FlexLink®

YOUTILIZE ADMINISTRATORS MANUAL

Version History

Version	Modifications	Revised By
0.1	Initial Creation	Eugene Campbell
0.2	Update to the Drive Motor Servicing Screenshot for build 7.7.7.0	Aegis
1.0	-	-
1.1	Updated System Requirements	Robert Henriksson

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Introduction

What is Youtilize

Youtilize is a software product designed to accompany a conveyor system at many levels. At the Service Monitoring level, Youtilize can deliver benefits relating to the maintenance of the conveyor system, providing timely information indicating the time to next service for the chain and the guide rails. In addition information on the state of each motor is provided, current consumption, etc. Information is gathered and displayed in real time. At the next level, Production Monitoring, additional product related information is provided. The OEE of the production line, or of individual machines on the line may be displayed, and queried to make user defined reports, in an intuitive manner. At the top level, the Factory Controls level can provide full control of the line equipment, and in addition enables connectivity to upper level MES or ERP systems.

This document

The following document is intended for Service Engineers responsible for installation/configuration of the FlexLink Youtilize solution. This manual will cover the installation and configuration of the Matrikon OPC Server solution as well as Youtilize system components, designing of Dashboards including details of gauges applicable to Youtilize and their calculations, system hardware requirements/supported operating systems, and system troubleshooting. Various aspects of the installation and configuration have been automated to minimize the overall installation and configuration time. One downside to installation/configuration automation is details related to the various components and how they work together may not be obvious. Throughout this document you will find information that will explain these details so Service Engineers will have the knowledge to better support end users.

Basic System Overview

Below is a basic diagram illustrating the relationships between a FlexLink conveyor's PLC, Matrikon OPC Server, and the Youtilize solution.

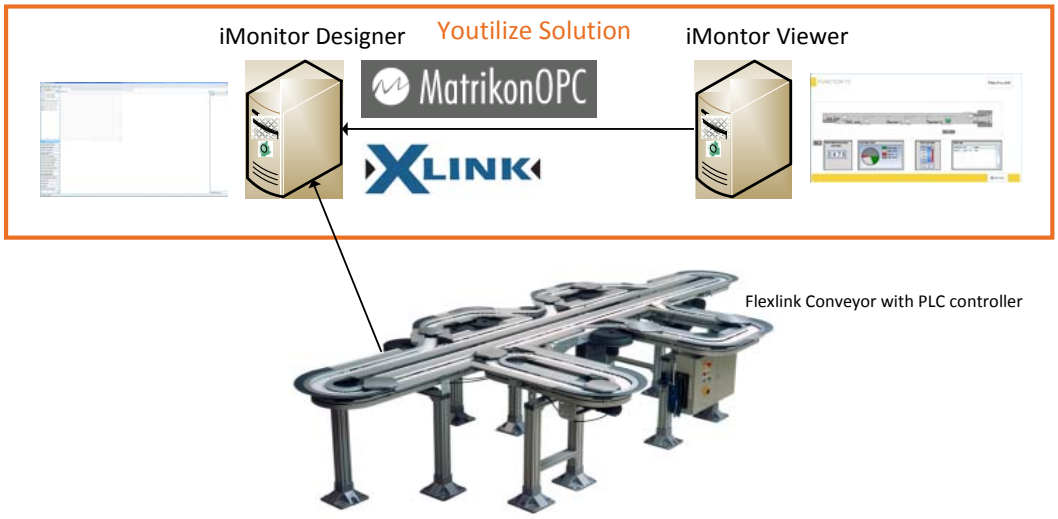


Figure 1

System Requirements

Hardware

As with any software system, specific hardware requirements may vary depending on the scale and complexity of the situation. In the case of Youtilize, both the size and production rate of the line play a critical role in determining the hardware requirements.

For many production lines, the *Standard Youtilize Hardware Requirements* defined here may be used to select the appropriate hardware. The standard hardware is intended to be used on production lines which conform to the limits described below. For lines whose scale or production-rate exceeds these limits, a Youtilize product expert must be consulted to determine the specific hardware requirements for that particular production line.

Determining If Standard Hardware Can Be Used on Your Line

The *Standard Youtilize Hardware Requirements* may be used on any line which conforms to the following criteria:

- The system is **NOT** a Youtilize Factory Control system.
- The number of dashboard viewing stations does not exceed **ten (10)** stations.
- The number of **motors** to be monitored on the line does not exceed **fifty (50)**.
- The **Motor sample rate** does not exceed **one hundred twenty (120)** samples per hour per motor.
- The number of **Unit Tracking Transactions per minute** does not exceed **four hundred (400)** transactions per minute. Unit Tracking Transactions is calculated according to the methodology defined below.

Calculating Tracking Transactions per minute

Each time the location of a unit moving down the production line is tracked by the Youtilize system, a tracking transaction is recorded in the Youtilize database. Tracking transactions are typically generated by the workstations specified in your line definition. However, X45, X46, and other functions may also be optionally configured to generate tracking transactions, so these must be accounted for as well in your calculations.

The calculation itself is very straightforward. The goal is to determine how many transactions per minute will be recorded across the entire line. This is done by multiplying the total number (N) of workstations and/or tracking functions with the line production rate in units per minute.

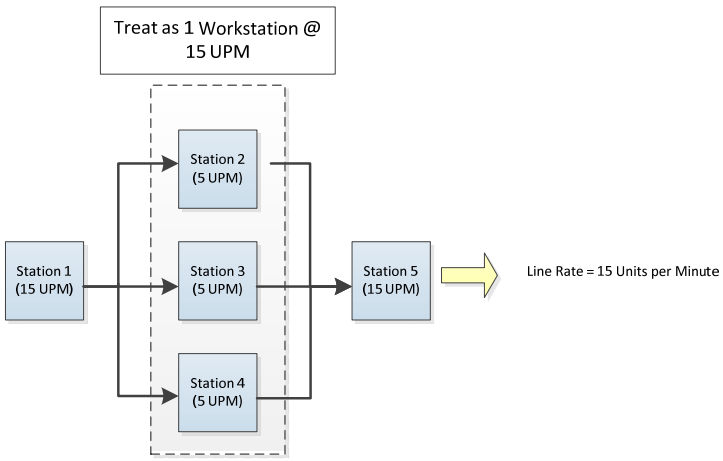
$$(N_{Workstations} + N_{Tracking\ Functions}) * Units\ per\ Minute_{Line} = Transactions\ per\ Minute$$

For example, consider a line with 10 workstations and 3 tracking functions. The line operates at 600 units per hour, or 10 units per minute. The transaction rate would be calculated as follows:

*(10 workstations + 3 tracking functions) * 10 units per minute =* **130 Transactions per minute**

Parallel Processing Workstations Treated as Single Workstation

One very important consideration is that parallel processing workstations may be treated as **one single** workstation in your calculation. This is because the transaction rate of workstations in this configuration is slower than the actual line rate. Only as a whole do they generate tracking transactions as the line production rate. Consider the following example:



In this example, the 3 workstations in parallel configuration have a **total effective throughput** equal to the line production rate. Therefore, they may be treated as one (1) single workstation in your load calculation. So, for this line, rather than using 5 total stations, you would use 3 instead (Station 1 + (Station 2-4 cluster) + Station 5 = 3 effective stations). Therefore, the transaction rate would be as follows:

3 Workstations * 15 units per minute = **45 Transactions per minute**

Standard Youtilize Hardware Requirements

All Youtilize components and 3rd party dependencies are installed on one PC, which is referred to as the Youtilize server. This includes SQL Server Express 2008 R2, Matrikon OPC Server, iMonitor Express, and xLink.

If Youtilize dashboard visibility is desired on the line, one or more additional PC's may also be deployed for purpose of displaying dashboards only. Though it is technically possible to display Youtilize dashboards on the Youtilize server, this approach is generally not recommended. Problems have occurred in the field with operators shutting down the Youtlize server PC when they have direct access to it, resulting in data loss.

Youtilize Server (Minimum)

- Intel Core i3 or faster processor (minimum 2 cores)
- 4 GB RAM
- Dual (2x's) 500GB hard disks in RAID 1 configuration (for fault tolerance) *
- 1 GB Ethernet NIC interface
- Windows 7, Windows 8, Windows Server 2008 R2, or Windows 2012 (x86 or x64 editions)
- Uninterruptable Power Supply (UPS) capable of running system for 5-10 minutes in case of power loss, and able to signal shutdown to Youtilize server if power outage continues beyond battery life.

** Note: If fault tolerance is not critical, and the risk of data loss is acceptable, the RAID 1 requirement may be dropped (single hard disk with no RAID is substituted).*

Youtilize Dashboard Viewer (Minimum)

- Intel Core 2 Duo or faster processor
- 2 GB RAM
- 80 GB or larger Hard Drive
- 100/1Gb Ethernet Network Card
- 19" monitor 1024 x 768 resolution
- Windows 7 or Windows 8 (x86 or x64 editions)
- Standard Windows mouse and keyboard

Specific Model Recommendation

The Dell PC configured below is a compact and effective Youtilize server which meets all of the Standard Hardware Requirements, and carries an approximate price tag of only $850 USD.

Dell OptiPlex 9010 Small Form Factor

Processors	3rd Gen Intel® Core™ i5-3470 (Quad Core, 3.20GHz, 6MB w/HD2500 Graphics)
Operating System(s)	Windows 7 Professional,w XP Mode,No Media, 64-bit, English
Productivity Software	Microsoft® Office Trial, MUI
Memory	4GB, NON-ECC, 1600MHZ DDR3, 1DIMM
Removable Media Storage Device	8X Slimline DVD-ROM
Boot Hard Drives	500GB 2.5 3Gb/s SATA with 16MB DataBurst Cache™
Graphics Cards	Intel Integrated Graphics,W/O

System Recovery	None
Warranty & Service	3 Year Basic Hardware Service with 3 Year NBD Onsite Service after Remote Diagnosis
Accidental Damage Service	None
Keyboard	Dell KB212-B USB 104 Quiet Key Keyboard,English
Security Software	None
OptiPlex 9010 SFF	OptiPlex 9010 Small Form Factor w/ Standard PSU
Energy Efficiency Options	No ESTAR Settings
MISC. Cables & Display Accessories	None
Second Hard Drive Options	500GB 2.5" SATA 3Gb/s with 16MB DataBurst Cache™
Hard Drive Mode	RAID 1 (Data Mirroring)
Systems Management Mode	No Out-of-Band Systems Management
Wireless	None

Software Dependences

The Youtilize solution has dependences on several software solutions. Some of the dependences are included with the iMonitor Express Installation package and others may require you to download and install before the installation can proceed. Below are the software requirements, where they can be found (if applicable), and where they are included in the iMonitor Express installation package.

Microsoft .NET Framework V3.5 SP1 or later

Microsoft .NET Framework V3.5 SP1 is a requirement for installing applications developed using recent version of Microsoft Visual Studio where the installed application as developed using .NET.

- NOT Included in the iMonitor Express Installation package (Installshield is only capable of checking that .NET Framework V3.5 is installed and cannot verify SP1. You can check Windows Program and Features for a list a installed applications to verify where SP1 has been installed).
- http://www.microsoft.com/download/en/details.aspx?displaylang=en&id=17851 (software download site). The above link is for Microsoft .NET Framework 4 which is recommended when installing on Windows 7 SP1.

Depending on the version of Operating System being installed and the level of patching that has taken place via Microsoft Updates it is possible that this installation is not required. Note that the Microsoft .NET Framework Redistributables are cumulative. If you have Microsoft .NET Framework 4 Component installed, it is not necessary to install Microsoft .NET Framework V3.5 SP1. You can verify the installation of Microsoft .NET Framework by going to 'Programs and Features' as follows:

Start → Control Panel → Programs and Features

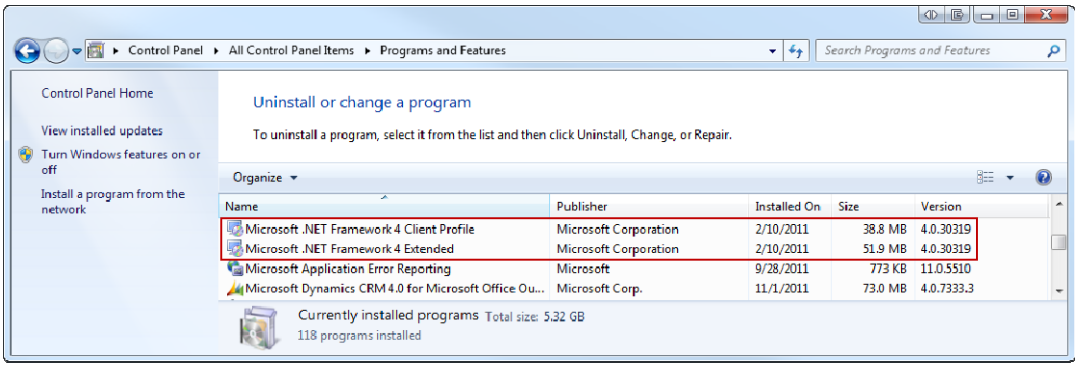


Figure 2

In Figure 2 you see that Microsoft .NET Framework 4 is installed. This satisfies the .NET Framework requires since this is a more recent install.

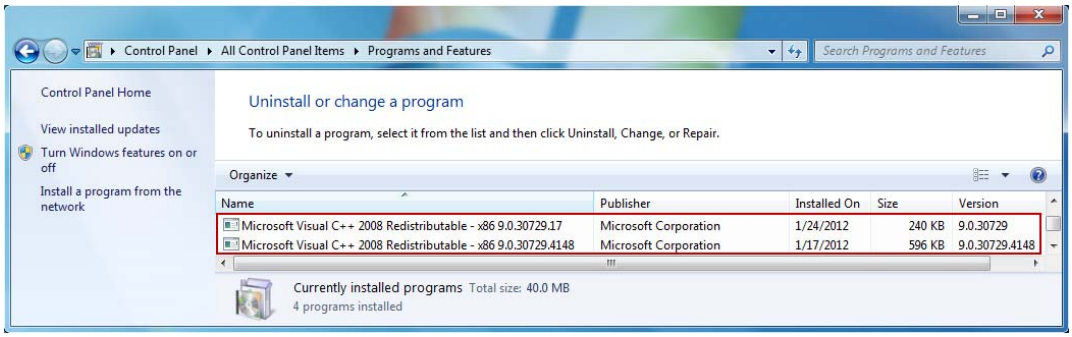
Microsoft C++ Redistributable 2008 SP1

Microsoft C++ Redistributable 2008 SP1 is used for running C++ applications on a system that does not have Microsoft Visual C++ installed.

- NOT Included in the iMonitor Express Installation package. Although the installer will indicate that the requirement has not been satisfied and a download link.
- http://www.microsoft.com/download/en/details.aspx?id=5582 (software download site)

Microsoft C++ Redistributable 2008 SP1 unlike Microsoft .NET Framework V3.5 SP1 or later usually does not get provided via Microsoft Windows updates unless an application that also depends on it has been installed. You can verify if Microsoft C++ Redistributable 2008 SP1 has been installed by going to 'Programs and Features' as follows:

Start → Control Panel → Programs and Features



NOTE: There have been several updates to the Microsoft C++ Redistributable 2008 SP1 install. Make sure that the version you have installed indicates at least version 9.0.30729.

Matrikon OPC Server

The Matrikon software is a requirement for interfacing with a PLC. The product you purchase/install will depend on the make/model of the PLC to be interfaced with. The software can be downloaded and will run unlicensed for 30 days. After 30 days the software MUST be licensed

- NOT Included in the iMonitor Express Installation package. .
- http://www.matrikonopc.com/opc-drivers/plcs.aspx (product information)

Sentinel Protection Drivers

The Sentinel Protection Drivers are necessary to interface with the Hardware Dongle used to license control the Youtilize Solution.

- NOT included in the iMonitor Express Installation Package.
- http://c3.safenet-inc.com/downloads/8/0/804F8C5F-F88F-4443-8871-2AD993DC33DB/Sentinel%20Protection%20Installer%207.6.5.exe

System Installation

As with any application the first some of the first steps is installing the application. The following section covers each component to be installed as well as some of the installation options. First we will talk about Operating System Patches/Updates as it is critical to makes sure the platform being installed on is as secure as possible, followed by the install of the Matrikon OPC Server software, Database Server, if applicable, and the Youtilize solution. The order for which this section is laid out is the order the software should be installed.

Operating System Patches/Updates

It is best to have all currently released Microsoft service packs and updates installed before deploying the Youtilize solution. As with any software solution maintaining the most current release ensures the highest level of security and product stability. Customers that stay current also get to take advantage of new features when they become available.

Microsoft .NET Framework V3.5 SP1 or later

The following details the installation of Microsoft .NET Framework 4.

NOTE: This installation package requires an internet connection. If an internet connection is not available caution to be taken to ensure that you download the full Microsoft .NET Framework 4 installation package.

NOTE: If UAC (User Access Control) is enabled it is a good idea to install using the 'Run as Administrator' Option accessible by right clicking on the installation program and selecting 'Run as administrator' as shown below:

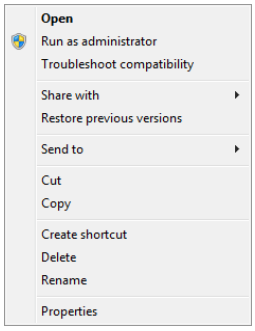


Figure 3

After selecting ‘Run as administrator’ you will be presented with a dialog asking to confirm that you have allowed the installation program to make changes to your system.

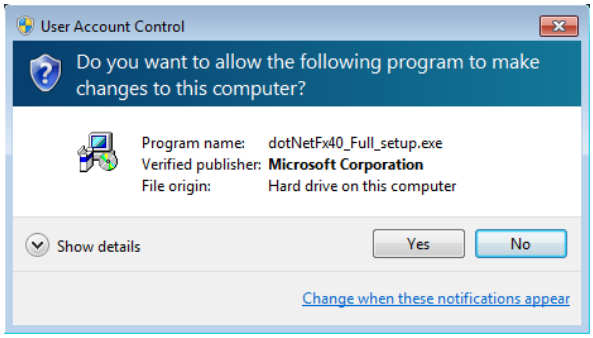


Figure 4

For more information regarding User Access Control (UAC) please see ‘***Working with Microsoft User Access Control (UAC)***’ in the Appendix.

After Double Clicking the Microsoft .NET Framework 4 installation package you will be presented with the following dialog (please complete steps necessary to allow installation with UAC enabled):

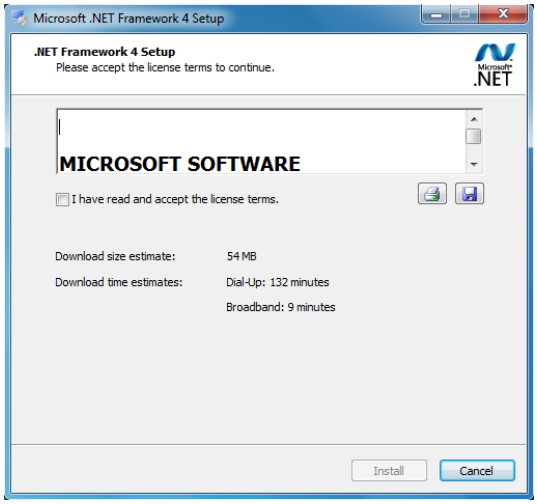


Figure 5

Check ‘I have read and accept the license terms’ and click ‘Install’ to start the installation.

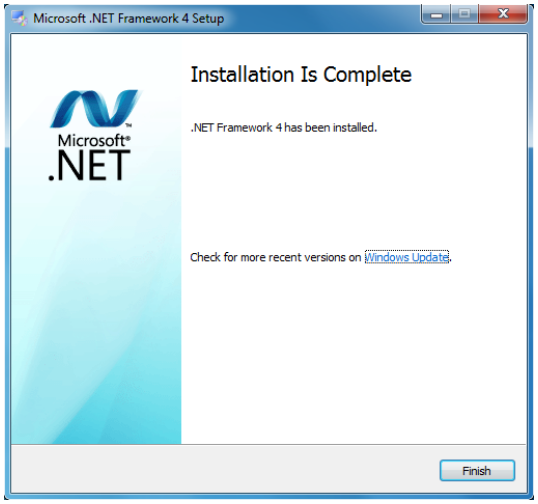


Figure 6

Click 'Finish' to finalize the installation of Microsoft .NET Framework 4.

Microsoft C++ Redistributable 2008 SP1

The following details the installation of Microsoft C++ Redistributable 2008 SP1.

NOTE: If UAC (User Access Control) is enabled it is a good idea to install using the 'Run as Administrator' Option accessible by right clicking on the installation program and selecting 'Run as administrator' as shown below:

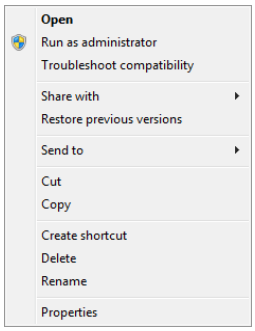


Figure 7

After selecting 'Run as administrator' you will be presented with a dialog asking to confirm that you have allowed the installation program to make changes to your system.

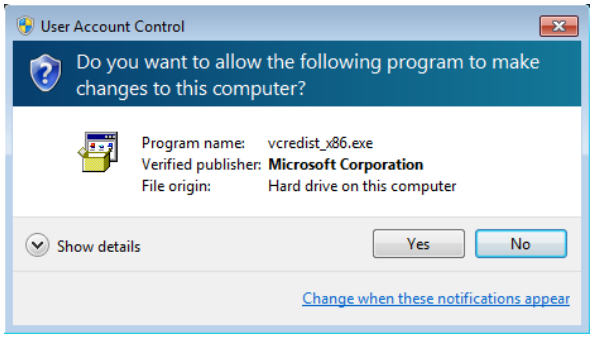


Figure 8

For more information regarding User Access Control (UAC) please see '***Working with Microsoft User Access Control (UAC)***' in the Appendix.

After Double Clicking the Microsoft C++ Redistributable 2008 SP1 installation package you will be presented with the following dialog (please complete steps necessary to allow installation with UAC enabled):

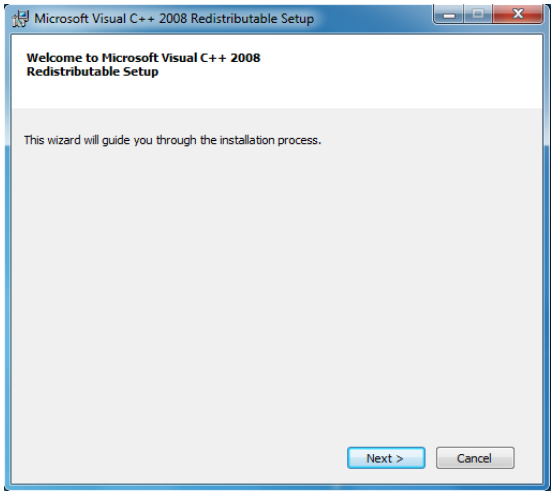


Figure 9

Click 'Next' to advance to the next screen.

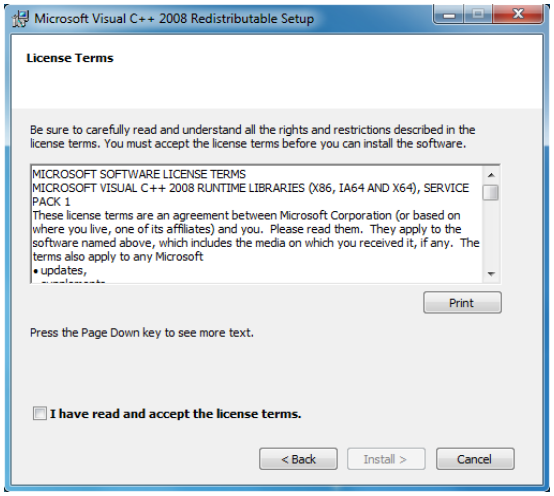


Figure 10

Check 'I have read and accept the license terms', and Click 'Install' to start the installation.

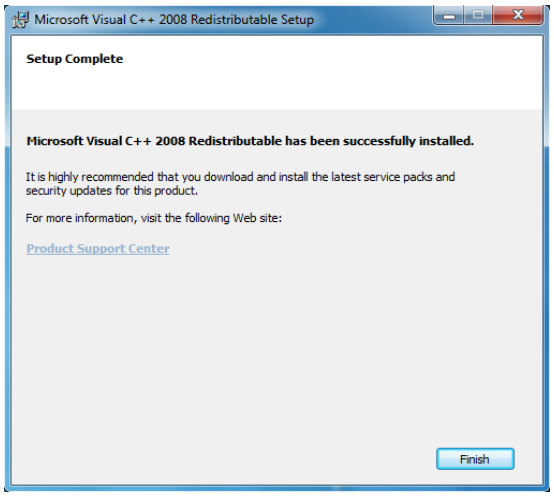


Figure 11

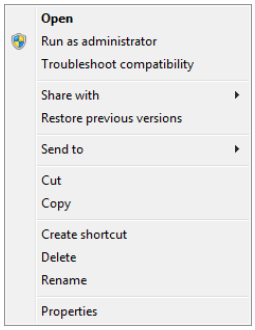
Click 'Finish' to finalize the installation of Microsoft C++ Redistributable 2008 SP1.

Sentinel Protection Drivers

The following details the installation of the Sentinel Protection Drivers.

Recommended – Sentinel System Driver Installer

NOTE: If UAC (User Access Control) is enabled it is a good idea to install using the 'Run as Administrator' Option accessible by right clicking on the installation program and selecting 'Run as administrator' as shown below:



After selecting 'Run as administrator' you will be presented with a dialog asking to confirm that you have allowed the installation program to make changes to your system.

For more information regarding User Access Control (UAC) please see '***Working with Microsoft User Access Control (UAC)***' in the Appendix.

After Double Clicking the Sentinel Protection Drivers installation package you will be presented with the following dialog (please complete steps necessary to allow installation with UAC enabled):

Click 'Next' to advance to the next screen.

Select 'I accept the terms in the license agreement', and click 'Next' to advance to the next screen.

Select 'Complete' and click 'Next' to advance to the next screen.

Click 'Install' to start the installation.

Click 'Finish' to finalize the installation of the Sentinel Protection Drivers.

Alternative installation - Sentinel Protection Installer

NOTE: If UAC (User Access Control) is enabled it is a good idea to install using the 'Run as Administrator' Option accessible by right clicking on the installation program and selecting 'Run as administrator' as shown below:

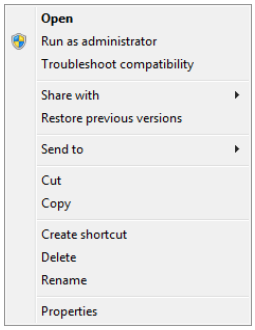


Figure 12

After selecting 'Run as administrator' you will be presented with a dialog asking to confirm that you have allowed the installation program to make changes to your system.

Figure 13

For more information regarding User Access Control (UAC) please see '***Working with Microsoft User Access Control (UAC)***' in the Appendix.

After Double Clicking the Sentinel Protection Drivers installation package you will be presented with the following dialog (please complete steps necessary to allow installation with UAC enabled):

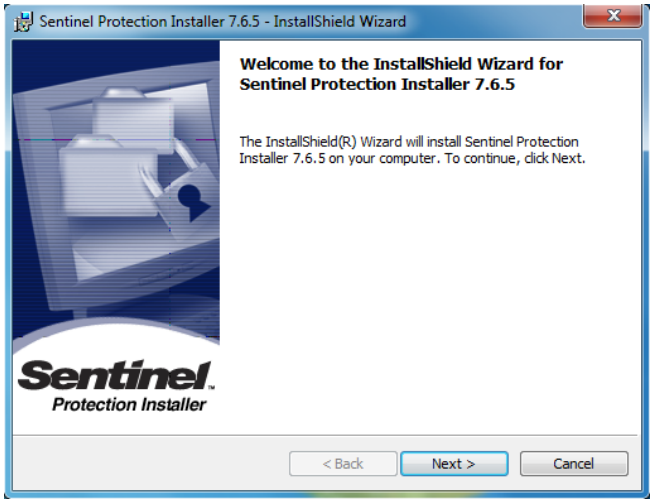


Figure 14

Click ‘Next’ to advance to the next screen.

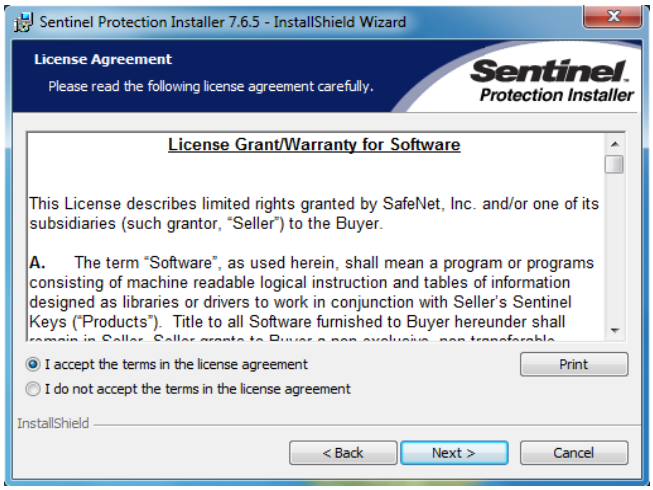


Figure 15

Select ‘I accept the terms in the license agreement’, and click ‘Next’ to advance to the next screen.

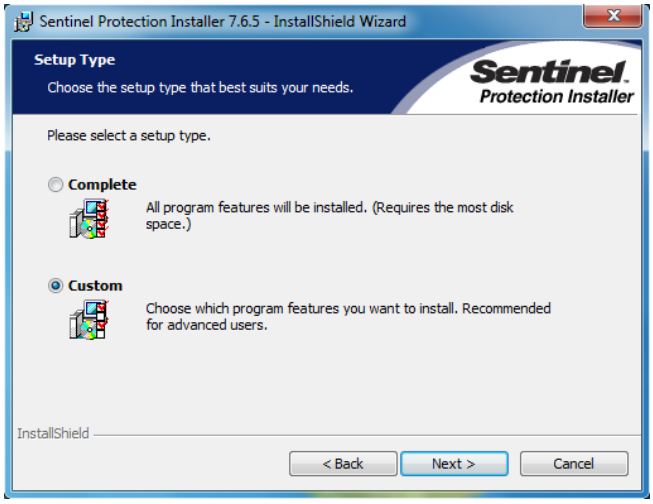


Figure 16

Select 'Custom' and click 'Next' to advance to the next screen.

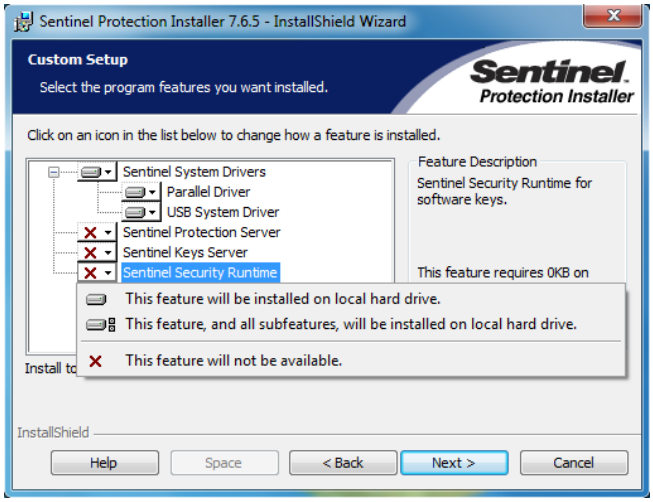


Figure 17

For each of the options indicated with a red 'X' in Figure 17 click on the icon and set to 'This feature will not be available'. Each option that will not be installed will have an icon next to it. Click 'Next' to advance to the next screen.

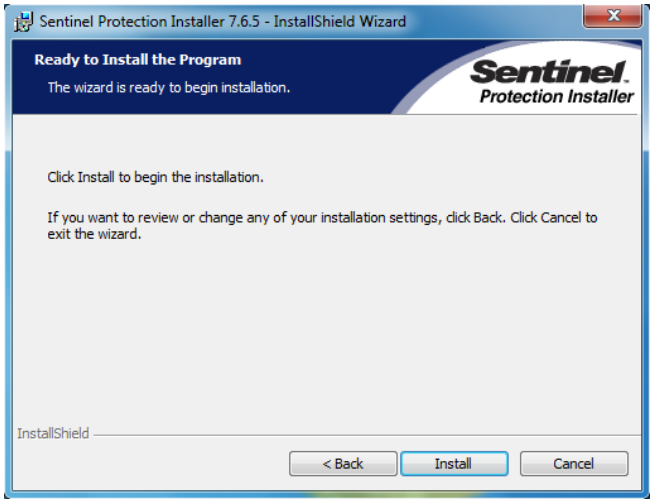


Figure 18

Click 'Install' to start the installation.

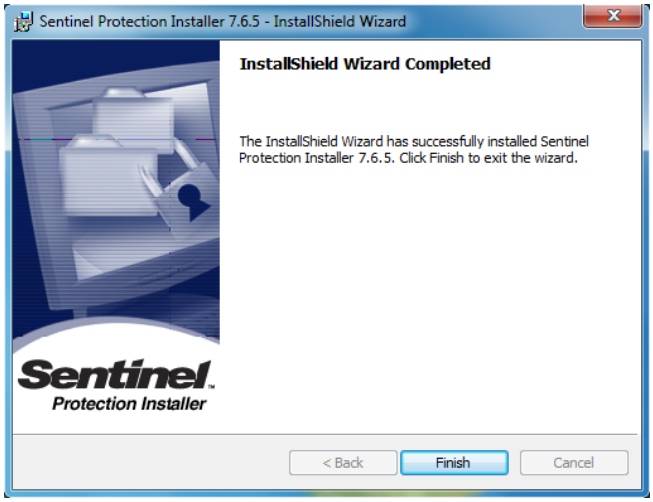


Figure 19

Click 'Finish' to finalize the installation of the Sentinel Protection Drivers.

At this point you can now plug in the USB hardware key. Once you plug in the key the drivers will automatically install. You can use Windows Device Manager to verify that the USB hardware key has been installed and is working properly. In Figure 20 note the presences of 'SafeNet USB SuperPro/UltraPro'. If you right click on the SafeNet USB device and select properties you will see that under Device Status, 'This device is working properly' as shown in Figure 21.

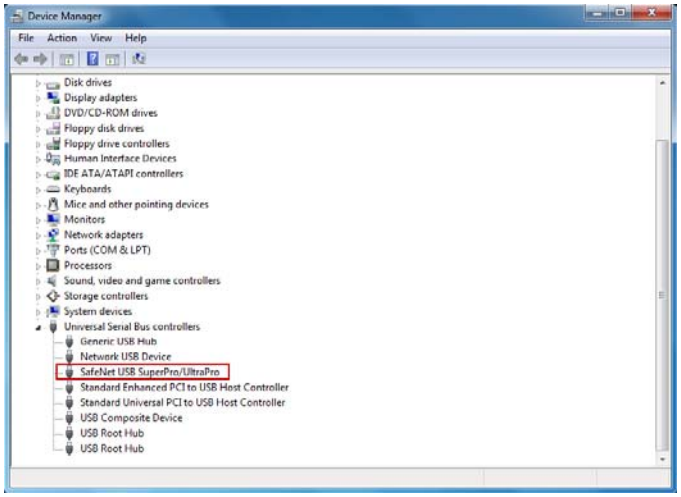


Figure 20

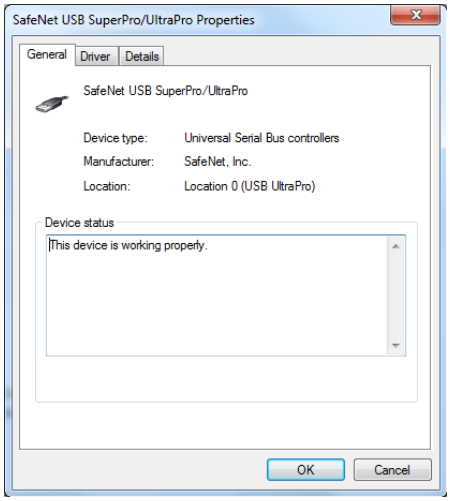


Figure 21

Matrikon OPC Server

Matrikon sells its products with service contracts. For specific details regarding the Matrikon software and service contract details you should contact Matrikon directly using the following options:

Software Acquisition

- http://www.matrikonopc.com/opc-drivers/plcs.aspx

NOTE: There are a number of options listed under MatrikonOPC PLC Servers. Which option you choose to install is going to be based on the PLCs used with the FlexLink line. The following table is a list of PLCs suites and whether they are supported by the Youtilize solution.

Matrikon OPC PLC Servers	Supported by Youtilize Solution	Notes
Allen Bradley OPC Server Suite	Yes	http://www.matrikonopc.com/drivers/opc-allen-bradley.aspx

GE Fanuc PLC OPC Server	No	http://www.matrikonopc.com/opc-drivers/opc-ge-plc-fanuc/base-driver-details.aspx
Honeywell HC900 OPC Server	No	http://www.matrikonopc.com/opc-drivers/opc-hc900/base-driver-details.aspx
Mitsubishi OPC Server	No	http://www.matrikonopc.com/opc-drivers/opc-mitsubishi/base-driver-details.aspx
Modbus (Modicon) OPC Server	No	http://www.matrikonopc.com/opc-drivers/opc-modbus/base-driver-details.aspx
OMRON OPC Server	No	http://www.matrikonopc.com/opc-drivers/opc-omron/base-driver-details.aspx
Siemens S7 PLC OPC Server	Yes	http://www.matrikonopc.com/opc-drivers/opc-siemens-s7-plc/base-driver-details.aspx#html
Siemens SIMATIC TI505 OPC Server	Yes	http://www.matrikonopc.com/opc-drivers/opc-simatic-ti505/base-driver-details.aspx#html
Matrikon OPC Genie	No	http://www.matrikonopc.com/drivers/base-driver-details.aspx?dId=162

Matrikon Sales

The following link provides details for ordering the Matrikon software.

- http://www.matrikonopc.com/products/opc-drivers/ordering-information.aspx

Installation Procedure

The following details the installation of the Matrikon OPC Server.

NOTE: If UAC (User Access Control) is enabled it is a good idea to install using the 'Run as Administrator' Option accessible by right clicking on the installation program and selecting 'Run as administrator' as shown below:

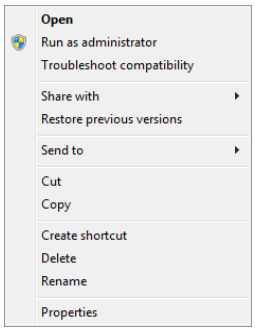


Figure 22

After selecting 'Run as administrator' you will be presented with a dialog asking to confirm that you have allowed the installation program to make changes to your system.

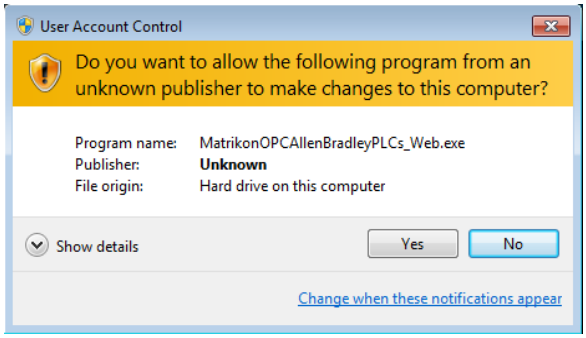


Figure 23

For more information regarding User Access Control (UAC) please see '***Working with Microsoft User Access Control (UAC)***' in the Appendix.

After Double Clicking the Matrikon OPC Server installation package you will be presented with the following dialog (please complete steps necessary to allow installation with UAC enabled):

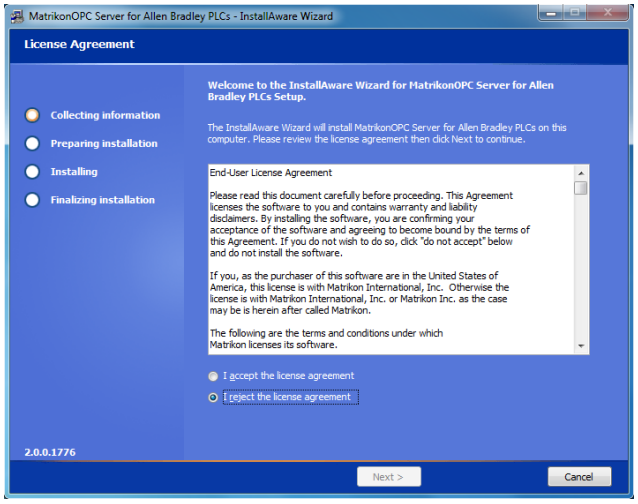


Figure 24

Select 'I accept the license agreement' and click 'Next' to advance to the next screen.

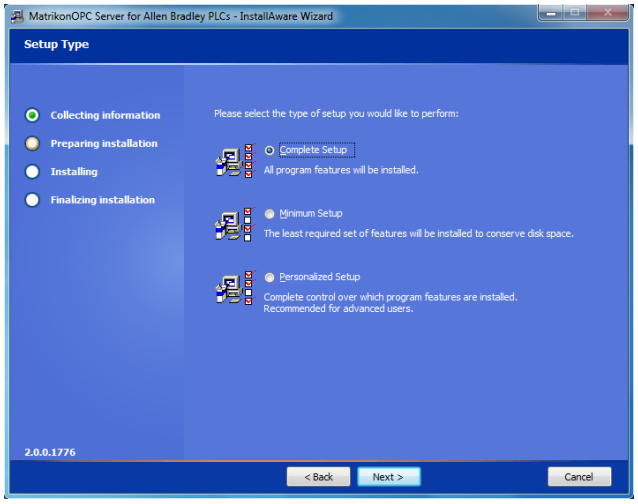


Figure 25

Select “Complete Setup’ and click ‘Next’ to advance to the next screen.

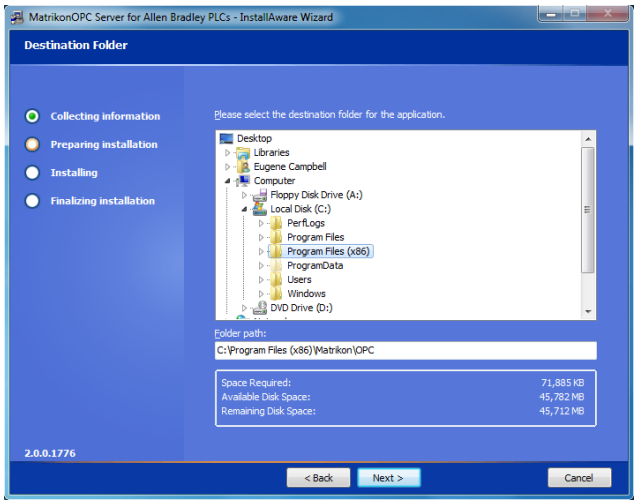


Figure 26

Click ‘Next’ to accept the destination folder and advance to the next screen.

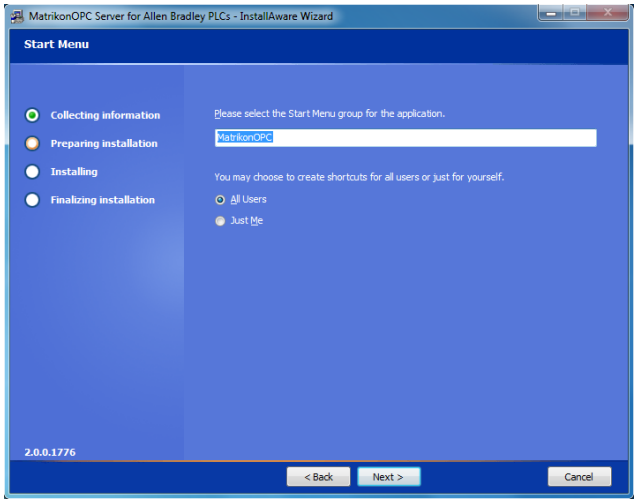


Figure 27

Click 'Next' to accept the default Start Menu Group and advance to the next screen.

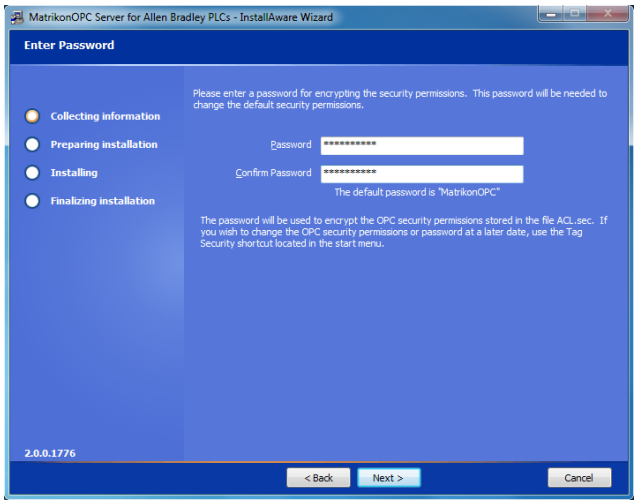


Figure 28

Enter a password of 'fusion220*' and confirm the password. Click 'Next' to advance to the next screen.

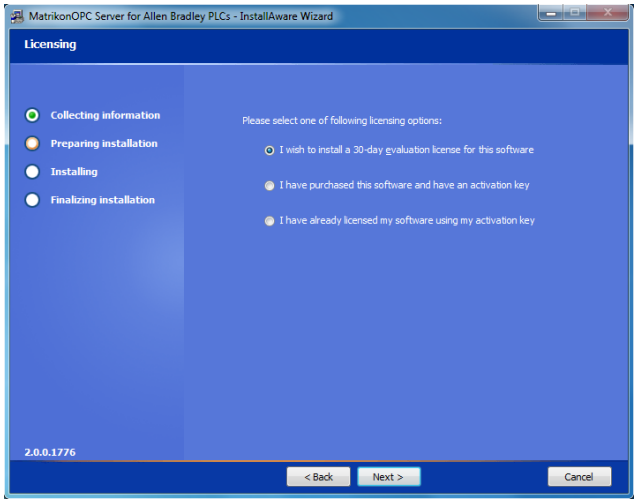


Figure 29

Select the appropriate option based on the current state of your license. The software can be upgraded from a 30 Day Evaluation to a full license at a later date. Click 'Next' to advance to the next screen.

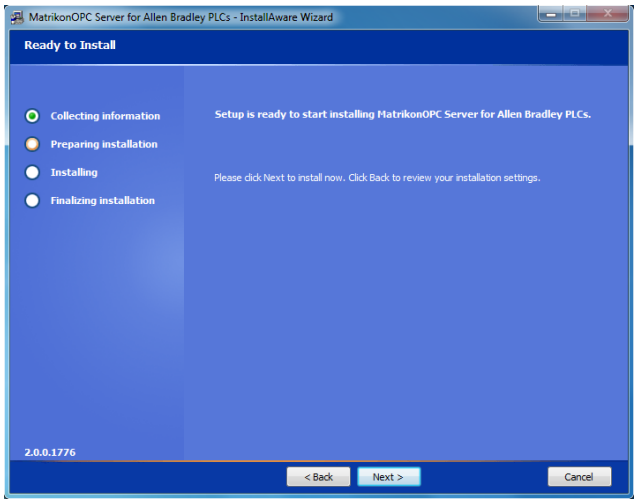


Figure 30

Click 'Next' to start the installation.

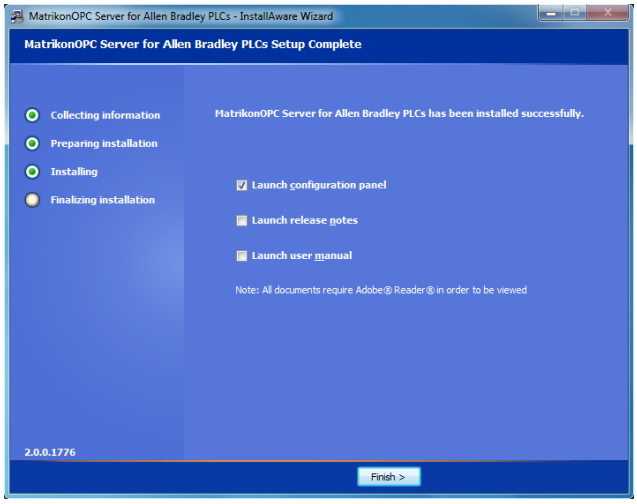


Figure 31

Deselect 'Launch configuration panel' and click 'Finish' to finalize the installation of the Matrikon OPC Server.

Matrikon Support

- Email: support@MatrikonOPC.com
- Fax: +1-780-448-9191
- Submit a ticket online
- Phone
- **North America**
  - UTC/GMT -7 hours (MST)
    8:00am-5:00pm
    +1-877-OPC-4-ALL
  - **Europe/Africa/Middle East ***
    UTC/GMT +1 hours (CET)
    9:00am-5:00pm
    +49-221-969-77-0
    (Request OPC Support)
    +44-1623-726-070
  - **Australia/Asia ***
    UTC/GMT +10 hours (AEST)
    9:00am-5:00pm
    +61-2-4908-2198
    (Request OPC Support)
  - For after-hours support in all regions, please use either of the following numbers. There is no extra charge from MatrikonOPC for calling their after-hours support numbers.
    Region: All
    +1-780-231-9480
    +1-780-264-6714

SQL Server (If Applicable)

If you are deploying the system using Option 'B' (distributed) or are not using the iMonitor Express Installation Wizard. You may also be deploying a new SQL Server or using an existing one. As with Microsoft Operating System Patches/Updates it is best to install all Service Packs and updates that are available. However it is understood that a single SQL Server can host a number of databases and it may not be possible to apply updates without internal review/approval. However it is recommended to have all updates complete before deployment.

Installation

Deployments requiring the installation of Microsoft SQL Server will likely follow two paths. The first would include the use of an existing Microsoft SQL Server and therefore the only process would be to create a Database and DSN along with updating the database with the iMonitor Express database schema. The alternative would be a dedicated SQL Server which would require the installation of Microsoft SQL Server and the configuration of database and DSN along with the updating the database with the iMonitor Express database schema. This guide assumes that users are capable of deploying Microsoft SQL Server and if any assistance is required should seek the assistance of Aegis Technical Support.

Youtilize Solution

The Youtilize solution is comprised of several components. The components are broken into two groups, sever side and client. Generally speaking the server side components are responsible for interfacing with the Matrikon software which in turn interfaces with the PLC(s). The data is provided to xLink which in turn processes/distributes/records the collected data. In further detail xLink processes the collected data, distributes it to the Real-Time Service, and records the data into the SQL database. The Real-Time service then takes the data provided by xLink and sends it to gauges arranged on dashboard(s) via a subscription that is created when dashboard(s) are loaded. Additionally the Alarm Service is responsible for executing configured Alarms while the Report Scheduling Service is responsible executing scheduled reports. For license control we have the Aegis Enterprise License Manager and finally, the Fusion Server Manager is used to configure the Real-Time, Report Scheduler, Alarm, and Enterprise License services.

The client side consists of two components, iMonitor Express and iMonitor Express Viewer. iMonitor Express is used to build or design Dashboards with a variety if gauges as well as to run Dashboards. Whereas the iMonitor Express Viewer is merely a tool for viewing previously designed Dashboards.

There are two ways to install the Youtilize solution. The first and simplest method only applies to customer installing using Option 'A' (consolidated). In a consolidated deployment the database is installed on the same system as iMonitor Express. During the installation process the installer will install SQL Server 2008 R2 Express (if it is not already installed), create a new database, load the database schema, setup a user account with the appropriate permissions, install and configure all Youtilize Solution components and initiate a configuration wizard that will allow you to specify one or more FlexLink configuration files used to populate the database with the appropriate data. This will be referred to as the iMonitor Express Wizard Install and a procedure including screenshots follows later in this section. The iMonitor Express Viewer is installed manually on stations as needed.

Second is a manual deployment which includes manually installing/configuration the SQL Server, manually installing/configuring the Youtilize Solution. This is considered an advanced approach to the deployment of the Youtilize solution and considered outside the scope of this document.

iMonitor Express Wizard Install Procedure

The following details the installation of the of iMonitor Express using the wizard install procedure..

NOTE: If UAC (User Access Control) is enabled it is a good idea to install using the 'Run as Administrator' Option accessible by right clicking on the installation program and selecting 'Run as administrator' as shown below:

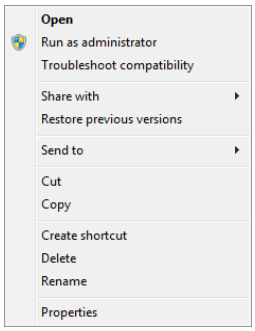


Figure 32

After selecting 'Run as administrator' you will be presented with a dialog asking to confirm that you have allowed the installation program to make changes to your system.

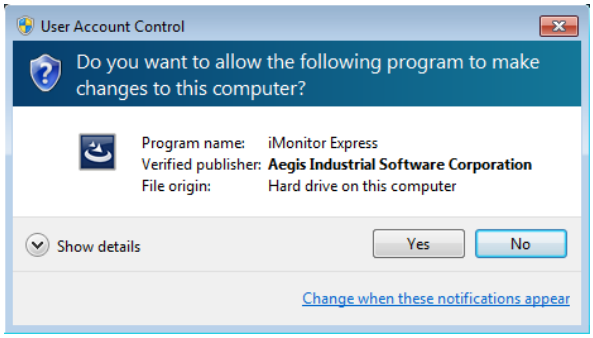


Figure 33

For more information regarding User Access Control (UAC) please see '***Working with Microsoft User Access Control (UAC)***' in the Appendix.

After Double Clicking the iMontor Express installation package you will be presented with the following dialog (please complete steps necessary to allow installation with UAC enabled):

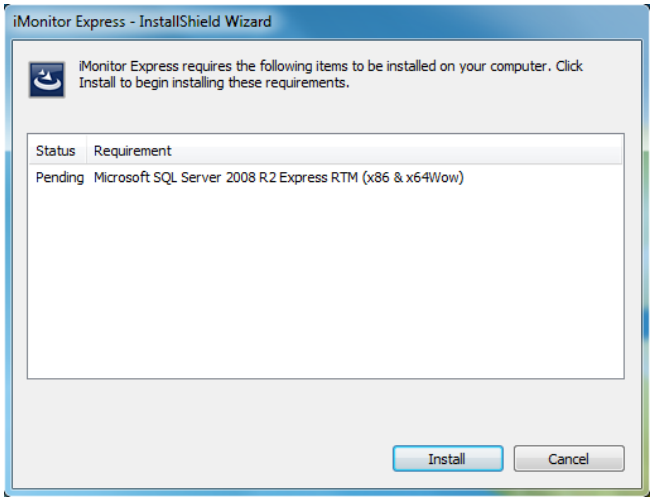


Figure 34

Click 'Install' to confirm the installation of Microsoft SQL Server 2008 R2 Express.

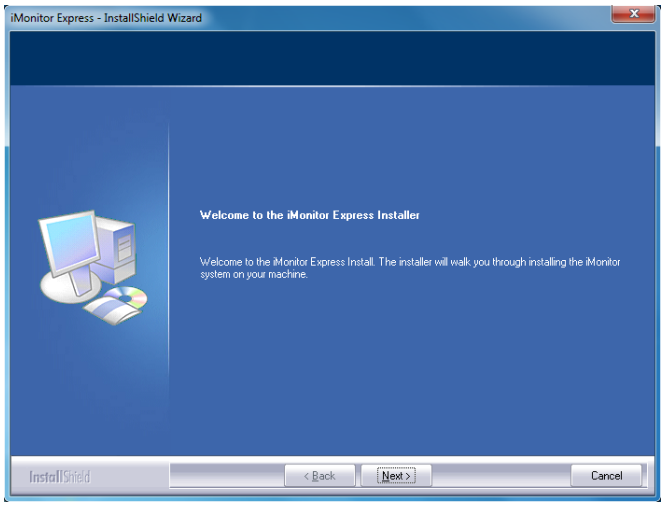


Figure 35

Click 'Next' to advance to the next screen.

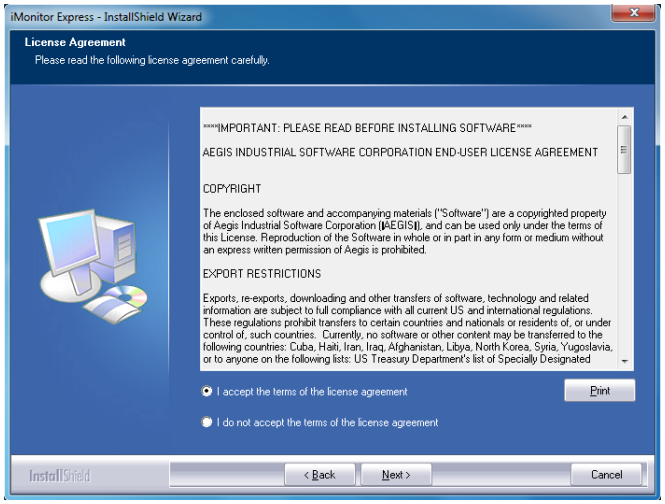


Figure 36

Select 'I accept the terms of the license agreement' and click 'Next' to advance to the next screen.

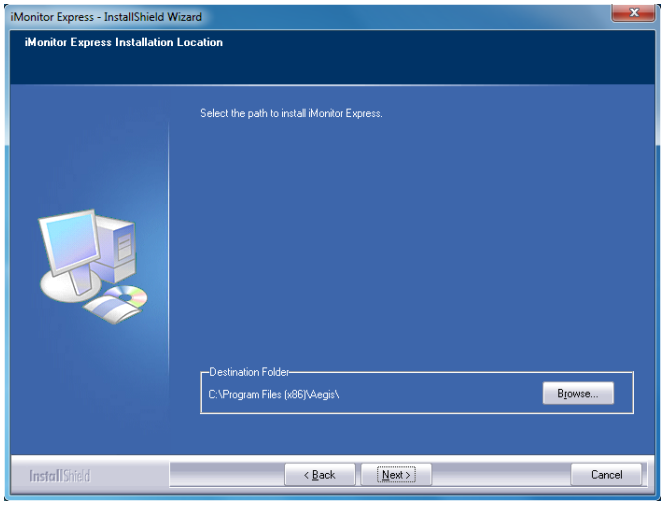


Figure 37

Click 'Next' to accept the destination folder and advance to the next screen.

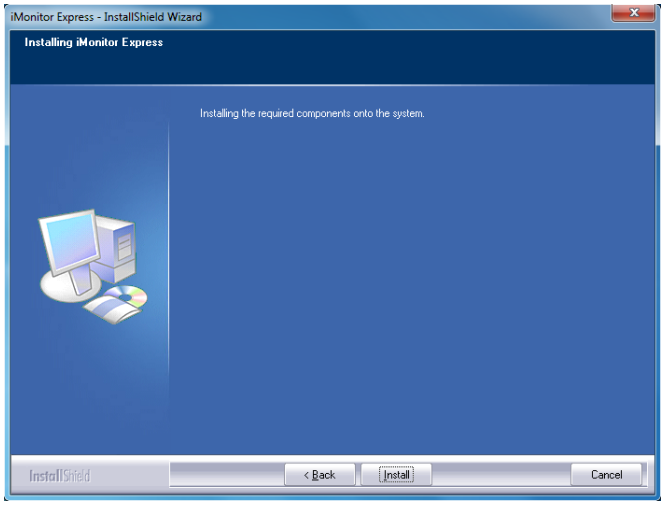


Figure 38

Click 'Install' to start the installation.

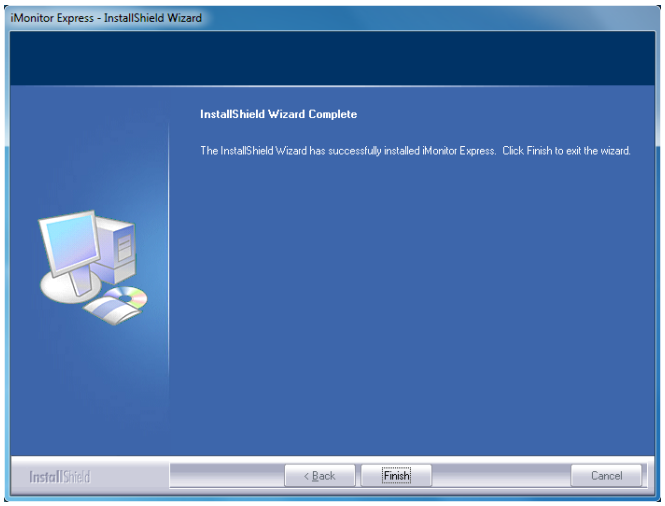


Figure 39

Click 'Finish' to finalize the installation of iMonitor Express.

Following the installation iMonitor Express will launch into a Configuration Wizard. The following steps will walk you through the configuration process.

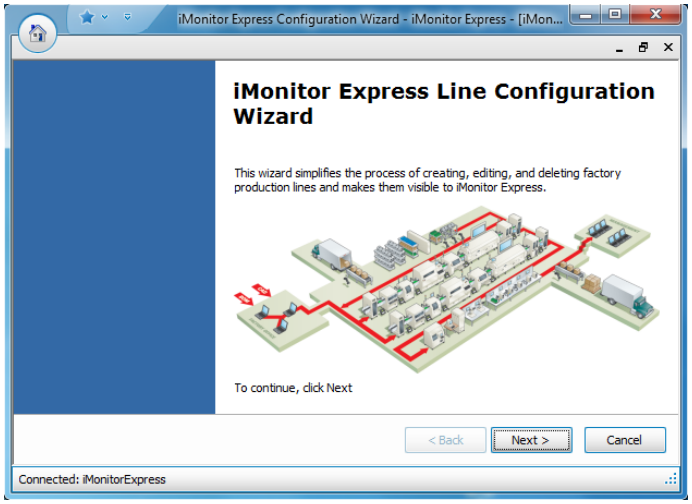


Figure 40

Click ‘Next’ to advance to the next screen.

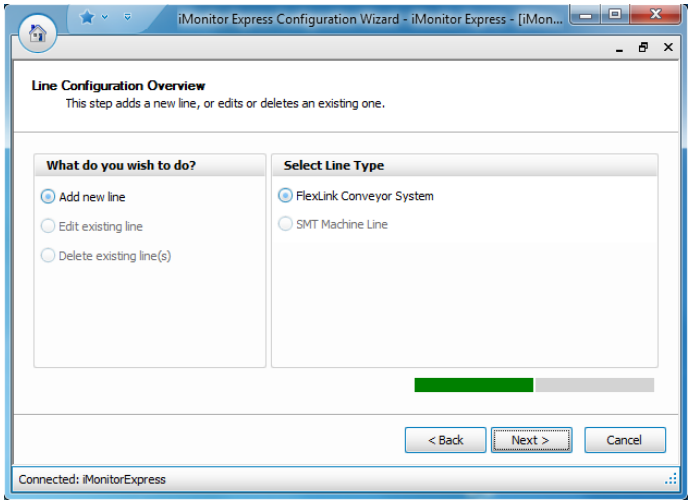


Figure 41

Select ‘Add new line’ and ‘FlexLink Conveyor System’ and click ‘Next’ to advance to the next screen.

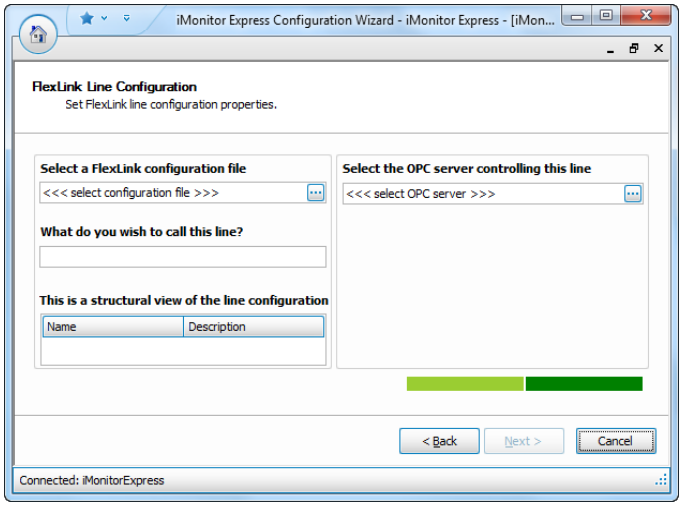


Figure 42

Next to 'Select a FlexLink configuration file' and 'Select the OPC server controlling this line' there is an ellipsis button. For 'Select a FlexLink configuration file' you will select the ellipsis button and select the *.flx file created for the line you are setting up. Next, for 'Select the OPC server controlling this line' you will select the ellipsis button and select the OPC Server applicable to the type of PLCs used for controlling the line. In Figure 43 we will select Matrikon.OPC.AllenBradleyPLCs since our example system uses Allen Bradley PLCs. This is also the type of Matrikon OPC Server that we installed. Click 'Next' to advance to the next screen.

NOTE: The values for 'What do you wish to call this line?' and 'This is the structural view of the line configuration' are created based on the contents of the *.flx file. The *.flx file is created in parallel to the programming of the PLC.

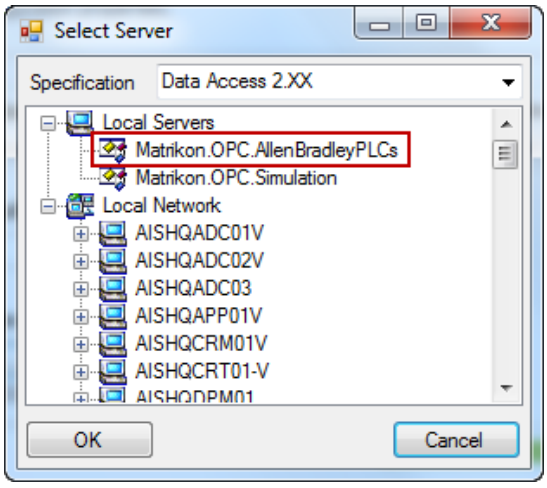


Figure 43

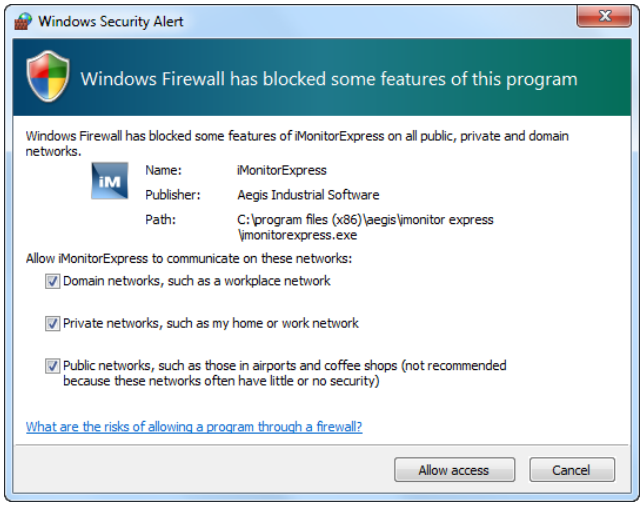


Figure 44

If the Windows Firewall is enabled you may be presented with the above dialog (Figure 44). Select the following options and click 'Allow access'.

- Domain networks, such as a workplace network
- Private networks, such as my home or work network
- Public networks, such as those in airports and coffee shops

NOTE: If you are aware of the system presence on the network such as whether the system is a domain member or not then you may want to select to only allow the applicable network. Making this change will not disable the Firewall for all traffic. It allows the iMonitor Express application access to these networks.

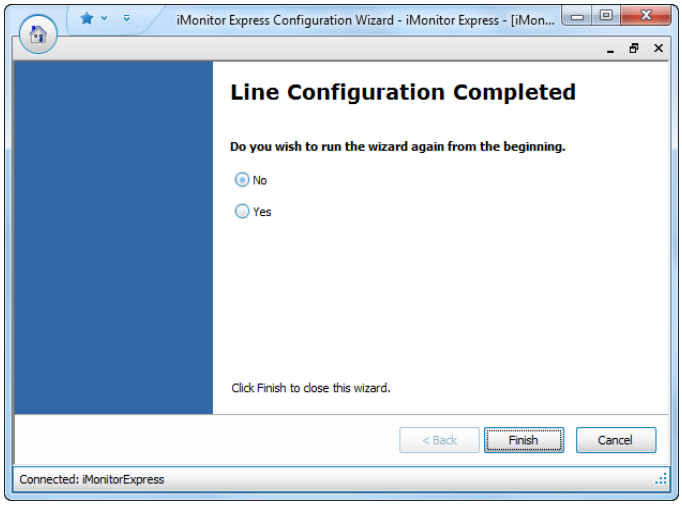


Figure 45

Click 'Finish' to finalize the iMonitor Express Configuration Wizard.

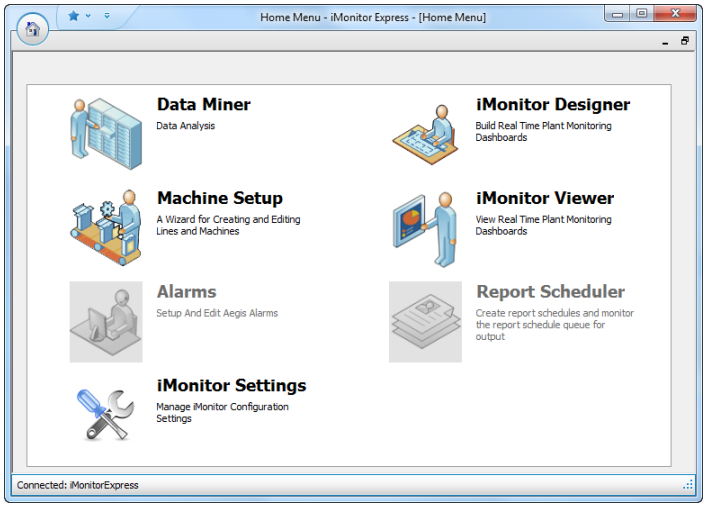


Figure 46

Now that the installation and configuration have been completed you will be launched into the iMonitor Express –Home Menu.

iMonitor Express - Add or Modify an Existing line.

1. Modify or create a new .flx file.
2. In Fusion Server Manager remove the xLink adapter under the machine data source see: FlexLink xLink Adapter – Fusion Server Manager section of the manual.
3. Start iMonitor express and enter the Machine Setup.
4. Click Next to go into the Line Configuration Overview.
5. Delete the FlexLink Line and re-add the new one with the new FLX file.

iMonitor Express Viewer Install Procedure

Once you have iMonitor express installed there may be a number of systems (based on your licensing) that can be configured as viewers. Using the iMonitor Express Viewer you will have access to dashboards.

NOTE: iMonitor Express Viewer is installed using ClickOnce. Due to the nature of ClickOnce you must make sure that you have all prerequisites installed before deploying the iMonitor Express Viewer or the install will stop prompting you to do the same. Once the application is installed it will check for updates on the iMonitor Express system responsible for the install each time the application is launched.

The following procedure goes over the process of installing the iMonitor Express Viewer.

In order to install the iViewer you need to have network access to the host computer where iMonitor Express is installed. Select the host computer from the network explorer. Browse to the 'C:\Program Files (x86)\Aegis\iMonitor Express' folder (might only be named 'iMonitor Express').

NOTE: this folder needs to be shared on the host computer in order to be visible and selectable.

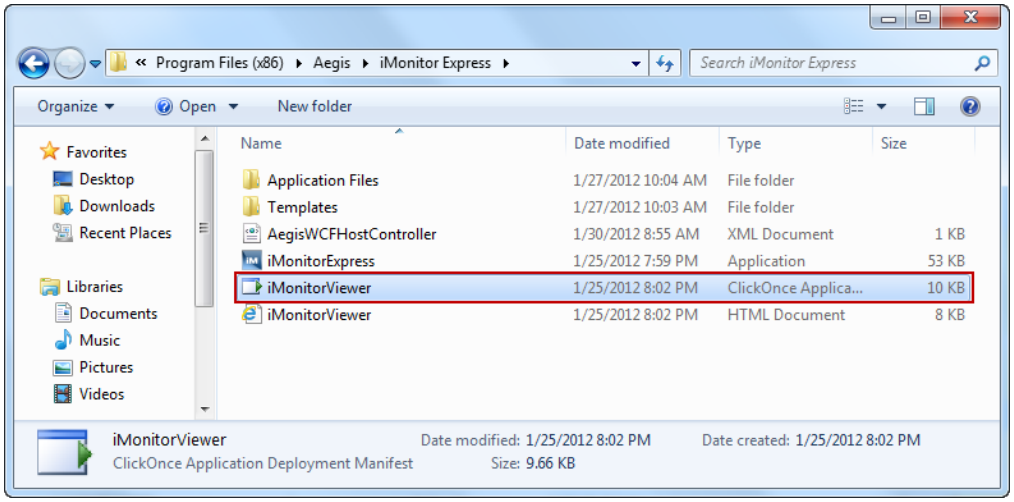


Figure 47

Double click on the iMonitorViewer.application ( ) webpage.

NOTE: If file extensions are not enabled you may not see iMonitorViewer.application. In this case you should use the icon associated to .application files as indicated above.

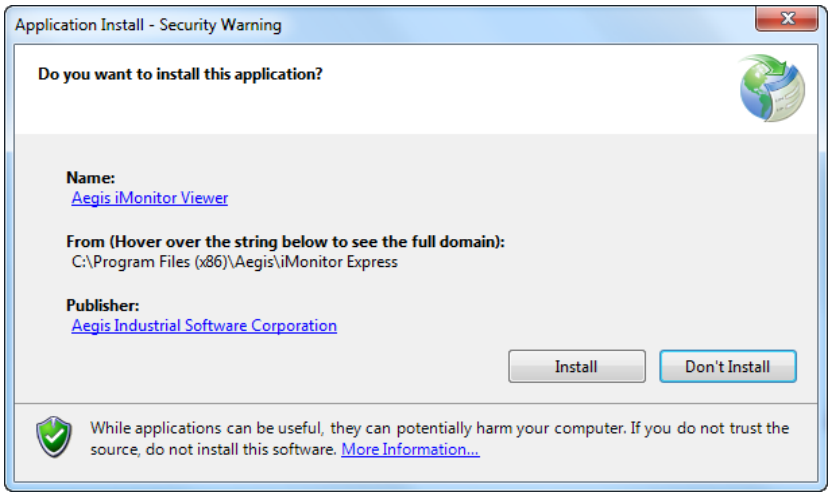


Figure 48

Click 'Install' to start the installation process.

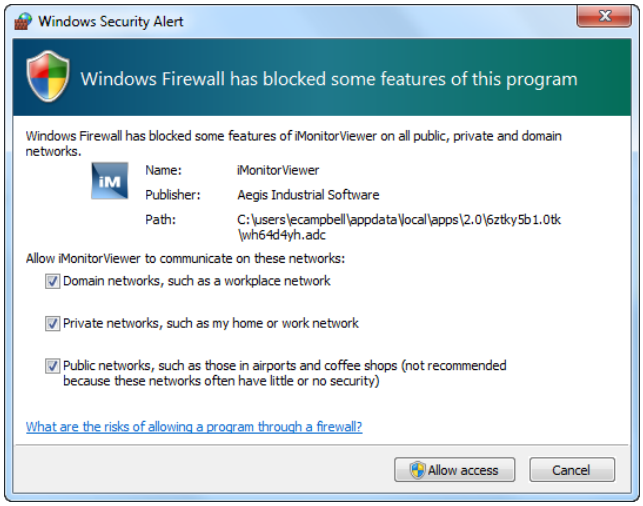


Figure 49

If the Windows Firewall is enabled you may be presented with the above dialog (Figure 49). Select the following options and click 'Allow access'.

- Domain networks, such as a workplace network
- Private networks, such as my home or work network
- Public networks, such as those in airports and coffee shops

NOTE: If you are aware of the system presence on the network such as whether the system is a domain member or not then you may want to select to only allow the applicable network. Making this change will not disable the Firewall for all traffic. It allows the iMonitor Express application access to these networks.

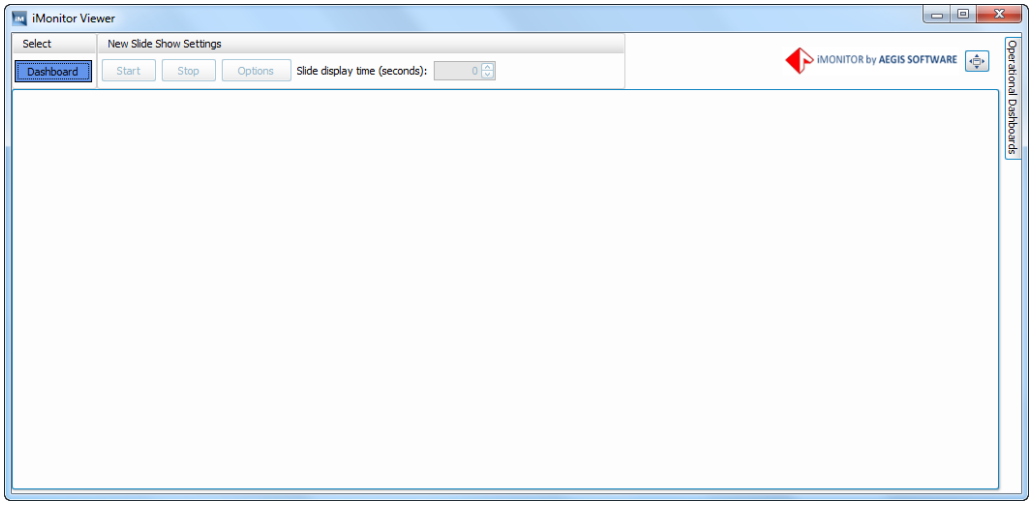


Figure 50

Figure 50 shows the iMonitor Viewer. Once you see this dialog the application has been successfully installed.

System Uninstall

This section covers uninstall of the Aegis product. There may be specific cases where you need to uninstall the software. This should not be used if you are upgrading the software as upgrade code is included in the installation package. This section will not cover the uninstall of Sentinel drivers as these are drivers related to a third party product and should you have issues with the specific drivers or hardware you may need to contact FlexLink for a replacement dongle or Sentinel support if you feel that you are having an issue related to the drivers. Matrikon is also a third party product that has somewhat complex license requirements and should the need to uninstall Matrikon arise you should contact Matrikon to make sure the license is not damaged in the process.

This section is broken into two sections. Uninstall of the iMonitor Express and additional uninstall steps.

iMonitor Express Uninstall

Click Start → Control Panel → and Select 'Programs and Features'.

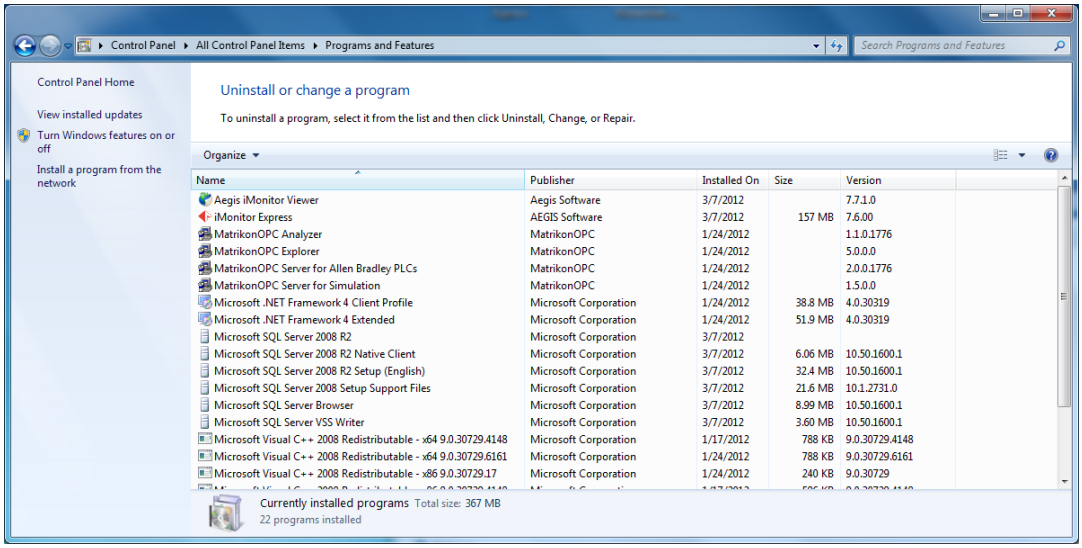


Figure 51

From the list of programs select 'iMonitor Express' and Click 'Uninstall'.

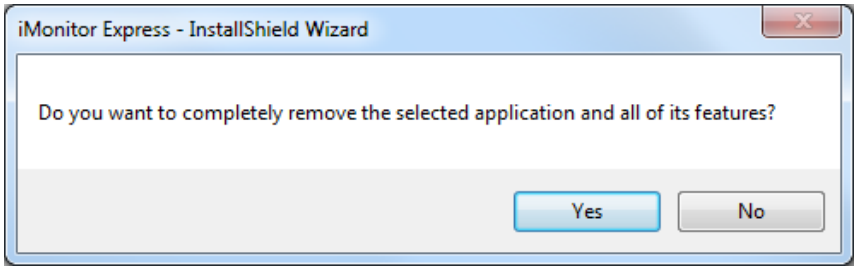


Figure 52

Click 'Yes'.

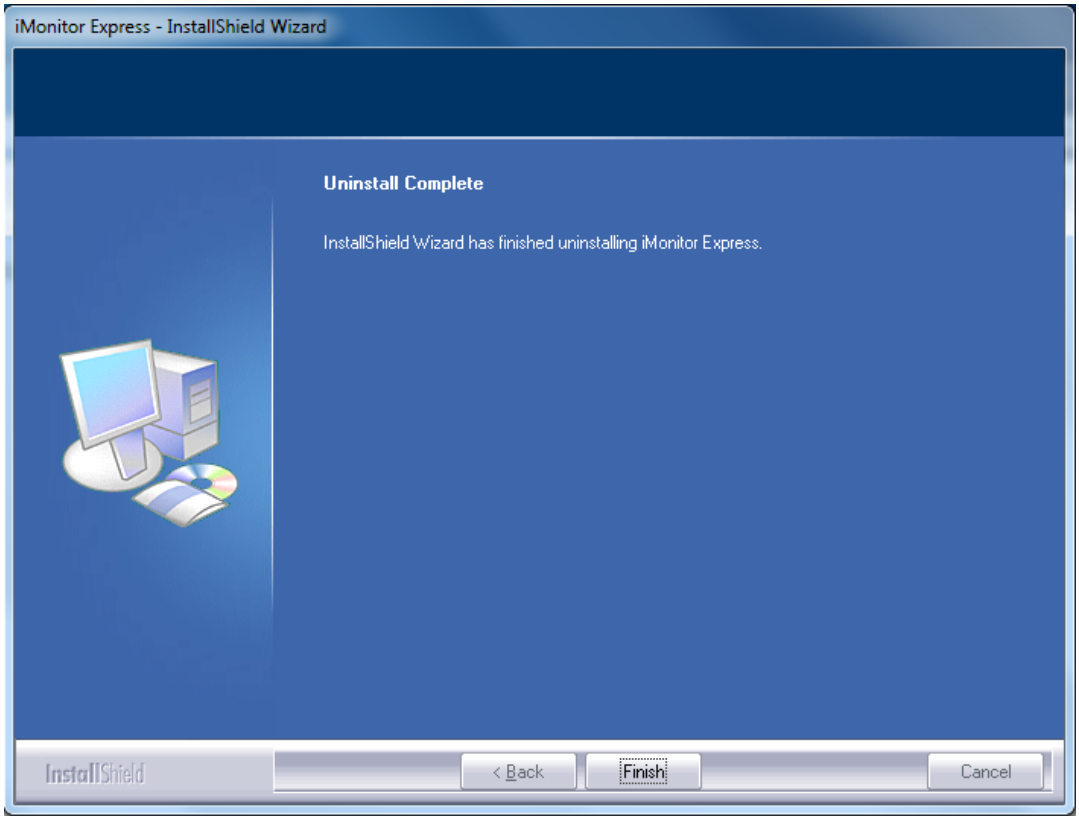


Figure 53

When the Uninstall completes click 'Finish'

Additional Uninstall Steps

The following steps include modifying the registry. Make sure you are caution when modifying the registry.

Delete the iMonitor Express Database

In order to delete the iMonitor Express Database you need to have Microsoft SQL Management Studio Express. Microsoft SQL Management Studio Express can be downloaded from Microsoft using the following link:

http://www.microsoft.com/download/en/details.aspx?id=22985&hash=BlTVkzvpIfFy%2blW%2fEVH5ZqRW9r68wsWCtEUfSq9bT1zGeDewCM%2bieCpAlGAUdq%2bdHq1OgGr2eXC23qgFSauD4w%3d%3d

The install of SQL Management Studio Express is fairly trivial and will not be covered in this manual.

Click Start → All Programs → Microsoft SQL Server 2008 R2 → SQL Server Management Studio

Figure 54

Logon to the system using either Windows Authentication or SQL Authentication as applicable

NOTE: for SQL Authentication the username is ‘sa’ and the password is ‘Sapassword1’. This information should not be shared with the customer. If this information changes we may no longer have access to the database should the information be lost by the customer and a full system reinstall will be necessary.

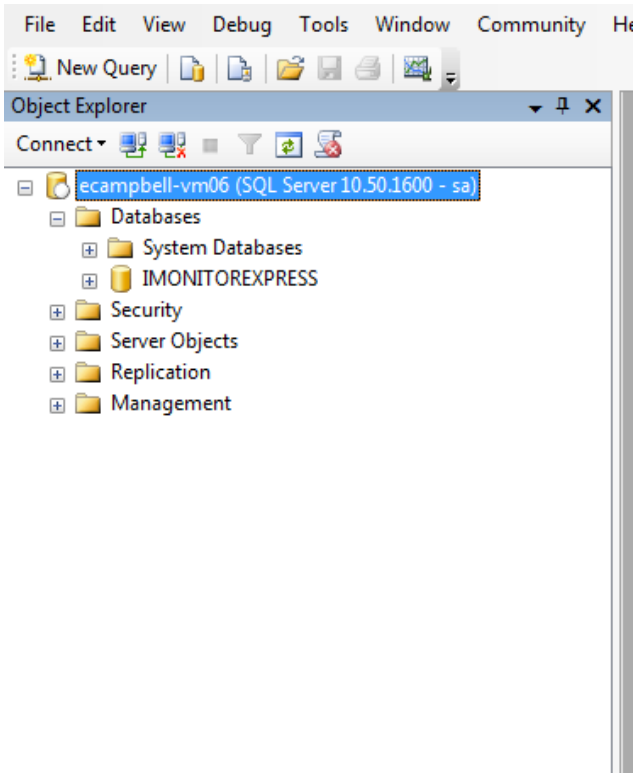


Figure 55

Expand Databases and right click on the database 'IMONITOREXPRESS' and select properties.

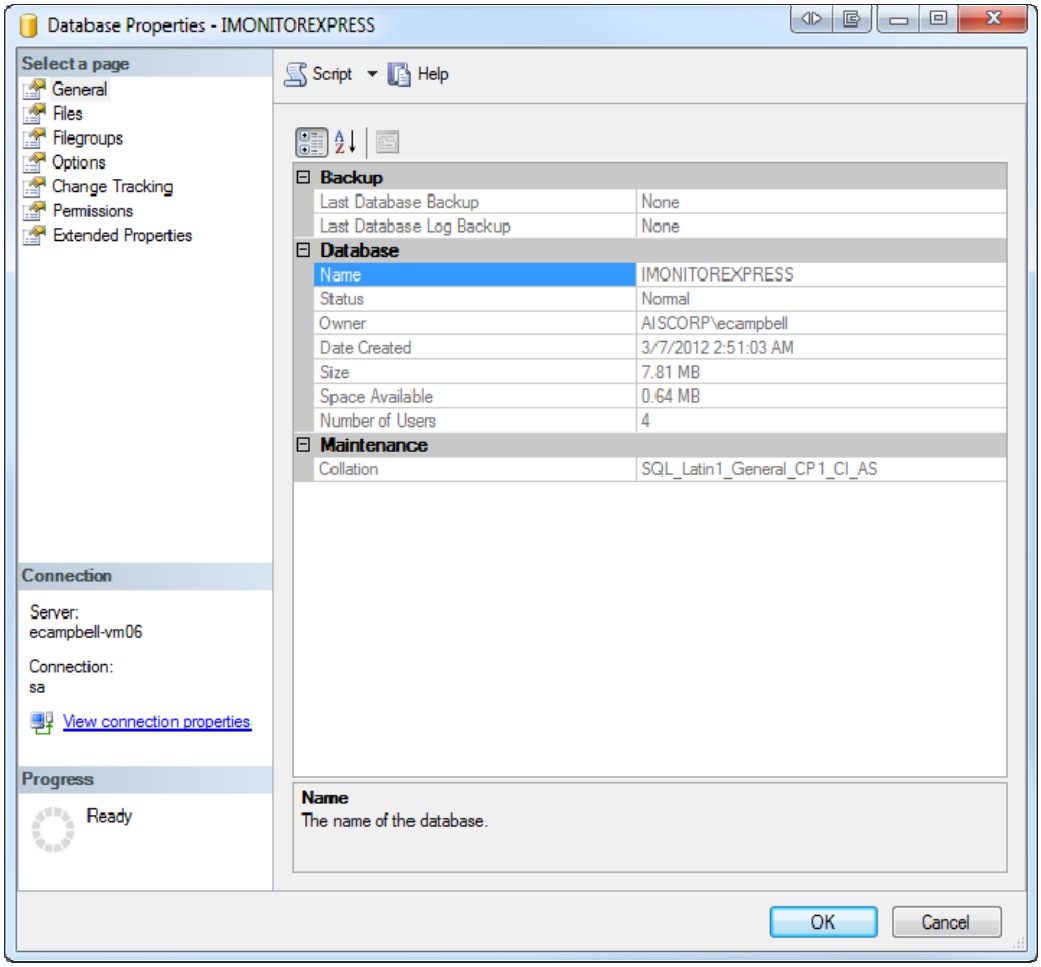


Figure 56

In the ‘Database Properties’ dialog on the left hand side select ‘Files’

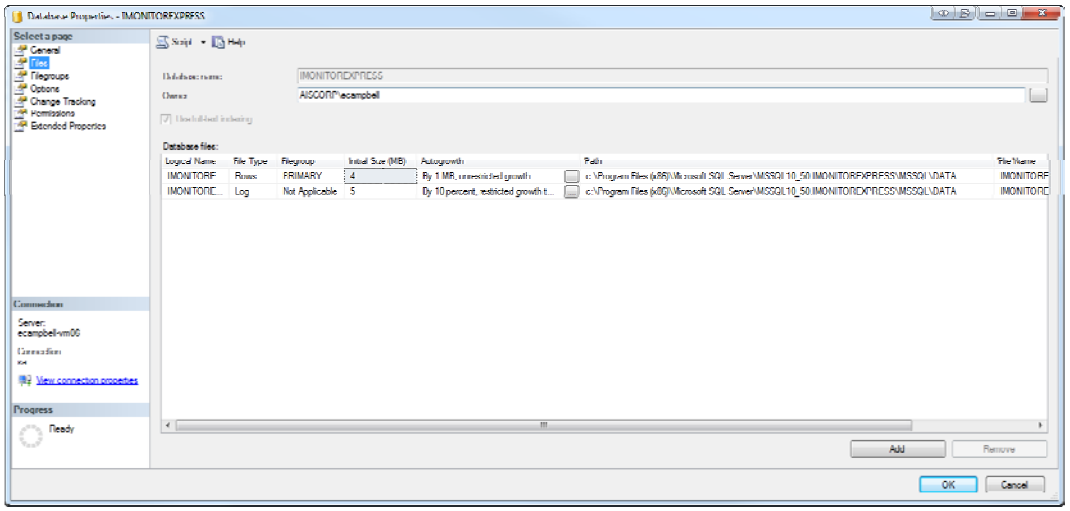


Figure 57

On the right hand side make note of the path where the database files which represent the 'IMONITOREXPRESS' database exist. You can copy this path by selecting one of the paths and pressing 'ctrl' + 'C'.

Open Windows Explorer, Start → Computer and paste the path previously copied in the file path bar located at the top of Windows Explorer as shown below and press 'Enter'

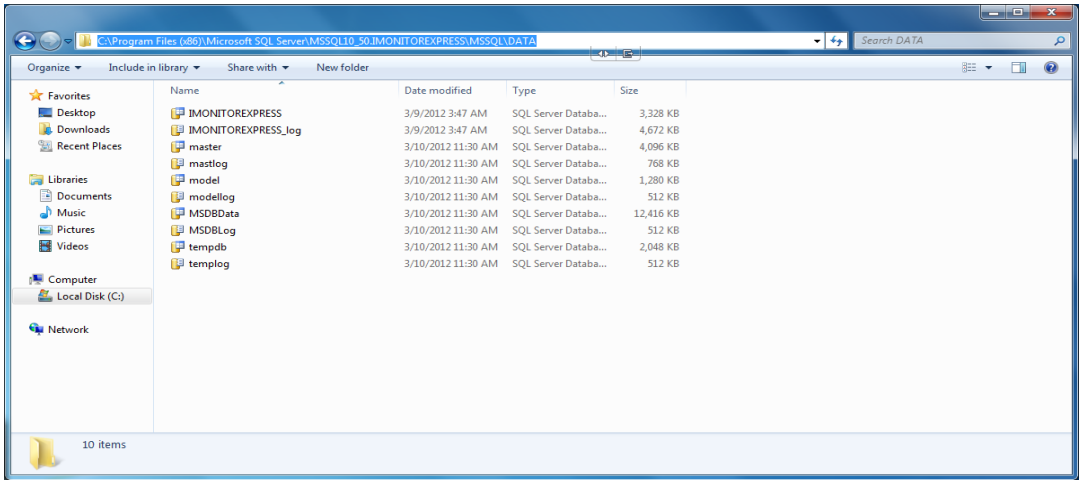


Figure 58

In this file path you will see two files call IMONITOREXPRESS and IMONITOREXPRESS_log. Do not do anything with these files as we will look back after deleting the database in SQL Management Studio to verify that the two database files have been deleted.

Back in SQL Management Studio right click on the 'IMONITOREXPRESS' database and select 'Delete'.

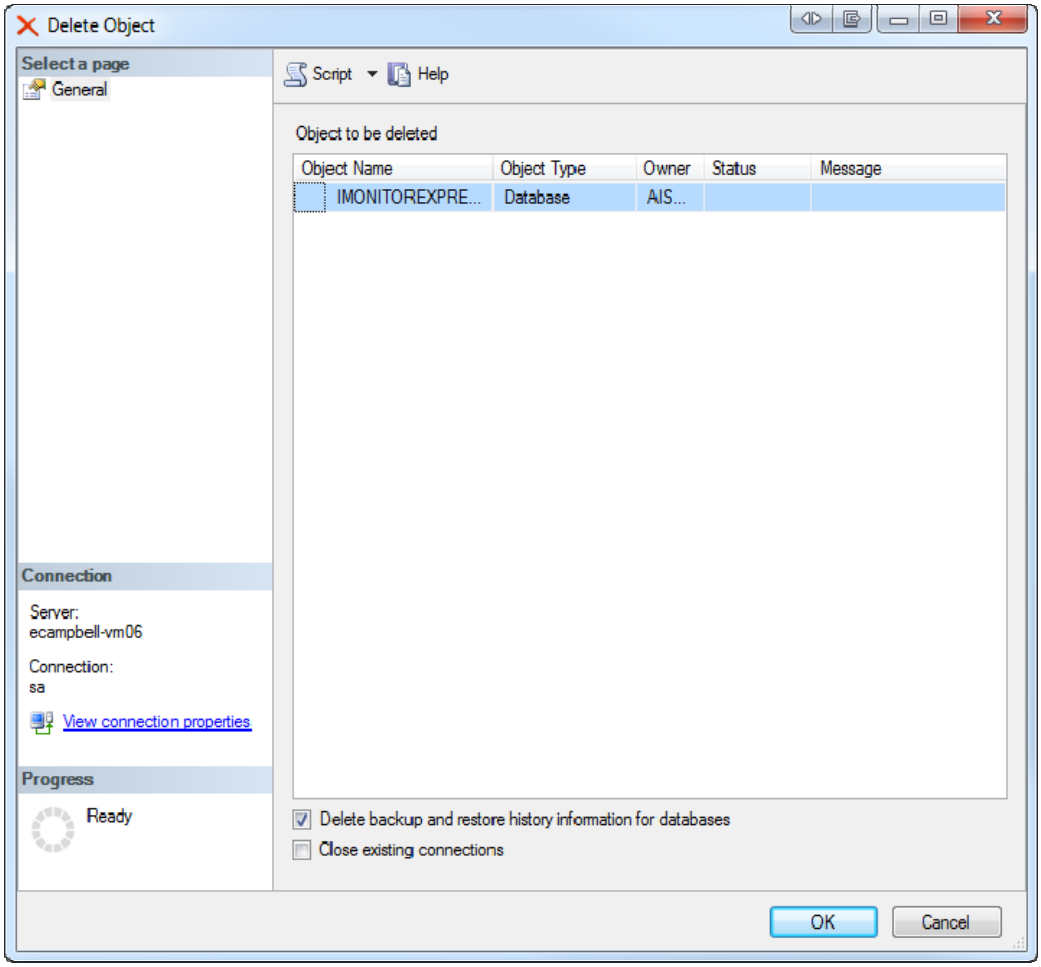


Figure 59

In the Delete Object dialog make sure to check ‘Close existing connections’ and click ‘OK’.

The IMONITOREXPRESS database should no longer show in SQL Management Studio and the two database files should no longer exist in Windows Explorer as shown below:

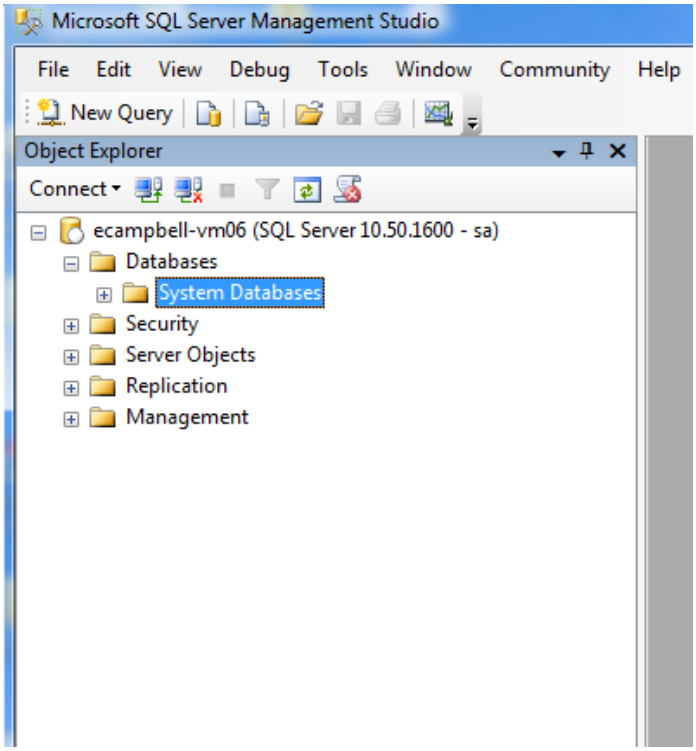

Microsoft SQL Server Management Studio
File Edit View Debug Tools Window Community Help
New Query
Object Explorer
Connect
ecampbell-vm06 (SQL Server 10.50.1600 - sa)
Databases
System Databases
Security
Server Objects
Replication
Management

Figure 60

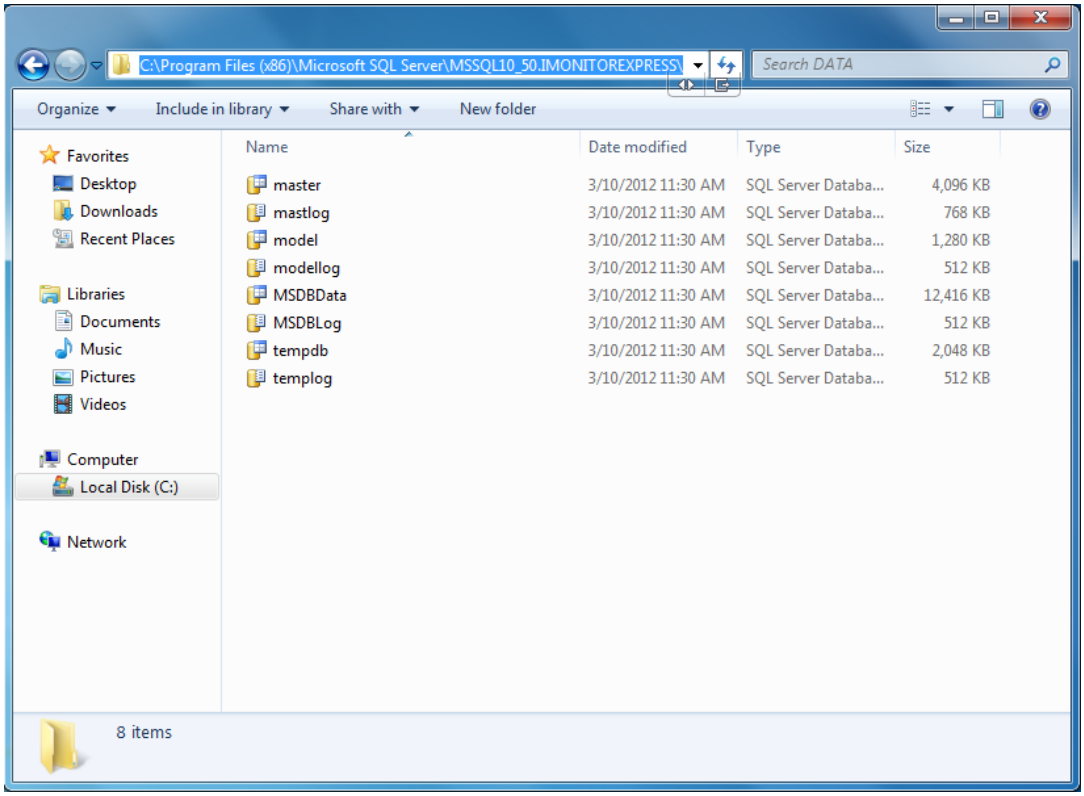


Figure 61

The database IMONITOREXPRESS has now been deleted from the system.

Clear the HKEY_LOCAL_MACHINE and HKEY_CURRENT_USER Registry Keys

Please exercise caution when working in the registry. Working within the registry could cause damage to the system which cannot be undone and may require the system to be reloaded. Only make the changes specified below.

HKEY_LOCAL_MACHINE

Click Start → and in 'Search programs and files' text box type 'regedit' and press 'Enter'.

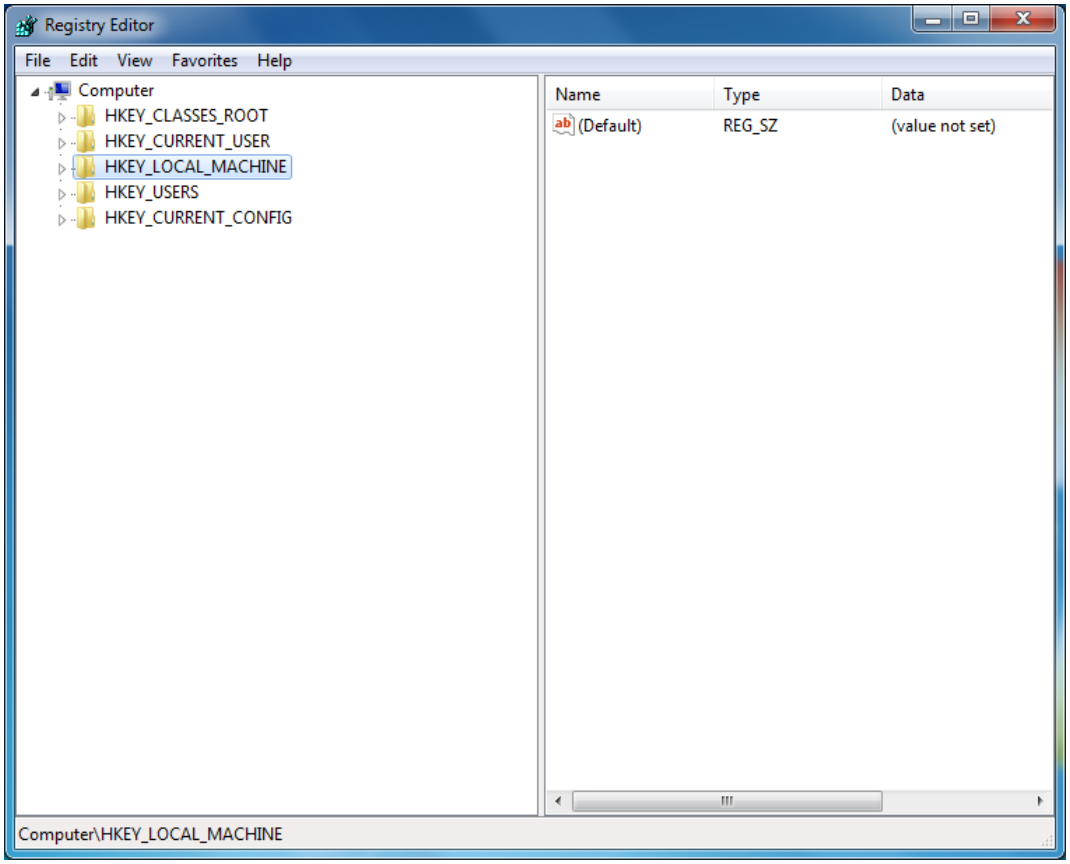


Figure 62

Expand 'HKEY_LOCAL_MACHINE → SOFTWARE → Wow6432Node.

NOTE: If you have installed iMonitor Express on a 32 bit system you will not see the 'Wow6432Node and will be working directly in the SOFTWARE key.

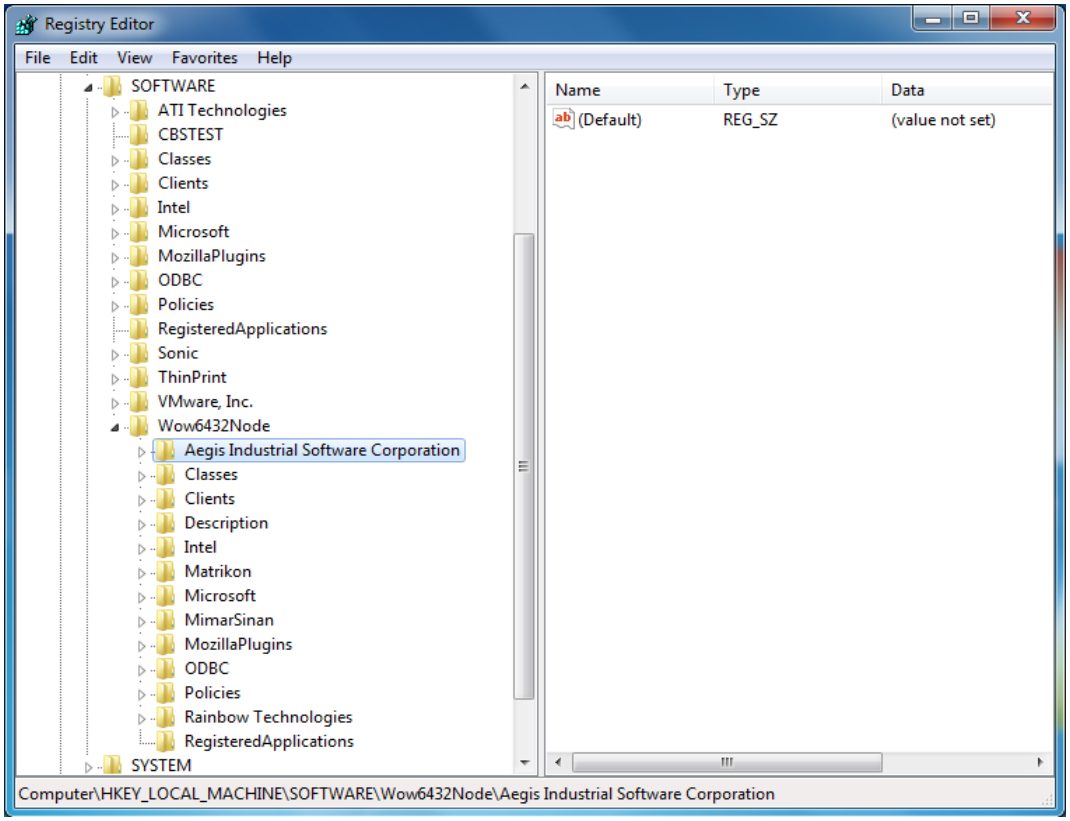


Figure 63

Right click on 'Aegis Industrial Software Corporation' and select 'Delete'.

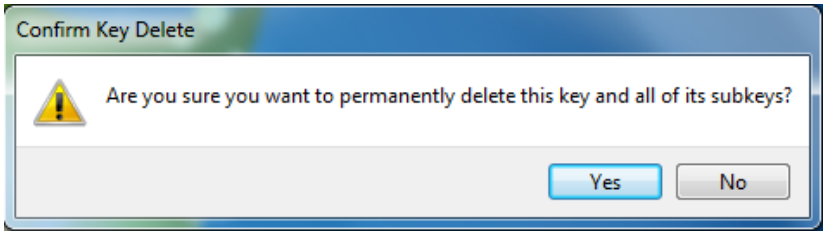


Figure 64

Click 'Yes' to delete the registry Key.

HKEY_CURRENT_USER

Collapse the HKEY_LOCAL_MACHINE key and expand HKEY_CURRENT_USER → Software key.

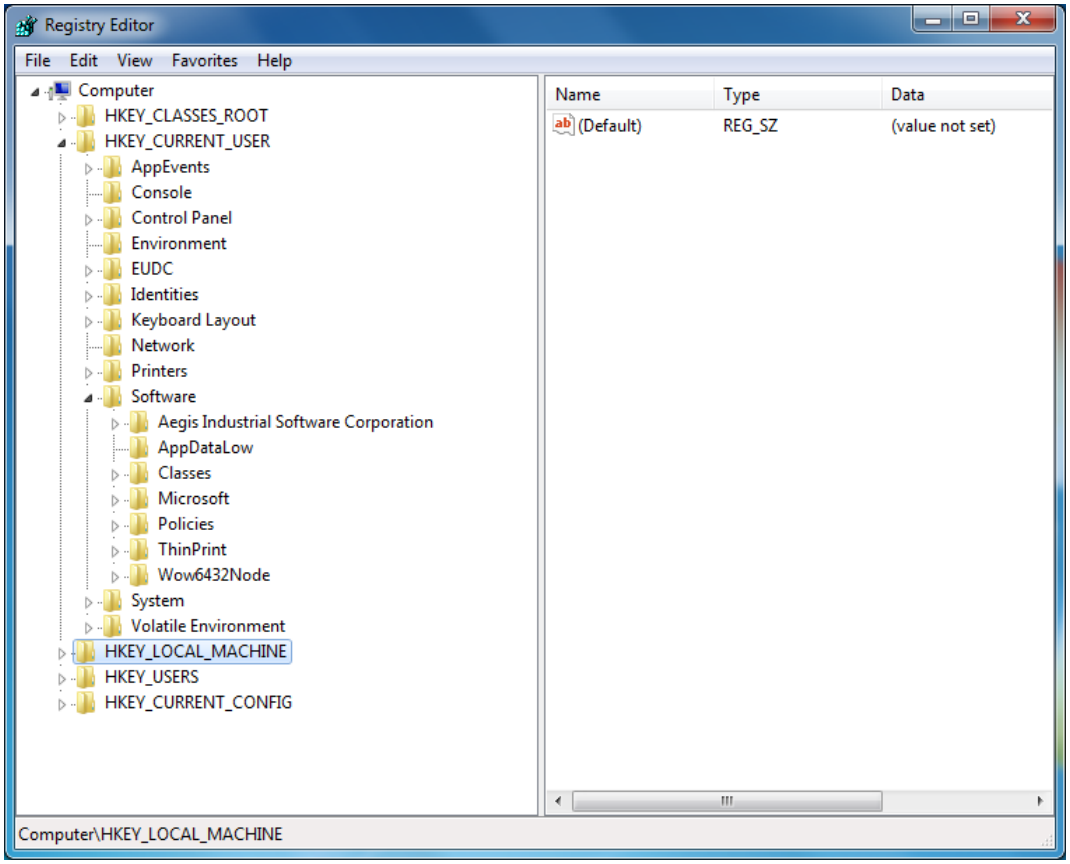


Figure 65

Right click on ‘Aegis Industrial Software Corporation’ and select ‘Delete’.

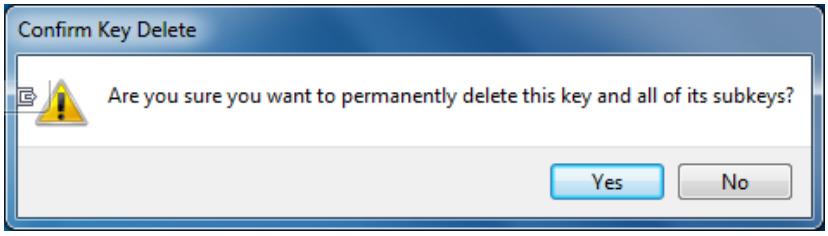


Figure 66

Click ‘Yes’ to delete the registry Key.

This concludes the steps necessary for preparing the system to have iMonitor Express reinstalled. You can now proceed with the install of iMonitor Express.

System Configuration

Configuration of the system includes several components, the FlexLink Configuration Tool used for creating the FLX file which details the PLC programming, Matrikon OPC Server used for

communication between iMonitor Express and a Line PLC, SQL Database used for data storage and only applicable if not using the database installed with the iMonitor Express Wizard, and the Youtilize Solution made up of iMonitor Express and iMonitor Express Viewer as well as several underlining services (xLink and Real-Time, Alarms, Report Scheduler Services). In the following section I will be going over the configuration of each of these components.

FlexLink Configuration Tool

The FlexLink Configuration Tool was designed to supplement the installation of the Youtilize Solution. The intent is during the PLC programming process the developer will identify and program tags into the PLC. Each of these tags may have a specific function and provide specific data. It is possible that a PLC may contain hundreds if not thousands of tags, and input of the tags into the FlexLink Configuration Tool while programming the PLC is the most convenient way to capture the information required when configuring the Youtilize Solution. The resulting *.flx file can be used with either the iMonitor Express Wizard or Manual Installation Procedures. The same tool is also included within the FlexLink Adapter configuration which is part of the xLink Configuration node of the Fusion Server Manager Snap-in. The following is an overview of the FlexLink Configuration Tool. First we will talk about the two methods of access the FlexLink configuration tool followed by the overview.

Standalone Tool

The standalone tool again used for the initial programming of the PLC is distributed as a set of files. The two files are as follows:

- FlexLinkSystemConfigurationTool.exe
- AegisSystemConfigurationLibrary.dll

Both files should be located in the same directory to allow the FlexLink Configuration Tool to work.

To execute the tool double click the ‘FlexLinkSystemConfigurationTool.exe The following dialog will open:

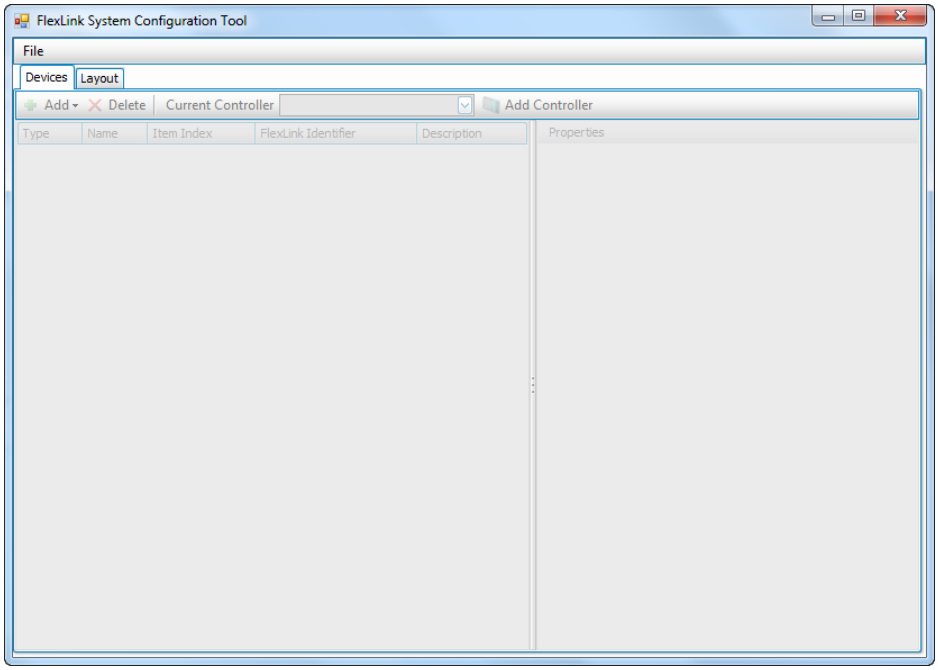


Figure 67

FlexLink xLink Adapter – Fusion Server Manager

The FlexLink Configuration Tool included in the Fusion Server Manager Snap-in is primarily designed to make changes to the *.flx file associated to the adapter. If you are starting a deployment and have not been provided with the *.flx file you can also create a new one.

NOTE: Each time you select the FlexLink xLink Adapter from the list of Data Sources under xLink Configuration you will be prompted for a Username, Password, and Database. The default username and password are ‘admin’. The Database should already be set to a preexisting DSN, if not select the appropriate Database from the list.

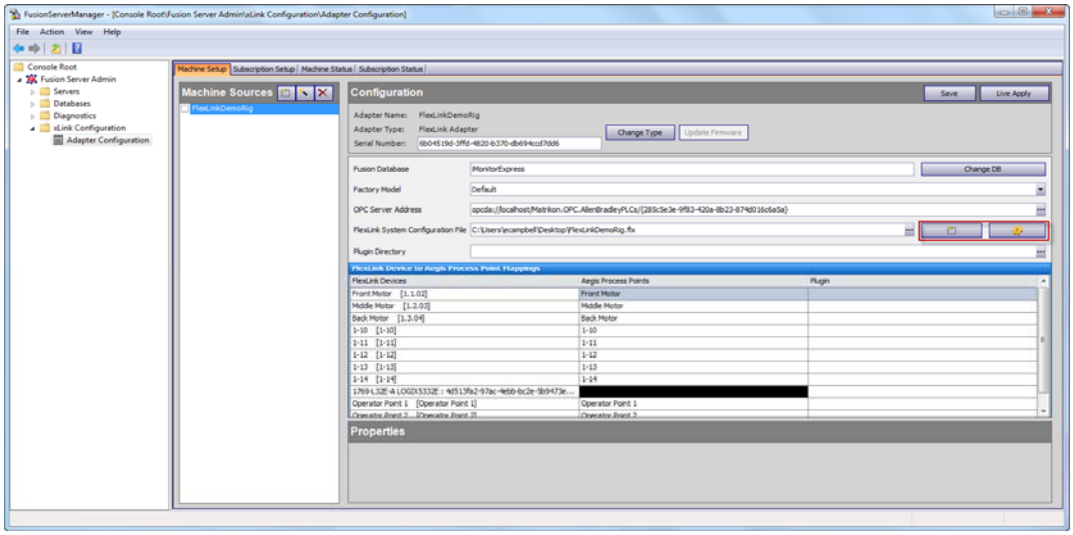


Figure 68

Information pertaining to the *.flx file are located on the line ‘FlexLink System Configuration File’. First is the path/filename of the *.flx file currently associated to the adapter. If this field is empty you will only have access to the (Create New) button. This button is used to create a new FlexLink Configuration file. If the file is currently associated to the FlexLink adapter both and (settings) will be enabled. The button is used to make changes to an existing *.flx file.

Overview

Once you have entered the FlexLink Configuration Tool either standalone or from the FlexLink xLink Adapter Configuration you are working with the same GUI (Graphical User Interface)

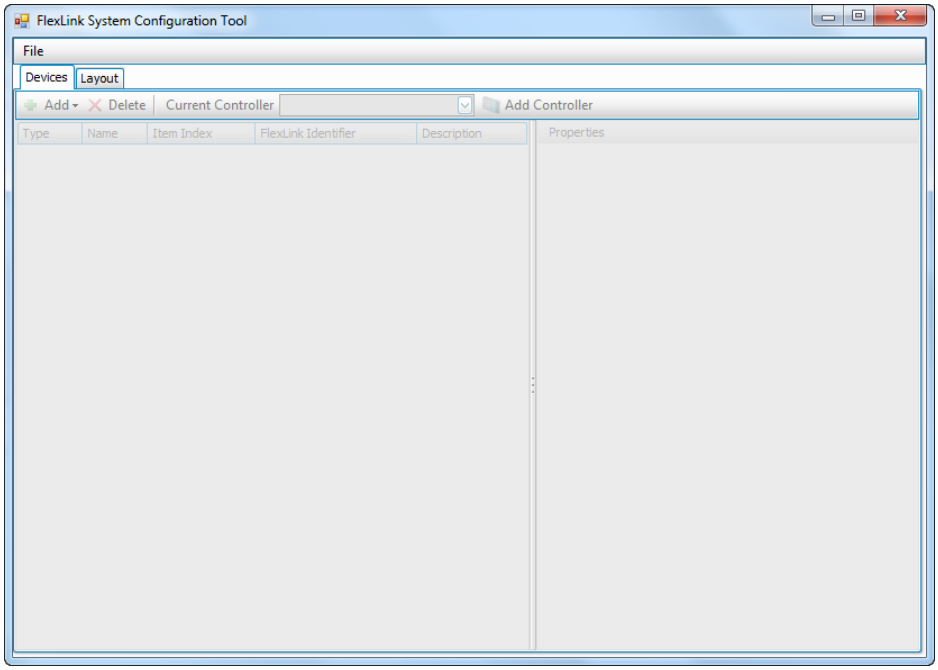


Figure 69

To start the process of creating a FlexLink Configuration you go to File → New.

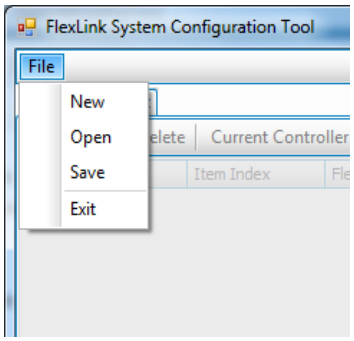


Figure 70

The following Dialog will be presented:

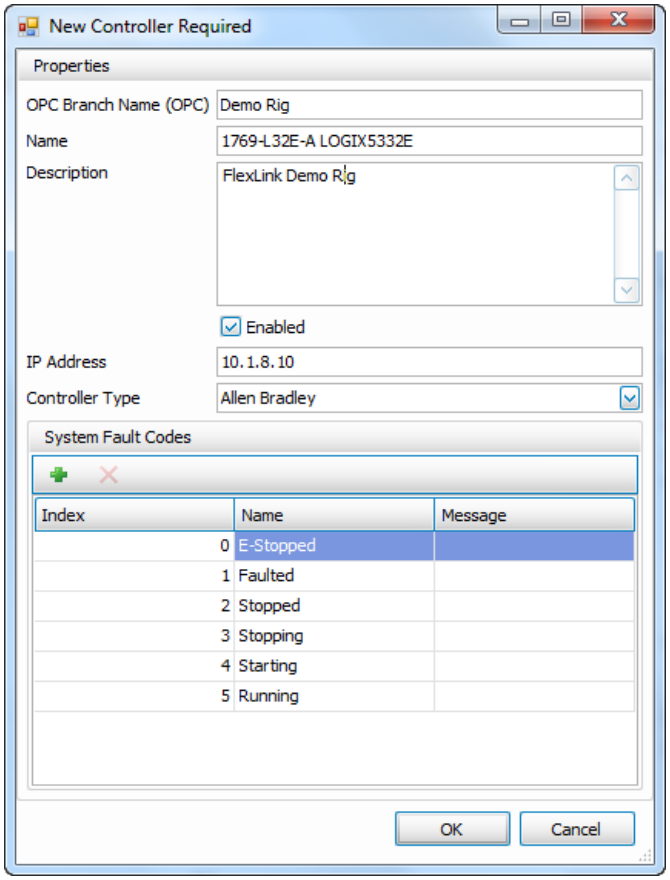


Figure 71

Enter information as described below:

- **OPC Branch Name (OPC):** Name of the FlexLink line.
- **Name:** Name of the OPC PLC Server (Copied from the Matrikon Configuration, note setting in Figure 71 above.
- **Description:** Any information that can be used to describe the FlexLink line.
- **Enabled:** Checked by default and should remain checked.
- **IP Address:** IP Address of the PLC Controller
- **Controller Type:** Type of PLC used to control the FlexLink line.
- **System Fault Codes:** Fault codes applicable to the PLC configuration.

Once all information has been entered click 'OK' to close the dialog.

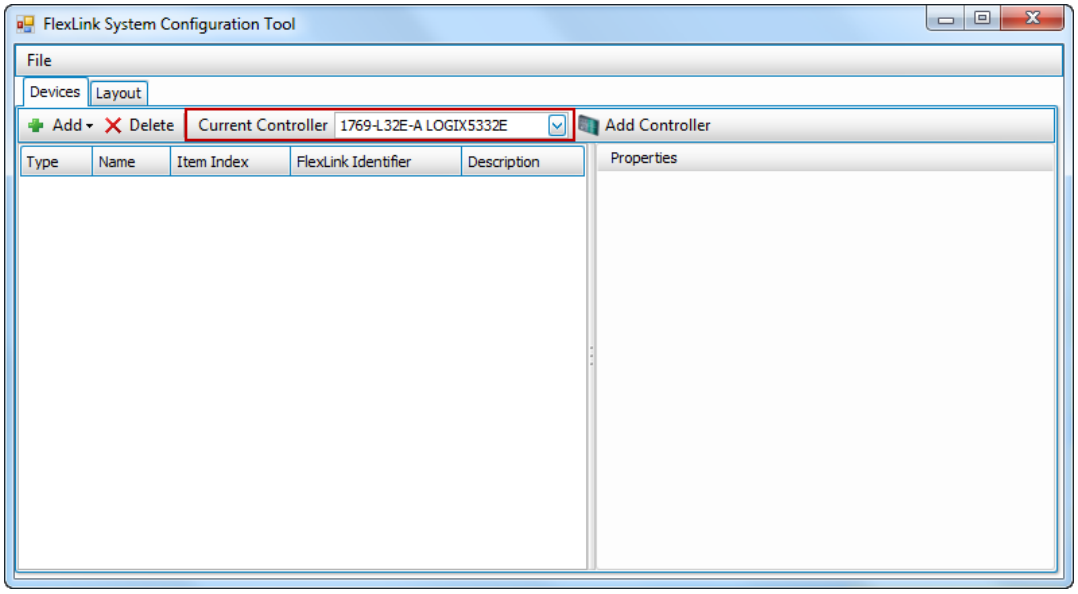


Figure 72

Notice the 'Current Controller' setting which is important when configuration a line that contains more than one controller.

You can see that you have two tabs at the top of the 'FlexLink System Configuration Tool' dialog, Devices and Layout.

Devices

The Devices tab presents the options for adding and configuration various devices that are being controlled by the 'Current Controller' (PLC). In this tab you can add Motors, Functions, and/or Analog Sensors.

Layout

The Layout tab presents a view of the system (line) and the controllers that are included. If you select a controller you can add Workstations, Entry Points, and/or Exit Points as applicable.

Adding Devices

New Motor

Make sure you have the correct 'Current Controller' selected.

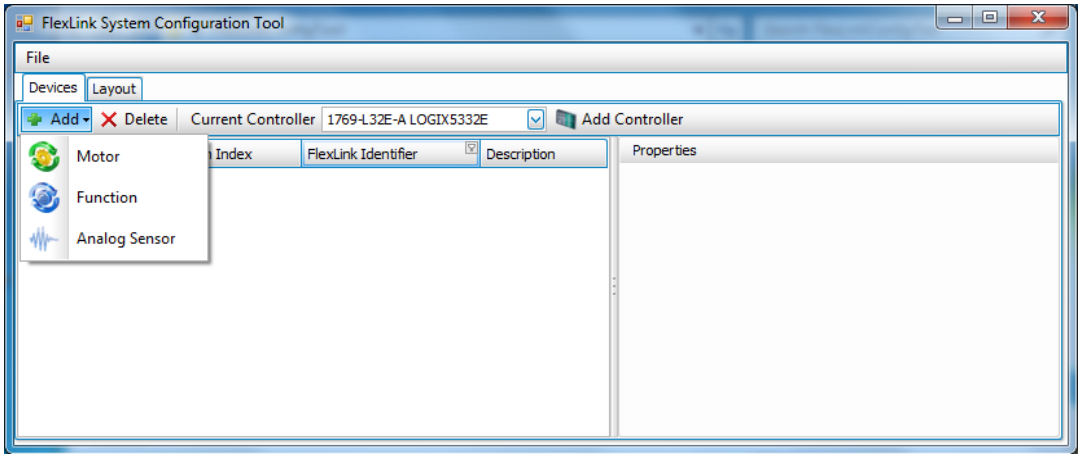


Figure 73

Click ‘Add’ and select ‘Motor’.

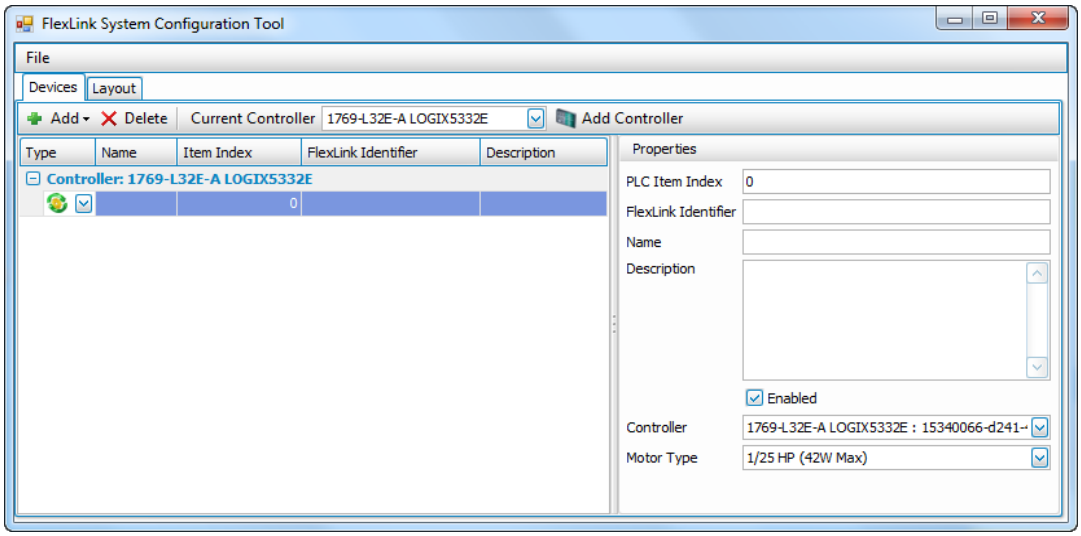


Figure 74

Under ‘Properties’ enter information as described below:

- **PLC Item Index:** This is also known as the Tag in the PLC.
- **FlexLink Identifier:** Identifying name FlexLink uses to describe the motor.
- **Name:** Name used to identify the item in the iMonitor Express GUI.
- **Description:** Field for entering a description for the device.
- **Enabled:** Checked by default and should remain checked.
- **Controller:** Populated with information relative to the ‘Current Controller’ setting.
- **Motor Type:** Type of motor connected to the PLC.

Repeat the above steps for adding a new motor for each Motor controlled by the ‘Current Controller’

New Function

Make sure you have the correct 'Current Controller' selected.

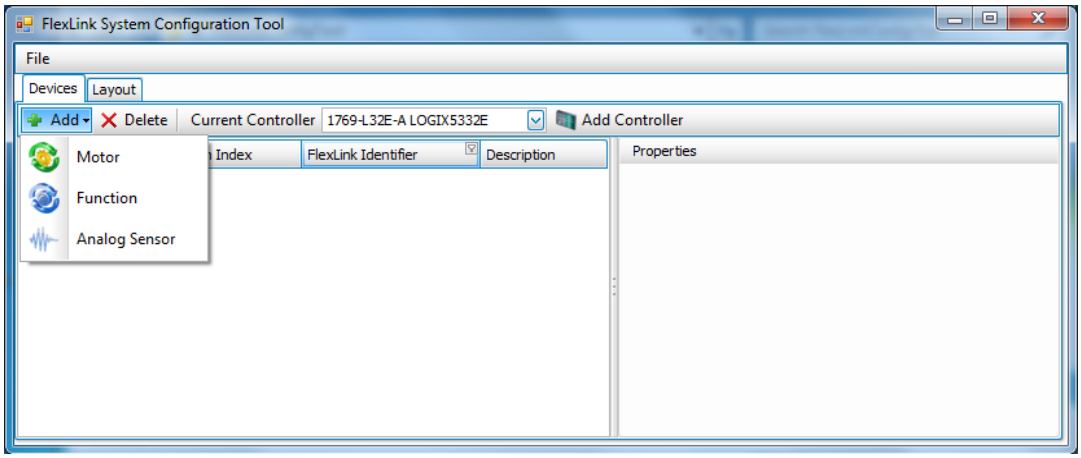


Figure 75

Click 'Add' and select 'Function'

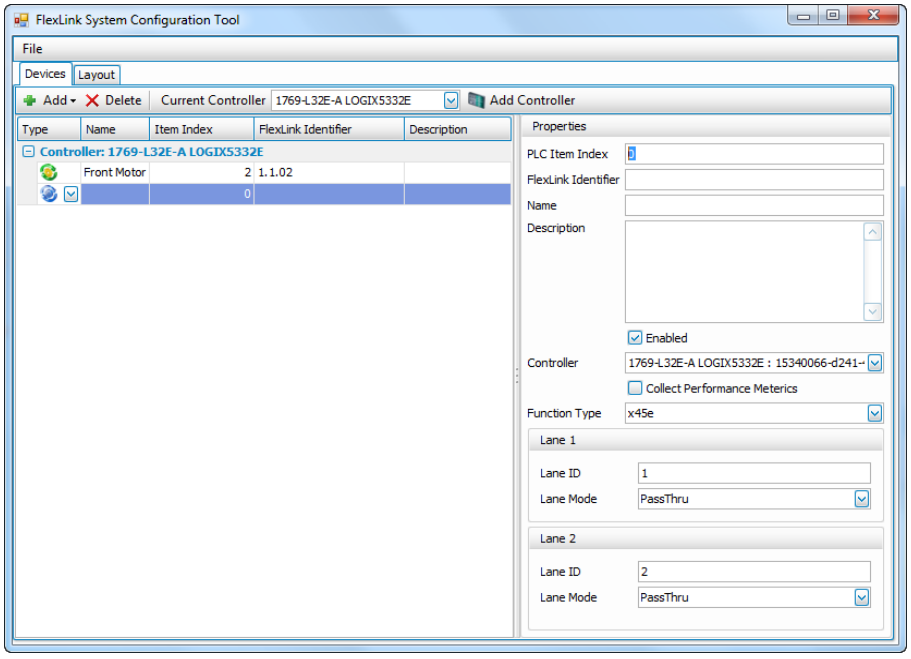


Figure 76

Under 'Properties' enter information as described below:

- **PLC Item Index:** This is also known as the Tag in the PLC.
- **FlexLink Identifier:** Identifying name FlexLink uses to describe the motor.
- **Name:** Name used to identify the item in the iMonitor Express GUI.
- **Description:** Field for entering a description for the device.
- **Enabled:** Checked by default and should remain checked.

- **Controller:** Populated with information relative to the 'Current Controller' setting.
- **Collect Performance Metrics:** Check if performance metrics will be provided by this function.
- **Function Type:** Select the type of function connected to the PLC.
- **Lane 1:** Not required for Youtilize leave as is. Factory Model required with routing information.
- **Lane 2:** Not required for Youtilize leave as is. Factory Model required with routing information.

Repeat the above steps for adding a new motor for each Function controlled by the 'Current Controller'

New Analog Device

Make sure you have the correct 'Current Controller' selected.

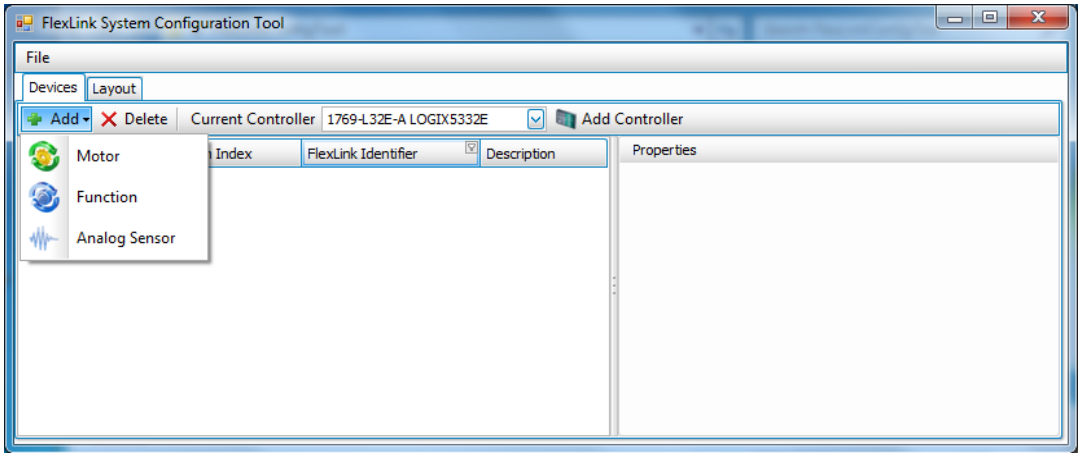


Figure 77

Click 'Add' and select 'Analog Sensor'

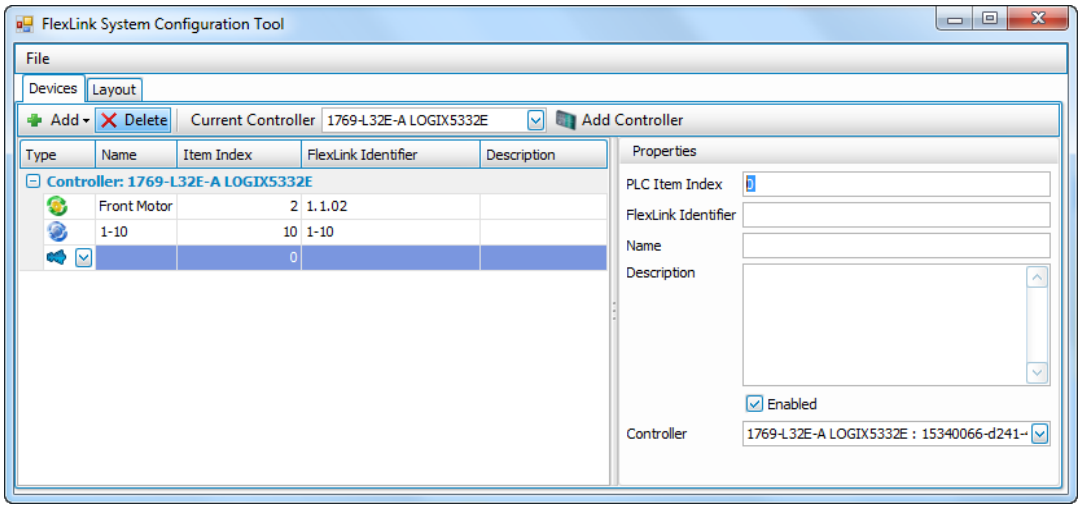


Figure 78

Under ‘Properties’ enter information as described below:

- **PLC Item Index:** This is also known as the Tag in the PLC.
- **FlexLink Identifier:** Identifying name FlexLink uses to describe the Analog Sensor.
- **Name:** Name used to identify the item in the iMonitor Express GUI.
- **Description:** Field for entering a description for the device.
- **Enabled:** Checked by default and should remain checked.
- **Controller:** Populated with information relative to the ‘Current Controller’ setting.

Repeat the above steps for adding a new motor for each Analog Sensor controlled by the ‘Current Controller’

Adding Workstations and Entry/Exit Points

Workstations and Entry/Exit Points are added in the Layout tab. Once you are in the Layout tab you will want to make sure that you have the appropriate controller selected in the tree view.

Adding Workstations

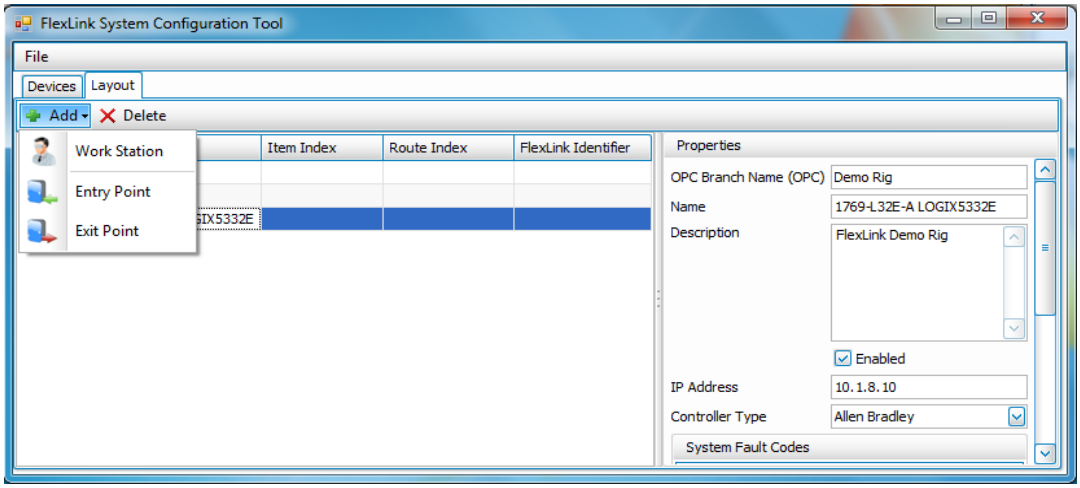


Figure 79

Click ‘Add’ and Select ‘Work Station’

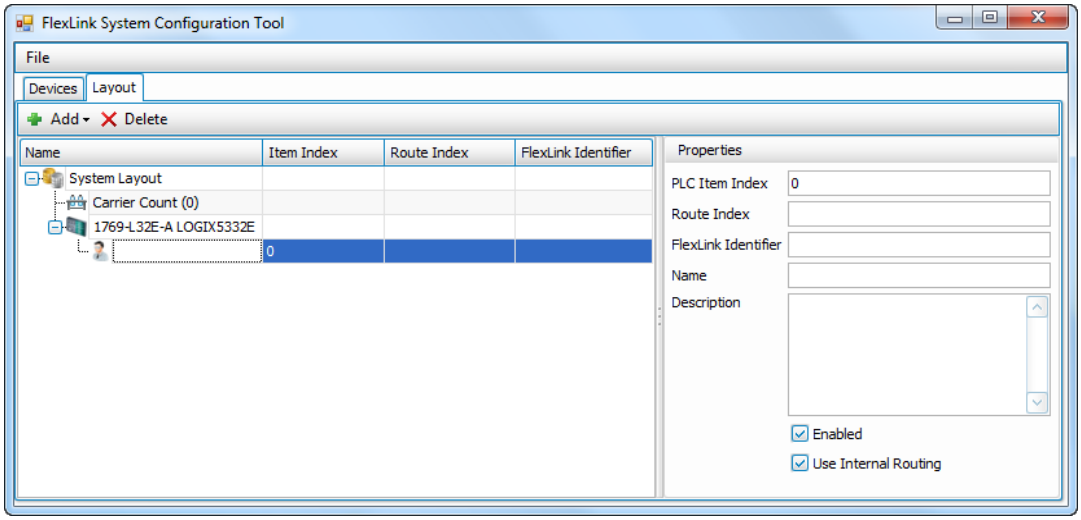


Figure 80

Under 'Properties' enter information as described below:

- **PLC Item Index:** This is also known as the Tag in the PLC.
- **Route Index:** Not required for Youtilize leave as is. Factory model required with routing information.
- **FlexLink Identifier:** Identifying name FlexLink uses to describe the Work Station.
- **Name:** Name used to identify the item in the iMonitor Express GUI.
- **Description:** Field for entering a description for the device.
- **Enabled:** Checked by default and should remain checked.
- **Use Internal Routing:** If the routing is controlled by FlexLink and simple reported to iMontor Express then this option should be enabled. If this option is disabled the following additional options will be added under properties.

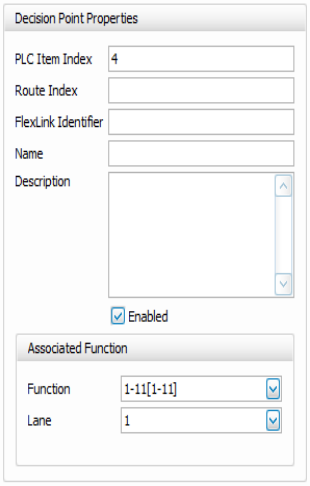


Figure 81

Under 'Decision Point Properties' enter information as described below:

- **PLC Item Index:** This is also known as the Tag in the PLC.
- **Route Index:** Not required for iMonitor express leave as is. Factory model required with routing information.
- **FlexLink Identifier:** Identifying name FlexLink uses to describe the Work Station.
- **Name:** Name used to identify the item in the iMonitor Express GUI.
- **Description:** Field for entering a description for the device.
- **Enabled:** Checked by default and should remain checked.
- **Associated Function:**
    - **Function:** Select from a list of available Functions.
    - **Lane:** Select from the list of available lanes.

Repeat the above steps for adding a new motor for each Analog Sensor controlled by the 'Work Station

Adding Entry Point

- Not required for Youtilize leave as is. Factory model required with routing information.

Adding Exit Point

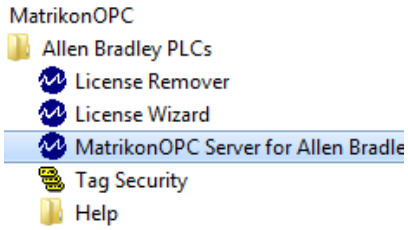
- Not required for Youtilize leave as is. Factory model required with routing information.

Matrikon OPC Server

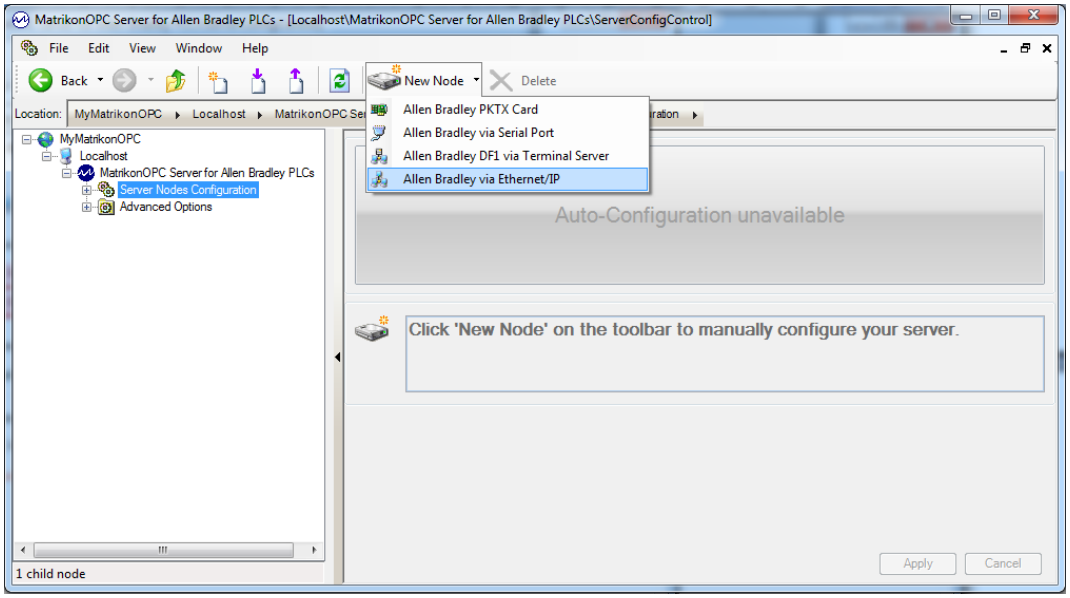
As mentioned earlier the Matrikon OPC Server is used for communication between the PLC Controller used in the FlexLink Line and the Youtilize solution. In this section we will go over the configuration of the OPC Server to establish a connection with the PLC Controller. Once the connection is configured the file created using the FlexLink Configuration Tool (covered in the previous section, System Configuration - ***FlexLink Configuration Tool***) and the configuration of the xLink Adapter (covered in the System Configuration -***Youtilize Solution***) will allow intelligent communication between the PLC Controller and the Youtilize Solution.

New configuration

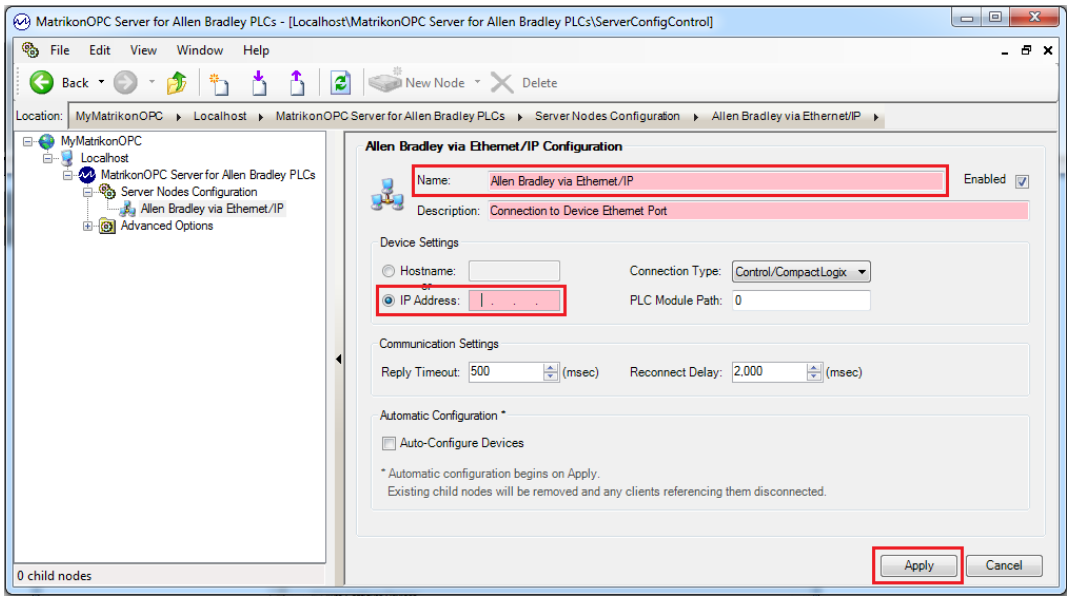
Open the Matrikon OPC Server by selecting it from start menu. Start → MatrikonOPC → MatrikonOPC Server. The OPC server name varies on which PLC suite installed.



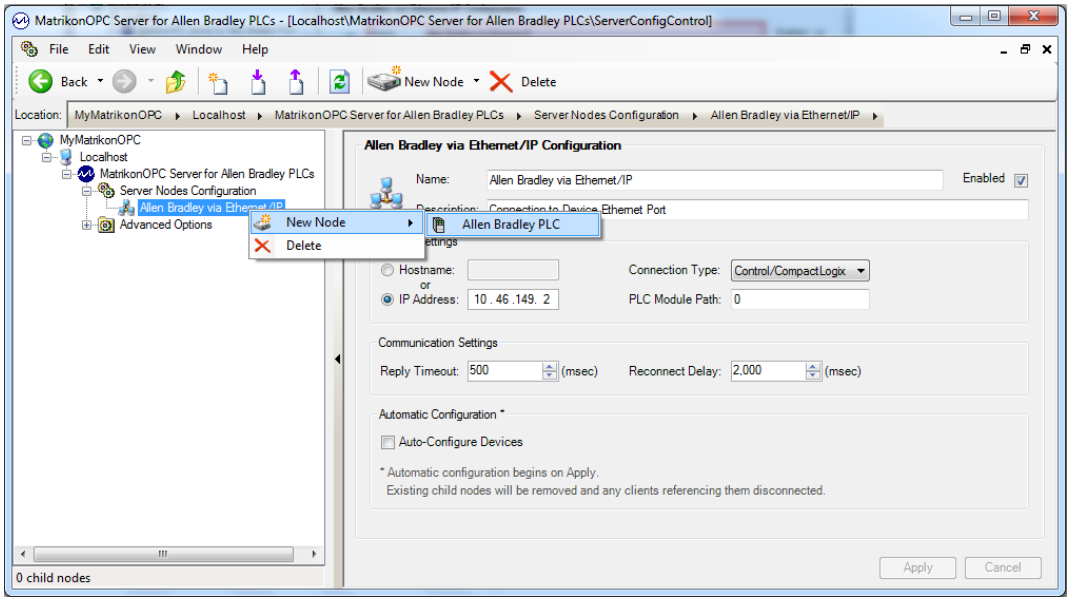
The MatrikonOPC start page will be presented. Click 'New Node' on the toolbar and select the option with Ethernet/IP in the drop-down list.



A new node will now appear under 'Server Nodes Configuration' in the left side tree structure. On the right side the Ethernet/IP configuration will be presented. Enter a name for the Configuration (Description is optional). Select the 'IP Address' radio button in 'Device Settings' section. Enter the IP address of the PLC you want to connect to. Then click the 'Apply' button in the bottom right corner.



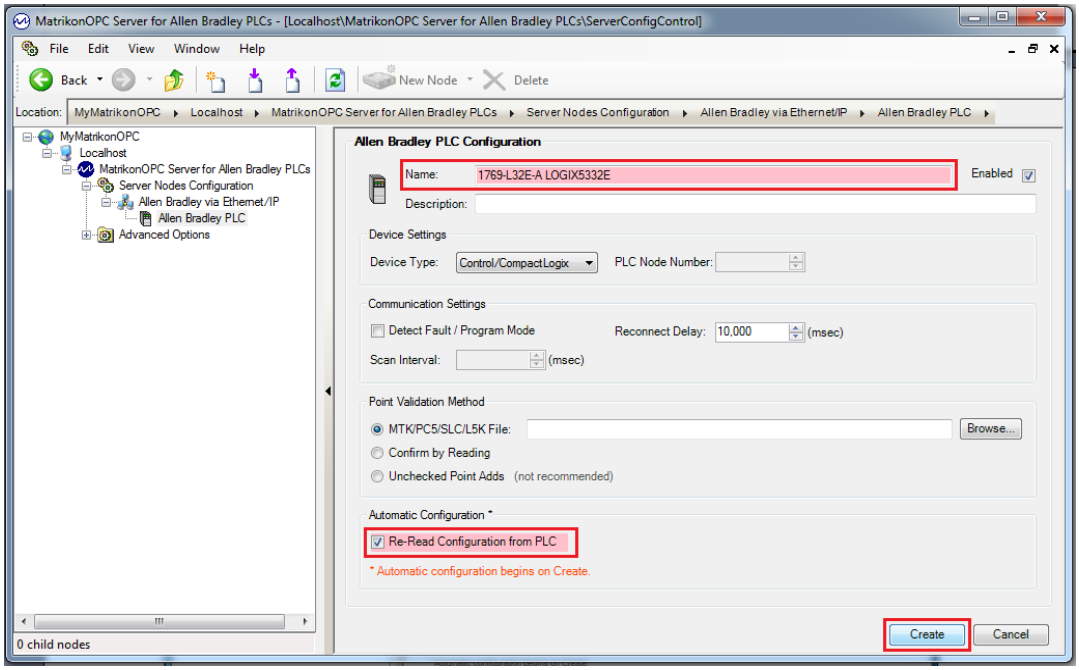
Right click on the created node in the left side tree structure. Select 'new node' → and select the 'PLC' option. Alternatively, select the created tree node and the click the 'New Node' button in the toolbar.



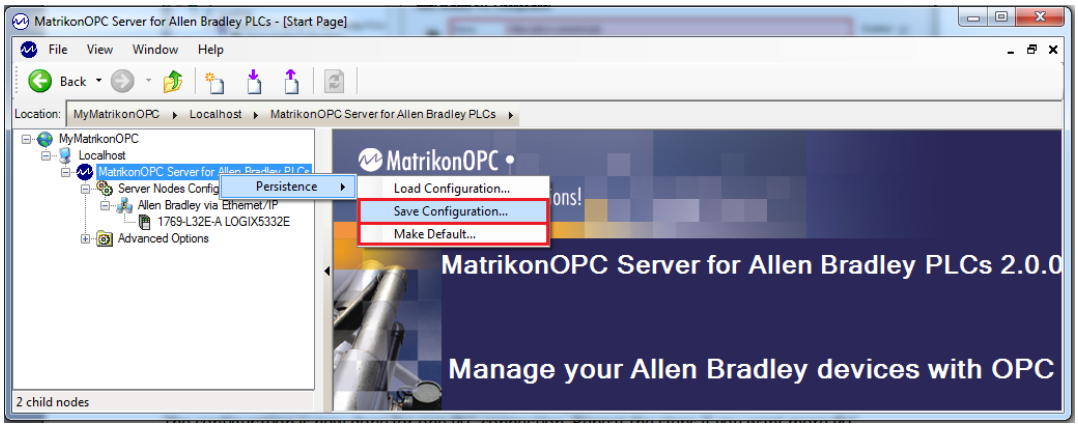
On the right side the PLC Configuration will be presented. Enter a name for the PLC configuration.

NOTE: This name will later be used in the FlexLink Configuration Tool (see section ‘FlexLink Configuration Tool’).

Check the ‘Re-Read Configuration from PLC’ in the ‘Automatic Configuration’ section. Then click the ‘Create’ button in the bottom right corner.



The configuration is now done for one PLC connection. Repeat the steps if you want more PLC connections. When all configurations are completed then right click on the 'MatrikonOPC Server' node in the tree structure → persistence → and select 'Save Configuration…' and specify the save location. Then also make this configuration to automatically load at startup by right click on the 'MatrikonOPC Server' node in the tree structure → persistence → and select 'Make Default…'.



Youtilize Solution

In this section we will be going over the configuration of various Youtilize Solution components previously mentioned (xLink Adapter, Real-Time Service, Dashboard Designer, iMonitor Express Viewer).

NOTE: If you installed the Youtilize Solution using the Installation Wizard you will not need to manually configure the applications. There may be certain situations where a combination of install methods is used. If that is the case you may need to review each of the following areas of configuration to determine which may apply to any additional systems you are setting up.

iMonitor Express

iMonitor Express is an application used to design/View Dashboards, view historical data, perform machine setup and change iMonitor Settings. What you have access to depend on the options you have purchased.

After iMonitor Express is installed no additional configuration is necessary to use the application.

iMonitor Express Viewer

The iMonitor Express Viewer is used to view previously designed Dashboards.

When running iMonitor Express Viewer on the same system you installed iMonitor Express the application will be able to discover the Real Time Service running on the local system. If you are running iMonitor Express Viewer on a remote system you will receive the following message indicating that you need to specify the location of the Real Time Service which is the name or IP of the system you installed iMonitor on.

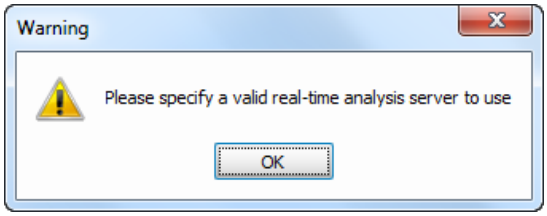


Figure 82

Click okay and you will then be presented with the 'Realtime Server Settings' dialog.

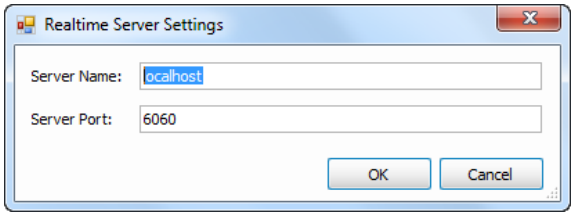


Figure 83

For Server Name enter the name or IP address of the system you installed the iMonitor Express or where you know the Realtime service is running. iMonitor Express Viewer will then open.

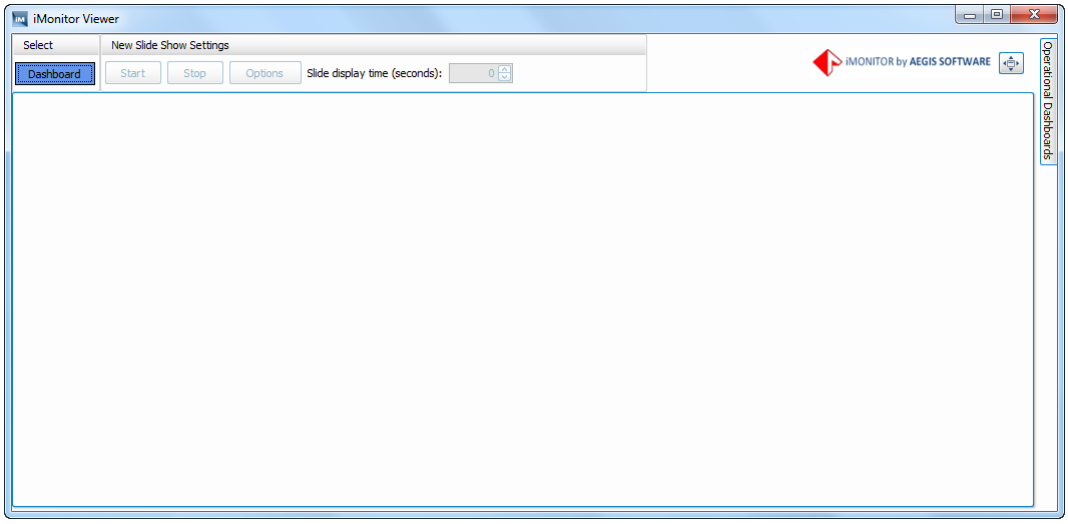


Figure 84

Dashboard Designer

The Dashboard Designer is available as part of the Production Level Monitoring and Factory Controls solutions and as an option in the Service Level Monitoring. Service Level Monitoring ships by default with a fixed set of Dashboards which are not editable by the user.

Dashboard Workspace

The Dashboard Workspace is where you design dashboards. In this section you will get an overview of the various components that make up the workspace.

When you first open the Dashboard Designer you will see the following view:

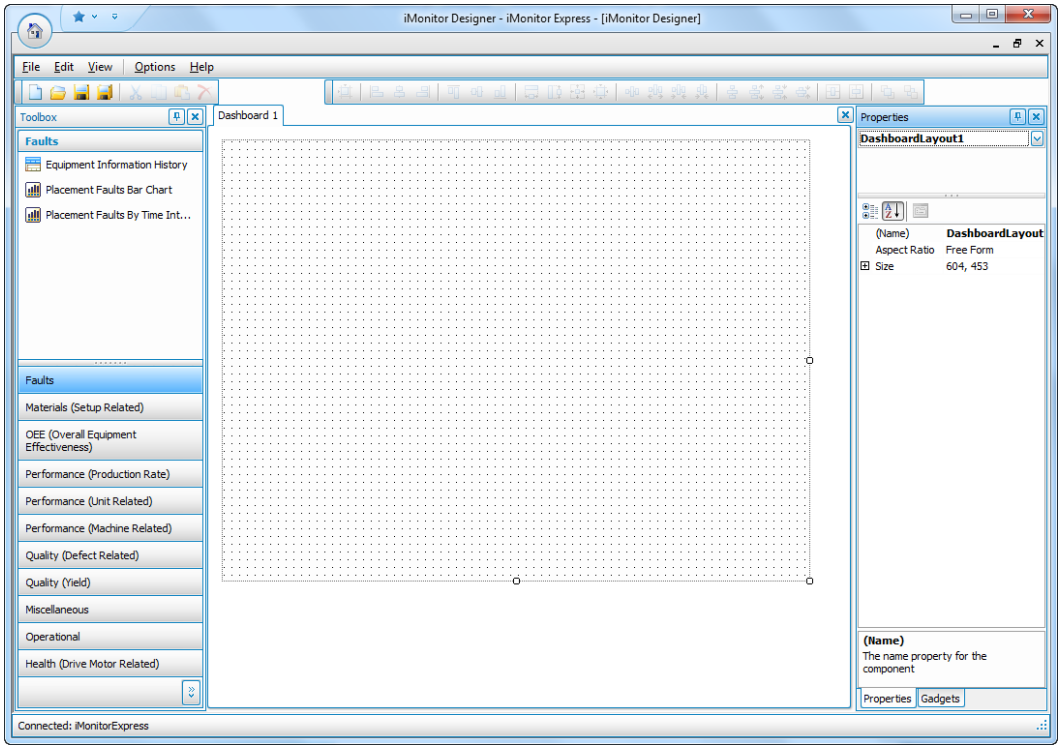


Figure 85

The following is a description of the various sections seen in the above screenshot.

- **Toolbox:** The toolbox contains all of the items that can be used in a dashboard. Specific groupings of gauges are placed in specific categories to assist in finding gauges.
- **Design Grid:** This is the area located in the center of the application and where you will be places gauges to create a dashboard.
- **Properties:** Located on the right side of the application this is where you can make specific changes to individual gauges and the design grid. The properties will only display for the item that is currently selected.
- **Gadgets:** Also located on the right side of the application as a tab at the bottom of the screen. Here you can see all of the gauges that are in the design grid and change Data Source properties on groups of gauges at one time.

Toolbox

As previously mentioned the Toolbox is on the left side of the iMonitor Designer application. Along with all of the gauges there are also miscellaneous gadgets that can be added to the design grid. This includes the following items:

- **Current Time Clock:** Displays the current time in a Dashboard. Useful when in full screen mode which hides the Windows taskbar.
- **Circle:** Used to draw a circle.
- **Tray:** Used to create groups of gadgets.
- **Picture Box:** Used to insert a picture.
- **Rectangle:** Used to draw a rectangle.
- **Smart Text Label:** Used to display text based on the item the Smart Text Label is linked with.
- **Text Label:** Used to display text.

All of the other items found in the Toolbox are described in the section '***Working with Gauges'***.

Design Grid

The design grid represents what is going to be viewed by users using iMonitor Express Viewer. Gadgets and/or Gauges can be added to the design grid by dragging and dropping them. You can also perform common functions such as cut, copy, paste, and Delete by selecting any item on the design grid and right clicking as shown below.

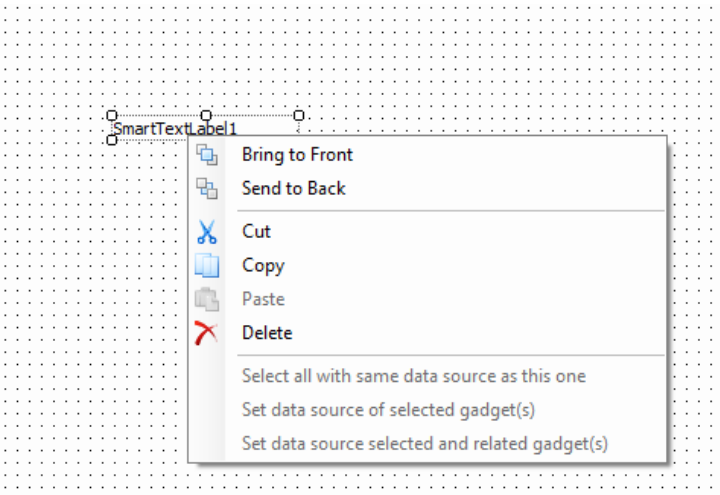


Figure 86

Also as shown in Figure 86 you can set gauge data sources which are a link to the point in your manufacturing that you want the gauge to display data for. i.e. Motor, Function, Workstation etc…

You can also select more than one gauge at a time allowing you to cut, copy, paste, and delete, as well as change data source properties. This is convenient when you have created a dashboard for a single line and want to duplicate it to additional lines.

Also notice that at the top of the design grid there are tabs. You can work on more than one dashboard at a time. The tab will either contain Dashboard # which is the default for a new dashboard, or the saved name of a dashboard if you have opened one you previously created.

Properties

Each gadget/gauge has its own properties. A lot of the properties are similar between gadgets and gauges. You can make changes to more than one gadget or gauge at a time but only properties that

are the same between the selected gadget and/or gauge will show up. Below is a list of some of the common properties.

- **(Name):** Displays the name
- **Back Color:** Color to be used for the background.
- **Border Color:** Color to be used for boards if they have been enabled.
- **Border Width:** Width of the border.
- **Border Style:** Style of the border.
- **Dashboard Link:** Ability to link gadgets and/or Gauges to other Dashboards. When you are viewing the dashboard and the item is clicked the linked Dashboard will be presented.

NOTE: With Dashboard links both the parent and child dashboard must be open to work. If you click the link associated to a dashboard that is not open nothing will happen.

- **Fill Color:** Color to Fill the Object.
- **Font:** Used to specify the font and properties of the font.
- **ForeColor:** Color of the font to be displayed.
- **Horizontal Alignment:** aligns either left, cent, or right.
- **Location:** Location of the gadget/gauge on the design grid.
- **Show Border:** Enable to Disable the border of a gadget/gauge.
- **Size:** Size of the gadget/gauge.
- **Text:** Text that you want displayed on the Dashboard
- **Vertical Alignment:** aligns top, middle, or bottom.
- **Clock Style:** Option of Analog or Digital for the Clock gadget.
- **Data Source – Data Source Type:** Type of the associated data source.
- **Data Source – Data Source Name:** Name of the Data Source.

Each gauge may have its own specific properties. For more information on these specific properties please reference the Property Information area shown in red below:

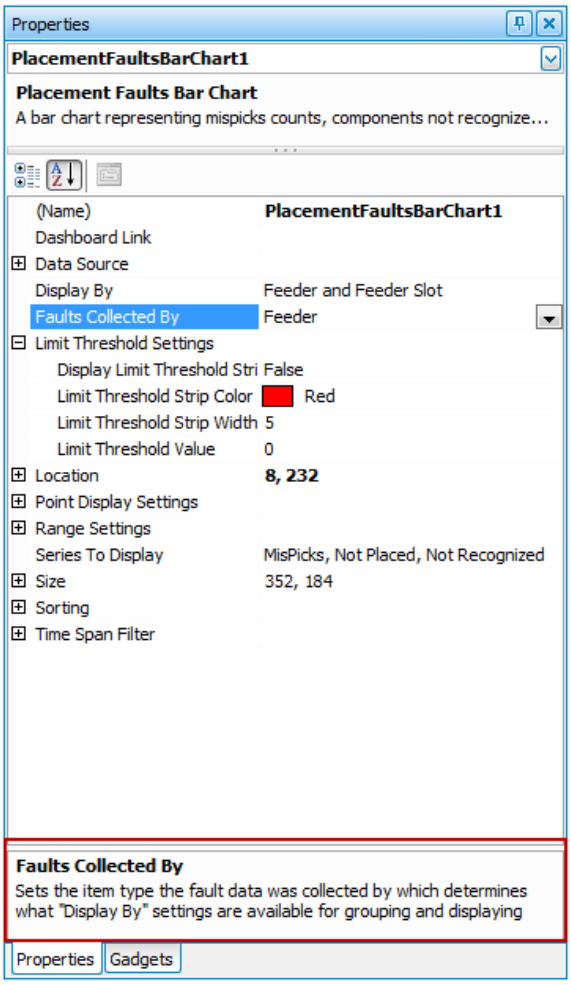


Figure 87

Gadgets

Here you are able to see the gauges based on the data source type and name that they are associated to. Please keep in mind that they are grouped based on both the type and name property and if a process point does not have an associated model point in the system it will show the same name. But if you select model point one time and then process point the next they will be grouped separately.

In the following figure you can see the various gauges and what points they are associated to:

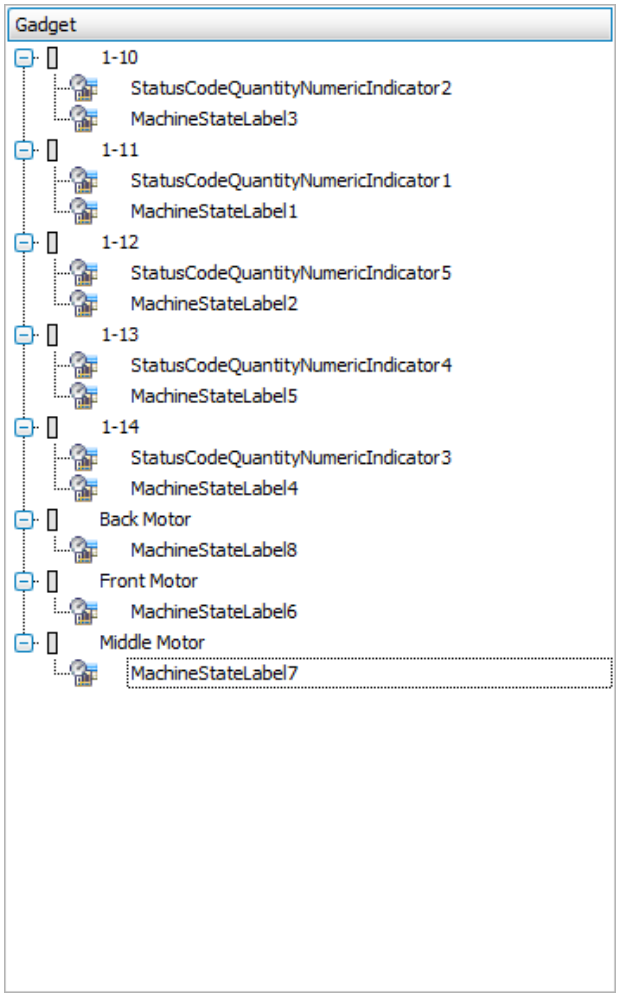


Figure 88

To change the Data Source Properties right click on an individual gauge to change just a single gauge or select a group by the associated point to change the entire group of gauges from one point to another.

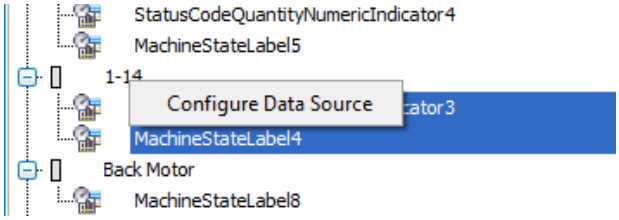


Figure 89

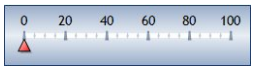
Working with Gauges

Types of Gauges

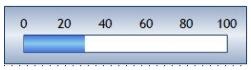
iMonitor consist of many types of gauges. Each gauge has properties that control the amount of data to be displayed, look and feel of the gauge, graphic limits for indicating acceptable values. For the most part the properties are self-explanatory and therefore will not be covered. This includes setting fonts and turning on certain true/false options. The following list contains the types and names for the various gauges that can be placed on a Dashboard.

- Circular Gauge (Default Display Type)

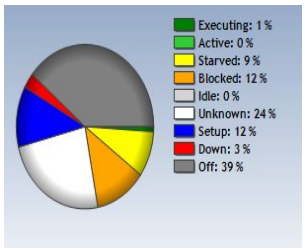
- Linear Gauge (property of a Circular Gauge)



- Bar Gauge (property of a Circular Gauge)



- Pie Chart



- Numeric Indicator

- Rolling Line Chart

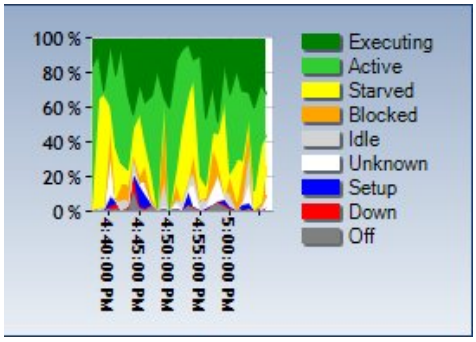
- Information Grid

Message Type	Date	Message
Error, Alarm, G...	04/08/2011 3:34 PM	Information message text
Error, Alarm, G...	04/08/2011 3:34 PM	Information message text
Error, Alarm, G...	04/08/2011 3:34 PM	Information message text
Error, Alarm, G...	04/08/2011 3:34 PM	Information message text
Error, Alarm, G...	04/08/2011 3:34 PM	Information message text

- Count Down/Count Up Timer

- Label

- Area Chart



Youtilize Supported Gauges

The iMonitor solution contains a large number of gauges. The following is a list of those that are supported by the Youtilize Solution:

- **Time to Next Service** (gauge type: Count Down Timer) – Displays the time to next service for a single Drive Motor.
- **Time Since Last Service** (gauge type: Count Up Timer) – Display the time the last time service was performed on a motor.
- **Equipment Measurement Gauge** (gauge type: Gauge) – Displays the specific drive motor measurement value. The measured values can be configured for motor power, motor

speed, or motor, runtime. Additionally a maximum, minimum, and average or median value can be set.

- **Equipment Measurement History Chart** (gauge type: Rolling Line Chart) – Displays the specified drive motor measurement value. The measured values can be configured to for motor power, motor speed, or motor runtime.
- **Utilization** (gauge type: Area or Pie Chart) – Displays how much time the Functions and Motor points have spent at any given state. i.e. executing, stopped, idle…
- **State** (gauge type: Rolling Line and Label) – Displays the current status of the functions and motors.
- **Yield** (gauge type: Gauge or Numeric Indicator) – Displays the percentage yield through operator points.
- **Status Code Quantity (Pass/Fail Count)** (gauge type: Numeric Indicator) – A numeric indicator that will display the number of units passed or failed through an operator point. The Indicator has a property that determines what counts to display for either pass for fail depending on the settings of the gauge.
- **Units per Hour** (gauge type: Gauge or Numeric Indicator) – A numeric indicator that will display the number of units passed through an operator point per hour.
- **Average Cycle Time** (gauge type: Gauge and Numeric Indicator) – The average cycle time for 'x' number of units where 'x' is a configurable property in the gauge.
- **Completed Units** (gauge type: Gauge or Label) – Displays the number of units passed through a given point. This would only count passed units and not failed units.
- **Cycle Count** (gauge type: Numeric Indicator) – A numeric indicator that will display the number of units through a given point.
- **OEE Availability (Overall Equipment Effectiveness)** (gauge type: Gauge or Numeric Indicator) – a numeric indicator that presents a value as the percentage of uptime. The percentage of uptime can also be described as the planed time that the machine is available. It is a measurement of uptime that is designed to remove the effects of schedule downtime, quality, and performance.
- **OEE Performance (Overall Equipment Effectiveness)** (gauge type: Gauge or Numeric Indicator) – a numeric indicator that presents a percentage which is a comparison of the Ideal Cycle time (predefined) and the actual operating time and number of units processed.
- **OEE Quality (Overall Equipment Effectiveness)** (gauge type: Gauge or Numeric Indicator) – a numeric indicator that presents a percentage which is a comparison of the total number of units processed to the number of times units failed.
- **OEE (Overall Equipment Effectiveness)** (gauge type: Gauge or Numeric Indicator) – a numeric indicator that presents a percentage based on a values provided by OEE Availability, OEE Performance, and OEE Quality.

Viewing Dashboards

iMonitor express provide two ways to view Dashboards that you are currently designing or were previously designed. The following section will go over both methods.

Dashboard Designer

To view dashboards in the Dashboard Designer, accessible from iMonitor Express) you first need to make sure the Real Time service settings are present.

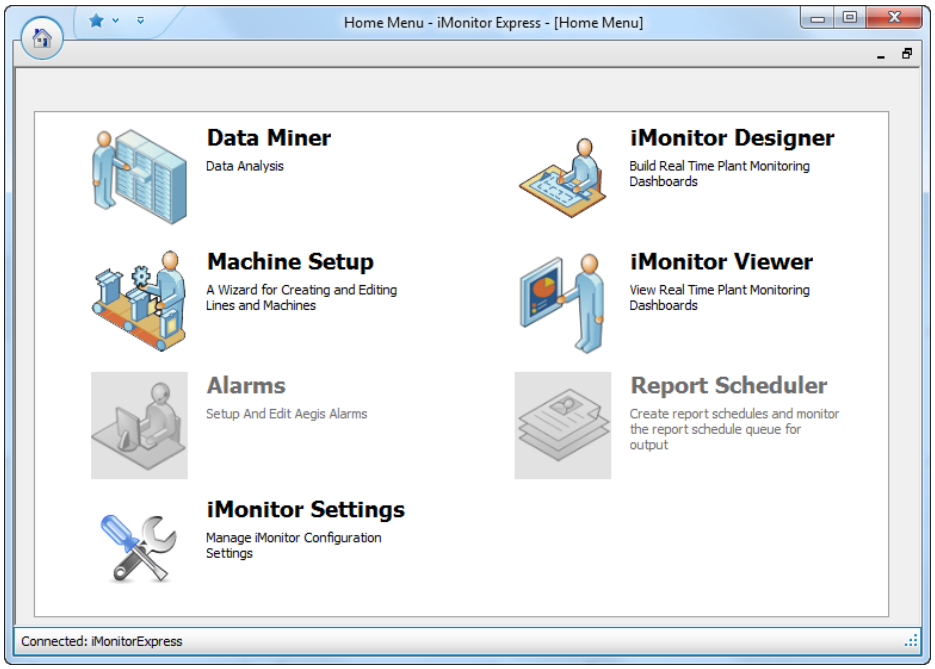


Figure 90

After opening iMonitor Express select ‘iMonitor Designer’.

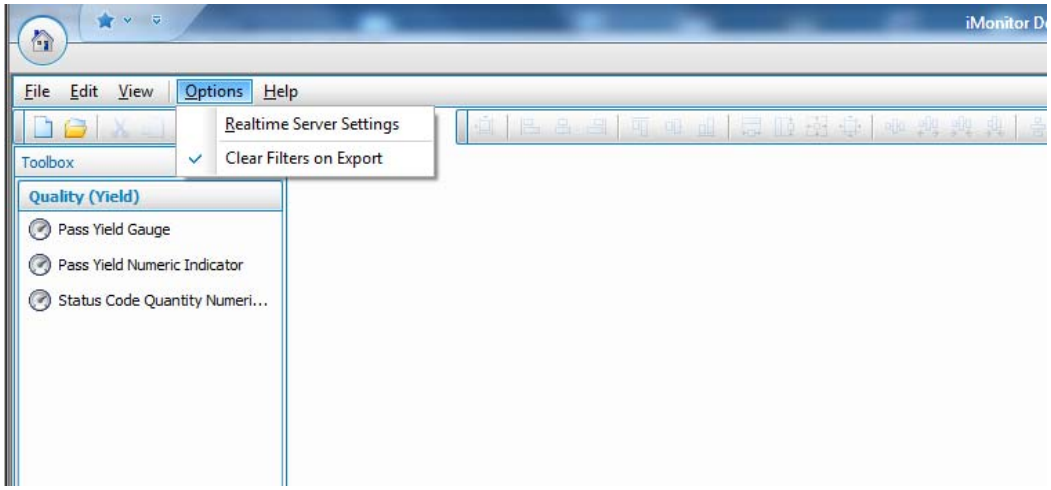


Figure 91

After opening the Dashboard Designer go to ‘Options’ and select ‘Real Time Server Settings’.

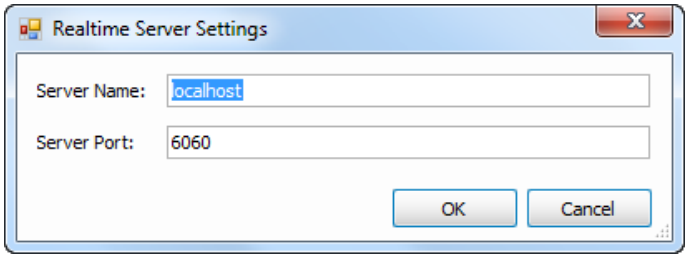


Figure 92

Verify that the 'Server Name' and 'Server Port' settings are correct and click 'OK'.

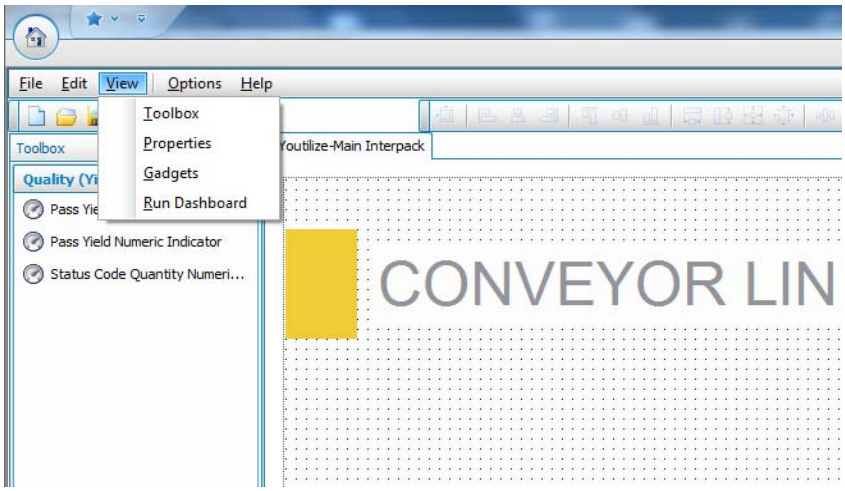


Figure 93

With the Dashboard you want to view selected (visible in the designer) click View and select 'Run Dashboard'.

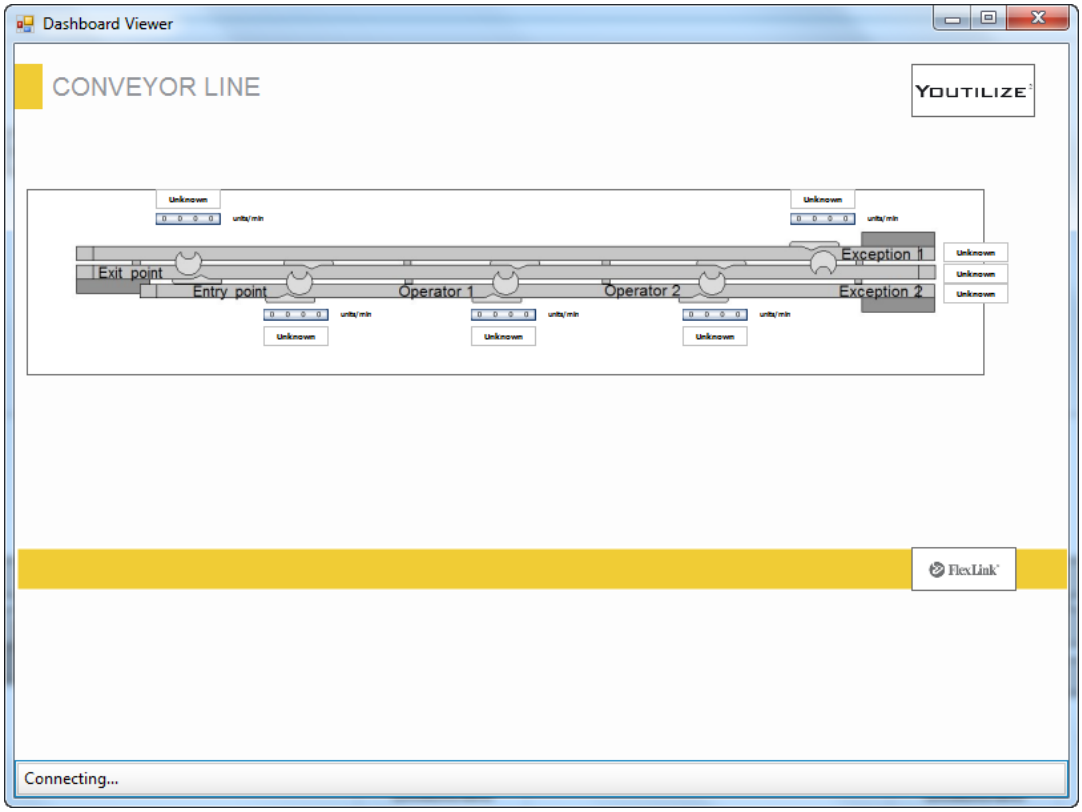


Figure 94

The 'Dashboard Viewer' window will open. The viewer will connect to the Real Time Service and display production data in the dashboard.

iMonitor Viewer

Like the Dashboard Designer the iMonitor Viewer is accessible form within iMonitor Express. However you can go directly into the viewer. You will also have the ability to open more than one Dashboard at a time and setup slide shows.

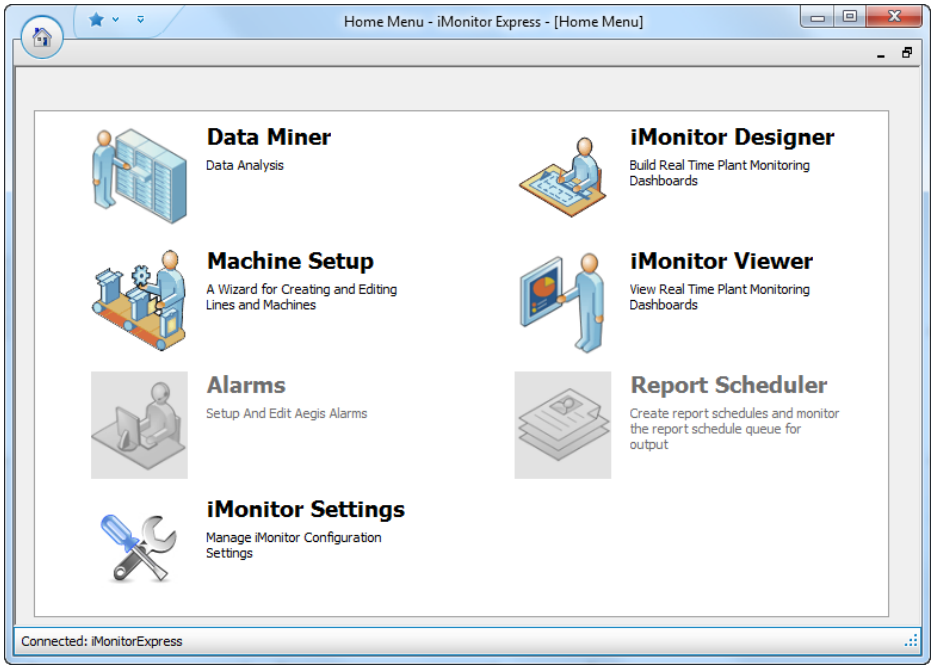


Figure 95

After opening iMonitor Express select 'iMonitor Viewer

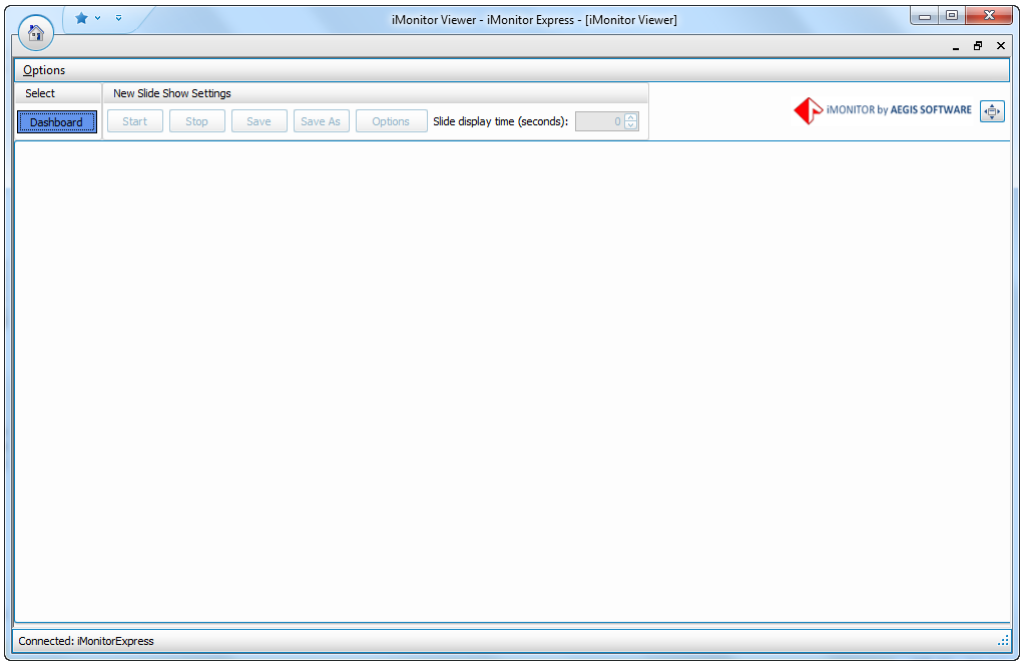


Figure 96

Opening Dashboards

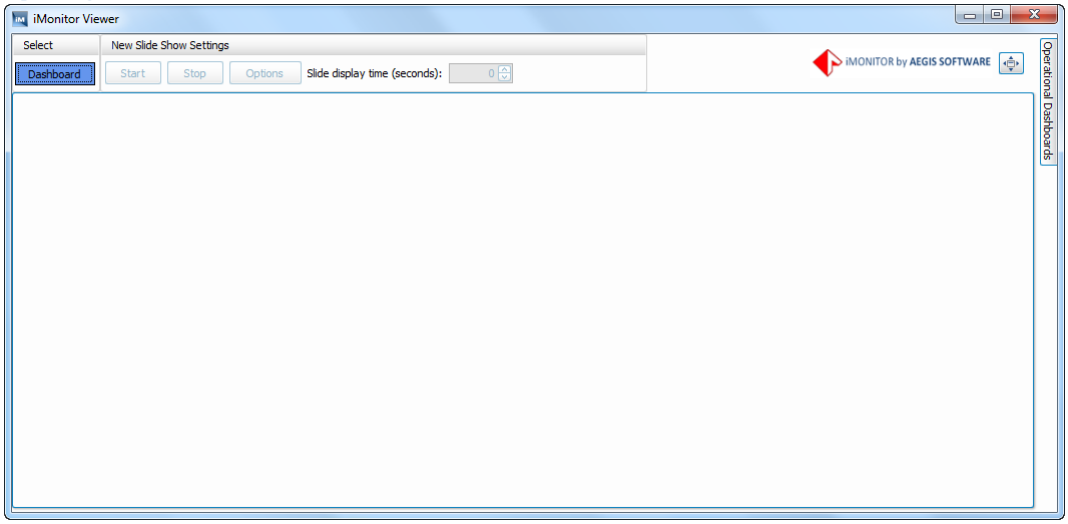


Figure 97

To open a Dashboard you will click the Blue button.

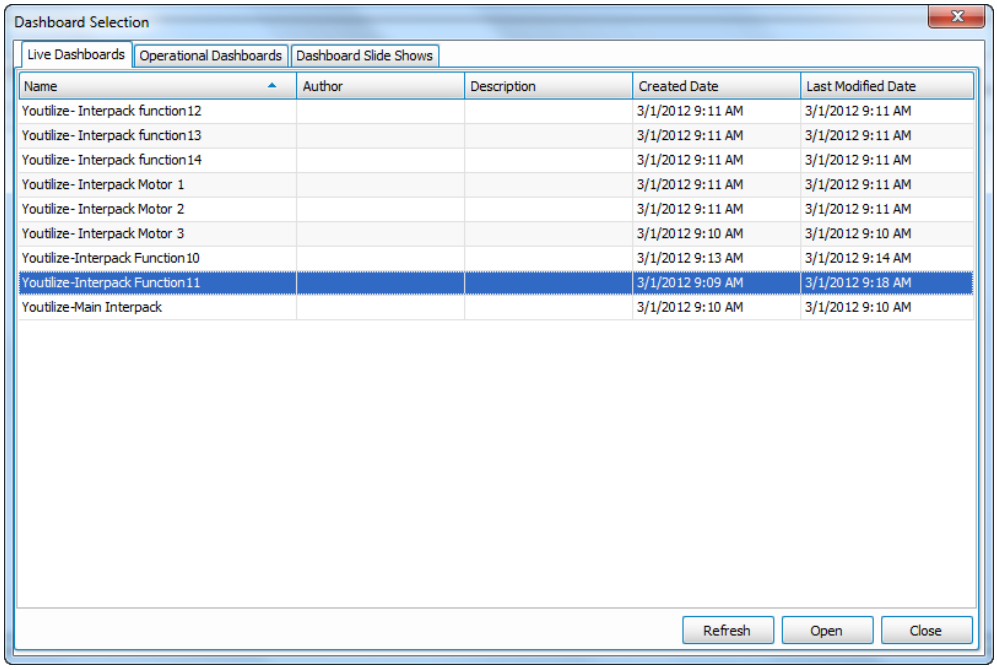


Figure 98

Select the Dashboard you would like to open and click ‘Open’.

NOTE: After you click ‘Open’ the ‘Dashboard Selection’ dialog does not close. This gives you the opportunity to open additional dashboards. Once you have opened all the dashboards you would like to view click ‘Close’.

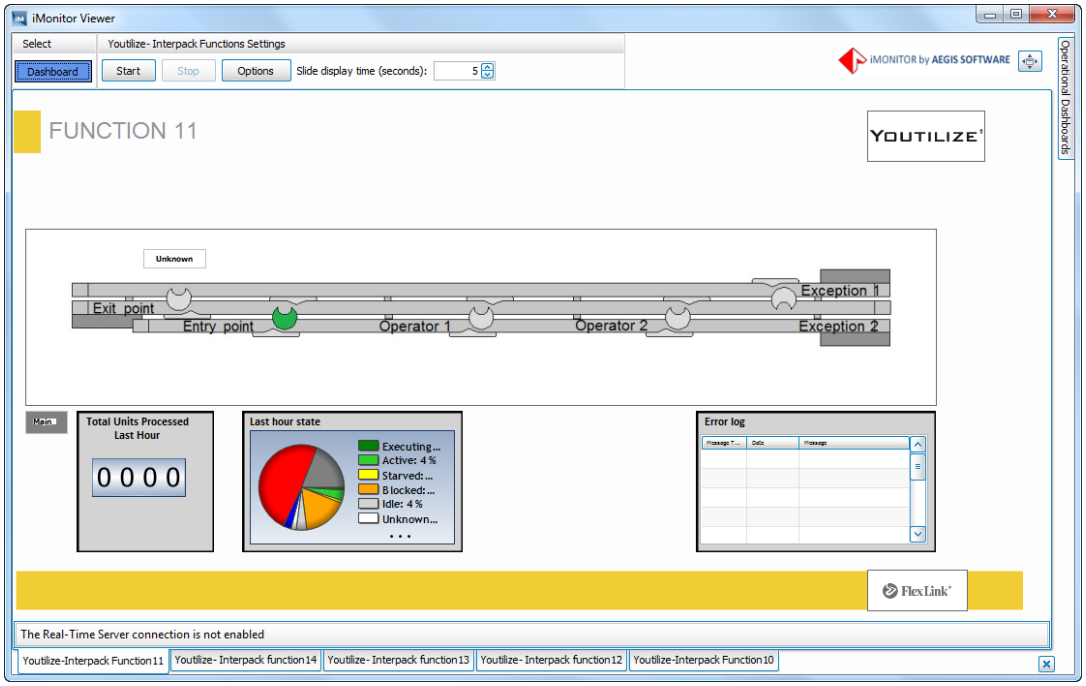


Figure 99

Slide Shows

A slide show is a collection of dashboards that have a slide display time property in seconds that can be saved as a template and later opened under Dashboard Slide Shows. The process of Opening a slide show is very similar to opening a Dashboard however you can only open on slide show at a time. If you would like to view additional dashboards you can open them individual from the 'Live Dashboards' tab.

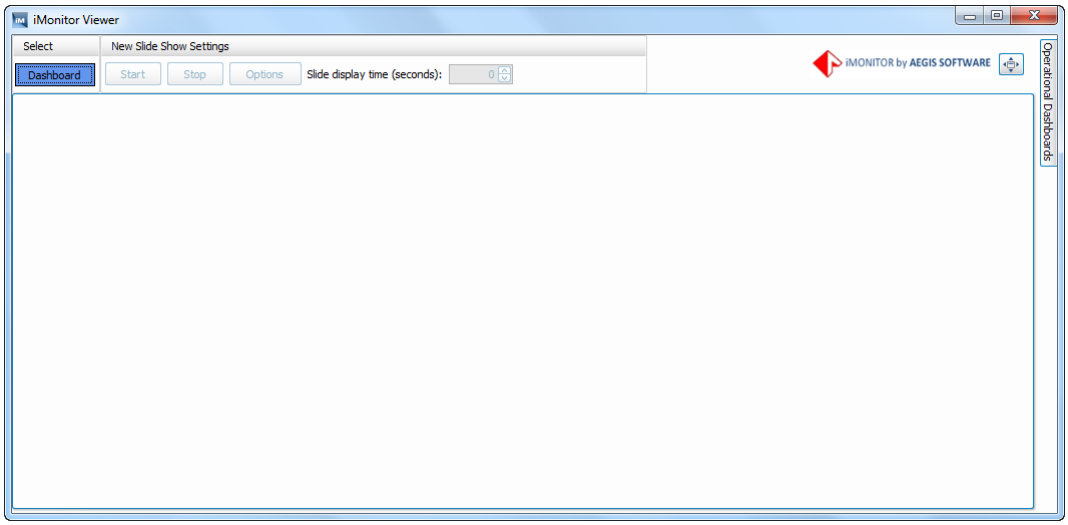


Figure 100

To open a Dashboard you will click the Blue

button.

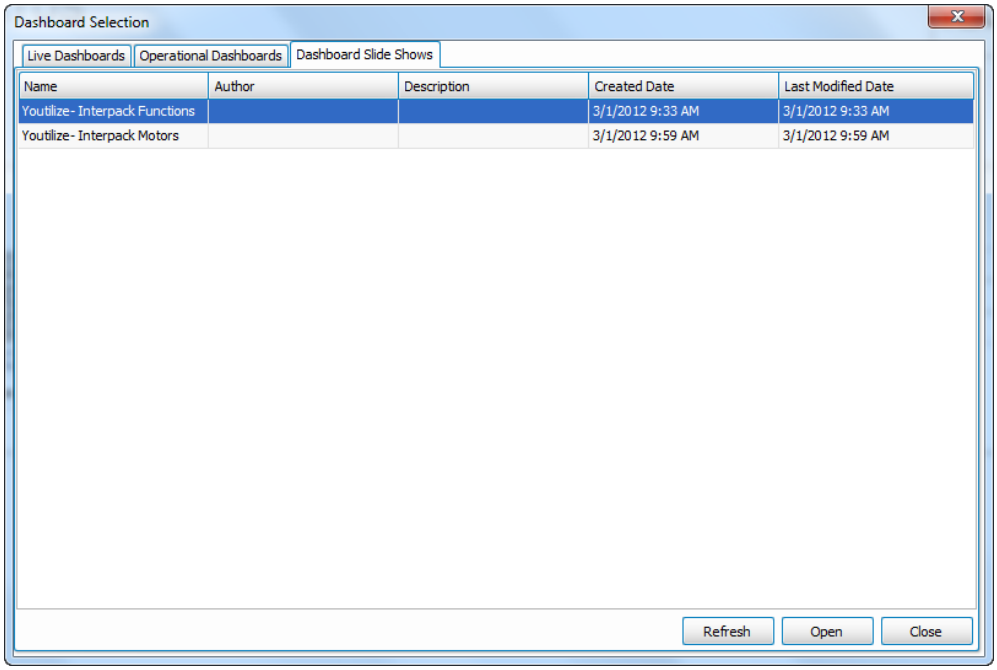


Figure 101

Select the 'Dashboard Slid Shows' tab and a slide then click 'Open'.

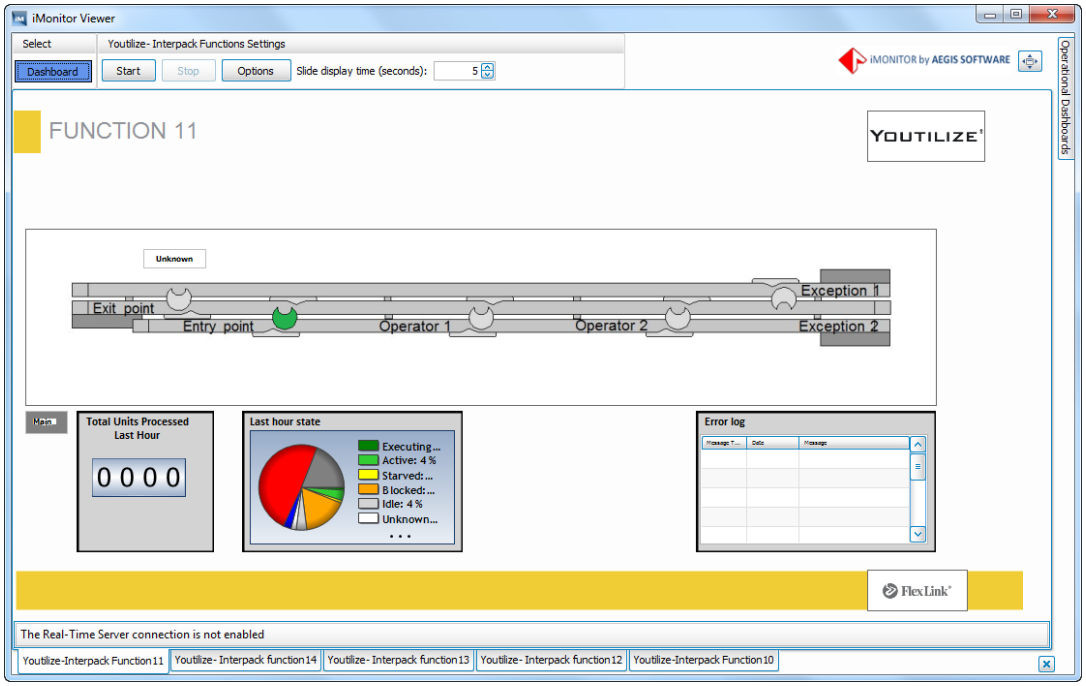


Figure 102

Once all of the slides show dashboards are open you can adjust the 'Slide display time' as well as add additional dashboards.

NOTE: Any changes made to a slide show in iMonitor Express Viewer cannot be saved. To make changes for future use you will need to use iMonitor Express – iMonitor Viewer.

Closing Dashboards

At any point you may want to close dashboards that are no longer needed or that were opened to get additional information. To close a dashboard make sure that that it is currently in the active view. If you are running a slide show make sure you stop it before preceding to prevent closing the wrong dashboard. Click the in the lower right corner.

iMonitor Settings

After opening iMonitor Express, select 'iMonitor settings'

OEE configuration

'Operating time' settings

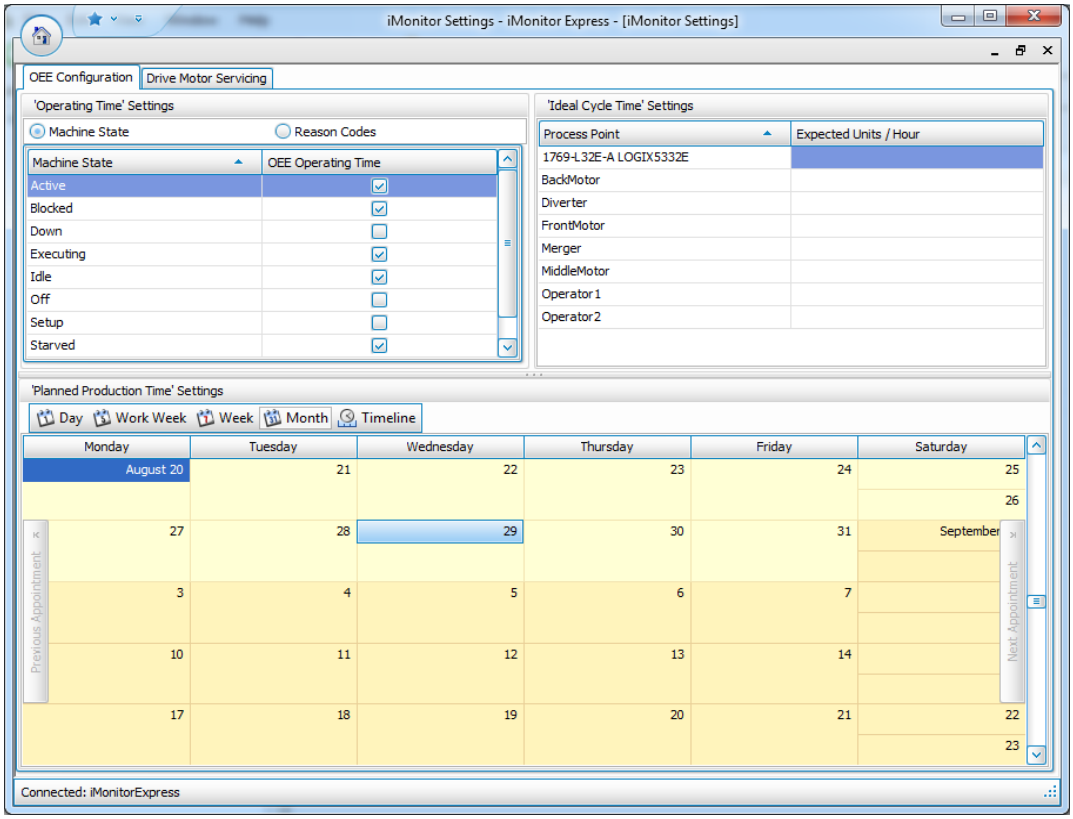
In the upper left area you will find the 'operating time' setting area. Here it is possible to define which states should count as operating time in the OEE calculations.

'Ideal Cycle time' settings

In the upper right area you will find the 'ideal cycle time' area. Here you can specify the ideal cycle time for your process points. It is only valid for functions and workstations.

'Planned production time' settings

In the lower area you will find the 'planned production time settings' outlined in a calendar format. The time you schedule in this calendar is the base for the OEE calculations (see OEE overview). If no time is scheduled, a 24/7 schedule is used as default.

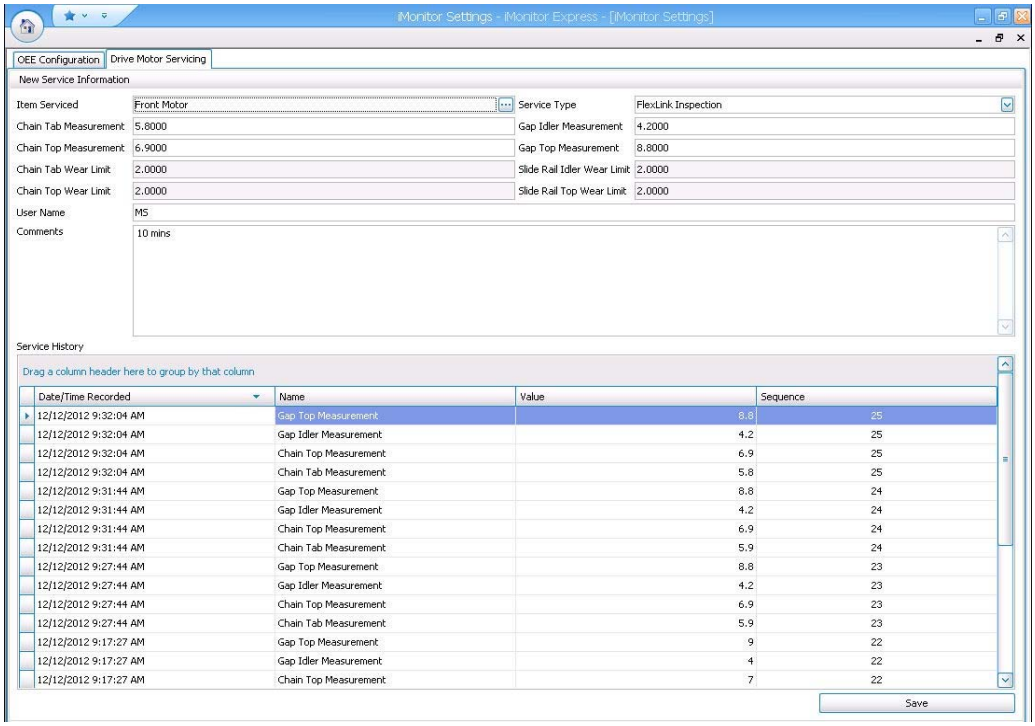


Drive motor servicing

In iMonitor Settings there is a tab for Drive Motor Servicing. This tab is used for entering data about the service monitoring on each conveyor.

For each service activity the Item Serviced must be filled in. Only process points of the type Motor is possible to choose. The Service Type describes which kind of activity that is to be executed. There are two types of components, Chain or Slide rail. For each alternative it is also possible to choose a replacement of the component.

Every inspection requires four measuring values to be entered. For the chain it is the actual component values that are measured but for the Slide rail the gap is measured. The component value for the Slide rail is calculated by the combination of the Chain value and the gap value. On the first inspection also the limit values for each inspection point must be filled in. All values have to be entered twice to secure correct data. At last it is possible to mark the activity with User name and Comments. The activity is finalized by entering Save.



Gauge Calculations

The following calculations are meant to be used as references for how each gauge is returns the results that are presented. As with any calculation the data presented is key to determining whether the presented results match the expected results. When using these calculations and presenting what are believed to be possible issues with the presented results the data should also be presented in such a way to enable proper understanding of how the data should have yielded the expected results instead of the presented results.

Time to Next Service Indicator

Filters Supported – Process Point

A time based gauge for a process point to when the next anticipated service should occur at the point in question.

See Appendix B for Specification agreed upon between FlexLink and Aegis.

Time since Last Service Indicator

Filters Supported – Process Point

A time based gauge showing how long it has been since the process point in question had service performed on it. Having service performed means entering Fusion Analytics and entering values in the Servicing Area.

Equipment Measurement History Gauge

Filters Supported – Process Point

The Equipment Measurement Gauge does not use any calculations. The gauge only displays data provided by the equipment it is connected too.

Equipment Measurement History Chart

Filters Supported – Process Point

The Equipment Measurement History Chart does not use any calculations. This gauge only displays historical data based on measurements provided by the equipment.

Utilization History and Pie Chart

Filters Supported – Process Point

The Utilization gauge takes time difference between states changes to sums each state to create a percentage based on the time frame specified.

Example
Running 3:06 PM
Stopped 3:11 PM
Starved 3:16 PM
Running 3:21 PM
Starved 3:26 PM
Running 3:31 PM
Blocked 3:36 PM
Running 3:41 PM
Stopped 3:46 PM

Sum Times
Running 3:06 PM → Stopped 3:11 PM = 300 Seconds Running
Stopped 3:11 PM → Starved 3:16 PM = 300 Seconds Stopped
Starved 3:16 PM → Running 3:21 PM = 300 Seconds Starved
Running 3:21 PM → Starved 3:26 PM = 300 Seconds Running
Starved 3:26 PM → Running 3:31 PM = 300 Seconds Starved
Running 3:31 PM → Blocked 3:36 PM = 300 Seconds Running
Blocked 3:36 PM → Running 3:41 PM = 300 Seconds Blocked
Running 3:41 PM → Stopped 3:46 PM = 300 Seconds Running

Total Times
Running = 1200 Seconds
Stopped = 300 Seconds
Starved = 600 Seconds
Blocked = 300 Seconds

Percentages
Running = 50%, Stopped = 12.5%, Starved = 25%, Blocked = 12.5%

State History Chart and Label

Filters Supported – Process Point

The State gauge displays the state as provided by the attached point. There is no calculation used to provide this data.

Pass Yield Gauge, Pass Yield Numeric Indicator

Filters Supported – Model Point / Process Point

Configured to use first pass or second pass yield. Pass yield is calculated using pass unit failures. First pass failures are units that have ever failed and second pass failures are units that have ever been failed more than once. Pass yield is calculated as ((total units – total failed) / total units) * 100.

Example
Unit 1: passed
Unit 2: failed then passed
Unit 3: failed twice
First Pass Yield is ((3 – (1 + 1) / 3) * 100 = 33.33%
Second Pass Yield is ((3 – 1) / 3) * 100 = 66.67%

Status Code Quantity Numeric Indicator (Pass/Pail Count)

Filters Supported – Process Point

The Pass/Fail Count gauge simples counts the number of units with a status equal to the status set for the gauge properties. If the gauge is set to Pass then each unit with a status of pass will get a count. Please note that the status' listed can vary depending on the Status Code setup in Fusion Manager.

Units Per Hour Gauge and Indicator

Filter Supported – Factory Line/ Process Point

Subtract the Time Started of the second most recent WIP record from the Time Started of the most recent WIP record for the active job at the point. Take the result (snapshot time per unit), and applies this formula to convert to units per hour. Units per Hour = 3600 / (snapshot seconds per unit).

Example:
Unit 1: Time Started = 5:35pm
Unit 2: Time Started = 5:29pm
Active Job Units per Hour = 3600 / (5:35 – 5:29) = 3600 / (360 seconds) = 10 Units/Hour

Average Cycle Time Gauge and Indicator

Filter Supported – Factory Line / Process Point

Averages the cycle time of the most recent 'x' number of units for the associated point (x is configurable, default is 10). 'Cycle Time' for a pair of units is defined as (Time Unit '2' Entered Point) – (Time Unit '3' Work Start at point). The calculation uses the 'Time Started' field of the ItemSummary table.

Example:
Unit 1: Time Started = 5:35:00pm
Unit 2: Time Started = 5:36:30pm
Unit 3: Time Started = 5:37:50pm
Cycle Time (1) to (2) = 90 seconds

Cycle Time (2) to (3) = 80 seconds
Average Cycle Time = (80 + 90) / 2 = 85 seconds

Completed Units Gauge and Label

Filter Supported – Factory Line/Process Point

Subtract the number of units that have failed, from the number of units processed through the point, to derive at the number of completed units. If the number of completed units is greater than the job quantity, the completed quantity is reduced to the job quantity.

Cycle Count Numeric Indicator

Filters Supported – Process Point

The Cycle Count gauge simple counts every item that passes through the point. No adjustment is made based on the status of the unit passing through the station.

OEE Availability (Overall Equipment Effectiveness) Gauge and Indicator

Filters Supported – Factory Line/Process Point

For a brief overview of OEE please see section OEE Overview below.

This value reports the percentage of up-time achieved during planned production time during a specified time window. Planned production time is considered all time within the specified time window if zero planned production times have been defined. If one or more planned production times have been defined then the total planned production time is the time within the specified time window that has been explicitly identified as being production time. Consider a planned production window has been defined as from 8:00am through 12 noon. If the specified time window for which OEE Availability is to be reported is 3 hours and the current time is 11:30am then the planned production time is 3 hours as the time window for reporting extends from 8:30am (11:30am – 3 hours) through 11:30am. However if the time is 8:30am then the planned production time would be 30 minutes as 5:30am through 8:00am was unplanned and only from 8:00am through 8:30am was planned.

Taking this a stage further, if the machine was down from 8:00Am through 8:30am then when reporting OEE at:

8:30AM Planned Production Time = 30 minutes
Operating Time = 0 minutes
OEE Availability = (Operating Time / Planned Production Time)
= (0 / 30)
= 0 (0%)

11:30AM Planned Production Time = 180 minutes
Operating Time = 150 minutes
OEE Availability = (Operating Time / Planned Production Time) x 100
= (150 / 180) x 100
= 0.8333 (83.33%)

Operating time is calculated by reviewing machine state information for the planned production time window and summing up the duration of each machine state which is designated as operating

time. The designation of a machine state as operating time or not is achieved in the OEE Configuration tab within the iMonitor Settings of iMonitor Express.

If no machine state information is recorded within the planned production time window the last known machine state value shall be used. If no machine state information has ever been recorded for the process point then the operating time shall equal the planned production time window.

Within iMonitor (but not iMonitor Express) it is possible for Operating Time to be determined using reason code information instead of machine state information. A reason code is assigned to a machine state record by an operator. As a result every time a new machine state is recorded an operator needs to assign a reason code (through the UI) before that change in machine state can be used in the determination of operating time. Consider the situation where a machine state is recorded and the operator assigns a reason code that is not considered operating time. From the time associated with that machine state record forward no further changes in machine state have had a reason code assigned. All time from the last machine state record with a reason code forward will be treated as operating time, or not, depending on whether the reason code is considered operating time or not. As a result, reason codes, being historical in nature, are not recommended when using dashboards to display OEE information.

For a factory line, it is the same calculation as above for all process points in the factory line. The lowest process point availability is returned.

Example
If time frame is 1 hour

Machine 1:	15 minutes down = 45 minutes / 60 minutes = 0.75	(75%)
Machine 2:	no down time = 60 minutes / 60 minutes = 1.00	(100%)
Machine 3:	20 minutes off = 40 minutes / 60 minutes = 0.67	(67%)

Availability = Machine 3 (lowest availability) = 67%

OEE Performance (Overall Equipment Effectiveness) Gauge and Indicator

Filters Supported – Factory Line/Process Point

Performance is calculated as Ideal Cycle Time / (Operating Time / Total Pieces).

The Ideal Cycle Time for each process point is recorded in the OEE Configuration tab within the iMonitor Settings of iMonitor Express and does not change (unless modified by an operator).

The operating time is calculated as described in section **Error! Reference source not found.**.

Total Pieces is calculated by counting up the number of WIP transactions recorded during the planned production time, where planned production time is calculated as described in section **Error! Reference source not found.**.

It can be seen that if availability is an issue it may be easier to get a high performance figure because total pieces is determined across the whole planned production window, and not just the operating window. This is an integral part of OEE design which is designed so as to put the focus on availability in that situation.

Example

If Ideal Cycle Time for a given machine is 60 seconds and the Operating Time is 1 hour then at 100% performance we would have to process the following number of items:

Performance	= Ideal Cycle Time	/ (Operating Time	/ Total Pieces)
1	= 1	/ (60	/ Total Pieces)
Total Pieces	= 60		

If we had processed 48 items the performance would be:

Performance	= Ideal Cycle Time	/ (Operating Time	/ Total Pieces)
	= 1	/ (60	/ 48)
	= 0.8	(80%)	

For a factory line, it is the same calculation as above for all process points in the factory line. The lowest process point availability is returned.

OEE Quality (Overall Equipment Effectiveness) Gauge and Indicator

Filters Supported – Factory Line/Process Point

Looks at first pass yield achieved during planned production time during a specified time window.

Quality = (Total Pieces – Total Failed) / Total Pieces

Example
Unit 1: passed
Unit 2: failed then passed
Unit 3: failed twice

Quality	= (Total Pieces	– Total Failed)	/ Total Pieces
	= (3	– 2	) / 3
	= 0.33	(33.33%	

For a factory line, it is the same calculation as above for all process points in the factory line. The lowest process point availability is returned.

OEE (Overall Equipment Effectiveness) Gauge and Indicator

Filters Supported –Factory Line/Process Point

The product of OEE Availability, OEE Performance and OEE Quality.

Example

OEE	=	Availability	x	Performance	x	Quality
	=	0.75	x	0.73	x	0.33
	=	0.18				
	=	18%				

OEE Overview

OEE = Availability x Performance x Quality

Where

Availability	= Operating Time / Planned Production Time
Performance	= Ideal Cycle Time / (Operating Time / Total Pieces)
Quality	= Good Pieces / Total Pieces

The order of calculation is as follows:

1. Availability
2. Performance
3. Quality

Availability is the percentage of the planned time that a machine is available. It is a measurement of uptime that is designed to remove the effects of scheduled downtime, quality and performance.

Performance is the percentage of the designed speed at which the machine is running. It is a measurement of speed that is designed to remove the effects of availability and quality.

Quality is the percentage of the planned total units produced. It is a measurement of yield that is designed to remove the effects of availability and performance.

Each of these calculations produces a value between zero and one. When this information is displayed it is usual for this value to be multiplied by one hundred and presented as a percentage value.

Consider the following:

Availability	0.56
Performance	0.78
Quality	0.87

To calculate OEE we would perform the following calculation:

= 0.56 x 0.78 x 0.87
= 0.38

When displaying this information the following would be displayed:

Availability	56%
Performance	78%
Quality	87%
OEE	38%

iMonitor Express Viewer

As previously mentioned the iMonitor Express Viewer is used to view Dashboards which have already been designed in the Dashboard Designer. In this section we will talk about the options available in the iMonitor Express Viewer.

Launching the Application

iMonitor Express Viewer can be access either by double clicking the icon placed on the desktop after it is installed or by going to Start → All Programs → Aegis Software → Fusion → Aegis iMonitor Viewer as shown below:

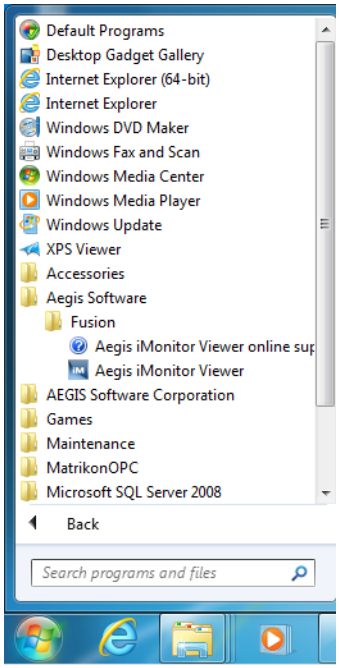


Figure 103

Opening Dashboards

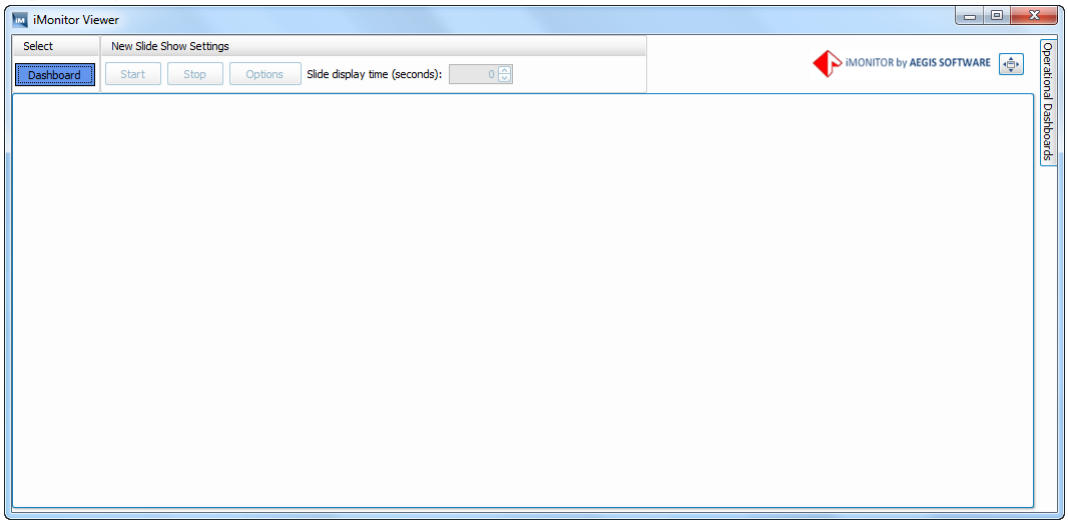


Figure 104

To open a Dashboard you will click the Blue button.

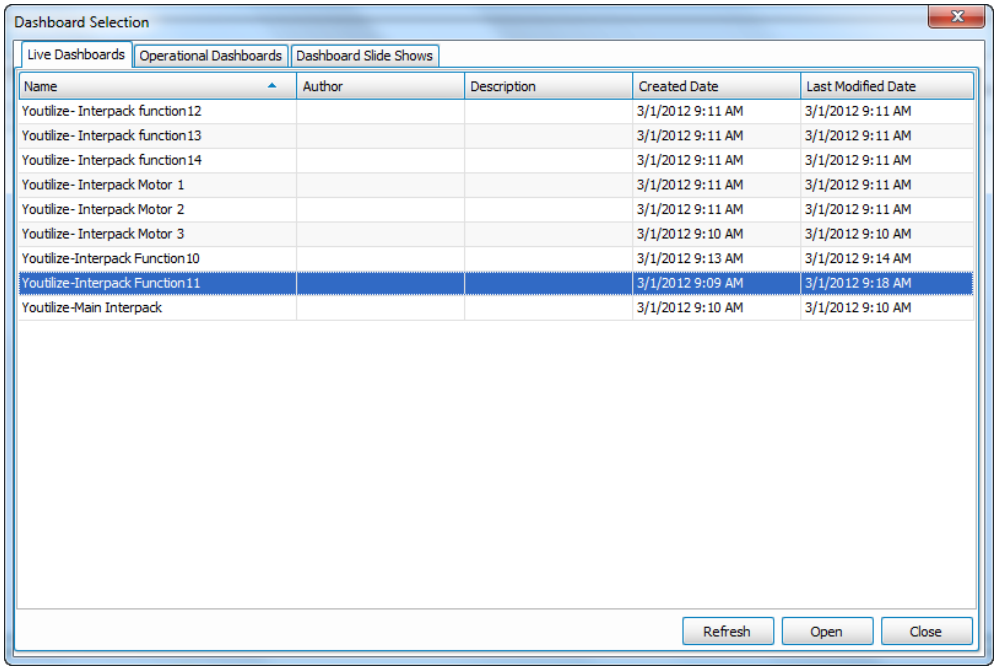


Figure 105

Select the Dashboard you would like to open and click ‘Open’.

NOTE: After you click ‘Open’ the ‘Dashboard Selection’ dialog does not close. This gives you the opportunity to open additional dashboards. Once you have opened all the dashboards you would like to view click ‘Close’.

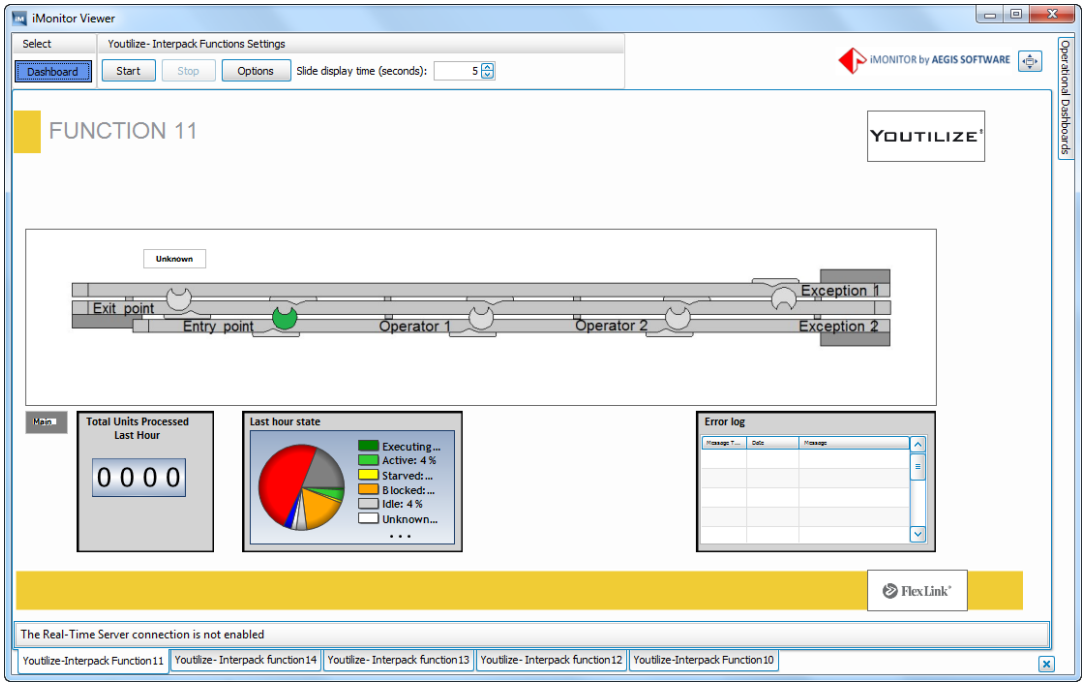


Figure 106

Slide Shows

A slide show is a collection of dashboards that have a slide display time property in seconds that can be saved as a template and later opened under Dashboard Slide Shows. The process of Opening a slide show is very similar to opening a Dashboard however you can only open on slide show at a time. If you would like to view additional dashboards you can open them individual from the 'Live Dashboards' tab.

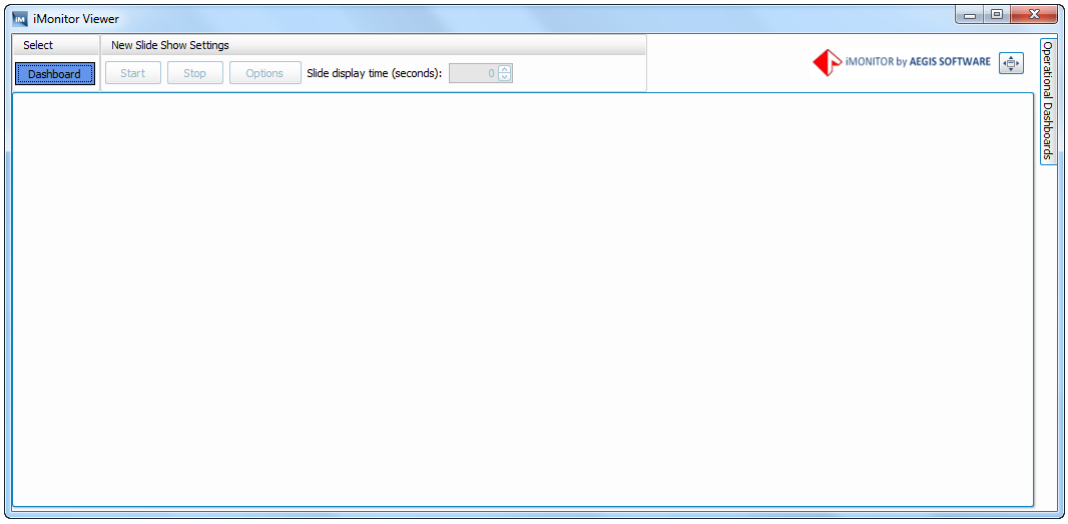
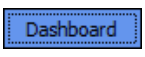


Figure 107

To open a Dashboard you will click the Blue  button.

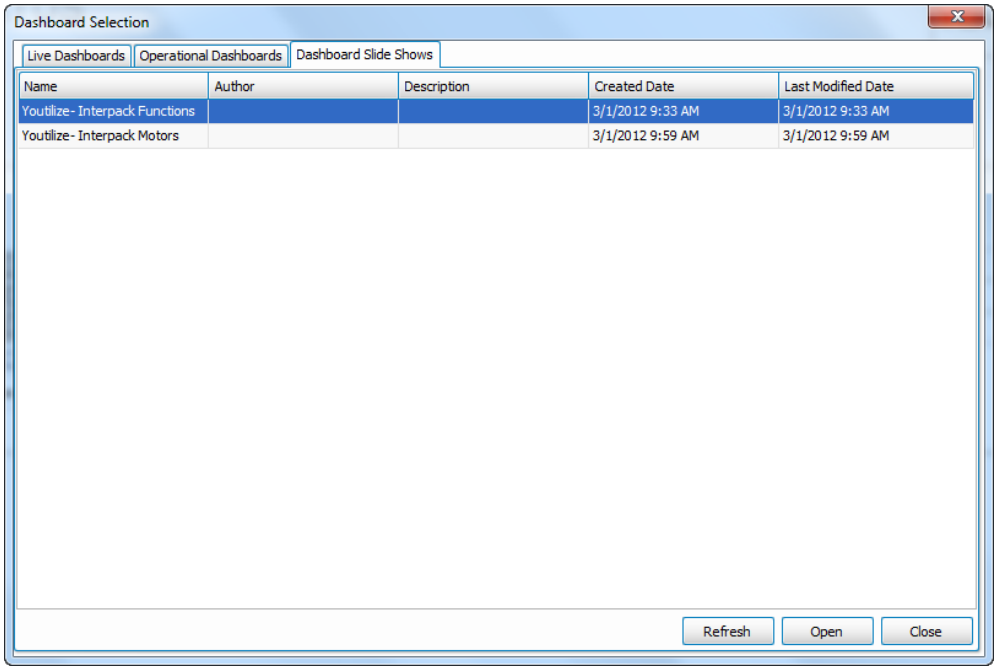


Figure 108

Select the 'Dashboard Slid Shows' tab and a slide then click 'Open'.

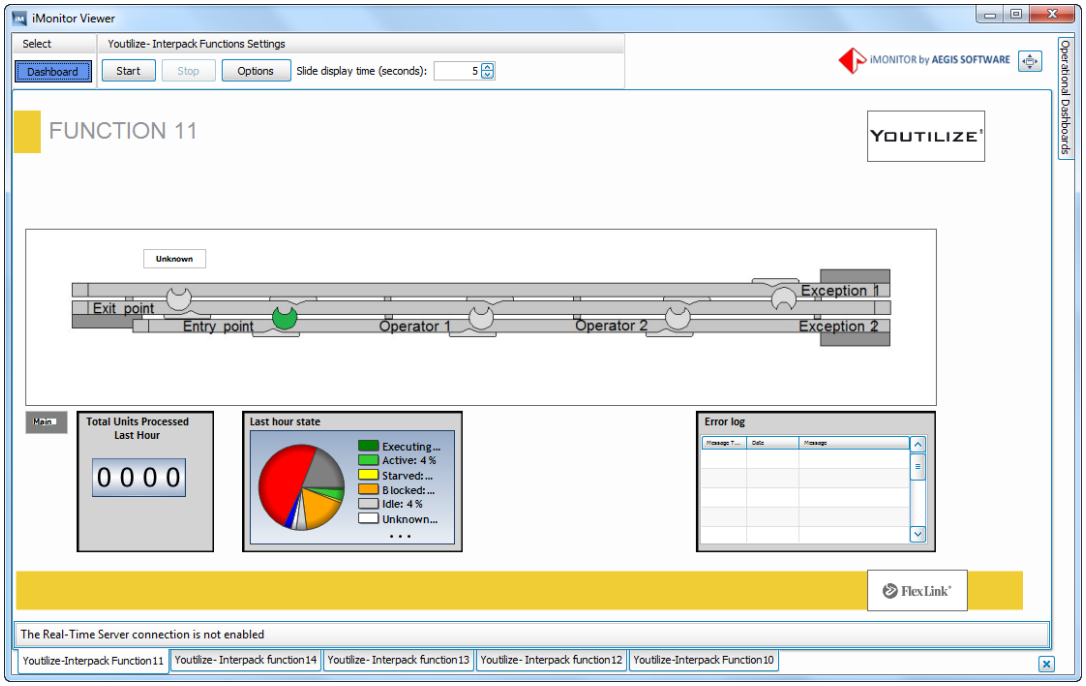


Figure 109

Once all of the slides shows dashboards are open you can adjust the 'Slide display time' as well as add additional dashboards.

NOTE: Any changes made to a slide show in iMonitor Express Viewer cannot be saved. To make changes for future use you will need to use iMonitor Express – iMonitor Viewer.

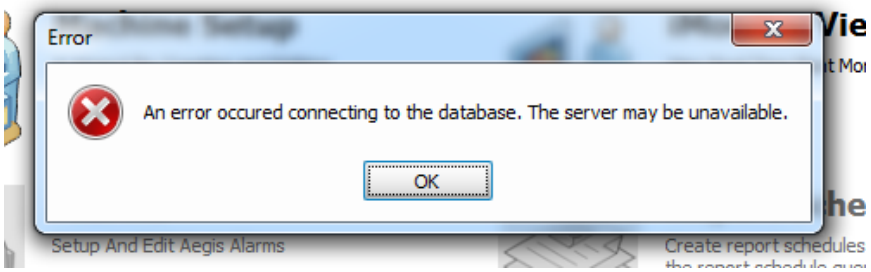
Closing Dashboards

At any point you may want to close dashboards that are no longer needed or that were opened to get additional information. To close a dashboard make sure that that it is currently in the active view. If you are running a slide show make sure you stop it before preceding to prevent closing the wrong dashboard. Click the in the lower right corner.

Troubleshooting

SQL Server

Unable to Connect to the Database



When the software throws this error, it indicates that there was some kind of problem when attempting to connect to the SQL Server Express database. When the software starts up, it attempts to connect to the database. If the database does not respond, it simply returns this error. The system has no ability to diagnose why. This error is kind of like the "Service Engine" light on your vehicle. When the service engine light starts flashing, it means something is wrong, but it is a very general warning that does not give you much information on what is wrong, just that something is wrong. The cause of it could be anything from a loose gas cap to a failed spark plug to some bad sensor.

When it comes to the cannot connect error, it can range from the long file path issue to interference from UAC, to permissions issues, to a conflict with an existing installation of SQL Server, to registry entries, to the location of the installation file on your computer. The list is long. Here is a troubleshooting guide to try and help you diagnose what particular problem is vexing you and how to repair it. If the troubleshooting is getting you nowhere, the full manual install is another method that may be more effective, as you take things into your own hands and have better visibility to errors.

As a potential source of more information to diagnose the problem with, you could always look for connection errors in both

```
C:\Program Files (x86)\Microsoft SQL
Server\MSSQL10_50.IMONITOREXPRESS\MSSQL\Log\ERRORLOG
```

and

You may have to use an administrator account to read this file. As an example ERRORLOG entry:

```
2011-01-02 11:32:15.08 Logon       Error: 18456, Severity: 14, State: 38.
2011-01-02 11:32:15.08 Logon       Login failed for user 'EXAMPLE\Example'.
Reason: Failed to open the explicitly specified database. [CLIENT: <named
pipe>]
```

Is the Database Service Running

If the service is running, it is an indication that SQL Server has installed correctly and the database is available for use by the toolset.

You can check to see if the Database Service is running by navigating to your the Services application. Depending on your operating system, the path may be a bit different, but it should be along the lines of Start>>Control Panel>>Administrative Tools>>Services(alternately type "services.msc" (excluding quotes) into a run window)

Scroll down through the list and look for a service named "SQL Server (IMONITOREXPRESS)". Check the Status of the service. If the status is anything other than "Running" (or, possibly, "Started" in the case of Windows XP users), right click on it and select "Start". If it then starts successfully the status will change to "Running".

If the Service refuses to Start or does not exist, more troubleshooting is needed some kind of installation issue with SQL Server. We need to look at the properties on the service and figure out where to go from here. One is files left over from some manual file deletions, the .mdf and .ldf files no longer exist, but the service is still there. Path to executable field may hold some clues.

- Ensure SQL Server (IMONITOREXPRESS): Open the **SQL Server Configuration Manager** (by default `Start | Microsoft SQL Server 2005 | Configuration Tools | SQL Server Configuration Manager`) and in the object tree in the left hand panel click on the **SQL Server Services** entry. Ensure entry for **SQL Server (**IMONITOREXPRESS**)** appearing in the right hand panel has a **State** of **Running**. If not select it and start it (either using the button on the toolbar or the option in the context menu).

Did SQL Server Install?

Check your Start menu and see if it installed at all. Go to Start>>Program Files>>Microsoft SQL Server 2008. If nothing exists here then there are two basic explanations:

1. When you selected to install manually, ran the installer, and omitted to install MSSQL Express. If this is the case. Try performing the installation procedure a second time, make sure that you install SQL Server 2008.
2. Something went wrong with the SQL Server installation and it failed to install at all. You can try installing the software again. If this is unsuccessful, you can try downloading and installing it manually.

Did the database get created?

Check the toolset installation directory for the restored database files. Depending on where you installed the Game and Toolset, they will be in a location similar to

```
C:\Program Files (x86)\Microsoft SQL
Server\MSSQL10_50.IMONITOREXPRESS\MSSQL\DATA
```

Browse to this location and look for the existence of the following two files:

```
IMONITOREXPRESS_log.ldf
```

and

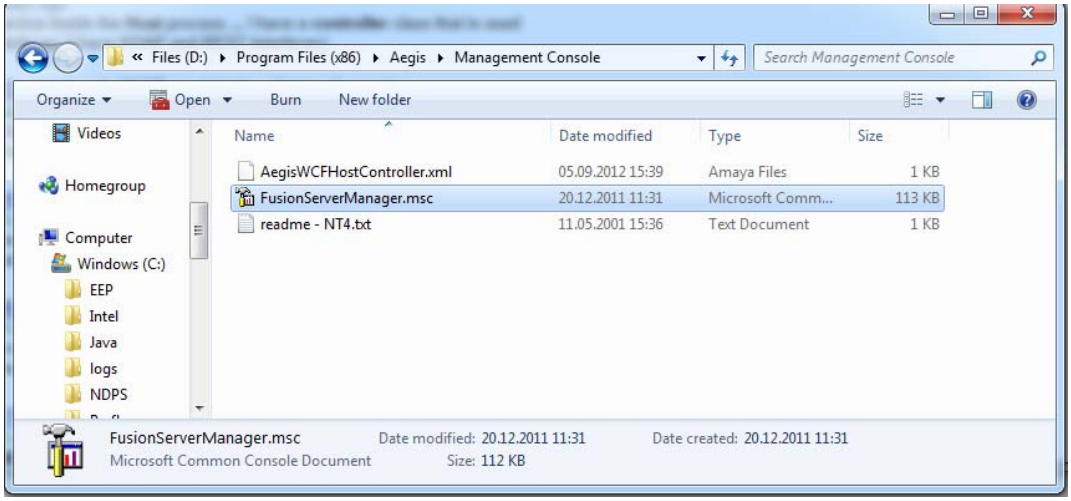
```
IMONITOREXPRESS.mdf
```

If these files exist, it indicates that the SQL Server was installed. If they are not present, you may need to perform a restore (assuming the presence of a backup). If the files exist, continue on to the next step of the troubleshooter.

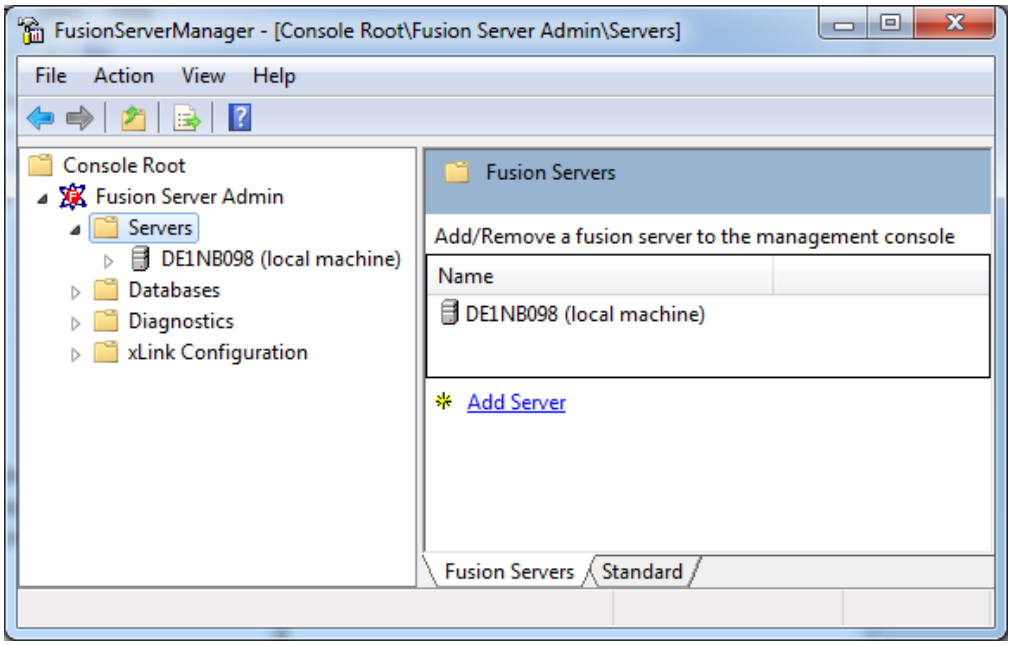
> **If the files do not exist**, then the database was not installed. You can either re-run the complete installer, or install the database manually.

Is the Software correctly pointing to database?

Run FusionServerManager.msc to check the database connection.



The “Servers” entry should be pointing to the local computer (for a standard installation) or to the designated server for a distributed system:



Sample SQL Statements

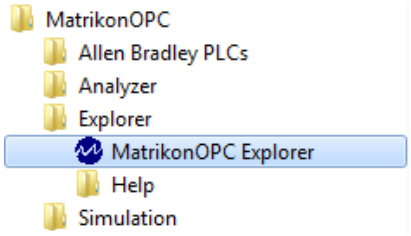
In Fusion Server Manager enable SQL logging to determine problems with generated SQL statements.

1. Fusion Server Manager – Diagnostics – System Logging: Select SQL add the required service:
2. AegisRealTimeAnalysisServer.exe, xLinkTransmitter.exe or iMonitorExpress.exe
3. Check all Output Levels
4. Set a log File directory and other applicable miscellaneous settings.
5. Select the formatting tab
6. Change the Output type for SQL to Simple text and select all the Auto fields.
7. Apply the changes and restart the services.
8. Log file should appear in the folder which will contain SQL statements run against the SQL Server.

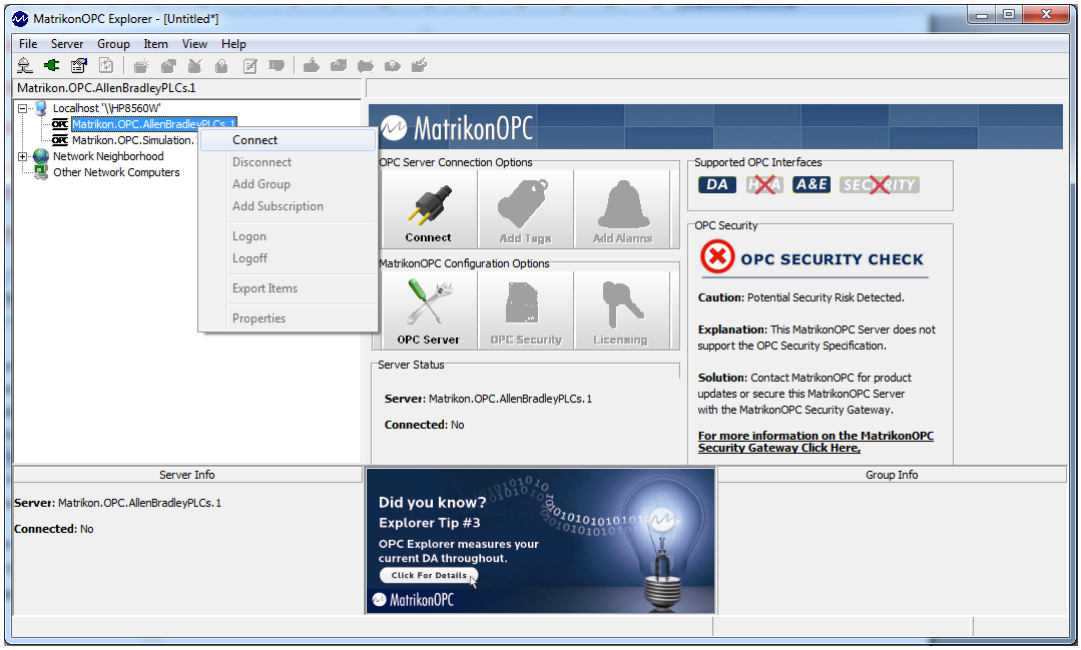
Matrikon OPC Server

Verifying PLC Information via Matrikon OPC Server

Open the Matrikon OPC Explorer by selecting it from start menu. Start → MatrikonOPC → Explorer → and select 'MatrikonOPC Explorer'.

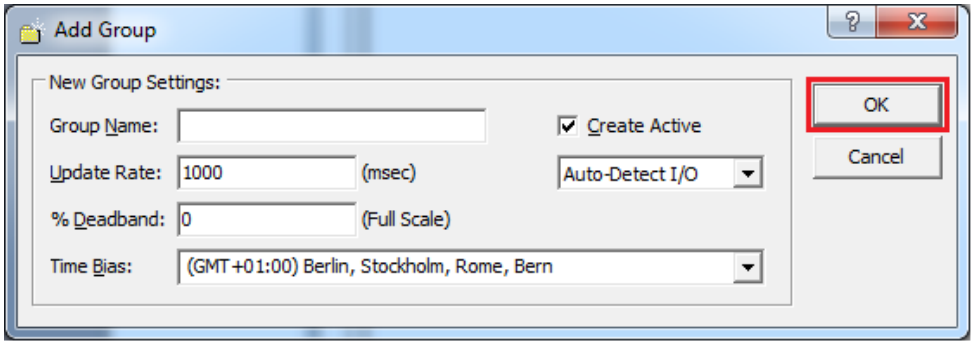


Expand the 'Local host' node in the tree structure to view the OPC servers running on the computer. Typically you will found two OPC Server items, one PLC specific server item and one simulation server item. Right click on the PLC specific server item → and select 'Connect'.



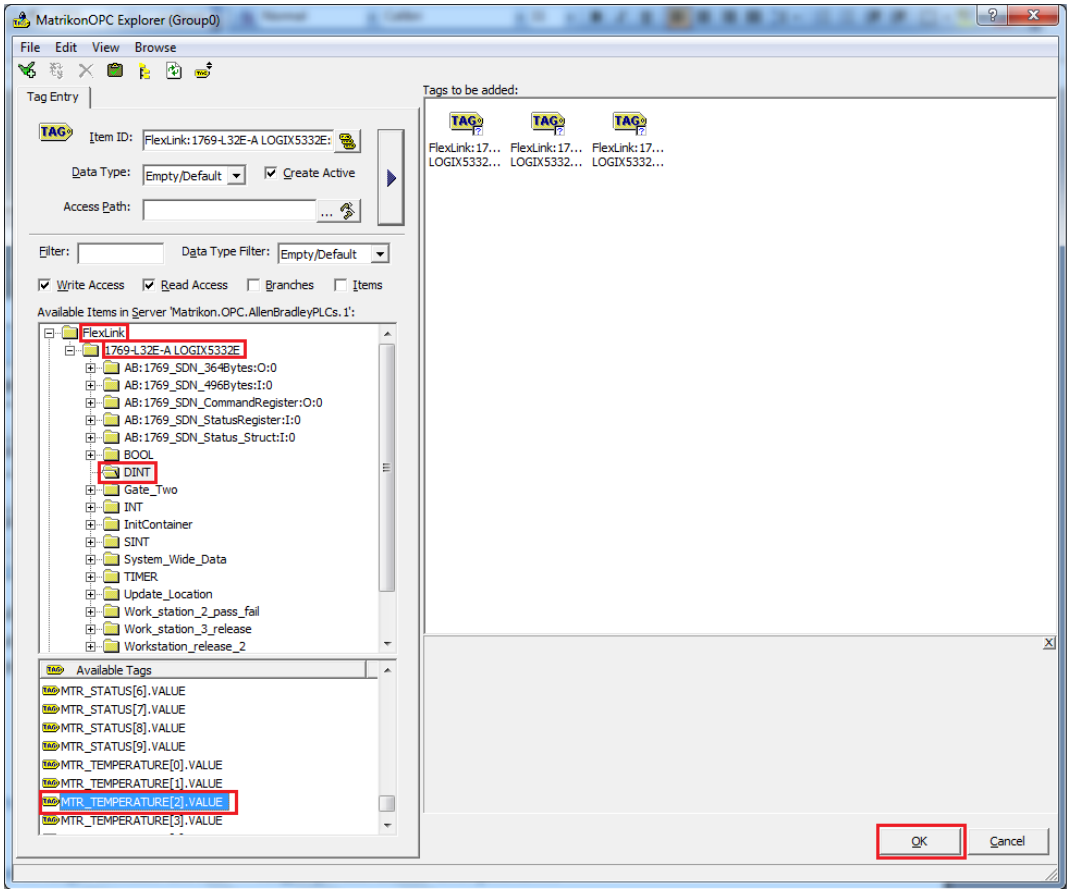
Now right click the node item again → and select 'Add group'.

The ‘Add Group’ dialog will appear. Press ‘Ok’.

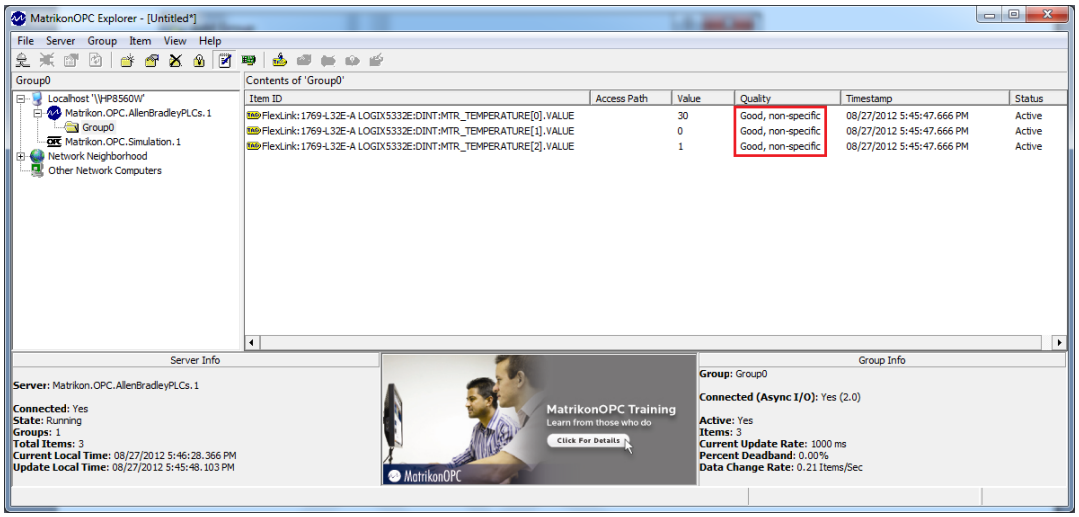


The tag browser will appear. In the upper tree structure, you will find your Ethernet/IP configuration made previously with the MatrikonOPC Server (The Alias node can be ignored). Expand the configuration and then you should see another node which is the PLC configuration. Expand that node. Now the available tags are shown. First select the node in the where the Youtilize variables are located (this varies on which PLC suite is used). The Youtilize variables can now be selected from the ‘Available Tags’ area. Drag and drop or double click on variables you want to monitor. Then click ‘Ok’ in the bottom right

corner.



Now the selected variables can be viewed in the explorer. Look in ‘Quality’ column. A ‘Good’ value indicates that the variable is properly read from the PLC. A ‘Bad’ value indicates that PLC cannot be read properly.



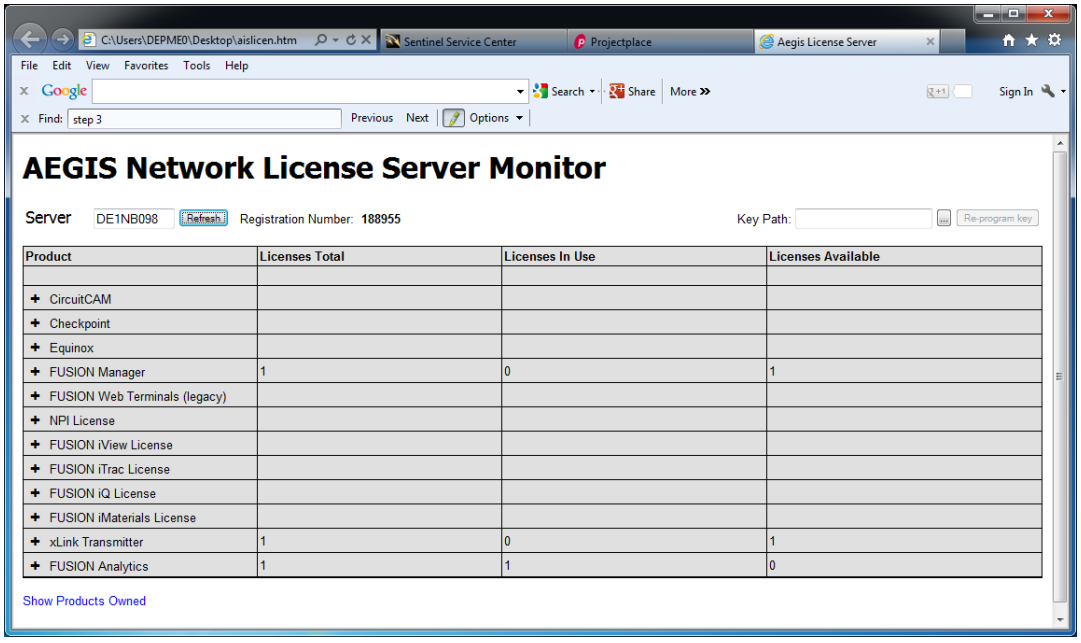
Licensing

Sentinel Protection Troubleshooting

1. Ensure the key driver only is installed.
2. Reboot the Computer.
3. Try the USB key in a different port.
4. Uninstall the key driver and re-install.
5. Verify Aegis services are running

Verify Connection to Aegis License Server

Assuming a cleanly executed install of the Sentinel software, the file “aislicen.htm” can help you check the installed license. Double click the file, and after a clicking on the “Refresh” button (the update will take a couple of seconds), you will see something like this:

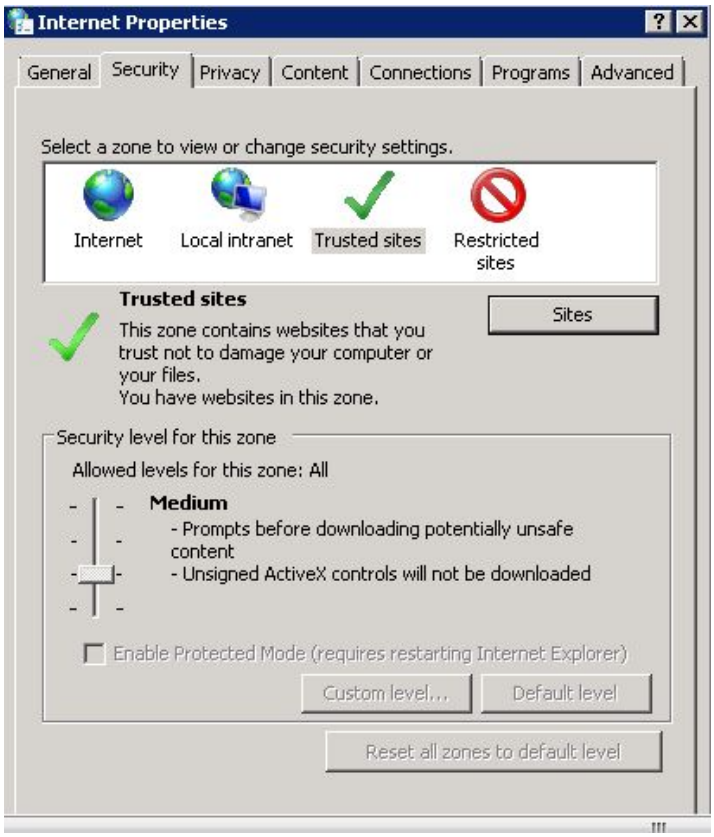


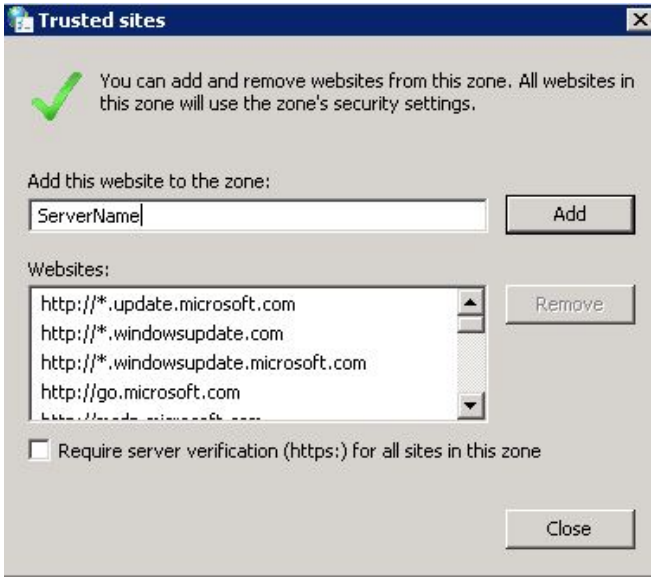
Here you can verify the number of installed licenses, so that for example, if you expect to have three dashboard viewers available, but only two licenses are present in the list, then you know that this is your problem.

Add License Server to Systems Internet Options – Trusted Sites

To add the License server to trusted sites the server name needs to added in internet options.

Start → Control Panel → Internet Options → Security Tab → Trusted sites Icon





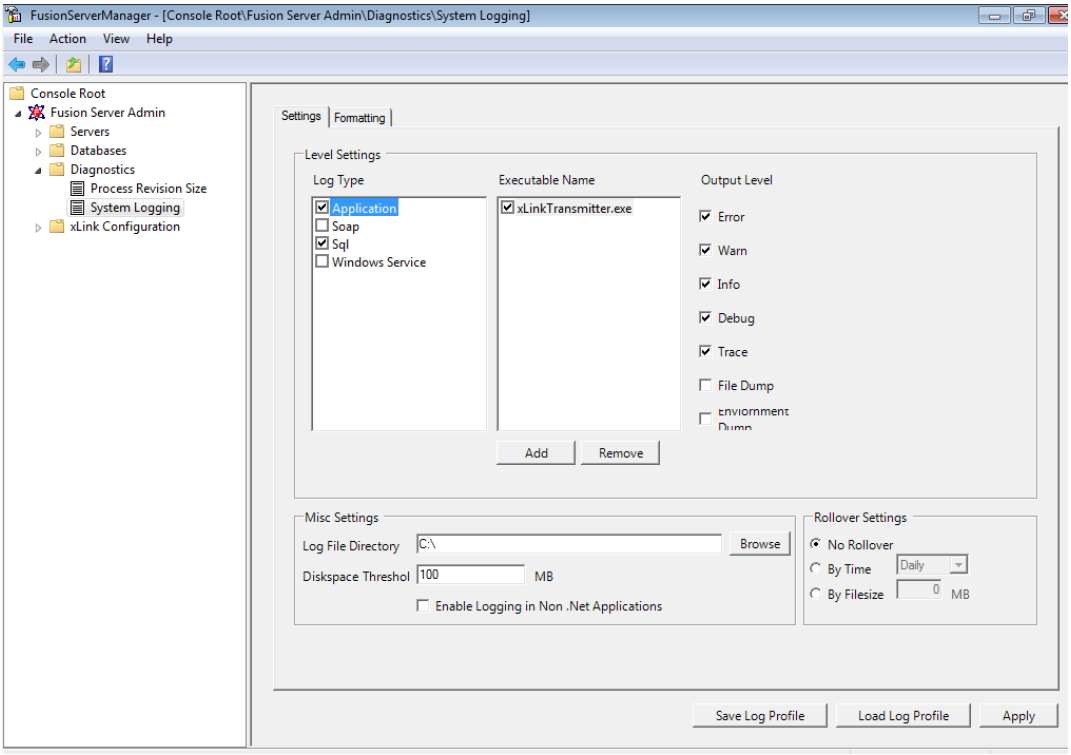
To add input server name and click the

button

Diagnostic Logging

In Fusion Server Manager enable Application and SQL logging to determine problems with generated.

1. Fusion Server Manager – Diagnostics – System Logging: Select Application , SQL and/or Service
2.
    a. AegisRealTimeAnalysisServer.exe and xLinkTransmitter.exe logs can be produced for Application , SQL and/or Service.
    b. iMonitorExpress.exe logs can be produced for Application and/or SQL
3. Check all Output Levels
4. Set a log File directory and other applicable miscellaneous settings.
5. Select the formatting tab
6. Change the Output type for Application to Simple text and select all the Auto fields.
7. Select SQL and add the required service:
8. AegisRealTimeAnalysisServer.exe, xLinkTransmitter.exe or iMonitorExpress.exe
9. Check all Output Levels
10. Set a log File directory and other applicable miscellaneous settings.
11. Select the formatting tab
12. Change the Output type for SQL to Simple text and select all the Auto fields
13. Apply the changes and restart the services.
14. Log file should appear in the folder which will contain SQL statements run against the SQL Server.



FlexLink xLink Adapter not processing data from Matrikon OPC server

1. Confirm the OPC service is installed and the service is running

Dashboards

Dashboards are not displaying any data

1. Confirm all Aegis services are running.
2. Viewer is marked as connected.
3. Turn on system logging.
4. Confirm xLink configuration.
5. Confirm Alan Bradley software is installed and configured.

Appendix A

Working with Microsoft User Access Control (UAC)

Beginning with Windows Vista, Microsoft added a new layer of protection to prevent unwanted applications from executing on systems without first being authorized by the user. Configuration settings for UAC are available under Control Panel → User Accounts. Below is an example of the configuration settings for UAC:

Start → Control Panel → User Accounts → Change User Account Control Settings

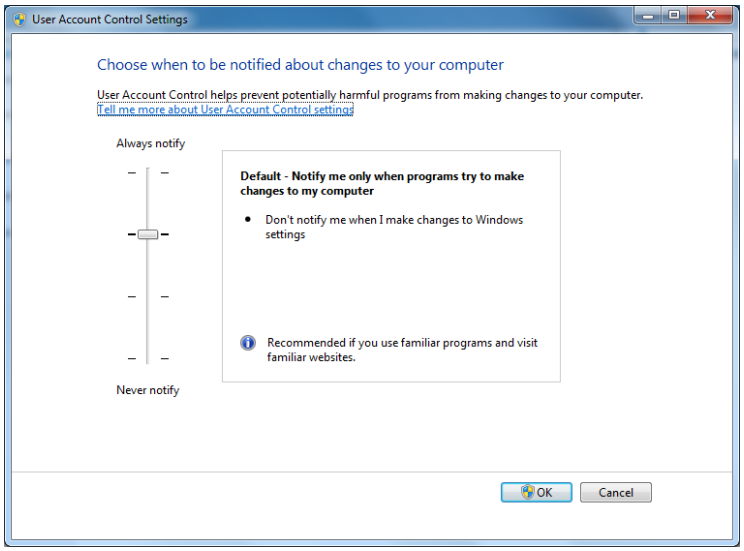


Figure 110

Database Cleanup

The Youtilize database will perform an automatic purge for data older than 6 months.

SQLExpress does not support any automated database cleanup plans.

Database Maintenance Plan

This function is not supported by SQLExpress.

TC/IP Ports Necessary for System Funcionality

Ports utilised as follows:

6060 Real Time Service

8393 Licensing Service

1433 SQL Database

iMonitor Settings

OEE Availability *= Operating Time / Planned Production Time*

Planned Production Line settings

If no schedule is set the default scheduled time will be 24/7.

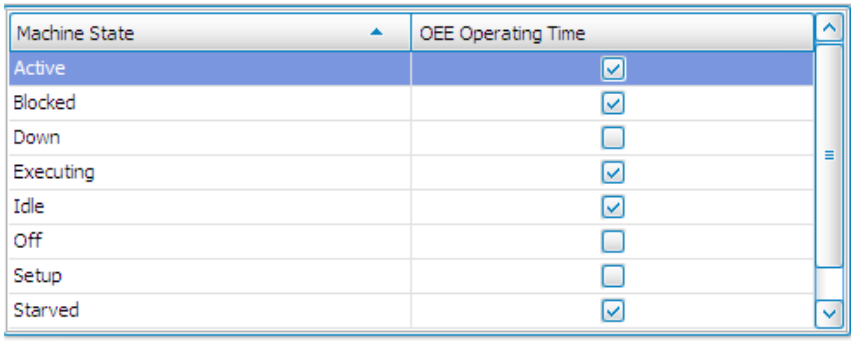
Once a schedule has been set up a schedule will always be required.

Operating Time

The operating time calculation can be configured by selecting a machine state.

- Will include in the OEE Operating Time calculation.

- Will excluded in the OEE Operating Time calculation.



Machine State	OEE Operating Time
Active	☑
Blocked	☑
Down	☐
Executing	☑
Idle	☑
Off	☐
Setup	☐
Starved	☑

Performance *= (Total Pieces * Ideal Cycle Time) / Available Time*

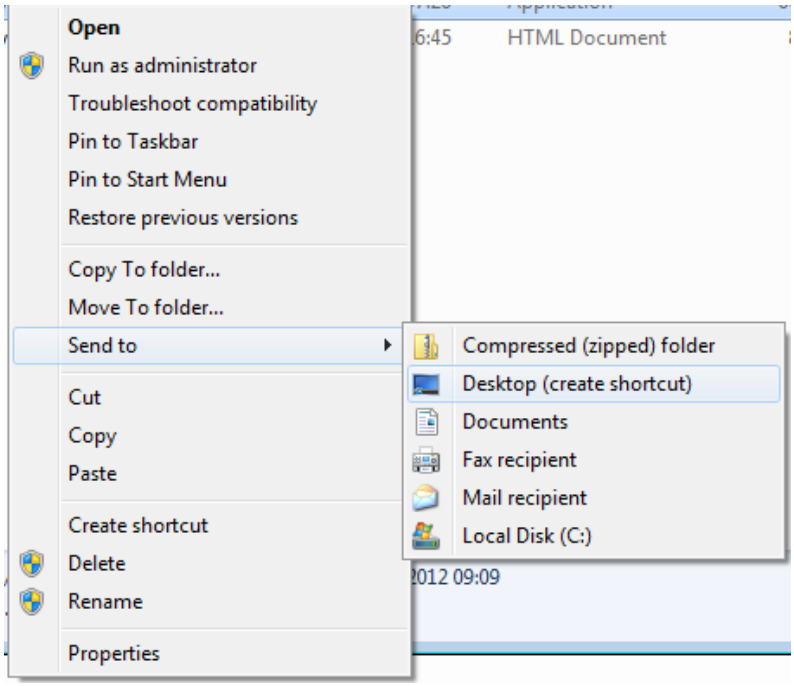
Ideal Cycle time settings

The ideal cycle time calculation can be configured by inputting the expected units per hour value per process point.

Startup Procedure

Users who would like the system to start the iMonitorViewer on startup.

Locate the iMonitorViewer.exe on the local drive right click Send to → Desktop (create shortcut)

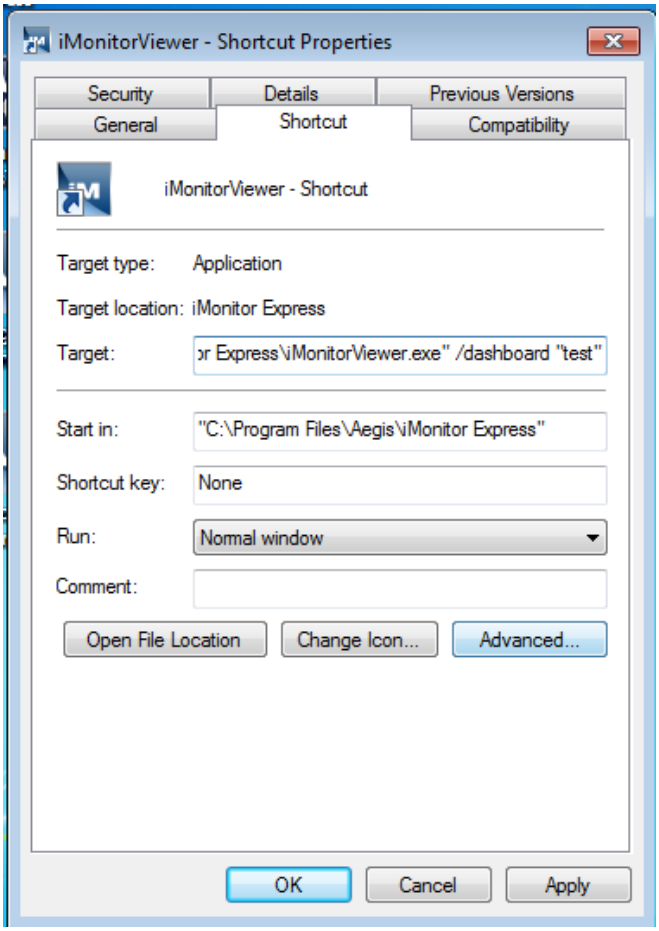


Copy the iMonitor Express icon into the windows startup application.

Shortcuts can also configured with command line parameters for auto-launching dashboards and changing to full screen:

fullscreenmode	-> launches in full screen
runslideshow	-> Automatically starts the slideshow
slideshow	-> Supply slide show name after switch
dashboard	-> Supply dashboard name after switch

Execution in Shortcut Target properties \Imonitorviewer.exe /dashboard "My Dashboard"



Limit the number of dashboards that can be opened

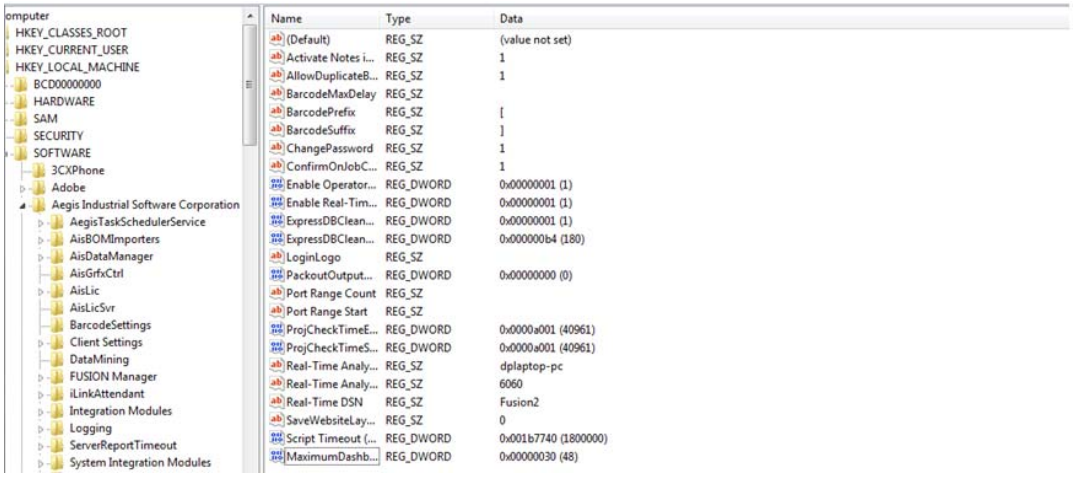
Select the Start →

Type 'regedit' in the search screen and press Enter →

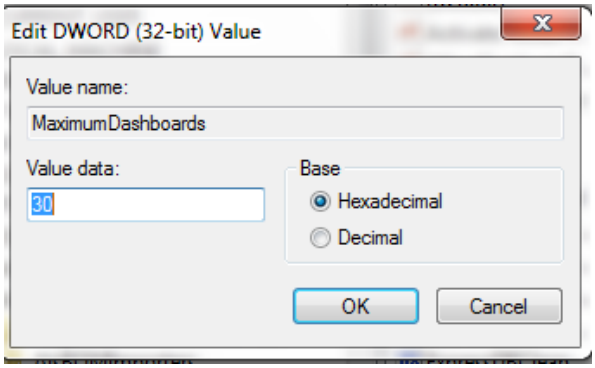
Navigate in the left pane:

HKEY_LOCAL_MACINE\Software\Aegis Industrial Software Corporation\WebOptions

In the right hand pane double click on"MaximumDashboards"



After adding double click on the MaximumDashboards amend to the required value



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Appendix B

Service Monitoring

The following describes what needs to be done for every conveyor in the system.

Initial measuring data

Gap, chain-beam, top (Gap_top)

The initial (nominal) value must be measured by a service engineer at start up or change of the component.

- $Measure_Nominal_{Gap_top}$

Thickness of chain top (Chain_top)

The initial (nominal) value must be measured by a service engineer at start up or change of the component.

- $Measure_Nominal_{Chain_top}$

Gap, chain-side plate, idler end (Gap_idler)

Formatted: Danish

The initial (nominal) value must be measured by a service engineer at start up or change of the component.

- $Measure_Nominal_{Gap_idler}$

Thickness of tab (Chain_tab)

The initial (nominal) value must be measured by a service engineer at start up or change of the component.

- $Measure_Nominal_{Chain_tab}$

Initial input data

The limit values for all component wear values must be filled in at start up.

- $Wear_Limit_{chain_top}$
- $Wear_Limit_{chain_tab}$
- $Wear_Limit_{slide_rail_top}$
- $Wear_Limit_{slide_rail_idler}$

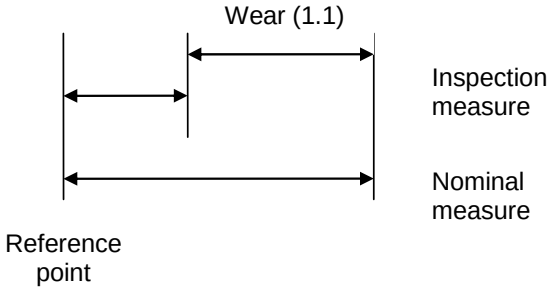
Inspection measuring data

The measurements points mentioned above are to be measured all over again at the inspection occasion.

Gap, chain-beam, top

- Measure_Inspection$_{Gap_top}$

The inspection value is decreasing due to wear of the components. This wear distance is the sum of the wear of the slide rail (top) and the chain (top).

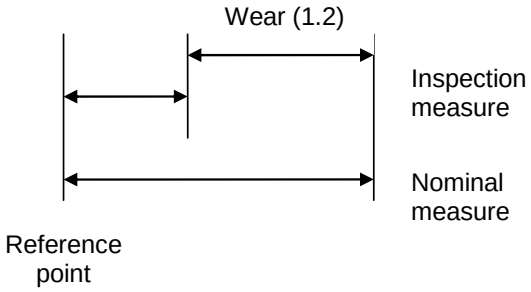


Picture 1: Measure, Gap, chain-beam (top)

Thickness of chain top

- Measure_Inspection$_{Chain_top}$

The inspection value is decreasing due to wear of the chain (top).

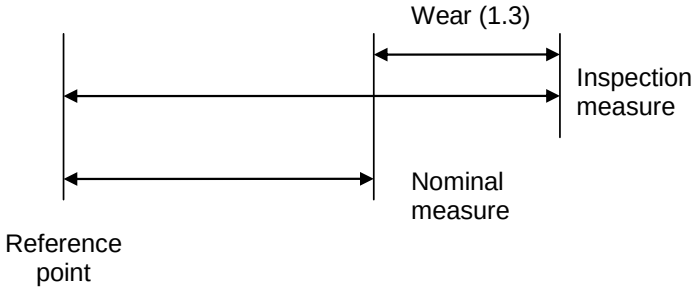


Picture 2: Measure, Thickness of chain top

Gap, chain-side plate, idler end (Gap_idler)

- Measure_Inspection$_{Gap_idler}$

The inspection value is increasing due to wear of the components. This wear distance is the sum of the wear of the slide rail (idler) and the chain (tab).

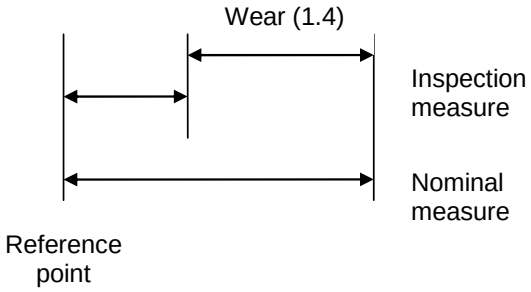


Picture 3: Gap, chain-side plate (idler end)

Thickness of tab (Chain_tab)

- Measure_Inspection$_{Chain_tab}$

The inspection value is decreasing due to wear of the chain (tab).



Picture 4: Measure, Thickness of tab

Wear calculations

The wear of the components can then be calculated.

The chain wear can be different on the two measuring points:

- $Wear_{chain_top} = Measure_Nominal_{Chain_top} - Measure_Inspection_{Chain_top}$
- $Wear_{chain_tab} = Measure_Nominal_{Chain_tab} - Measure_Inspection_{Chain_tab}$

The slide rail wear can be different on the two measuring points. Due to the fact that it is hard to measure the slide rail itself these wear values has to be calculated from two measurements.

- $Wear_{slide_rail_top} =$

$= Measure_Nominal_{Gap_top} - Measure_Inspection_{Gap_top} - Wear_{chain_top}$

- $Wear_{slide_rail_idler} =$

$= Measure_Inspection_{Gap_idler} - Measure_Nominal_{Gap_idler} - Wear_{chain_tab}$

Automatic Measured data

The PLC is sending momentary current value of the motor to the Youtilize software

- I_{Motor}

Continuous task

Every sample occasion, there is a new current value from the motor. Then a number of calculations have to be updated.

Accumulated Service Index, SI_{new} (Ah)

The estimation is that the motor current has been fixed to this value the whole period since the last sample. This SI value must be calculated unique for every component on the conveyor. This means there are one value for SI connected to the chain and one for the slide rail, both using the formula below.

- $SI_{chain,\ new}$
- $SI_{slide_rail,\ new}$

$$SI_{new} = SI_{old} + I_{motor} * \Delta t$$

These values must be possible to reset when a new component is installed.

Accumulated Runtime, $Runtime_{new}$ (h)

If the conveyor is running the accumulated Runtime value is updated. As for the SI this runtime value is connected to each component.

- $Runtime_{chain,\ new}$
- $Runtime_{slide_rail,\ new}$

$$Runtime_{new} = Runtime_{old} + \Delta t$$

These values must be possible to reset when a new component is installed.

Estimated remaining Runtime, $Runtime_{to\ limit}$

The next calculation is to estimated remaining lifetime in Runtime.

- $Runtime_{to\ limit_chain}$
- $Runtime_{to\ limit\ slide_rail}$

Generic formula:

$$Runtime_{to\ limit} = \frac{Runtime_{new}}{SI_{new}} * (SI_{Lim} - SI_{new})$$

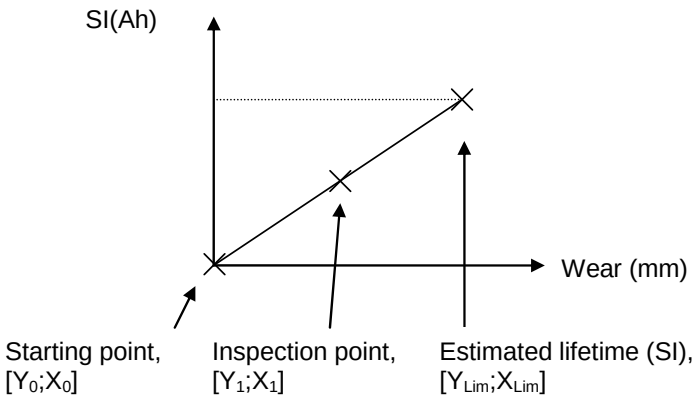
For the chain and the slide rail there are two SI values each. The lowest of these decides when the limit is reached.

$$Runtime_{to\ limit\ chain} = \frac{Runtime_{chain,\ new}}{SI_{chain,\ new}} * (\min(SI_{limit\ chain\ top}; SI_{limit\ chain\ tab}) - SI_{chain,\ new})$$

$$Runtime_{to\ limit\ slide\ rail} = \frac{Runtime_{slide\ rail,\ new}}{SI_{slide\ rail,\ new}} * (\min(SI_{limit\ slide\ rail\ top}; SI_{limit\ slide\ rail\ idler}) - SI_{slide\ rail,\ new})$$

Inspection point

The Service Index (SI) can be plotted in a graph as the function of the wear of the component. If the SI is linear to the wear it looks like the graph below.



Picture 5: Graph SI(Ah) vs wear(mm)

The starting point is called $[Y_0;X_0]$. This is the time when a new component is installed. Both the Service Index (Y_0) and the wear (X_0) is zero because the conveyor has not been run at all yet. When an inspection is done we have an actual wear value of the component, X_1. The corresponding accumulated SI value is called Y_1.

With this set the estimation of the Service Index for the component can be calculated.

$$SI = Y = f(x) = \frac{Y_1}{X_1} * x$$

Estimated Lifetime in Service Index, SI_{lim} (Ah)

If we use this formula we can estimate the point where the wear is reaching its limit value. The limit value of the wear is called X_{Lim} and the corresponding Service Index Y_{Lim}. There are four wear measures and one SI_{limit} connected to each one.

- $SI_{limit_chain\ top}$
- $SI_{limit_chain\ tab}$
- $SI_{limit_slide\ rail\ top}$

- $SI_{limit_slide\ rail\ idler}$

$$SI_{Lim} = Y_{Lim} = f(X_{Lim}) = \frac{Y_1}{X_1} * X_{Lim}$$

The next inspection point is over writing all these values with (hopefully) even more accurate values.

Database Requirements

Time to next service uses data from two tables in the database – ServiceLogs (max size approximately 200 bytes per motor) and EquipmentMeasurements (max size approximately 150 bytes per motor per measurement). Each motor utilizes one ServiceLogs record as an accumulator, so this tables' size will never amount to much. Each motor power change is recorded in EquipmentMeasurements, so for a dumb motor this will be very few records, for a smart motor under constantly varying load this could become quite high.

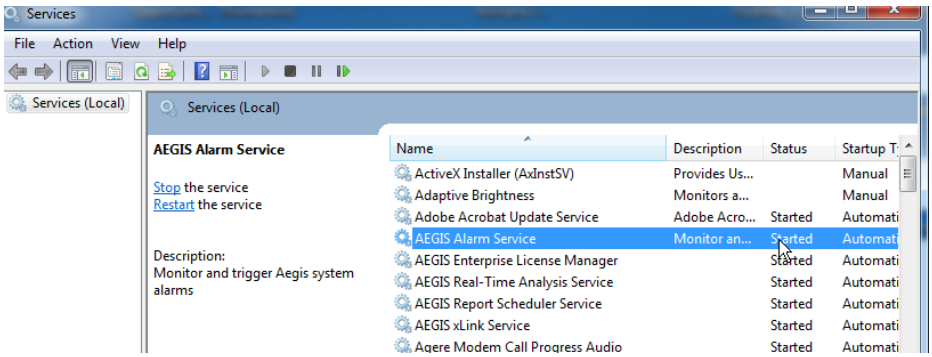
At a large installation with more than 100 motors, and also full Production Montioring the database can grow to as much as 6GB after 3 months. Such installations automatically include a full MSSQL license, which has a maximum data size of 524 petabytes, so the only real limitation is the size of the drive used to contain the database. The free MSSQL Express version installed with Serice Level Monitoring has a limitation of 4GB of data, should more be required, then a full MSSQL license must be purchased. The software contains a cleanup routine that removes all data over 6 months of age and this does not have any effect on Time to next service which needs the ServiceLogs record and the last EquipmentMeasurements record for each specific motor only. So for pure Service Level Monitoring, the database size should not be a problem.

Appendix C

Upgrade Installation:

It is usually possible to install a newer version of iMonitor Express on top of an existing one. Here are the steps required:

- Stop all AEGIS services.
    - Windows Start Button->Run->services.msc
    - Stop all five Aegis services by right-clicking on the service, and the select 'stop' from the menu:



- Run the new installer until complete.
- Re-index the database:
    - Navigate to <Program Files> \ Aegis \ Management Console and opened FusionServerManager.msc
    - Navigate to Console Root \ Fusion Server Admin \ Databases \ Tools \ Data Admin
    - Set the "Target Database System DSN" to the DSN name for the database used by Aegis – "iMonitorExpress".
    - Pressed the "Upgrade Target Database Schema" button.
    - Pressed the "Index Target (FUSION DB ONLY)" button.
    - Closed Fusion Server Manager.
- Restart the Aegis Services, from services.msc.
- Done.

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