Proficy Plant Applications 2023

Maintenance

We want to hear from you. If you have any comments, questions, or suggestions about our documentation, send them to the following email address:

doc@ge.com

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Maintenance Documentation

Additional documentation for Plant Applications maintenance tasks is available as knowledge base articles at https://digitalsupport.ge.com. White papers, best practices, and code samples are also available at the GE Support site. Best practices address topics about setting up and using Plant Applications for better efficiency and performance. Knowledge base articles include technical information for setup, updating, migration, reporting, and many other topics.

Plant Applications System Backups

Performing system backups should be a part of an administrator's daily maintenance routine.

A site should have standard measures to adequately preserve and restore a Microsoft SQL Server Database. This can be done with a tool such as Symantec's Backup Exec or ARCserve.

Restoring a Database

Restoring a database backup returns the database to the same state it was in when the backup was created. Any incomplete transactions in the database backup, (transactions that were not complete when the backup operation completed originally), are rolled back to ensure the database remains consistent.

Restoring a transaction log backup reapplies all completed transactions that are in the transaction log to the database. When applying a transaction log backup, SQL Server reads forward through the transaction log, rolling forward all the transactions on the transaction log. When SQL Server reaches the end of the transaction log, it has re-created the exact state of the database at the time the backup operation started. The restore operation then rolls back all transactions that were incomplete when the backup operation started.

Backing up a database does not back up full-text index data in full-text catalogs. However, if full-text indexes have been defined for tables, the metadata for the full-text index definitions are stored in the system tables in the database containing the full-text indexes. Therefore, the metadata for the full-text indexes are backed up when a database backup is created. After a database backup is restored, the full-text index catalogs can be re-created and repopulated.

Backup Guidelines

We recommend backing up the Plant Applications data using the SQL Server scheduled backup utility and placing that data in another drive on the Server. This will speed up the process of the backup, reduce the possibility of the data being lost during a backup, and allow for a later backup to tape or other media while SQL Server is running and is unaffected. The backup to tape could be done using software such as Backup Executive.

Backup requirements are dependent upon the amount of data captured, speed of data recovery, procedural requirements already determined by the client, risk tolerance, legal requirements and cost of lost data. As there are many methods to back up the Plant Applications data, we cannot detail them all here. The following material will however provide a basis from which you can protect against loss of data. Other resources for backup information can be found using SQL Server Books Online (usually installed with SQL Server), or by viewing the following links:

- http://www.microsoft.com/TechNet/sql/manuals/admincmp/75517c03.asp

- http://www.sqlmag.com/

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- http://www.swynk.com/faq/sql/sqlserverfaq.asp

Backup Schedule

As a minimum, we recommend a full backup be completed on a weekly basis and transaction logs on a daily basis. Depending upon resources and management requirements, the following example would provide a more thorough backup plan. If the data being saved is relatively small in size, then full backups could be completed on a more regular basis. Backups can slow down processes, therefore a specific strategy for your company should be developed.

Complete a full backup (of both GBDB and Master databases and logs) on a daily basis, preferably at a very slow operational time, e.g. 2:00am when other processes are not running. Depending upon average length of time the backup takes to complete and save on the local hard drive, schedule the backup to tape, or other media, shortly afterwards to ensure the capture of the full backup.

Run backups of the transaction logs every hour. These backups should be stored on another physical, not partitioned, drive.

The full backups should be kept on the server for a period of one week. This will allow for fast access to data that is backed up. Anything older than seven days can be automatically deleted. Check to ensure that there is adequate space on the hard drive for these backups and for the operational requirements of Plant Applications and any other applications installed on the server. If there is not enough space, consider adding another drive or backing up to other machines concurrently.

A second Back-Up routine using software like Back-up Exec should daily pick up the files created above and write them to tape.

Backup Recommendations for Proficy Server

The following information is for guidance only. If you follow the recommendations below, please ensure you have tested the procedures thoroughly and document any changes or specific set ups for your system. Your site is responsible for System backups.

(The following excerpt is from Microsoft Technet)

Backing up a database makes a copy of a database, which can be used to restore the database if it is lost. Backing up a database copies everything in the database, including any needed portions of the transaction log.   The transaction log is a serial record of all the modifications that have occurred in a database, and which transaction performed each modification. The transaction log is used during recovery operations to roll forward completed transactions, and roll back (undo) uncompleted transactions. For more information, see "Transaction Logs" in Microsoft SQL Server Database Developer's Companion.

Backing up a transaction log backs up only the changes that have occurred in the transaction log since the transaction log was last backed up.

A backup operates like a fuzzy snapshot taken of a database or transaction log:

- A database backup records the complete state of the data in the database at the time the backup operation completes.
- A transaction log backup records the state of the transaction log at the time the backup operation starts.

Backup Recommendations for Plant Applications Web Server

All the files, web pages and images that make up the web site as well as the configuration data that Internet Information Server uses to make the site available to the inter/intranet should be backed

up. This will also include all the Report Templates (Access and Excel documents) and all reports that are generated.

The key elements of the Plant Applications Web Server that need to be protected include:

- Plant Applications Database (SQL Server)
- Plant Applications Web Site (IIS)
- Report Templates (MDB, XLT)
- Reports

Plant Applications SQL Backup Job

When Plant Applications is installed (as of build 162), it automatically sets up an MSSQL Server job to run a backup of the GBDB database to the disk, which can then be backed up along with other files to a tape. The timing of this job can be modified but it should be run once a day. This job backs up both the GBDB database and the transaction log to the standard SQL Server backup directory (i.e. …\MSSQL\Backup). However, for this job to run the SQLAgent service must running and configured to automatically start upon system boot.

To Modify the Plant Applications SQL Backup Job Schedule:

1. Open SQL Server Enterprise Manager and connect to the Proficy Server.
2. Expand the Management folder and then expand the SQL Server Agent group.
3. Click on Jobs and then in the right-hand pane, right-click on the job called "DB Backup Job for DB Maintenance Plan 'Backup Plant Applications DB" and select "Properties" from the pop-up menu.
4. Select the Schedules tab and then select the current schedule and click on the Edit button.
5. Ensure that "Recurring" is selected and then hit the Change button.
6. Modify the schedule accordingly and then hit OK twice to exit the Job Properties.

SQL Server Performance

SQL Server Log Files

SQL Server Log Files: SQL Server has two log files, which provide useful troubleshooting information. They are usually located in the **…\Microsoft SQL Server\Log** directory (or **MSSQL\Log**). This directory is usually located under the same root directory where the databases are installed.

- **ErrorLog:** The main log file contains all connection messages and error reporting since SQL Server was started. Depending on the setup, the output SQL Trace flags may be reported here (i.e. if DBCC 3605 is enabled). Old log files are sequentially assigned an integer extension.

- **SQLAgent.Out:** The other log contains messages and error reporting for the MSSQL SQLAgent service. Among other things, the SQLAgent is responsible for running backups and other jobs. It should be checked if there are problems with any scheduled task.

For more information, please see your **SQL Server Books Online**.

SQL Server Memory Allocation

SQL Server should be set to dynamically adjust the amount of memory used. If SQL Server is installed on the same server as Plant Applications or any other application the maximum available should be set to 75% of the total physical memory. If it is set to 100%, then SQL Server will continue to grab memory until all the memory is used up. At that point it will start paging to the hard drive and a severe decline in performance will be encountered.

To check SQL Server Memory Allocation:

1. From the Start menu, select Programs, then Microsoft SQL Server, and then click Enterprise Manager.

   The **Enterprise Manager** opens.

2. Select the server name in the tree.

3. From the Tools menu, select SQL Server Configuration Properties. The **SQL Server Properties** dialog box opens.
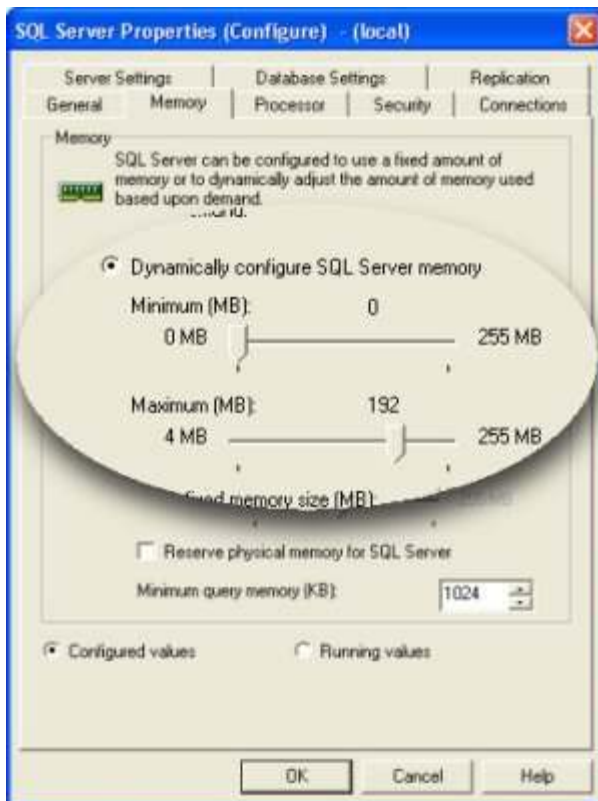
4. Click the **Memory** tab.

5. Do the following:

- Ensure that the **Dynamically configure SQL Server memory** option is selected

- Set the **Maximum (MB)** is set to approximately 75% of the total physical memory. Use the slider bar to adjust the memory amount.

Increasing RAM on the server is a very effective and relatively cheap way to improve performance as RAM is 1000x faster than a Hard Drive for reading. We advise installing as much memory as possible to improve the performance.

6. Click **OK**.

For more information, please see you **SQL Server Books Online**.

SQL Profiler

SQL Server Profiler is a graphical tool that allows you to monitor and collect server events such as:

- Server connects and disconnects

- Transact-SQL batches

- The execution of statements within stored procedures

- Deadlocks

- Errors written to the SQL Server error log

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This information can be displayed in SQL Server Profiler, stored in trace files, or saved in a Microsoft® SQL Server™ table. SQL Server Profiler can read trace files created in SQL Server Profiler or SQL Trace, as well as Transact-SQL scripts.

Examples of event data captured by SQL Server Profiler include:

- The types (classes) of events being traced (e.g. SQLBatchCompleted)
- The SQL Server name of the users performing activity in SQL Server
- The text of Transact-SQL statements and stored procedures being executed
- The duration of Transact-SQL and other types of events
- The severity of errors

Event data can be filtered so that only a subset of the event data is collected. For instance, a filter can be defined to trace only those SQL:BatchCompleted events with a duration greater than one second.

Additionally, SQL Server Profiler allows captured event data to be replayed against SQL Server, thereby effectively re-executing the saved events as they occurred originally.

SQL Server Profiler can also be used to:

- Monitor the performance of SQL Server.
- Debug Transact-SQL statements and stored procedures.
- Identify slow-executing queries.
- Capture error information in the context of the queries being executed.
- Identify scans of large tables.

Using SQL Profiler with Plant Applications

- SQL Profiler is useful for troubleshooting spLocal_* stored procedures created specifically for sites
- Allows you to see the values of the input parameters
- Allows the capture of run statistics
- Open an existing trace or create a new one
- Save to a file
- Send our support team a sample
- Add filters to make traces more efficient and easier to read
- Make traces more efficient and easier to read by using filters, such as:
  o LoginName=comxclient
  o TextData Like %splocal%
  o ApplicationName Like Plant Applications%

For more information, please see your **SQL Server Books Online**.

SQL Server Management Studio

As part of the Microsoft SQL Server Client Tools package, SQL Server Management Studio (Query Analyzer) is a handy tool that allows you to query the database directly using Transact SQL. It is essentially a window in SQL Server through which you can execute custom SQL queries. Many of the stored procedures executed by the Plant Applications Administrator Troubleshooting tools (i.e. spSupport_ShowRunning and spSupport_ShowBlocking) can be executed directly from Management Studio.

Management Studio is also your main development arena for custom calculations, reporting and event stored procedures. It provides a number of handy features that allow evaluation of the performance of custom Transact SQL code.

For more information, please see your **SQL Server Books Online**.

SQL Query Show Execution Plan

The Show Execution Plan basically represents the strategy SQL Server is using to search for and retrieve data. This execution plan is then cached and used henceforth as long as the source query or stored procedure doesn't change.

The Show Execution Plan, and the related Display Estimated Execution Plan option, allows detailed analysis of a query's performance. An administrator can see exactly where the performance cost is occurring and, as a result, can reduce the cost by modifying the query. One example of this is table index utilization. Queries against large tables must take proper advantage of the table's indexes. Otherwise they will experience a significant performance hit as the query attempts to retrieve an excessive number of records from the table that will be unnecessarily discarded through other methods (i.e. Joins).

For more information, please see your **SQL Server Books Online**.

SQL Results in Grid

Under the Query option menu bar, the selection 'r;Results In Grid' causes query results to be returned in a spreadsheet style grid instead of as text rows. This is especially handy for copying into other spreadsheet applications like Excel.

For more information, please see your **SQL Server Books Online**.

SQL Show Client Statistics

The Show Client Statistics command provides detailed information about client-side statistics for query execution(s). Among the statistics is some valuable data regarding the communication between the client and the server. Overall performance can be significantly affected by network speed and availability and this may be diagnosed through analysis of these statistics.

For more information, please see your **SQL Server Books Online**.

SQL Show Server Trace

The Show Server Trace command provides access to information used to determine the server-side impact of a query. If enabled when a query is executed, the Show Server Trace command displays the Trace pane, which provides information about the event class, subclass, integer data, text data, database ID, duration, start time, reads and writes, and CPU usage.

For more information, please see your **SQL Server Books Online**.

Using Trace Flags

DBCC Trace Flags

Although mostly undocumented, SQL Server provides a number of trace flags that can be used to further diagnose issues. Trace flags are used to customize certain characteristics controlling how Microsoft® SQL Server™ operates. Trace flags are turned on by executing a DBCC TRACEON statement and remain enabled in the server until disabled by executing a DBCC TRACEOFF statement or the SQL Server is restarted. New connections into the server do not see any trace flags

until a DBCC TRACEON statement is issued. Then, the connection will see all trace flags currently enabled in the server, even those enabled by another connection. Executing DBCC TRACESTATUS will display those flags that are currently enabled.

For more information about trace flags, see your **SQL Server Books Online**.

Using SQLDIAG.exe

SQLDIAG.exe is a command line tool that collects information about SQL Server and writes it to a text file. It can be useful for documenting or troubleshooting your SQL Server. When you run this command while SQL Server is running, the following information is collected and stored in a text file called **sqldiag.txt**, which is stored in the **\mssql\log** folder.

- The text of all error logs

- SQL Server registry information

- SQL Server dll version information

- The output from the following system stored procedures:
  - sp_configure
  - sp_who
  - sp_lock
  - sp_helpdb
  - xp_msver
  - sp_helpextendedproc
  - sysprocesses

- Input buffer SPIDs/deadlock information

- Microsoft diagnostics report for the server

- The last 100 queries and exceptions (if the query history trace was running)

For more information, see your **SQL Server Books Online**.

OPC Server

Plant Applications OPC Installation and Startup

Install Plant Applications OPC Server

1. Start the Plant Applications client installation.

2. Check Plant Applications OPC server on the Select Components screen.
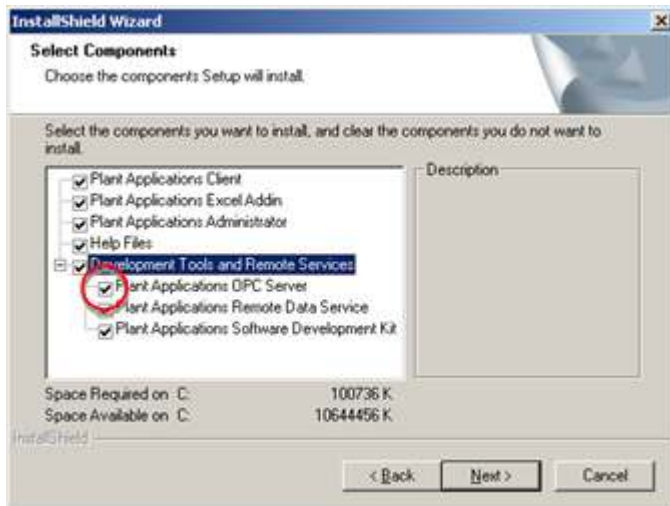
3. Finish the Plant Applications client installation.

Translate the Windows User account to a Plant Applications user ID

The Plant Applications OPC Server must translate each Windows NT user (account) who attempts to use the server into a Plant Applications site user.

For example, if there is a group of five computers that will be used as OPC clients, the Windows account that logs into each computer must be translated into a Plant Applications user ID in order to load the Plant Applications OPC Server.

> *The computers can be configured so users can log on using the same Windows account, or different Windows accounts. This depends on your system configuration. For each Windows account that will be used, the Plant Applications OPC Server will have to find an associated Plant Applications user ID.*

The Windows NT account/Plant Applications user ID association is configured in the Plant Applications Edit User dialog box.

To associate a Windows user account with a Plant Applications user ID:

(I*f you are editing an existing Plant Applications site user, go to Step 5.)*

1. Expand the Plant Applications Server>Security Management>Site Users.

2. Right-click the **Site Users** folder.

3. Select **Add New User** from the Popup menu.

   A blank new entry position displays in the Site Users list.

4. Type the name of the site user and press **Enter**.

5. Right-click the site user and select **Edit <*user name*> Properties** from the pop-up menu.

An **Edit User** dialog box opens.

6. In the **Edit User** dialog box, do the following:

   a. optional: In the **Description** field, type a brief description to help identify the user or provide additional information. You are limited to 255 characters.

   b. optional: In the **Password** field, type a password. You are limited to 30 characters.

   c. In the **Windows Info** field, enter the Windows NT account that you want to use to log in to the computer where the OPC client is installed. Click the **Browse** ... button to browse for and select an available Windows NT account.

   d. optional: In the **Default View** field, select a default view for this user. The selected view will be automatically opened when this user logs in to the Plant Applications Client application.

   e. Make sure the **Active** check box is checked in order for this user to have access to Plant Applications.

      The **Active** check box is checked by default.

   f. optional: Check **Role-Based** if you want this site user to participate in role-based security.

   g. optional: Check **Mixed-Mode** to allow this site user to use either their Plant Applications user name (the name you entered in step 4) or their Windows NT account name and password. If this option is not selected, the site user must use their Windows NT account to log in to Plant Applications

7. Click the **Save** ⊠ button to save your changes.

8. Repeat this procedure all Windows NT accounts that will be allowed access to the Proficy OPC Server.

Register a Plant Application OPC Version

Specify the default version as follows.

In-Process Version Registration

Plant Applications registers the in-process version by default. If another version was registered the in-process version can be registered again, as follows.

1. Open a Windows Command window.

2. Type cd c:\Program Files\Proficy\Plant Applications\Server

Where

`c:\Program Files\Proficy\Plant Applications` is the directory for the Plant Applications application.

3. Press **Enter**.

4. Type regsvr32 propcsvr.dll

5. Press **Enter**.

   The out-of-process version is now the default version.

6. Exit the Windows Command window.

   To un-register the in-process version substitute the following at the command line.

   ```
   regsvr32 /u propcsvr.dll
   ```

Out-of-Process Version Registration

1. Open a Windows Command window.

2. Type cd c:\Program Files\Proficy\Plant Applications\Server

Where

`c:\Program Files\Proficy\Plant Applications` is the directory for the Plant Applications application.

3. Press **Enter**.

4. Type `PROPCSvr.exe /regserver`.

5. Press **Enter**.

   The out-of-process version is now the default version.

6. Exit the Windows Command window.

   To un-register the in-process version substitute the following at the command line.

   ```
   PROPCSvr.exe /unregserver
   ```

Service Executable Version Registration / Un-registration

1. Open a Windows Command window.

2. Type `cd c:\Program Files\Proficy\Plant Applications\Server`

Where

`c:\Program Files\Proficy\Plant Applications` is the directory for the Plant Applications application.

3. Press **Enter**.

4. Type `PROPCService.exe /regserver`.

5. Press **Enter**.

   The service executable version is now the default version.

6. Exit the Windows Command window.

   To un-register the in-process version substitute the following at the command line.

```
PROPCService.exe /unregserver
```

Plant Applications OPC Server

Plant Applications Client includes a Plant Applications OPC Server option.

The Plant Applications OPC Server enables you to expose Plant Applications variables and properties through an OPC application, as follows.
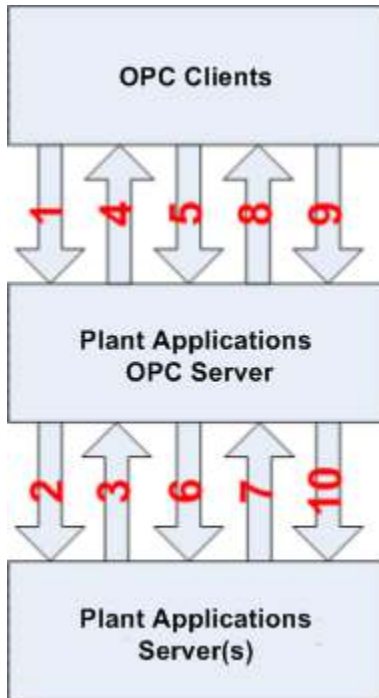
1	OPC Client starts and starts the Plant Applications OPC Server, if it is not already running.
2	OPC Server requests tag and property data from the available Plant Applications servers.
3	Plant Applications servers respond with tag data.
4	OPC Clients can now browse available data.
5	OPC Clients request tag data updates.
6	OPC Server subscribes to Plant Applications data.
7	Plant Applications servers send updates.
8	OPC Server provides real time data updates.
9	OPC Clients update variables or properties.
10	OPC Server sends changes to Plant Applications servers.

Plant Applications OPC Versions

Plant Applications provides three OPC versions as follows.

Version	In-process
Installed File	`PROPCSvr.dll`
Description	When an application tries to use the OPC COM object, it gets instantiated in-process using this dll. If multiple applications use the Plant Applications OPC, each one has its own copy in-process.

	• *Each copy uses PC memory. The OPC caches Plant Applications data for each copy. Therefore, if there are, for example 10 applications using OPC, there are 10 copies of cached data.*		
Version	**Out-of-process**		
Installed File	`PROPCSvr.exe`		
Description	When an application instantiates the COM object,the `PROPCSvr.exe` runs in a separate process. Other applications that use the Plant Applications OPC will share this process, including memory space and cache. When all of the applications disconnect, the process goes away. Each Windows user ID gets a separate OPC process. If a user logs out from Windows, the process goes away. • *Users cannot share an out-of-process copy; each user must have a separate copy. In order to log out, must log out from Windows because a process is running under a user account.*		
Version	**Separate service**		
Installed File	`PROPCService.exe`		
Description	Has the service manager code in it. When this is being used, all applications and Windows users go through this service. Can start up its own Service running under user name when services start, most start under local system account. OPC has to be under a user name. • *If you have the service running under one user name and the client under another user name you may have to configure DCOM.*		

Plant Applications OPC Client

A Plant Applications OPC client can access the Proficy Server if the Plant Applications OPC Server can translate the computer's logged on Windows NT account to a Plant Applications user ID.

1. Open an OPC application.

2. Display a list of available OPC Servers.

3. Select the Proficy.OPC Server.1.

4. Continue to use the OPC application's functionality to view Plant Applications data.

Plant Applications OPC Available Data

The following data is available through the Plant Applications OPC Server.

Variable Data

`Property Name = Server:Line.Unit.Variable.Property`

Where

`Server`	*Optional*	Database server. If a server is not included the default server is used.
`Line.Unit.Variable`	*Required*	Plant Model Line, Unit and Variable Do **not** include spaces in names.
`Property`	*Optional*	Any property name listed below. If a property is not included the `Value` property is used.

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Example	PAServer:PaperMachine.Winder.OpacityLimit.UReject

Available Properties:

Class	Property Name	Property Description	Data Type
Dynamic	Value	Variable Value	Variable's Type
Static	Eng_Units	Engineering Units	String
Static	Description	Description	String
Dynamic	UEntry	Upper Entry Limit	Float
Dynamic	UReject	Upper Reject Limit	Float
Dynamic	Uwarning	Upper Warning Limit	Float
Dynamic	UUser	Upper User Limit	Float
Dynamic	Target	Target Value	Float
Dynamic	LUser	Lower User Limit	Float
Dynamic	LWarning	Lower Warning Limit	Float
Dynamic	LReject	Lower Reject Limit	Float
Dynamic	LEntry	Lower Entry Limit	Float
Static	VarId	Variable ID	Integer
Static	PUID	Production Unit ID	Integer

Production Units

Property Name = Server:Line.Unit.Property

Where

Server	*Optional*	Database server. If a server is not included the default server is used.
Line.Unit	*Required*	Plant Model Line and Unit Do **not** include spaces in names.
Property	*Required*	Any property name listed below.
Example	PAServer:PaperMachine.Winder.CurrentProduct	

Available Properties:

Class	Property Name	Property Description	Data Type
Dynamic	Var Name	Unit Variables	Variable's Type
Static	Description	Description	String
Static	PUID	Production Unit ID	Integer
Static	MUID	Master Unit ID	Integer
Static	PLID	Production Line ID	Integer
Dynamic	CurrentProduct	Current Product	Float
Dynamic	CurProdName	Current Product Name	String

Topic 100

Property Name = Server:Line.Unit.Topic100.Property

Where

Server	*Optional*	Database server. If a server is not included the default server is used.
Line.Unit	*Required*	Plant Model Line and Unit

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		Do *not* include spaces in names.
Topic100	*Required*	Used for Downtime reporting.
Property	*Required*	Any property name listed below. Currently Downtime is the one property.
Example		PAServer:PaperMachine.Winder.Topic100.Downtime

Available Properties:

Class	Property Name	Property Description	Data Type
Dynamic	Downtime	Downtime	String

Plant Applications OPC Server

Troubleshooting

First Steps in Troubleshooting

Check these items as first steps in troubleshooting:

- Check the Plant Applications log files in ..\Plant Applications\Server\LogFiles for large file size and errors.
- Check the SQL Server log file in Enterprise Manager → Management → SQL Server Logs for large file size and errors.
- Check the server CPU usage through the Windows Task Manager for excessive memory consumption by a particular process.
- Check the current activity through the Administrator Server Troubleshooting tools or by running the spSupport_ShowRunning stored procedure in Management Studio or by checking Enterprise Manager → Management → Current Activity.

Refer to GE Support web site (https://digitalsupport.ge.com), and select **Error Messages** under Knowledge Base Categories.

Troubleshooting Helpful Hints

Here are some helpful hints to troubleshoot some issues:

- Clients are not responding
  - Check the Client connection.
  - Check the server CPU usage.
  - Check the gateway log for network issues.
- High server CPU usage
  - Check the Windows Task Manager for which process is using all the CPU.
- No data and no activity on the server
  - Check for blocking in the Administrator Server Troubleshooting tools.
- High SQL Server CPU usage
  - Check the Current Activity in the Administrator Server Troubleshooting tools.
  - Check the log files for the last reload time of each service.
  - Check the pending tasks
- Missing some event data
  - Check the historian through the Excel Add-In for valid source data.
  - Check the EventMgr log file for errors.
  - Check the DatabaseMgr log file for errors.
  - Put the relevant service into debug mode and monitor the log files.
- Missing some variable data
  - Verify the data through the Administrator View Variable Data feature.
  - Check the historian through the Excel Add-In for valid source data.
  - Check the Reader log file for errors.
  - Check the SummaryMgr log file for errors.
  - Put the relevant service into debug mode and monitor the log files.

- Plant Applications services are running but do not appear to be responding
  - o Activate the IsAlive site parameter.
- MSSQL Backups aren't running
  - o Ensure that the SQLAgent service is set to automatically run on start-up.

Troubleshooting Tools

The following tools are used for troubleshooting and should be installed on the server so in the event of network issues they can be run locally for diagnostic purposes.

Remote Control Software

Remote control software, such as Carbon Copy, PC Anywhere or the administrative version of Windows Terminal Services, should be installed on the server to facilitate troubleshooting activities.

Plant Applications Administrator

The Plant Applications Administrator should be installed on the Plant Applications server. One of the reasons for this is when reloading Plant Applications services with an effective date, the date used is from the machine where the Plant Applications Administrator is installed on. This is only an issue if you are in a different time zone than the server. If you reload the services from a time zone east of the server's time zone, there is potential for lost data because the reload time is in the future. As such, it is helpful to have the Administrator installed on the server itself so you can reload the services locally.

SQL Server Client Tools

The SQL Server client tools should also be installed locally in case network issues do not allow remote SQL client connections.

GE Intelligent Platforms Support Web Site

Our support web site contains helpful information: new releases on builds, service packs, web reports and more. It is also place to either create a new support ticket or review ones in progress. Most importantly, it is an excellent resource for customers. The Knowledge Base continues to grow as new items are added and it provides a handy search feature. The web site is located at https://digitalsupport.ge.com.

To access the web site, one is required to have a use name and password. The user name is the users email address and the password is provided by GE Intelligent Platforms. A password can be received by submitting a request via the log in page.

Plant Applications System Recovery

Recovery of a locked up Proficy Server should be done in a series of progressive steps. This will help identify the true cause of the lock-up.

1. If the problem has been determined to be with a specific Plant Applications service, restart that individual service.
2. Restart all the Plant Applications services.
3. Shutdown all Plant Applications services, restart SQL Server and then restart the Plant Applications services.
4. Reboot the server.

Plant Applications Client Message Log

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The Plant Applications Client has a message log which may report errors associated with an issue. These messages are mostly used by the support team but can be used to further diagnose issues with the Client. The message log is cleared out every time the Client is closed so it is important to save any relevant messages.

To view the Plant Applications Client message log:

1. Log on to the Plant Applications Client.

2. From the **Help** menu, click **View Message Log**.

   The **Message Log Viewer** dialog box opens.

3. Click **Copy to Clipboard** to copy the message log to your Clipboard. Then, you can paste the message log into a Word document or text file.

Plant Applications SDK Error Log

The **ProficySDKErrors.log** file is installed with every Plant Applications Client installation and is normally located in **C:\Program Files\Common Files\Profic**y. This log contains connection information and some errors that are not reported to the Plant Applications Client application. It also applies to any client that uses the Plant Applications SDK, which means that along with errors associated with the Plant Applications Client itself, it will also report errors associated with any custom applications using the Plant Applications SDK or EAS.

Raw Historian Data Analysis

A key tool for diagnosing issues with data retrieved from the historian is the Raw Data feature of the Plant Applications Excel Add-In.

Missing events or issues with variable data can be identified by looking at the raw historian data. You can see exactly what Plant Applications is using to help determine whether issues are related to historian data rather than the interpretation of the data by Plant Applications. Problems that are apparent in the raw historian data may not be apparent in a Trend display. For more information, refer to "Retrieving Raw Data" in the Plant Applications Add-in for Excel online help.

For more information, refer to "Excel Add-In," in this help system.

Checking Server CPU Usage

If your server CPU is constantly running at 100% utilization then it is likely that it is unable to process all of it requested tasks. This means it may not have enough available processing to keep up with calculations, data collection or even communication with clients. It is normal for the CPU to jump to 100% while it is processing bursts of activity but when the CPU stays there for an extended period of time then it is likely that there is an issue.

To check Server CPU usage:

1. Press **Ctrl+Alt+Delete**.

2. In the **Windows Security** dialog box, click **Task Manager**.

   The **Windows Task Manager** dialog box opens.

3. Do the following:

- Click the **Performance** tab to view CPU usage and the CPU usage history.

- Click the **Processes** tab to find out how much memory each process is using. Click a column heading to sort the information.

Checking Server Memory Usage

If your server does not have enough physical memory to run efficiently as it is currently configured, it will most likely cause your server to page unnecessarily. This excess paging can drastically slow down your server's performance.

To check Server CPU usage:

1. Press Ctrl+Alt+Delete.

2. In the Windows Security dialog box, click Task Manager.

   The **Windows Task Manager** dialog box opens.

3. Do the following:

- Click the **Performance** tab and verify that the total **Commit Charge** memory is less than the total **Physical** memory. See Troubleshooting Server Memory Usage for more information.

- Click the **Processes** tab to find out how much memory each process is using. Click a column heading to sort the information.

Checking Server Disk Space

If your server runs out of disk space then it will obviously affect server performance. All data files (ie. SQL Server databases) and log files should be configured to reside on the largest drive in the server.

Troubleshooting Server Disk Space Usage

Check the following:

- Check the size of the Plant Applications log files

- Check the size of the SQL Server database files.

- Check the size of the SQL Server log files.

- Check the memory allocated to SQL Server because, if SQL server has exceeded its dynamic memory allocation, then it may generate large swap files.

Troubleshooting Server Memory Usage

SQL Server Dynamic Memory Allocation

SQL Server can be configured to dynamically configure how much memory to use. However, if this is set incorrectly it can cause SQL Server to use all of the available memory, which results in poor server performance. As such, check the maximum memory allocated to SQL Server.

Memory Leaks

Memory leaks can steal valuable memory from your server, reducing performance, and perhaps even forcing you to reboot your server. Some memory leaks come from the operating system itself, device drivers, MDAC components, SQL Server and virtually any application.

Memory leaks are often hard to identify, especially if they leak memory slowly. Generally, memory leaks become apparent when you notice that your server is running out of available memory and paging becomes a big problem. A symptom of this is a server that runs quickly after being rebooted, but begins to run more and more slowly as time passes, and when the system is rebooted again, it speeds up again.

Maintenance

One way to help get rid of many memory leaks is to ensure that you always have the latest service packs or updates for your server's software. But a memory leak you find may not have an immediate fix. If this is the case, you may be forced to reboot your server periodically in order to free up memory.

Identifying what is causing a memory leak is often difficult. One method involved using Performance Monitor to monitor all of the counters in the Memory object over time, seeing what is happening internally in your computer. Another method is to use Task Manager to view how much memory is assigned to each process. A process that seems to be using an unusual amount of memory may be the culprit.

Proficy Server Troubleshooting Details

Using Proficy Server Log Files

Each of the Plant Applications services has a log file. The location of all the log files on the server is set by the site parameter **LogFilePath** (the default path is C:\Program Files\Proficy\Proficy Server\LogFiles). The log files report reload times, execution messages and errors and, when debug is turned on, debugging information. Log files should be check periodically and any error messages should be resolved. Every time a service is restarted, a new log file is created.

Plant Applications Services Debug Mode

Plant Applications has a debug facility where additional execution information can be written to the Plant Applications log files. This is an extremely valuable tool for debugging calculations and diagnosing other execution issues.

There are 3 levels of debugging, each of which writes progressively more information.

- The first level, **Low**, will write minimal information.

- The next level, **Medium**, will provide more information to most likely solve the issue and

- The **High** level should only be used by our support team as it produces stack traces which will only be understood by us.

Debug mode should be used sparingly as the log files can grow to an immense size very quickly. Do not leave debug mode on for an extended period of time or you may find yourself unexpectedly running out of disk space.

To turn on Debug mode:

1. Click to open the Server **Management** folder.

2. Double-click **Control Services**.

3. Right-click on the desired service, then select **Debug** and then choose the debug level.

- **CalculationMgr Service:** The following commonly used debug information is available in the CalculationMgr and can be used to verify that the calculation is being executed at the right time and with the right arguments:
  - Triggering variable
  - Calculation timestamp
  - Actual execution start time and end time
  - Passed argument values
  - Result values

- **DatabaseMgr Service:** The DatabaseMgr will show the messages that it receives. This is useful when using result sets and you need to verify that the message format is correct and is being properly sent to the DatabaseMgr.

- **EventMgr Service:** The EventMgr log file will show the times it wakes up to check the historian for data and any times that it fires an event model because of it.

Proficy Server Show Files

Each of the Plant Applications services has a show file (.shw). The show files are always located in the same directory as the log files. The show files contain the configuration information acquired by the Plant Applications service when it was last reloaded. The running configuration can be verified here. If changes have been made in the Administrator, the show file can be checked to see if they have been picked up by the Plant Applications service. They are also a handy place to copy configuration information from when submitting issues to Plant Applications Support (the more information the better!).

Proficy Server Buffer Files

Each of the Plant Applications services has a buffer file. The location of the buffer files is determined by the Site Parameter BufferFilePath. The buffer files stored queued actions for the Plant Applications service to execute. If missing, the files and directories located in the BufferFilePath are automatically created.

Deletion of the buffer files can be a potentially helpful option when troubleshooting a problem as it will effectively reset the server. The Plant Applications services must be shut down for the buffer files to be deleted. By removing the buffer files, you are removing any queued actions so when the services are restarted there is no historical processing and Plant Applications will only process new events. It must be noted that, for the same reason, it will also result in some lost data as any recently queued actions will be lost.

Plant Applications Administrator Data Verification

Event Data: Event data can be verified through the Plant Applications Client displays. The displays are all based off the actual event data so any and all events present in the tables will be reflected in the Client displays.

The event data can also be retrieved through the Excel Add-In. This method is preferable as it easier to do analysis in Excel and check out the event data against other event and variable data.

Variable Data: Variable data is harder to fully verify in the Plant Applications Client displays due to the nature of the Client's data retrieval methodology. In the Autolog display, the columns are analogous to windows into the Tests table. The Client will search the Tests table for any data that matches the timestamp of the column in the Autolog display. As such, there may be additional data in the database for a particular variable that is not shown in the Autolog display.

The Plant Applications Administrator has the capability to show all of the data associated with a particular variable. The View Variable Data feature is essential for verifying the data shown in the Plant Applications Client. For example, if there is missing or a problem with data in the Client, the View Variable Data feature should be used to verify the data in the database before checking anything else. Often the problem may be due to a configuration problem and the problem with the data is due to a timestamp mismatch or extra values in the database.

The variable data can also be retrieved through the Excel Add-In. This method is preferable as it easier to do analysis in Excel and check out the event data against other event and variable data.

To Retrieve Variable Data in the Administrator:

1. Expand the **Plant Model** folder Plant Applications Administrator tree and then drill down to the desired variable.
2. Right-click on the variable and select **View Variable Data** from the pop-up menu.
3. If necessary, modify the filter to retrieve data for the desired time frame.

Plant Applications System Troubleshooting

The time it takes to debug a problem on a computer system is relative to knowledge of available resources, understanding the information and knowing how to respond to the issue. Plant Applications provides many different methods for seeking out the reason for a problem, however, problems in Plant Applications may not be due to the Plant Applications application or database, but due to the operating system, other applications running at the same time, memory resources etc. We provide recommendations on system configuration to try to limit issues that may affect the operation of Plant Applications. SQL Server has management tools available for maintenance and troubleshooting purposes. These tools along with those included with Plant Applications should reduce overall time in finding the source of a problem and finding a suitable resolution. For database performance monitoring and tuning, we suggest a trained MS SQL Server database manager on site, at all times.

Every Plant Applications user should be identified using an individual Plant Applications User account. Do not allow anyone to use the generic ComXClient user. As an Administrator trying to resolve an issue you need to be able to talk to the people using the system at the time of the issue and the best way to identify them is through the Plant Applications User.

Using Server Performance Monitor

The Performance Monitor shows many of the same statistics that are available from the Plant Applications Administrator Server Troubleshooting tools. The main difference between them though is that the Performance Monitor shows them in real time while there is a configured delay in the Administrator statistics. The Performance Monitor also has some extra statistics that are not available through the Administrator.

As in the troubleshooting tools, the Performance Monitor gives insight into the performance of specific Plant Applications functions. It can be used to identify poorly behaving stored procedures which may be impacting overall Plant Applications performance.

To Run Server Performance Monitor:

1. Open the Control Panel and click **Administrative Tools**. The **Administrative Tools** dialog box opens.

2. Click **Performance**.

3. Under **Console Root**, click **System Monitor**.

4. Click the **View Report** button 🖹.

5. Click the **Add** button ➕ to add counters. The **Add Counters** dialog box appears.

6. Do the following:

    a. Click the **Performance Object** arrow to select one of the Plant Applications objects (i.e. 'r;Plant Applications CalcMgr SP's').

    b. Click the **All counters** option.

    c. Select the desired instances.

    If the Plant Applications objects are not in the Performance Object list then they may not have been installed correctly. Running the 02-InstallPerfRegStuff.bat batch file may correct this. This file is located in the …\Proficy\Server directory.

7. Click **Add**.

RDS Fails to Start

The Plant Applications Remote Data Service fails to start up and you see the following information in the Event Viewer:

```
Type: Error
User:  N/A
Computer:  ServerName
Event ID:  7000
Source: Service Control Manager

The Plant Applications Remote Data Service service failed to start due to
the following error:
The system cannot find the path specified.

For more information, see Help and Support Center at
http://go.microsoft.com/fwlink/events.asp.
```

To verify the issue:

1. Click **Start**, point to **Administrative Tools**, and click **Services**. The **Services** management console appears.

2. In the details panel, right-click **Plant Applications Remote Data Service** and select **Properties**. The **Plant Applications Remote Data Service Properties** dialog box appears.

3. On the **General** tab note the value entered in the **Path to executable** box.

4. Search for **PRRDS.exe** and verify the location of the file. The actual location of the file may not match the path of the file noted in step **3**.

5. Click **Start** and click **Run**. The **Run** dialog box appears.

6. In the **Open** box, type regedit.

7. Navigate to **HKey_Local_Machine\System\CurrentControlSet\Services\PRRDS**.

8. Right click **ImagePath** and click **Modify**. The **Edit String** dialog box appears.

9. In the **Value data** box, type the actual path of the **PRRDS.exe** file.

10. Click **OK** to save the changes.

11. Restart the Plant Applications Remote Data Service.

Server Maintenance

During an upgrade, Plant Applications may determine that tables in your database may require re-indexing, which will help improve performance. If this is the case, the Server Management icon will be yellow, instead of gray, and a new item will be added under Server Management: **Server Maintenance**.

During installation, a message box may also be displayed informing you that server maintenance needs to be performed.

This maintenance must be performed during a scheduled down time because the Plant Applications Manager service must be stopped.

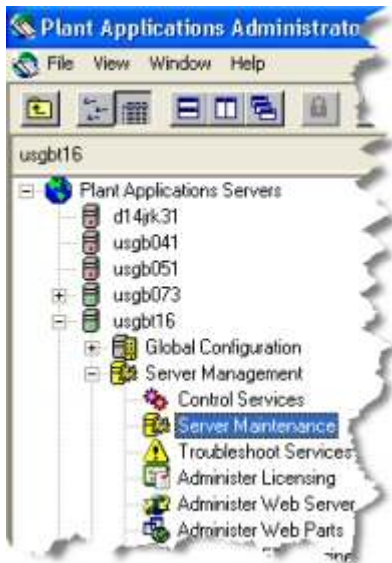To perform server maintenance:

1. Open Plant Applications Administrator.

2. Click Server Management.

3. Double-click Server Maintenance.

Server Maintenance will not be in the tree if maintenance is either not necessary or it has been completed.

4. A message box will inform you that the **Plant Applications Manager** service must be stopped before you apply the maintenance scripts. If necessary, stop the Plant Applications Manager service. Click **OK**.

5. In the **Database Maintenance Scripts** dialog box, select the table that you want to re-index and click **Apply**.
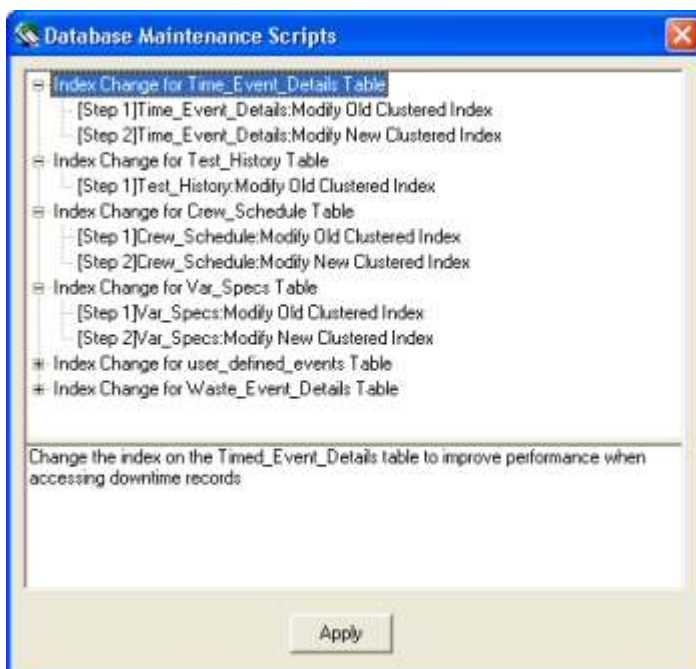
You can select only one table at a time.

6. A message box will inform you that the process could take a long time. Click **Yes** to continue.

7. Repeat steps 5 and 6 for each table you want to re-index.

8. After all the tables have been re-indexed, click the **Close** ✖ button on the **Database Maintenance Scripts** dialog box.

Cannot Connect to Historian

When searching for a historian tag, the historian services fail to connect to the historian node and displays the error:

Could not connect to the historian. Verify the Plant Applications Remote Data Service is running on your Server.

To resolve the issue, do one of the following:

- Verify the Common License Viewer is licensed for the Historian Connector. For example, if using OSI Pi and AspenTech, the license viewer must be licensed for two historian connectors.

- Verify the correct version of the Plant Applications Remote Data Service (RDS) is running.

- Validate the Historian Connectors properties. If RDS is being used for historian communications, ensure the Remote Data Service option is enabled on the Historian Connector and the Plant Applications RDS service has been installed on the remote historian node. When making changes to the connector, restart the following services: Plant Applications Remote Data Service, Proficy Server EventMgr, Proficy Server Summary Mgr, Proficy Server Reader, and Proficy Server Writer.

- If RDS is not being used for historian communications, verify the Remote Data Source option is **not** checked on the Historian Connector and the corresponding historian client API tools have been installed on the Plant Applications Server. When making changes to the connector, you must restart the following services: Plant Applications Remote Data Service, Proficy Server EventMgr, Proficy Server Summary Mgr, Proficy Server Reader, and Proficy Server Writer.

Test Connection Fails

After successfully configuring a new historian and you click the Test Connection button in the Edit Historian dialog box, the following error message is displayed:
Method ~ Object ~ Failed~

Depending upon the type of historian connection you are using, you will need to install the corresponding historian API's in order for the Proficy .DLLs to make a connection to the historian.

Once the required historian API has been installed, restart the following services: Plant Applications Remote Data Service, Proficy Server EventMgr, Proficy Server Summary Mgr, Proficy Server Reader, and Proficy Server Writer.

Historian Type	Proficy DLL	Required Historian API
GE Proficy - Historian	PR2IH.dll	ihapi.dll
Intellution Advanced Historian	fixtools.dll	piapi32.dll
OSI PI	PR2PI.dll	piapi32.dll
AspenTech InfoPlus.21	PR2IP21.dll	AspenTech Libraries

No Communications Occurring

Maintenance

Data entered through a Plant Applications Client display is not being saved to the database. All Proficy Server services (Reader, Writer, SummaryMgr, Gateway, Stubber, and so on) return the following message in the log files when attempting to connect to the cmRouter service: ERROR: [ServerName] Bad magic number in message. Dropping Connection.

The cmRouter service returns the following error in the log file:

```
[2/2/2006 3:01:48.364 PM] [P:\Program Files\Proficy\Proficy
Server\Messaging/../LogFiles\cmRouter-16.Log] Opened...

[2/2/2006 3:01:48.364 PM] DebugLevel is [Off Not Tracing Msgs]

[2/2/2006 3:01:48.380 PM] Initialization completed successfully.

[2/2/2006 3:01:48.380 PM] cmRouter Service Started [Version 1.0.19]

[2/2/2006 3:01:48.411 PM] This device supports encryption. Messages sent
will use encryption.

[2/2/2006 3:01:48.442 PM] ERROR: Could not connect in AcceptConnections
call.

[2/2/2006 3:01:48.442 PM] ERROR: Could not listen for connections on
protocol [TCP].

[2/2/2006 3:01:48.442 PM] [R:\4636\6456\1138830299\1138896382\0] Opening
Message Buffer.....

[2/2/2006 3:01:48.442 PM] [R:\4636\6456\1138830299\1138896382\0] Message
Buffer Opened. 0 Messages (ok=1)
```

This error message indicates the Proficy server is encountering a TCP communication error and is unable to "Create a socket", "Bind the Socket to the Address", and/or "Listen for Messages" using the default port of 10000.

To displays all active TCP connections and ports the computer is listening on, run "NetStat -a" from a DOS Command Prompt on the Proficy Server. After determining what application is already listening on that port, you can either resolve internally or change Plant Applications to listen on a different port by modifying the following files:

- Message.ini

- cmRtr.ini

- PlantAppsMessaging.ini

- cmConfigMgr.ini

Edit all of the .INI files and change the value of "Protocol0_Item0 = 10000" to "Protocol0_Item0=10033" or another unused port, then restart the Proficy Server for all changes to take effect.

To change the port used by Plant Applications:

1. On the Proficy Server, go to: <drive>:\Program Files\Proficy\Proficy Server\Messaging. By default, these files are installed on drive C.

2. Using Notepad or another text editor, open one of the four files.

3. Locate the following line.
   Protocol0_Item0 = 10000

4. Change 10000 to an unused port number. You must use the same port number in each of the four files.

5. Save the file.

6. Repeat steps 2 through 5 for each of the four files.

7. After all four files have been changed, restart the Proficy Server.

Clients Cannot Connect to Proficy Server

If the Administrator or Client are unable to make a connection to the Plant Applications Server, the issue may be a file that was not registered during installation. In the ProficySDKErrors.log, you may see an ActiveX error or "Unknown error WebAppsServices.NET.Authentication."

1. Create a **.bat** file in **C:\Program Files\Common Files\Proficy\Plant Applications** and copy the code below into the **.bat** file. The path to the webappsservices.net.dll may vary depending on the client operating system and must be updated prior to executing the .bat file on the Client workstation. For Windows 2003, the path would be **C:\WINDOWS** and for Windows 2000/NT, the path would be **C:\WinNT**

    ```
    REM cd c:\ProficySource\Bin

    cd c:\program files\common files\proficy\plant applications

    c:\Windows\microsoft.net\framework\v1.1.4322\regasm.exe
    webappsservices.net.dll /unreg

    c:\Windows\microsoft.net\framework\v1.1.4322\regasm.exe
    webappsservices.net.dll /codebase /tlb:webappsservices.tlb
    ```

2. Execute the newly created .bat file against the Client workstation. Upon completion, reopen the Plant Applications Client /or Administrator. The, application should now be able to make a connection to the server.

Clients Cannot Connect to Remote SQL Server Instance

If the Administrator and Client cannot connect to a remote SQL Server instance, verify that the server connection in the Plant Applications Administrator is formatted correctly and points to the correct SQL Server name\Instance.

1. In the Plant Applications Administrator, from the **File** menu, click **Server**. The **Connect Server** dialog box appears.

2. In the **Server** column verify the server name is formatted using the format, **SQL Server name\Instance**.

3. If necessary, right-click the server and click **New**. The **Server** dialog box appears.

4. Enter the correctly formatted information.

5. Click **Advanced** and ensure **Default Server** is selected (checked).

6. Click **OK**.

7. If the server is not connected, right-click the server and click **Connect**.

8. Click **Close**.

Run-time Error 427

If you receive the error:
Run-Time Error '427': This key is already associated with an element of this collection, you will need to re-register the ProfSvr.dll and PrMsgs.dll on the computer where you received the error.

1. Locate ProfSvr.dll and PrMsgs.dll. By default, they are installed at C:\Program Files\Common Files\Proficy\Plant Applications.

2. Click Start and click Run. The Run dialog box appears.

3. In the Open box, type `regsvr32` and the path to the file. For example:
    ```
    regsvr32 "C:\Program Files\Common Files\Proficy\Plant
    Applications\ProfSVR.dll"
    ```

> *If you used **Search** to locate the files, you can drag the file from the Search Results to the Run dialog box, after typing regsvr32.*

4. Click **OK**.

5. Click **OK** to acknowledge the informational message.

6. Repeat steps 2 through 5 for each of the **.dll** files.

Could Not Connect to Server

If you open the Plant Applications Administrator and see the message:
Could not connect to server:[10.10.65.108]. Attempt to ping the server by name and address, If problems persist please contact your administrator.

If you open the Event Viewer and see the following messages, you may need to reset the proficydbo user's password.

```
Event Type: Error

Event Source: Proficy Server

Event Category: LicenseMgr

Event ID: 1004

Date:  24.01.2007

Time:  15:06:46

User:  N/A

Computer: NTTS08

Description:

Error connecting to DB. (Check Password on License Key and Verify SQL
Server is Running) ((Fatal ODBC Error) Error: (Connect) Connecting [-1]
[DRIVER={SQL
SERVER};SERVER=NTTS08;DATABASE=;UID=COMXCLIENT;PWD=******;APP=PLANTAPPS
LICENSE MANAGER;]).
```

To reset the proficydbo account:

1. In SQL Query, run the following commands.

   ```
   use GBDB

   exec sp_Revokedbaccess 'ProficyDBO'

   go

   exec sp_Revokedbaccess 'ComXClient'

   go

   exec sp_Revokedbaccess 'ProficyConnect'

   go

   exec SpSupport_ChangeDBOAccount 'Proficydbo','ProficyDBO'
   ```

2. Log into SQL using the user name,**comxclient**, and the password,**comxclient** and the user name, **proficydbo**, and password,**proficydbo**.

Autolog Not Licensed on Server

"The Plant Applications Autolog Application Is Not Licensed On Server <server name>"

The message, "The Plant Applications Autolog Application Is Not Licensed On Server <server name>", could be an indication that you need to reset your database permissions.

To reset your permissions:

- From SQL Server Management Studio execute the following to rebuild the SQL permissions:
  ```
  exec sp_Revokedbaccess 'ProficyDBO'
  go
  exec sp_Revokedbaccess 'ComXClient'
  go
  exec sp_Revokedbaccess 'ProficyConnect'
  go
  exec SpSupport_ChangeDBOAccount 'Proficydbo','ProficyDBO'
  ```

Invalid Key Error 35603

If you are unable to open the Connect Server dialog box from the Administrator, Client, or Excel Add-in and you receive the error,**Invalid Key Error 35603**, you may need to delete the following registry key.
HKey_Current_User\Software\Proficy\Proficy\Servers

To delete the registry key:

1. Click Start and click Run. The Run dialog box appears.

2. In the Open box, type regedit.

3. Click OK. The Registry Editor appears.

4. Navigate to and delete the following key:
   HKey_Current_User\Software\Proficy\Proficy\Servers

5. Recreate the server connection.

Not All Tags are Returned

When Plant Applications browses tags on an OPC server, it requests all tags that are **Readable**. These **Readable** tags should include tags that are also **Readable and Writable**, which is according to the OPC DA 2.05 specification. Some OPC servers return only tags that are **Readable** and exclude tags that are both **Readable and Writable**. For these servers, you must manually enter tags that are both Readable and Writable.