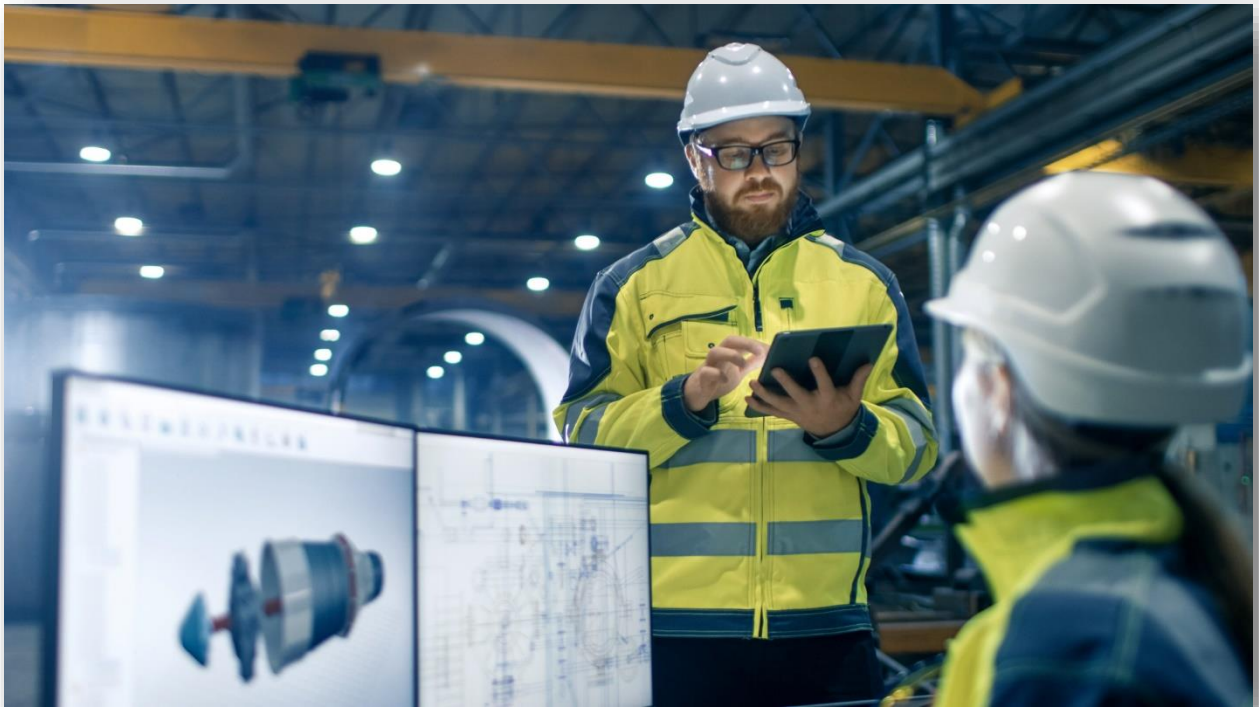


# Microsoft® SQL Server® Configuration for Autodesk AutoCAD® Plant 3D and AutoCAD® P&ID



This whitepaper outlines the configuration of Microsoft SQL Server Express, Standard or Enterprise for use with Autodesk AutoCAD Plant 3D and AutoCAD P&ID projects.

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# Overview of Databases

AutoCAD Plant 3D and AutoCAD P&ID use a file-based database (SQLite) by default. If a server-based database is desired for improved multi-user performance and reliability Microsoft SQL Server Express or Microsoft SQL Server Standard/Enterprise can be implemented. If the project is intended to be hosted on Autodesk Vault, Microsoft SQL Server must be used. Any references made to *AutoCAD Plant 3D* in this document also applies to *AutoCAD P&ID*.

## Database Structure

Project drawings and databases are used to store all the information for the project. This information includes line number tags, equipment tags, pipe specifications, etc. Since the information is stored in both the AutoCAD drawings and in the database, this allows you to copy drawings across projects and retain the data.

In a **SQLite** database project, the individual DCF files stored in the project folder contain the database information.

- ProcessPower.dcf – P&ID database
- Piping.dcf – 3D piping database
- Iso.dcf – Isometric database
- Ortho.dcf – Orthographic database
- Misc.dcf – Miscellaneous project configuration data (related files)

Once a project is migrated to **MS SQL Server** the project files remain at the same folder location and the databases are stored and accessed through SQL Server. The five databases described above will reside on the SQL Server for each individual Plant 3D project. Expect to see multiple SQL databases with the prefix name you provide during the new project setup or SQLite project migration to SQL.

As you work in a project the software is periodically querying the database tables reading and writing information as needed. For example, if a user adds or modifies a valve tag, that information is updated in the project database (or local data cache) so no one else can use the tag that was just assigned. When the drawing is saved, the tag information is updated inside the drawing (DWG) itself.

## Database Engines

### SQLite

SQLite is a self-contained, server less, zeroconfiguration, transactional SQL database engine which means there is no separate database server required. The database engine is embedded and installed with AutoCAD Plant 3D and AutoCAD P&ID.

SQLite uses a file-based system, so each database is a single file stored on disk. The SQLite database engine uses a *read many, write once* record locking scheme. While many users can be reading from the database at any given time the entire database must be locked before a record can be written to a table row. SQLite is intended for a single user (standalone) environment. For more information about SQLite record locking, please refer to *File Locking and Concurrency in SQLite* in the [Links and Learning Resources](#) section of this document.

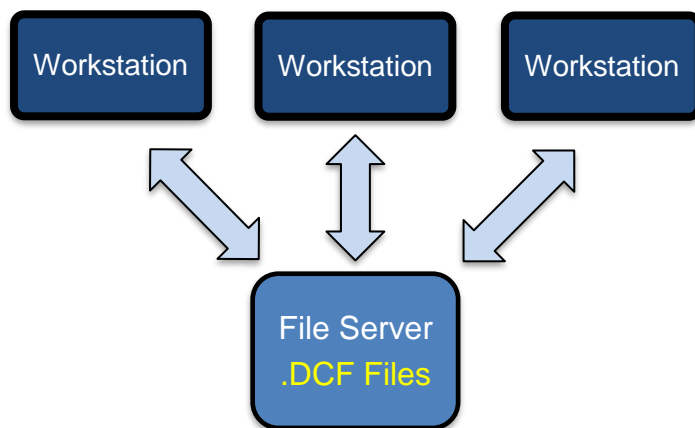


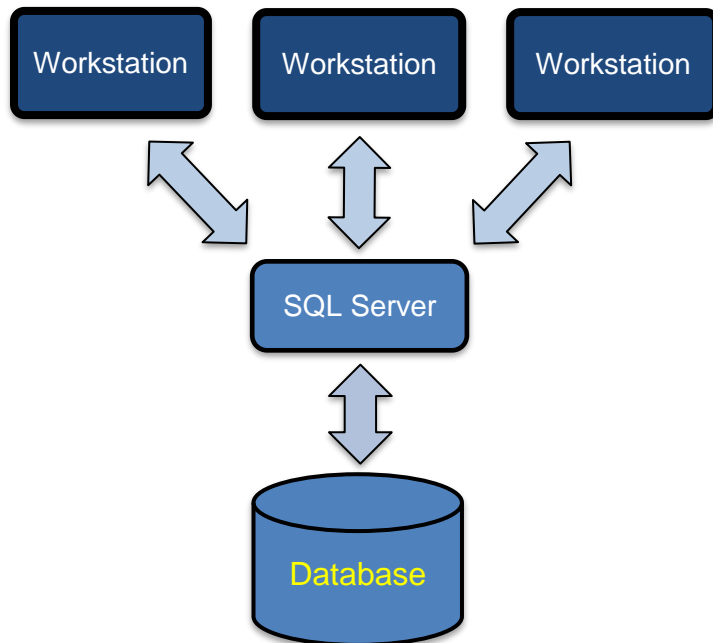
Figure 1. SQLite

*This graphic shows each workstation, running its own local SQLite database engine and accessing the DCF (database) files for the project stored on a file server.*

## Microsoft SQL Server

Microsoft SQL Server is a client/server architecture which means the database transactions are passed from the client to the server, processed, and then sent back.

SQL Server uses a granular approach to record locking; it only locks a single database row if it needs to be updated instead of the entire database. SQL Server is intended for a typical multi-user, corporate network environment.



*Figure 2. Microsoft SQL Server This graphic shows each workstation accessing a SQL server which is hosting the project databases.*

# Installing Microsoft SQL Server

The process of configuring Microsoft SQL Server (MS SQL) begins with the installation. Before installing MS SQL, please check the [hardware and software requirements for SQL Server](#) from Microsoft.

To setup a new project or migrate an existing SQLite project to Microsoft SQL Server one of the following versions is required:

*Microsoft SQL Server Express 2008 - 2016*

*Microsoft SQL Server Standard 2008 - 2016*

*Microsoft SQL Server Enterprise 2008 - 2016*

## SQL Server Limits (Maximum system resources per SQL edition)

*Microsoft SQL Server Express: 10GB max per database, 1 GB RAM per instance*

*Microsoft SQL Server Standard: 524,272 TB max per database, 64GB RAM per instance*

*Microsoft SQL Server Enterprise: 524,272 TB max per database, Operating system max RAM per SQL instance*

If you do not have a license for Microsoft SQL Server available to use, *Microsoft SQL Server Express* is available for free from Microsoft's website (see [Links and Resources](#) section for the website link.)

The recommended download is *SQL Express with Tools* which will include both SQL Express Server and SQL Server Management Studio.

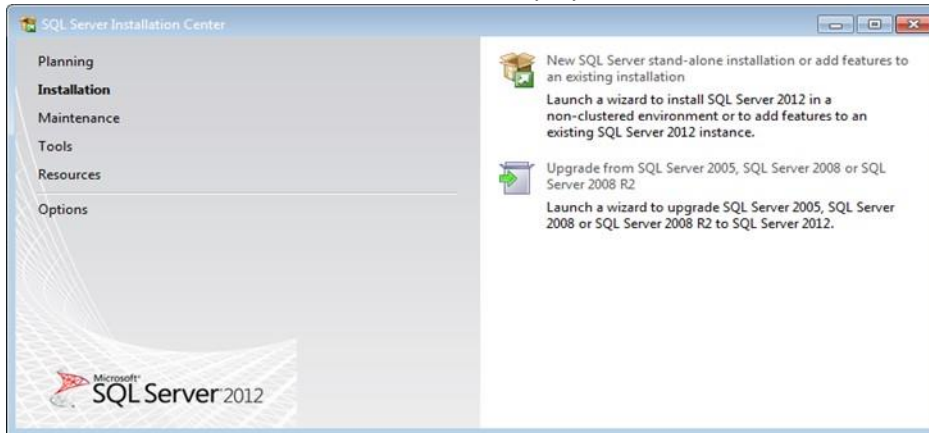
## Configure a New Instance of SQL Server

If no previous installations of MS SQL Server exist on the server, you will need to configure a new instance.

An existing SQL instance can be used for projects, but it is recommended that AutoCAD Plant 3D has its own dedicated instance to use. This simplifies the administration tasks by keeping the databases for Plant separate from any existing databases. If the project will be used with Autodesk Vault, please refer to *Configure SQL Server for Vault Projects* located in the [Links and Learning Resources](#) section of this document.

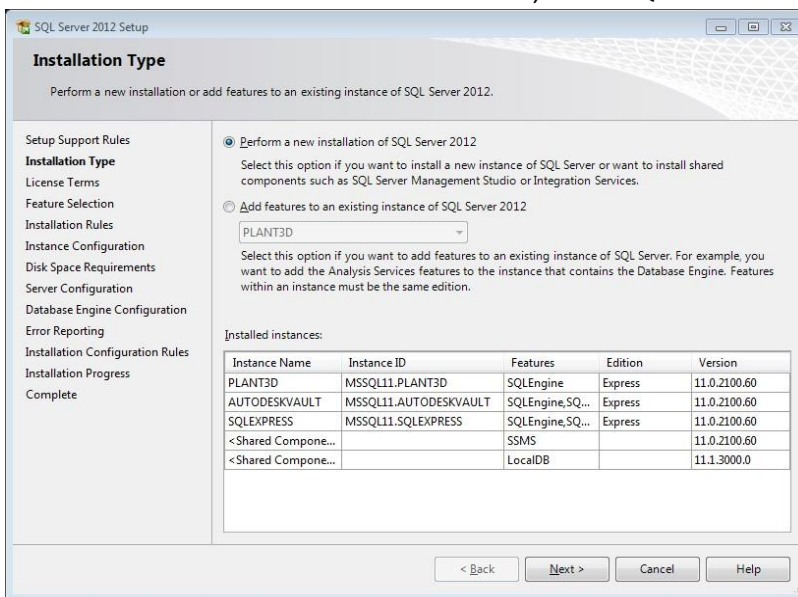
To configure a new SQL instance on a server run the setup for Microsoft SQL Server and follow the steps on the next page.

1. Download MS SQL Server Express and launch the installation
2. The SQL Server Installation Center will be displayed



**Figure 3. SQL Server Installation Center**

3. Click “Installation” and select the first choice, “New SQL Server stand-alone installation or add



features to an existing installation.”

4. The Setup Support Rules check will run along with the Product Updates
5. Click the Next button to continue installing the setup files
6. In the Installation Type section, select “Perform a new installation of SQL Server 2012” and click Next
7. Check boxes for license terms and data usage and click Next
8. Set options for instance features and click Next (default options are recommended.) In the “Named instance” field, enter a descriptive name for the new SQL Server instance (e.g. Plant3D)

*Note: You can modify the instance root directory if needed. This is the location where the SQL databases will be stored on the server. By default, it will be under the directory where SQL Server is installed.*

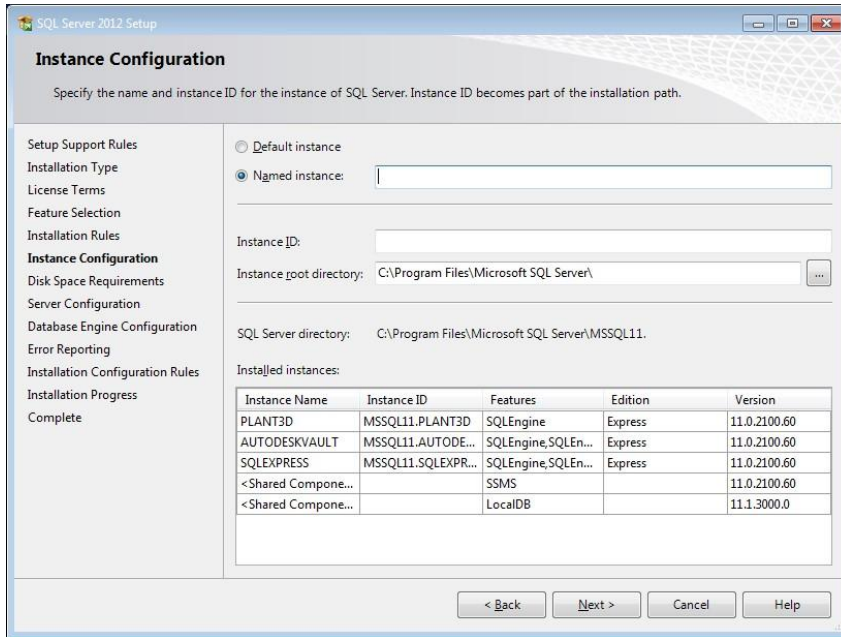


Figure 5. Instance Configuration – Instance Name, ID, and Root Directory

9. In the Server Accounts options set the startup for both services to “Automatic” and click Next

*Note: The SQL Server Browser service is required by workstations on the local area network to locate the SQL Server.*

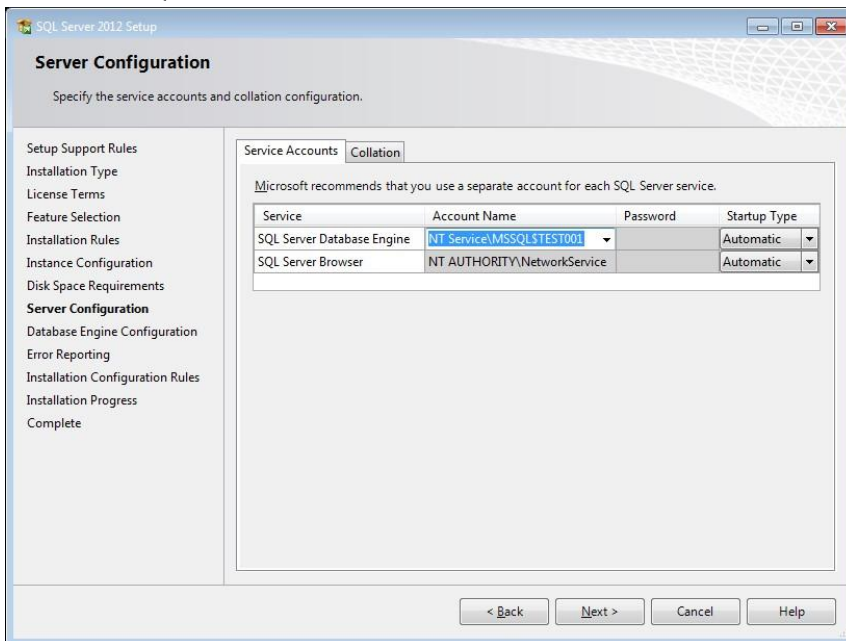


Figure 6. Server Configuration



10. In Database Engine Configuration you must specify whether **Windows authentication mode** or **Mixed Mode** will be used. If using Mixed Mode, a password for the System Administrator (sa) account will need to be entered. With either mode, one or more SQL Server Administrator accounts will need to be specified. If you will be the primary admin click the “Add Current User” button to automatically add your Windows user account to the list. Additional admins can be added later. For more information about authentication modes, please refer to the [Configure SQL Server Security Rights](#) section of this document or click the Help button which will describe the options that are available.

11. The following screen will prompt if you would like to participate in error reporting to Microsoft. After making your selection, click Next

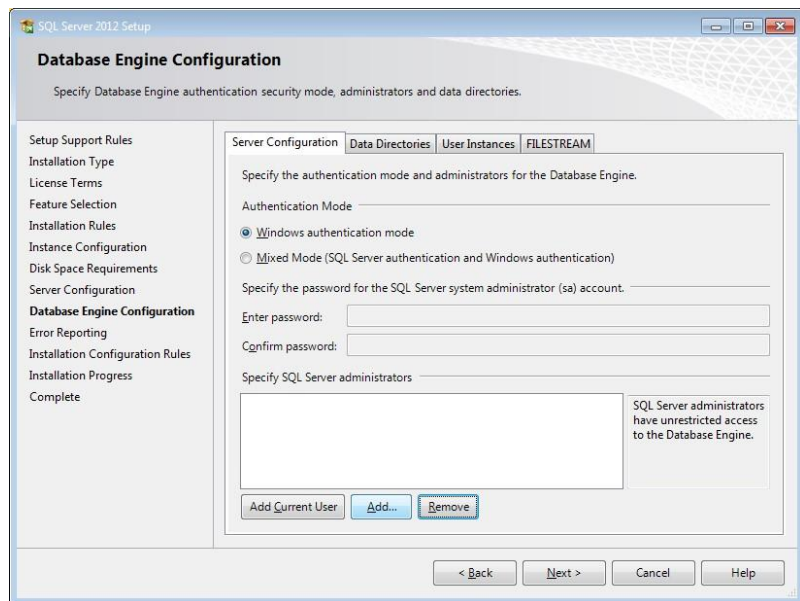


Figure 7. Database Engine Configuration - Account Provisioning

12. The Installation Configuration rules will process, and the installation process will begin

13. When the installation is complete you will see the image depicted in Figure 8. The new instance is now ready to use for hosting AutoCAD Plant 3D or AutoCAD P&ID projects.

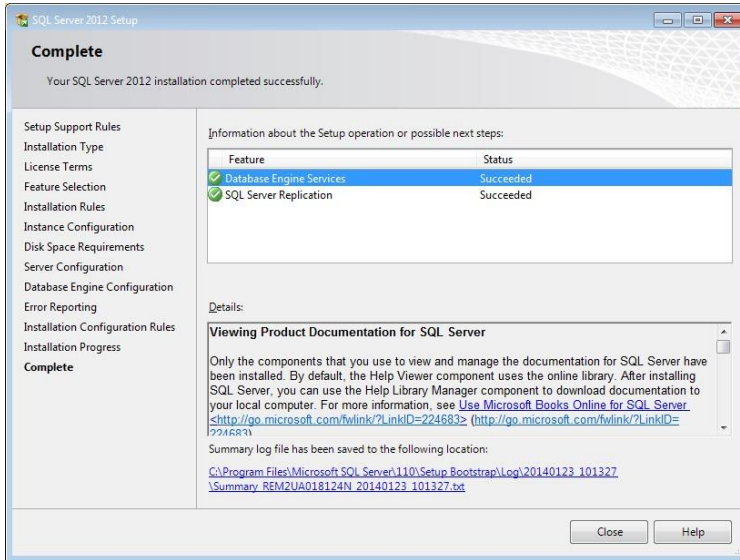


Figure 8. SQL Server 2013 Installation Complete

## Configuring Microsoft SQL Server

Configuration changes need to be made to SQL Server after installation to ensure access and connectivity for the users. This section covers the TCP/IP configuration and user permission modifications.

### Configure SQL Server for Remote Connections

Once the SQL Server instance is created you must configure SQL Server to accept remote connections. This will allow workstations access to the database across the network.

1. Launch SQL Server Configuration Manager from the Start Menu
2. Microsoft SQL Server <version> → Configuration Tools → SQL Server Configuration Manager

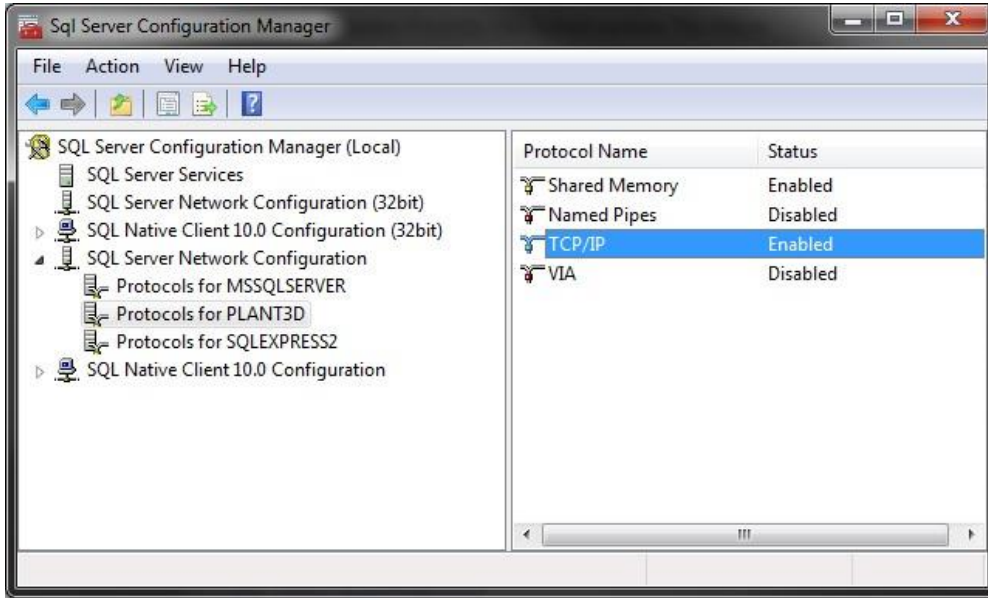


Figure 9. SQL Server Configuration Manager

3. Expand “SQL Server Network Configuration” and select the protocols for your new instance
4. Right-click “TCP/IP” and select “Enabled”
5. Restart the server for change to take effect

## Configure SQL Server Security Rights

Modifications can be made to the security settings for SQL projects to allow/disallow user access to certain projects hosted on the SQL Server. This section will cover the changes that need to be made. Please note the security settings suggested here should be used as general reference. Consult with your corporate IT group for policies regarding the SQL Server in use at your location.

SQL Server supports two authentication modes, Windows authentication mode and mixed mode:

- **Windows Authentication** is the default and is often referred to as integrated security because this SQL Server security model is tightly integrated with Windows. Specific Windows user and group accounts are trusted to log in to SQL Server. Windows users who have already been authenticated do not have to present additional credentials.
- **Mixed Mode** supports authentication both by Windows and by SQL Server. User name and password pairs are maintained within SQL Server.

When using Windows Authentication users will not be required to enter any credentials when they open a project; their Windows login credentials will be used. When using SQL Server Authentication users will be required to enter their SQL user name and password when opening the project.

For more in-depth information about SQL authentication modes, please refer to *SQL Server Security and Protection – Choose an Authentication Mode* in the [Links and Learning Resources](#) of this document.

## SQL Security Mode

The SQL security mode for a project can be modified at any time by editing each of the DCF files located inside the project folder (ProcessPower.dcf, Piping.dcf, Iso.dcf, Ortho.dcf, and Misc.dcf.) These files can be edited with Windows Notepad or XML editor.

In the following example of a DCF file “Integrated Security” is set to **false**, which means the project is using Mixed Mode security on and users will be required to enter a SQL username and password to open the project:

```
<?xml version="1.0" encoding="utf-8"?>
<DatabaseLink xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <Parameter>
    <Name>DatabaseEngine</Name>
    <Value xsi:type="xsd:string">Autodesk.ProcessPower.DataObjects.DbEngine.PnPMsSQLDbEngine</Value>
  </Parameter>
  <Parameter>
    <Name>Data Source</Name>
    <Value xsi:type="xsd:string">.Server name\Instance name</Value>
  </Parameter>
  <Parameter>
    <Name>Integrated Security</Name>
    <Value xsi:type="xsd:boolean">false</Value>
  </Parameter>
  <Parameter>
    <Name>Initial Catalog</Name>
    <Value xsi:type="xsd:string">Project name _Piping</Value>
  </Parameter>
</DatabaseLink>
```

If Windows Authentication mode is desired, open each of the DCF files in the project folder with a text editor such as Windows Notepad and change the value for Integrated Security to **true**.

## SQL Security Logins

Modifications to SQL security settings are accomplished through *Microsoft SQL Server Management Studio* which is available for download from the Microsoft website. It must be installed in addition to MS SQL Server.

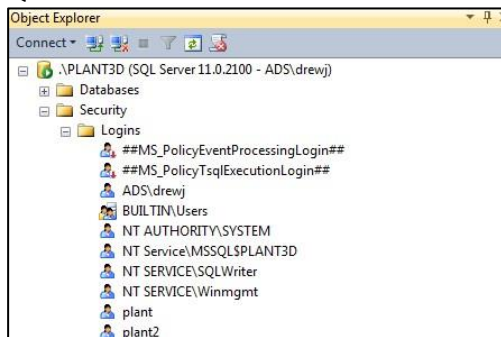


Figure 10. SQL Server Management Studio

## SQL Logins

Logins for SQL Server will need to be configured before anyone can use Plant 3D with projects. New login accounts can be created under Logins as shown in Figure 11. If you receive an error message (connection failed) when creating a new Plant 3D project, make sure a new login has been created and proper server roles have been assigned as described in the next section.

When using Windows Authentication mode, domain users, user groups, and local user computer accounts can be added. Authentication new logins can be created by specifying a login name along with a password.

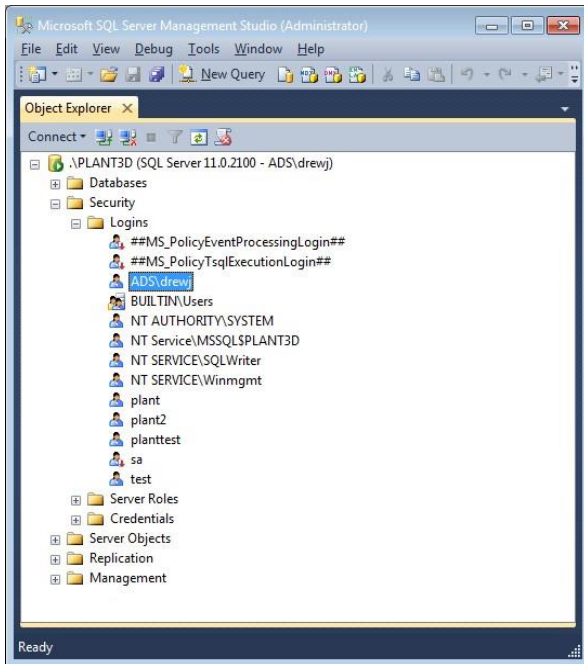


Figure 11. SQL Server Management Studio - Logins

## Server Roles

The Server Roles of MS SQL Server control access to server-wide security privileges on the SQL server; actions such as creating new databases, erasing existing databases, etc. The Server Role can be assigned in the properties for each login:

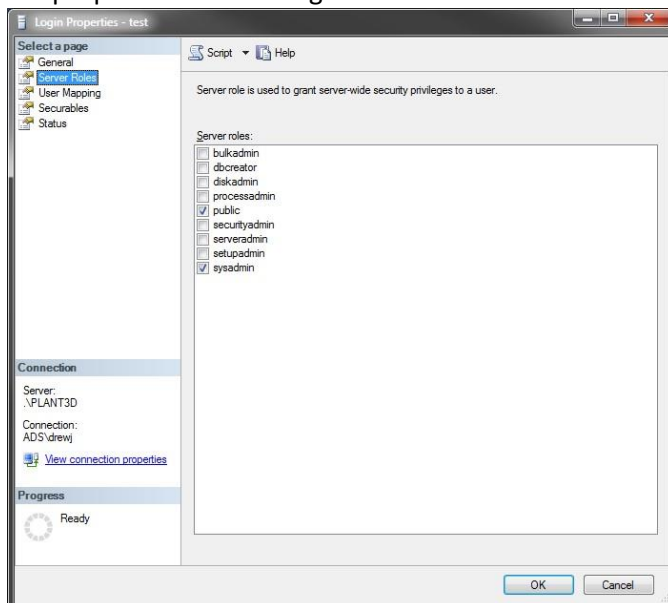


Abbildung 1Figure 12: Server Roles

### *Project Administrator Accounts*

Any account used to create new projects will need to have the “**sysadmin**” server role assigned to it. The system admin role can perform any activity in the database engine.

### *Project User Accounts*

Any account that needs access to a project but not the ability to create new projects will only need “**public**” server role assigned to it. All SQL server users, groups, and roles belong to the public role by default.

For more information about SQL logins, users and roles, please visit the *Managing Logins, Users, and Schemas How-to Topics* link in the [Links and Learning Resources](#) section of this document.

## **Recovery Models**

SQL Recovery Models are designed to control transaction log maintenance. A recovery model is a database property that controls how transactions are logged, whether the transaction log requires (and allows) backing up, and what kinds of restore operations are available. Three recovery models exist: simple, full, and bulk-logged. SQL databases for AutoCAD Plant 3D and AutoCAD P&ID use the **simple recovery model**. This is the default, and recommended setting for all SQL project databases to avoid excessive transactional logs taking up unnecessary disk space on the SQL Server. For more information please refer to the *Recovery Models (SQL Server)* link in the [Links and Learning Resources](#) section of this document.

### Project Backup

Obtaining a complete backup of a Plant 3D SQL Server project involves two parts. Backing up the project files and folders and the SQL databases stored on the SQL Server. To obtain a consistent backup both must be backed up at the same time. If a project needs to be archived the backup process can be used to accomplish this. Nightly backups are recommended to avoid any major loss of work. Please check with your local IT staff if needed to coordinate backups as needed.

## **Backing up SQL Databases**

SQL Backups are performed using *Microsoft SQL Server Management Studio 2012* which is part of the Microsoft SQL Server 2012 Express installation download. Please note, *Microsoft SQL Server Management Studio 2012* is not loaded as part of the SQL instance and must be manually installed.

1. Begin by launching SQL Server Management Studio from the Start Menu
2. The Connect to Server prompt will be displayed



Figure 13. Connect to Server

3. Enter the SQL Server computer name and the instance in the following format (SERVERNAME\INSTANCE) or click the drop-down button to browse your network for available SQL Servers
4. Select the first Plant 3D project database in the list, right-click, and choose Back Up...

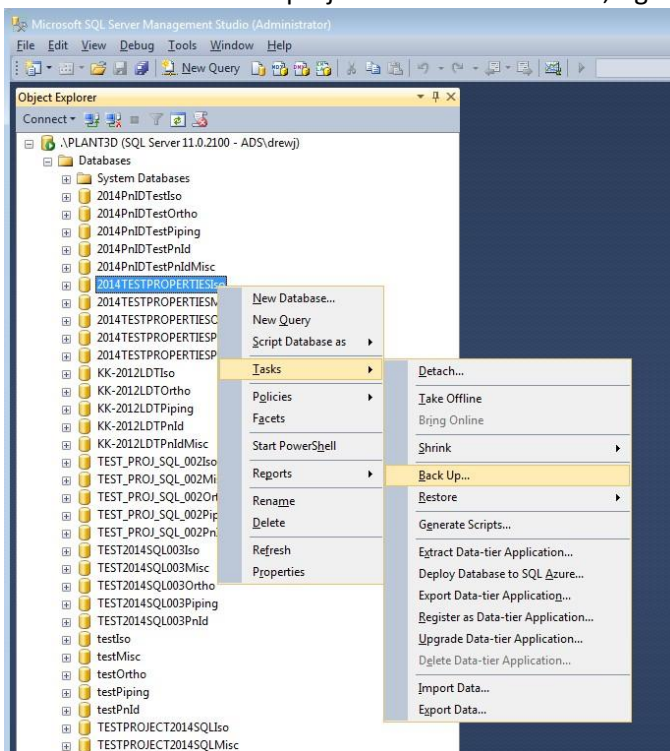


Figure 14. Back Up database task

5. In the Back Up Database window select the options for the location of where the backup files will be written

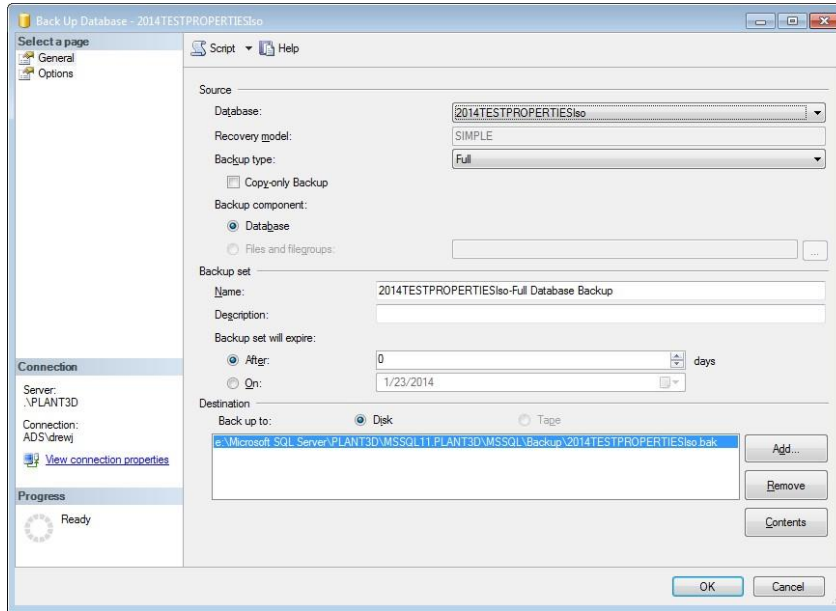


Figure 15. Back Up Database

6. Click OK to perform the backup operation
7. Repeat steps 1 through 6 for the additional databases that belong to the project (Iso, Ortho, Piping, Process Power, and Misc.)



## Backing up Project Files and Folders

Before running a back on the project files, be sure all users have save their drawings and exit Plant 3D. This will ensure all file and database locks have been closed out.

If project files and/or drawings are set to a path located outside of the project folder be sure to include these as well. Check the paths in Project Setup to verify the location.

Examples of project content which may be stored outside of the project folder:

- 3D Drawings
- P&ID Drawings
- Isometric Drawings
- Orthographic Drawings
- Equipment Templates
- Related Files
- Drawing Templates (.DWTs)
- Shared Content (catalogs and spec sheets – see below)

The **PLANTCONTENTFOLDER** command can be used in Plant 3D to obtain the current location of the shared content for the project. For more information about the shared content folder, please refer to *AutoCAD Plant 3D Shared Content Folder* in the [Links and Learning Resources](#) section of this document.

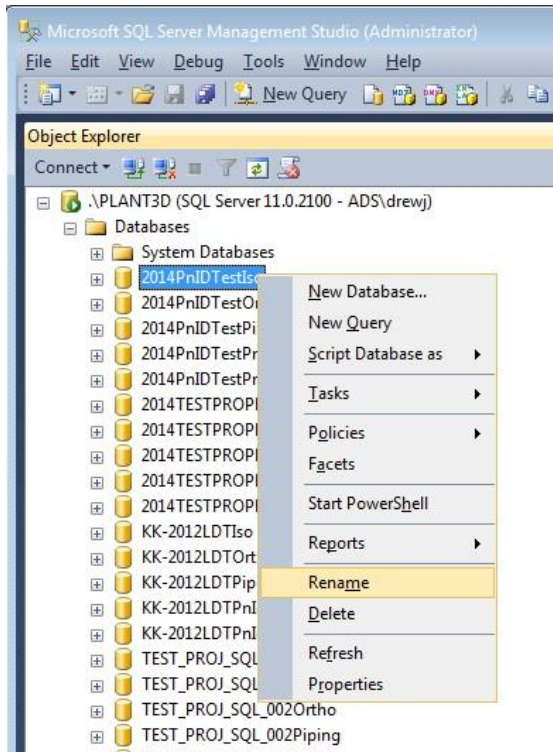


```
Command: PLANTCONTENTFOLDER
Command:
PLANTCONTENTFOLDER = "c:\AutoCAD Plant 3D 2014 Content" (read only)
Type a command
```

## Restoring SQL Databases

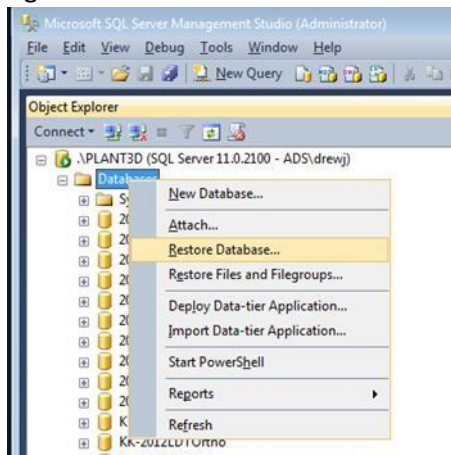
If a situation occurs where you need to restore your project, use the following steps to restore the SQL databases from backups.

1. Launch SQL Server Management Studio 2012 from the Start Menu
2. Right click on the existing project database name and select Rename (Iso database will always be on top so you can begin there)



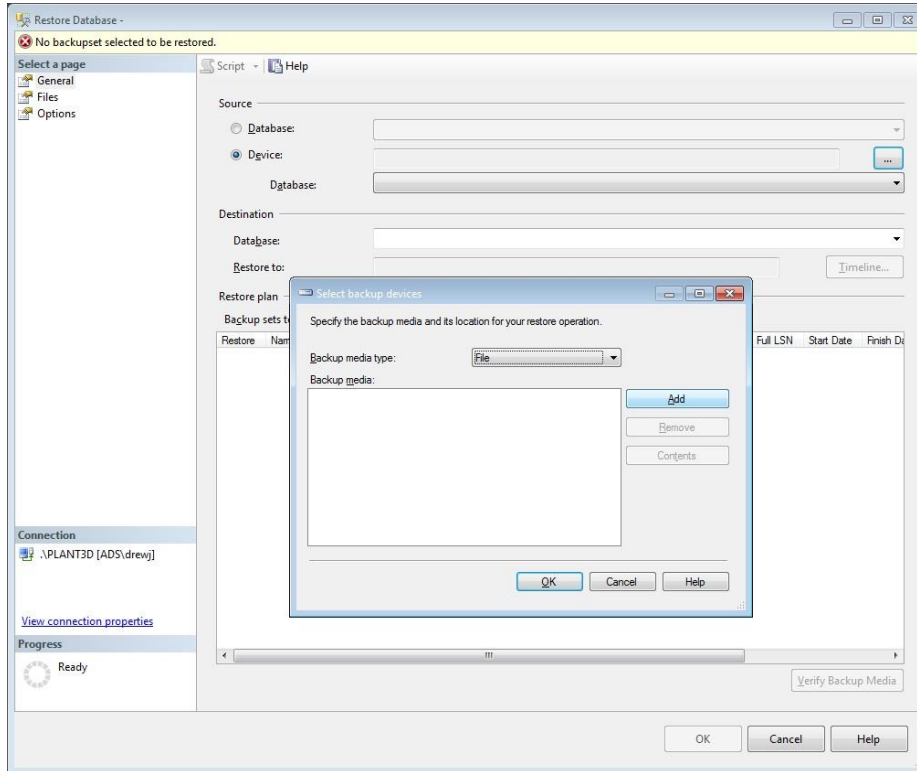
**Figure 16. Rename Database**

3. Enter a new name for the project (e.g. TestProject002Iso\_OLD)
4. this process for all of the project's databases (Piping, Iso, Ortho, ProcessPower, and Misc)
5. Right click on the Databases folder and select Restore Database



**Figure 17. Restore Database Task**

In the Restore Database window, choose “Device” and click the browse button



6.

**Figure 18. Restore Database**

7. Click the Add button, browse to the location of the original SQL backup file, select it and click OK
8. Click OK again and the Destination and Restore Plan will update with the proper information from the backup
9. Click OK to begin the restoration process
10. Repeat the process for the additional project databases (Piping, Iso, Ortho, ProcessPower, and Misc)

## Restoring Project Files and Folders

Restoring the project files and folder is simply a matter of uncompressing the archive (if you used a compression method such as ZIP or RAR) back to its original path on the server or local drive.

# Project Administration

## Converting an Existing SQLite Plant 3D Project to SQL Server

Conversion of an existing AutoCAD Plant 3D project using SQLite databases to MS SQL Server involves using a tool titled *Project Maintenance Utility* which is installed with AutoCAD Plant 3D and AutoCAD P&ID. Once a project has been migrated from SQLite to SQL Server it can no longer be opened as a SQLite project.

Once a project has been converted to SQL Server a new project can still be created from it using Project Setup Wizard and selecting “Copy settings from existing project.” The new project files and folders will be created along with new SQL databases on the SQL Server.

### Project Maintenance Utility

1. Backup your existing project folder.
2. Browse to the installation folder for AutoCAD Plant 3D or AutoCAD P&ID:
  - C:\Program Files\Autodesk\AutoCAD <version>\PLNT3D
  - C:\Program Files\Autodesk\AutoCAD <version>\PNID
3. Run *PnPProjectMaintenance.exe*
4. Select “Convert a Project to SQL Express”, and then click Next

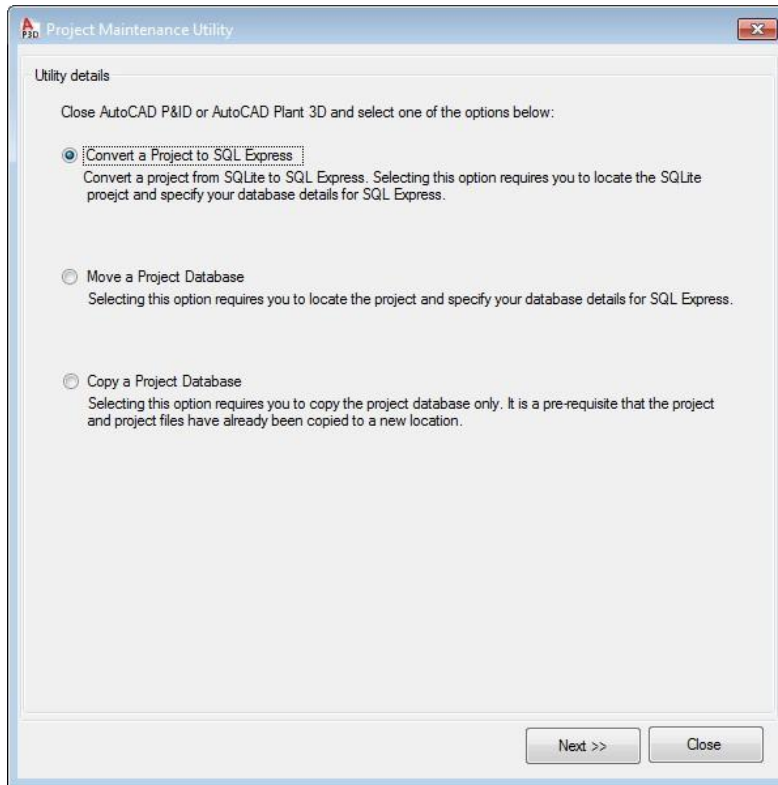


Figure 19. Project Maintenance Utility

5. In the Convert Details section click the Browse button

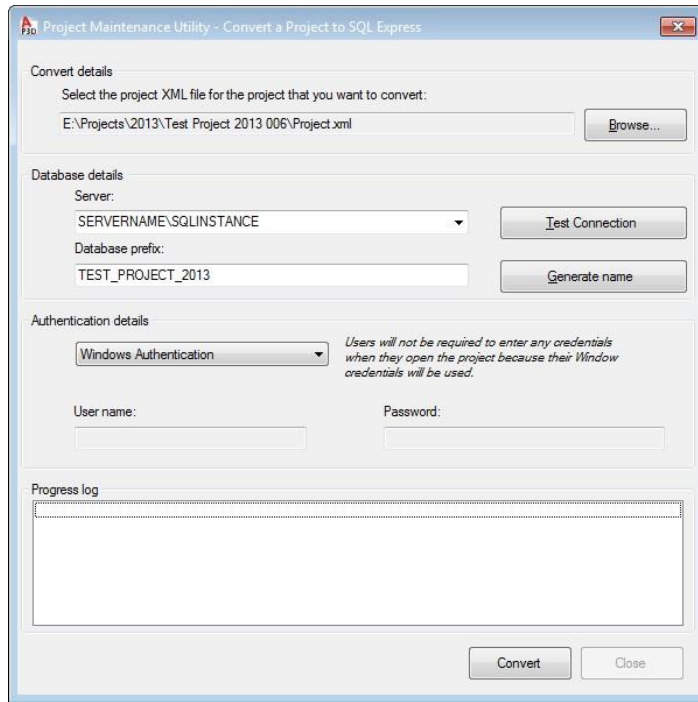


Figure 20. Project Maintenance Utility – Convert a Project to SQL

6. Browse to the location of your project. Select the *Project.xml* file for the project and click Open
7. In the Server field type the name of the SQL Server instance in the following format:

***SQLSERVERNAME\SQLINSTANCE***

*SQLSERVERNAME* is the computer name of the SQL Server and *SQLINSTANCE* is the name of the SQL instance that is running on the server. Note: you may need to use the fully qualified domain name of the server depending on your network configuration (i.e. myserver.domain.com\PLANT3D)

8. Click the Test Connection button to confirm the connection to the server
 

*Note: You will need to enter credentials for a user account that has “sysadmin” server role permissions.*
9. In the Connection Succeeded dialog box, click OK
10. In the database name prefix field enter a prefix to be use (for example the project name). This value will be used to create the database names (i.e. Project001\_PnId, Project001\_Piping, Project001\_Iso)
11. In the Authentication Details select the authentication mode

**Windows Authentication** – Users will not be required to enter any credentials when they open the project. Windows credentials will be used

**SQL Server Authentication** – Enter a SQL Server administrator login credentials. Users will be required to enter their credentials when they open the project.

*Note: Please refer to the [Configure SQL Server Security Rights](#) section of this document for more information on authentication modes.*

12. Click the Convert button and the conversion process will begin

The existing SQLite DCF file databases will be converted to the SQL Server. When the conversion process is complete the DCF files in the project folder will be text files (XML configurations) pointing the project to SQL Server databases.

## Moving and Copying SQL Projects

Existing SQL project databases can be moved or copied in the following scenarios:

- Move or Copy existing project databases to another SQL Server
- Move or Copy existing project databases to a different SQL instance on the same server

Before attempting to move or copy SQL project databases to another server or SQL instance be sure to backup your existing project. This includes the project files and folders in addition to the SQL databases using Microsoft SQL Server Management Studio.

Use the following instructions to perform these tasks.

### Moving a SQL Project Database

Please note this process will only move the SQL **databases** from one MS SQL Server to another. The project's configuration files must still be changed manually to re-direct the project to the proper server.

1. Backup your existing project.
  2. Make sure all users save their drawings in the project and close out of AutoCAD Plant 3D
  3. Browse to the installation folder for AutoCAD Plant 3D or AutoCAD P&ID:
    - C:\Program Files\Autodesk\AutoCAD <version>\PLNT3D
    - C:\Program Files\Autodesk\AutoCAD <version>\PNID
2. Run PnPProjectMaintenance.exe

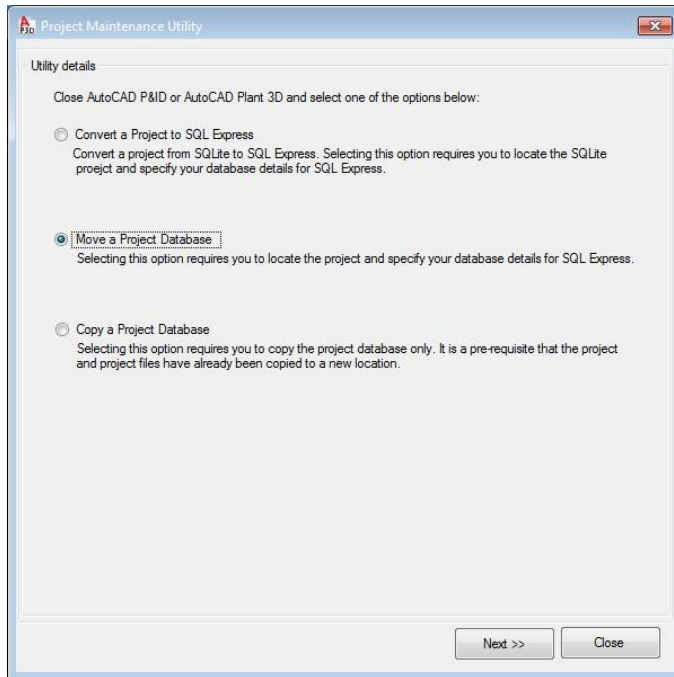


Figure 21. Project Maintenance Utility

3. Select “Move a Project Database”, then click Next
4. In the Convert Details section click the Browse button
5. Browse to the location of your project. Select the *Project.xml* file for the project and click Open

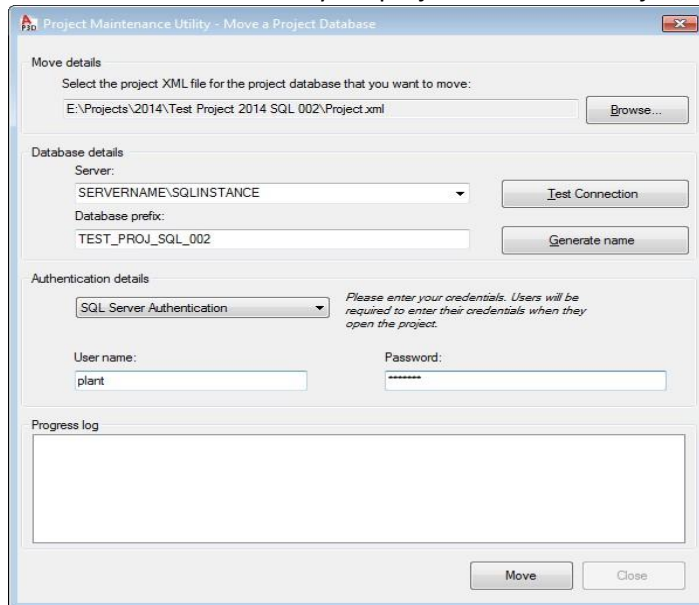


Figure 22. Project Maintenance Utility - Move a Project Database



6. In the Server field type the name of the destination SQL Server instance in the following format:

***SQLSERVERNAME\SQLINSTANCE***

*SQLSERVERNAME* is the computer name of the SQL Server and *SQLINSTANCE* is the name of the SQL instance that is running on the server. Note: you may need to use the fully qualified domain name of the server depending on your network configuration (i.e. myserver.domain.com\PLANT3D)

7. In the Database Prefix field, enter the original prefix used when the project was created

8. Click the Test Connection button to confirm the connection to the server

*Note: You will need to enter credentials for a user account that has “sysadmin” sever role permissions*

9. In the Connection Succeeded dialog box, click OK

10. In the Authentication Details select the authentication mode

***Windows Authentication*** – Users will not be required to enter any credentials when the open the project. Windows credentials will be used

***SQL Server Authentication*** – Enter a SQL Server administrator login credentials. Users will be required to enter their credentials when the open the project.

Note: Please refer to the [Configure SQL Server Security Rights](#) section of this document for more information on authentication modes.

11. Click the Move button and the relocation process will begin

12. In Windows Notepad or a text editor application, open *ProcessPower.dcf* in the project folder.

13. Enter the new database server and SQL instance name in the “Data Source” value. This value is highlighted in the DCF example as “SERVERNAME\INSTANCENAME”

14. Enter the database name in the “Initial Catalog” value. This value is highlighted in the DCF example as “PREFIXNAME\_ProcessPower”

15. Repeat the same edits for the additional DCF files (*Piping.dcf*, *Iso.dcf*, *Ortho.dcf*, and *Misc.dcf*).

Example *ProcessPower.dcf*:

```
<?xml version="1.0" encoding="utf-8"?>
<DatabaseLink xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <Parameter>
    <Name>DatabaseEngine</Name>
    <Value xsi:type="xsd:string">Autodesk.ProcessPower.DataObjects.DbEngine.PnPMsSQLDbEngine</Value>
  </Parameter>
  <Parameter>
    <Name>Data Source</Name>
    <Value xsi:type="xsd:string">SERVERNAME\INSTANCENAME</Value>
  </Parameter>
  <Parameter>
    <Name>Integrated Security</Name>
    <Value xsi:type="xsd:boolean">>true</Value>
  </Parameter>
  <Parameter>
    <Name>Initial Catalog</Name>
    <Value xsi:type="xsd:string">PREFIXNAME_ProcessPower</Value>
  </Parameter>
</DatabaseLink>
```

## Copying a SQL Project Database

Please note this process will only copy the SQL **databases** from one MS SQL Server to another. The project's configuration files must still be changed manually to re-direct the project to the proper server (if the project has been copied to a different SQL server/instance.)

1. Backup your existing project.
2. Browse to the installation folder for AutoCAD Plant 3D or AutoCAD P&ID:
  - C:\Program Files\Autodesk\AutoCAD <version>\PLNT3D
  - C:\Program Files\Autodesk\AutoCAD <version>\PNID
2. Run PnPProjectMaintenance.exe

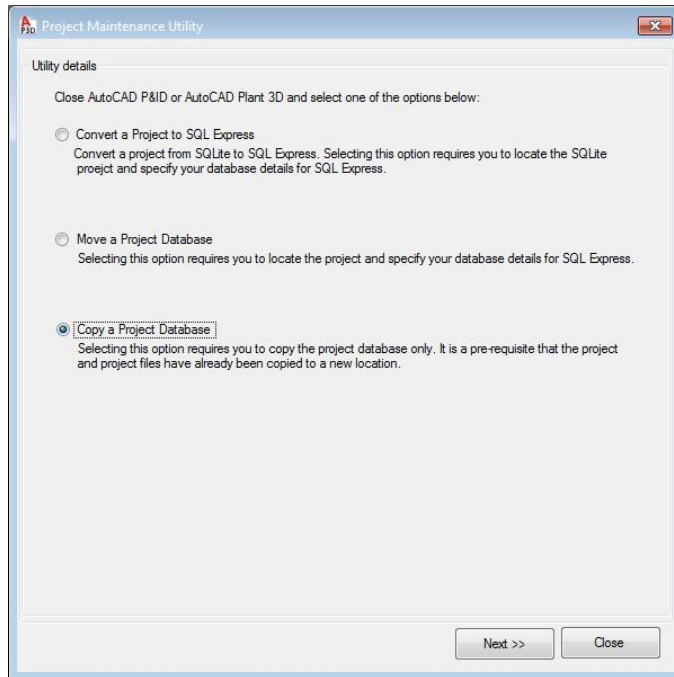


Figure 23. Project Maintenance Utility

6. Select “Copy a Project Database”, then click Next
7. In the Convert Details section click the Browse button
8. Browse to the location of your project, select the *Project.xml* file for the project, and click Open

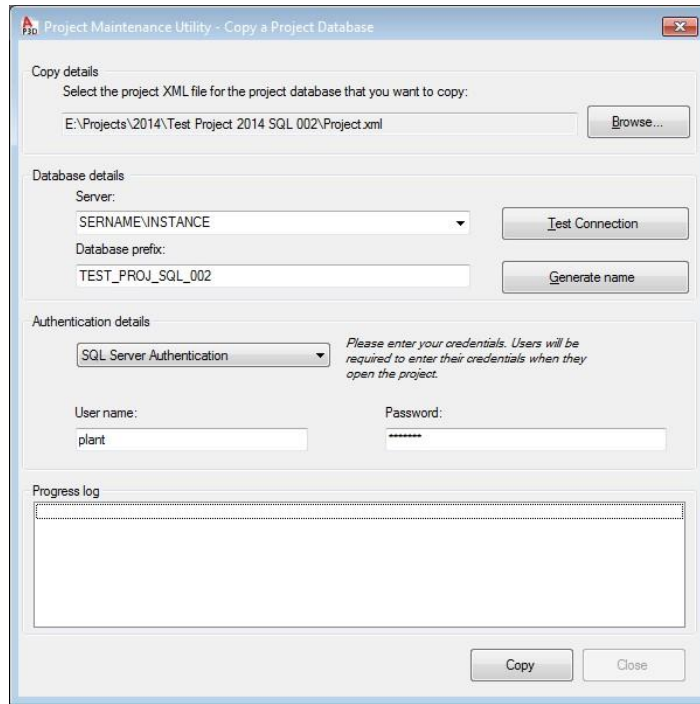


Figure 24. Project Maintenance Utility - Move a Project Database

7. In the Server field type the name of the SQL Server instance in the following format:

***SQLSERVERNAME\SQLINSTANCE***

*SQLSERVERNAME* is the computer name of the SQL Server and *SQLINSTANCE* is the name of the SQL instance that is running on the server. Note: you may need to use the fully qualified domain name of the server depending on your network configuration (i.e. myserver.domain.com\PLANT3D)

16. In the Database Prefix field, enter the original prefix used when the project was created
17. Click the Test Connection button to confirm the connection to the server

*Note: You will need to enter credentials for a user account that has “sysadmin” sever role permissions*

18. In the Connection Succeeded dialog box, click OK
19. In the Authentication Details select the authentication mode

***Windows Authentication*** – *Users will not be required to enter any credentials when the open the project. Windows credentials will be used*

**SQL Server Authentication** – Enter a SQL Server administrator login credentials. Users will be required to enter their credentials when the open the project.

Note: Please refer to the [Configure SQL Server Security Rights](#) section of this document for more information on authentication modes.

20. Click the Copy button and the process will begin
21. In Windows Notepad or a text editor application, open *ProcessPower.dcf* in the project folder.
22. Enter the new database server and SQL instance name in the “Data Source” value. This value is highlighted in the DCF example as “SERVERNAME\INSTANCENAME”
23. Enter the database name in the “Initial Catalog” value. This value is highlighted in the DCF example as “PREFIXNAME\_ProcessPower”
24. Repeat the same edits for the additional DCF files (Piping.dcf, Iso.dcf, Ortho.dcf, and Misc.dcf).

Example *ProcessPower.dcf*:

```
<?xml version="1.0" encoding="utf-8"?>
<DatabaseLink xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <Parameter>
    <Name>DatabaseEngine</Name>
    <Value xsi:type="xsd:string">Autodesk.ProcessPower.DataObjects.DbEngine.PnPMSQLDbEngine</Value> </Parameter>
  <Parameter>
    <Name>Data Source</Name>
    <Value xsi:type="xsd:string">SERVERNAME\INSTANCENAME</Value>
  </Parameter>
  <Parameter>
    <Name>Integrated Security</Name>
    <Value xsi:type="xsd:boolean">>false</Value>
  </Parameter>
  <Parameter>
    <Name>Initial Catalog</Name>
    <Value xsi:type="xsd:string">PREFIXNAME_ProcessPower</Value>
  </Parameter>
</DatabaseLink>
```

## Project Maintenance Tasks

In the event of a crash, there are several tasks which can be performed on a project in order to check consistency of the databases and the project drawings.

### Project Audit

Project audit checks the project database for any invalid records or errors. It also removes unused line number tags from the project's tag registry. The command to run a project audit is AUDITPROJECT.

Before running an audit, the following steps are required:

1. Save and close all project drawings
2. Ask all users to save their drawings and close AutoCAD Plant 3D and/or AutoCAD P&ID
3. Launch AutoCAD Plant 3D/P&ID on one workstation
4. Open any of the project drawings
5. Enter AUDITPROJECT on the command line

Once the project audit completes you can scroll up the command line history to see the results. You may need to increase the command line history or enable the command log file before running the audit.

To create a log file of the audit, use the LOGFILEMODE command and set it to 1. You can change the log file path from the AutoCAD options for Plant 3D or use the LOGFILEPATH command to set the location where the log file will be generated. LOGFILEMODE can be set back to 0 once the audit is complete to avoid additional log files from being generated.

### Project Drawing Audit

Plant audit checks the current drawing to find any objects that do not have records present in the project database. The command to run a drawing audit is PLANTAUDIT.

**Note: Do not use the regular AutoCAD Recover command on an AutoCAD Plant 3D model drawing or AutoCAD P&ID drawing. This command is specialized to plain AutoCAD**

## Purging Local Data Cache

When a project is opened from a network location AutoCAD Plant 3D and AutoCAD P&ID will create a local cache file on the hard disk to help optimize performance.

Purging the PLDC (persistent local data cache) will release disk space that has been consumed by completed projects. After PLDC has been purged, opening the project and drawings may take longer than usual as the cache will have to be re-built. Usually this will be the first time the project is used after PLDC purge. Purging the PLDC will not delete, remove or corrupt your projects and the cache will rebuild again as soon as the project is opened.

The PLDC should be manually purged in the following situations:

- Periodically to free up disk space
- When a project has been completed to free up disk space
- When a project has moved to a new location on the network
- Prior to restoring a project from backup

To purge the local data cache, use the following steps:

- Close all AutoCAD based products including AutoCAD Plant 3D and/or AutoCAD P&ID
- Browse to the installation folder for AutoCAD Plant 3D or AutoCAD P&ID:
  - C:\Program Files\Autodesk\AutoCAD <version>\PLNT3D
  - C:\Program Files\Autodesk\AutoCAD <version>\PNID
- Double-click on PnPLocalDataCachePurger.exe
- Click the 'Purge' button

# Links and Learning Resources

The following table contains the links to resources referred to in this document.

Title	Hyperlink
File Locking and Concurrency in SQLite	<a href="http://www.sqlite.org/lockingv3.html">http://www.sqlite.org/lockingv3.html</a>
Hardware and software requirements for SQL Server	<a href="http://msdn.microsoft.com/enus/library/ms143506.aspx">http://msdn.microsoft.com/enus/library/ms143506.aspx</a>
SQL Server Security and Protection – Choose an Authentication Mode	<a href="http://msdn.microsoft.com/enus/library/ms144284.aspx">http://msdn.microsoft.com/enus/library/ms144284.aspx</a>
SQL 2012 - Managing Logins, Users, and Schemas How-to Topics	<a href="http://msdn.microsoft.com/enus/library/aa337552.aspx">http://msdn.microsoft.com/enus/library/aa337552.aspx</a>
Recovery Models (SQL Server)	<a href="http://msdn.microsoft.com/enus/library/ms189275.aspx">http://msdn.microsoft.com/enus/library/ms189275.aspx</a>
Security and Protection (Database Engine)	<a href="http://msdn.microsoft.com/enus/library/bb510589.aspx">http://msdn.microsoft.com/enus/library/bb510589.aspx</a>
Configure SQL Server for Vault Projects	<a href="https://help.autodesk.com/view/PLNT3D/2019/ENU/?guid=GUID-80D9F362-17C4-4319-9BD3-34827B854561">https://help.autodesk.com/view/PLNT3D/2019/ENU/?guid=GUID-80D9F362-17C4-4319-9BD3-34827B854561</a>
AutoCAD Plant 3D Shared Content Folder	<a href="https://help.autodesk.com/view/PLNT3D/2019/ENU/?guid=GUID-B52BC39D-9FD5-42FC-8E55-3618BB3B5D99">https://help.autodesk.com/view/PLNT3D/2019/ENU/?guid=GUID-B52BC39D-9FD5-42FC-8E55-3618BB3B5D99</a>

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## Document Revisions

V1.0	Final Draft (2/12/2014)
V2.0	Corrections to typos (6/24/2015)
V 3.0	Full revision of the whitepaper (11/26/2018)

