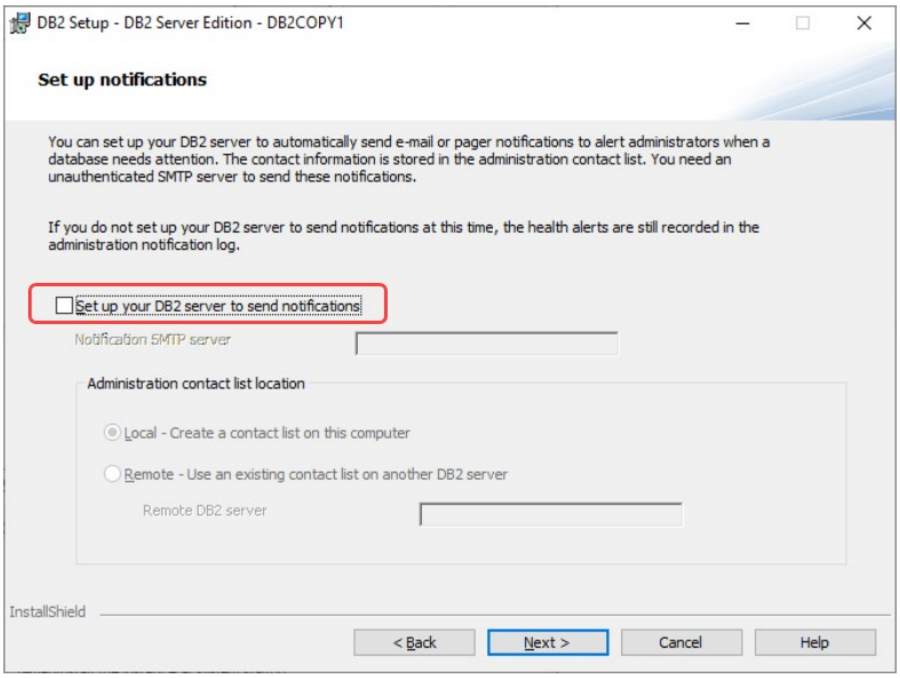
17. On the **Named Pipes** tab, select **Disable**.



18. On the **Startup** tab, select **Autostart the instance at system startup**.

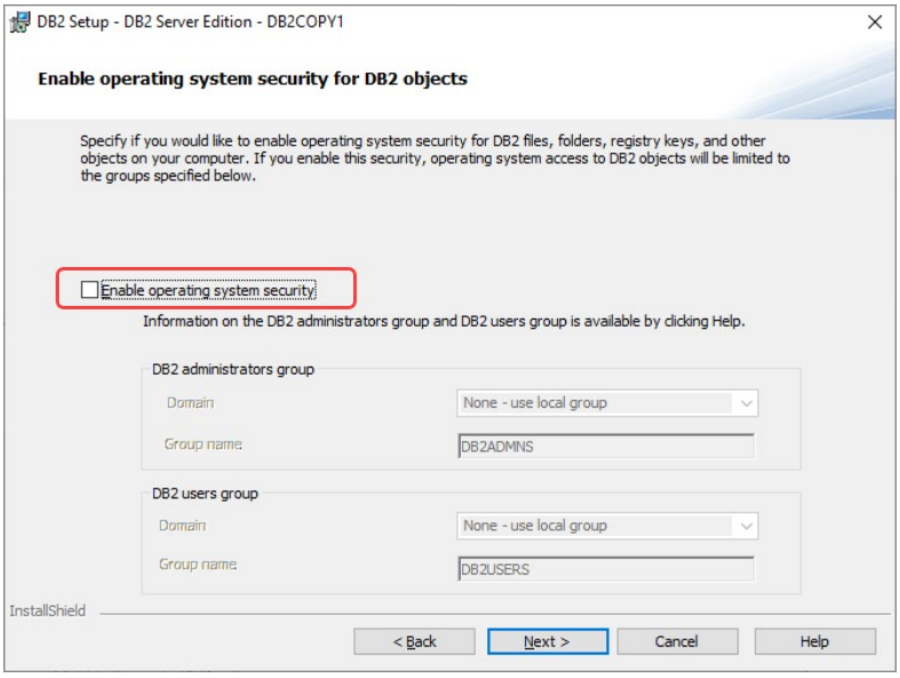


19. On the **Set up notifications** form, clear/deselect the **Set up your DB2 server to send notifications** check box and click **Next**.



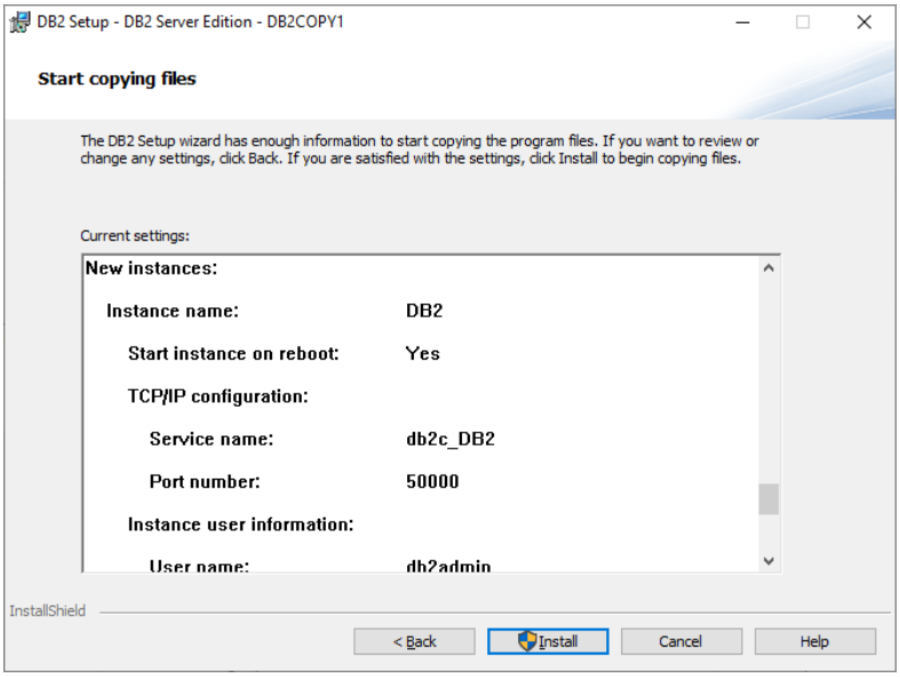
20. On the **Enable operating system security for DB2 objects** form, clear/deselect the **Enable operating system security** check box.

Note: It is very important that this check box is **NOT** selected.

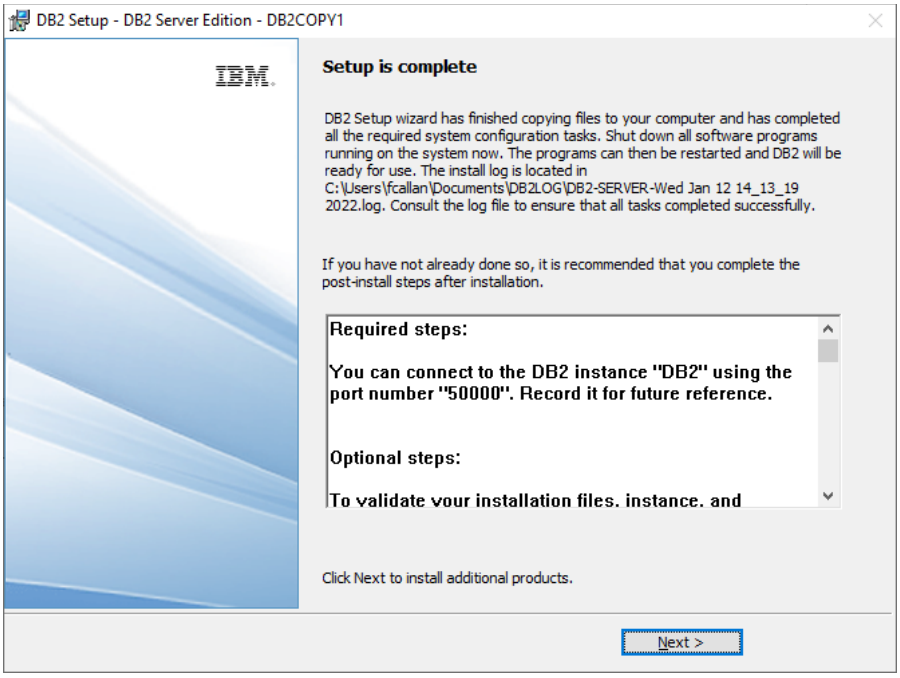


21. Click **Next**.

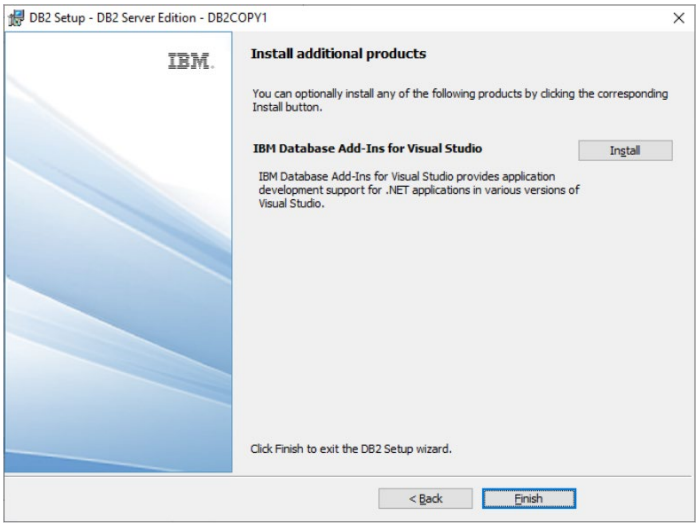
22. On the **Start copying files** window, verify the current settings are correct, confirm the port number is set to 50000 and click **Install** to begin the installation.



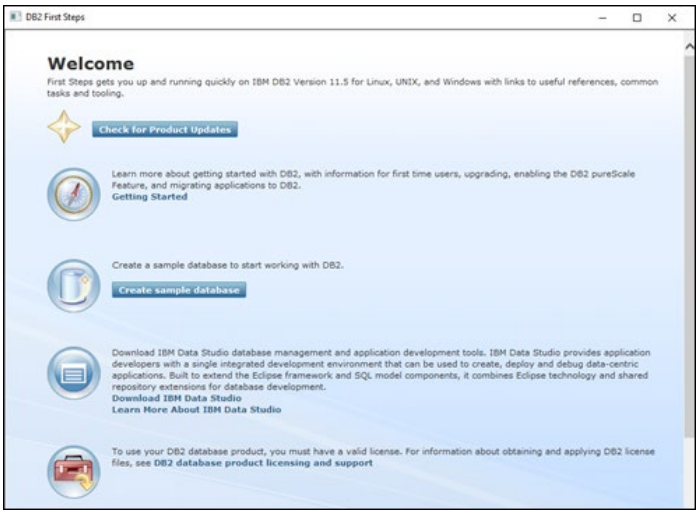
23. On the **Setup is complete** form, click **Next**.



24. On the **Install additional products** form, click **Finish**.



25. On the **DB2 First Steps** form, close the window.)



26. Restart the Windows server. This will ensure all DB2 services are started correctly on boot.

27. If TruckMate is not installed yet, refer to the TruckMate 2022 Installation Guide available on the Trimble Transportation Learning Center.

28. Before you can upgrade your database's catalog, you must set certain DB2 registry values.

    a. Open a DB2 Administrator command window as DB2ADMIN (or the user you set up in Step 11 of this procedure).

    b. Execute each of these setting commands in this order:

```
db2set DB2_UPGRADE_SKIP_CYCLE_CHECK=TRUE

db2set DB2_CAPTURE_LOCKTIMEOUT=ON

db2set DB2_COMPATIBILITY_VECTOR=08
```

```
db2set DB2_RESOLVE_CALL_CONFLICT=YES
db2set DB2_SQLROUTINE_PREPOPTS="ISOLATION UR"
db2set DB2_INLIST_TO_NLJN=ON
db2set DB2_SKIPINSERTED=ON
db2set DB2_EVALUNCOMMITTED=ON
db2set DB2_SKIPDELETED=ON
db2set DB2_HASH_JOIN=NO
db2set DB2_WORKLOAD=
db2set DB2_PARALLEL_IO=*
db2set DB2_EXTSECURITY=NO
db2set DB2_FORCE_DIAGS=true
db2set DB2_EVENT_LOG_CONFIG=512
db2set DB2_ATS_ENABLE=YES
db2set DB2COMM=TCPIP
update dbm cfg using NUM_POOLAGENTS 0 AUTOMATIC
update dbm cfg using INSTANCE_MEMORY AUTOMATIC
update dbm cfg using AGENT_STACK_SZ 128
update dbm cfg using ASLHEAPSZ 15
update dbm cfg using MON_HEAP_SZ 6144 AUTOMATIC
update dbm cfg using DIAGSIZE 100
update dbm cfg using DFT_MON_STMT ON
update dbm cfg using DFT_MON_BUFPOOL ON
```

c. Execute this command: `db2stop`

d. Execute this command: `db2start`

29. Complete the steps in Configuring Databases and DBMS Environment Variables.
    This step requires a TruckMate and ISC4 database and the TruckMate software (which includes the SQL Execute program) to be installed before you can finish configuring the databases and variables.

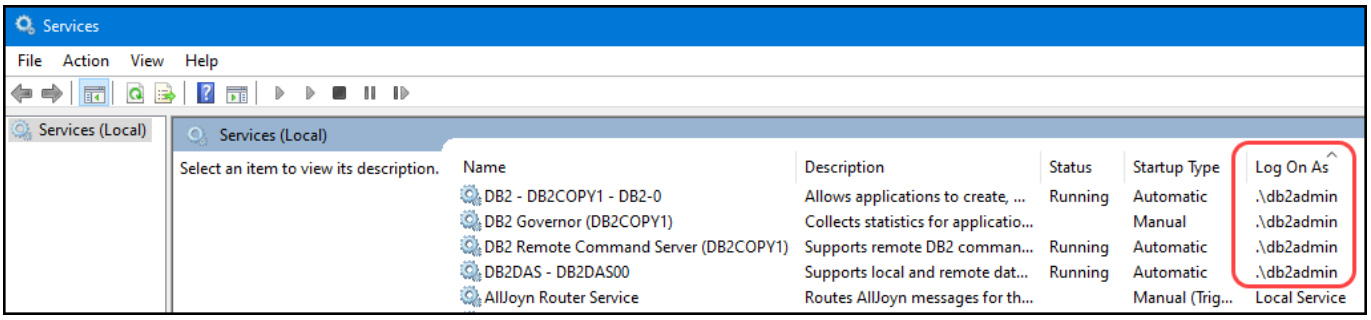
    Note: As of DB2 11.5.6, a new '**DB2_UPGRADE_SKIP_CYCLE_CHECK**' DB2 configuration option is added during installation. This new option must be set to *True* to avoid errors that may prevent TruckMate from running. This option can be set using SQL Execute in TruckMate 2021.x and higher with the latest patch updates applied. However, we recommend setting this registry value (as listed in Step 28 of this procedure) ***before*** upgrading your database catalog.

30. Contact TruckMate support to apply your permanent DB2 license key. See Applying a DB2 11.5 License for more information.

Confirm/Update DB2 Services are running with the Domain User

You must confirm or update the DB2 service logon accounts to be the domain **db2admin** user as per your configuration in the New Installation - Prerequisites section above.

1. Go to Windows Control Panel > Administrative Tools > **Services**.
2. Sort the list of services by clicking on the **Log On As column** heading. Find the group of services who have the local db2admin user (`.\db2admin`) as the user. If you installed DB2 as per the instructions, you should not find any of these. If you do find any, you need to change the local user to your domain user (`<your_domain>\db2admin`). One exception to this rule is if the installation is an isolated test environment.



3. To update the user, right-click the applicable service and select **Properties**.
4. On the **Log On** tab, select **This Account** and enter in the domain db2admin user's credentials.
5. Click **Ok**.
6. On the main Services utility screen, **Start** and **Stop** the services you change to apply your changes and test the user credentials are correct.

Upgrade/Migration from DB2 10.5 /11.1 to 11.5

This section describes how to migrate your existing TruckMate databases from DB2 10.5 or DB2 11.1 to DB2 11.5.

Upgrading DB2 to 11.5

is a multi-step process to ensure each database is ready be upgraded, upgrading the DB2 database software program, updating each database and addressing any invalid routines or objects and rebinding any objects requiring it after the upgrade.

For anyone currently running the much older 9.7 version of DB2, you must contact TruckMate support and arrange for assistance with the upgrade.

Upgrade preparation

Administrators should plan for sufficient time to complete the upgrade process based on:

- Time required for creating and testing an offline backup of existing database.
- The size and density of the data in the database. The larger the database, the lengthier the upgrade.

Manual Offline Database Backup

You should perform a manual offline backup of all the existing DB2 databases that you plan to continue using with TruckMate. Drop the databases you do not want to keep prior to migrating.

- Refer to the Manual Database Backups section in this document for procedural instructions on performing an offline database backup.

Note: It must be an **offline backup**. Online backups cannot be restored into a version of DB2 that is different from the version they were backed up in.

Prepare Existing Databases for Upgrade

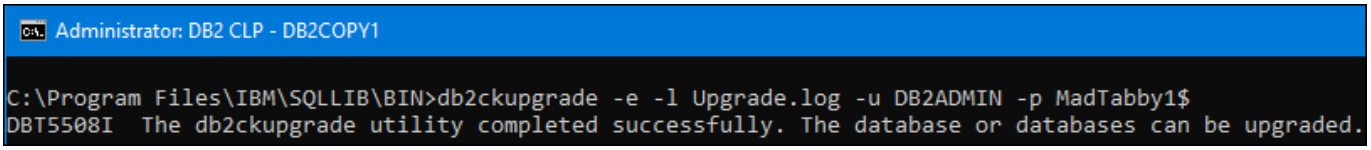
Take note of all the DB names of the local databases you will be upgrading to 11.5 after upgrading the DB2 software. This list will be used later to re-catalog all the DBs on the local drives.

Also, take note of any ODBC connections pointing to TruckMate databases (excluding connections that start with TM_REPORTING). These ODBC connections will need to be manually added again later.

Verify Existing Databases for Upgrade

1. Open the DB2 Command Line Processor (CLP) by typing **DB2CMD** in the **Windows Search/Run** on the **Start** menu.
2. Run the `db2ckupgrade <database_name> -l <log_File_Name.log> -u DB2ADMIN -P <db2admin_password>` command to verify that all databases can be upgraded.
   Use the -e parameter for the database name to run the upgrade verification function for all databases on this server.

For example, if you want to verify all the databases on the server with a log file created in the same folder where the db2ckupgrade.exe file is located:



3. If you do not get the "`DBT5508I The db2ckupgrade utility completed successfully. The database or databases can be upgraded`" message, please reach out to TruckMate support immediately.

Note: If your Windows PATH variable is unable to find the DB2CKUPGRADE command, the db2ckupgrade.exe file is installed during the initial DB2 install and is typically located in:

`C:\Users\<USER>\AppData\Local\Temp\UNIVERSAL\db2\windows\utilities`

Capture DBM and DB2 Environment Variable Settings

1. Open the DB2 Command Line Processor (CLP) by typing **DB2CMD** in the **Windows Search/Run** on the **Start** menu.
2. Execute the following commands to create three TXT files in the specified location:

```
DB2 get dbm cfg > C:\Temp\DBM_Data.txt

DB2set -all > C:\Temp\DB2Set.txt

DB2 List Database Directory > C:\Temp\DB2List.txt
```

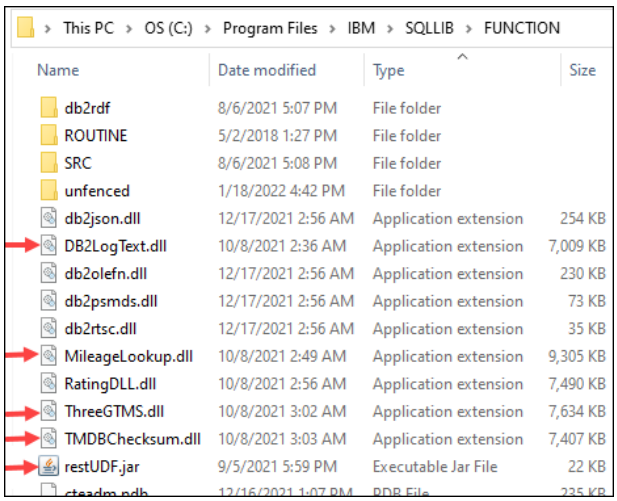
These text files contain lists of the DBM and DB2 Environment Variable Settings and a list of the databases.

Uninstall DB2 10.5/11.1 Database Management Software

At this point in the upgrade process, you can now uninstall your existing version of DB2 10.5/11.1 using the standard Windows Add/Remove Programs console. Accept all prompts.

Important: Once DB2 10.5 /11.1 has been removed from the database server, you **MUST REBOOT** the server.

Note: The TruckMate installer will insert a JAR and several DLL files into the `IBM\SQLLIB\FUNCTION` folder. Uninstalling the older version of DB2 will not delete the FUNCTION folder but if you manually delete this folder, it will remove these specialized TruckMate files. This is not a problem if you are installing a new version of TruckMate as part of a migration/update process since the TruckMate installer will re-insert these files.



Install the DB2 11.5 Database Management Software

Please follow the steps in the Install the DB2 11.5 Database Management Software section.

Confirm/Update DB2 Services are running with the Domain User

Please follow the steps in the Confirm/Update DB2 Services are running with the Domain User section.

Catalog Databases

1. Open the DB2 Command Line Processor (CLP) by typing **DB2CMD** in the **Windows Search/Run** on the **Start** menu.
2. Execute the following command to catalog your TruckMate databases you took note of earlier:

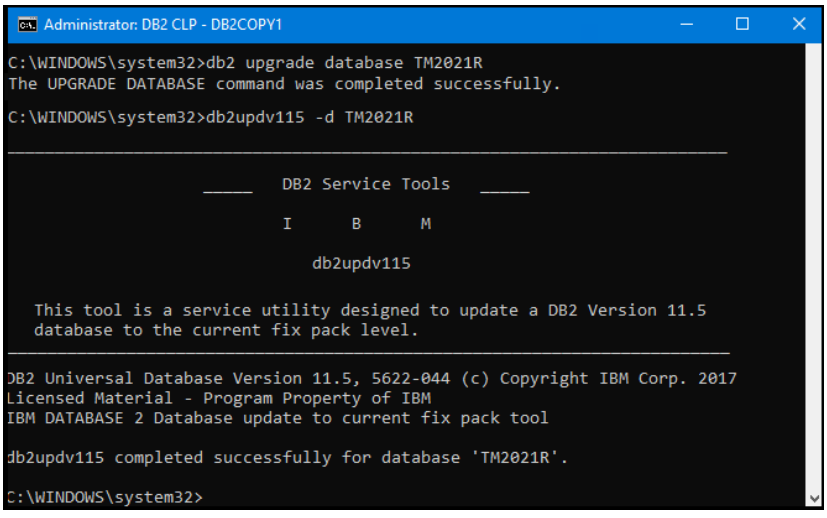
   ```
   Catalog Database <DB_ALIAS> ON <Drive location>
   ```

3. Repeat step 2 for **all** databases that need to be cataloged, including the ISC4 database.
4. Now recreate the ODBC connections you took note of earlier as well.

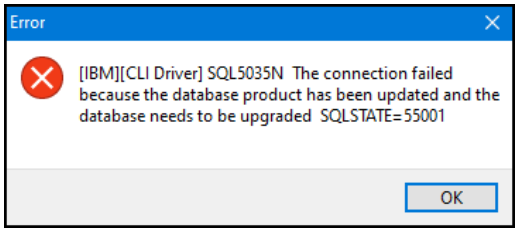
Upgrade each Database

1. Open the DB2 Command Line Processor (CLP) by typing **DB2CMD** in the **Windows Search/Run** on the **Start** menu.
2. Enter `DB2Start` to make sure the database is running.
3. Enter the following command(s) to upgrade each database:
   - `db2 upgrade database <database_name> -u DB2ADMIN -p <db2admin_password>`
   - `db2updv115 -d <database_name> -u DB2ADMIN -p <db2admin_password>`

For example:



Note: Each individual DB2 database must be upgraded to the new DB2 version. If you attempt to connect to an *un-upgraded* database, a SQL5035N error will be displayed.



Post Upgrade Steps

1. Check for invalid routines.
   - In SQL Execute, go to Tools menu > *Review Invalid Objects*.
   - Once complete, *Rebind all Objects* that require it.

   Note: If you are running into deadlock errors during Flyway updates, it is likely due to implicit rebinds occurring. Allow 15 to 20 minutes for the rebinds to finish.

   If you are still experiencing deadlock issue, try executing the following command against each database with the issue:

   ```
   update db cfg using catalogcache_sz 1024:
   ```

2. Contact TruckMate Support and arrange for someone to add the DB2 License for your version of DB2. This must be done by a TruckMate staff member.

Upgrade/Migration from DB2 9.7

For anyone who is currently running a much older version of DB2 (i.e., DB2 9.7 or older), you will need to install a newer version of DB2 on your database server and upgrade your TruckMate databases. Please contact Trimble TruckMate support.

Applying a Fix Pack Update to an Existing 11.x Installation

This section details the steps required to update your IBM DB2 Fix Pack (FP) level.

An *update* is not the same as a full *migration/upgrade* and involves a much simpler and less extensive procedure than the processes associated with an upgrade version migration.

Tip: The latest DB2 Versions / Fix Packs are available at the TMW Client Center website: https://clientcenter.tmwsystems.com/ClientCenter/Login/Login.aspx. From the menu, navigate to Build Delivery > Downloads.

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1. Log on to the DB2 server as the **db2admin** user.
2. Take an **Offline Backup** of your database as per the Database Backup and Restoration section in this document.
3. Double-click the .EXE file you downloaded to run the self-extracting tool. Extract the files to a directory you can easily access.
4. Once the files are extracted, run '**setup.exe**'. The DB2 Setup Launchpad will display.
5. On the DB2 Setup Launchpad, click **Install a Product**. A number of options will appear in the Install a Product section.
6. Scroll through the product list and click the **Work with Existing** button below the appropriate DB2 product editions title heading (i.e., Workgroup, Enterprise and Advanced Editions). The Installer will prepare the installation files.

Tip: You can determine which DB2 product you have installed by opening the Windows **Control Panel** and navigating to the **Uninstall a Program** list. The current edition installed should match what license you own. Note that if you are unsure of the license type you own, you should contact TruckMate Support and speak to a DBA to be sure.

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7. Select the DB2 Copy Name you have previously installed in the top grid, and then click the **Launch DB2 Setup Wizard** button near the bottom of the window.
8. When a warning message appears regarding several processes that must be shut down to continue, select '**Yes'**. The **DB2 Setup Wizard** should be displayed shortly after this.
9. On the **Enable operating system security for DB2 objects** form, clear/remove the checkmark in the **Enable operating system security**. We do not want this turned on. Click **Next**.
10. On the **Resuming the DB2 Setup wizard for DB2 form**, click **Next**.

Note: The wizard will validate your existing DB2 Installation, and then proceed with the update, installing any available upgrade.

11. If you are prompted to reboot to complete the setup, click **OK**.
12. When the Setup is complete, click **Finish**.
13. When you are prompted to reboot, click **Yes**.
14. After rebooting and logging on with your **db2admin** user, the **DB2 First Steps** window will appear. Close this window.
15. Open the **DB2 Command Line Processor** (CLP) by entering **DB2CMD** in the Windows **Run** dialog. Now execute the following command for all the databases on your DB2 server:

```
db2updv115 -d <database_name> -u DB2ADMIN -p <db2admin_Password>
```

Applying a DB2 11.5 License

Only Trimble TruckMate Support or Training & Implementation staff can install your DB2 11.5 license. DB2 license key files are not distributed.

This enables us to double check your DB2 installation as well as ensure you are licensed to run the hardware where your DB2 is installed DB2. We also check your network for other DB2 servers to ensure those are correctly licensed as well.

Please contact your installation/upgrade coordinator or the support department to have your permanent DB2 11.5 license key applied.

Note: When first installing DB2, you have a 90-day trial period. This should be an adequate amount of time to get the correct licensing applied by Trimble TruckMate staff.

Installing IBM DSM & IBM Data Studio client

Two free-of-charge graphical user interfaces available for download on the Client Center are the web based **IBM Data Server Manager (DSM)** and the **IBM Data Studio** Windows client application.

This section describes how to install the two IBM components listed above.

Uninstalling previous IBM Data Studio Components

If you have previous versions of **IBM Installation Manager**, **IBM Data Studio Client** or **Web Console** installed, you need to uninstall them first. Click **Start**, go to the Windows **Control Panel** and click **Uninstall a Program**. Remove the programs in the following order:

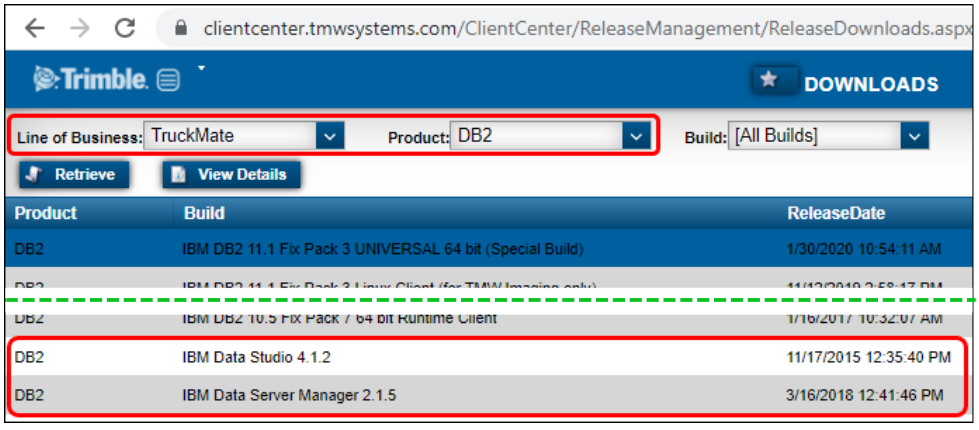
1) IBM Data Studio Client
2) IBM Data Studio Web Console
3) IBM Installation Manager

Tip: *If you had the Web Console installed before, you need to unconfigure it first.* From the Start menu, navigate to **All Programs > IBM Data Studio > Data Studio 4.1 Web Console**. Press the shift key, right-click **Unconfigure the Data Studio web console**, select **Run As Administrator** from the right-click shortcut menu and follow the unconfigure wizard.

Downloading IBM Data Studio Components

Download the latest IBM Data Studio Components for DB2 available on the Trimble Client Center website.

From the menu, navigate to Build Delivery > Downloads. Line of Business = TruckMate, Product = DB2 and download the IBM Data Studio and IBM Data Server Manger installers.



Installing IBM Data Server Manager (DSM)

IBM Data Server Manager (DSM) is IBM's preferred and most actively developed database management tool. You can complete most day-to-day tasks with this web-based software.

Installing Data Server Manager

The following instructions are for a new installation. For upgrades to DSM, please see the next section.

1. While logged on as the db2admin user (i.e., a user with admin privileges on this server), extract the IBM Data Server Manager installation ZIP file (i.e., `v#.#.#-ibm-datasrvmgr-win64.zip`) to the location you want DSM to run from permanently.

   Tip: If you extract the package contents into `C:\`, the **IBM Data Server Manager** product expands into `C:\ibm-datasrvrmgr`. We recommend you use this as your installation location.

2. Once you have extracted the files, press the **Shift** button and right-click the **Setup.bat** file. Select **Run As Administrator** from the shortcut menu.

3. The **DSM Server Manager Setup** form should be open and sitting at step 1 of 3. Select the *I accept the terms of the license agreement* check box and click **Next**.

   On step 2, change the **User ID** to **dsmadmin** and set the password to **M@dd0x01** (using zeros). This user does not need to be in the Active Directory on the domain. Leave the default ports as-is and click **Run Setup**. A progress bar is displayed.

4. Upon installation completion, the step 3 of 3 page will tell you that the setup is complete. Click **Finish** to close the installation wizard.

5. You will notice a DOS command Window remains open and says “Press any key to continue…”. **Before you press any key, copy the HTTP URL**. This URL can be used to access the Data Server Manager site from anywhere on your network.

6. Open your favorite web browser and type or paste the URL from the previous step into the address bar. If you get a page that says no response was received, give it a couple minutes and try again, Data Server Manager is still starting up.

7. Once you are prompted with the DSM login screen, the first thing you should do is bookmark this page for future reference.

8. In the login form, put **dsmadmin** as the user and enter the password you selected and click **Log In**. Your DSM installation is now verified as working.

Upgrading Data Server Manager

The following instructions are for an upgrade to a previous installation on DSM.

1. While logged on as the db2admin user (i.e., a user with admin privileges on this server), navigate to your **Windows Services**. Find the **IBMDataServerMgr** service. Right-click the service and select **Stop** from the shortcut menu.

2. Navigate to the bin directory of your initial DSM installation location. If your installation is in our suggested directory, the location should be: **`C:\ibm-datasrvrmgr\bin`**

3. Run the **status.bat** file by double-clicking on it. The report back should say the server status is **INACTIVE**. Press any key to close the command window.

4. Now extract the updated IBM Data Server Manager installation ZIP file (e.g., `ibm-datasrvmgr-win64.zip`) into the previous install directory. Allow the files to be overwritten and replaced.

   Tip: If you extracted the package contents into `C:\` on your initial installation, the **IBM Data Server Manager** product expands into **`C:\ibm-datasrvrmgr`**. We recommend using this as your installation location.

5. Once you have extracted the files, push the **Shift** button and right-click the **Setup.bat** file in the root installation directory. Select **Run As Administrator** from the shortcut menu.

6. In newer versions of DSM, the upgrade will complete automatically in the command window. If you are prompted for input, follow the instructions to completion.

7. Now open up your favorite web browser and navigate to your DSM URL. If you get a page that says no response was received, give it a couple minutes and try again, Data Server Manager is still starting up.

8. Once prompted with the DSM login screen, put **dsmadmin** as the user and enter the password you selected and click **Log In**.

   Your DSM installation is now verified as working.

Adding Database Connections in DSM

This section describes how to add database connections in IBM Data Server Manager. A connection must be entered for every database you wish to have automatically backed-up, maintained and monitored.

1. From your internet browser, open your bookmark for the **IBM Data Server Manager** site.

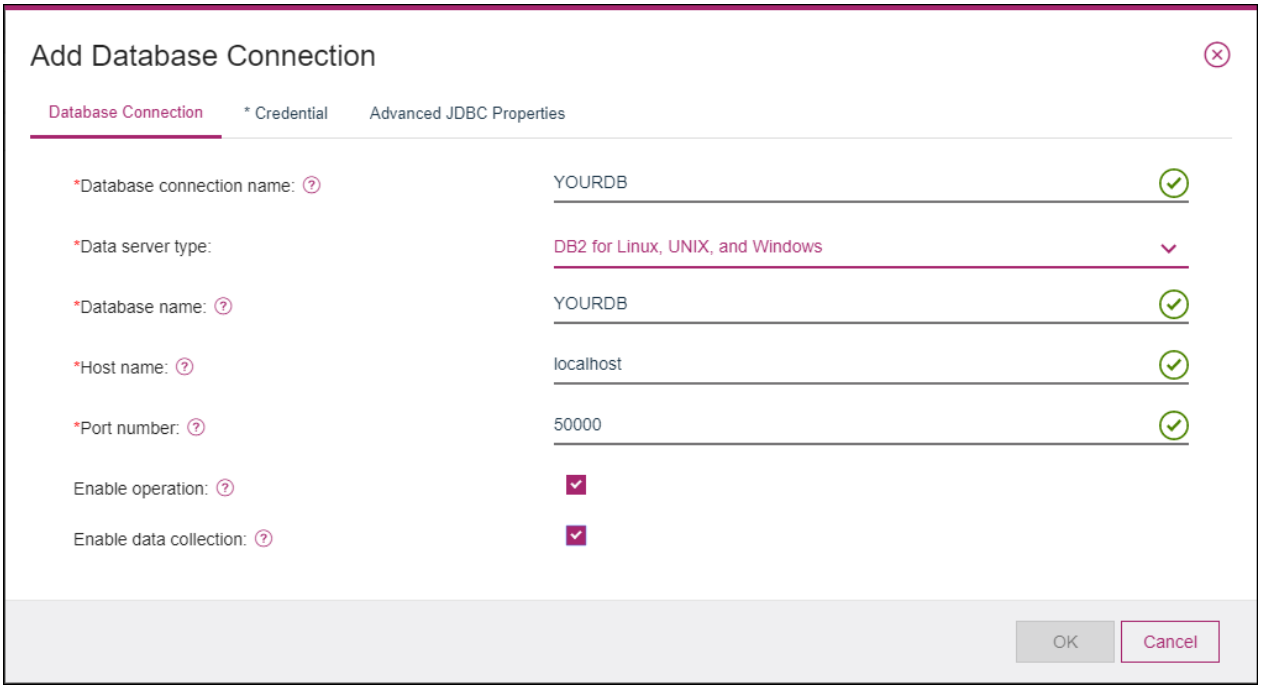
2. Login with the **db2admin** user and password. These were setup when you installed DSM in the Installing IBM Data Server Manager section.

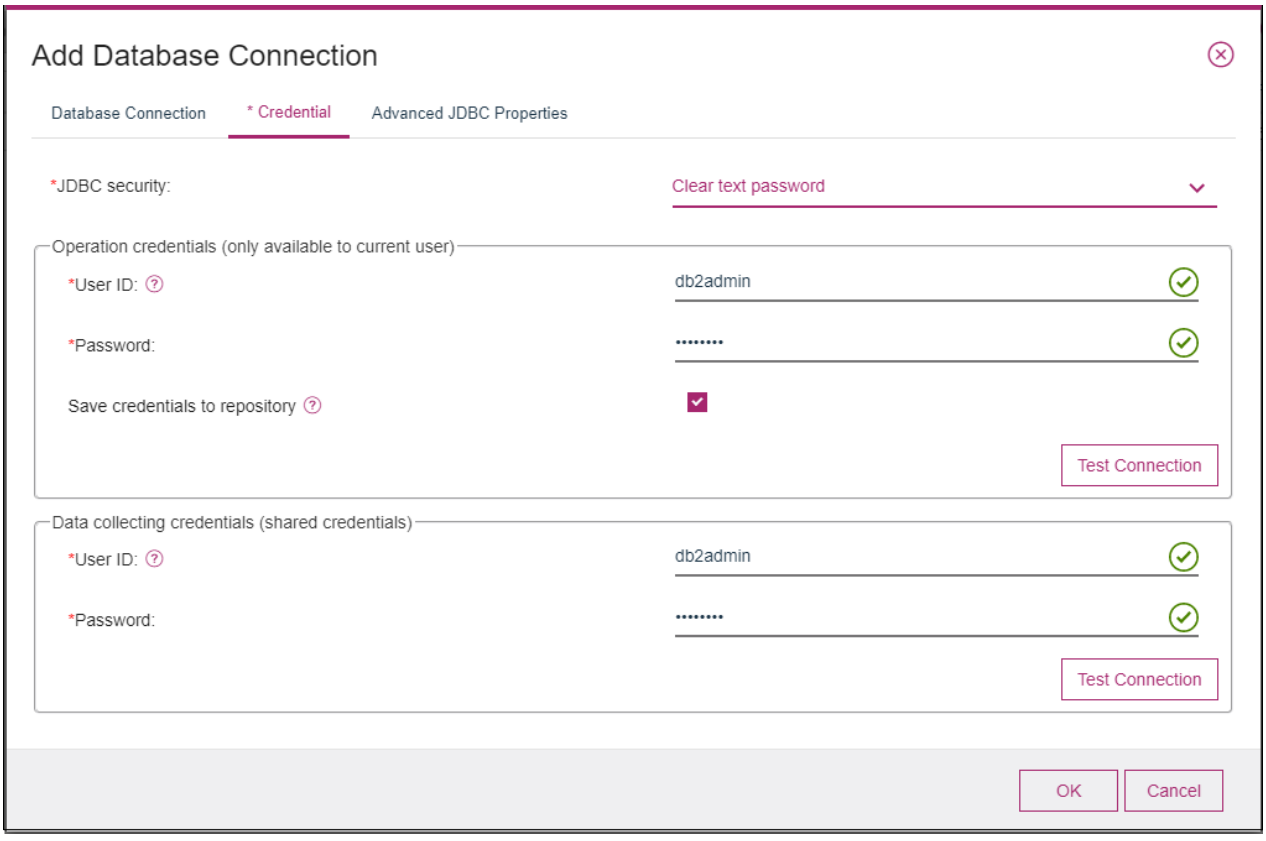
3. Once you are logged in, you will be presented with the Data Server Manager home page. Hover over **Settings** in the menu on the left and click **Manage Connections**.

4. Now click the **Add** button while on the **Database Connection** tab.

5. Fill out the **Add Database Connection** form (including the **Credential** sub-form) with the applicable information and then click the **Test Connection** buttons. If the tests are successful, click **OK** and save the database connection information.

   Here is a screenshot of an example you can follow:





6. You should see your new connection in the **Database Connections** grid listed.

7. Repeat the process of adding connections for all the databases you wish to monitor and perform maintenance on. Close the **Databases** tab when complete.

Configuring the SMTP Email Notification Service

This section describes how to configure IBM Data Server Manager to use your SMTP server for automated job notifications.

1. From your internet browser, open your bookmark for the **IBM Data Server Manager** site.
2. Login with the **dsmadmin** user and password. These were setup when you installed DSM in the Installing IBM Data Server Manager section.
3. Once you are logged in, you will be presented with the Data Server Manager home page. Hover over **Settings** in the menu on the left and click **Product Setup**.
4. On the Product Setup page, click the **Email Server** section link.
5. The **Email Server** section will be displayed. Populate the form with your applicable SMTP server information. **Send a Test E-mail**. If the test is successful, click the **Save Email Settings** button.

Installing IBM Data Studio Client

This application has more advanced features that may be required by Trimble TruckMate staff or advanced TruckMate users and IT personnel.

1. While logged on as the **db2admin** user you installed DB2 with (i.e., a user with admin privileges on this server), extract the **IBM Data Studio Client installation** ZIP file (i.e., `ibm_ds####_win.zip`) and run **LaunchPad.exe** from the folder you extracted it to.
2. On the **IBM Data Studio Client** form, select **Install or Update Product**.
3. Now select **Administrative Installation** or **Update**.

   Note: First, the installation package will need to install the **IBM Installation Manager**, and then you will install the **IBM Data Studio Client** via the **Installation Manager**.

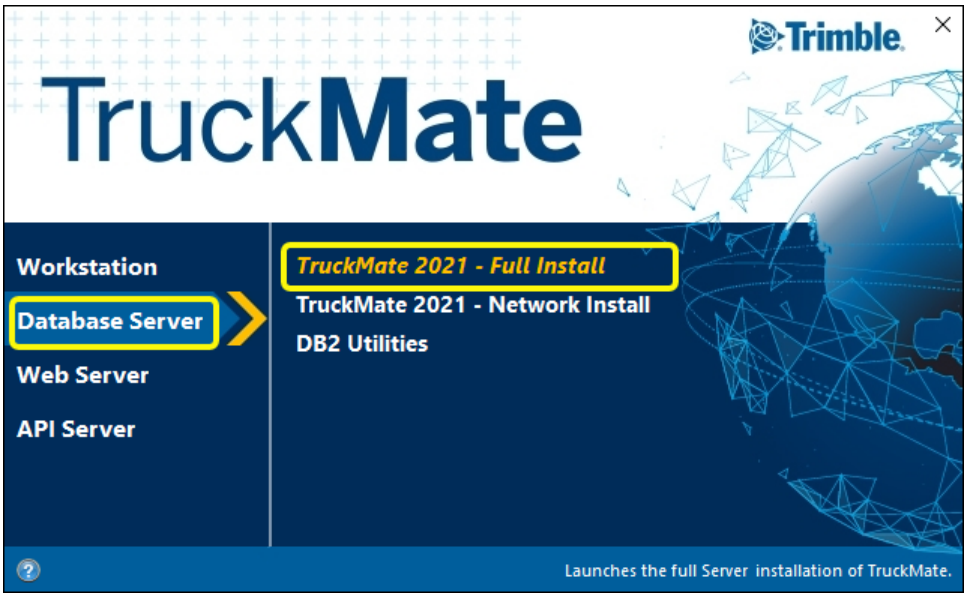
4. Select **Next** in the **Install Packages** screen that opens.
5. Accept the license agreement and click **Next**.
6. Click **Next** again if you wish to leave the default Installation Directory as is.
7. Now click **Install**.
8. Once the Installation Manager has been installed, click **Restart the Installation Manager** button.
9. The **IBM Installation Manager** form will open. Click the **Install** button.
10. On the **Install Packages** page, put a checkmark in the **IBM Data Studio Client** check box at the top and click **Next**.
11. Accept the license terms and click **Next**.
12. Click **Next** if you wish to leave the default **Shared Resource Directory** as is.

13. Click **Next** if you wish to leave the default **Installation Directory** as is.
14. Click **Next** to accept the default **Language** selection.
15. Click **Next** to install the **Full Product Options**.
16. Click **Next** to confirm getting product Help access from the Web.
17. Click **Install**.
18. Once the installation is successfully completed, click **Finish** and close the **IBM Installation Manager**.

Install TruckMate database and application

Before you can configure a TruckMate database, you must first create or import a TruckMate (and ISC4) database as a starting point and install the TruckMate application.

- Create the TruckMate DB2 databases (typically performed by TruckMate implementer).
- Install the TruckMate application > Database Server software.



Database Configuration

This section covers essential database configuration you should check and/or modify.

***Important**: The configuration procedures and settings discussed in this section have a significant impact on the reliability and the performance of your entire TruckMate for Windows system.*

Configuring Databases and DBMS Environment Variables

Your TruckMate DB2 databases and the DB2 database management system (DBMS) have many different configuration settings. TruckMate systems have many baseline DB2 settings so a purpose built utility is available in the TruckMate SQL Execute program to help review and validate appropriate configuration settings.

Note: Before you can configure a TruckMate database, you must first create or import a TruckMate (and ISC4) database as a starting point and install the TruckMate application (in order to access the SQL Execute program).

1. From the database server desktop, open up **SQL Execute** from the TruckMate menu under **Utilities > Database Utilities > SQL Execute**.
2. Connect to your TruckMate Database using the schema owner login credentials (usually **TMWIN**).
3. Once the application is open, navigate to the Performance menu and click it. Now select the **DB2 Configs** and select your primary database from the sub-menu.
4. Enter your **db2admin** domain user password and click **OK**.
5. The **DB2 Settings that effect TruckMate Performance** form should be displayed. In the form, you will see a grid that lists all the DB2 configuration parameters TruckMate systems have an interest in. To accept the defaults, click **OK**. DB2 Command Line Processor (CLP) windows will follow. Allow them to continue.

   Note:

   - Rows highlighted in Red with a checkmark indicate required changes. Yellow highlighted rows without a checkmark indicate a non-standard value that seems reasonable to leave as-is. Non-highlighted items are already set correctly.
   - As of DB2 11.5.6, a new '**DB2_UPGRADE_SKIP_CYCLE_CHECK**' DB2 configuration option is added during installation. This new option must be set to *True* to avoid errors that may prevent TruckMate from running. This option can be set using SQL Execute in TruckMate 2021.x and higher with the latest patch updates applied.

6. When prompted to restart DB2, click **Later** if you have other databases to configure such as the **ISC4** database (which has its own custom settings) or other TruckMate databases you have on the server. Repeat steps 2 through 5 for each database.

7. Once you have completed running the performance setting optimization for each database you can choose to **Restart DB2 Now**, if there are *no active users* on the system.

   If there are *active* users, click **Later** and ensure you schedule your own restart of DB2 as soon as possible. It is important to ***remember to restart the DB2 databases***.

Configuring Database Logging

This section describes how to define your database logging configuration. Logs keep a record of all changes made to database objects and data. All changes are first written to log buffers in memory and then moved or flushed to log files on disk when the changes are committed or the buffers are full. In case of a mishap, such as a power failure, the log files would be used to return the Database to a consistent state.

Depending on your needs, database logging can be configured in one of the following ways:

- **Archival Logging:** this type of logging does not overwrite log files but creates additional logs to record all transactions since the last backup of the Database. Archival Logging supports roll-forward recovery and is the recommended logging type for all production databases.
- **Circular Logging:** this type of logging uses a circle or 'ring' of log files to record changes to a Database. When the last log is filled, the first file is reused in a circular fashion. Since transaction information can be overwritten, roll-forward recovery is not possible with Circular Logging. Circular Logging is not recommended, and will not be supported by this document.

Active logs contain transaction information that has not been committed or rolled back, or those committed changes that have not yet been written to the database files. When all changes in an active log are no longer needed for normal processing, the log is closed and becomes an archived log.

Using DB2 to Automatically Archive Log Files

DB2 Archive Logging provides the ability to create log files that record all transactions since the last backup of the Database, and will not overwrite the log files. Therefore, the ability to perform a roll-forward recovery is available. Only online backups are only possible after a database has been configured for log file archiving.

1. From the **Start** menu, navigate to the **IBM Data Studio Client** application, click **Start** and point to **All Programs**. Point to **IBM Data Studio** and then click **IBM Data Studio <version#> Client**.
2. **IBM Data Studio Client** should open after selecting the default workspace (if prompted).
3. On the **Administration Explorer** tab on the left side of the **Database Administration** perspective/view, expand the tree: All **Databases > localhost > DB2**.
4. Double-click the database to configure and fill in the username and password portion of the form displayed with your db2admin domain user credentials and click **OK**.
5. The database will expand and list many folders underneath it in the tree view. Right-click the database icon you just connected to, select the **Set Up and Configure** menu option and select the **Configure Database Logging** sub-option.

6. A new **Configure Database Logging <DBNAME>** tab should open to the right side of the application. This is DB2's Logging Configuration 'Wizard'.

7. Notice the sub-tabs on the left hand side of the wizard underneath the **Settings** heading. On the first tab, **Logging Type**, select **Archive** as the **Database logging type**.

8. Verify the **Automatic DB2 archive** option is selected and populate the File System Location field as per the DB2 Server OS, Data, Log and Backup Folder Structure section near the beginning of this document (i.e., `L:\DB2Logs\<DBNAME>\Archive`). Feel free to provide an optional **Failure archive log location**, if so desired.

9. Now click the second tab, **Logging Size**. If you did the configuration steps in the previous configuration section, you should see the following values: 24 primary log files, 48 secondary files and each file size being 2500 4K pages. Leave **Enable infinite logging** in an un-checked state.

10. Now click the next tab, **Logging Location**. Populate the **Active log path** field with the location where you want your active logs to reside (i.e., `L:\DB2Logs\<DBNAME>\Active`).

11. Now we need to do an offline backup. Skip a few tabs and click the **Backup Image** tab. Click the **Add** button and the **Browse** button to select the location to store your offline backup (i.e., `L:\DB2Backups\<DBNAME>\Offline`).

12. Click the **Backup Options** tab and confirm the **Backup type** is **Full backup** and the **Availability** is **Offline**.

13. Now click the **Command** section header to expand that section. Note that you can view the DB2 CLP commands that will be executed. From here you can Edit, Run or Save the commands. If you are ready to complete the changes, click the **Green Arrow/Run** button to start the process. You will notice the **Messages** section automatically open and display a progress bar as well as textual progress updates.

14. You should see the **Status** reported as **Successful** in the **SQL Results** tab at the bottom of the **IBM Data Studio** application. Your database is now setup for log file archiving and you can now take online database backups.

Database Backup and Restoration

TruckMate / DB2 database backups (and more importantly, testing them) is a critical IT process that needs to be understood and mastered by one or more people in your organization. This section covers backing up and restoring your database.

If after reading and practicing this section you find you would like some additional help, we would be happy to assist you. Please contact TruckMate support for assistance.

Important: Trimble Inc. does not assume any liability for the loss of your data. You alone are responsible to ensure it is backed up and restorable.

Manual Database Backups

This section includes the required steps to complete the manual Backup procedures. These procedures are normally used when you need to do a backup outside of your regularly scheduled database backups, for example prior to an upgrade or patch. These procedures include both Online and Offline backups and you need to decide which option to choose depending on the situation:

- **Online Backup:** This option enables users to continue accessing the database while the backup is performed; therefore it is normally selected when you are backing up a live environment in a 24/7 operation where users cannot be denied access to the database for any period of time.
- **Offline Backup**: This option requires all users to be logged off the system and any TruckMate services such as Mileage Server must be shut down while the backup is performed; therefore this option it is normally selected when you can bring the system down for an extended period of time. For example, when you are backing up a test environment or are just about to do a database upgrade/migration.

Backup Databases with TruckMate's SQL Execute

1. From your database server's desktop, go to the **Utilities > Database Utilities > SQL Execute** program in the TruckMate menu.
2. Connect to your TruckMate Database using the schema owner login credentials (usually TMWIN).
3. Once the application is open, navigate to the **Tools** menu and select the **Database Backup Wizard**.
4. When the **Database Backup Wizard** opens, click **Next**.
5. Populate the appropriate fields and select your desired options in the **Specify administrative user** and backup type wizard page. Click **Next**.
6. The **Performance and Compression Options** page will be displayed. Compress the image if you desire. We suggest leaving the other option related to performance enabled (automatic). Click **Next**.
7. On the **Completing the Database Backup Wizard** page, click **Finished**. Allow the CLP windows to proceed and review the log file for errors once it is presented in your default text editor (i.e., Notepad).

Backup Databases with IBM Data Studio Client

Online Backup

This section provides the steps required to complete an online backup with the IBM Data Studio Client outside of your regularly scheduled maintenance. Note that you need to have Archive Logging enabled on your database to do an online backup. See Configuring Database Logging section to learn more.

1. From the **Start** menu, navigate to the **IBM Data Studio Client** application.
2. Click **Start**, point to **All Programs,** point to **IBM Data Studio** and click **IBM Data Studio <version#> Client**.
3. **IBM Data Studio Client** should open after selecting the default workspace (if prompted).
4. On the **Administration Explorer** tab on the left side of the Database Administration perspective/view, expand the tree: **All Databases > localhost > DB2**.
5. Right-click the database you wish to backup, select **Back Up and Restore**, and select **Backup**. A new Back Up <DBNAME> tab should open to the right side of the application. This is DB2's backup 'Wizard'.
6. Notice the sub-tabs on the left hand side of the wizard underneath the Settings heading. The first tab, backup information, summarizes the database and other applicable information to backups and restores.
7. Skip the next tab and select the **Backup Image** tab. Click the **Add** button, select the row that says <**Specify Backup Location**> and click **Browse**. Navigate to your desired storage location (i.e., `L:\DB2Backups\<DBNAME>\Online`), select it and click **OK**.
8. Now click the next tab, **Backup Options**, confirm **Full Backup** is selected and feel free to check one or both of the **Compression and Throttle** related options, if desired. Also, confirm **Online** is selected in the **Availability** section. We suggest you check the box to Include log files in the backup image.
9. Click the **Command** section header to expand that section. Note that you can view the DB2 CLP commands that will be executed. From here you can Edit, Run or Save the commands. If you are ready to complete the changes, click the **Green Arrow/Run** button to start the process. You will notice the **Messages** section automatically open and display a progress bar as well as textual progress updates.
10. You should see the **Status** reported as **Successful** in the **SQL Results** tab at the bottom of the IBM Data Studio application when the backup process is complete.

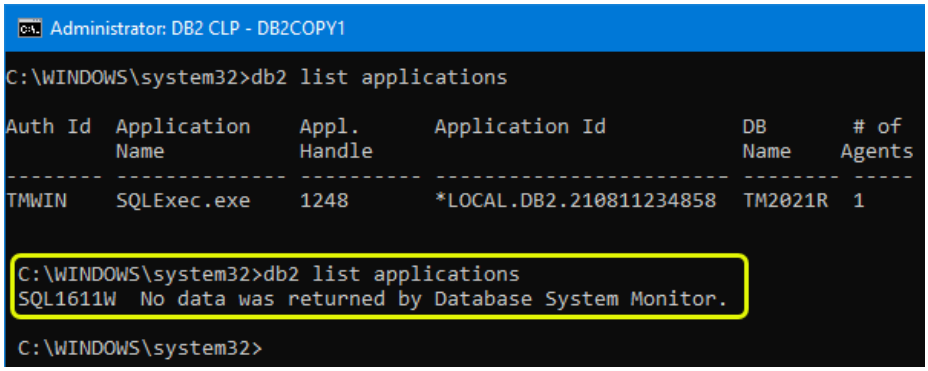
Offline Backup

This section provides the steps required to complete an offline backup with the IBM Data Studio Client outside of your regularly scheduled maintenance.

***Important**: Ensure that all Users are logged off the Database and all TruckMate services (EDI, Mileage Server, MobileComm etc.) are shut down prior to starting this procedure.*

To determine if any services and integrations are running:

1. Run **DB2CMDADMIN** from the Windows Run window.
2. Enter `db2 list applications` and press ENTER.
   - If there are connected services and/or integrations, they appear in a table. You must stop each service and/or integration before proceeding, especially if there is a new version of the associated executable files being installed as part of the upgrade.



   - If there are no connected services and/or integrations, the following message appears:

     `SQL1611W No data was returned by Database System Monitor.`

To create the offline backup:

1. From the **Start** menu, navigate to the **IBM Data Studio Client** application.
2. Click **Start**, and point to **All Programs**. Point to **IBM Data Studio** and click **IBM Data Studio <version#> Client**.
3. **IBM Data Studio Client** should open after selecting the default workspace (if prompted).
4. On the **Administration Explorer** tab on the left side of the **Database Administration** perspective/view. Expand the tree: **All Databases > localhost > DB2**.
5. Right-click the database you wish to backup, select **Back Up and Restore** and click **Backup**. A new **Back Up <DBNAME>** tab should open to the right side of the application. This is DB2's backup 'Wizard'.
6. Notice the sub-tabs on the left hand side of the wizard underneath the **Settings** heading. The first tab, backup information, summarizes the database and other applicable information to backups and restores.
7. Skip the next tab and select the Backup Image tab. Click the **Add** button then select the row that says **<Specify Backup Location>** and click **Browse**. Navigate to your desired storage location (i.e., `L:\DB2Backups\<DBNAME>\Offline`), select it and click **OK**.
8. Click the next tab, **Backup Options**, confirm **Full Backup** is selected and feel free to check one or both of the **Compression and Throttle** related options, if desired. Also, confirm **Offline** is selected in the **Availability** section.

9. Now click the **Command** section header to expand that section. Note that you can view the DB2 CLP commands that will be executed. From here you can Edit, Run or Save the commands. If you are ready to complete the changes, click the **Green Arrow/Run** button to start the process. You will notice the **Messages** section automatically open and display a progress bar as well as textual progress updates.

10. You should see the **Status** reported as **Successful** in the SQL Results tab at the bottom of the IBM Data Studio application when the backup process is complete.

Offline backup using Command Window

To create an **offline** backup:

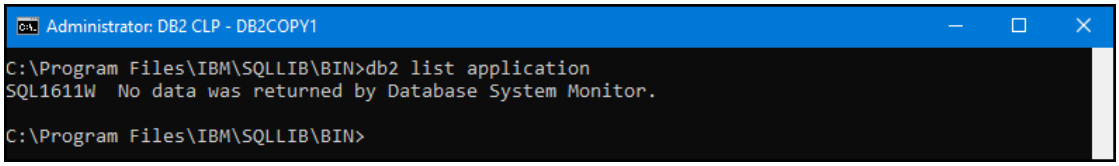
1. Open the DB2 Command Line Processor (CLP) by typing **DB2CMD** in the **Windows Search/Run** on the **Start** menu.

2. List the active applications/databases to see if there are any open connections.

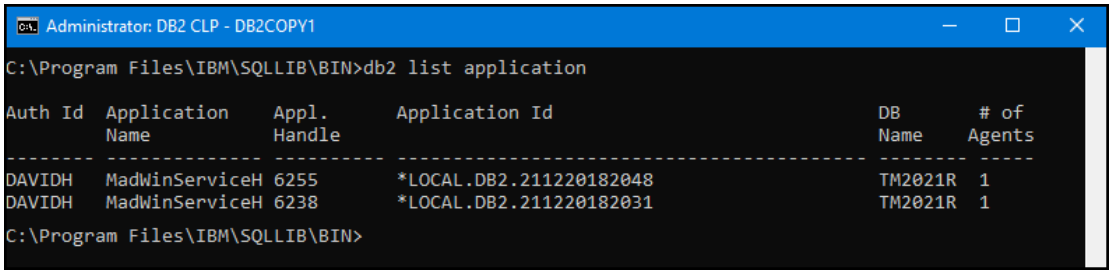
   ```
   db2 list application
   ```

   - If no user or service is connected to the database, you will see the following message:

     ```
     SQL1611W No data was returned by Database System Monitor.
     ```

   - If a user of service is connected to the database, you will see a list.

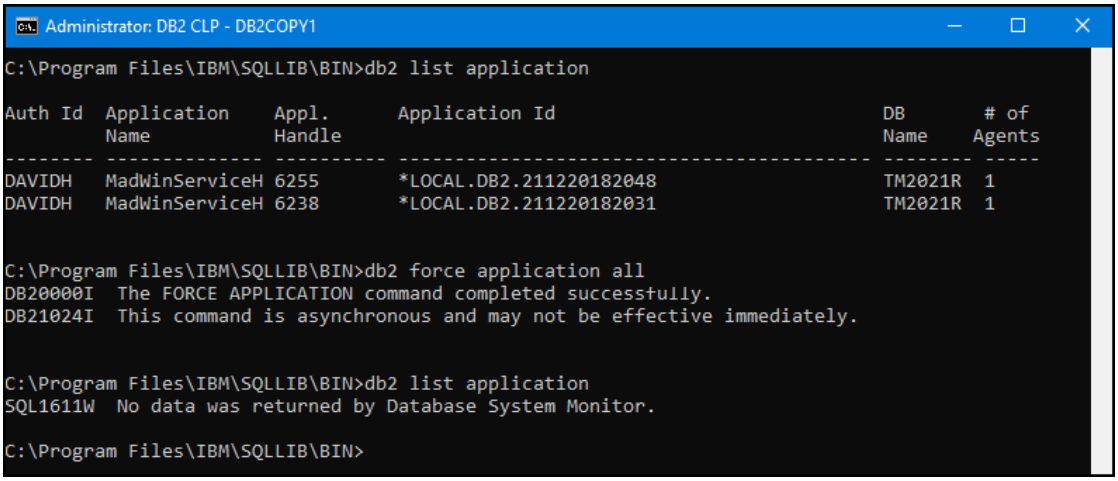
     

1. Use the force application command to close any open connections.

   ```
   db2 force application all
   ```

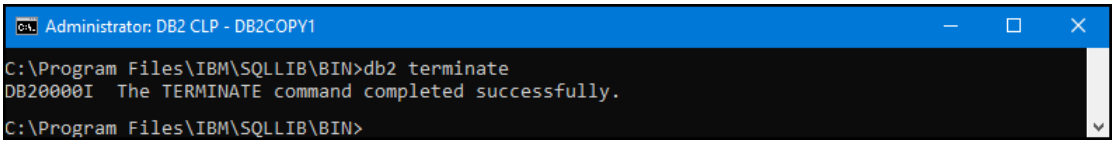
   ```
   db2 list applications
   ```

2. Repeat these command a few times until the db2 list applications confirms all connections are closed by returning a "`No data was returned by Database System Monitor.`" message



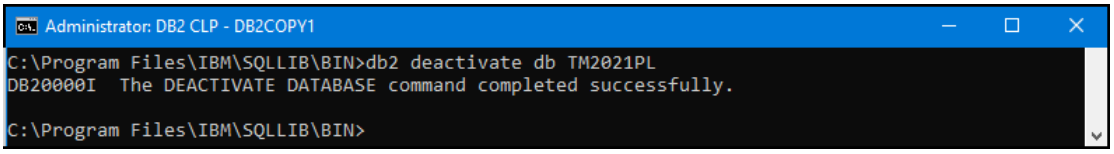
3. Terminate the connections.

   ```
   db2 terminate
   ```



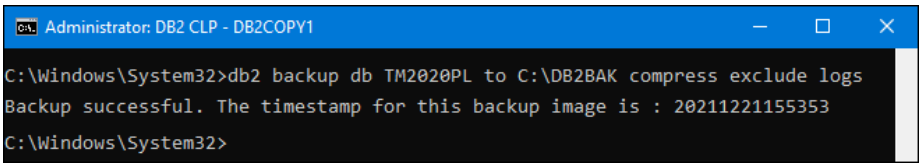
4. Deactivate the database. (Users cannot connect until the database is activated.)

   ```
   db2 deactivate db <database name>
   ```



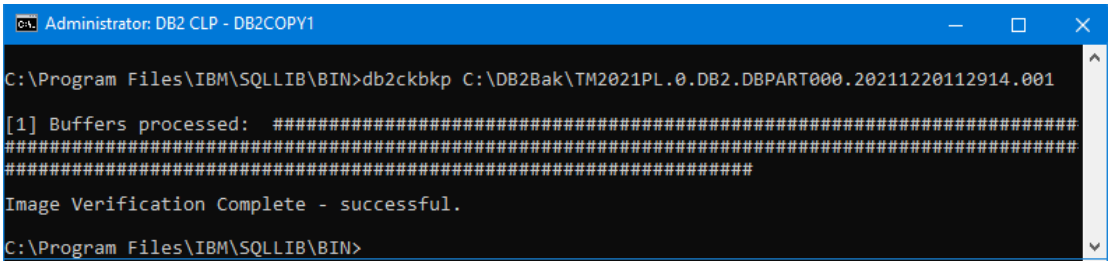
5. Make a full offline backup. The entire database is copied to a backup file in the specified location.

   ```
   db2 backup db <database name> to <location> compress exclude logs
   ```



6. Verify that the backup file was correctly created.

   ```
   db2ckbkp <location\backup file>
   ```



7. Once the database upgrade is complete and the system is ready for users to connect to the system again, activate the database to allow connections.

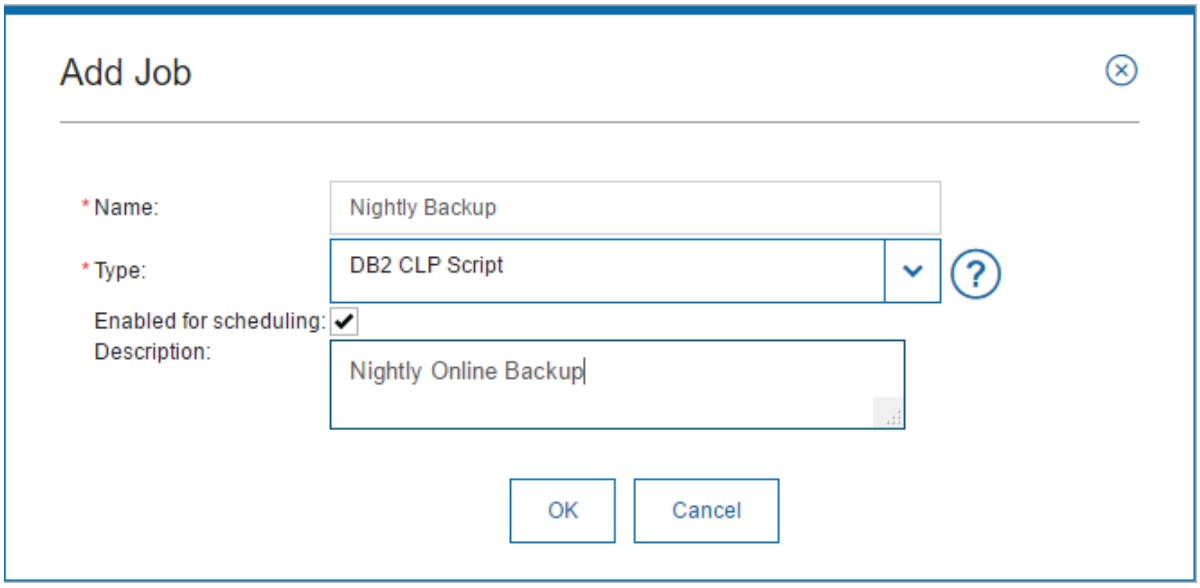
   ```
   db2 activate db <database name>
   ```

   Note: Rebooting the server will activate the database(s).

Configuring Automatic Database Backups with IBM DSM

This section describes how to configure an automated backup to occur every night for a TruckMate database. It assumes you have already completed all the steps in the Installing IBM Data Server Manager (DSM) section.

1. From your internet browser, open your bookmark for the **IBM Data Server Manager** site.
2. Login with the **db2admin** user and password. These were setup when you installed DSM in the Installing IBM Data Server Manager section.
3. Once you are logged in, you will be presented with the **Data Server Manager** home page. Click **Jobs** in the menu on the left. The **Jobs** page should be displayed.
4. Use the second dropdown box that contains the words "`View Options`" and select the **View Options: Job Definition** link. The job definitions page will load.
5. Click the **Add Job** button. Populate the **Add Job** form that is displayed and click **OK**. Here is an example form filled out:



Once you click **OK** on the **Add Job** form, you will be presented with a more detailed view of the job and you will be sitting on the **Script** menu option of the **Job Components** menu. Use the example command below to help you populate the script text field:

```
CALL SYSPROC.ADMIN_CMD('BACKUP DATABASE <DBNAME> ONLINE TO
"C:\DB2Backups\<DBNAME>\Online" COMPRESS INCLUDE LOGS  WITHOUT PROMPTING');
```

Tip: You should only need to change the <DBNAME> references to your database name if you have followed the rest of the recommendations in this document.

6. Click **Schedules** in the **Job Components** menu and click the **Add Schedule** button.
7. In the **Schedule Details** sub-tab that opens, select the initial date and time you would like to start this task. Early morning when few users are on the system is generally a good time to select. Select the **Repeats** check box and select **Every Day** from the dropdown menu. Populate the **Until** fields if you so desire.
8. Click the **Databases** tab and click the **Select Databases** button. In the form that displays and change the drop down box to **Single database** then select the database name you put in your script command in the previous step. Normally you can leave the **Use the default user ID** option selection as-is.
9. Click **Notifications** in the **Job Components** menu and click the **Add Notification** button.
10. In the **Email Recipients** section, type in the email addresses you wish to notify every time this job executes. Separate multiple addresses with comas. Click the **Apply** button when you have completed your list.
11. Click the **Select Databases** button in the **Database Notification Criteria** section. Once the input form comes up, put a checkmark beside the database name that you selected in the previous steps and click **OK**. Feel free to change the **Notify if dropdown** box to your liking, default is to **Always** notify.
12. Now we have all the necessary information entered, you can click the Save All button above the **Job Components** menu.
13. To test that you have set everything up correctly, click the **Run** button beside the **Save All** button you just clicked. In the form that displays, put a checkmark beside the database name that you selected in the previous steps and click **OK**. Click the **OK** button on the subsequent dialog box that tells you to look at the **History** to see the jobs progress.
14. Select the **View Options: History** option in the second drop-down box. Here you will see the listing of job progress and history.
15. You should see a **Status** of **Succeeded** on your backup job once the **Progress** column reads **Completed**. If it failed, highlight the row and click the **View log in browser** button to see why it failed. Make the appropriate adjustments to your job to get it working consistently.

Tip: You can create a similar job that would restore a database on a reoccurring schedule to keep a test database close to the state of your production database. The steps would be very similar to the above but the main command would be changed from a BACKUP to a RESTORE, plus some other minor adjustments.

Manual Database Restorations

This section includes the required steps to complete the manual database restoration procedures. These procedures are normally used when you need to do a restore a database image to create a test database. These procedures may also be needed to restore your database if a critical failure occurred on your production server and/or database. These procedures include both restoring Offline and Online backups.

Restoring Databases with IBM Data Studio Client

The section provides the steps required to restore a Database from a backup image. This process includes the roll-forward procedure when restoring from an Online Backup to re-apply changes that were made by transactions that were committed after the last Database backup image was made. The roll-forward procedure requires that you have been capturing transactions in an archive log file location. See Configuring Database Logging section to learn more.

1. From the **Start** menu, navigate to the **IBM Data Studio Client** application.
2. Click **Start**, and point to **All Programs**. Point to **IBM Data Studio** and click **IBM Data Studio <version#> Client**.
3. **IBM Data Studio Client** should open after selecting the default workspace (if prompted).
4. On the **Administration Explorer** tab on the left side of the **Database Administration** perspective/view. Expand the tree: **All Databases > localhost > DB2**.
5. Right-click any database in the tree-view, select **Back Up and Restore**, and click **Restore**. A new **Restore Database <DBNAME>** tab should open to the right side of the application. This is DB2's restore 'Wizard'.

   Important: If you do not have any databases listed in your tree-view, this means you are working with a new installation of DB2 or all pre-existing databases have been dropped. In this case, you will need to do your first restore from a backup at the DB2 Command Line Processor (CLP). Please see the following section titled Restoring Databases with the DB2 Command Line Processor (CLP) for instructions on that process.

6. Notice the sub-tabs on the left hand side of the wizard underneath the **Settings** heading. The first tab, **Restore Type**, allows you to select your **Restore Target**. Select the **Restore the backup to a different database** option.

   ***Important**: You should not need to restore the backup to the database you selected. If you think you need to do this on a production database, contact TruckMate support before doing so.*

7. Fill in the **Database Name** field with the name you want your new database to be called and populate the **Database Location** field with a root drive path (i.e., `D:\`).

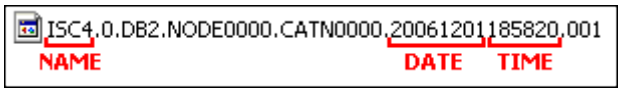
   Tip: Database names can be 8 characters long and should be kept simple. Sticking to alphanumeric characters plus underscores (_) will ensure your database name is accepted.

8. Click the next tab, **Restore Objects**, leave the default **Restore the entire database** option selected.

9. Populate the **Backup images details** section using your standard DB2 backup image file locations (i.e., `L:\DB2Backups\<DBNAME>\Offline`) as well as the date and time information from the file you wish to restore from.

   Take note that you can change your source database from the one you initially selected when starting the wizard by putting a **checkmark** beside the **Backup is from another database** option. If you select this, populate the text field with database name found in the file name of the backup file you wish to restore from.

   Tip: Your database backup image files will appear as indicated in the following image, which will detail which parts of the filename which will be used (Name, Date and Time):

10. Click the next tab, **Restore Options**, leave most options as-is but select **Restore the specified objects and then roll them forward** option.

11. Click the next tab, **Roll-forward Type**. Normally you will want to leave the Type of roll-forward operation as the default **The end of logs** selection. Other options are available depending on what you are trying to accomplish with the database restore.

12. Lower down on the **Roll-forward Type** tab there is a **Retrieval of the archived logs for roll-forward** section. Choose your preferred option:

    I. **Use default log location** is pretty straightforward. The other two options need more explanation.

    II. **Disable the retrieval of archived logs during the roll-forward operation** is used for database backups you are restoring which don't need to have the latest data from the original source database log files applied. This is often the case when making a test database.

    III. **Specify alternate locations for archived logs** is needed if your log files for the database you are restoring are not in the default log location. This is often the case when you are restoring a database from a different backup image as configured in **Backup images details** section of the **Restore Objects** tab.

13. Click the **Roll-forward Final State** tab and select Complete the roll-forward operation and return to the active state.

14. Click the **Command** section header to expand that section. Note that you can view the DB2 CLP commands that will be executed. From here you can Edit, Run or Save the commands. If you are ready to complete the changes, click the **Green Arrow/Run** button to start the process. You will notice the **Messages** section automatically open and display a progress bar as well as textual progress updates.

15. You should see the **Status** reported as **Successful** in the **SQL Results** tab at the bottom of the IBM Data Studio application when the restore process is complete.

16. The newly restored database can now be added in TruckMate's **Database Connection Manager** and be used with your TruckMate applications.

Restoring Databases with the DB2 Command Line Processor (CLP)

The section provides the steps required to restore a database from a backup image using the DB2 Command Line Processor (CLP).

1. Open the DB2 Command Line Processor (CLP) by typing **DB2CMD** in the Windows Search/Run on the Start Menu.

2. At the command prompt, execute one of the following commands (replacing the variables marked with '<' and '>' with particular values specific to your situation):

   If you have a database that uses auto-managed storage, the following command will restore the database:

   ```
   RESTORE DATABASE <ORIGINAL DBNAME> FROM "<BACKUP FILE PATH>" TAKEN AT
   <TIMESTAMP> ON "<DRIVE LETTER>" INTO <NEW DBNAME> WITH 2 BUFFERS BUFFER
   1024 PARALLELISM 1 WITHOUT PROMPTING
   ```

   If the above command fails, the database you are restoring is an older type and does not have auto-managed storage. The following command will work for you:

   ```
   RESTORE DATABASE <ORIGINAL DBNAME> FROM "<BACKUP FILE PATH>" TAKEN AT
   <TIMESTAMP> TO "<DRIVE LETTER>" INTO <NEW DBNAME> WITH 2 BUFFERS BUFFER
   1024 PARALLELISM 1 WITHOUT PROMPTING
   ```

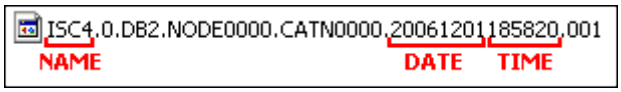
   If you have an online backup file that contains embedded log files which you want to restore along with the backup, the following command is needed:

   ```
   RESTORE DATABASE <ORIGINAL DBNAME> FROM "<BACKUP FILE PATH>" TAKEN AT
   <TIMESTAMP> ON "<DRIVE LETTER>" INTO <NEW DBNAME> LOGTARGET "<LOG FILE
   PATH>" NEWLOGPATH "<LOG FILE PATH>" WITH 2 BUFFERS BUFFER 1024 PARALLELISM
   1 WITHOUT PROMPTING
   ```

   If you have a backup restored and the database is sitting in a roll-forward pending state. You need to roll-forward through the transaction logs to make the database active. The following command will accomplish this:

   ```
   ROLLFORWARD DB <DB NAME> TO END OF LOGS AND STOP OVERFLOW LOG PATH (<DIR
   WHERE YOU COPIED THE LOGS TO>) NORETRIEVE
   ```

Tip: Your database backup image files will appear as indicated in the following image, which will detail which parts of the filename that will be used (Name, Date and Time):



Open a DB2 Command Window - Administrator as DB2ADMIN

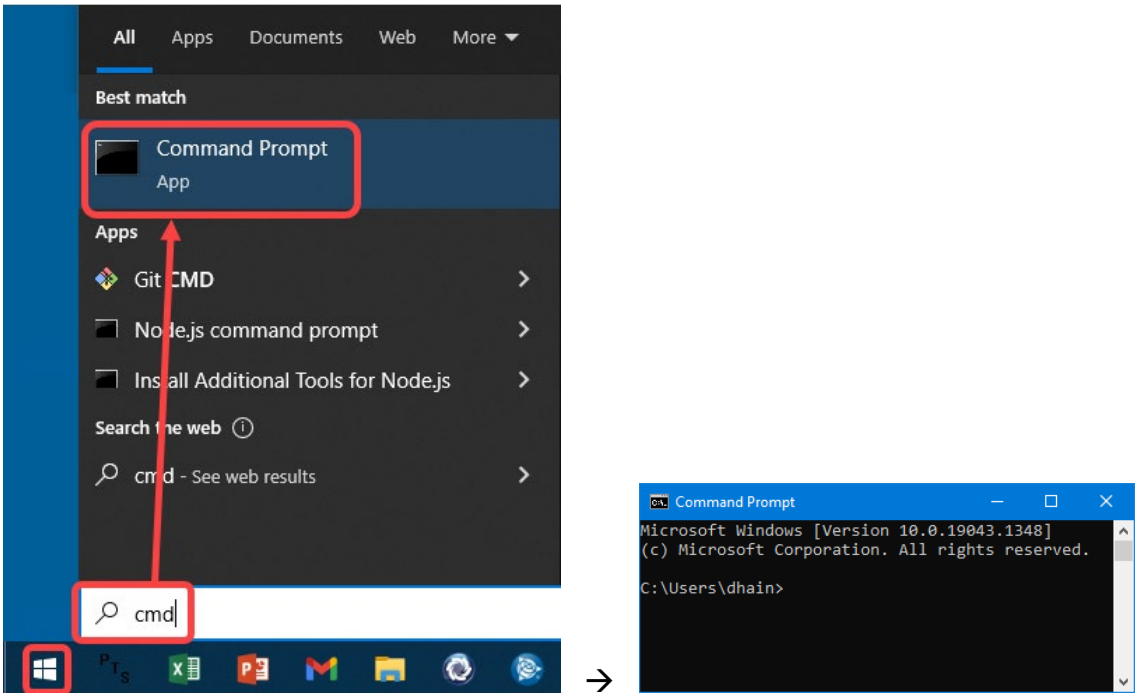
If you are having problems with DB2 authorization while running SQL commands in the DB2 Command Line Processor (CLP) window, one solution is to append the db2admin user name and password to the commands to run them using the db2admin user permissions. For example:

```
db2ckupgrade <database_name> -l <log_File_Name.log> -u DB2ADMIN -P <db2admin_password>
```

Another way to ensure you are using the db2admin user permissions is to open a DB2 Administrator level command window as the DB2ADMIN user. (The DB2ADMIN user is created during the DB2 installation when TruckMate is initially installed.)

It requires opening a couple of interim Windows command windows first to make sure the user running the DB2 command window is DB2ADMIN.

1. Open a regular Windows command window.

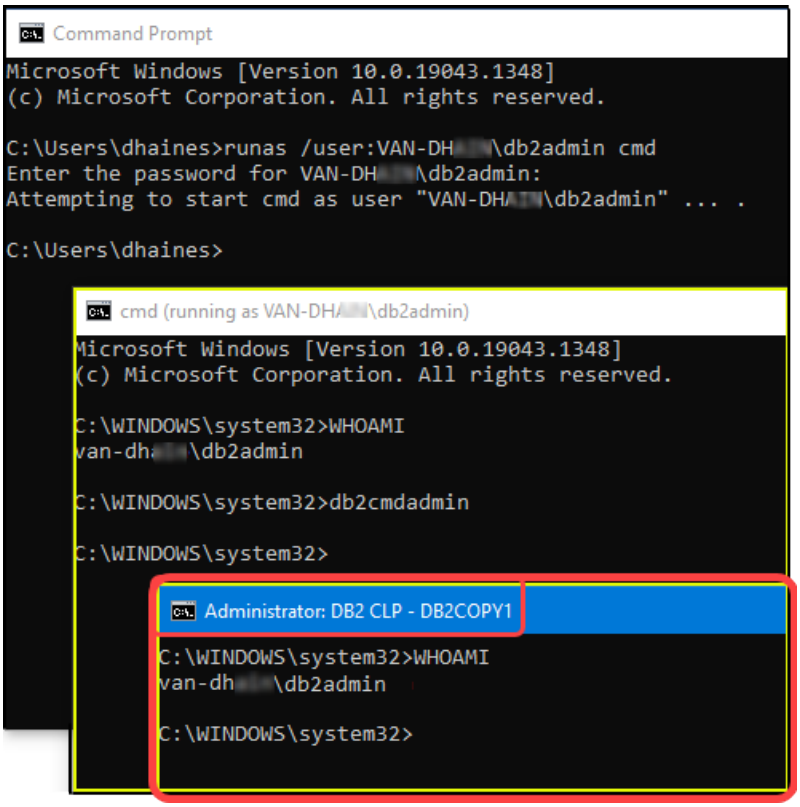


2. Enter `runas /user:<DEVICE_NAME or DOMAIN>\db2admin cmd`

   A second Windows command window opens.

3. Enter `WHOAMI` to verify this second window was opened by user DB2ADMIN.

4. Enter `db2cmdadmin` in the second command window.
5. A third command window opens. This is the DB2 Administrator command window as noted by the word Administrator in the window title bar.
6. Enter `WHOAMI` again to verify this third window was opened by user DB2ADMIN.



Use this "Administrator" command window (i.e., the third window), to run the DB2 commands as the db2admin user.

Database Performance Optimization and Health Monitoring

All databases need some periodic maintenance and it is a good idea to monitor your databases for any issues before they become a major problem. This section will describe how to setup important periodic maintenance tasks as well as basic overviews of DBI's pureFeat and the IBM Data Server Manager (DSM) health monitoring features.

A Healthy Database is characterized by the following:

- There are sufficient resources (fast disk I/O, suitable memory, sufficient CPU capacity, etc.) to accomplish tasks.
- Resources are used efficiently.
- Tasks complete within acceptable periods of time, or without significant performance degradation.

REORG, RUNSTATS and REBIND

Here are some terms you need to know with respect to maintaining your database for optimal performance:

- **REORG (table or index reorganization)**: This maintenance activity can increase the efficiency of access to your data. The process is akin to the Windows drive defragmentation process. A REORG reorganizes the data into a clean and organized fashion. This process does not need to be done as often as RUNSTATS and REBIND.
- **RUNSTATS (data access optimization)**: DB2 updates the statistics on the data and indexes for all tables in your database. These statistics are used by the DB2 query optimizer to improve the performance of queries that execute against the database. The optimizer uses these statistics to determine which path is best to access the data.
- **REBIND (static code optimization)**: DB2 recompiles statically bound routines such as stored procedures to utilize the updated data and index statistics generated by the RUNSTATS procedure.

Note: Maintenance task should be run in the following priority order: REORG (if needed), RUNSTATS and finally REBIND.

The above tasks can be run from various locations such as the DB2 Command Line Processor (CLP), IBM Data Studio Client, IBM Data Server Manager and TruckMate's SQL Execute. For simplicity sake, this document will only discuss ad-hoc executions with TruckMate's SQL Execute and task automation with IBM Data Server Manager. Feel free to familiarize yourself with the options available to you in other applications.

Performance Maintenance with TruckMate's SQL Execute

TruckMate's SQL Execute program can do performance maintenance tasks on an ad-hoc basis. In the following section, Performance Maintenance Automation, automating these tasks is discussed. You should always automate these tasks maintenance tasks. However, from time to time you may need to do these maintenance tasks manually from SQL Execute (i.e., after a TruckMate version upgrade, mass data import, mass data purge, etc.).

***Important**: We recommend that you run all these procedures with as few people active on the system as possible. Running these tasks during peak production hours will affect end-users negatively and is strongly discouraged.*

Running RUNSTATS and REBIND

1. Go to TruckMate > Utilities > Database Utilities > SQL Execute and run the **SQL Execute** program.
2. Connect to your TruckMate Database using the schema owner login credentials.
3. On the **Performance** menu, click **Runstats**. A form should be displayed with a schema dropdown box and a table listing.
4. Select the individual tables you wish to RUNSTATS on or click the **Select All** button. Click **OK** on the form and **OK** once again to the dialog box that is presented.
5. Click the **Execute** button or push the **Ctrl and Enter** keys at the same time to start the **RUNSTATS** process.
6. When **RUNSTATS** is complete, click **Performance Menu** and point to **Rebinds**, and then click **All Procedures**. Click **OK** to the dialog box presented.
7. Click the **Execute** button or push the **Ctrl and Enter** keys at the same time to start the **REBIND** process.
8. Close **SQL Execute** once complete.

Running REORG, RUNSTATS and REBIND

The REORG is prepended to the RUNSTATS and REBIND processes in the following procedure. A REORG is not needed often and it can take a very long time to complete on large databases.

1. Go to TruckMate > Utilities > Database Utilities > SQL Execute and run the **SQL Execute** program.
2. Connect to your TruckMate Database using the schema owner login credentials.
3. On the **Maintenance** menu, under the **Performance** heading, click **All of the Above**.
4. Click **Yes** to automatically generate and execute a database optimization script.
5. Once the processing is complete, click **OK**. Complete any remaining forms or wizards. Any login forms should be populated with your db2adamin domain user credentials.

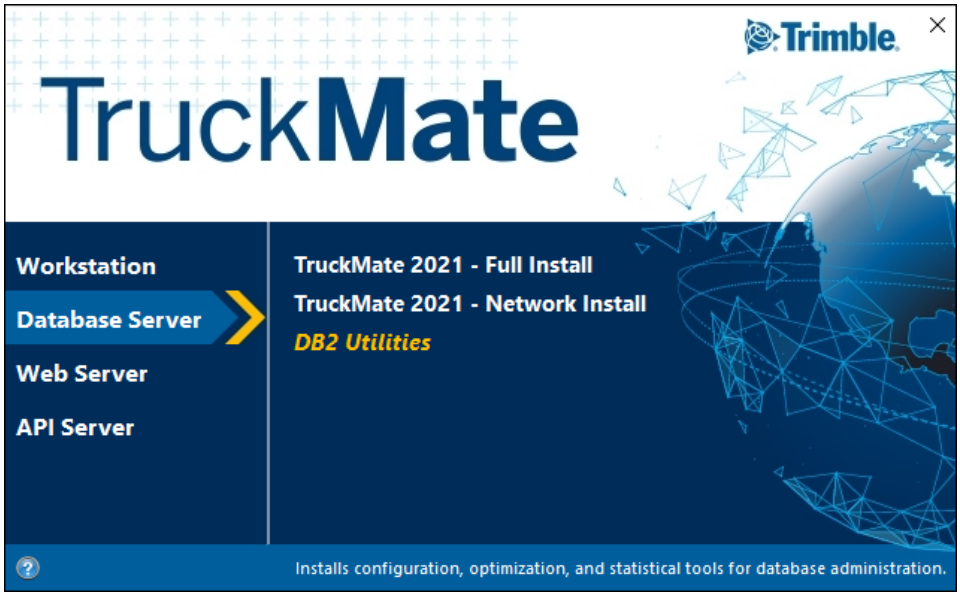
Performance Maintenance Automation

This section describes how to configure automated maintenance activities for your TruckMate databases. These jobs should be setup for every production TruckMate database.

TruckMate Specific DB2 Utilities

The TruckMate installation disk image has DB2 Utilities included on it. You should have installed these on your DB2 server after installing TruckMate. If you have not, please do so now. We suggest installing the utilities in the default location.

Here is a screenshot of the installation option on the TruckMate installation image launch pad:



Scheduling RUNSTATS_SCHED.BAT and OPTALL_SCHED.BAT

The **RUNSTATS_SCHED.BAT** script does a **RUNSTATS** on the tables and indexes then **REBINDs** all the stored Procedures. **This is the most important reoccurring maintenance procedure for your TruckMate systems performance.**

The RUNSTATS_SCHED.BAT file is found in the DB2 Utilities location (i.e. C:\Program Files (x86)\TruckMate <Version#>\DB2 Utilities)

Tip: The RUNSTATS_SCHED.BAT should be run daily just after going-live with TruckMate. After the first two weeks have passed and your database is more populated, run the job every 2 weeks to a month.

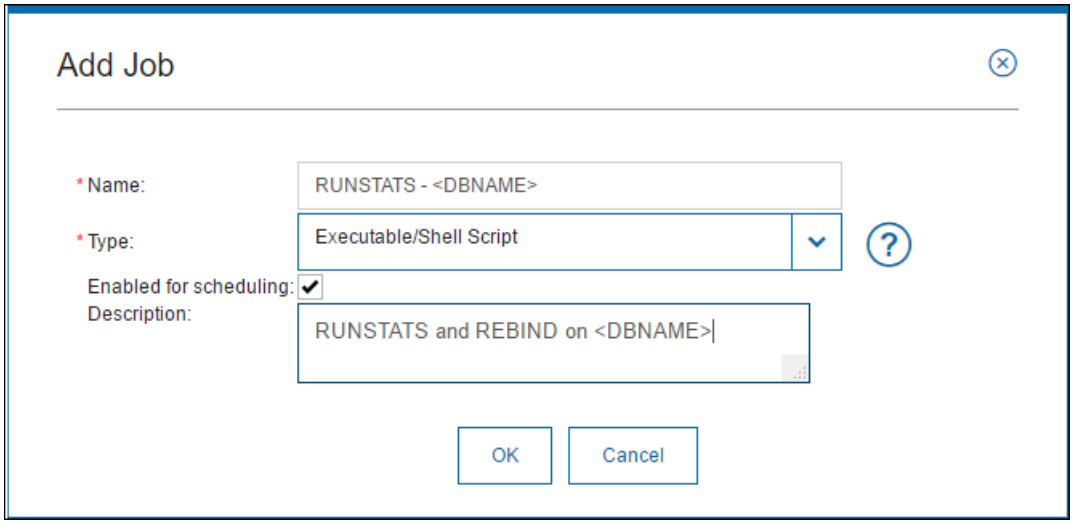
The **OPTALL_SCHED.BAT** script does all three table/index related performance maintenance tasks: **REORG**, **RUNSTATS** and **REBIND**. The OPTALL_SCHED.BAT file is found in the DB2 Utilities location (i.e. C:\Program Files (x86)\TruckMate <Version#>\DB2 Utilities)

Tip: OPTALL_SCHED.BAT does not need to be run frequently. Generally speaking, once or twice a year should suffice.

The remainder of the steps in this section will discuss scheduling the **RUNSTATS_SCHED.BAT** file only. It will also assume you have installed the DB2 Utilities in the default location. Scheduling the OPTALL_SCHED.BAT file is the same except for the frequency of reoccurrence.

The remainder of the steps in this section will discuss scheduling the RUNSTATS_SCHED.BAT file only. It will also assume you have installed the DB2 Utilities in the default location. Scheduling the OPTALL_SCHED.BAT file is basically the same except for the frequency of reoccurrence.

1. Go to the location your DB2 Utilities are stored and update the **RUNSTATS_SCHED.BAT** file contents by right clicking it and selecting Edit.
2. Once the .BAT file is open in edit mode, change the **CD** command path to your DB2 Utilities installation directory. If the path is not on the `C:` drive, add a new line to the file with the alternate drive letter above the **CD** command (i.e., `D:`). Also update the <**DBNAME**> and <**PASSWORD**> fields to the appropriate values for your environment. Save the file and close the editor.
3. From your internet browser, open your bookmark for the **IBM Data Server Manager** site.
4. Login with the **db2admin** user and password. These were setup when you installed DSM in the Installing IBM Data Server Manager (DSM) section.
5. Once you are logged in, you will be presented with the Data Server Manager home page. Click **Jobs** in the menu on the left. The **Jobs** page should be displayed.
6. Use the second dropdown box that contains the words "**View Options**" and select the **View Options: Job Definition** link. The job definitions page will load.
7. Click the **Add Job** button. Populate the **Add Job** form that is displayed and click **OK**. Here is an example form filled out:



8. Once you click **OK** on the **Add Job** form, you will be presented with a more detailed view of the job and you will be sitting on the **Script** menu option of the **Job Components** menu. Use the example command below to help you populate the script text field:

```
"C:\Program Files (x86)\TruckMate <Version#>\DB2 Utilities\RUNSTATS_SCHED.BAT"
```

Tip: You need to populate the <Version#> with the values that match your specific environment.

9. Now click **Schedules** in the **Job Components** menu and then click the **Add Schedule** button.
10. In the **Schedule Details** sub-tab that opens, select the initial date and time you would like to start this task. Early morning when few users are on the system is generally a good time to select. We recommend doing it after you have done your nightly backup already.
11. Put a checkmark in the **Repeats** box and select **Every Day, Daily Interval** or **Monthly** from the dropdown box. Populate the **Until** fields if you so desire.
12. Click the **Databases** tab and then click the **Select Databases** button. In the form that displays, change the drop down box to Single database then select the database name you put in your script command in the previous step. Normally you can leave the Use the **default user ID** option selection as-is.
13. Now click **Notifications** in the Job Components menu. Click the **Add Notification** button.
14. In the **Email Recipients** section, type in the email addresses you wish to notify every time this job executes. Separate multiple addresses with comas. Click the **Apply** button when you have completed your list.
15. Click the **Select Databases** button in the **Database Notification Criteria** section. Once the input form comes up, put a checkmark beside the database name that you selected in the previous steps and click **OK**. Feel free to change the **Notify if** dropdown box to your liking, default is to **Always** notify.
16. Now we have all the necessary information entered, you can click the **Save All** button above the **Job Components** menu.
17. To test that you have set everything up correctly, click the **Run** button beside the **Save All** button you just clicked. In the form that displays, put a checkmark beside the database name that you selected in the previous steps and click **OK**. Click the **OK** button on the subsequent dialog box that tells you to look at the **History** see the jobs progress.
18. Now select the **View Options: History** option in the second drop-down box. Here you will see the listing of job progress and history.
19. You should see a **Status** of **Succeeded** on your backup job once the **Progress** column reads **Completed**. If it failed, highlight the row and click the **View log in browser** button to see why it failed. Make the appropriate adjustments to your job to get it working consistently.

Tip: You can create similar jobs for other databases by copying the RUNSTATS_SCHED.BAT or OPTALL_SCHED.BAT file and giving it a new name on a database-by-database basis (i.e., RUNSTATS_SCHED_<DBNAME>.BAT) and then repeating the above steps.

DBI pureFeat

Trimble TruckMate is a reseller of an extremely powerful database performance-monitoring product called **DBI pureFeat**. It is sold at a deep discount to TruckMate customers only. We believe in this tool so much that all new customers actually have it automatically bundled with their TruckMate licenses.

Here is some quick bullet point information on **DBI pureFeat**:

- Monitor every single query from all users and all applications 24x7, if desired.
- Despite how much this product can monitor, it has very low overhead on the production machine, like 2 to 3%.
- Users can 'go back in time' to see what caused performance problems last night when the night shift was working or go back months if they desire. This is extremely powerful.
- Find and solve performance problems within 5 clicks of a mouse, literally.
- Run trending analysis to see how the system has been improving or degrading over time and why.
- Keeps track of database schema and configuration changes automatically because those changes can affect performance.
- Users can see database changes and the effects on performance plotted on charts and graphs.
- Analyze performance before and after software upgrades (or better yet, analyze it in test before upgrading).
- Get proactive DAWG style alerts when something this going wrong instead of hearing it from upset users once it is already too late.
- Narrow down problems by Database, Applications, Users, Tables, Tablespaces, Bufferpools and more.
- Users can also test and tune KPIs, DAWGs, User Filters, Crystal Reports and more with pureFeat's tools.

If you do not have DBI pureFeat but would be interested in purchasing it, contact your TruckMate sales representative.

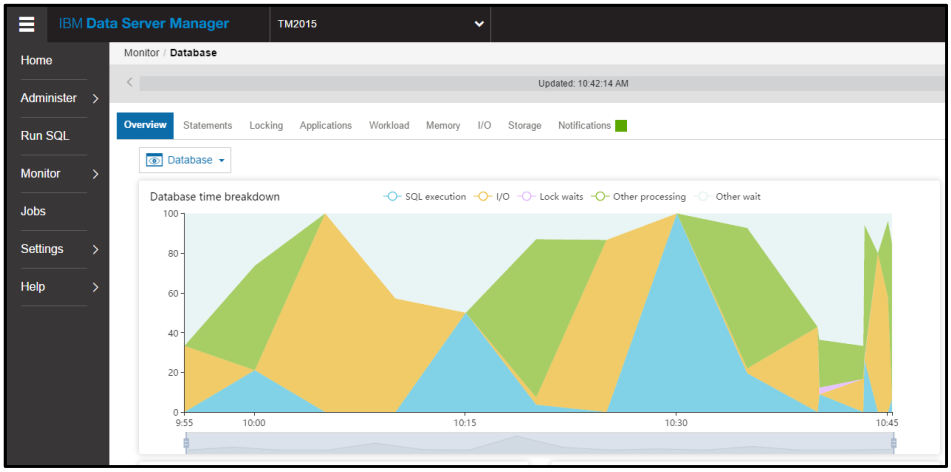
Monitoring Databases in IBM Data Server Manager

The monitoring components of **IBM Data Server Manager (DSM)** provide the graphical interface to database health monitoring. The DSM constantly monitors the health of the instances and their databases, without user interaction. If the system detects an issue based on the alert thresholds, it will raise an alert and can even send a notification to user-defined contacts.

The monitoring portion of **Data Server Manager** comes with a set of predefined thresholds for notifications/alerts. Using the various alert and notification configuration options in Data Server Manager, you can customize the alert indicator setup.

1. From your internet browser, open your bookmark for the **IBM Data Server Manager** site.
2. Login with the **db2admin** user and password. These were setup when you installed DSM in the Installing IBM Data Server Manager (DSM) section.
3. Once you are logged in, you will be presented with the Data Server Manager home page. Click **Monitor** in the menu on the left. The Monitor/Database page should be displayed and sitting on the Overview tab for the database listed in the top drop-down box in the top left of the web page (generally your production DB).

4. Here you will see visual charts and graphs that highlight potential issues. Notice the other tabs such as: `Statements, Locking, Applications, Workload, Memory, I/O, Storage and Notifications.`



As you can see in the above screenshot, there are many options and pieces of data that can help you understand the health of your system. Familiarize yourself with these various functions and adjust or create alerts/notifications to your liking.

Issues with slow database connections

If you are using TruckMate 2024.2 or later, users may experience slow database connections when:

- Logging in
- Starting the first TruckMate application
- Logging out

What causes slow connections?

Even though the DB2 server is always running, only databases that have at least one active connection are active in memory.

Databases with no active connections are “dormant”: They live on the server with no allocated resources and nothing cached in memory. Activating a dormant database can create delays, since by default the system relies on implicit activation triggered by the first connection. This first connection cannot return before activation is completed.

How is TruckMate impacted?

TruckMate makes multiple database connections upon startup. Each of these can be potentially impacted by the activation delay.

When first starting TruckMate, this process takes place:

5. TruckMate Server Host (MADSRV32.EXE) verifies the user’s login, then disconnects.
6. The selected TruckMate application starts:
    a. It connects to the database.
    b. It connects to ISC4 to activate its license.

Delays can occur at any or all these steps, slowing down the process.

Starting with TruckMate 2024.2, the ISC4 database is dormant between login and logout. Because logging out requires reconnecting to deactivate the license, delays can occur at this point as well. Unlike the main TruckMate database, ISC4 does not host persistent connections. This means it frequently goes dormant, even in live environments.

Activate databases explicitly

To explicitly activate a database, you must run the ACTIVATE DATABASE command from an account with SYSADM authority.

Grant yourself SYSADM authority (optional)

In TruckMate, members of the Administrators group have SYSADM authority by default. If your account is not already part of the local Administrators group, you can add it. This lets you activate databases and run other SYSADM commands without needing to authenticate as DB2ADMIN.

You can also add yourself to a group that you designate as the DB2 system administrators' group. Run this command in a DB2 window:

```
update dbm cfg using sysadm_group MY_SYSADM_GROUP_NAME immediate
```

where `MY_SYSADM_GROUP_NAME` is the name of your group.

Note: If you are working in a domain environment, you may want to review the topics in Db2 and Windows security introduction on the IBM documentation site. These topics may be of special interest:

- Authentication with groups and domain security
- The DB2_GRP_LOOKUP environment variable and Db2 group enumeration

In a production environment, DB2 should run as a domain user so that it has domain access when determining user authorization. Running DB2 as a local user and then connecting to it as a domain user that is a member of the local Administrators group may cause a SQL1092N authorization error. This is because the local DB2 user cannot query the domain.

Running DB2 as a domain user requires the domain controller to be always accessible. In environments where it is not always accessible, such as on development systems, a local user such as DB2ADMIN should be used for both the service and for issuring commands requiring SYSADM access.

Run ACTIVATE DATABASE

In a DB2 command window, run ACTIVATE DATABASE for your main TruckMate database and ISC4, as shown in this illustration.

```
db2 => activate db ISC4
DB20000I  The ACTIVATE DATABASE command completed successfully.
db2 => activate db TMWINCUR
DB20000I  The ACTIVATE DATABASE command completed successfully.
```

If you receive a message that states:

```
SQL1490W Activate database is successful, however, the database has already
been activated on one or mode nodes
```

the database was already activated when you ran the command, so no changes were made.

Note: Activation only lasts until the DB2 server is restarted. If a system reboot takes place or a DB2STOP command is run, the activation status is reset. To reactive the databsase, run ACTIVATE DATABASE again.

Activate databases automatically using Task Scheduler

As described in the IBM DB2 documentation, you cannot:

- Flag a database as “always active”
- Tell DB2 to activate databases upon startup

However, you can use Task Scheduler to create a task that runs the activation comments when DB2 starts. In addition to startup, it will run on every DB2 informational event.

This type of event-based trigger is better than a system startup trigger, as it will not run before DB2 is ready and it will run again whenever DB2 is started.

Copy this XML code, replacing the DB2 instance and database names to match your own.

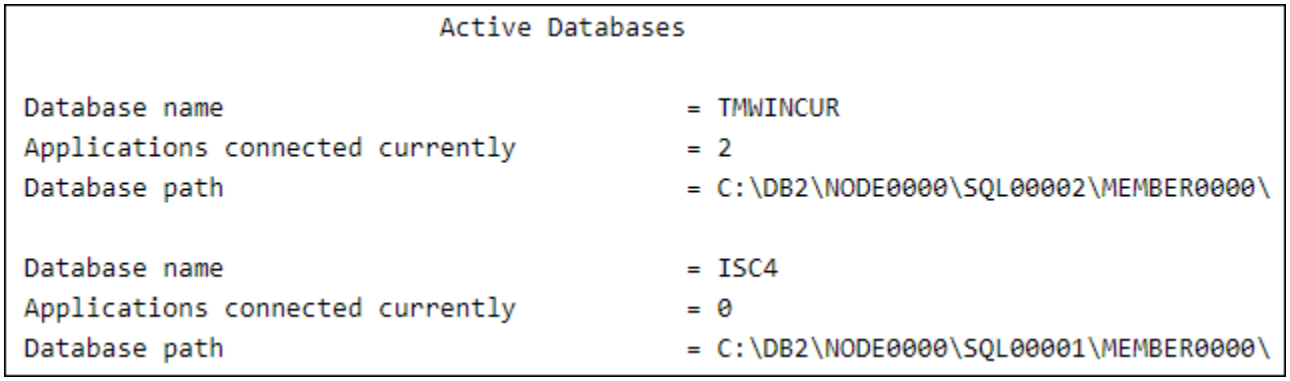
```
<?xml version="1.0" encoding="UTF-16"?>
<Task version="1.2" xmlns="http://schemas.microsoft.com/windows/2004/02/mit/task">
  <RegistrationInfo>
    <URI>\DB2 activate databases</URI>
  </RegistrationInfo>
  <Triggers>
    <EventTrigger>
      <Subscription>&lt;QueryList&gt;&lt;Query Id="0"
Path="Application"&gt;&lt;Select Path="Application"&gt;*[System[Provider[@Name='DB2-
0'] and EventID=1]]&lt;/Select&gt;&lt;/Query&gt;&lt;/QueryList&gt;</Subscription>
    </EventTrigger>
  </Triggers>
  <Actions Context="Author">
    <Exec>
      <Command>"C:\Program Files\IBM\SQLLIB\BIN\db2cmd.exe"</Command>
      <Arguments>db2 activate db TMWINCUR</Arguments>
    </Exec>
    <Exec>
      <Command>"C:\Program Files\IBM\SQLLIB\BIN\db2cmd.exe"</Command>
      <Arguments>db2 activate db ISC4</Arguments>
    </Exec>
  </Actions>
</Task>
```

Save it as an XML file, then import it into Task Scheduler.

To check that the task is working:

7. Run DB2STOP.
8. Run DB2START.
9. Run LIST ACTIVE DATABASES.

You should see something like this illustration.



Activate databases manually using a batch file

You can create a script that runs the necessary activation commands. Because it needs SYSADM, SYSCTRL, or SYSMAIN authorization to run, you should run the script as DB2ADMIN or grant yourself SYSADM authority.

Activate with implicit credentials

This script activates databases using the credentials of its environment. Replace the database names with your own as needed.

```
@echo off
"C:\Program Files\IBM\SQLLIB\BIN\db2cmd.exe" /c "db2setcp db2 activate db ISC4"
"C:\Program Files\IBM\SQLLIB\BIN\db2cmd.exe" /c "db2setcp db2 activate db TMWINCUR"
```

Activate with explicit credentials

Use this script in environments where you can safely save your DB2ADMIN password (YourDB2AdminPassword) in clear text in a batch file. Do ***not*** use it in live environments or anywhere where the password must be kept secure.

```
@echo off
"C:\Program Files\IBM\SQLLIB\BIN\db2cmd.exe" /c "db2setcp db2 activate db ISC4 user
db2admin using 'YourDB2AdminPassword'"
"C:\Program Files\IBM\SQLLIB\BIN\db2cmd.exe" /c "db2setcp db2 activate db TMWINCUR
user db2admin using 'YourDB2AdminPassword'"
```

You can check which databases are active by running LIST ACTIVE DATABASES.

Deactivate a database

Once a database is activated, it stays active until DB2 is restarted. You cannot back up active databases to an offline location without deactivating them first. Use the DEACTIVATE DATABASE command.

Performance Problem Resolution

This section provides steps in determining and resolving performance issues with your TruckMate applications. These procedures can provide assistance in first ruling out external causes for performance slowdowns; running an initial performance checklist; and revealing the steps to take once you have determined the specific cause.

In some cases, however, these steps may not have the desired result and you will need to complete the Reporting Performance Issues section prior to contacting our support department with the details.

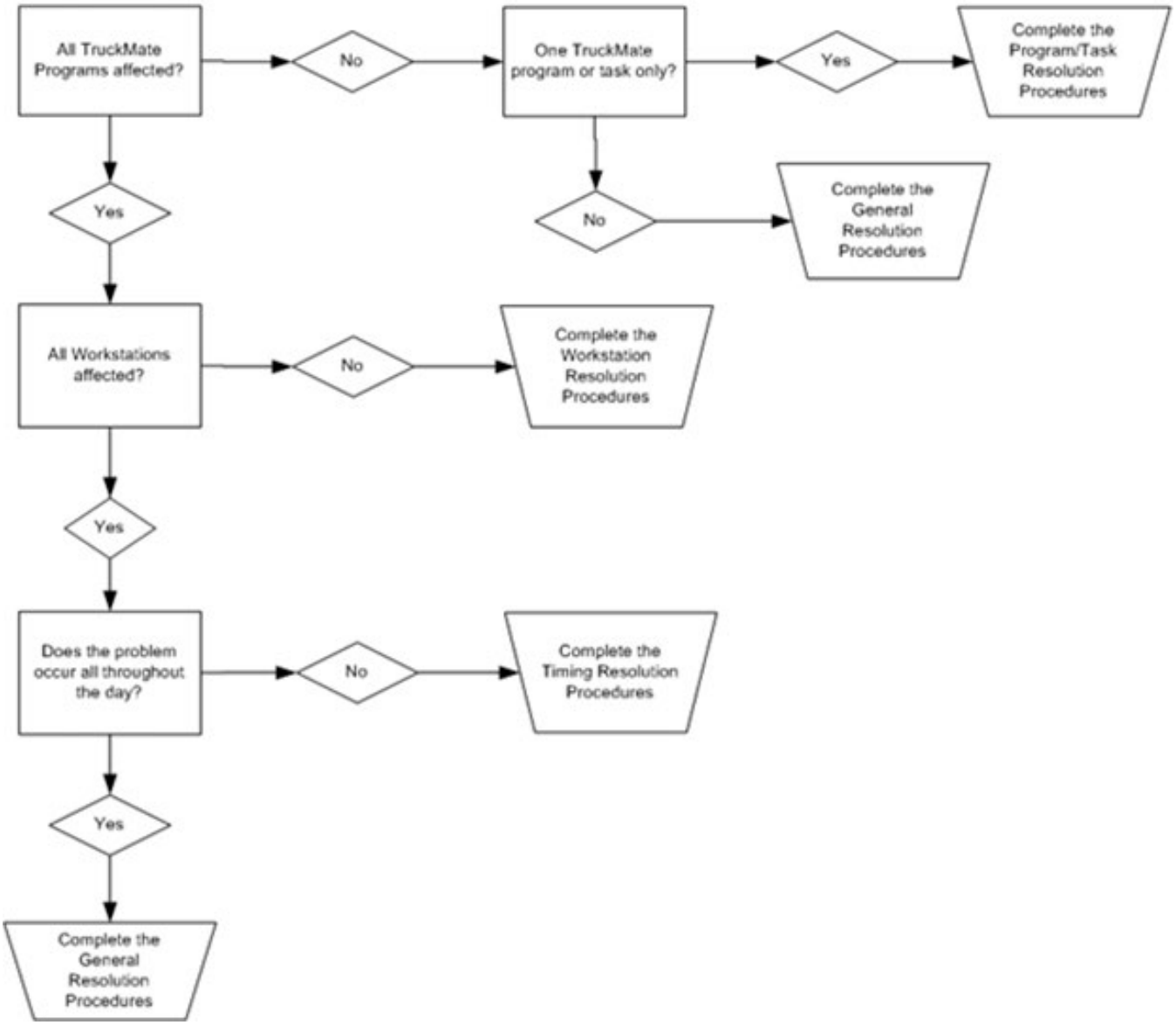
Determining the Source of Performance Problems

The first step in resolving TruckMate performance issues is to rule out any external reasons for the slowdown. The following points can be reviewed to determine any possible performance issues:

Network Issues	Ensure your Network is not the cause of the slowdown.
Hardware Upgrades	Ensure a recent (or lack of) hardware upgrade is not the cause of the slowdown.
Software upgrades	Ensure a recent software upgrade, other than TruckMate is not the cause of the slowdown (i.e., Windows update, Anti-Virus update, etc.).
DB2 Fix Pack	Ensure you have the latest approved DB2 Fix Pack installed.

Once you have ruled out the previous items as a cause of your performance issues in TruckMate, the next step is to determine how broad the problem in TruckMate is by defining the areas that are affected by slow performance (see the following Specific Performance Determination Flow Chart illustration). Once this has been clearly defined, you can proceed with the appropriate procedures to resolve the problem.

Specific Performance Determination Chart



General Performance Resolution

This section provides general guidelines on what to look for and general steps to take when performance appears to affect your overall TruckMate performance.

1. Ensure there is no Virus Scanning Software on your DB2 directories.
2. Confirm OS System Advanced Setting for **Processor Scheduling** is adjusted for **Background services.**
3. Confirm OS System Power Setting is **High Performance**, not Power Saving or Balanced.
4. Ensure proper isolation levels are set for packages by running the following SQL:

   ```
   SELECT COUNT(*) FROM SYSCAT.PACKAGES WHERE PKGSCHEMA IN ('LYNX', 'TMWIN')
   AND ISOLATION <> 'UR'
   ```

   No results should be returned.
5. Confirm there are no outstanding items in IBM Data Server Manager that require attention. For more information, refer to the Monitoring Databases in IBM Data Server Manager section.
6. Ensure you have completed Performance Optimization procedures in the last 30 days. If not, refer to the Database Performance Optimization and Health Monitoring section.
7. If this did not resolve your performance problem, complete the Reporting Performance Issues section / form prior to contacting support.

Program/Task Specific Resolution

This section provides the steps to take when the performance problem appears to be program specific.

1. Confirm the program with performance issue has the **Application Configurator > DB2Isolation** option set to **UR**.
2. Go to TruckMate > Utilities and run the **Application Configurator** (ConfigExplorer.exe) program.
3. For each of the following programs: **Driver Pay**, **Driver Deductions**, **AR Cash Receipts** and/or **Billing Registry** confirm the Application Configuration setting – **Commit Each Trans** is set to ***TRUE***.
4. Can you narrow the problem down to a specific task? If yes, get a TruckMate Monitor (accessible from the Toolbar of most TruckMate programs) or a DB2 Trace to see if a specific SQL statement takes a very long time to complete.
5. Ensure proper Isolation Levels are set for packages by running this SQL:

   ```
   SELECT COUNT(*) FROM SYSCAT.PACKAGES WHERE PKGSCHEMA IN ('LYNX', 'TMWIN')
   AND ISOLATION <> 'UR'
   ```

   No results should be returned.

6. If this did not resolve your performance problem, complete the Reporting Performance Issues section / form prior to contacting support.

Workstation Specific Resolution

This section provides the steps to take when the performance problem appears to be workstation specific.

1. Confirm the workstation has the latest DB2 Fix Pack installed. Refer to the Applying a Fix Pack to an Existing 11.x Installation section.
2. Confirm the workstation is not having network card issues. See online resources for troubleshooting advice.
3. If this did not resolve your performance problem, complete the Reporting Performance Issues section / form prior to contacting support.

Performance Timing Resolution

This section provides the steps to take when it appears the performance problem only occurs during a specific timeframe.

1. Does the problem occur during your Automatic Backups or Maintenance? These tasks can be resource intensive. Consider adjusting the timeframe that these tasks occur.
2. Does this occur while KPIs, Reports or DAWG alerts are running? If so, there is likely a malformed SQL statement. See the DBI pureFeat section and use this tool to find these types of issues.
3. Is the system configured for automated updates from a third party? If yes, it is recommended you turn off the updates or schedule them for a more appropriate time.
4. Is there a particular business process running at this time, for example the Billing Registry, Driver Pay Registry, etc.?
5. If this did not resolve your performance problem, complete the Reporting Performance Issues section / form prior to contacting support.

Reporting Performance Issues

The Reporting Performance Issues section is provided to assist you in reporting the status and details of your performance issues when the recommended performance resolution procedures have not resolved the problem.

Ensure you complete this section prior to contacting support at: TruckMateSupport@trimble.com.

1. Did you complete the Performance Problem Determination section? Yes / No
   a. If no, ensure you complete this procedure to rule out external problems and confirm your configuration is accurate.
2. What Resolution procedures have you completed?
   a. General Resolution Procedures section? Yes / No
   b. Program/Task Specific Resolution Procedures section? Yes / No

   If yes, what Program or Task is causing the problem?

   _____

   If a Task is the problem, what details did the TruckMate Monitor or db2 trace provide?

   _____
3. Have you completed the Workstation Specific Resolution section? Yes / No
4. Have you completed the Performance Timing Resolution section? Yes / No

   If yes, at what is the timeframe of the performance problem?

   _____
5. Are there any error message(s)? Yes / No

   If yes, what is the message(s)?

   _____

   _____
6. Does the problem occur during a certain business process? Yes / No

   If yes, what is the process?

   _____

   _

7. Server Specifications:

   CPU Count: _____ Total Cores:_____

   Memory Amount: _____

   Disk Layout and Type:

   C:\ _____

   D:\ _____

   L:\ _____

8. Approximately how many users are affected? _____

9. Additional Information:

_____

_____

_____

_____