GENESIS64
Additional Features
Training Manual

Version 10.7

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Document Number: TM-G64-AF-1070

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Introduction to GENESIS64's Additional Features

1

Welcome to the training for ICONICS' GENESIS64 HMI/SCADA Suite's 'Additional Features'. This course and material assumes that you have already attended the ICONICS GENESIS64 'Standard' Training Course and are familiar with the basic concepts taught within that class and that are contained in separate training materials, including use of the Workbench and different Providers (configurators, runtime tools, etc.).

This course will take you through important new V10.7 features including the use of GENESIS64's Silverlight-integrated tools (Workbench-SL, PortalWorX-SL), asset-based management/monitoring (via the AssetWorX provider) and cross-component action settings (via Commanding). This training manual includes hands-on exercises that provide opportunities for you to work with and learn about these 'Additional Features' on your own.

1.1. Objectives

After completing this chapter, you should be able to:

- Understand the differences between Workbench Classic, based on Windows Presentation Foundation and Workbench-SL, based on Microsoft Silverlight

1.2. The Structure of this Course

In this course, we will be providing basic training on some specific, underlying tools and technology within the GENESIS64 and AnalytiX suites.

In Chapter 2, we will provide an overview of the engineering workbench (called Workbench-SL), the Web-based engineering tool used to configure several ICONICS Products. We will also cover the AssetWorX provider. AssetWorX is an ICONICS product that utilizes ISA95 Intelligent Asset Technology to create models and organization of all assets within a system.

Chapter 3 will cover how to use Equipment Classes and Aliases, in order to make adding equipment to the tree-based asset management system even easier.

Chapter 4 will include information about PortalWorX-SL.

Finally, Chapter 5 will cover the latest improvements to our Commanding functions.

1.2.1. Before You Begin

The material in this course assumes that you are familiar with or have experience with the following:

- Microsoft Internet Explorer
- Microsoft Silverlight-based tools
- 64-bit Microsoft Windows operating systems such as Windows 7, Windows 8, or Windows Server 2012 (should be able to launch and close applications)
- The ICONICS GENESIS64 and/or AnalytiX suites of software applications

1.3. Environment

ICONICS' GENESIS64/AnalytiX suite has the following minimum system requirements. Your system must meet the minimum requirements before you can install the software.

CPU:
Dual Core 64-bit processors
(e.g. AMD Athlon 64 X2, Intel Xeon, or AMD Phenom)

Memory:
Minimum: 4 GB of RAM
Recommended: 6 GB of RAM

Hard Disk:
Recommended: At least 50 GB free hard disk space is recommended – for installation and to allow for SQL Server database growth.

Drive:
DVD Drive for installation

Operating System:
Any Windows 64-bit operating system, including:

- Windows 8 x64 (Professional or Ultimate Edition)
- Windows 7 x64 (Professional or Ultimate Edition)
- Windows Server 2008 R2 x64
- Windows Server 2008 x64
- Windows Server 2012

.NET Framework:

Microsoft .NET Framework 4.0

Web Server:

Microsoft Internet Information Services (IIS) 7.0 [IIS with FTP is a prerequisite. This can be installed from the Start menu → Control Panel → Programs and Features → Turn Windows Features On and Off.

Additional Software:

- Microsoft SQL Server 2008 R2 SP1 or higher
- Microsoft SharePoint Server 2010 or SharePoint Foundation 2010 (required for PortalWorX-SP only, can be installed on a separate server if desired)
- Microsoft Office Excel 2003 or above (32 bit only required for ReportWorX)

Web Access: Via Silverlight Publishing: Internet Explorer 7 or later, Firefox 3 or later, Safari, Chrome.

Note: It is recommended that the system's page file size be a minimum of four (4) times the size of installed (physical) RAM.

Note: The connection to a SQL Server data source may be either local or remote.

Optional Hardware:

Ethernet adapter (for remote PC connections or Ethernet I/O)

USB port (for hardware or software license or license transfer)

Serial COM ports or other adapters (for data I/O)

Note: The requirements described above are based on typical applications. Depending on your specific application, the minimum requirements may vary. These system requirements assume that the OPC server(s) are installed locally on the system and that the following ICONICS components are all installed and running: Energy AnalytiX, Facility AnalytiX and ReportWorX. For AnalytiX application servers that will also utilize portions of the ICONICS GENESIS64 HMI/SCADA suite, including tools within the Platform Services, note that those requirements are separate, but must also be taken into consideration.

Lab: Training Installation and Confirmation

L1

In this lab, we will install GENESIS64 and the OPC Server Suite and apply the necessary files for the rest of the training.

Estimated time to complete this lab: 90 minutes

1.1. Task Checklist

In this lab, you will complete the following tasks:

- Install GENESIS64
- Install and configure the ICONICS OPC Server Suite
- Apply the training support files

1.2. Support Files

You will need the following file(s) to complete this lab:

- GENESIS64 Installation Software (version 10.7 or higher)
- ICONICS OPC Servers Installation Software
- icTonics.opf file
- AdditionalFeaturesPackageFile.pkgx file

1.3. Installation

In this section, we will walk you through the installation of GENESIS64 as well as list software that you should have on the system before you begin the install process.

- Other goals for this lab are to:
    - Understand the privileges inherent to local user "admin" (which you are automatically logged in as) on each training machine.
    - Confirm proper functionality using the icTonicsMonitor display in runtime.

1.3.1. Installation Prerequisites

Before we install any ICONICS applications, it is generally a good idea to make sure that some software has already been installed on the computer. Below is a list of what is recommended that you already have installed. If you're attending training at an ICONICS training facility, the following software is installed.

- Internet Information Services (IIS) with FTP components
    - FTP is required when you intend to publish displays for use with WebHMI clients.
- The latest .Net Framework – The GENESIS64 installation will try to detect this component and install it if it is not there. This can take up to an hour to install.
- SQL Server 2005 SP4 Express or higher – The configuration database in GENESIS64 can only be a Microsoft SQL Server 2005 SP4 or higher database.
- User Account Control (UAC) – Although GENESIS64 works with UAC, it's best to have it turned off during installation.

Depending on your operating system, the IIS installation may require your operating system's installation disk. You should obtain this from your IT administrator. Additionally, the path where IIS needs to be installed varies by operating system. You may want to ask your instructor as to its required location on the operating system you will be using.

1.3.2. Installing GENESIS64

1. Under the 'Product Installation' section, select **GENESIS64** to start the installation.

Note: It's worth noting that if the GENESIS64 installation disk auto-run does not launch the splash screen below, you can go to the root of the installation disk and double-click on the "**Default.hta**" file to bring up the splash screen.

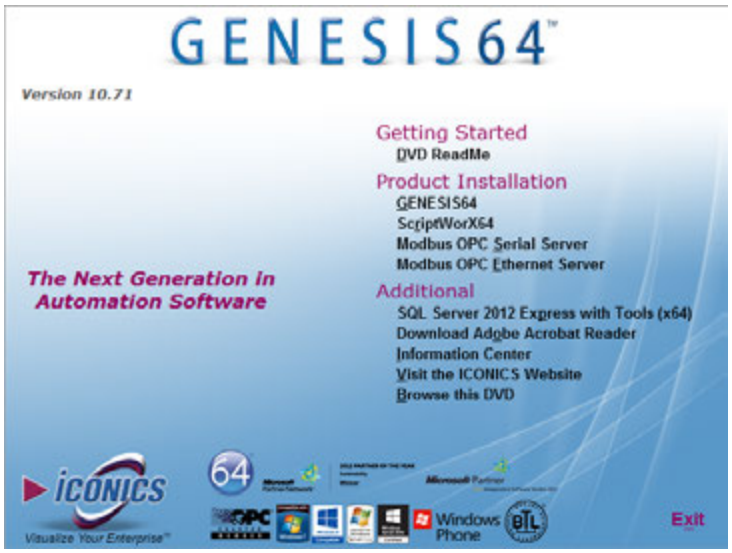

Figure L1.1 - Installation Splash Screen

2. You should then see the **InstallationShield Wizard** as shown in Figure L1.2. Click on "**Install**" to continue.

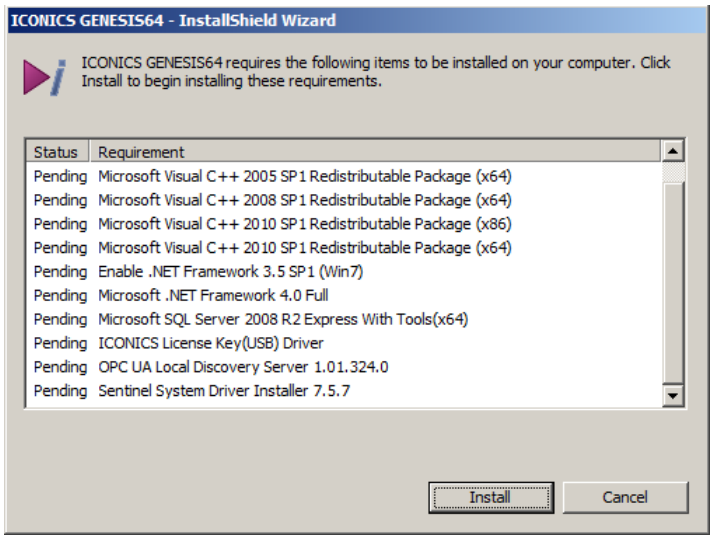

Figure L1.2 - Installation Shield Wizard

Note: If you get any popup security warning messages, just click on "Run" to continue the installation.

3. The installation may take a few minutes and you may see some command prompt windows opening. This is normal.

4. If you don't have SQL Server pre-installed on your machine, you will get a message as shown in Figure L1.3 below. If you are only doing a local installation, just click on "Yes" to proceed. If you are doing a corporate installation, you may not need to install SQL Server now. But, you need to ask your IT administrator to provide you with a domain, as well as a SQL server user account.

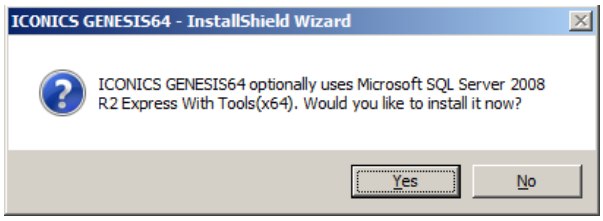

Figure L1.3 – SQL Server Installation

5. Depending on your hardware, you may also come across some prompt windows which ask you to restart your computer. Follow its instructions.

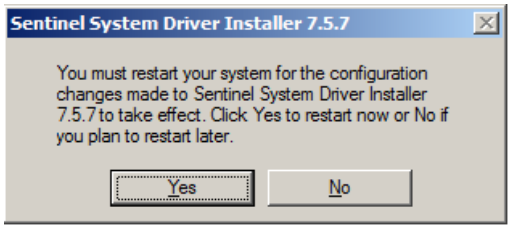

Figure L1.4 – Restart Request from New Driver Installation

6. When the installation pre-requisites are complete, you should see the installation **Welcome** screen.

Figure L1.5 - Installation: Welcome Screen

7. Click on "Next" to begin the installation.

8. On the **License Agreement** screen, choose the "I accept the terms in the license agreement" option and click on "Next".

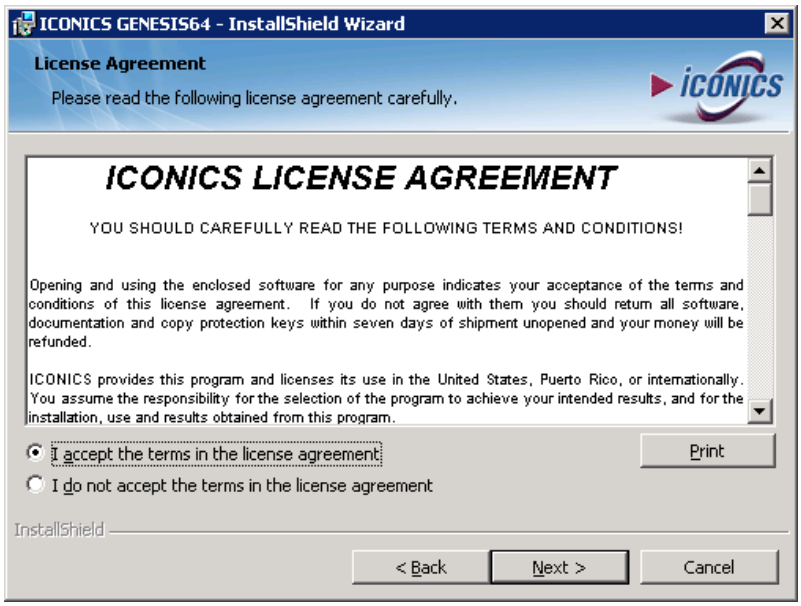

Figure L1.6 - Installation: License Agreement

9. On the **Setup Type** screen, leave the selection at "**Typical**" and click on "**Next**".

10. On the **Database Server configuration** screen, your screen should look like Figure L1.7. If not, you can choose the SQL Server from the dropdown list. If your SQL Server Browser services are not running, you might not be able to see a list of installed SQL Servers. In this case, you will need to type in the SQL Server name. If you installed the SQL Server with the GENESIS64 Installation disk, the instance name is *hostname*\SQLEXPRESS where *hostname* is the name of your computer.

Note: You can open up the command prompt from the Windows start menu, and type “hostname” (without quotes) and then the Enter key to verify your hostname.

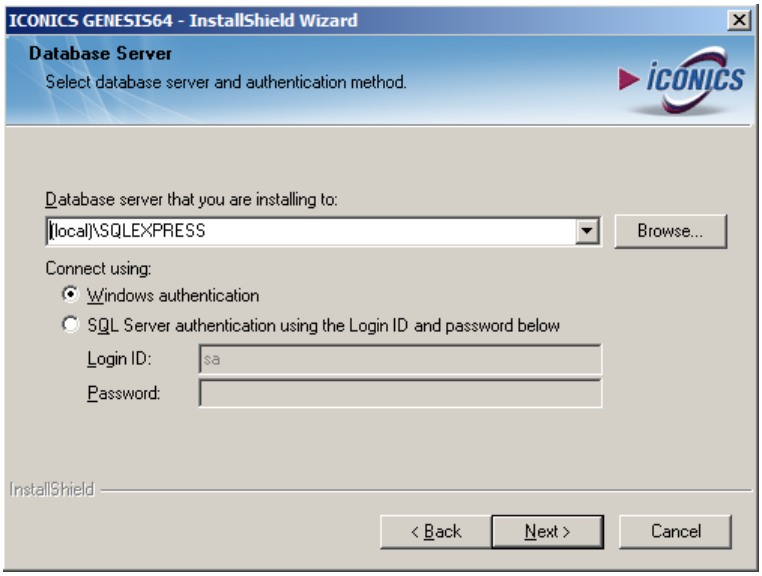

Figure L1.7 Installation: Database Server Configuration

11. On the **Setup type** screen, check **GenDemo**.

12. On the **Ready to Install** screen, click on “Install” to begin.

13. The installation will take a few minutes. During installation, you will see the **User Setup Wizard**. Click on “Next” to continue.

Figure L1.8 - User Setup: Welcome Screen

14. On the next screen, you will choose a user to run the ICONICS Services. This user must have a password. You can choose an existing local computer user or a Domain user. In this course, we will use the existing user "admin".

15. Give this user a password that conforms to the password policy on the computer and click on "**Finish**". Note, if you're attending training in Foxborough, please ask the instructor for the username and password.

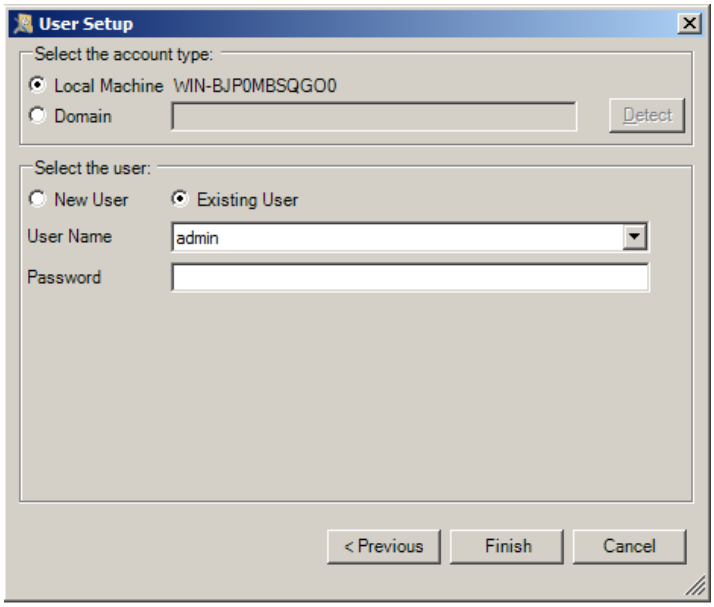

Figure L1.9 - User Setup: User Selection

16. You will then see the **GENESIS64 SQL Databases Installation Wizard**. Click on "Next" in the **Welcome** screen.

Figure L1.10 - GENESIS64 SQL Databases Installation: Welcome Screen

17. Leave the default selection in the **Change common database options** screen and click on "Install".

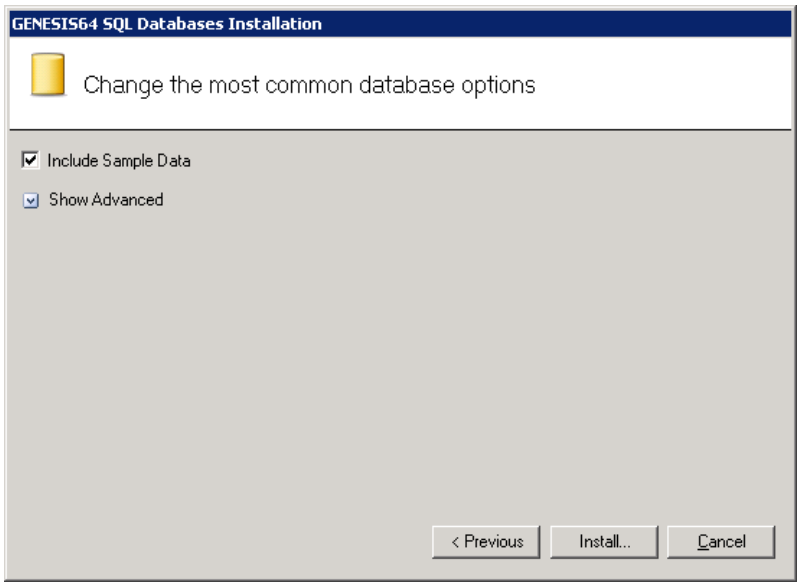

Figure L1.11 - GENESIS64 SQL Database Installation: Change Common Database Options

18. The installation continues and this takes a few minutes.

19. When the installation completes, you will receive a confirmation message as shown in Figure L1.12.

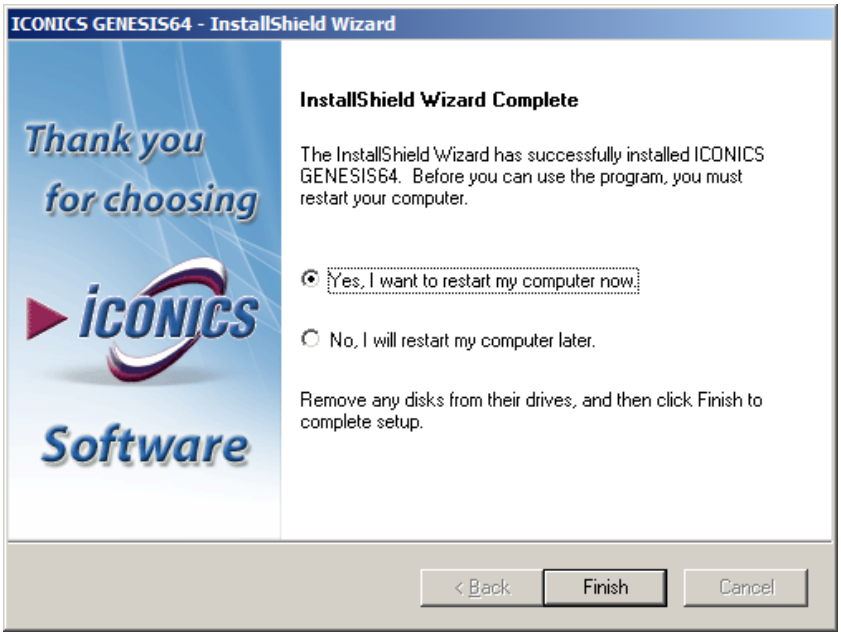

Figure L1.12 Installation: Completed

20. Click on "**Finish**" to close the dialog box and reboot your computer.

1.3.3. Installing the OPC Server Suite

1. Insert the OPC Servers installation disk.

2. When the splash screen comes up, click on the "OPC Standard Server Suite" link, which is circled in Figure L1.13 below. In case the splash screen does not pop up (you may have auto-run disabled), you can go to your DVD drive and double-click on the "Default.hta" file to bring up the splash screen.

Figure L1.13 - OPC Servers Installation Splash Screen

3. You should see the **InstallShield Wizard** come up. Click on "Install" to begin the pre-requisite installation.

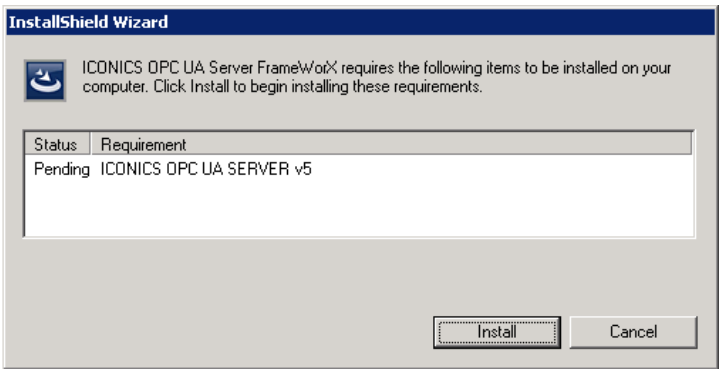

Figure L1.14 - Prerequisites for OPC Server Installation

4. Once the prerequisites are installed, you should see the OPC Server Suite 5 Setup Welcome screen. Click on “Next” to continue.

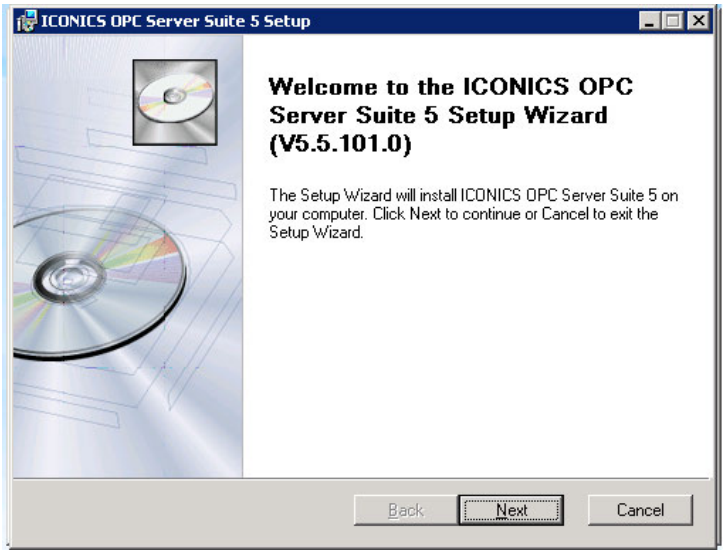

Figure L1.15 - ICONICS OPC Server Suite 5 Setup: Welcome Screen

5. On the Licensing Agreement screen, choose the “I accept the terms in the License Agreement” option and click on “Next”.

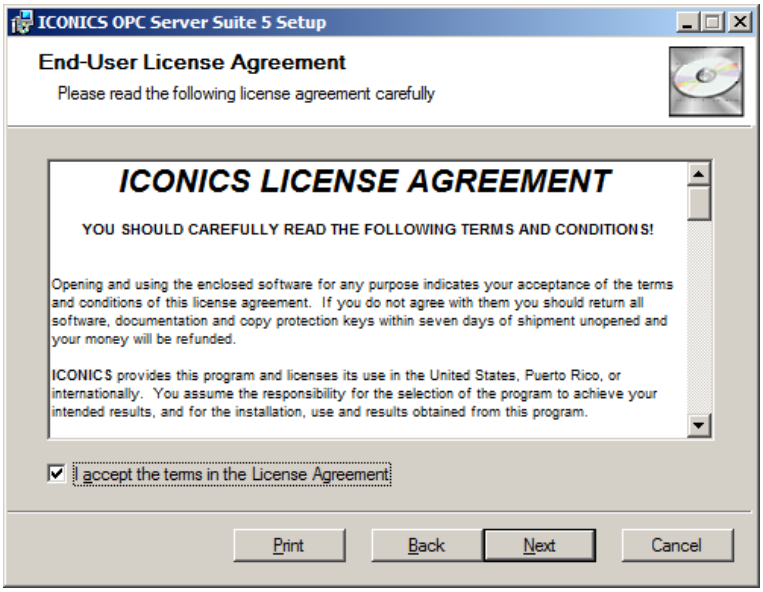

Figure L1.16 - ICONICS OPC Server Suite 5 Setup: License Agreement

6. Leave the Destination folder as default on the next screen and click on "Next" to continue.

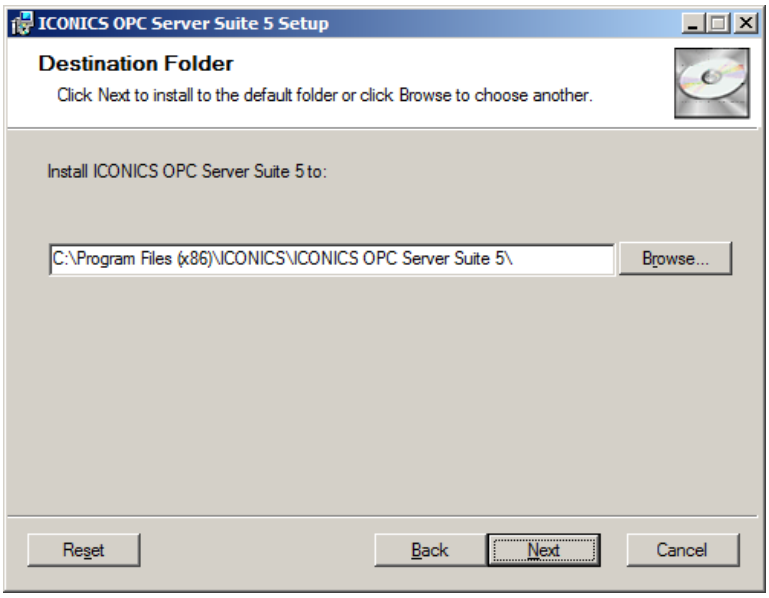

Figure L1.17 - ICONICS OPC Server Suite 5 Setup: Destination Folder

7. Leave the application data folder as default and click on "Next".

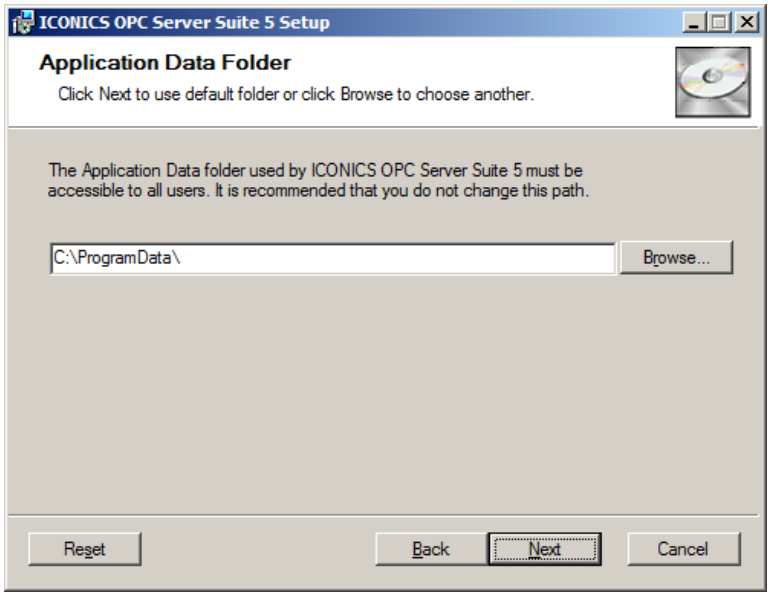

Figure L1.18 - ICONICS OPC Server Suite 5 Setup: Specify Application Data Folder

8. Leave the Shortcut folder as default and click on “Next”.

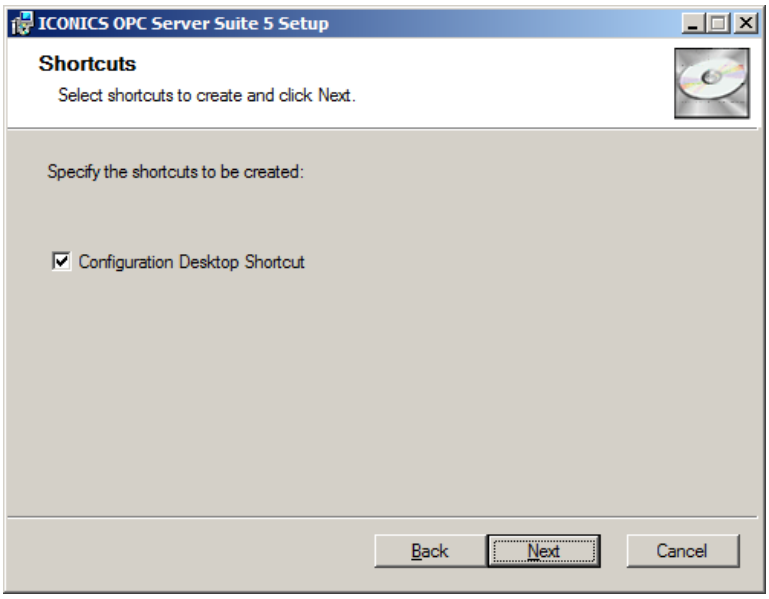

Figure L1.19 - ICONICS OPC Server Suite 5 Setup: Shortcuts Folder

9. On the Select Feature Screen, make sure that all features are selected and click on “Next.”

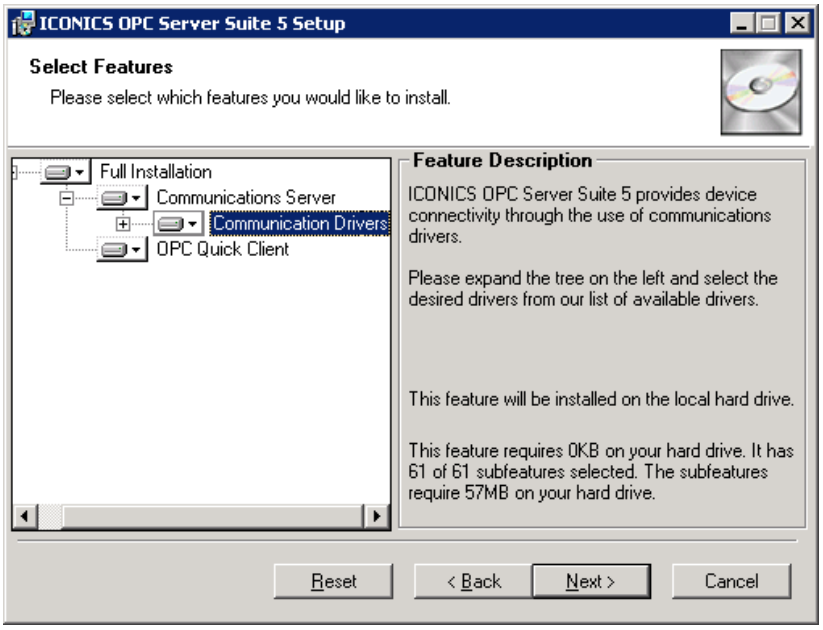

Figure L1.20 - ICONICS OPC Server Suite 5 Setup: Select Features

10. Click on “Next” on the 'Ready to Install the Application' screen to begin installation. This may take a few minutes.

11. When the installation completes, you will see a screen notifying you that you have successfully completed the installation. Click on “Finish” to complete the installation.

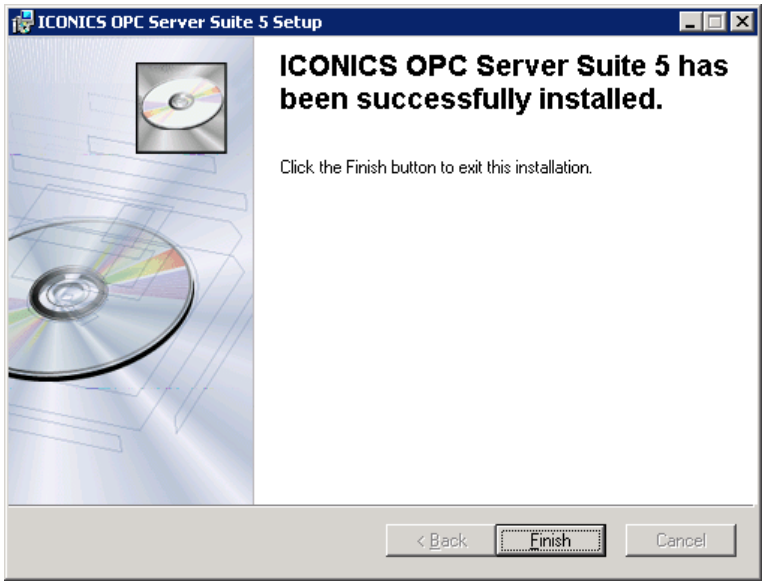

Figure L1.21 - ICONICS OPC Server Suite 5 Setup: Successfully Installed

12. You will then see the **ICONICS OPC UA Server FrameWorX - Installation Wizard** welcome screen. Click on “Next” to continue.

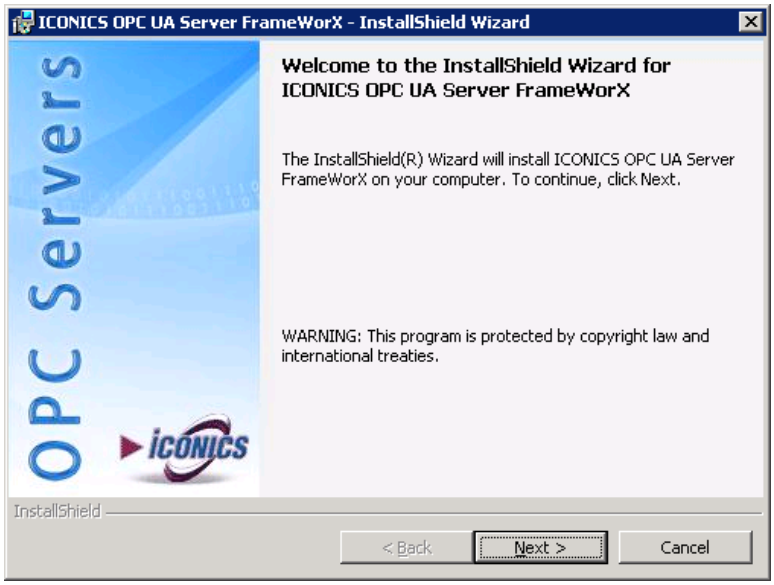

Figure L1.22 - ICONICS OPC UA Server FrameWorX: Welcome Screen

13. Click on “Install” on the 'Ready to Install the Program' screen to begin installation for the OPC UA Server FrameWorX. This will take a few minutes.

14. When the installation completes, you should see a confirmation screen. Click on “Finish” to close the wizard.

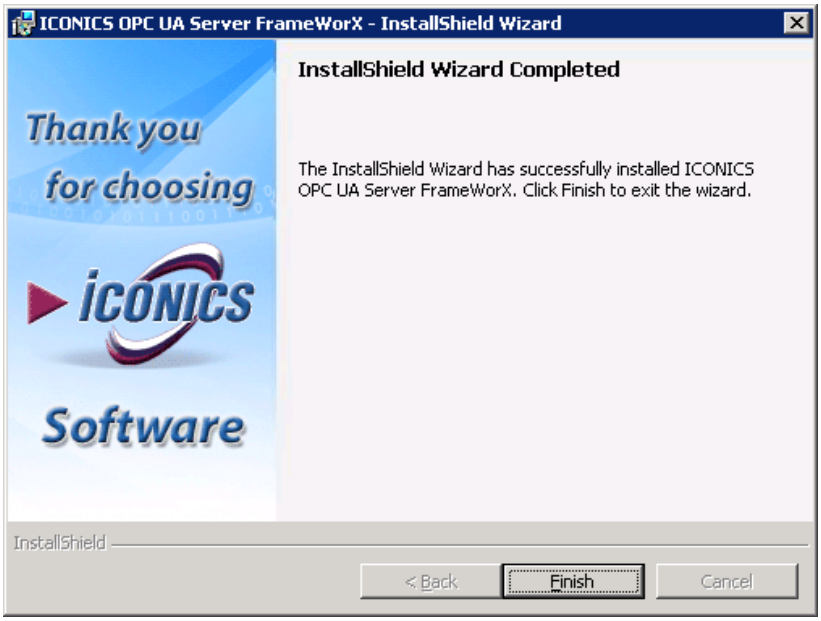

Figure L1.23 - ICONICS OPC UA Server FrameWorX: Installation Completed

15. Click on “Exit” on the splash screen to close it.

1.4. DCOM Configuration

1. Go to **Start** → **Run** and type in “**dcomcnfg**” (without quotes) in the **Run** dialog box and click on “**OK**”.

2. In the **Component Services** Window, expand Component Services → Computers → My Computer → DCOM Config on the left-hand pane.

3. Find the “ICONICS OPC Server Suite 5.5” component in the list, right-click on it and select “Properties”.

4. In the **ICONICS OPC Server Suite Properties** dialog box, select the Security tab.

5. Change the Access Permissions to “Use Default”.

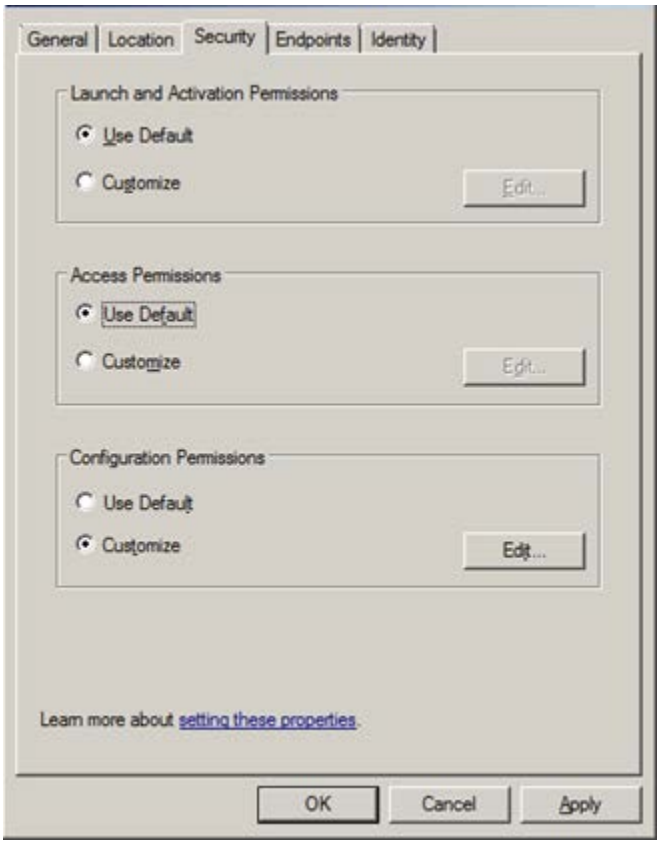

Figure L1.24 - ICONICS OPC Server Suite Properties: Security

6. Close the **Component Services** window.

1.5. Training Support Files

There are some support files that you will need in order for the training to run smoothly. After this training course was developed, a Package (.pkgx) file was created by executing the **GENESIS64 Pack and Go Utility**. For those of you who are attending the two-day training class, the unpack process will configure the system appropriately.

1. Open **Windows File Explorer** and navigate to C:\
2. Create a folder here called "**Training**". This folder will be your project folder and you will store all of the training files in this folder.
3. **Copy** the following files into the C:\Training directory (This folder and files will already exist on the Foxborough training computers):
   - **GENESIS64TrainingSymbol.sdfx**
   - **icTonics.opf**
   - **AdditionalFeaturesPackageFile.pkgx**

   Note: Ask your instructor for these files if you do not have them.

OPC Server Configuration

1. Start the ICONICS OPC UA Server 5 Configurator by going to Start → All Programs → ICONICS → ICONICS OPC Server Suite 5 → **ICONICS OPC Server 5 Configuration.**
2. Go to **File** → **Open** and browse to **C:\Training**.
3. Select the "**icTonics.opf**" file and click on "**Open**".
4. Select "**Yes, Update**" if you see the following screen, as shown in Figure L1.25.

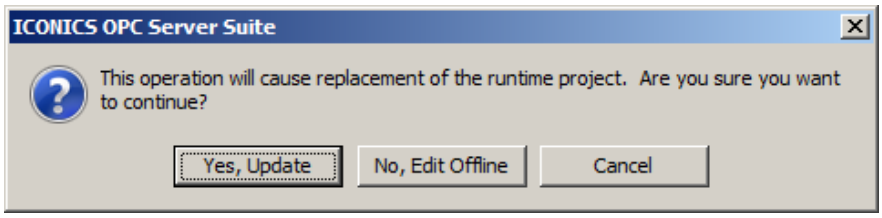

Figure L1.25 – Update OPC Server

5. Close the **ICONICS OPC Server Suite Configurator**.

OPC UA Configuration

1. Open the **OPC UA Configuration** by going to Start → All Programs → ICONICS → ICONICS OPC Server Suite 5 → OPC UA Configuration.

2. On the **Server Endpoints**, select the "**opc.tcp://127.0.0.1:49460**" endpoint and uncheck the "**Enable**" checkbox near the bottom of the dialog box.

3. Select the "**opc.tcp://*ComputerName*:49460**"endpoint where *ComputerName* is the name of your computer.

4. Click on the "**Edit**" button near the bottom of the dialog box to bring up the **Endpoint Definition** dialog box.

5. **Uncheck** the "**Basic128Rsa15**" and "**Basic256**" options. The dialog box should now look like Figure L1.26 on the following page.

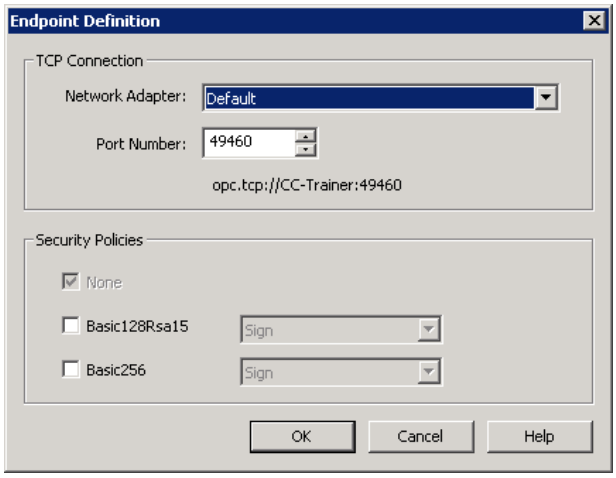

Figure L1.26 - Endpoint Definition

6. Click on "**OK**" to close the dialog box.

7. Check the "**Enable**" checkbox at the bottom of the **OPC UA Configuration Manager** and click on "**Close**" to save the settings and close the dialog box.

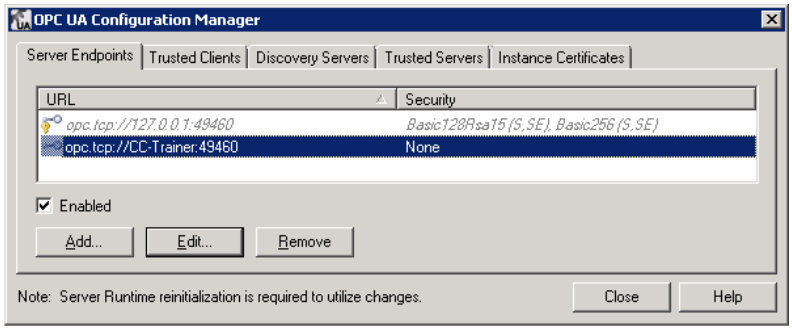

Figure L1.27 - OPC UA Configuration Manager

Unpacking the AdditionalFeaturesPackageFile.pkgx file

1. Launch the Workbench Classic by selecting **Start → All Programs → ICONICS → Workbench**. Keep the Workbench open for the remainder of this lab.

2. From within the **Workbench Classic**, click on the **Project** tab.

3. Select the **Unpack Project** icon. This launches the Unpack Wizard.

4. On the Welcome screen, select **Next**.

5. To the right of the **Package file:** field, select the **Browse** button.

6. Next, navigate to the **C:\Training** folder, then select the file **AdditionalFeaturesPackageFile.pkgx** and click **Open**.

7. Click **Next**.

8. Click **Next Again**.

9. As seen in the figure below, on the dialog with the "**Customize the unpack options**" header, check the "**Activate Databases**" checkbox.

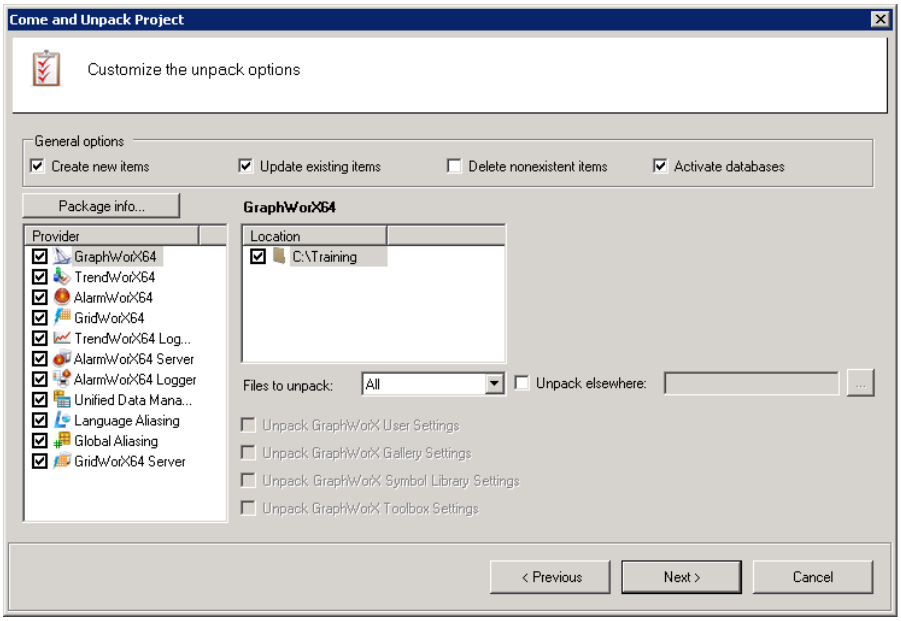

Figure L1.28 – Unpack – Activate Databases

10. Click **Next**.

11. Click **Next** again.

12. Click **Finish**.

13. When the unpack process is complete, verify that all the entries in the log have a **Green Check Mark** in the **Status** field. Report any errors to your instructor.

14. In the upper left, click on the **Floppy Disk** icon to **save the project**.

1. Testing the deployed configuration

1. From within the Workbench Classic, select the **GraphWorX** provider.
2. From within the **Project Explorer**, expand the tree under **My Computer → Training**.
3. **Double click** on the **icTonicsTankMonitor** entry in the tree.
4. This launches **GraphWorX** and opens the **icTonicsTankMonitor** display in Configuration mode.
5. In the upper right hand corner of the Workbench, select **Runtime**.
6. Follow the instructors lead to verify the following components are functioning properly:
    - **Value Sets**
        - Click on the 'Select Recipe' button and select a recipe.
        - All fields should populate with data. Valves should open, the tank should fill, etc…
    - **Global Aliasing**
        - Click on each of the Mixer Tank buttons
            - Tank labels should change to the appropriate name.
            - Select a recipe for each tank.

This concludes this lab.

Workbench-SL and AssetWorX 2

Workbench-SL

ICONICS Workbench-SL is intended to provide functionality that is similar to the WinForms/Windows Presentation Foundation (WPF)-based Workbench, now known as the *Workbench Classic* of prior GENESIS64 versions, but with improved "reach" and ease-of-deployment that Silverlight technology offers.

AssetWorX

AssetWorX is an enterprise control system for integrating business and manufacturing control systems in Workbench-SL. It provides a tree-like structure in which you can build your enterprise in the form of physical locations and business units, and organize equipment such as buildings and machinery in one centralized system for analysis by the ICONICS GENESIS64 suite of products. The tree-like structure provides a functional hierarchy for navigation and data roll-ups. Physical locations and areas of responsibility can be identified in this hierarchy.

2.1. Objectives

After completing this chapter, you should know:

- How to Use Workbench-SL Web-based Configuration Tool
- How to Access Tools and Providers
- How to Use the Project Explorer

In addition, you should also know:

- The Architecture of the AssetWorX provider in Workbench-SL
- Configure an AssetWorX database and Data Import or Export
- Define Units of Measure, Temperature Sources/Instances and Polling Groups
- Build Hierarchical Tiers within the Asset Tree

2.2. Introduction to Workbench-SL

Workbench-SL offers light-weight deployment with fast startup time, which also supports third-party plug-ins. It is capable of using existing data services (created using the Software Factory toolkit) as well as new WCF RIA Services. Workbench-SL has a look and feel similar to the Workbench Classic, including familiar elements such as a toolbar ribbon and Project Explorer, but now has enhanced user-friendly options such as a list-view Project Explorer for browsing, which can be filtered and sorted.

The Silverlight edition of the Workbench runs in all browser platforms, including Microsoft Internet Explorer, Firefox, and Safari, etc. Its Silverlight components are also available as Web Parts in SharePoint and can run on the Windows 7 Phone.

Workbench-SL supports providers similar to its WPF-based counterpart, but also additional ones including AssetWorX, FDDWorX and Energy AnalytiX.

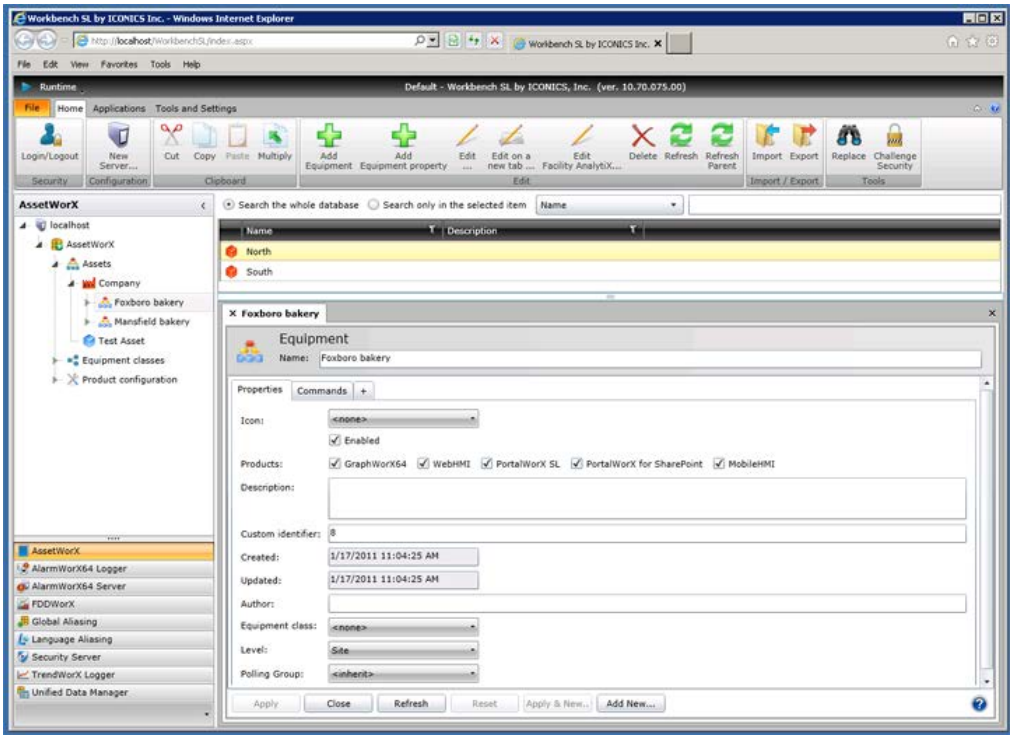

Figure 2.1 - Workbench-SL

In Workbench-SL, You Can:

- Organize data sources on the basis of a hierarchical structure of assets and equipment, using AssetWorX.
- Configure EA to calculate, report on, and manage energy use if the Energy AnalytiX provider is installed.

At the same time, the *Workbench Classic* still acts as a single interface where you can use every component of GENESIS64. It is a configuration tool in which you can also simulate an operator's runtime interface and manage projects. You can, of course, continue to use Workbench Classic as a companion tool to Workbench-SL. Many GENESIS64 configurations can be done from within Workbench-SL. What cannot be done inside the Workbench-SL is still available from within the Workbench Classic.

2.2.1. Workbench-SL vs. Workbench Classic

Features to note about Workbench-SL and Workbench Classic are:

- They are two independent applications.
- Both include Pack & Go technology.
- Their Projects are NOT shared - The provider and database lists are maintained separately.
  - Workbench-SL's providers and databases are within the IcoSetup databases
  - Workbench Classic's providers are within the project file (*.prjx) and databases are within web.config.
- Just the active databases are shared between them - via the file, IcoSetup64.ini, where the active database is stored.

2.2.2. Opening Workbench-SL

To open Workbench-SL from the Windows **Start** button, select **All Programs** → **ICONICS** → **Workbench-SL**.

When you open Workbench-SL for the first time, you see all of the applications, tools, utilities and services listed in the Project Explorer that you can open within Workbench-SL. It is made up of:

- The **ribbon bar** (along the top)
- Two **Project Explorers** that you can hide or display:
  - A **tree explorer** that gives you a way to navigate and browse; and buttons that give you access to ICONICS providers
  - A **grid explorer** you can use for searching
- The **content** or **work area** where configuration forms open

2.2.3. The Ribbon

The ribbon helps you to quickly find the commands you need to complete a task. Commands are organized in logical groups with tabs. You can minimize the ribbon by double-clicking on the ribbon tabs.

The ribbon has three tabs:

- **Home tab** - Contains all commands and changes depending on the currently selected item in the Project Manager and on the application that is currently loaded in the Workbench.
- **Applications tab** - Gives you access to the providers (applications) in the Tree Explorer's button bar.
- **Tools and Settings tab** - Lets you show or hide various elements of the window as well as personalize the project properties.

Figure 2.2 - Sample Home Tab in the Workbench-SL Ribbon

Note: This Ribbon changes as you select different Providers.

2.3. Tools and Providers

GENESIS64's Workbench and Workbench-SL save all of your tools, application providers, and settings with your projects in their project files so that you can reopen and reuse your project and settings easily. In each project are stored:

- **Application providers**
- **Database configurations** such as Global Aliasing, Language Aliasing, and other SQL databases
- **Network services tools** (Classic WB only) such as GenTray, SNMP, the FrameWorX Server, and the Security Server
- **Workbench configuration settings** that you apply to the Workbench window position, styles, modifications to the design surface, layouts, and templates

A project is typically stored where the servers are running, but in actuality, several servers may need to be accessed in order to run the different displays of an enterprise. As long as you have defined the servers' connections, those connections are stored with the project, too.

Centralized security allows all GENESIS64 operations to be secured. Security Server limits access permissions to projects and plug-in, including file access to create, modify, or read only. Historical data is stored.

The Workbench is designed for concurrent configuration by multiple development team members over the internet. It follows the *optimistic concurrency model*; there are no database locks. Multiple application servers and databases can be configured simultaneously. An additional ICONICS Workbench Toolkit can also be used to create plug-ins from third-party content providers.

2.4. Providers in Workbench-SL

Development and runtime modes of all installed and licensed ICONICS GENESIS64 products can be accessed and used in the Workbench. Even though the following providers are available in Workbench-SL, you can pick and choose which providers appear in the Workbench's Project Explorer, as shown in the figure below.

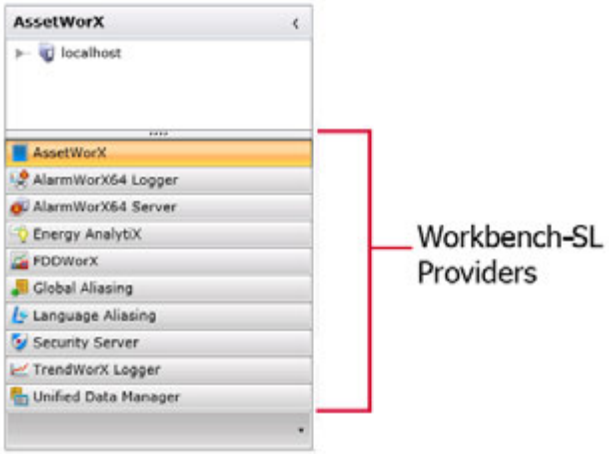

Figure 2.3 - Workbench-SL Providers

2.4.1. Working with Services

A number of GENESIS64 components are servers or services that you can control and modify within Workbench-SL. They include:

- **AlarmWorX Server** starts and stops the alarm server, as well as provides a configuration interface to configure alarms.
- **Global Aliasing System (GAS)** stores variable names and their values within an SQL database so that these variables can be used throughout GENESIS64 applications. Start, stop, create, and modify global aliases using this interface.
- **Language Aliasing System (LAS)** makes substitutions for language aliases whenever the assigned language in the Language Selector dialog box is changed.
- **Unified Data Manager (UDM)** is a central location for storing expressions, subscriptions, groups, values, registers, triggers, and other data that can be used by any GENESIS64 application. The service can be started, stopped, and all of these data types and data instances can be created and modified within the UDM in the Workbench.

2.5. Workbench-SL User Interface

Workbench-SL is used for the following purposes:

- To display a configuration form
- To host a viewer component for an application

GENESIS64 stores configuration data organized in object form into a set of SQL databases. Many of the other components of GENESIS64 are essentially front ends to different databases and the data contained inside them. When you load a utility within Workbench-SL, it loads a configuration form in runtime. These forms often come with Apply and Refresh buttons since the data is stored in a database and may require that changes be committed or that current data be retrieved.

2.6. Project Explorer

In GENESIS64's Workbench-SL, there are two Project Explorers: the

- **Tree Explorer**, which contains a tree structure for navigating the assets. A section in the lower left for the providers (or applications); and the
- **Grid Explorer**, which contains the content of the item that is selected in the Tree Explorer and serves as a way to search the selected item and the items children. These explorer features are highlighted in the following example. Note that the **Home** ribbon has options for showing or hiding these two explorers.

Note: In this training manual, the terms "node" and "tree items" are interchangeable (unless otherwise noted). They both signify a specific level (or branch) of a navigable tree.

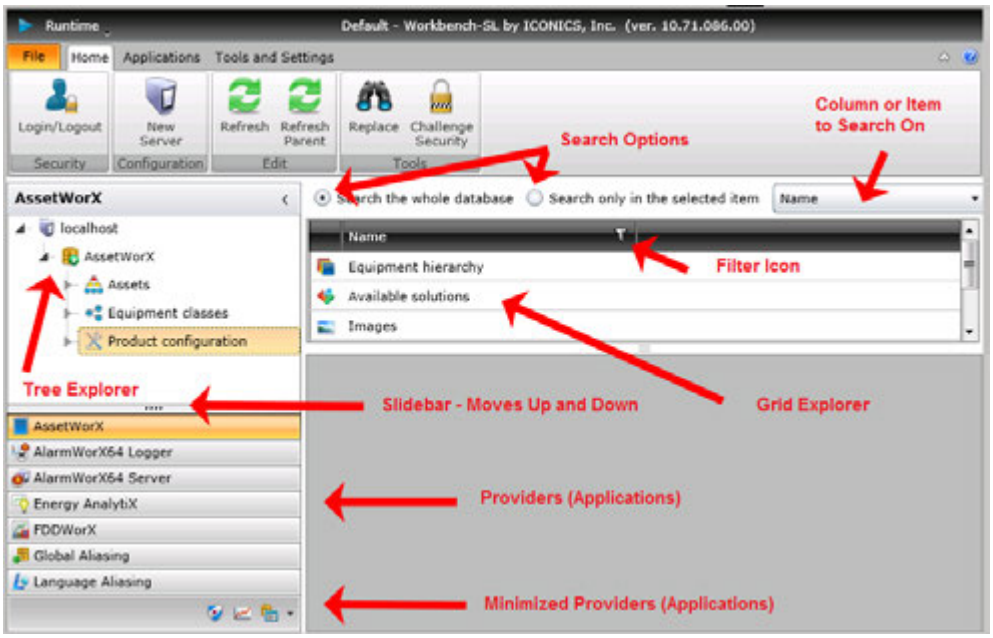

Figure 2.4 - The Project Explorers in the Workbench

The Tree Explorer is the primary navigational component for quickly accessing data in the installed applications. Button bars and icons make it easy to access applications from inside the Workbench. Its components can also be moved. In moving them you can:

- **Leave them free floating** by clicking and dragging the toolbar of the Project Explorer off of a docked position to make it free floating. Double-click on the Project Explorer title bar to return the pane to its last docked position.
- **Dock them** to any side of the Workbench64 window. To move the pane, click the title bar and move the pane onto any of the arrow icons of the Diamond Dock feature.

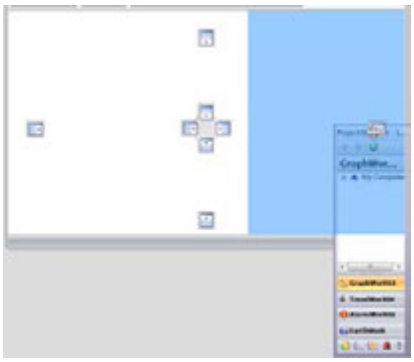

Figure 2.5 - Diamond Dock

- **Minimize them to a tab** by clicking the push pin icon in the Project Explorer title bar to minimize the panel to a tab. The following image shows how the Project Explorer components look when they are minimized. To view the Project Explorer expanded, click on the minimized tab; you can then click again on the push pin if you want to return the panel to maximized view.

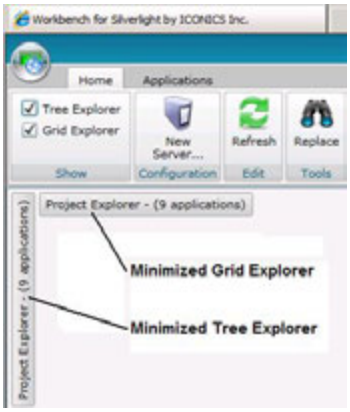

Figure 2.6 - Minimized Project Explorers in the Workbench

The Project Explorer is always in view within the Workbench64 in one form or another.

Searchable Grid Project Explorer: Selecting a node in the Tree Explorer displays the node's content in Grid Explorer. Note that you can search the selected item or you can search the entire database. You can also click on a column's filter icon to limit the content that appears in the pane.

Note: You cannot search the Tree Explorer, but you can search the Grid Explorer.

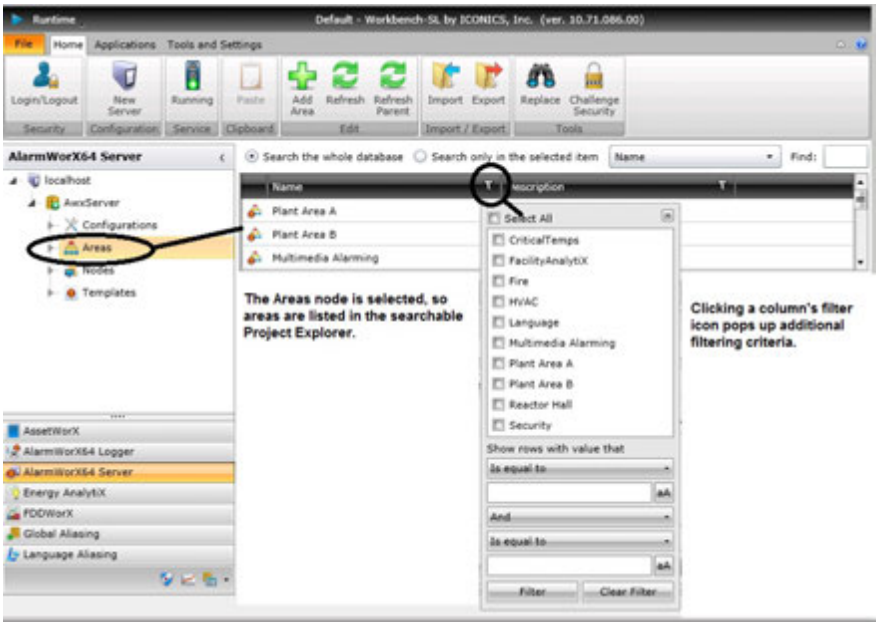

Figure 2.7 - Searchable Project Explorer Options

2.6.1. Working in the Project Explorer

The Tree Explorer can be modified to show just those applications, tools, and services that you need for your project. You can re-size the pane, as well as to move the slider up or down to view more button bars. The Workbench-SL project explorer allows for efficient provider access by opening each provider's configuration in a separate tab.

To Move between the Providers (applications) in the Workbench:

- Click the buttons listed in the bottom of the Project Explorer. Below is an example of some available provider buttons.

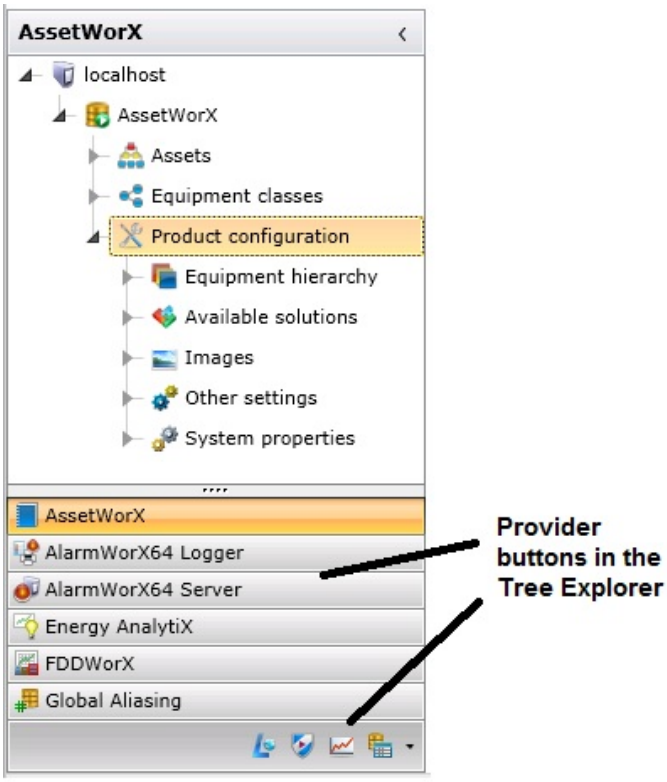

Figure 2.8 - Application Buttons

2.6.2. Data in the Project Explorer

When you view components in the Tree Explorer you are viewing either configuration or data display files. For example, while AssetWorX shows you a navigation tree of configuration options and the asset tree, the AlarmWorX64 Server shows you a set of configuration forms for object data stored in the AlarmWorX64 SQL database. Provider data are organized into a hierarchical object tree of Server database with Database object at the top, stored Configurations for different items with alarms of different types, geographical organization using the group object called Areas, and a group object called Nodes which organizes redundancy configuration aspects.

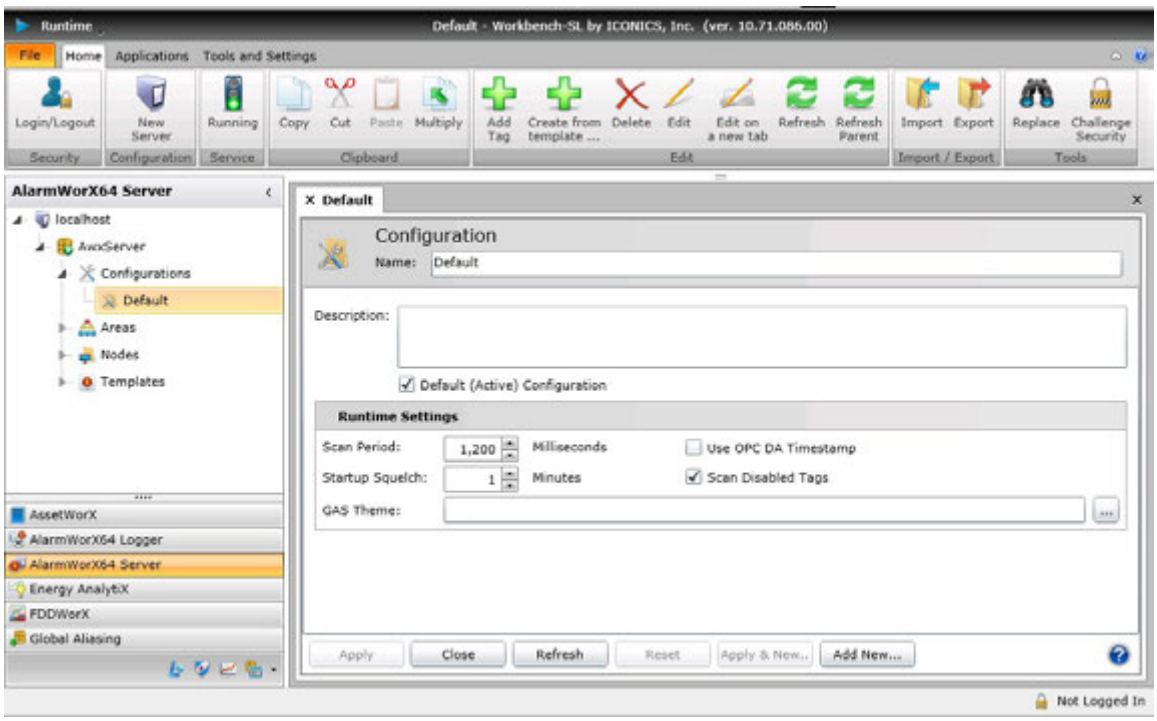

Figure 2.9 - Data in the Tree Explorer

2.7. Ribbon

The ribbon for Workbench-SL is designed to help you quickly find the commands you need to complete a task. Commands are organized in logical groups. The ribbon has two tabs: the **Home** tab provides general tool bar functions and changes depending on the item that is selected in the Project Manager, and the **Applications** tab gives you access to the providers (applications) that are in the Tree Explorer's button bar. Examples of both are shown below. You can minimize the ribbon by double-clicking on the ribbon tabs.

Figure 2.10 - Sample Home Tab in the Workbench-SL Ribbon: This Ribbon Changes with Your Project Explorer Selections

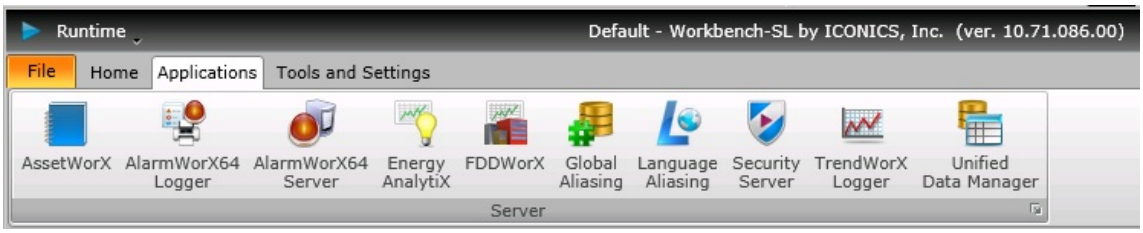

Figure 2.11 - Sample Applications Tab in the Workbench-SL Ribbon

2.8. Filtering and Sorting Information in the Workbench

In the Silverlight edition of Workbench64, you can filter and sort lists of objects in tabs. If there are a lot of calculations that are listed on the tab, you can filter out (within the Grid Explorer) the ones you don't want to see by clicking any of the filter icons in the column heading on the tab. Clicking a filter icon pops up a small dialog where you can enter filter criteria. In the following example, we clicked the filter icon for the Name column, which popped up a filter window to filter table content to show rows for specific names.

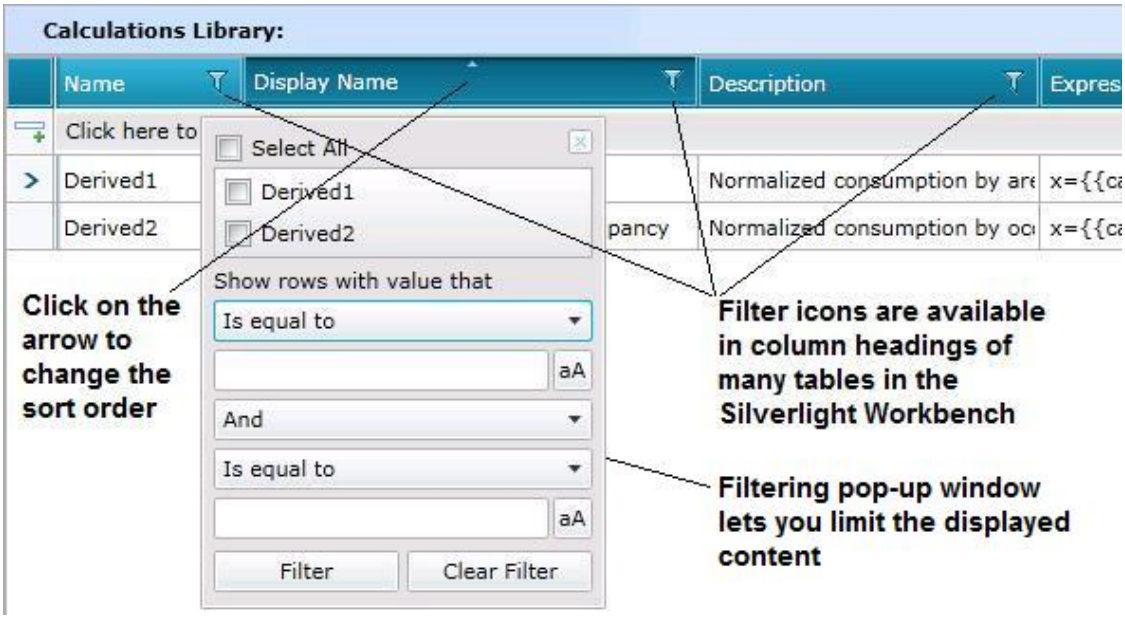

Figure 2.12 - Sorting and Filtering Options

Steps for filtering and sorting are provided in this topic:

- Sorting information
- Filtering information
- Clearing a filter
- Using Conditions in a Filter

2.8.1. Sorting Information

To sort the content of a table on the basis of values in one column, click on the column heading. This makes the sorting icon visible. Then click on the sorting icon to make the table sort in ascending or descending order, using the column as its basis.

2.8.2. Filtering Information

To filter information to display only what you want to see:

1. Start by thinking about what you want included in the listing and decide which column will let you choose that information.

2. Click on that column's filter icon in the column heading. This opens the column's popup filter.

3. Now specify your filter criteria. The data you select will be included in the table. There a few ways you can filter data:

   - You can select any or all of the items listed in the top half of the filter. Selecting no rows is the same as selecting all of them. But as soon as one item in the list is selected, only the selected items are included in the results. The following figure shows an example where all were selected using the Select All check box, and then individual items were deselected.

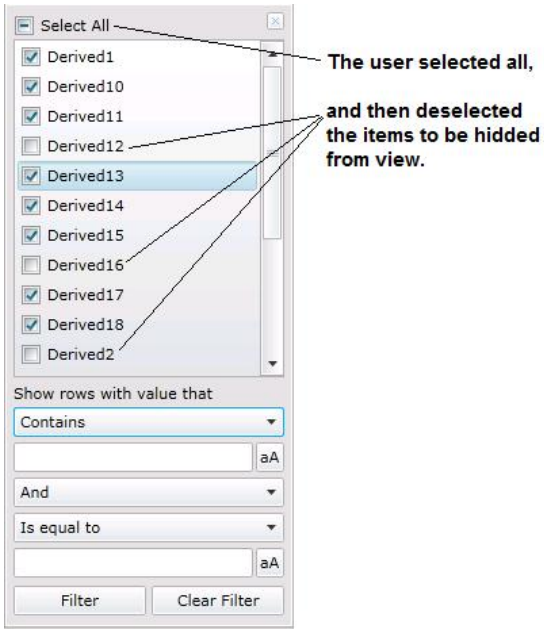

Figure 2.13 - All Items Selected, Then Specific Items Deselected

- You can also (or alternatively) enter one or two conditions. The figure below shows the fields where you enter conditional information. For example, you can include only those rows that have "Foxboro" in the description, or exclude only those rows. Under the **Show rows with value that** heading, you can enter a condition (for example, **Starts with**) and then optionally choose a Boolean value (**And** or **Or**), and then another condition. For help using this part of the popup filter, see the 'Using Conditions in a Filter' topic.

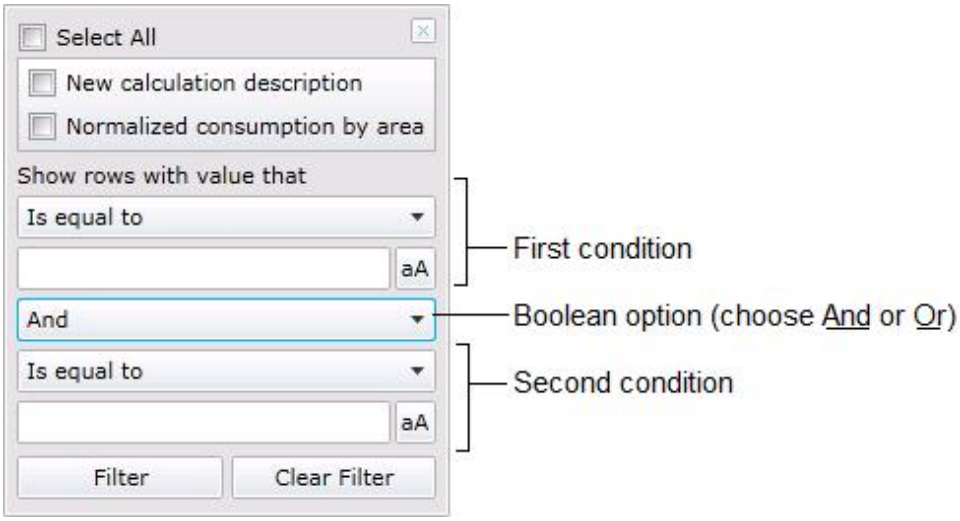

Figure 2.14 - Conditional Options for Filtering Rows in a Table

4. Click the **Filter** button to update the results in the table. In some cases, as you enter values, the data in the table is instantly filtered so you can see the result; in others you will have to click the Filter button to see updated results.

5. You can filter on more than one column. For example, you can filter the Name column to eliminate a few known rows, then filter on the Description column to display rows that rows that contain the word "West" in the description.

6. When you are done with a filter, simply click outside the filter box or click the popup box's **X** button to close it.

2.8.3. Clearing a Filter

You can tell which columns have a filter in place by the appearance of the column filters.

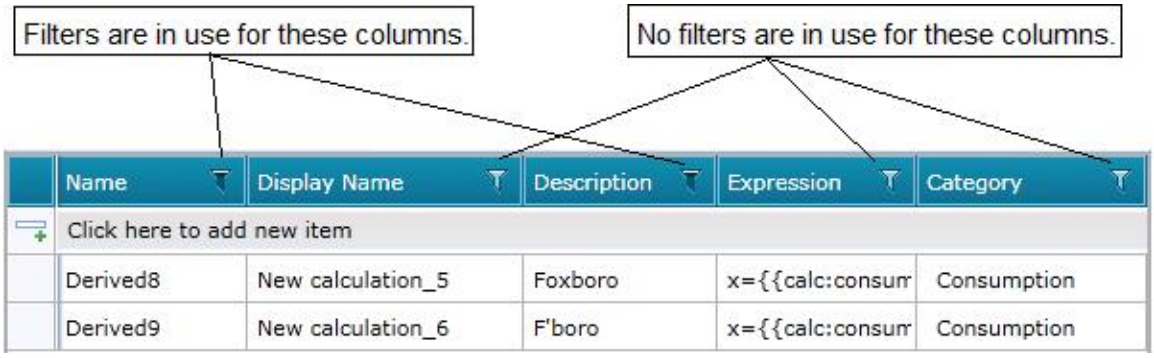

Figure 2.15 - Appearance of the Filter Icons in Column Headings

To clear a filter so that no rows are hidden based on that column:

1. Click on the filtered column's filter icon in the column heading. This opens the column's popup filter.
2. Click the Clear Filter button.
3. Click outside the popup filter or click the popup box's **X** button to close it.

2.8.4. Using Conditions in a Filter

In a column's filter popup window you can include up to two conditions for listing information, as shown in the sample below.

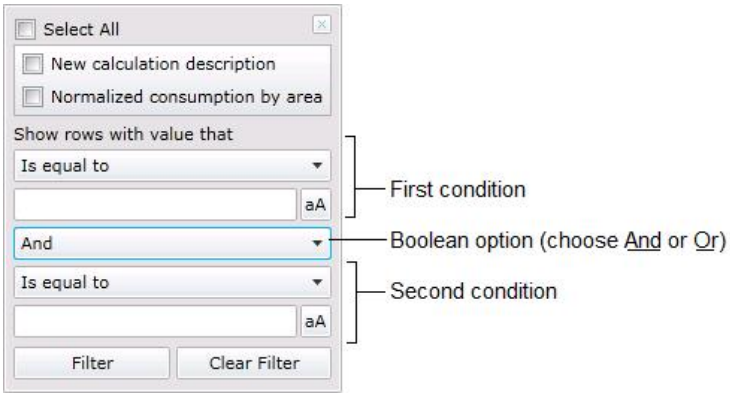

Figure 2.16 - Conditional Options for Filtering Rows in a Table

Each condition is made up the condition and the values for that condition. For the condition, you can select one of the following and enter an appropriate value in the field below your selection. If the value must be case-specific, you can click the **aA** button, also.

- **Is equal to**: Rows must contain the exact string that you specify as the value -- no more and no less.
- **Is not equal to**: Rows must not contain the exact string that you specify as the value.
- **Starts with**: Rows must begin with the string you specify as the value.
- **Contains**: Rows must have the string you specify as the value. For example, you might use this to list vendors with a phone number that contains "1-508".
- **Does not contain**: Rows must not have the string you specify as the value.
- **Ends with**: Rows must end with the string you specify as the value. For example, if you enter "USA" as the value, a row that has "Foxborough East USA" will be included but a row that has "Foxborough West U.S.A." will be filtered out.

Below are some examples.

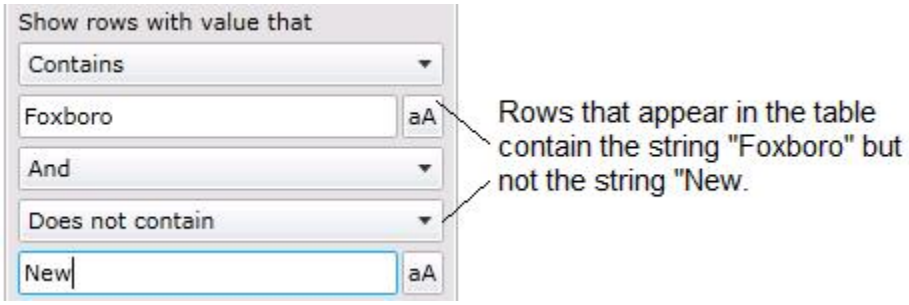

Figure 2.17 - Example 1

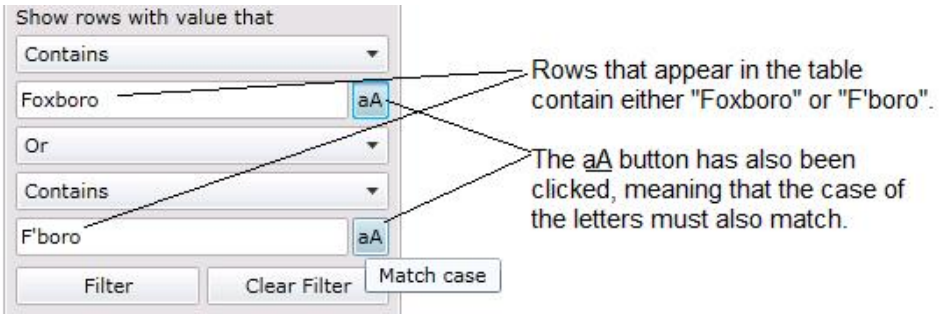

Figure 2.18 - Example 2

2.9. Switching Between Workbench-SL and PortalWorX-SL

Workbench-SL contains several configuration providers within the GENESIS64 HMI/SCADA suite, while PortalWorX-SL contains viewers and runtime options. There may be instances where users may wish to switch between both tools within the same browser.

2.9.1. From Workbench-SL to PortalWorX-SL

When you have Workbench-SL open in your browser, you'll notice certain product identifiers to let you know which of the two Silverlight-based tools you currently have open, as shown below. For instance, with Workbench-SL (running in Internet Explorer 9 in the example below), you'll notice Workbench-SL in the top window description, in the browser tab name and in the Default project name.

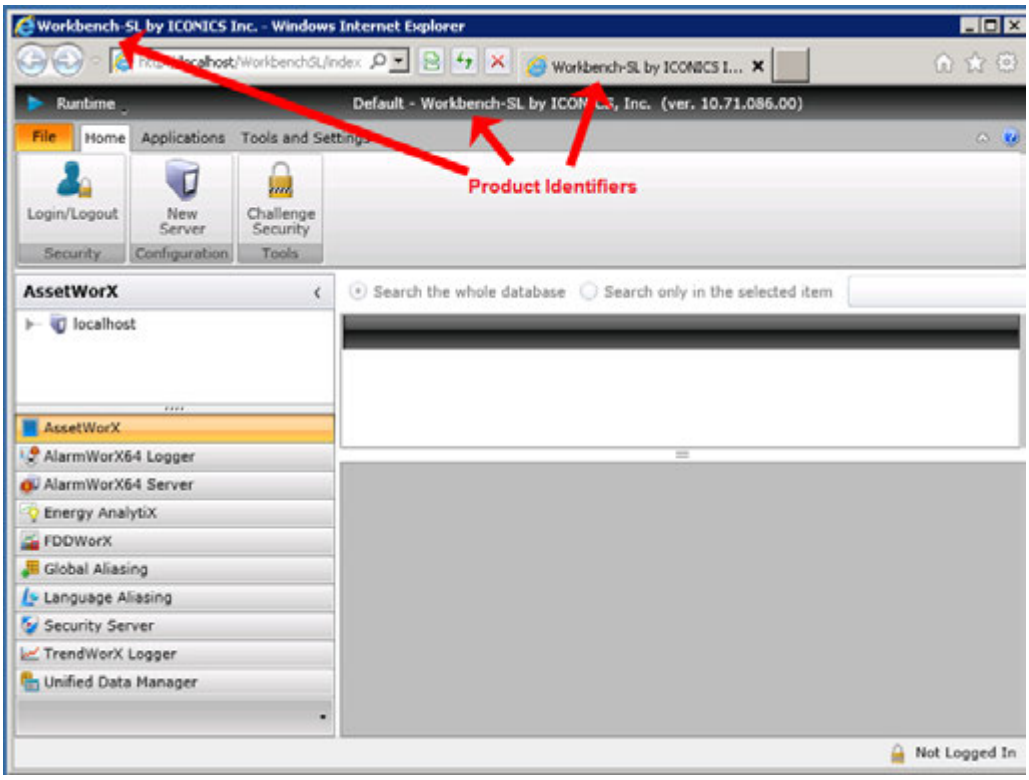

Figure 2.19 - Product Identifiers within Workbench-SL (Running in Internet Explorer 9)

Workbench-SL is the Configuration tool that you are presently using. If you wish to switch to PortalWorX-SL, you wish to use the Runtime tool so you will need to click on the Runtime button (Runtime) in the top left of the screen. This will open (continuing to use Internet Explorer 9 as the browser in our example) an additional tab containing the PortalWorX-SL Runtime tool.

2.9.2. From PortalWorX-SL to Workbench-SL

When you have PortalWorX-SL open in your browser, you'll notice certain product identifiers to let you know which of the two Silverlight-based tools you currently have open, as shown below. For instance, with PortalWorX-SL (running in Internet Explorer 9 in the example below), you'll notice PortalWorX-SL in the top window description, in the browser tab name and in the Default project name.

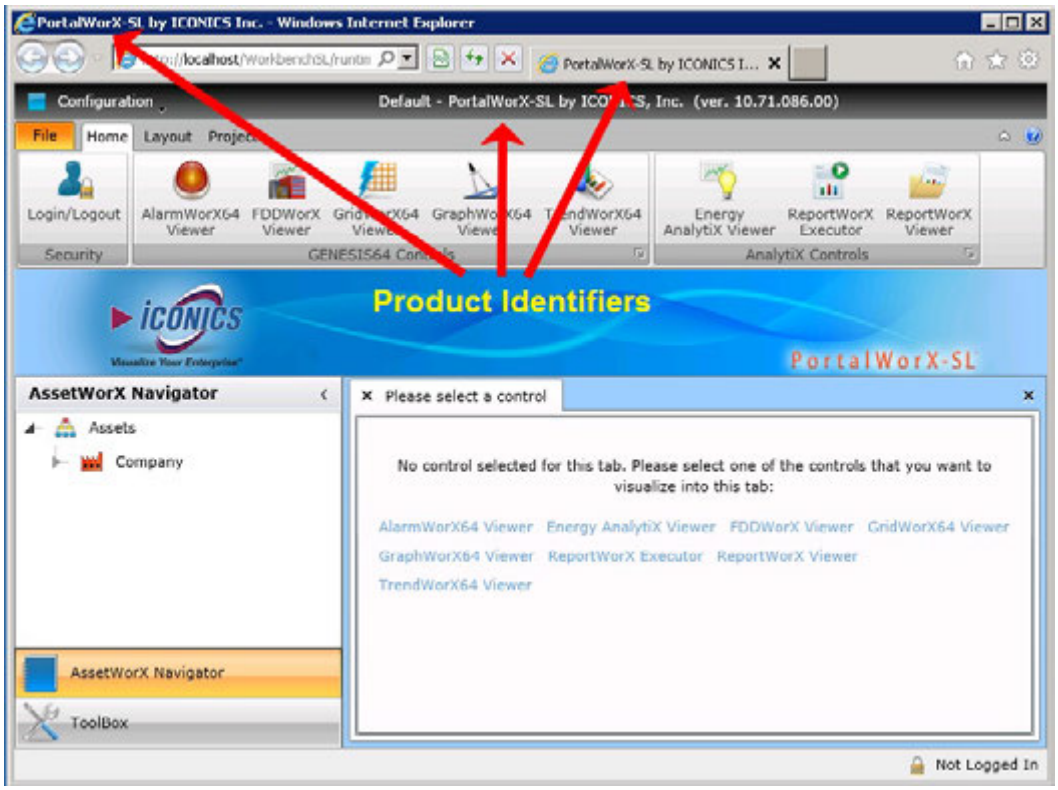

Figure 2.20 - Product Identifiers within PortalWorX-SL (Running in Internet Explorer 9)

PortalWorX-SL is the Runtime tool that you are presently using. If you wish to switch to Workbench-SL, you wish to use the Configuration tool so you will need to click on the Configuration button (Configuration) in the top left of the screen. This will open (continuing to use Internet Explorer 9 as the browser in our example) an additional tab containing the Workbench-SL Runtime tool.

2.10. Introduction to AssetWorX

When learning to use AssetWorX, one must first become acquainted with Nodes. Nodes are the expandable selection in the Asset Tree. For example, in the Figure below, underneath "AnalytiX Demo" you see the tree nodes "General Options, "Consumption," "Costs," "Carbon," "Calculations" and "Triggers." The individual Nodes are what composes an Asset Tree.

Figure 2.21 - Nodes in Asset Tree

Features of AssetWorX

- Designed for Massive Systems - able to handle millions of tags
- Object-oriented Database - to work with real world objects
- AssetWorX Runtime - store, cache and checkpoint tags
- Base for AnalytiX Products - integration with Energy AnalytiX/Facility AnalytiX

The asset tree provides a way to organize data sources (OPC, database, web services) and visualizations (such as human-machine interfaces (HMI), charts, and reports) in a logical hierarchical structure. For example, rather than OPC data sources being organized based on the address space of the server itself, these data sources can be organized by geographic/physical locations of the associated sensors (for example, by site, building, floor, and machine).

AssetWorX allows you to collect data from multiple applications and configures it into a single tree, organized in a logical structure that you define. AssetWorX comes with three predefined nodes at the highest level of the structure. These nodes are:

- **Assets**, which is where you configure your equipment and house your hierarchical asset tree.
- **Product Configuration**, which is where you identify your preferences for AssetWorX settings.

It is in these three nodes that you configure your asset tree, define the structure of the asset tree, and set general configuration options for AssetWorX.

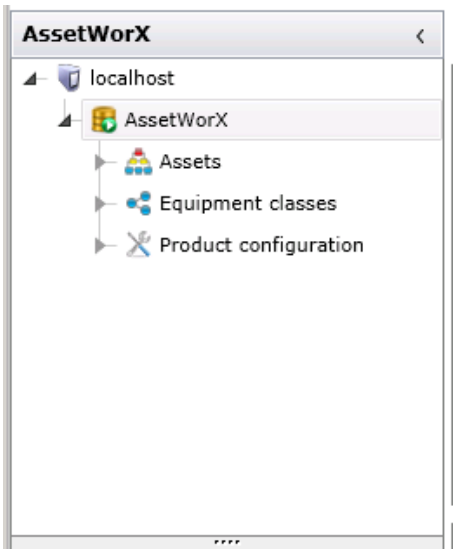

Figure 2.22 - The Three AssetWorX Nodes

At any enterprise, equipment is interconnected with its physical location and in business units that are easily organized hierarchically. You define the interconnected relationships of equipment using a tree-like structure called the **asset tree**. Each piece of equipment gets its own node in the asset tree. Each piece of equipment in the asset tree can have its own associated properties. A property might be a variable data source, a reference to an HMI graphic, or a static value. It is at these nodes where you can analyze data to obtain an ongoing, current energy analysis for each piece of equipment, where both configuration and runtime features are available.

In configuration mode, for each node in the tree, you can add properties like dynamic data connections or associated runtime layouts. In runtime mode, the tree becomes the interface from which runtime users launch reports and HMI layouts, as well as visualize alarm summary data.

The asset tree conforms to a hierarchy of tiers that are predefined in AssetWorX. The hierarchical structure of the assets follows the ISA-95 standard for organization levels. Each tier in the hierarchy represents a type of equipment, such as cities, campuses, buildings, product lines, stockrooms, and machinery. Rules for each tier determine how equipment can be configured on each tier. A set of default asset tree tiers is installed for you as an example, but it is expected that you will customize these tiers later on.

AssetWorX is a Workbench-SL tool for setting up the tools and applications that are used by other applicable Providers (for instance, Energy AnalytiX, FDDWorX, etc.).

AssetWorX has three main nodes:

- **Assets -** Defines equipment in the asset tree
- **Equipment Classes -** Defines templates that make it easier to define equipment
- **Product Configuration** - Configures settings for the products installed in the Silverlight Workbench

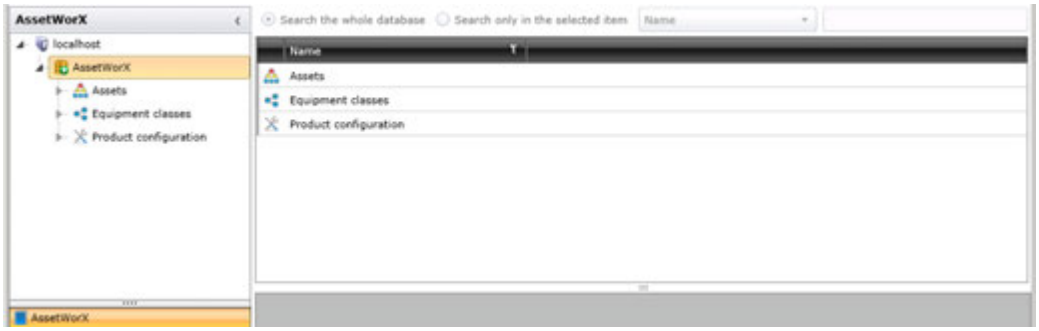

Figure 2.23 - AssetWorX in the Project Explorer's Tree View (Left) and Search Panel (Right)

2.10.1. Architectural Overview of AssetWorX

The AssetWorX provider found in GENESIS64's Workbench-SL provides data sources and visualizations (HMI, charts, etc.) in a logical hierarchical structure. The Asset Tree itself provides intuitive, easy setup and configuration to any level of aggregation, from an entire campus or enterprise down to a specific meter or user. AssetWorX, following ISA-95 and S88 standards for organizational levels, allows users to import AutoDesk BIM and Automation ML models for faster deployment.

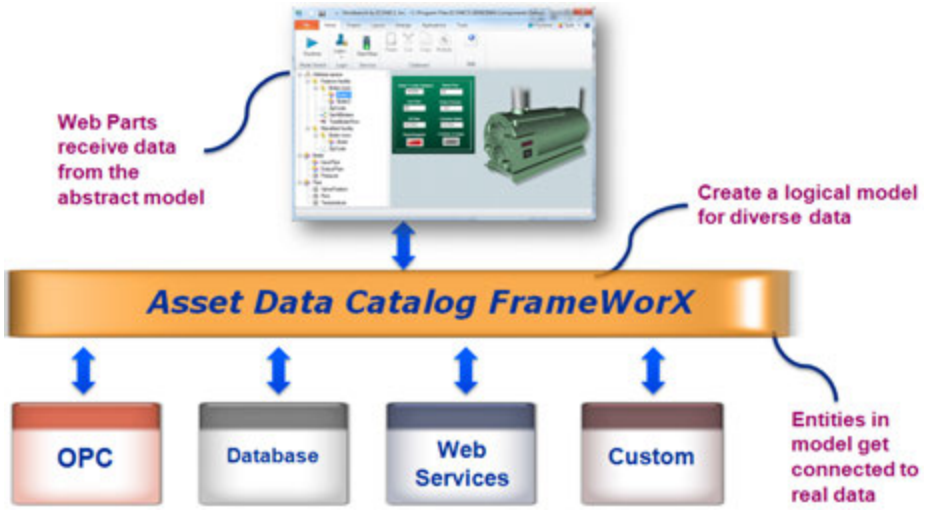

Figure 2.24 - AssetWorX Architecture

Below is an example of several asset tree characteristics.

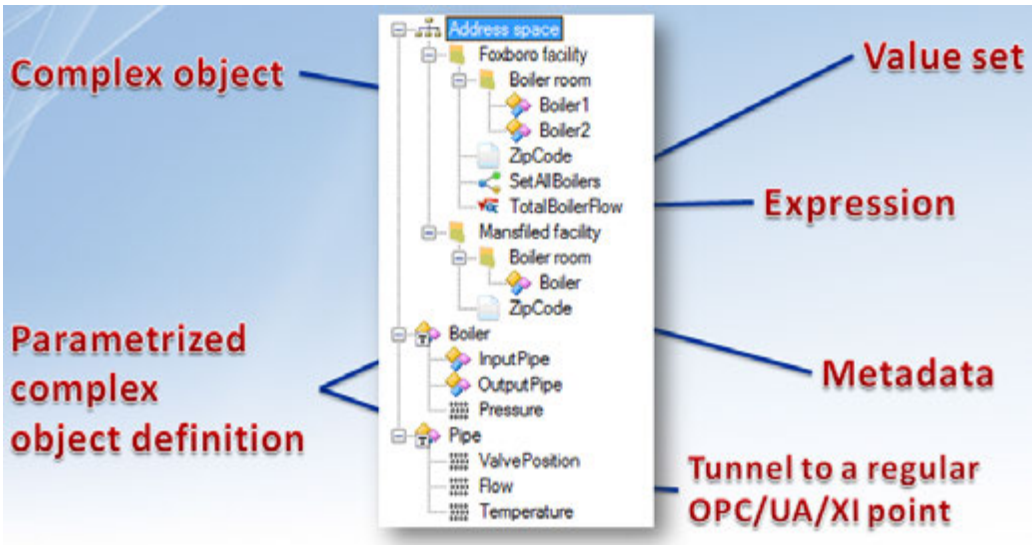

Figure 2.25 - Asset Tree Characteristics

2.10.2. Assets vs. Tags

Tags	Assets
Complex Path Structure	Tree Structure
Complex Naming ➤ @opc:…/…/…/… .Value	Simplified Naming ➤ Rapid Mixer 01
Varied Organization ➤ OPC Server Dependent ➤ Protocol Dependent	Hierarchical Organization ➤ Empty Asset Folders ➤ Parent/Child Relationships
BACnet/OPC-UA ➤ Object Oriented ➤ Non-Hierarchical Tags	Associated Properties ➤ Objects with Multiple Properties per Asset

2.10.3. Quick Start with AssetWorX

This section outlines the general steps you must take in order to use AssetWorX to build an asset tree. (Take note that "equipment nodes" are also known as "assets".)

1. Create an AssetWorX Configuration Database, Connect to it, and Activate it.
2. Define basic information required on the Product Configuration node.
3. Follow the Steps to Building an Asset Tree, then add equipment to the Asset Tree.

2.11. AssetWorX Configuration Databases

When you first launch AssetWorX in ICONICS' Workbench-SL, a default database will appear in the tree explorer. You have the option to either create a new database or connect to an existing one. In Workbench-SL, any AssetWorX database that you create is shared among all AnalytiX providers (e.g. Energy AnalytiX and FDDWorX). Any changes made to an AssetWorX database will be propagated to all AnalytiX providers. You will see an example of an existing and added AssetWorX database during this chapter's lab. Activating an AssetWorX Configuration Database

Setting the active database in AssetWorX sets the active database for all participating servers. You can add multiple databases within the AssetWorX tree explorer, but only one can be active at any time. This concept will be reviewed in the lab for this chapter.

2.11.1. Exporting and Importing

2.11.1.1. Exporting Data from AssetWorX

You can export data from an AssetWorX database, asset tree, or equipment class node to a .CSV (comma-separated values) file. The file can then be imported into AssetWorX for use elsewhere. Note that you can export from any equipment node in the asset tree, or from any equipment class. The name you assign to the .CSV file that is created should identify the exported content.

2.11.1.2. Importing Data into AssetWorX

You can import data into the AssetWorX database or into the asset tree or equipment class node. It is assumed that the data you want to import has been exported from an AssetWorX database and is stored in a .CSV (comma-separated values) file. Be aware of the data being imported so that you import it to an appropriate location in the Project Explorer. For example, do not import equipment classes into the asset tree.

2.12. General Setup in AssetWorX

2.12.1. Enabling the Available Solutions

When you create an asset, you will have the option of adding the Energy AnalytiX extension. If the Energy AnalytiX solution is disabled, the option of adding the extension will also be disabled. This is done via the 'Available solutions' branch of the 'Product configuration' node in the AssetWorX provider, as shown below.

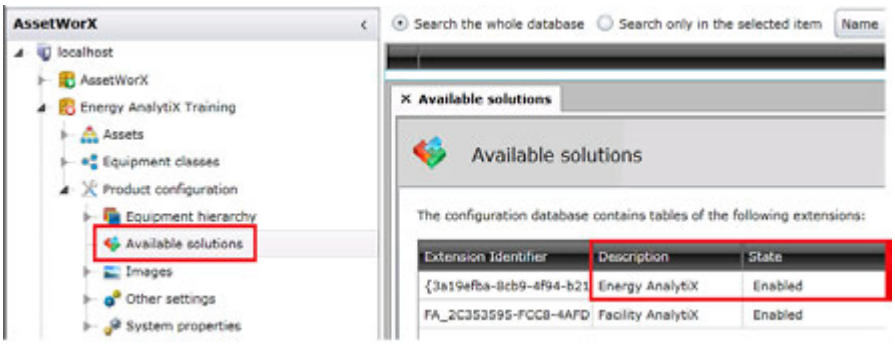

Figure 2.26 – Available Solutions: Energy AnalytiX Enabled

2.12.2. Other Settings Node

In AssetWorX, the Product Configuration node is where you set your system settings. In the Project Explorer, under ***localhost*** → **[the name of your AssetWorX database. In our examples, we've named it '*AssetWorX*']** → ***Product Configuration***, select **Other Settings**. This displays the Other Settings window, shown below. Within the Other Settings window are the General and Caching tabs.

General Tab - Deals with Equipment Classes, which you will learn about later in this training.

Figure 2.27 - Other Settings: General Tab

Caching Tab

The **Data Store** section of the Caching tab within 'Other settings' allows you to set a data storage location.

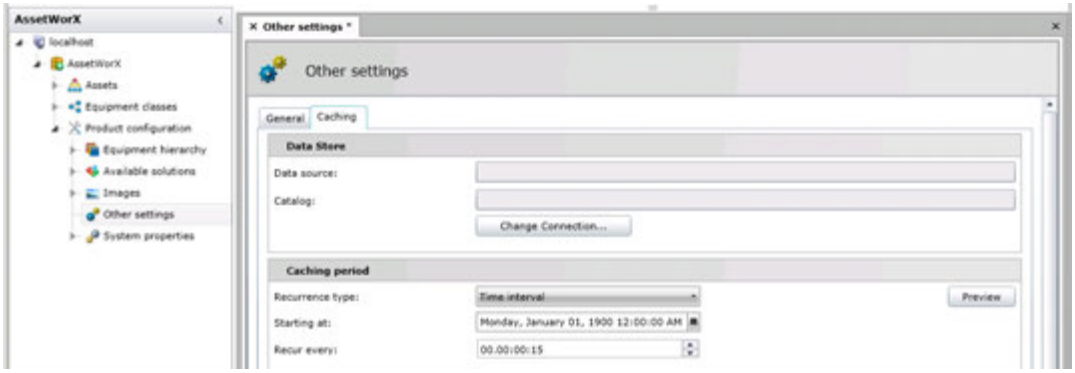

Figure 2.28 - Other Settings: Caching Tab

Data Store - The Data Store section of the Caching tab within 'Other settings' allows you to set a data storage location. Clicking on the 'Change Connection' button opens the following window:

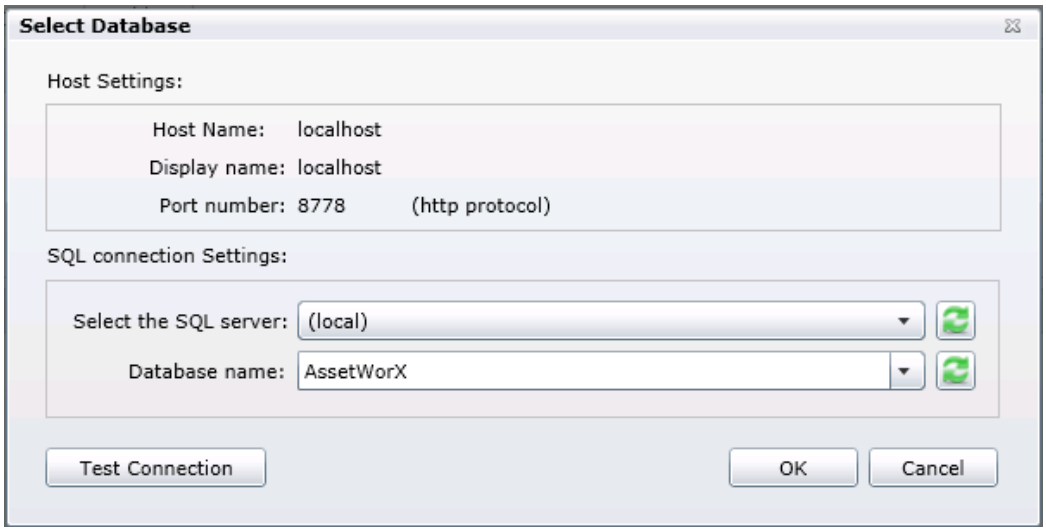

Figure 2.29 - Select Database Window

Use the pull-down menus to select a SQL server and Database name. Should you wish to make sure the connection will work, click on the 'Test Connection' button. Once you have made you selections, click the 'OK' button to return to the Caching tab of the 'Other settings' window. Your selections will now appear in the 'Data source:' and 'Catalog:' fields.

Caching period - The Caching period section of the Caching tab allows you to set a time period for caching data.

Recurrence Type - Choose from One time only, Time interval or Specific dates and times.

Starting At – This function allows users to decide when caching should first occur (either once or repeatedly at a programmable time). You can enter a day, date and time in the text entry field OR click on the calendar button ( ). Clicking the calendar button opens a calendar selection tool. Select your date and time, then click 'Close'. Your selected day, date and time will appear in the text entry field.

Recur every - This function allows users to decide how often caching should occur. Set the amount of days/minutes/hours/seconds you wish the caching to recur. Highlight a day/minute/hour/second section within the text entry field and use the up and down arrows to change in set increments.

Click 'Apply' to save your settings or 'Apply & Close' to save your settings and return to the main Workbench-SL/AssetWorX provider screen.

2.12.2.1. AssetWorX Server Caching

Benefits of AssetWorX Server Caching are:

- Values of properties can be stored persistently
- Data is served to clients faster than OPC Servers that may be slower
- Stores values written from the client

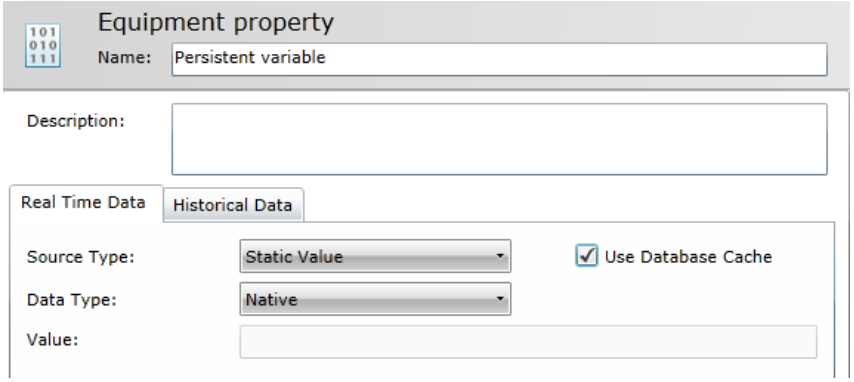

Figure 2.30 - Database Caching Selected within an Equipment Property in AssetWorX

2.13. How to Build the Asset Tree

In AssetWorX, the asset tree defines the physical distribution of equipment and assets for your corporation. In the Equipment node of the configuration database, you build the asset tree to be used by your enterprise for all aspects of reporting and rolling up costs for your business. If you will be installing additional providers, the providers place requirements on the asset tree that you must familiarize yourself with **before** adding equipment to the asset tree in AssetWorX. For example, if Energy AnalytiX and FDDWorX are or will be installed, the asset tree is where you will be reporting and calculating energy consumption, energy-related costs, and carbon emissions. It is also where fault reporting will be generated for FDDWorX.

2.13.1. What Is the Asset Tree?

The asset tree is a structure that represents the physical locations and/or business configuration of your enterprise. It contains buildings, equipment, product lines, and other components that affect costs at your company. Once built, it is a navigational tool for you to use for navigating your corporate structure. Runtime users will have access to the asset tree, and will be able to navigate it for running reports that are available to them through providers that are installed for use in Workbench-SL.

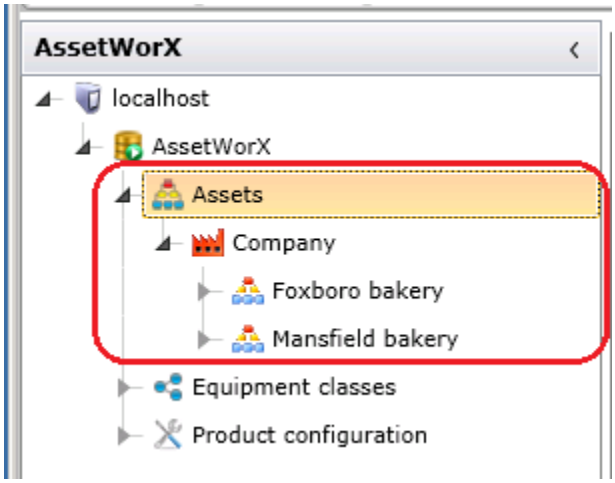

Figure 2.31 - The Asset Tree Resides on the Asset Node

The levels in the asset tree are determined by the equipment hierarchy, and cannot break from the hierarchy's rules. The illustration below shows a sample asset tree (on the left) with the equipment hierarchy that regulates it (on the right).

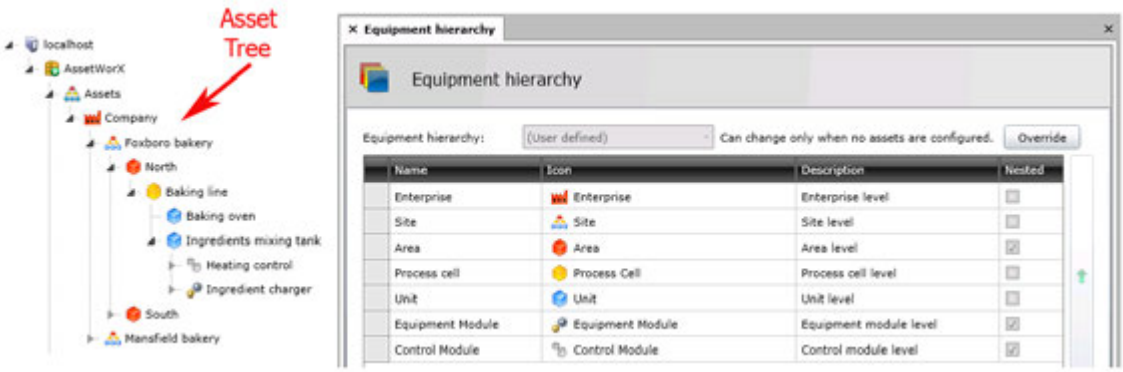

Figure 2.32 - An Asset Tree and its Regulating Equipment Hierarchy

2.13.2. Equipment in the Asset Tree

In order to be able to report on equipment, you must define all of the physical equipment you want to report on. In defining equipment, you need to consider the providers you will be using the asset tree for. If you will be installing the ICONICS Energy AnalytiX and/or FDDWorX providers, then these providers place requirements on the asset tree that you must familiarize yourself with **before** adding equipment to the asset tree. For an understanding of the requirements that any particular provider has, refer to the documentation for that provider before building the asset tree.

As you define equipment, you embed it into a hierarchical reporting structure called an asset tree. Each tier of the asset tree categorizes and defines the equipment for that level. In Workbench-SL, the asset tree appears in the Project Explorer. A default asset tree is installed for you but it is expected that you will override it with your own equipment structure.

AssetWorX displays in a tree-like structure in Workbench-SL's Project Explorer. An example of an asset tree is shown below. Note that the company has two bakeries (Foxboro bakery and Mansfield bakery), and the Foxboro bakery is divided between the North and South branches. The North branch's baking line is expanded so you can see some of its equipment.

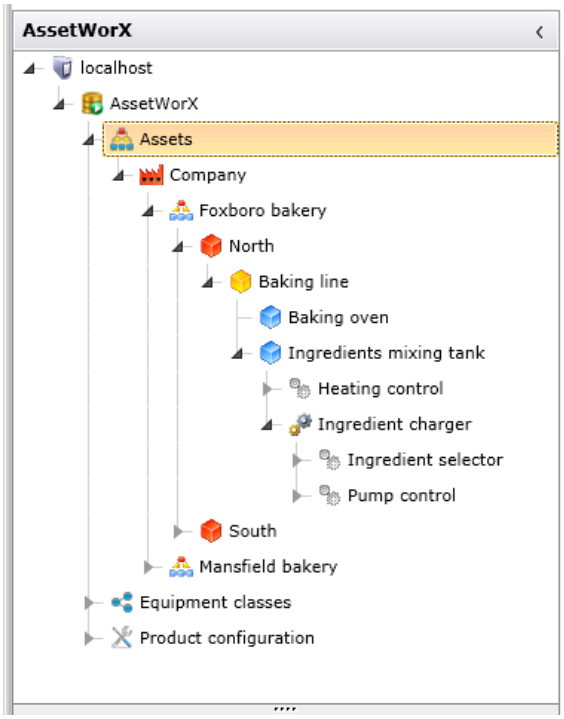

Figure 2.33 - Sample Asset Tree

This is just one example of an asset tree. Obviously, yours will be unique to your company's needs. For that reason, before you begin you must plan out your asset tree structure to make sure you have included all equipment and to make sure it is organized in a way that makes its use intuitive and useful.

Make sure you include all types of equipment you want to report against. Start at the highest level, such as a corporate entity or a geographic region, then break that level out into more detail about equipment that is lower in the asset tree. Continue with each level until you have worked your way down to individual robots, machinery, or other equipment such as meters. Once you have a plan that includes everything you want to report on and that accounts for future plans, too, you can create your asset tree.

Obviously, you have equipment that can be seen physically in front of you, such as robots, production lines, and plants. But you can also create *logical* structures such as business units that group your physical equipment into a hierarchy which you can use to review availability, performance and quality on a broader scale.

2.13.2.1. Equipment Placement in the Asset Tree

If you are using other providers with AssetWorX, those providers may require where in the asset tree some equipment is placed. For example, if Energy AnalytiX is installed, the placement of meters is critical to your ability to analyze energy consumption. It is critical that you pay attention to the requirements to each of the providers that are not installed today, but also the providers you plan to install in the future.

2.13.2.2. Icons in the Asset Tree

Note that equipment in the asset tree has icons. You can specify the icons that represent certain types of equipment tiers, equipment nodes, and equipment classes. Use these icons in a way that lets users easily identify the nodes in the tree. Providing well-planned icons gives your users a way to quickly and easily identify locations, buildings, types of equipment, types of meters, and so on. Make sure to use icons in a way that can provide this type of ease.

2.13.3. Strategies for Building the Asset Tree

Before building your asset tree in AssetWorX, it is important that you put together a strategy. The structure you ultimately create must reflect all of the needs for all of the providers you will be installing for use in the AnalytiX configuration database. You do not want to have to change its structure once it is built. Also, you should be aware of all of the tools available to you for building it so that you can exploit features that will help you.

2.13.3.1. Plan Before You Start!

First of all, make sure you are familiar with what the asset tree is and what it provides for you. This means reviewing all of the documentation for setting it up **before** you actually build the asset tree.

Then, if you will be using Energy AnalytiX, FDDWorX, or other providers, refer to the online help and documentation for those providers before you construct the asset tree. This is important to do up front because once your asset tree is created you can no longer take advantage of the template capabilities that are available with aliasing. You can apply uniform information only while building the nodes of the asset tree; after that you will be maintaining each node individually. For that reason, set aside time to plan before you move ahead.

Of particular importance are the following considerations:

- Make sure you understand the Steps to Building an Asset Tree.
- **Some providers' requirements** may prompt you to change the structure of your *asset tree*. For this reason alone, it is important that you consider any future requirements you may have, also.
- Create an asset tree that is **easy to add to and modify**. For example, if you will be adding buildings or changing energy technologies, make sure the asset tree you create will be easy to change.
- Use **icons** in a way that makes the asset tree easy to work with. You can provide your own icons that represent certain types of equipment tiers and equipment nodes,. Use these icons in a way that lets your users easily identify the nodes in the tree. Providing well-planned icons gives your users a way to quickly and easily identify locations, buildings, types of equipment, types of meters, and so on. Therefore, use icons in such a way, as to provides that type of ease.

- Come up with a strategy for applying **permissions** for runtime users to access equipment nodes in the asset tree, along with types of commands in each node's runtime menu. You can use the asset tree's structure to exploit the ability for equipment nodes to inherit the permissions set in parent nodes. The strategy for granting permissions is described in the Defining User and Group Permissions for Equipment topic as well as the Permissions Tab for Equipment topic. Permissions in the asset tree use the Security Server users, groups, and settings defined using the Classic GENESIS64 Workbench.

- Familiarize yourself with all of the **tools** in AnalytiX providers, including the ability to "Make Copies Using the Multiply Function", "Export Data", and "Import Data".

2.13.3.2. How to Proceed

Follow these general steps in order to build the asset tree:

1. Review the AssetWorX documentation as well as the documentation of all providers in Workbench-SL, and then plan what the tiers and structure of the asset tree will be. Create the equipment hierarchy (Defining Tiers for the Asset Tree).

2. Start adding equipment nodes to the asset tree (Adding Equipment to the Asset Tree).

2.13.4. Establishing the Tiers of the Hierarchy

Why do you need an Equipment Hierarchy with Tiers? When you configure your equipment in AssetWorX, you create an **equipment hierarchy** that specifies which types of equipment belongs at each tier of the asset tree. Doing this controls the structure of the asset tree by preventing you from accidentally assigning certain types of equipment to inappropriate tiers, and it also controls whether an asset level can have multiple tiers of equipment at each level. Therefore, the equipment hierarchy applies universally throughout the configuration database's asset tree.

When you first install AssetWorX, you will find that there are three different equipment hierarchies provided for you to choose from, each with their own predefined tiers. You can alternatively decide to define a hierarchy of your own choosing. Your options include the following:

- The **Batch Production** equipment hierarchy consists of tiers that structure the equipment typically used in batch processing.

- The **Building Automation** equipment hierarchy consists of tiers for buildings and campuses.

- The **Discrete Manufacturing** equipment hierarchy consists of tiers for the equipment that is frequently found in discrete manufacturing.

- The **User Defined** option lets you choose of the preexisting equipment hierarchies as a starting point, and lets you define the tiers that you need for your installation. You can add any number of levels, and can even define and add iconic images that uniquely identify each tier.

You can use these levels as they are, rename them, delete them, move them, and add more levels. Do what you need to do so that they suit your enterprise's purposes. The objective you want to keep in mind when doing so is that each tier defines a specific type of equipment that occupies that tier.

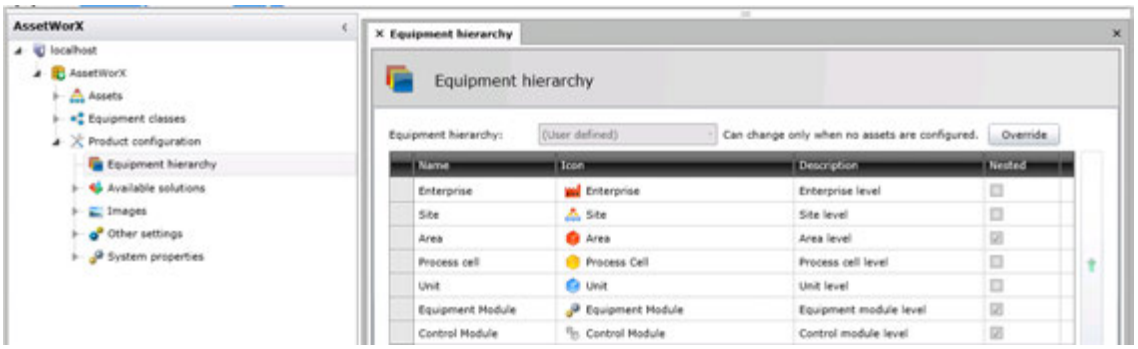

Figure 2.34 - Asset Tree (left) and the Equipment Hierarchy that Controls it (right)

2.13.4.1. Understanding the Rules of the Equipment Hierarchy

Before you define the tiers of the equipment hierarchy, put together a plan for structuring your company's equipment in a tree-like structure. Then define the tiers of the equipment hierarchy in AssetWorX. You can add images that identify each level.

So that you can do this, it is important that you understand how the hierarchy works.

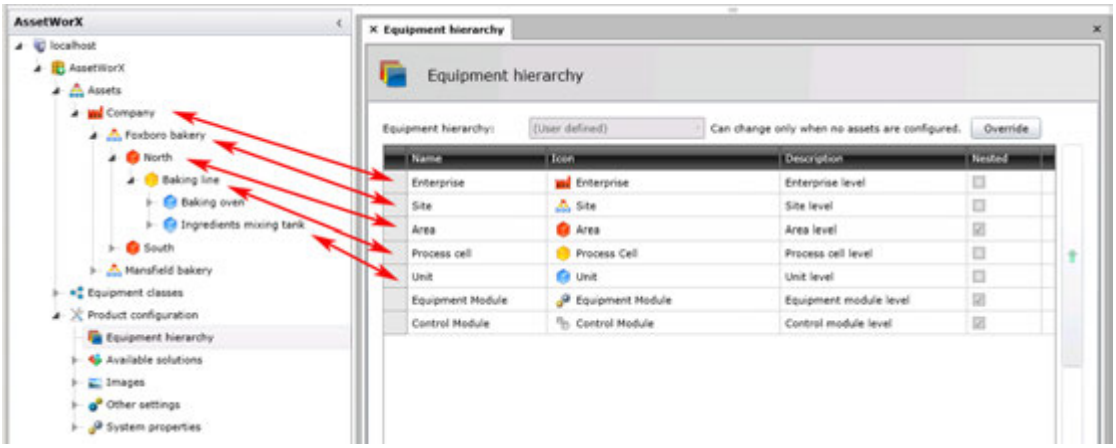

Figure 2.35 - Asset Tree (left) and the Equipment Hierarchy that Controls it (right)

Here are a few rules you need to keep in mind when deciding what you want the tiers of the equipment hierarchy to be:

- **Each tier identifies a type of logical or physical equipment.** Furthermore, each tier is intended to be a summarized version of the tier below it so that, as you work your way down the hierarchy you find that each tier is made up of the equipment at the next lower tier. For example, if the enterprise is made up of sites, each site is made up of areas, each area has process cells, each process cell has units, and so on. The tiers in this example are Site, Area, Process Cell, Unit, and so on.
- **Equipment that you add to the asset tree cannot skip tiers.** For example, if you are using the tiers listed in the prior bullet item, the Site's child tier always contains equipment definitions for areas, and an area's child tiers are always equipment definitions for process cells. An area cannot have a child tier full of equipment definitions for units.
- **A tier can repeat itself for more than one level if you identify the tier as one that can be *nested*.** This means, for example, that facilities can contain other facilities.
- **The tiers display in the sequence, from broadest to most details, from top to bottom.** Once equipment is defined to a tier in the asset tree, you cannot raise or lower that tier in the equipment hierarchy.

2.13.4.2. Defining the Tiers of the Equipment Hierarchy

Use the Equipment Hierarchy tab to identify asset levels in your asset tree, by following these steps:

1. In AssetWorX, in the Project Explorer navigation tree expand ***localhost*** → **[the name of your AssetWorX database. In our examples, we've named it '*AssetWorX*']** → **Product Configuration**.
2. Click on **Equipment Hierarchy**. This opens the Equipment Hierarchy tab, which looks like this:

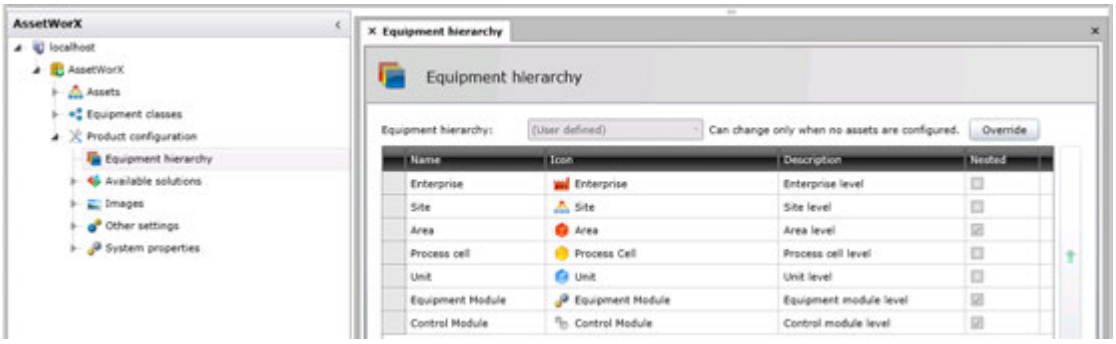

Figure 2.36 -Equipment Hierarchy Defines the Tiers of the Asset Tree

3. If there are assets in the asset tree already, an **Override** button appears on the tab. You cannot change the equipment hierarchy unless you click the Override button.

4. From the **Equipment Hierarchy** drop-down list, select the hierarchy you want to use for this configuration. If you are creating the hierarchy for the first time, choose the hierarchy that is closest to the one you want to use, then follow the steps below to modify it.

5. To add a new tier to the hierarchy, click on the gray row that says **Click here to add new item**. The row becomes enabled so that you can define a new tier. Enter the following:

   a. Enter a **Name** for the new tier.

   b. Choose the **Icon** to represent the tier in the equipment hierarchy. You can use any .jpg or .png as a placeholder if you like. For help creating and configuring a new icon, refer to the Configuring icons for the equipment hierarchy section, below in this topic.

   c. Enter a **Description**.

   d. If more than one level of equipment can be created in the asset tree for this tier, put a checkmark in the **Nested** column. If only one level of this tier can be created in the asset tree, leave the checkbox empty.

6. Click **Apply** to save the new tier.

7. Now, with the tier still selected, click the down arrow at the right of the table to move the tier to the position where it belongs in the hierarchy. Click the up and down arrows to position the new tier in the hierarchy. Note that the new tier cannot be inserted above any tier that has equipment in it in the asset tree.

8. Repeat these steps to define additional tiers.

9. To remove a level, select the level and press the **Delete** key on your keyboard.

10. Click **Apply** to save the change, or click **Apply & Close** to also close the tab.

2.13.4.3. Configuring Icons for the Equipment Hierarchy

Tiers in the equipment hierarchy and equipment in the asset tree are represented by small, iconic images that have been configured in the AnalytiX Catalog. If you are adding a new tier to the equipment hierarchy, you must choose an icon in AssetWorX that will represent the tier in the hierarchy. You can use any image as a placeholder until you have finalized the images you will be using.

Uses

Icons in the equipment hierarchy are used by default for each tier in the asset tree. You can, however, use icons for each individual type of equipment which you select at the time you add equipment to the asset tree. For example, you can use the icon of an office building for the Building tier of the hierarchy, but when you add a warehouse, select the warehouse icon instead. If you are using Energy AnalytiX, you can create a separate set of icons that identify meters and utility sources.

You can create icons that represent:

- **Tiers in the equipment hierarchy.** For steps to associate icons with tiers, refer to the Defining tiers for the asset tree topic. Icons that are defined for tiers are used by default for any equipment node that you add to the asset tree without the use of an equipment class.
- **Individual types of equipment in the asset tree.** For steps to associate an icon with any equipment node in the asset tree, refer to the Adding Equipment to the Asset Tree topic. Equipment that you add to the asset tree is given a default icon that you can override for that equipment node.

Strategies

Plan out the icons you intend to use. How you use them and set them up will be determined by your enterprise, the complexity of your asset tree, and the needs at your organization. Keep in mind that the icons in the asset tree will be used not only by the personnel who configures providers in the Workbench-SL, but also by runtime user who are viewing charts and reports. For this reason, you might want to set strategies in place for colors and shapes that you use in the asset tree, to make equipment in the asset tree easy to identify.

AssetWorX comes to you with some default images in place. You can use these images or create your own. If you want to use your own, then you must configure them in AssetWorX by following the steps provided below. The images must be saved to a file in a **.JPG** or **.PNG** format.

Steps

To Configure an Icon for Use in a Tier of the Equipment Hierarchy:

1. Open Workbench-SL, and click the AssetWorX provider button in the Project Explorer.

2. **Expand** *localhost* → [the name of your AssetWorX database. In our examples, we've named it "*AssetWorX*"] → Product Configuration.

3. Right-click on the **Images** node and select **Edit** or **Edit on New Tab**. This opens the Images tab, which looks like this:

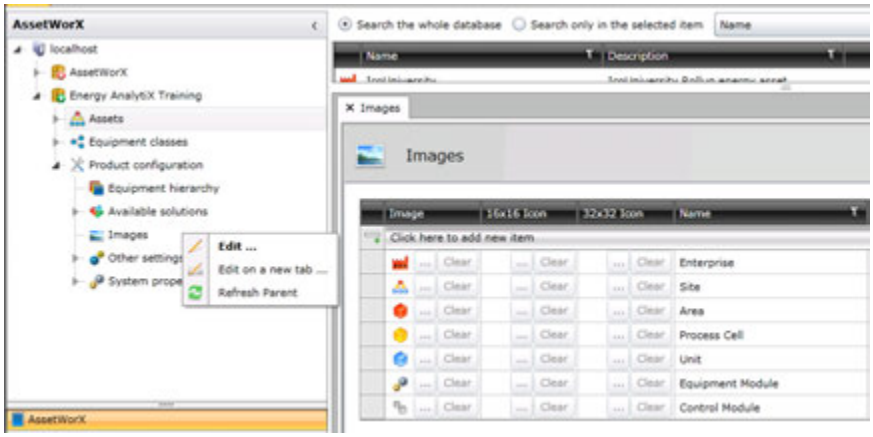

Figure 2.37 - Configure Icon Images for Use in the Equipment Hierarchy

4. Click on the gray row that says **Click here to add new item**. This enables the row.

5. Click the ellipsis button [...] in the **Image** column to choose the image as it will appear in the asset tree. This opens an Open dialog where you must navigate to the .jpg or .png file created for this purpose. Select the file and click the **Open** button; the dialog box closes and the file image appears in the Image column.

6. Optionally, in the **16x16 Icon** column you can choose a 16-pixel by 16-pixel version of the icon. If you leave this column empty, the icon in the Image column is used by default.

7. Optionally, in the **32x32 Icon** column you can choose a 32-pixel by 32-pixel version of the icon that appears on the Equipment tab when you are modifying equipment values. If you leave this column empty, the icon in the Image column displays on the Equipment tab.

8. Enter a **Name** and **Description** for the new tier.

9. Move it to the correct location in the hierarchy by clicking the up and down arrow buttons at the right.

10. Click **Apply** to save the change, or click **Apply & Close** to also close the tab.

2.14. Assets in the Tree

2.14.1. Adding Equipment to the Asset Tree

In order to do production, energy, facility, or any other type of analysis on equipment at your enterprise, you must build your equipment into an asset tree. Equipment can be added to the asset tree one tree node at a time.

- You can create equipment classes (which are templates) for individual types of equipment, and then use those equipment classes as a basis for adding equipment.
- You can build equipment classes into a tree structure that can be copied to the asset tree and used as a basis for building equipment into your asset tree.
- You can control which equipment is visible within an Asset Navigator within certain platforms (GraphWorX64, WebHMI, PortalWorX-SL, PortalWorX-SP and/or MobileHMI).
- On the Equipment form there are several tabs, including the Properties tab, Commands tab, Permissions tab, and + tab.

2.14.2. Steps to Building an Asset Tree

In the "Strategies for Building the Asset Tree" topic, we looked at ways in which you can build the asset tree in AssetWorX. It is critical that you pre-plan and formulate a strategy for the creation of the asset tree.

Before you Begin

- Review the documentation of ***all other providers*** that are installed or will be installed.
- Create a strategy for building an asset tree that incorporates all of the other providers.
- Create the tiers of the asset tree as described in the Why an Equipment Hierarchy with Tiers? topic.

Top-Down Strategy

To build the asset tree, you must start at the top-most tier in the equipment hierarchy and work your way down to the bottom-most tier of the equipment hierarchy. The asset tree is always contained in the Assets node in AssetWorX. Here is a general description of how you get started:

1. In Workbench SL, open AssetWorX if it is not already open. (You can open it by clicking the AnalytiX Catalog provider button in the Project Explorer.)

2. Expand ***localhost*** **> [the name of your AssetWorX database. In our examples, we've named it '*AssetWorX*']**, and then right-click **Assets**, and select **Add Equipment**. This displays the Equipment form, with the **Properties** tab on top.

3. In this tab, note your options in the **Level** drop-down list: you can only select the level or levels that are allowed by the rules defined in the equipment hierarchy. So when you define an asset directly under the Asset node, you can select only the top-most tier of your equipment hierarchy; in the example below, the top-most level is Enterprise. At this level, the equipment you are defining is most likely a business entity or location.

Figure 2.38 - Level Drop-down List

4. After defining the top-most level of your asset tree, now you can begin to define the next level of the asset tree. To do this, in the Project Explorer, right-click the equipment you just added to the Asset node and select Add Equipment again. Once again, this displays the Equipment form, with the **Properties** tab on top, except that now you are one level down in the equipment hierarchy. In the example below, this is the Site level.

Figure 2.39 - Site Level

5. You can continue to build the asset tree in this way, one equipment record at a time, or you can set up equipment classes that you can use a templates for creating similar pieces of equipment quickly and easily. Note that you can even set up structures of equipment classes that for quickly setting up multiple levels of the asset tree in one action.

2.14.3. Adding Equipment to the Asset Tree

In order to do production, energy, facility, or any other type of analysis on equipment at your enterprise, you must build your equipment into an asset tree. There are a few ways you can do this:

- You can add equipment to the asset tree piece by piece
- You can create equipment classes (which are templates) for individual types of equipment, and then use those equipment classes as a basis for adding equipment
- You can build equipment classes into a tree structure that can be copied to the asset tree and used as a basis for building equipment into your asset tree
  The steps provided below describe how to add equipment one node at a time. On the Equipment form there are several tabs, including the Properties tab, Commands tab, Permissions tab, and + tab; each tab is shown below. Alternately, you can use equipment classes as templates to speed things up; for more about equipment classes, refer to the "Using an Equipment Class to Add an Equipment Node to the Asset Tree" topic.

To Add Equipment to the Asset Tree:

1. In Workbench SL, open AssetWorX if it is not already open. (You can open it by clicking AssetWorX provider button in the Project Explorer.)
2. Expand ***localhost*** **> [the name of your AssetWorX database. In our examples, we've named it '*AssetWorX*'] > Assets**. This takes you to the asset tree.
3. If you are just beginning to build your asset tree, start by adding the topmost tier (or tiers) to the Asset node itself. Expand the asset tree so that you can see the asset you want to add the asset to.

4. Right-click the asset you want to add the asset to, and select **Add Equipment**. This displays the Equipment form, with the **Properties** tab on top, as shown in the following image. For a description of the fields on this tab, refer to the Properties Tab for Equipment topic.

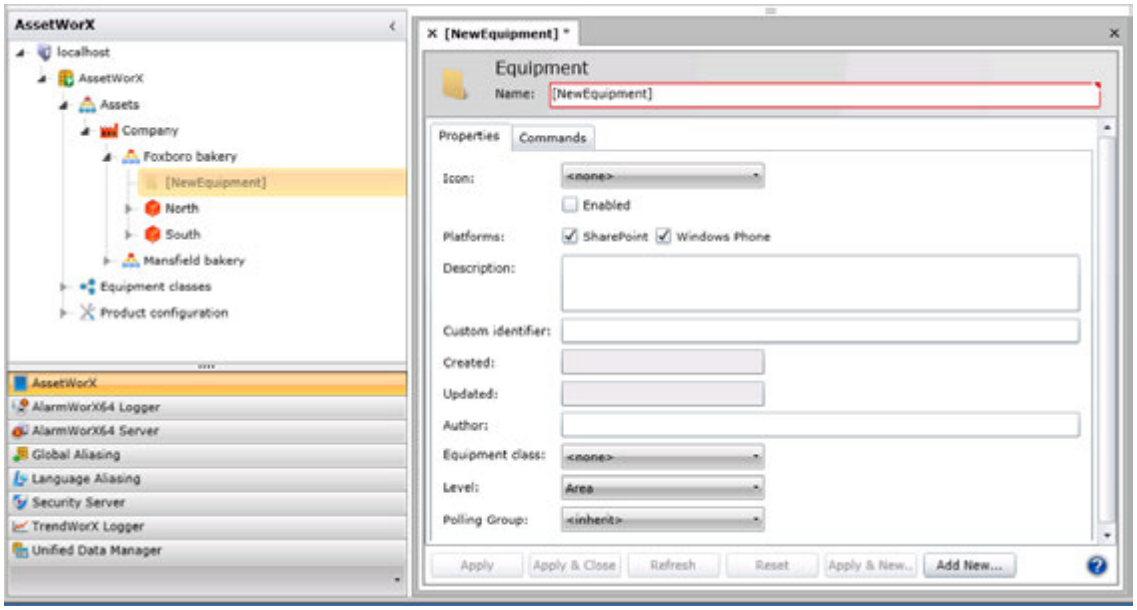

Figure 2.40 - Equipment Form - Showing the Properties Tab

A second tab called **Commands** is also available, as shown below. On this tab, you Set up Commands for Runtime Navigation. For more help using this tab, refer to the "Commands Tab for Equipment" topic.

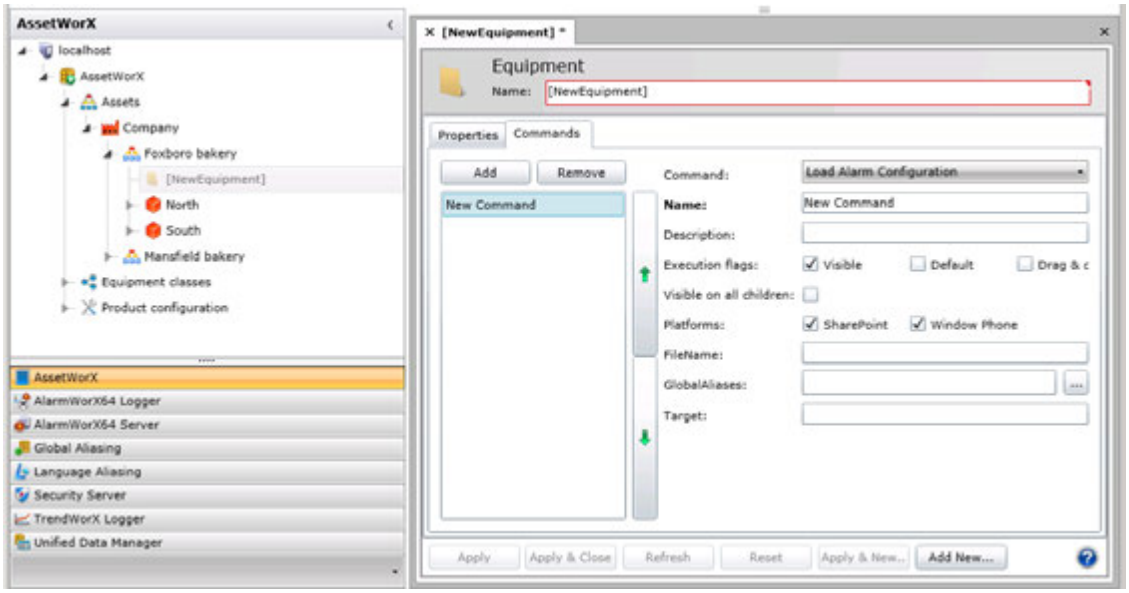

Figure 2.41 - Equipment Form - Showing the Commands Tab

When you save the new equipment record, an additional tab, the + tab, appears. Use this tab to add tabs to the form, as shown in the following image. In this example, the asset is an energy asset, so the Add New drop-down list lets the user configure the equipment for use in Energy AnalytiX. If FDDWorX is installed, the user could also configure the equipment for use with it, too. This tab is described in the + Tab for Equipment topic.

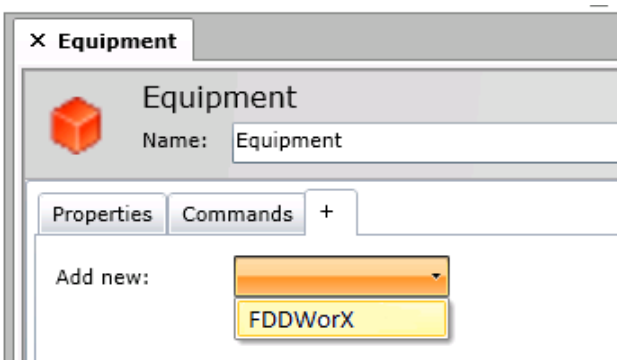

Figure 2.42 - Equipment Form - Showing the + Tab

For example, if the user elects to select Energy AnalytiX so that the equipment can be included in analysis in Energy AnalytiX, the tab shown below would be added to the form. For more about application-specific forms, refer to the help for the applications that appear in the + tab's **Add New** drop-down list.

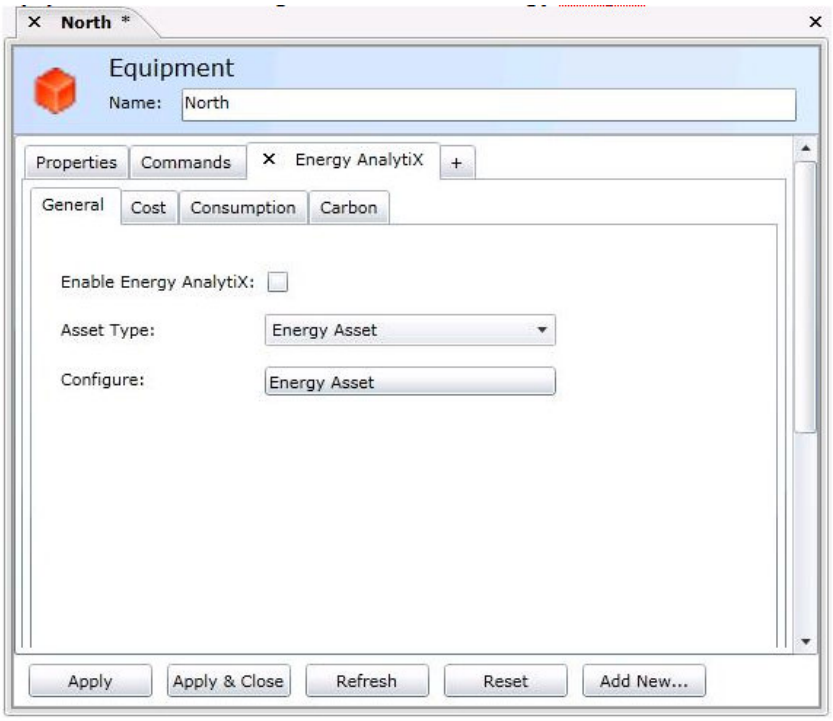

Figure 2.43- Equipment Form - Showing an Added Tab for Energy AnalytiX

2.15. Asset Security

GENESIS64 uses a security model that is both granular and additive. You can set individual rights and access based on users and groups, create named policy settings that can be applied to users and groups, and control access to individual applications, features, systems, and more based on time settings if you wish. The Security Server, the service that provides user and group policy-based security to the different GENESIS64 applications and features, offers a powerful means for configuring access to your applications. The security model evaluates the membership of users and groups and will deny access to a user when that feature is denied to them regardless of the group's access rights. However, if a user's access isn't specified as 'Denied' or 'Allowed', then the group membership sets the access policy.

The security system contains two components:

- **The Security Server** which manages user logins, and
- **Security system clients** contained within the applications in the GENESIS64 family (e.g., GraphWorX64 , TrendWorX64 , AlarmWorX64, etc.). Any stimulus that causes a change in security status (e.g., a user login or logout) will be immediately posted to the affected clients.

Security settings are configured in the Security Server using the classic Workbench or Workbench-SL.

2.15.1. Asset Security Priveleges for Users and Groups

The Security Server, as shown in the following figure, offers nearly identical security options for user accounts and for groups. You can apply security restrictions at the group level, the user level, or both. The Security Server uses the following rules for determining whether a privilege is extended or denied to a user based on his or her security:

1. If a user lacks a privilege and is added to a group that has that privilege, the privilege is extended to the user.

2. If a user or group has a privilege that is denied, then that privilege is denied to the user even if the user was allowed that privilege at the user account level. **Denials always take precedence**.

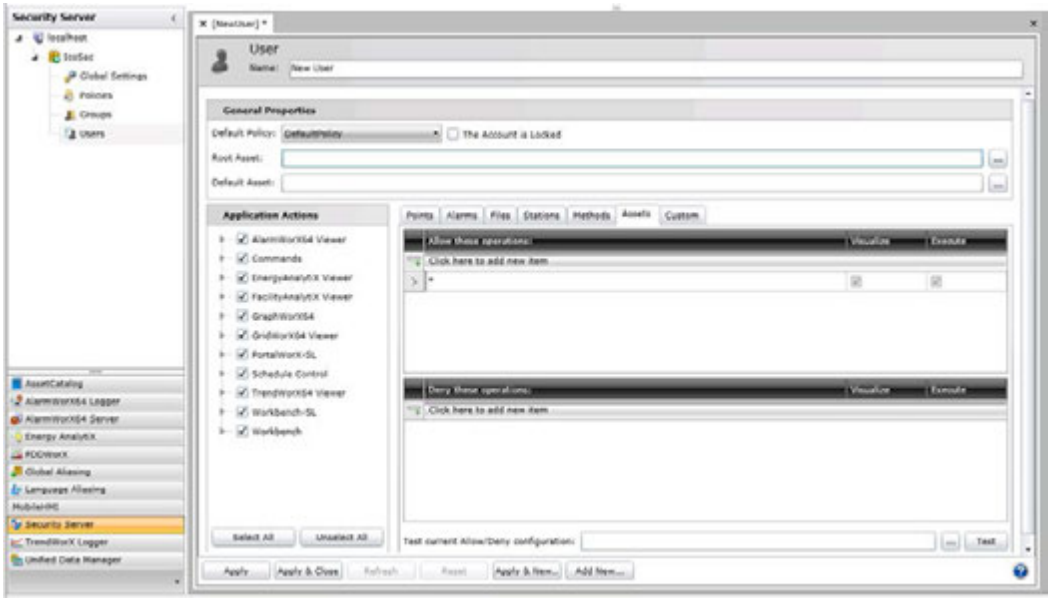

Figure 2.44 - New User Form within the Security Server Accessed via Workbench-SL

The **General Properties** section of the User form (or of the Groups form) allows you to:

- Set a Default Policy (if already set through the Policies node in the same Security Server provider) as well as lock the account.
- Set a Root Asset (where the set security is carried through all its contained assets)
- Set a Default Asset.

Clicking the ellipsis [...] button opens the data browser, shown below, where you are able to select your specific asset.

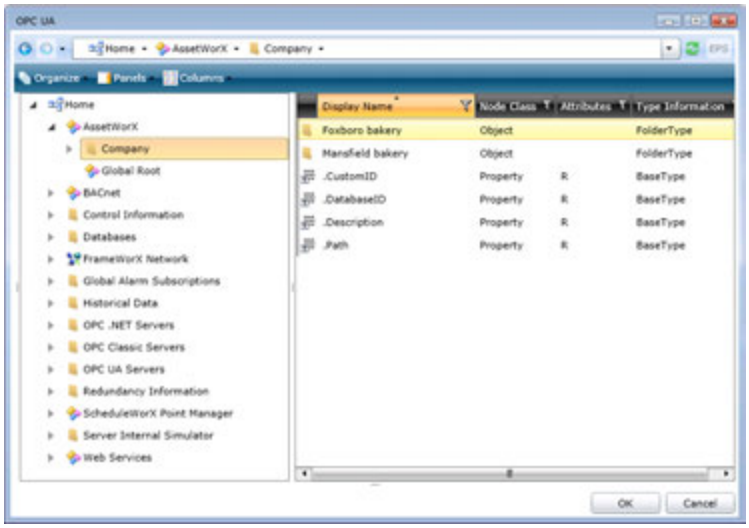

Figure 2.45 - Using the Data Browser to Select Either a Root or Default Asset for Security Priveleges

Once you define a group or user account, you define its privileges. The **Applications Actions** section of the User (or Group) security settings provides the ability to Allow or Deny the use of certain features within GENESIS64 components. Most relevant to this training is the 'Commands' section, shown below. All components are allowed by default, with a checkmark signifying the User (or Group) is currently able to use that feature. Removing the checkmark and saving the User's (or Group's) security setting means that feature will be restricted.

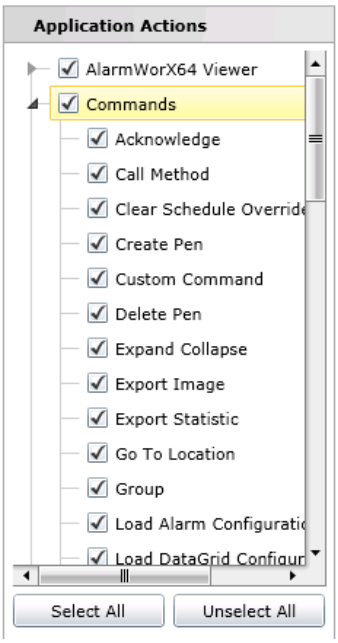

Figure 2.46 - Application Actions Section of the User Security Settings Form

Further security privileges (for a User or Group) can be defined by using the several listed tabs (Points, Alarms, Files, Stations, Methods, Assets and Custom). Note that the Application Actions section of the User or Group properties remains visible, regardless of which of these tabs is selected. This training will cover the 'Assets' tab. (More information on the Security Server, and the other tabs in the User or Group security settings, is available in other training sessions and materials.)

The Assets tab allows you to select specific assets (using the ellipsis button [...] to access the Data Browser) and allow visualization and/or execution operations for that asset or deny them, as shown in the following figure.

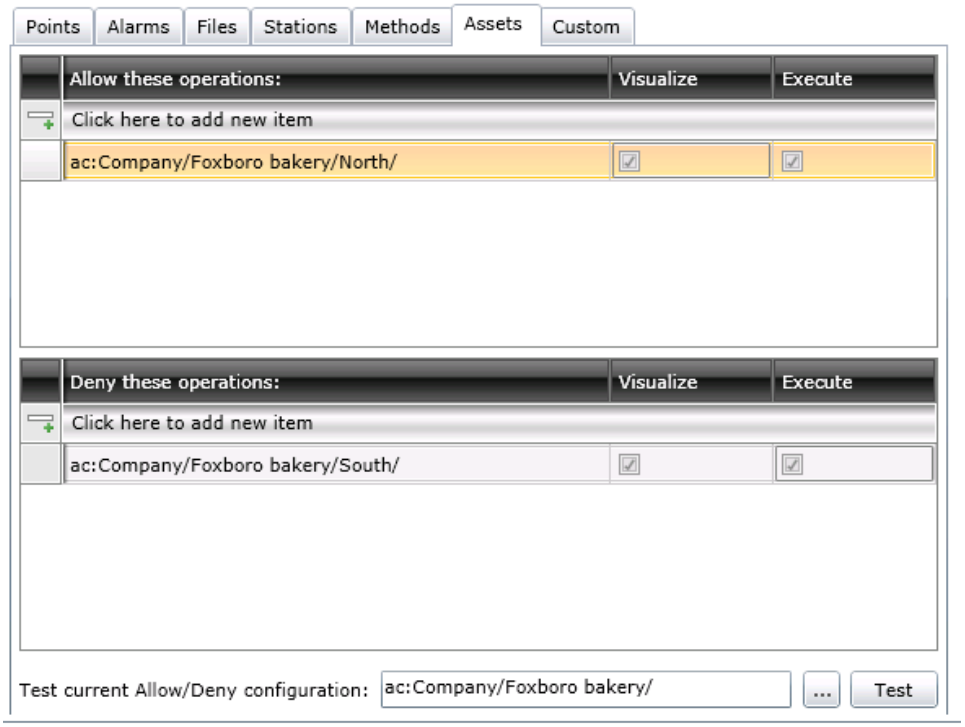

Figure 2.47 - Allowing/Denying Asset Operations for a User in the Security Server Provider in Workbench-SL

In the figure above, this specific user would be allowed to both visualize and execute operations for the /Foxboro bakery/North asset, but would be denied visualization or execution for the /Foxboro bakery/South asset.

Lab: Building the Asset Tree L2

2.1. Lab Overview

With Lab 1 complete, your training configuration is intact and tested. With this lab, we will build the asset tree that corresponds to the icTonics project.

Estimated time to complete this lab: 30 minutes

2.1.1. Task Checklist

In this lab, you will complete the following tasks:

- Build an asset tree in Workbench Silverlight that correlates to the icTonics project created during the GENESIS64 Standard training.

Note: If you have not attended the GENESIS64 Standard training, your instructor should have delivered the Lab1 support file: AdditionalFeaturesPackageFile.pkgx.

2.1.2. Support Files

You do not need any support files to complete this lab.

2.2. Preparing the icTonics Asset Tree

There are some prerequisites, e.g. installing Silverlight, that are required in order to work in a Silverlight browser session. In the next few sections, we'll set up our systems to accommodate PortalWorX-SL and Workbench-SL. Let's get started!

2.2.1. Enabling Internet Explorer File Download

For training at the Foxborough, MA facility, we use a Windows Server class operating system. Although GENESIS64 is certified for Windows 2012 Server, at the moment, we're using Windows 2008R2 Server.

I mention this because the operating system version affects how Silverlight gets installed. We will have to make an **Internet Explorer Security** change to **Enable File Download**. Here we go.

1. Select **Start** → **Control Panel** → **Internet Options** to launch the Internet Properties dialog.

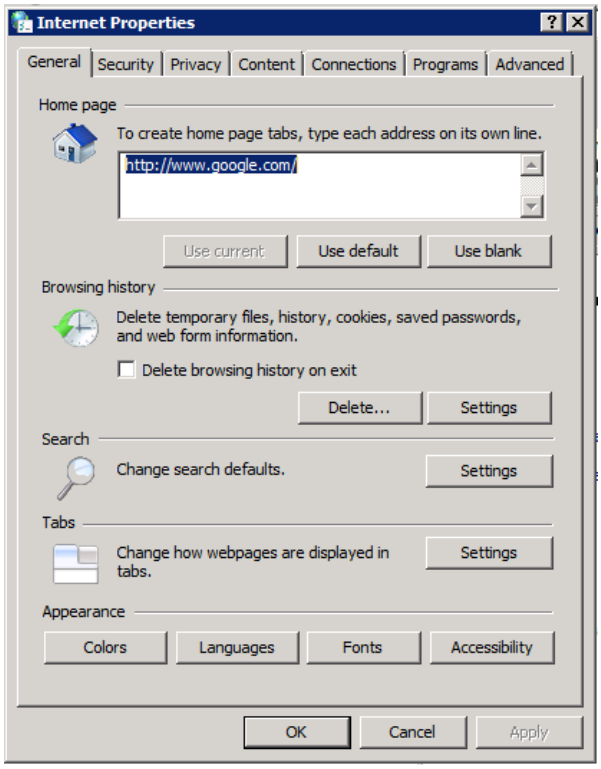

Figure L2.1 – Configuring Internet Options

2. Select the **Security** tab.

3. Select the **Internet Icon**.

4. Click on the **Custom level** button.

5. Click on the empty section of the scroll bar on the right 5 times to expose the **Downloads** property.

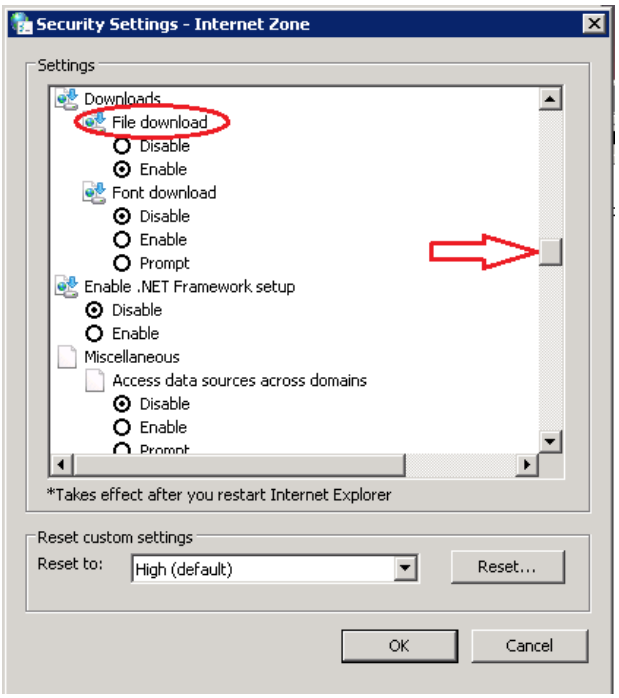

Figure L2.2 – Configuring Internet Options

6. **Enable** the '**File Download**' property.

7. Click **OK**.

8. Click Yes to confirm the Zone Settings Change. Keep the **Internet Options** dialog **open**.

2.2.2. Adding your Host to the List of Trusted Sites

1. From within the **Internet Options** dialog, select the **Security** tab.
2. Select the **Trusted Sites** icon.
3. Click on the **Sites** button.

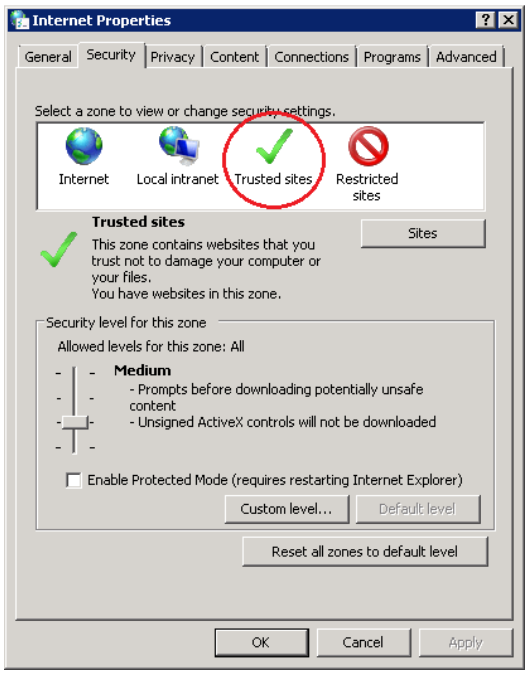

Figure L2.3 – Internet Explorer Trusted Sites

4. **Uncheck** the "**Require server verification (https") for all sites in this zone**" checkbox.
5. In the "**Add this website to the zone:**" field, enter: **http://localhost**.
6. Click **Add**.
7. Click **Close**.
8. Leave the Internet Properties dialog open.

2.2.3. Configuring Internet Explorer Cache

The following setting is suggested during development. However, for performance reasons, you may want to leave this setting Automatic at the time of deployment.

1. From within the **Internet Options** dialog, select the **General** tab.
2. In the **Browsing history** section, click on the **Settings** button.
3. Under the header "**Check for newer versions of stored pages:**", select the "**Every time I visit the webpage"** radio button.
4. Click **OK.**
5. Click **OK** again to close the **Internet Properties** dialog.
6. Click **OK** again.

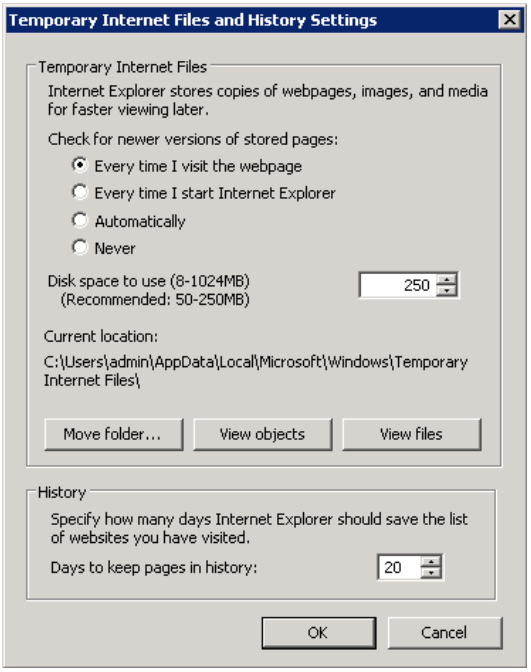

Figure L2.4 – Internet Explorer Cache Setting

Note: From within PortalWorX hitting the F5 key will force Internet Explorer to refresh the webpage. This may be necessary after making changes to a Silverlight version of GraphWorX64, TrendWorX64, AlarmWorX64, etc… file that is used in a PortalWorX64 viewer.

2.2.4. Installing Silverlight

Silverlight is an add-on to Internet Explorer. When you launch Workbench-SL for the first time, you will be prompted to install Silverlight, if it is not already installed.

1. Launch **Workbench-SL** by selecting **Start → All Programs → ICONICS → Workbench-SL**.
2. You may see a Login dialog. **Log in** with the username and password you used to install GENESIS64.
3. When you see the **Silverlight dialog,** click on the '**Click Now to install**' button.

Figure L2.5– Silverlight Installation Dialog

4. Click **Run** and follow the **Silverlight installation** instructions.
5. You should see a "**Installation Successful**" notification. Click **Close**.
6. **Press F5 to refresh** the Internet Explorer session and to **launch Workbench-SL**.

2.2.5. Creating the icTonics Training Database

1. From within Workbench-SL, be sure the AssetWorX provider is selected in the navigation tree on the left side, as seen in the figure below.

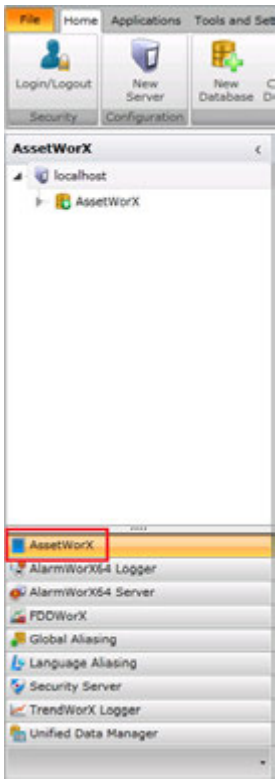

Figure L2.6 – AssetWorX Provider in the Workbench-SL Navigation Tree

2. Right-click on the "localhost" node in the AssetWorX navigation tree and select "**New Database**", as shown in the figure below.

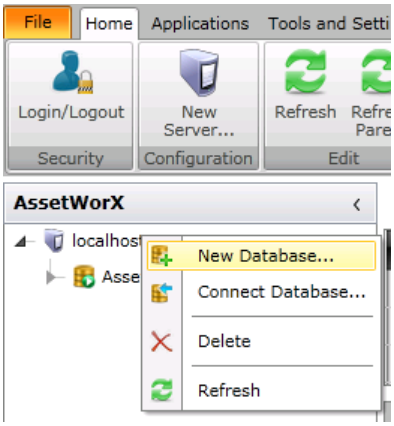

Figure L2.7 – Creating a New Database in Workbench-SL

3. You will see a message indicating that the changes you are about to make will be propagated to other AnalytiX providers. Click **OK** to continue.

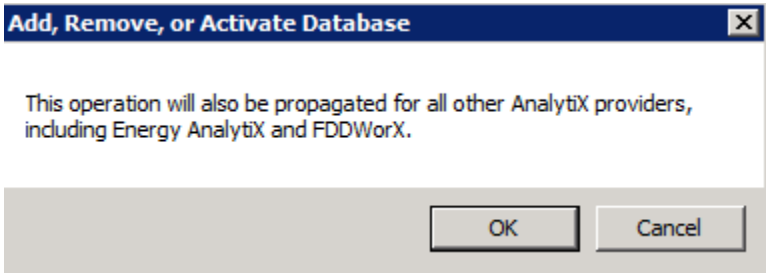

Figure L2.8 – Creating a New Database Propagates Changes to all AnalytiX Providers

4. The "**Create a new Database**" dialog box will appear when "loading" is complete. Enter the **Database name: "icTonics"** (without the quotes).

5. Confirm that the "**Include sample data**" checkbox is **unchecked**.

6. Leave the remaining fields as they are and select **OK** to continue.

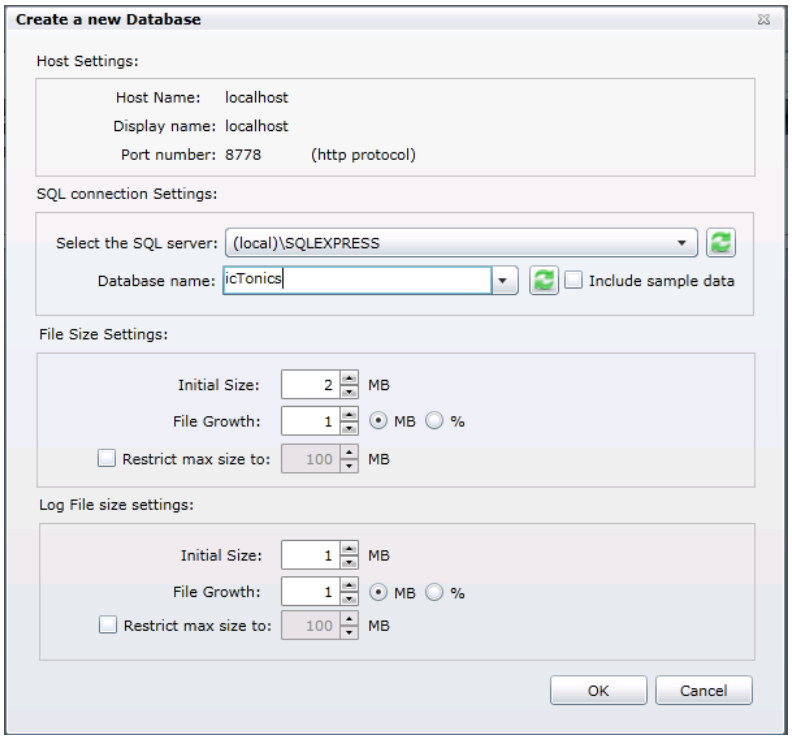

Figure L2.9 – Create a New Database Dialog Information

7. When the database creation is complete, in the navigation tree on the left, you will see a second node under localhost called "**icTonics**". This entry will have a red circle on the icon. This **Red** (**Not Active**)/**Green** (**Active**) indicator defines which database is currently Active.

2.2.6. Making the icTonics Database Active

When we created the icTonics training database, we learned that the AssetWorX provider can support multiple databases in one project instance. However, it is important to note that only one database can be Active at one time.

When GENESIS64 is installed, by default, the AssetWorX database is active. We will select our icTonics training database and make this the active database.

1. The figure below shows the Asset Tree collapsed for each database.

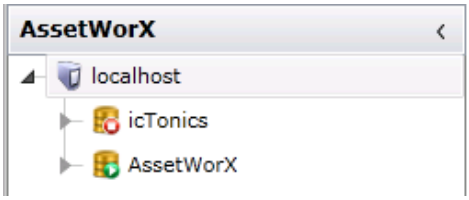

Figure L2.10 – Two AssetWorX Databases

2. The AssetWorX database has a Green (Active) icon.

3. The icTonics training database has a Red (Not Active) icon. Select the **icTonics** training database with a right mouse click and select **Make Active**.

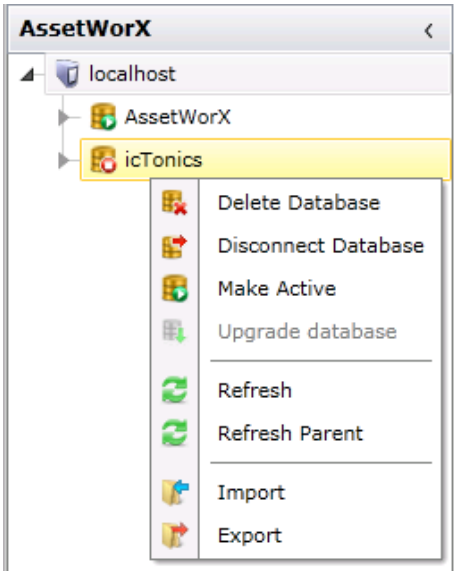

Figure L2.11 – Switching the Active Database

4. You will see a message indicating the changes you're about to make will be propagated to other AnalytiX providers.

5. Click **OK** to continue.

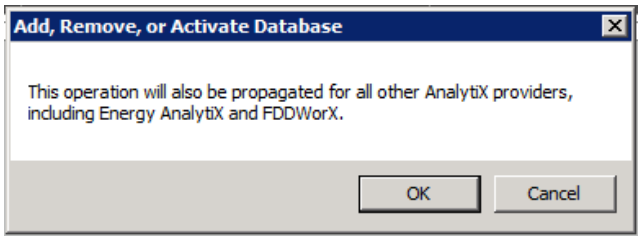

Figure L2.12 – Creating a New Database Propagates Changes to All AnalytiX Providers

6. The icTonics training database icon should turn green and the AssetWorX icon should turn red.

2.2.7. Building an Asset Tree

At any enterprise, equipment is interconnected with its physical location and in business units that are easily organized hierarchically. You can define the interconnected relationships of equipment using a tree-like structure called the **Asset Tree**.

Now that we have the icTonics training database created, we will need to add our assets. Through the execution of the following steps, we will create an asset tree similar to the structure defined in the figure below.

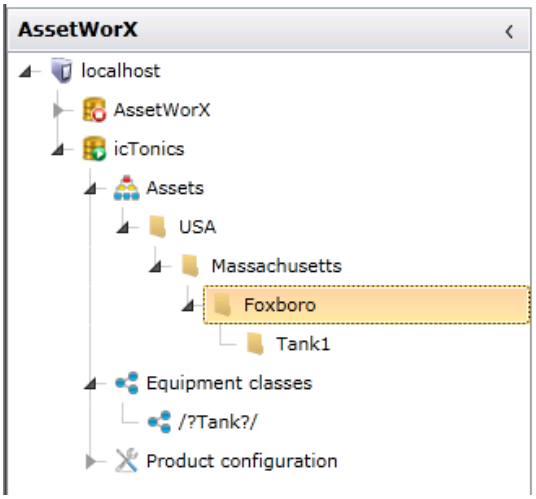

Figure L2.13 – Training Class Asset Structure

1. Let's proceed by right-clicking on the **Assets** node under the **icTonics** training database. Then, select **Add Equipment.** (Notice that you are in the **Properties** sub tab.)

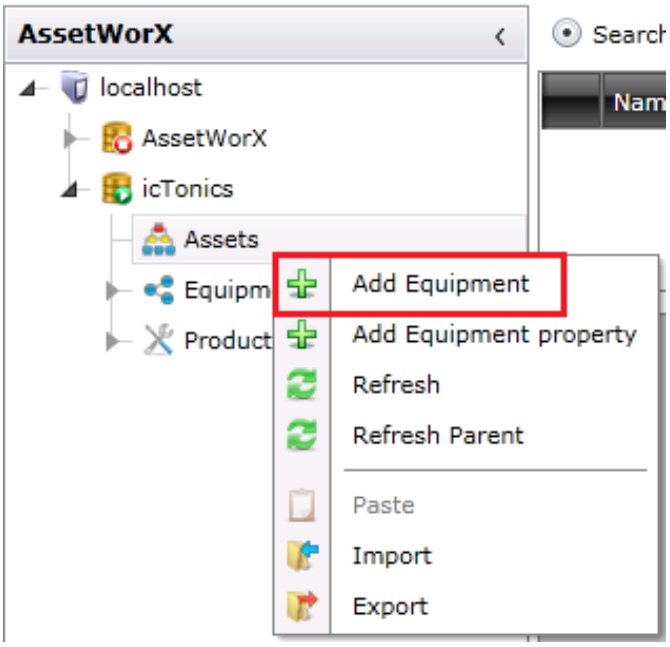

Figure L2.14 – Adding the First Asset

2. From the **[New Equipment]** tab on the right, with the sub tab **Properties** tab selected, enter the following entries into the appropriate fields:

- **Name:** USA
- **Icon:** Enterprise
- **Description:** The USA Asset

3. Although each asset also has a **Commands** sub tab, the configuration of the assets in this section of the manual will not require Command changes. However, we will be using commands later during this training.

4. Click **"Apply & Close"** after completing the property entries for each asset.

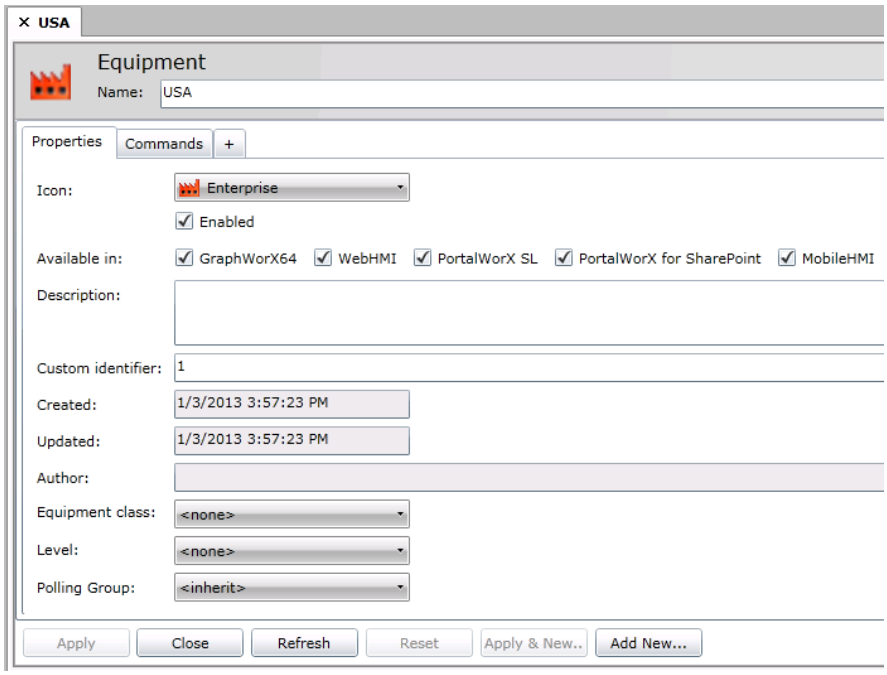

Figure L2.15 – Sample Asset Properties Dialog

5. Proceed by selecting each newly created USA asset with a right-click and select **Add Equipment** until you have completed the asset tree as depicted in the figure below. Remember to click **Apply & Close** to commit the property changes.

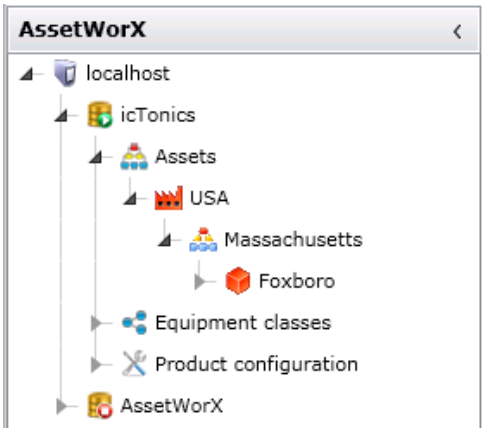

Figure L2.16 – Asset Tree Build Out Continued

Note: Reference the previous figure to check that your asset tree is being built as described.

6. Starting with a right-click on the 'USA' asset, select the **[New Equipment]** tab on the right and, with the sub tab **Properties** tab selected, enter the following entries into the appropriate fields:

   - **Name:** Massachusetts
   - **Icon:** Site
   - **Description:** Massachusetts Asset

7. Right click on 'Massachusetts'. From the **[New Equipment]** tab on the right, and with the sub tab **Properties** tab selected, enter the following entries into the appropriate fields:

   - **Name:** Foxboro
   - **Icon:** Area
   - **Description:** Foxboro Asset

This concludes this lab.

Equipment Classes and Aliasing 3

It is strongly recommended that you create equipment classes for use as templates when adding equipment nodes to the asset tree in AssetWorX. An equipment class looks a lot like an equipment node, except an equipment class is stored on the Equipment Classes node in AssetWorX, not in the asset tree itself. An equipment class is really just a template for creating an equipment node. As such, its properties are only anticipated values or default values or aliases. Using aliases in an equipment class lets you establish placeholders for properties and easily define these properties after the equipment node is added to the asset tree.

3.1. Objectives

After completing this chapter, you should know:

- How to Create Equipment Classes for Use as Templates
- How to Create a Multi-Tiered Structure of Equipment Classes
- How to Use Equipment Properties
- How to Use Aliases in an Equipment Class
- How to Use an Equipment Class to Add Equipment to the Asset Tree

3.2. Creating Equipment Classes for Use as Templates

You can build equipment classes into multi-tiered structures so that they appear much like they would in the asset tree. Some equipment class configurations may require you to build a multi-tiered structure. For example, if you have installed the Energy AnalytiX provider, before you can configure a raw consumption calculation for an equipment class to be used for adding energy assets to the asset tree, you must create a second, "child" equipment class for a meter. Then you can use the multi-tiered equipment class as the basis for defining machines that have a meter.

Below are some possible uses you may have for creating single and multi-tiered equipment classes. You can create an equipment class to be used for defining the following:

- Buildings (the top tier) with many floors (as child tiers) in the asset tree.
- Machinery (the top tier) on a plant floor and the meters that monitor it (child tiers).
- A plant (the top tier) with workstations (child tiers).
- Campuses (one tier); or campuses with buildings (two tiers); or campuses with buildings and meters (three tiers).

By creating these structures in advance, you can preload all of their equipment information that they have in common, such as the right-click commands to be used for all sites. You can also provide aliases for equipment information, allowing you a way to easily define uniform information to be used for your equipment nodes.

The remainder of this topic describes how to work with equipment classes and use them as templates.

- Create an Equipment Class
- Create a Multi-Tiered Structure of Equipment Classes
- Use Aliases in an Equipment Class
- Use an Equipment Class to Add an Equipment Node to the Asset Tree
- Handle Instantiation Errors

3.3. Creating an Equipment Class

To Create an Equipment Class to be Used as a Template:

1. In Workbench SL, open AssetWorX if it is not already open. (You can open it by clicking the AssetWorX provider button in the Project Explorer.)
2. Expand ***localhost*** **> [the name of your AssetWorX database. In our examples, we've named it '*AssetWorX*'] > Equipment Classes**.
3. Right-click **Equipment Classes** or right-click the equipment class **folder** you want to add the equipment class to. Then select **Add Equipment Class** from the pop-up menu. This opens the Equipment Class form with the Properties tab on top and the Commands tab underneath it.

4. In the **Name** field, type the name of the new equipment class. Use the name field to identify the type of equipment node that this equipment class is designed to create. Note that whatever you type here will be used as the name of any equipment that is created from this equipment class. For example, if you type "Template for Multi-Story Building" then every equipment node that you create from this equipment class will be given that same name. You will have to modify the name for each equipment node that you create.

   Alternatively, you can enter an alias, instead. For example, if you type /?Multi Story Building NAME?/, when you create an equipment node, you will be prompted to replace the name as the equipment node is created. For more details, refer to the "Using Aliases in an Equipment Class" section, later on in this document.

5. Click **Apply**. This saves the equipment class in the Equipment Classes node and enables the + tab, which we will get to later.

6. Complete the fields on the **Properties** tab. These fields are described in the "Properties Tab for Equipment Classes" topic.

7. Go to the **Commands** tab to define any standard right-click menu items you want provided during runtime for equipment nodes created from this equipment class. For detailed information about how to use this tab to create runtime menus, refer to the "Setting up Commands for Runtime Navigation", as well as "Commands Tab for Equipment Classes" later in this manual.

8. Go to the **Permissions** tab to define permissions for accessing the node and its menu items at runtime. For detailed information about using this tab, refer to the "Defining User and Group Permissions for Equipment", as well as "Permissions Tab for Equipment Classes".

9. If you have installed **other providers** that will be using the asset tree, or if you will be installing other providers that will use the asset tree, **now is the time to define information that those providers will be using**. Their information will be added as you add new equipment nodes to the asset tree. You cannot use equipment classes to add information once an equipment node has already been added.

   If any provider that you will be using has not yet been installed, take the time now to install the provider so you can define information to be used by the provider. For more information, refer to "Installing Available Solutions".

10. If all of the providers you will be using are installed, click on the **+ tab**. On this tab you will see a drop-down list of all of the providers that are installed.

11. From the **Add New** list, select the provider whose information you want to configure for the equipment class. This adds a tab for the selected provider. For example, if you select FDDWorX from the drop-down list, then a tab called FDDWorX is added to the Equipment Class form.

12. Go to the provider's tab and define the information. For help, refer to the provider's help for that tab. For example, use the help for the FDDWorX tab or the Energy AnalytiX tab.

13. Return to the + **tab** as many times as you need to configure information for additional providers.

14. Click **Apply** to save the equipment class.

15. At this point you can create additional equipment classes and add create a multi-tiered structure if you want to. For more information, refer to "Creating a Multi-Tiered Structure of Equipment Classes" below.

16. When you are done you can use the equipment class to add equipment nodes to your asset tree. For how to do this, refer to the "Using an Equipment Class to Add an Equipment Node to the Asset Tree" section later in this document.

3.4. Creating a Multi-Tiered Structure of Equipment Classes

Now that you know how to create an equipment class (as described above), let's take a look at how you can create a multi-tiered structure of equipment classes. As we work with multi-tiered equipment classes, keep in mind that a multi-tiered structure has a parent at the top tier with children under it in the next tier down. If there is a third tier, then the children have children too.

A multi-tiered structure equipment class has one parent at the top, but the parent can have as many child equipment classes as is necessary, and as many tiers as needed. You will want to take time to plan out your multi-tiered structures so that they are detailed enough to be of good use to you, but not so elaborate that they become cumbersome. You may need to experiment with them before putting them to use.

Example

The following illustration shows a multi-tiered structure of equipment classes for creating a building. The Multi-Floor Building equipment class is the parent, and the Floor Template equipment class is its child. The Electric Meter is the child of the floor template. Keep in mind that a child equipment class can also be used independently of its parent. Following the example shown in the image on the next page, you can use the Multi-Floor Building equipment class to create a building with one floor and one meter, and then use the Floor Template equipment class to add additional floors and meters, as shown in the sample asset tree (on the right) for the Atlanta equipment node.

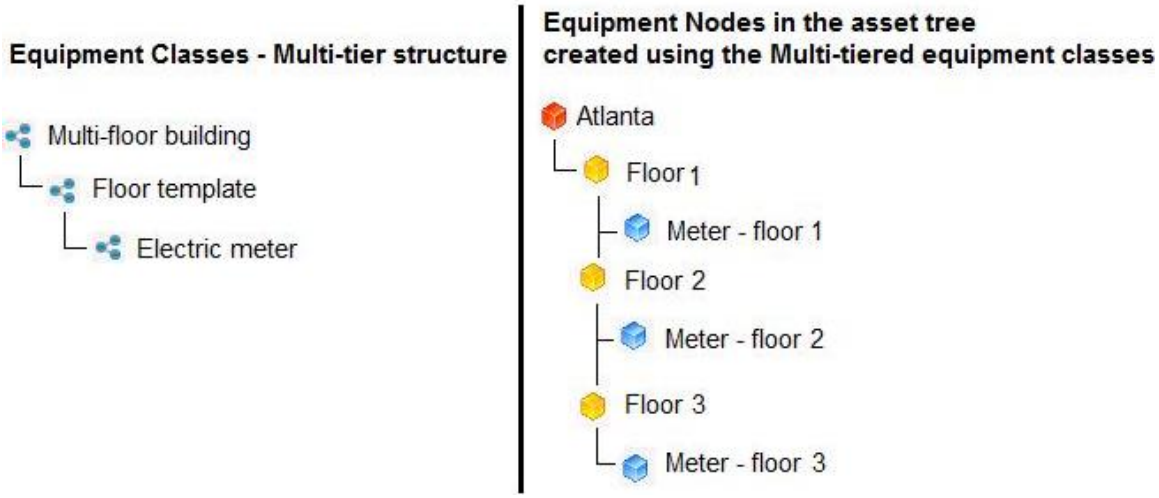

Figure 3.1 - Using a Multi-Tiered Equipment Class for Adding Equipment to the Asset Tree

3.4.1. *Steps for Creating Multiple Tiers*

The following steps assume that you are familiar with how to define an equipment class, described above in the "Creating an Equipment Class" section.

To Create a Multi-tiered Structure of Equipment Classes:

1. Create the ***parent*** equipment class first. The parent must be created in either the **Equipment Classes** node or the equipment class **folder** you want to add the parent to.

2. Add a new ***child*** equipment class by right-clicking the parent equipment class and selecting **Add Equipment Class** from the pop-up menu. This adds a new equipment class to the parent. Save the child equipment class.

3. At this point, you can add more child equipment classes to the parent, or can add a third tier by adding a new child equipment class to the child defined in step 2.

4. When you have finalized the structure that you want, you can return to each equipment class and refine its definitions so that as much information as possible is included in the equipment class before it is used as a template. For example, you can do the following:

   - You can use aliases as described in the following "Using Aliases in an Equipment Class" section.

   - Define any standard right-click menu items you want provided during runtime for equipment nodes created from this equipment class. For detailed information, refer to "Setting up Commands for Runtime Navigation", as well as "Commands Tab for Equipment Classes"..

   - If other providers will be using the asset tree, or if you will be installing other providers that will use the asset tree, **now is the time to define information that those providers will be using**. If any provider that you will be using has not yet been installed, take the time now to install the provider so you can define information to be used by the provider. For more information, refer to "Installing Available Solutions".

5. When you are done you can use the equipment class to add equipment nodes to your asset tree. For how to do this, refer to the "Using an Equipment Class to Add an Equipment Node to the Asset Tree" section later in this topic.

3.5. Using Aliases in an Equipment Class

When creating an equipment class, you must populate its fields with information that defines the type of equipment. For example, an equipment class for creating buildings might contain all of the pop-up menu commands to be associated with buildings. However, not all buildings share the same information. For that reason, after using the equipment class to add a building to the asset tree, you will need to visit every field that needs to be defined uniquely for the building. You do not, however, want important information to go undefined for the building. To prevent this from happening, and to easily manage the information that will need to be defined, you can use aliases in you equipment classes.

An alias is simply a placeholder for information that will need to be defined for any equipment node that is defined using the equipment class. Instead of entering values in every equipment class field, you can enter an alias surrounded by **/?** and **?/**, like this: **/?** ***Alias*** **?/**. The alias can be any text string that you want. Just make sure that it describes the information to be added, for example, /?BuildingName?/ or /?DescriptionOfMeter?/.

Then, when you use the equipment class to create an equipment node (as described in the following section, "Using an Equipment Class to Add an Equipment Node to the Asset Tree"), you will be prompted to replace each alias with the information needed for defining the equipment node. If you are unable to provide the information at that time, the aliases will remain on the equipment node until information can be provided. When information becomes available, you can easily enter it by instantiating (or replacing) the aliases, as described in "Instantiating an Equipment Node's Aliases".

It is important that you realize that not all equipment class fields can be aliased. If you are not sure, you can enter an alias to see if one is allowed, or you can refer to the online help topics for the equipment class tabs in AssetWorX.

3.6. How to Use Aliasing

The following tips and reminders will help you to use aliases:

- You can enter aliases only on equipment classes, as described above in "Creating an Equipment Class".
- To enter an alias in a field, type the alias surrounded by the characters **/? ?/** as in the following format: **/?*alias*?/**
- The alias is a string that can contain any alphanumeric characters as well as spaces and punctuation characters.
- You can use aliases as the names of equipment classes such as, **/?electric meter name?/** or **/?warehouse name?/**. As a result, the alias will appear as the name of the equipment class in the Equipment Class tree structure, as shown below. When an equipment node is created using the equipment class, the alias will be used as the node name until the alias is instantiated.

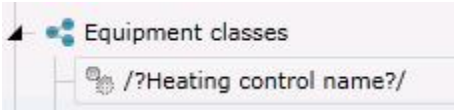

Figure 3.2 - Alias as Equipment Node Name

You can use an alias inside a string such as a URL or a description, as in the examples highlighted in red in the Description field in the following illustration:

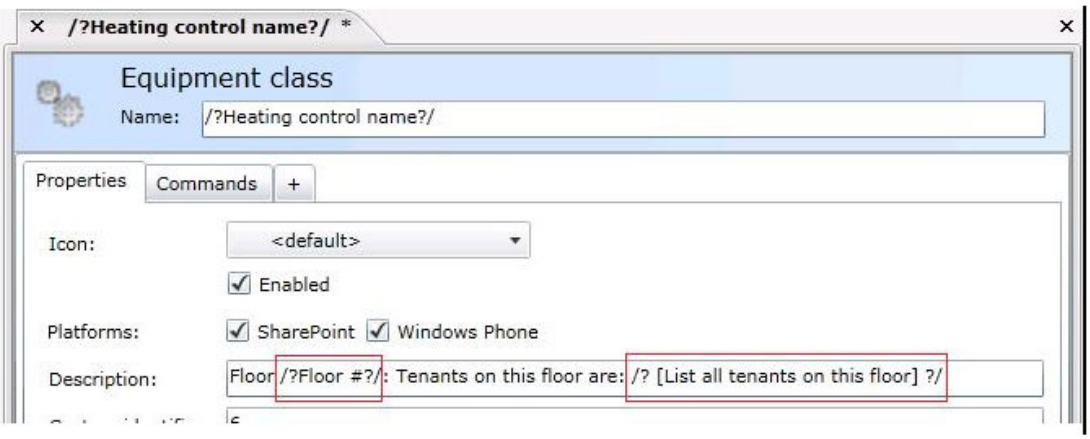

Figure 3.3 - Alias Used Inside String

Other examples:

- http://www./**?office website?**/.com
- **/?Product-Line?/** manufacturing in **/?City, State of building?/**

3.7. Adding Equipment Properties

For each level of Assets within the tree control of the AssetWorX provider in Workbench SL, you can add Equipment Properties. These allow you to connect the associated asset to real-time (utilizing multiple data source options) or historical data sources

To Add an Equipment Property to an Existing Equipment Asset in AssetWorX

1. First, you must have already created an asset. You could assign an equipment property to the top-level 'Assets' node if you wish, but in our example, we are connecting to a sub-branch in the tree, an equipment asset we've named 'Test Asset'.

   You can add the property by either right-clicking on the equipment in the asset tree and selecting 'Add Equipment property' OR you can click on the item and then, once the contextual ribbon changes to the items relevant to your item selection), click on the 'Add Equipment property' button in the Home ribbon at the top of the screen. Both methods are highlighted in the following image.

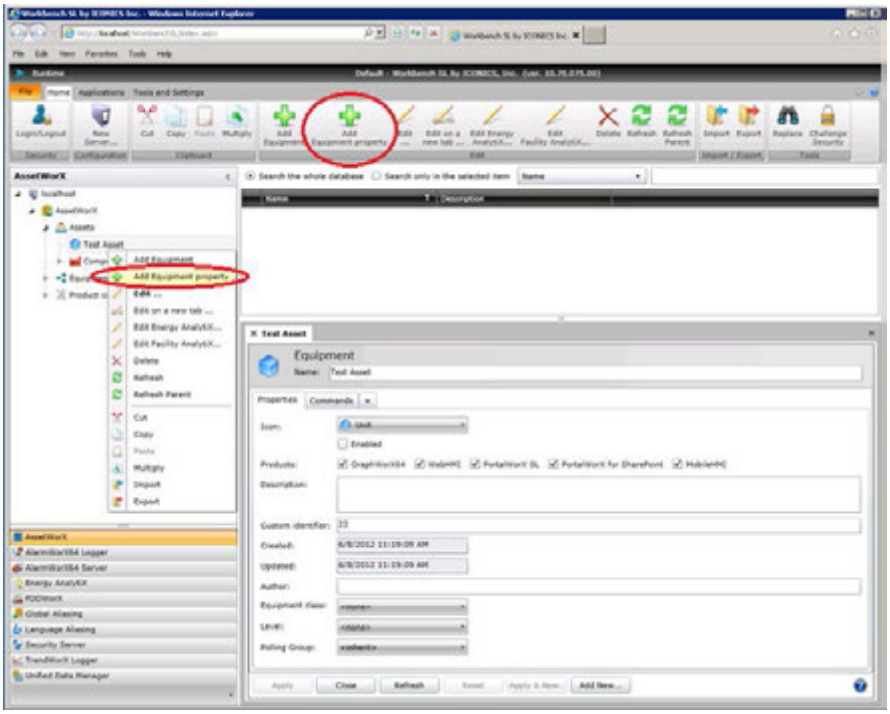

Figure 3.4 - 'Add Equipment Property' in AssetWorX

2. This will open a [NewEquipmentproperty] tab in the right-side window of Workbench SL, as well as a placeholder in the top right items list. This items list shows any sub-items connected to an asset, as well as any of its connected properties. Give your property a name and description and then decide whether your property will need to connect to Real Time Data or Historical Data.

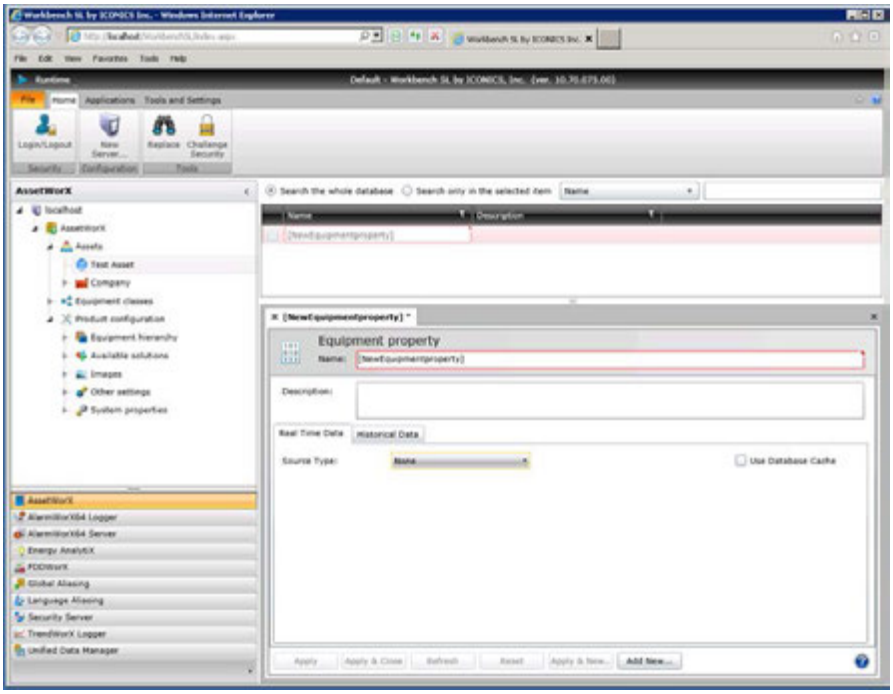

Figure 3.5 - Equipment Property Settings in Workbench SL

Next, see the following options for selecting either Real Time or Historical Data.

3.7.1. *Real Time Data Tab*

- **Source Type: None**

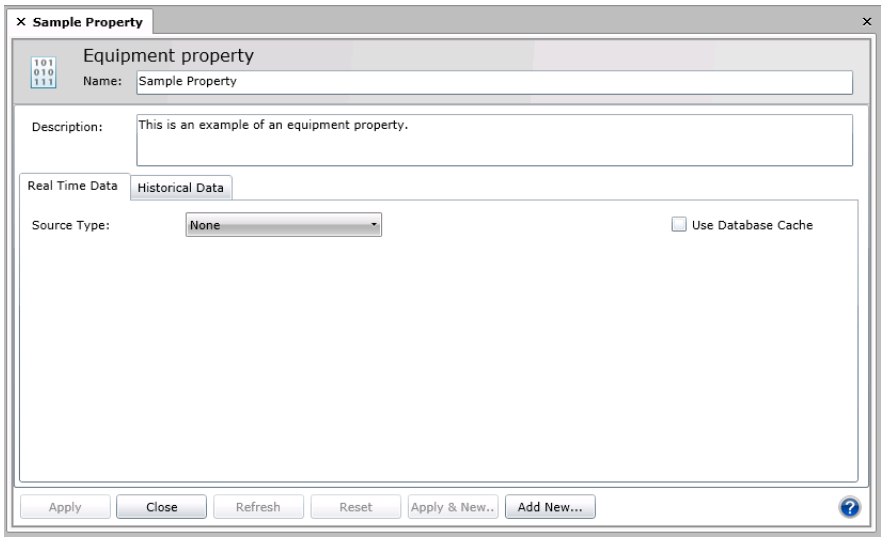

Figure 3.6 - Real Time Data - Source Type: None

In this instance, you won't require a connection to any Real Time data. You can still decide to use any existing data cached in the database by clicking on the 'Use Database Cache' checkbox.

- **Source Type: Static Value**

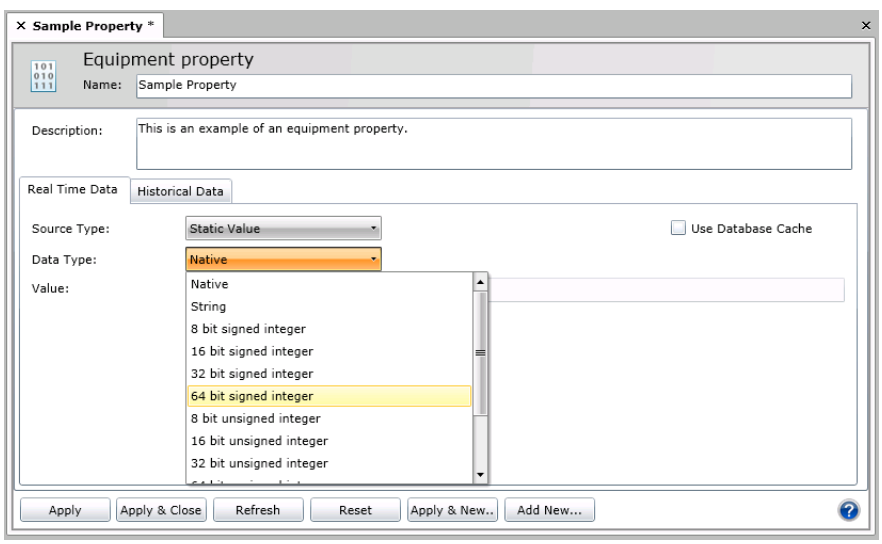

Figure 3.7 - Real Time Data - Source Type: Static Value

In this instance, once you select 'Static Value' from the pull-down menu, you'll see options to select a 'Data Type' and, depending on that type, be able to enter a Value (in the following text entry field). You can also decide to use any existing data cached in the database by clicking on the 'Use Database Cache' checkbox.

Data Types include:

- Native - will prevent you from entering anything in the Value text field.
- String
- 8 bit signed integer
- 16 bit signed integer
- 32 bit signed integer
- 64 bit signed integer
- 8 bit unsigned integer
- 16 bit unsigned integer
- 32 bit unsigned integer
- 64 bit unsigned integer
- 32 bit floating point number (single precision)
- 64 bit floating point number (double precision)
- Boolean value

- **Source Type: Dynamic Tag**

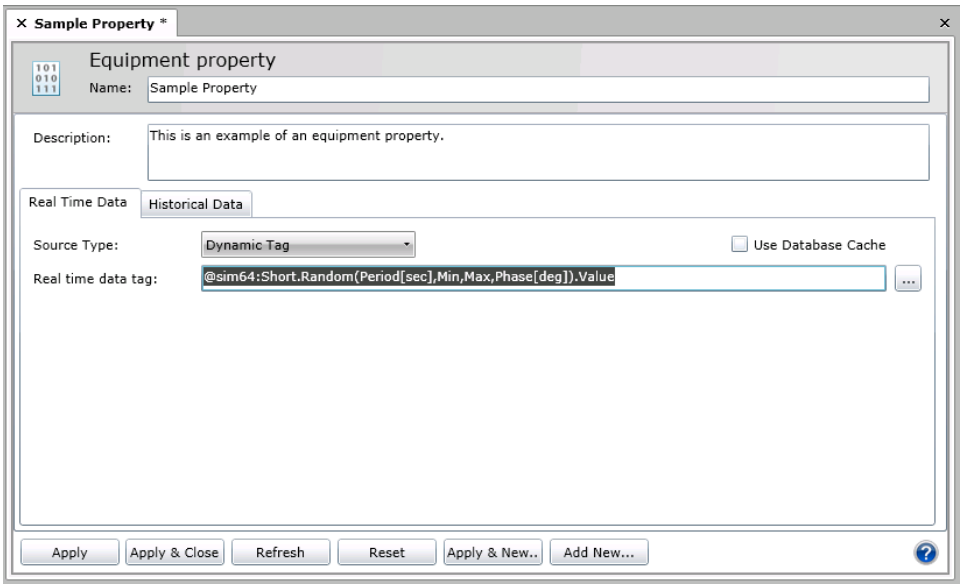

Figure 3.8 - Real Time Data - Source Type: Dynamic Tag

In this instance, once you select 'Dynamic Tag' from the pull-down menu, you'll be able to enter a **Real time data tag**. If you don't know the exact location, you can click on the ellipsis [...] button to bring up the Data Browser, where you will be able to select from all connected data sources. In the example above, we are using a simulated data value source. You can also decide to use any existing data cached in the database by clicking on the 'Use Database Cache' checkbox.

- **Source Type: Polled Dynamic Tag**

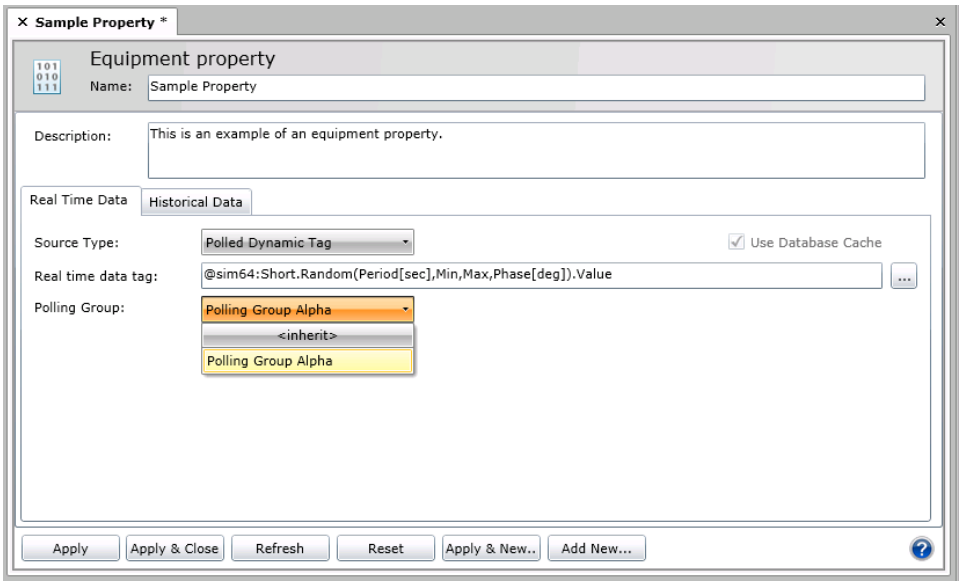

Figure 3.9 - Real Time Data - Source Type: Polled Dynamic Tag

In this instance, once you select 'Polled Dynamic Tag' from the pull-down menu, you'll be able to enter a **Real time data tag**. In the example above, we are using a simulated data value source.

In comparison to the regular 'Dynamic Tag' option explained above, the Polled Dynamic Tag allows you to set times/recurrences for data retrieval, using a **Polling Group**. Polling Groups, set through the Product configuration/System properties/Polling groups node in AssetWorX, contain polling criteria such as the scan rate, read timeout, group splitting, recurrence type, starting time/date and time of recurrence.

In the Equipment property, if you don't know the exact location, you can click on the ellipsis [...] button to bring up the Data Browser, where you will be able to select from all connected data sources. The **Polling Group** pull-down allows you to either <inherit> the polling settings from the higher branches of the asset tree in which this particular equipment asset has been placed OR you can select a Polling Group that has been created through the Polling Groups feature of the AssetWorX provider's System properties (in this example, we are selecting 'Polling Group Alpha').

You can also decide to use any existing data cached in the database by clicking on the 'Use Database Cache' checkbox.

Benefits of AssetWorX Server Polling include:

- Periodically gets values from occasionally connected OPC Servers
- Stores values into AssetWorX cache
- Reads data in groups of configurable size

- **Source Type: Expression**

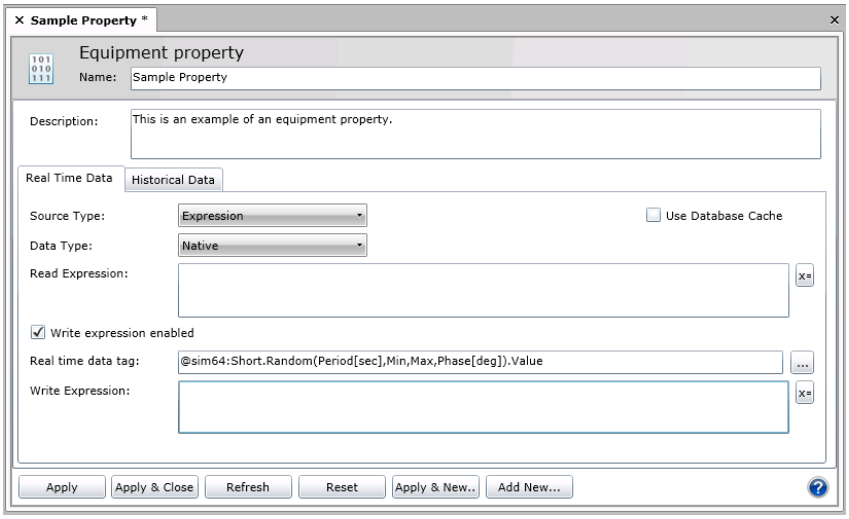

Figure 3.10 - Real Time Data - Source Type: Expression

In this instance, once you select 'Expression' from the pull-down menu, you'll see options to select a 'Data Type' and, depending on that type, be able to enter a Value (in the following text entry field). You can also decide to use any existing data cached in the database by clicking on the 'Use Database Cache' checkbox.

Data Types include:

- Native - will prevent you from entering anything in the Value text field.
- String
- 8 bit signed integer
- 16 bit signed integer
- 32 bit signed integer
- 64 bit signed integer
- 8 bit unsigned integer
- 16 bit unsigned integer
- 32 bit unsigned integer
- 64 bit unsigned integer
- 32 bit floating point number (single precision)
- 64 bit floating point number (double precision)
- Boolean value

Next, you'll be able to either enter a Read Expression directly into the text entry field or click on the [X=] button to open the Expression Editor.

Once you have entered a Read Expression, you have the option of also creating a Write Expression. Click on the 'Write expression enabled' checkbox in order to allow the remaining text entry fields to become active.

You'll be able to enter a **Real time data tag**. If you don't know the exact location, you can click on the ellipsis [...] button to bring up the Data Browser, where you will be able to select from all connected data sources. In the example above, we are using a simulated data value source.

Next, you'll be able to either enter a Write Expression directly into the text entry field or click on the [X=] button to open the Expression Editor.

3.7.2. Equipment Properties as Holding Registers

When adding an Equipment Property, and selecting the Real Time Data tab, you will be able to select a Source Type. By selecting "Static", it means this Property has no further OPC input or output. If you also elect to "Use Database Cache" (by clicking the checkbox) on that property, it allows for Read/Write by clients. With these settings made, you can use GraphWorX64 (or any other client, or even a server) to write a value to this Property and AssetWorX will remember it, even during computer shutdown, as the value is being written to the Database Cache. In this way, the Property works as a sort of memory cell or holding register for ICONICS applications.

3.7.3. Implementing Equipment Properties in Other ICONICS Components

In real world applications, there are all sorts of OPC servers connected to different devices. When a user starts designing GraphWorX64 displays, in order to get to the OPC points, he or she has to browse all the different OPC servers, each possibly with a uniquely organized address space. In cases where the GraphWorX64 display designer is NOT the same person who configured the individual OPC servers, it might be difficult for the designer to immediately understand where to look for each required OPC point. For this reason, the person configuring the OPC servers could make things easier by creating an AssetWorX Property for each OPC point and organizing them into a logical structure.

Also, this decouples the GraphWorX64 displays from the OPC point names, so when an OPC point name changes (possibly due to someone starting to use a different OPC server or just due to a mistake), it is then possible to just update the OPC input of a single AssetWorX Property that maps this specific OPC point. There could be a dozen GraphWorX64 displays or other components (AlarmWorX64 Server, Hyper Historian, etc…) that subscribe to this AssetWorX Property, but they do not need to be re-configured to get data from the new OPC input, as they do not subscribe directly to it.

3.7.4. *Historical Data Tab*

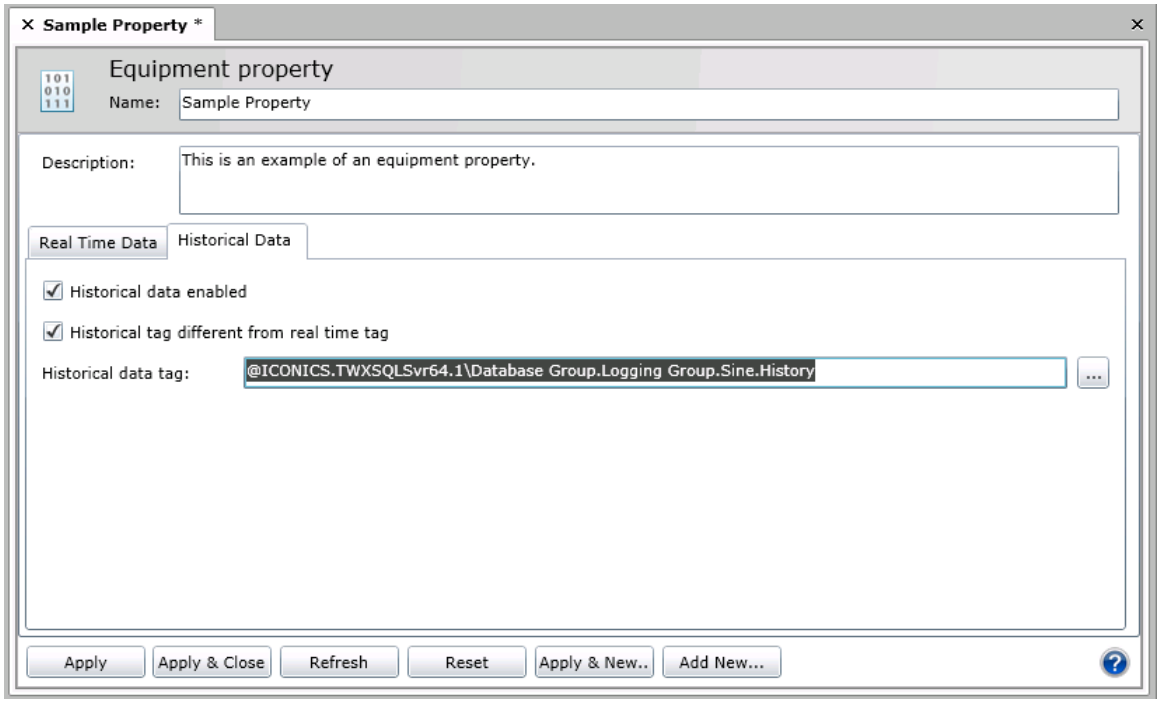

Figure 3.11 - Historical Data Tab in the Equipment Property Settings in AssetWorX

First, if you decide to utilize historical data with your equipment property, click on the checkbox for 'Historical data enabled'.

If you have not already changed settings in the Real Time Data tab, the 'Historical tag different from real time tag' checkbox will be inactive. If you did make changes to the Real Time Data tab, click the checkbox if you wish to use a different data tag. In the example above, we have used a simulated historical tag.

You'll then be able to enter a **Historical data tag**. If you don't know the exact location, you can click on the ellipsis [...] button to bring up the Data Browser, where you will be able to select from all connected data sources. In the example above, we are using a simulated data value source.

3.7.5. *Activating Equipment*

Equipment in the asset tree is not available for runtime processing until you activate it. For an equipment node to be active, it (as well as all parent nodes in the asset tree) must be active. If the equipment or any node above it in the tree is not activated, it will not be available for Runtime processing.

Note: You can create an equipment class so that any equipment node it creates is automatically activated. Simply make sure the Enable check boxes for the equipment class are selected (that is, make sure they have a check mark in them). For more information, refer to the "Creating Equipment Classes for Use as Templates" topic.

To Activate an Equipment Node:

1. In the Workbench SL, open AssetWorX if it is not already open. (You can open it by clicking AssetWorX provider button in the Project Explorer.)
2. Expand ***localhost*** **> [the name of your AssetWorX database. In our examples, we've named it '*AssetWorX*'] > Assets**. This takes you to the asset tree. Expand the asset tree until you reach the equipment node to be activated
3. Select the node. If the Equipment form does not open, click the **Edit** button on the Home ribbon, or right-click the node and select **Edit** from the pop-up menu.
4. On the Properties Tab, click the **Enabled** check box to put a check mark in it as highlighted in the following image.

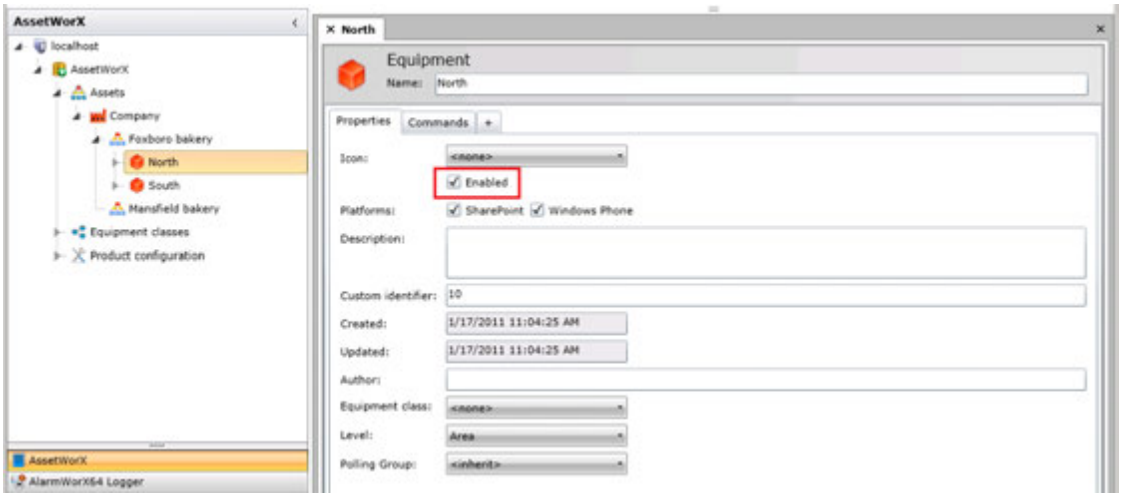

Figure 3.12 - Setting the Enabled Checkbox

5. If other providers' tabs are available for the equipment, make sure the equipment is enabled for the providers you want it to be used for. For example, if the Energy AnalytiX provider is installed and the Energy AnalytiX tab appears in the Equipment form, go to the Energy AnalytiX tab and make sure to click the **Enable Energy AnalytiX** checkbox to put a check mark in it as highlighted below.

6. Click **Apply**.

7. Repeat steps 3 through 6 for each equipment node above the equipment node in the asset tree. For example, following the example shown in these steps, you would repeat the steps for the Foxboro Bakery and Company nodes.

3.7.5.1. Setting up Runtime Menus for Equipment Nodes (Commanding)

At runtime, users can access reports, displays, trends, alarms, and other information about equipment from the AssetWorX's asset tree by right-clicking on any node in the tree. Right-clicking pops up a menu of options that you have defined for runtime users. Runtime menus can vary from node to node, and from platform to platform. For example, you can create menu options that are available only from a desktop monitor or only from a phone app.

All runtime menu options described below are configured on the **Commands** sub-tab of an equipment node's **Equipment** tab. Note however that the same commands can be configured for equipment classes using the **Commands** sub-tab of an equipment class's **Equipment Class** tab.

To Configure a Runtime Menu, Do the Following:

1. Open Workbench SL and, in the Project Explorer, click the **AssetWorX** provider button to open AssetWorX.

2. Then in the navigation tree do either of the following:

   - Expand ***localhost*** **> [the name of your AssetWorX database. In our examples, we've named it '*AssetWorX*'] > Assets** to access the asset tree. Expand the asset tree and click on the equipment you are defining runtime menu commands for. This displays the Equipment tab, with the **Properties** tab on top.

   - Expand ***localhost*** **> [the name of your AssetWorX database. In our examples, we've named it '*AssetWorX*'] > Equipment Classes** to access equipment classes. Navigate to the equipment class you are defining runtime menu commands for and select it. This displays the Equipment Class tab, with the **Properties** tab on top.

3. Click the **Commands** sub-tab.

4. On the Commands sub-tab, click the **Add** button to add a command to the menu. A form appears at the right.

5. From the **Command** drop-down menu, select the command you want to add. The remainder of this topic describes all of the commands and options for configuring runtime menus for equipment nodes and equipment classes. Commands let users do the following in Runtime mode:

   - **Load a display** into the runtime view. You can load GraphWorX displays, trends created in TrendWorX, and alarms created in AlarmWorX.
     - For an **equipment node's menu**, refer to the "Load Display Command", "Load Alarm Display Command", or "Load Trend Display Command" topic for equipment nodes.
     - For an **equipment class**, refer to the "Load Display Command", "Load Alarm Display Command", or "Load Trend Display Command" topic for equipment classes.

   - **Write a value** to a field.
     - For an **equipment node's menu**, refer to the "Write Value Command" topic for equipment nodes.
     - For an **equipment class**, refer to the "Write Value Command" topic for equipment classes.

   - **Run a transaction** using ICONICS BridgeWorX.
     - For an **equipment node's menu**, refer to the Run Transaction Command topic for equipment nodes.
     - For an **equipment class**, refer to the Run Transaction Command topic for equipment classes.

   - **Set global aliases**.
     - For an **equipment node's menu**, refer to the "Set Global Aliases Command" topic for equipment nodes.
     - For an **equipment class**, refer to the "Set Global Aliases Command" topic for equipment classes.

   - **Open a URL** in the runtime view.
     - For an **equipment node's menu**, refer to the "Open URL Command" topic for equipment nodes.
     - For an **equipment class**, refer to the "Open URL Command" topic for equipment classes.

   - **Run a report**.
     - For an **equipment node's menu**, refer to the "Run Report Command" topic for equipment nodes.
     - For an **equipment class**, refer to the "Run Report Command" topic for equipment classes.

- **Load a single report or multiple reports** into the runtime view.
  - For an **equipment node's menu**, refer to the "Load Report Command" or "Load Executed Reports Command" topic for equipment nodes.
  - For an **equipment class**, refer to the "Load Report Command" or "Load Executed Reports Command" topic for equipment classes.

- **Load data from ICONICS FDDWorX**.
  - For an **equipment node's menu**, refer to the "Load FDDWorX Data Command" topic for equipment nodes.
  - For an **equipment class**, refer to the "Load FDDWorX Data Command" topic for equipment classes.

- **Load data from ICONICS Energy AnalytiX**.
  - For an **equipment node's menu**, refer to the "Load Energy AnalytiX Data Command" topic for equipment nodes.
  - For an **equipment class**, refer to the "Load Energy AnalytiX Data Command" topic for equipment classes.

Commands appear on the left, and looks something like the following example.

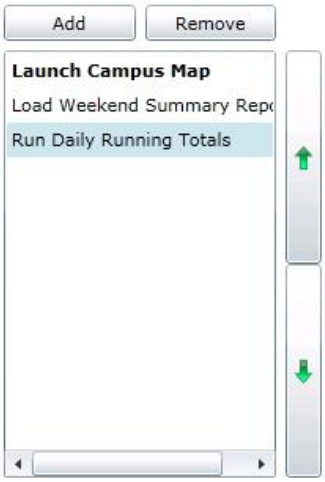

Figure 3.13 - Sample Menu Items on the Commands Sub-tab

6. If you want to modify the behavior of a menu item, select the item in the list so that it's configuration information appears on the right. Then modify the menu item's configuration. Note that the type of change you want to make may require you to delete them existing menu item and create a new one.

7. If you want to delete a menu item, select the item in the list and click the **Remove** button.

8. If you want to change the sequence of menu items in the list, select a menu item you want to move, and then click the **up** or **down arrow** to move it up or down in the list.

9. If you want to change the text that appears in the menu, select the menu item with its configuration information on the right. Type the new name in the **Name** field.

10. Complete the fields for the command, and save the command by clicking **Apply** or **Apply & Close**.

3.7.5.2. Making Copies Using the Multiply Function

The Multiply command is particularly convenient for creating a number of new items such as equipment nodes or equipment classes in AnalytiX Catalog. You can use it to make multiple copies of an item in the Project Explorer. Use it to make three copies or 50 copies or more. In making multiple copies you can enter the formula to be used for populating fields in the copies: you can leave those fields unchanged, or you can specify a number to be appended to those values.

If you are making copies of a node that has a multi-level structure, the entire structure is copied. Copies will appear above the original item in the same level of the asset tree as the original. The names of copies will have numbers appended to them in accordance with your numbering specifications.

To Use the Multiply Function:

1. In Workbench SL's **Project Explorer**, right-click the item you want to copy. From the pop-up menu, select **Multiply**, as shown below. (The Multiply function may not be available for all items.)

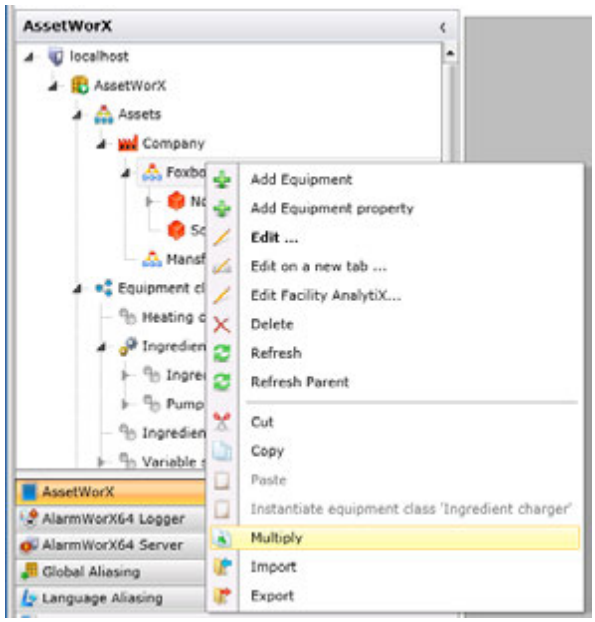

Figure 3.14 - Selecting Multiply from the Pop-up Menu

The Multiply Options dialog box appears, and will look something like the following:

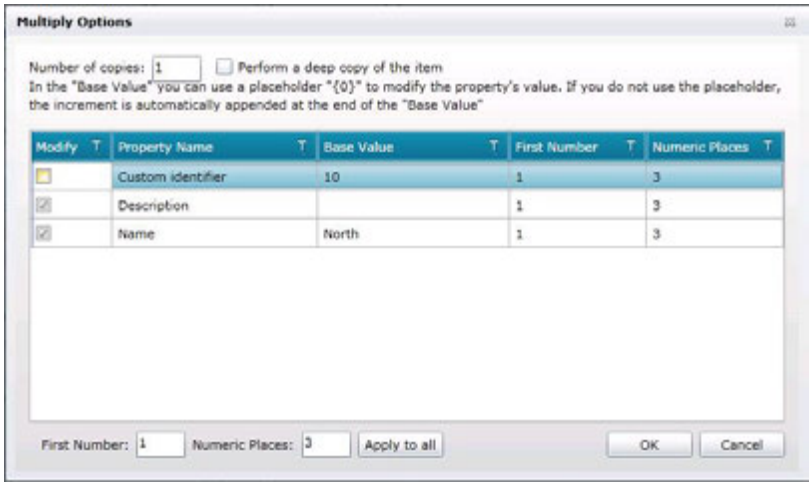

Figure 3.15 - Multiply Options Dialog Box

2. In the **Number of Copies** field, specify the number of copies you are creating.

3. This dialog box lists the properties that you can modify in the copies that are created. The item's properties are listed in the **Property Name** column, and the properties' values are listed in the **Base Value** column. If you want the base value to remain unchanged in all copies that are created, remove the check mark from the **Modify** column. (Note that some properties may be required to change; if they are, you will get an error message when you apply changes.)

4. Change the **Base Value** of any properties as you wish. If you wish the Base Value to be the incremented number that is generated when the multiples are created, enter {0} as the **Base Value**. Otherwise, the number will be added as a suffix to the base value.

5. For each property value that will change, in the **First Number** column specify the first number to be assigned to copies (for example, 100). In the **Numeric Places** column specify the number of numeric places to be reserved for the numbers that are appended. For example, if you enter 5, then five numeric places will be reserved; if the first number is 100, the first copy's name will be appended with 00100, the second with 00101, the third with 00103, and so on.

   Alternatively, you can apply a uniform numbering scheme to all properties that are being modified by entering values in the **First Number** and **Numeric Places** fields at the bottom of the dialog box, then clicking the **Apply to All** button.

6. When you are ready, click the **OK** button. A progress monitor will appear; when it is done a message will appear at as the last item, as shown below.

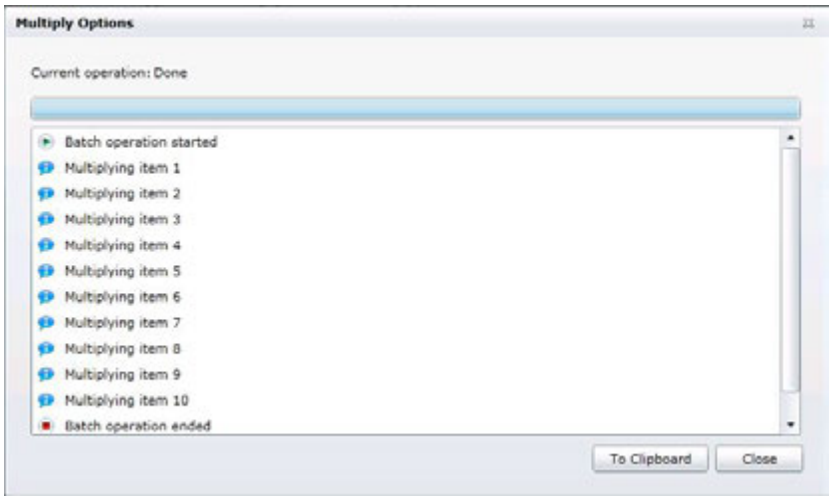

Figure 3.16 - Ten Copies

7. If there are errors, you can click the **To Clipboard** button to copy the displayed messages to the Windows clipboard, then open a text editor and paste them there for later reference.

8. Click **Close** to complete the process. The copies appear in the Project Explorer.

3.8. Using an Equipment Class to Add an Equipment Node to the Asset Tree

Once you have defined an equipment class for the type of equipment you want to add to the asset tree, you can use it to define equipment nodes in the asset tree. You do this by dragging the equipment class from the Equipment Class node and dropping it into the asset tree where it belongs and instantiate the aliases.

To Add an Equipment Node to the Asset Tree by Using an Equipment Class:

1. In Workbench SL, open AssetWorX.

2. Under the **Assets** node, expand the asset tree to expose the equipment node you want to add equipment to.

3. Under the **Equipment Classes** node, find the equipment class to be used at the template for the equipment you are adding to the equipment tree.

Select the equipment class and hold down the mouse while you **drag the equipment class** from the *equipment class tree* to an asset in the *asset tree* and hold the cursor over the equipment node you are adding a child node to. It should look something like the following example in which the equipment class called "Ingredient charger" is being held over the equipment node called "Mansfield bakery".

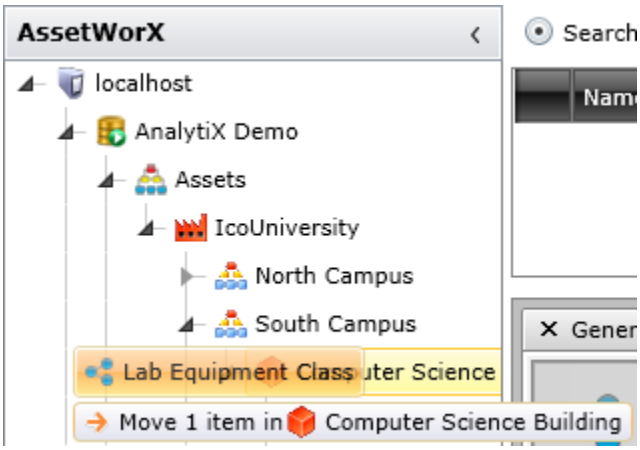

Figure 3.17 - Dropping an Equipment Class into the Asset Tree

4. When the equipment class is in the correct location, **release the mouse** to drop the equipment class into the asset tree. At this point the equipment class (or classes, if you are using a multi-tiered equipment class) is in the asset tree, but not yet saved.

5. The **Instantiation Options** dialog box appears. This is where you will instantiate (or assign values to) the aliases in the equipment class(es). Before you continue, read these conditional items:

   - If you copied the equipment to the wrong equipment node, you can click the **Cancel** button. The dialog box will close and no change is made to the asset tree.

   - If the message "**No aliases found**" appears in the dialog box, click the Instantiate button. A second dialog box will appear; click **Close**, and you are done.

6. The **Instantiation Options** dialog box lists all of the aliases defined for all of the equipment classes you just used. The following example shows two aliases, but there may be many.

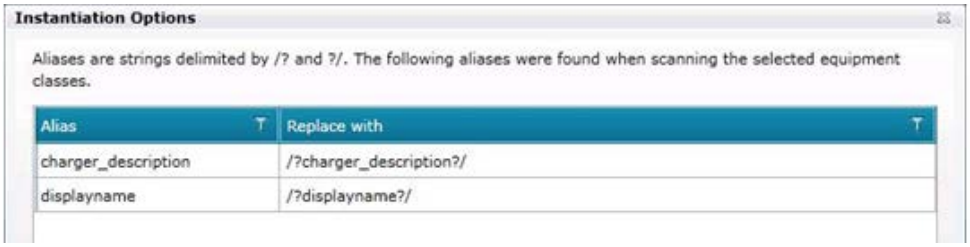

Figure 3.18 - Aliases in the Instantiation Options Dialog Box

At this point, you will be replacing aliases with values to be used for the equipment node you are creating -- or *instantiating* values for the equipment node. It is important to understand that you are not required to provide replacements for aliases at this point. In fact, it is possible that you do not yet know the values to use for the equipment node you are creating. You can skip step 8, or just instantiate a few aliases if you like, and go straight to step 9. You can instantiate aliases at any time later on by following the steps in "Instantiating an Equipment Node's Aliases".

7. For each alias in the dialog box, go to the **Replace With** column and replace the alias with the value to be used for the equipment in the asset tree. In the following example, both aliases have been replaced. The *charger_description* alias has been changed to "Forklift charger" and the *displayname* alias has been changed to "Load recharge times report".

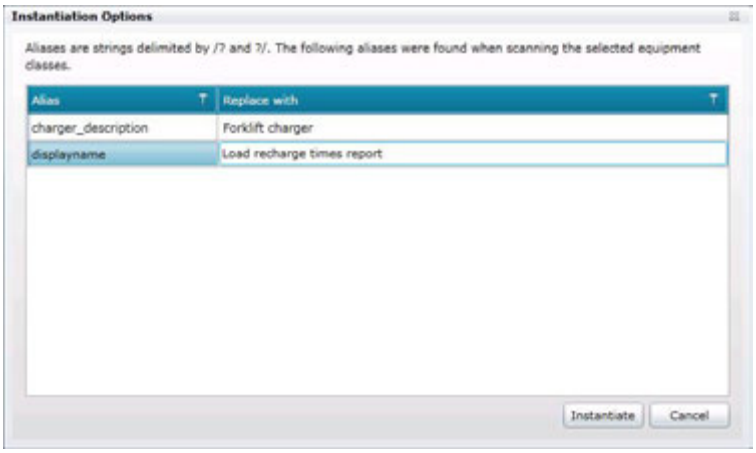

Figure 3.19 - Aliases Replaced with Real Values

8. Click the **Instantiate** button. The replacements are made and the new equipment nodes are saved in the asset tree. If the save is successful, you will see the following dialog box. You are done.

   However, if there were errors, no changes were saved to the asset tree; refer to the steps under the heading "Handling Instantiation Errors".

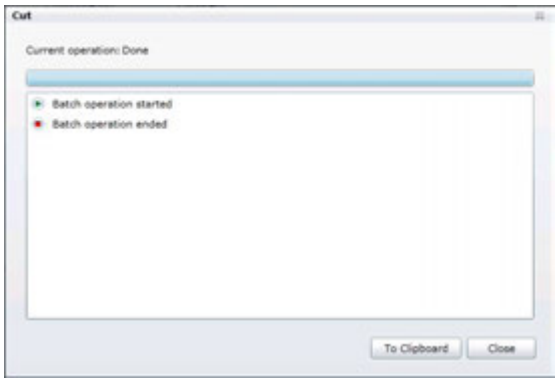

Figure 3.20 - A Successful Instantiation

3.8.1.1. Handling Instantiation Errors

1. If there were errors in the instantiation of the equipment class's aliases, you will see an error message in the resulting dialog box, like the example shown below. In this case, none of the new equipment nodes are saved. To easily record any errors that occurred, click the **To Clipboard** button; this copies all messages from the dialog box to the Windows clipboard.

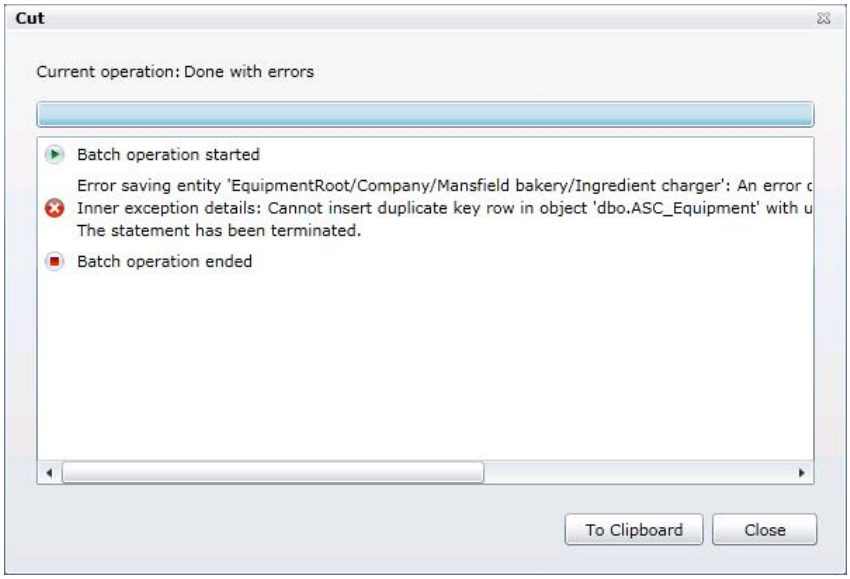

Figure 3.21 - Instantiation Error

2. You may be prompted for permission to access the clipboard. If you are prompted, grant permission to the clipboard.

3. Once the dialog boxes close, the changes are not saved. Open a text editor such as Microsoft Notepad and paste the text into the file, which you can save. Use the error text to correct the error, then try to create the equipment node again.

   The following example shows the error's test pasted into a Notepad file.

Figure 3.22 - Error Content Pasted into Notepad

Lab: Equipment Classes L3

3.1. Lab Overview

In Lab 2, you created the foundation of the asset tree that will be used for the remainder of this training course. In this lab, Lab 3, we will proceed by creating an equipment class and dragging equipment class assets into the asset tree.

Estimated time to complete this lab: 45 minutes

3.1.1. Task Checklist

In this lab, you will complete the following tasks:

- Create an equipment class with equipment properties.
- Drag and drop equipment class tree nodes into the asset tree.
- Instantiate the equipment class to resolve alias definitions.

3.1.2. Support Files

You do not need any support files to complete this lab.

3.2. Adding Tree Nodes Using an Equipment Class

Let's get started.

3.2.1. Configuring an Equipment Class Asset

The Equipment classes node is empty. We will proceed by creating a child node under the Equipment classes branch.

1. Launch the Workbench-SL by selecting **Start → All Programs → ICONICS → Workbench-SL**. Type in the username and password that was used to install GENESIS64.

2. From within the Project Explorer on the left, select the **AssetWorX** provider.

3. Expand the **icTonics** database asset tree. After completing Lab 2, this should be the active database.

4. Right-click on the **Equipment classes** node and select **Add Equipment class**.

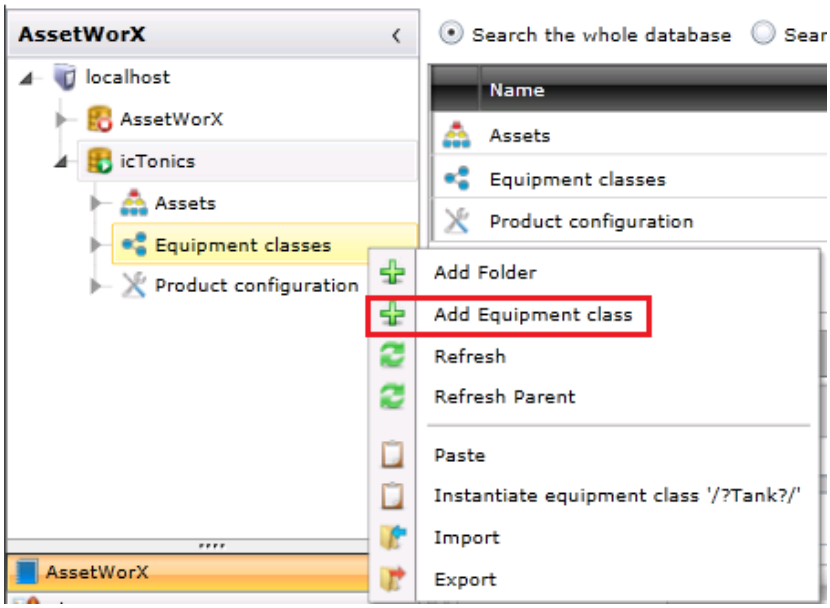

Figure L3.1 – Adding an Equipment Class

5. Name the Equipment class **/?Tank?/**. The delimiters /? and ?/ are place holders for values that will be entered during the instantiation process.

6. Select **Process Cell** as the **Icon** type.

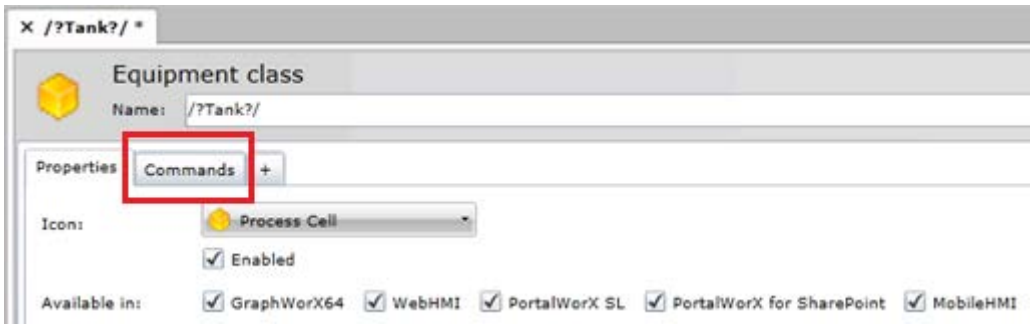

Figure L3.2 – Define the Icon: As Process Cell

7. Select the **Commands** sub-tab. Seen highlighted with a rectangle in the previous figure.

8. Click on the **Add** button.

9. Configure the **Command** as described below:

   Note: Leave the default settings in any field that is not mentioned below.

   - **Command:** Load Graphics Display
   - **Name:** LoadDisp_icTonicsTankMonitor
   - **Description:** Load Graphics Display icTonicsTankMonitor
   - **Execution flags:** Visible and Drag & drop
   - **Filename:** http://localhost/PubDisplay/icTonicsTankMonitor.gdfxs

   Note: Localhost could be replaced with the hostname or IP address of the computer where IIS is running and the displays have been published.

   - **GlobalAliases:** TanksTheme=&/?Tank?&/Theme/0;

   Note: While working with an equipment class, if you select the Tank1 global alias using the ellipses button, your syntax may resemble this TanksTheme=Tank1Theme/0; and you will have to manually modify the syntax to accommodate the equipment class aliasing.

10. When the configuration resembles the figure below, click **Apply** and **Close**.

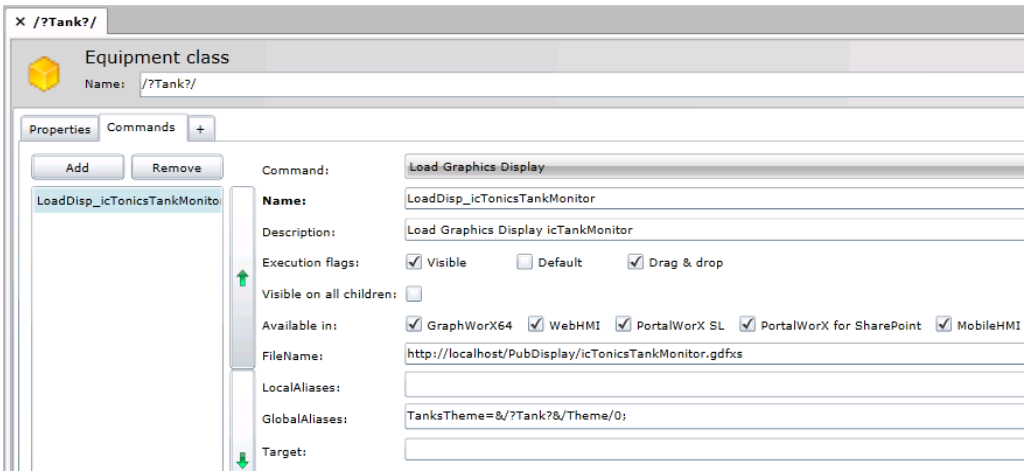

Figure L3.3 – /?Tank?/ Equipment Class Definition

3.2.2. Adding Equipment Properties

For each level of Assets within the tree control of the AssetWorX provider in Workbench-SL, you can add Equipment Properties. These allow you to connect the associated asset to real-time (utilizing multiple data source options) or historical data sources. Let's proceed to learn how this works.

1. We will continue by defining Equipment Properties within the /?Tank?/ Equipment Class. The figure below shows a fully instantiated Tank1 asset with Equipment Properties.

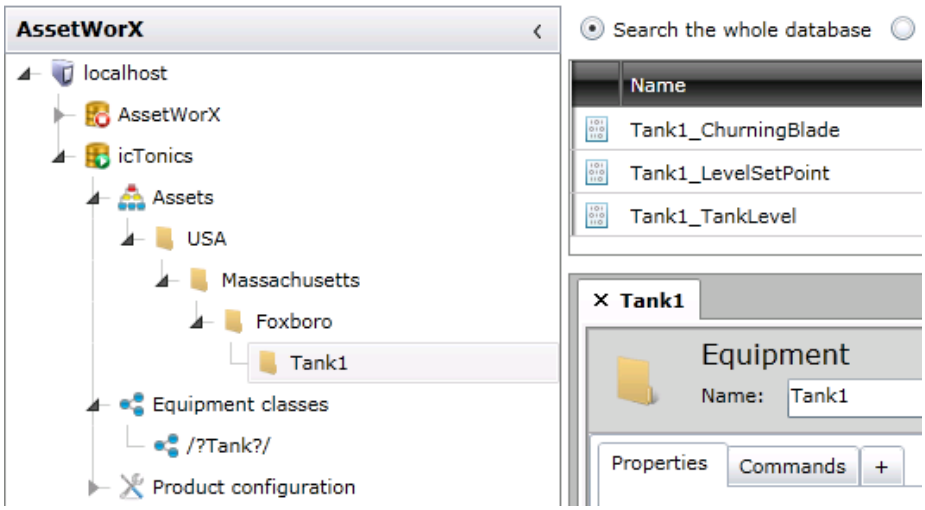

Figure L3.4 – Tank1 Asset with Equipment Properties Defined

2. Let's proceed by right-clicking on the **/?Tank?/** node under **Equipment Classes**. Then select **Add Equipment class property.**

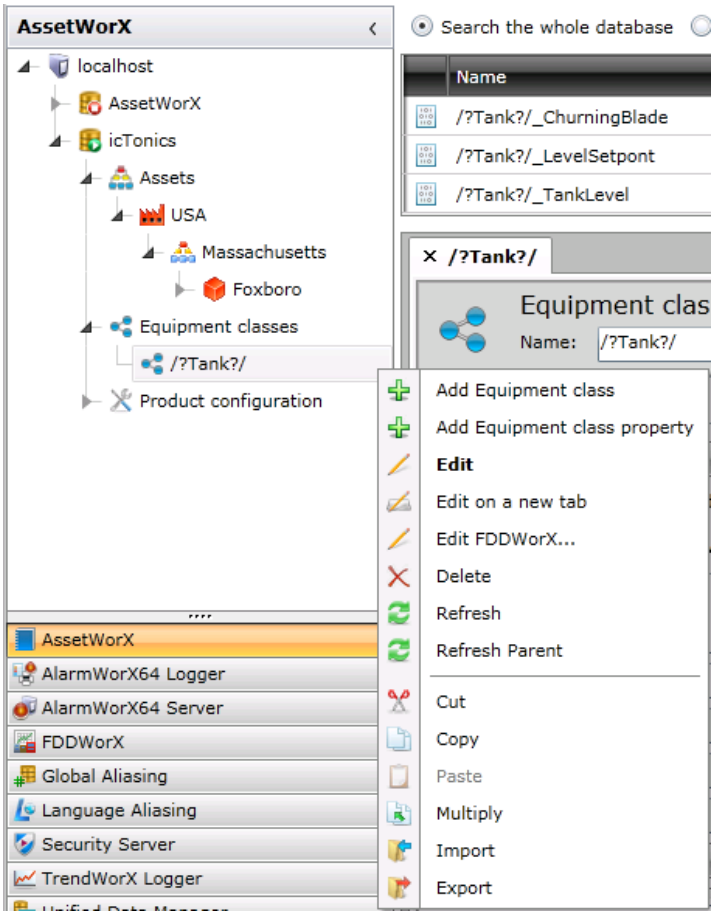

Figure L3.5 – Adding an Equipment Property to the Tank1 Asset

3. Configure the first property: Right-click on **/?Tank?/** and select **Add Equipment.**

   - **Name:** /?Tank?/_ChurningBlade
   - **Source Type:** Dynamic Tag
   - **Real time data tag:**

   @ICONICS.IconicsOPCUAServer.V5\icTonics.Tanks.USA.Foxboro./?Tank?/.ChurningBladeStatus.Value

Note: If you use the Data Browser to select the Tank1 tag, you will have to manually replace "Tank1" with the alias /?Tank?/.

4. Click **Apply**.

5. Add a second Equipment Property to the /?Tank?/ asset with these definitions:

    - **Name:** /?Tank?/_LevelSetpoint
    - **Source Type:** Dynamic Tag
    - **Real time data tag:**

    @ICONICS.IconicsOPCUAServer.V5\icTonics.Tanks.USA.Foxboro./?Tank?/.LevelSetPoint.Value

6. Click **Apply**.
7. Add a third Equipment Property to the /?Tank?/ asset with the following definitions:

    - **Name:** /?Tank?/_TankLevel
    - **Source Type:** Dynamic Tag
    - **Real time data tag:**

8. **@ICONICS.IconicsOPCUAServer.V5\icTonics.Tanks.USA.Foxboro./?Tank?/.TankLevel.Value**
9. Click **Apply**.
10. Following the conventions of the previous three steps, continue adding equipment properties for each element in the list below.

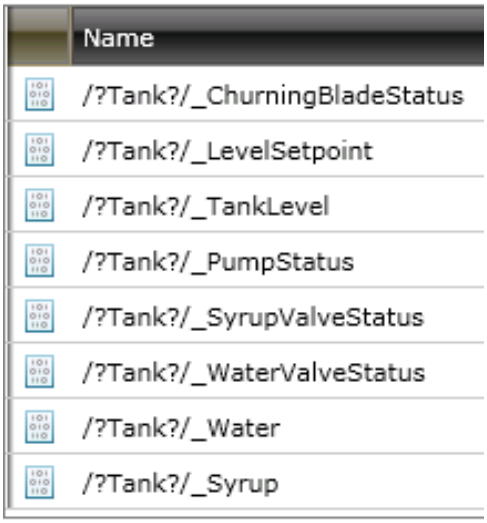

Figure L3.6 – Equipment Properties List

3.2.3. Adding the Equipment Class to the Asset Tree

The figure below depicts the current asset tree. We will proceed by dragging the /?Tank?/ equipment class and dropping the equipment class onto the Foxboro node. This initiates the instantiation process which in turn resolves /?Tank?/ into a usable string. We will continue by creating assets Tank1, Tank2 and Tank3.

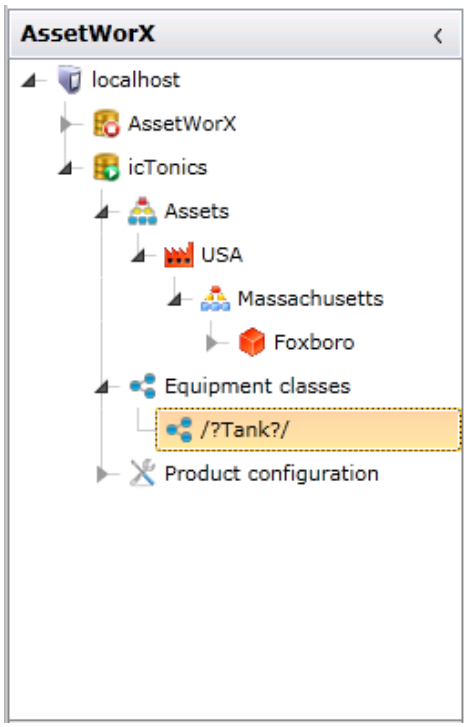

Figure L3.7 – A View of the Current Asset Tree

1. Expand the Assets tree until **Foxboro** is exposed.
2. Also expand the **Equipment classes** asset tree to expose **/?Tank?/.**
3. Select on the **/?Tank?/** equipment class.
4. **Click and hold** with the **left mouse key** on the **/?Tank?/** equipment class.
5. While holding the left mouse key down, **drag the /?Tank?/** equipment class and hover over the **Foxboro** asset as seen in the following figure.

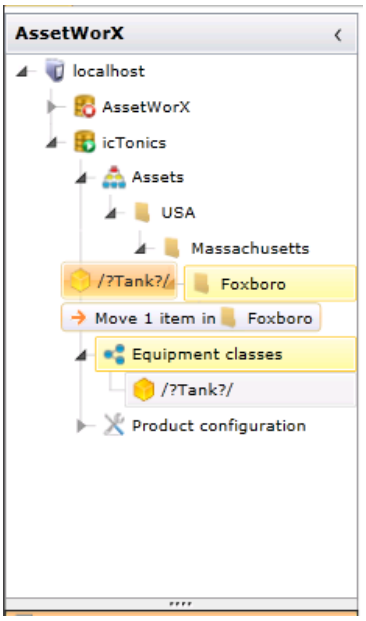

Figure L3.8 – Dragging and Dropping the /?Tank?/ Equipment Class into an Asset Tree

6. While hovering over the **Foxboro asset**, when you see the "**Move 1 item in Foxboro"** message, release the mouse key. This starts the instantiation process.

3.2.4. The Instantiation Process

The following section outlines the process required to Instantiate the /?Tank?/ alias.

1. At this point, you should see the **Instantiation Options** dialog.
2. In the **"Replace With"** column, replace the **/?Tank?/** alias with the word **Tank1.**

Figure L3.9 – Defining the /?Tank?/ Equipment Cass Alias

3. Click on the **Instantiate** button. When you see the **"Current operation: Done"** message, as seen in the following figure, the instantiation process is complete.

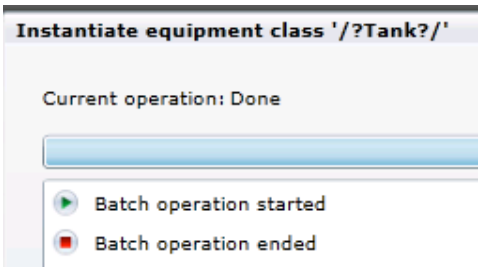

Figure L3.10 – Instantiation Process Complete

4. Click **Close**.
5. Expand the asset tree below the Foxboro asset.
6. Select the newly created **Tank1** asset. This will expose the Tank1 properties on the right.
7. Select the **Commands** sub-tab.
8. Select the **LoadDisp_icTonicsTankMonitor** command entry.
9. Notice two things. First, all the configuration defined in the /?Tank?/ equipment class has been applied to the Tank1 asset. Second, notice that the syntax of the GlobalAlias has been automatically modified to accommodate global alias resolution in runtime.

3.2.5. Adding Tanks 2 and 3

Now that we've walked through the process of creating an asset based on an equipment class, we will proceed, with minimal assistance from this documentation, to add the Tank2 and Tank3 assets.

1. Let's add Tank2 and Tank3 using the same procedure as Tank1. Here's a quick outline of the steps.
2. Select the **/?Tank?/** equipment class with the left mouse key.
3. **Drag and drop /?Tank?/** onto the Foxboro asset.
4. Release the mouse button to start the instantiation process.
5. In the **Replace With** field, replace **/?Tank?/** with **Tank2** or **Tank3** respectively. Click on the **Instantiate** button.
6. You're done when you see the **"Current operation: Done"** message.

7. Click **Close**.

3.2.6. Entering Runtime

Until now, we've only done configuration. Let's proceed by spending some time working with our configuration in Runtime.

Working with the GraphicWorX64 Viewer Control.

1. From within the Workbench-SL, in the upper left corner, click on '**Runtime**'.

   Note: If you do not see the '**Runtime**' selection, click on the **Tools and Settings** tab and confirm that the **Show the Ribbon Title** checkbox is checked.

Figure L3.11 – Initiating Runtime from Workbench-SL

2. Clicking on Runtime opens a new browser session. Notice the **AssetWorX Navigator** on the left and the **Viewer Control window** on the right.

3. Note the list of viewers on the right.

4. We will be exploring PortalWorX-SL in more detail during upcoming labs.

3.2.7. Expanding the Viewable Area

1. Let's expand the viewable area of this Internet Explorer session.

2. Select the PortalWorX-SL **Project** tab.

3. From the **Ribbon** drop down list, select **None**.

Note: Upon clicking OK in the next step, near the top of the banner, look for the notification, which will be displayed briefly, indicating how the key sequence **CTRL+F1** will re-expose the **Ribbon**.

Figure L3.12 – CTRL+F1 to Show Ribbon

4. A **Warning** dialog requiring user confirmation that the ribbon will be hidden appears. Click **OK**.

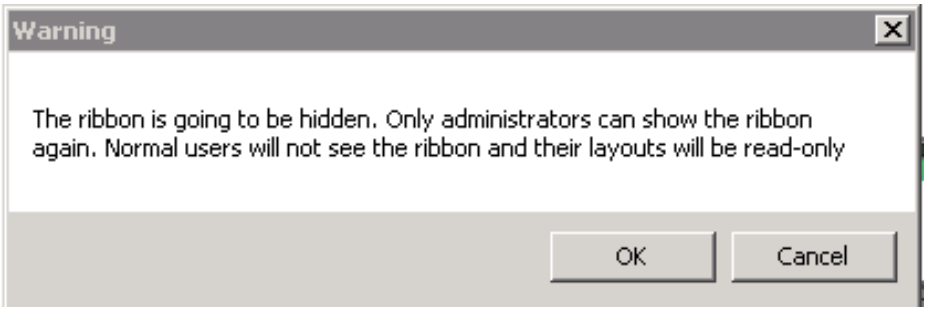

Figure L3.13 – Hidden Ribbon Warning

5. Press **F11** to hide the Internet Explorer Ribbon.

6. Essentially all that should be visible in the browser at this point is the **Banner**, **AssetWorX Navigator** and the list of viewers.

7. Take a moment to poke around and get acquainted with the PortalWorX-SL runtime environment.

8. Press Ctrl-F1 and F11 to return to the default view.

This concludes this lab.

PortalWorX-SL 4

ICONICS PortalWorX-SL provides a Web browser-based Runtime environment utilizing Microsoft Silverlight technology for several ICONICS HMI/SCADA, manufacturing intelligence and analytical applications. It is complementary to the Workbench-SL configuration tool, also accessed through a standard Web browser.

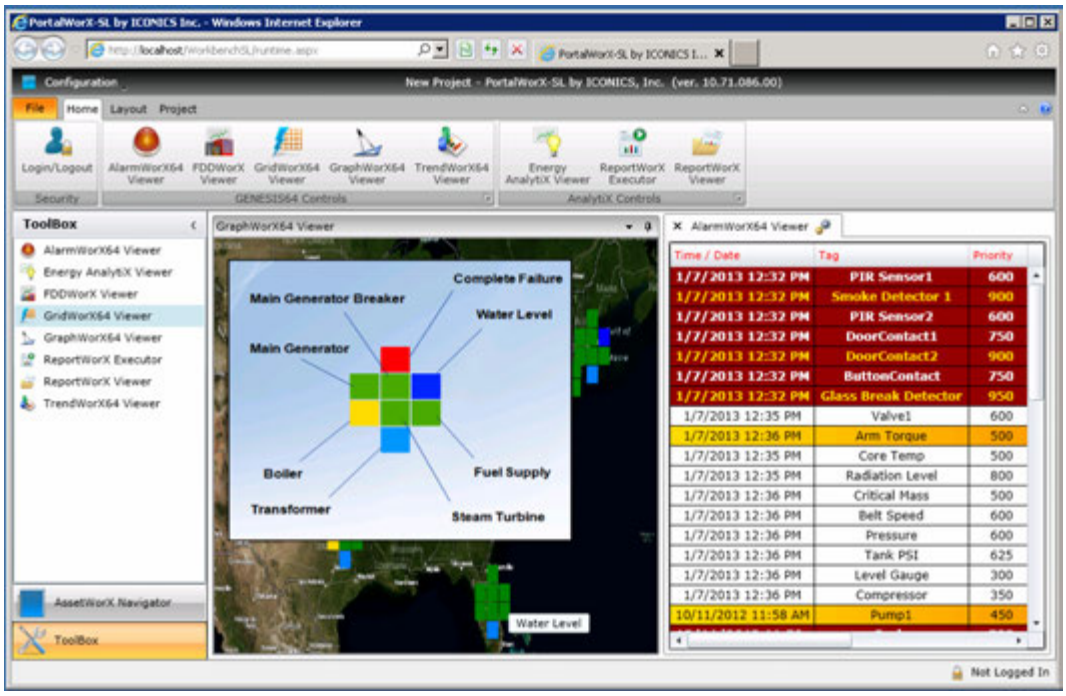

Figure 4.1 - PortalWorX-SL Running in Internet Explorer

4.1. Objectives

After completing this chapter, you should know:

- How to Use PortalWorX-SL Web-based Runtime Tool
- How to Access Tools and Providers
- How to Utilize the AssetWorX Navigator

4.2. Introduction to PortalWorX-SL

4.2.1. Opening PortalWorX-SL

To open PortalWorX-SL, from the Windows **Start** button, select **All Programs → ICONICS → PortalWorX-SL**.

When you open PortalWorX-SL for the first time, you will see the Asset Navigator in the Project Explorer on the left side of the browser window. In the top middle of the screen, you will see the controls/providers (viewers and executors) that you can open within PortalWorX-SL.

PortalWorX-SL features multiple components that can be further customized by the user, including:

- **Asset Navigator** - This appears within the Project Explorer panel on the left side of the browser window, allowing users to utilize a tree structure view of an organization's assets (and connected data therein).
- **Ribbon Bar** - This contains the 'Show' checkboxes which allows users to view or hide specific PortalWorX-SL components [Asset Navigator, Ribbon Bar, Toolbox, Headers, Ribbon Title] as well as the groups of both GENESIS64 and AnalytiX Controls (when loaded).
- **Controls** - Depending on which Controls/Providers are loaded from specific installation media (a GENESIS64 installation disc or an AnalytiX installation disc, for example), this part of the Ribbon shows which controls can be accessed from PortalWorX-SL. These can include:
  - AlarmWorX64 Viewer
  - GraphWorX64 Viewer
  - GridWorX64 Viewer
  - TrendWorX64 Viewer
  - FDDWorX Viewer
  - ReportWorX Executor
  - ReportWorX Viewer
  - Energy AnalytiX Viewer

- **Viewer/Executor Window** - The 'main' section of PortalWorX-SL where any loaded viewer can be specifically configured for runtime visualization. Note: The majority of configuration for any viewer is done in a separate configuration provider (such as through the classic Workbench or Workbench-SL). PortalWorX-SL provides additional options for strictly visualizing configured data, as explained in the Help topics for each attached control/provider.
- **Toolbox** - The Toolbox is an additional listing of all loaded controls/providers - useful if you have hidden the top Ribbon bar or wish to move the list of controls/providers around within the PortalWorX-SL window.

4.3. Switching Between PortalWorX-SL and Workbench-SL

PortalWorX-SL contains multiple viewers and runtime options within the GENESIS64 HMI/SCADA suite, while Workbench-SL contains several configuration providers. There may be instances where users may wish to switch between both tools within the same browser.

4.3.1. From PortalWorX-SL to Workbench-SL

When you have PortalWorX-SL open in your browser, you'll notice certain product identifiers to let you know which of the two Silverlight-based tools you currently have open, as shown in the following image. For instance, with PortalWorX-SL (running in Internet Explorer 9 in the following example), you'll notice PortalWorX-SL in the top window description, in the browser tab name and in the Default project name .

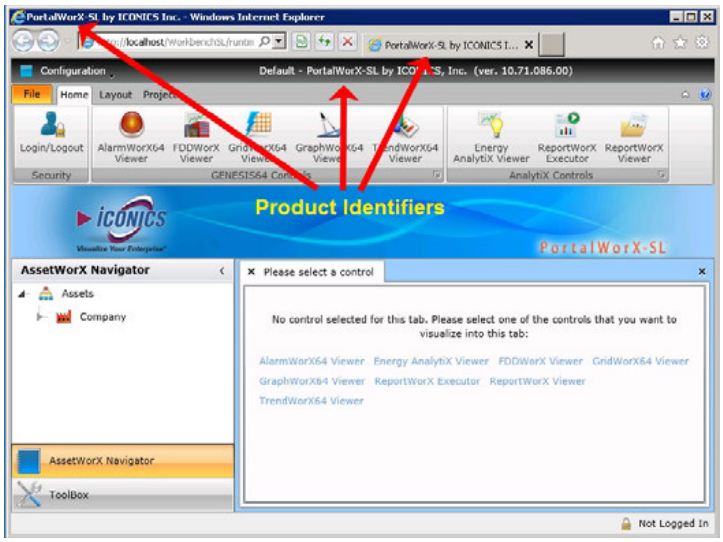

Figure 4.2 - Product Identifiers within PortalWorX-SL (Running in Internet Explorer 9)

PortalWorX-SL is the **Runtime** tool that you are presently using. If you wish to switch to Workbench-SL, you wish to use the **Configuration** tool so you will need to click on the **Configuration** button (Configuration) in the top left of the screen. This will open (continuing to use Internet Explorer 9 as the browser in our example) an additional tab containing the Workbench-SL Runtime tool.

4.3.2. From Workbench-SL to PortalWorX-SL

When you have Workbench-SL open in your browser, you'll notice certain product identifiers to let you know which of the two Silverlight-based tools you currently have open, as shown in the following image. For instance, with Workbench-SL (running in Internet Explorer 9 in the following example), you'll notice Workbench-SL in the top window description, in the browser tab name and in the Default project name.

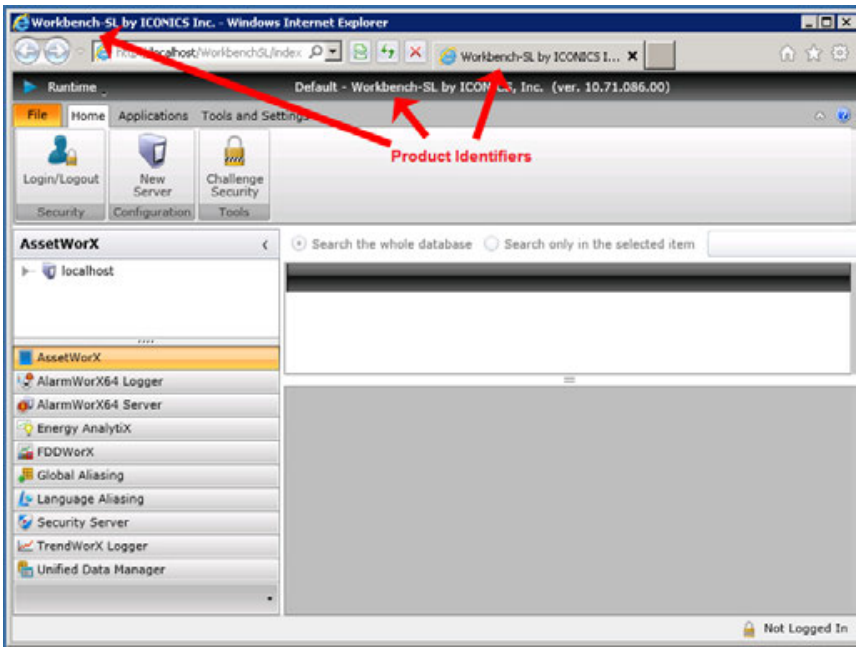

Figure 4.3 - Product Identifiers within Workbench-SL (Running in Internet Explorer 9)

Workbench-SL is the **Configuration** tool that you are presently using. If you wish to switch to PortalWorX-SL, you wish to use the **Runtime** tool so you will need to click on the **Runtime** button (Runtime) in the top left of the screen. This will open (continuing to use Internet Explorer 9 as the browser in our example) an additional tab containing the PortalWorX-SL Runtime tool.

4.4. Ribbons

PortalWorX-SL contains four ribbons at the top of the browser screen:

- File
- Home
- Layout
- Project

... as shown below.

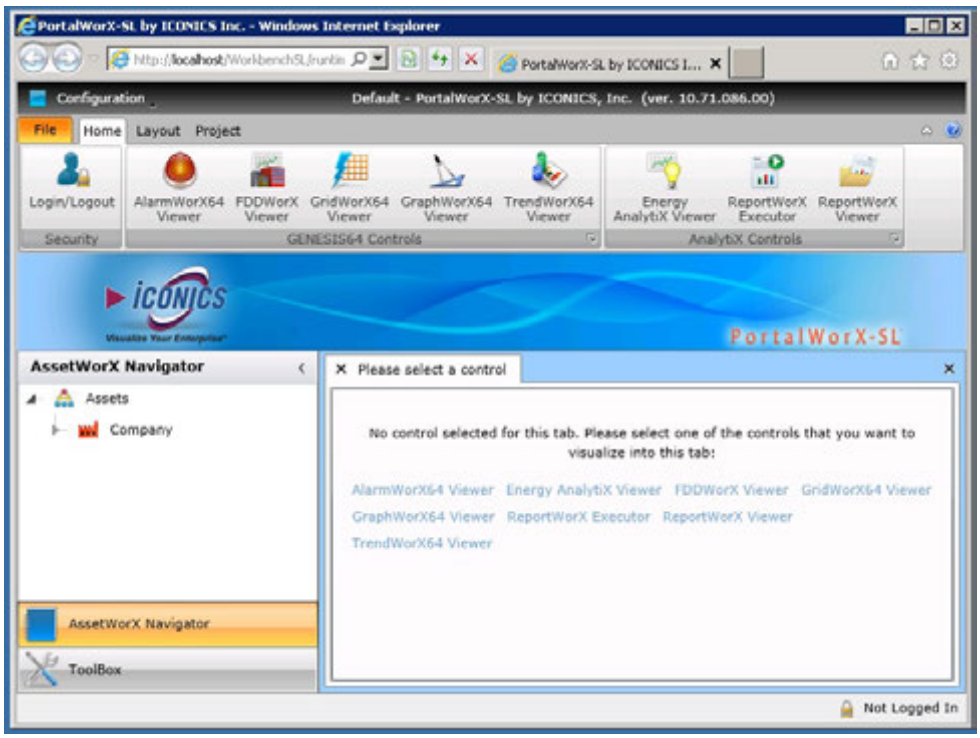

Figure 4.4 - PortalWorX-SL As it Appears When First Opened

4.4.1. File Ribbon

The File Ribbon contains the following options:

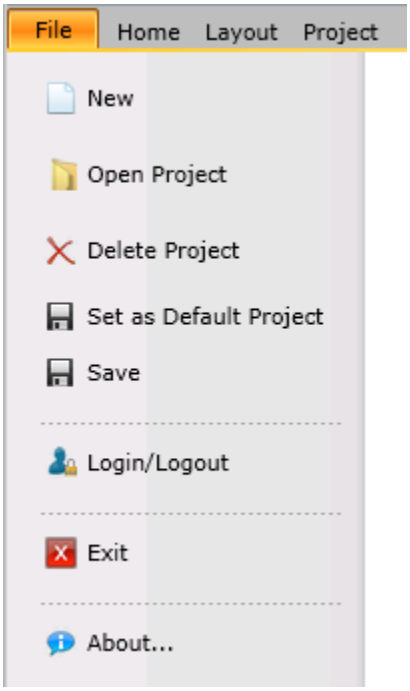

Figure 4.5 - File Ribbon

New - Clicking on 'New' brings up three 'new project' options. 'Empty Project' allows you to create a new empty project. 'Default Project' allows you to create a default project containing default applications. 'Clone Project' allows you to create a clone of the project in use.

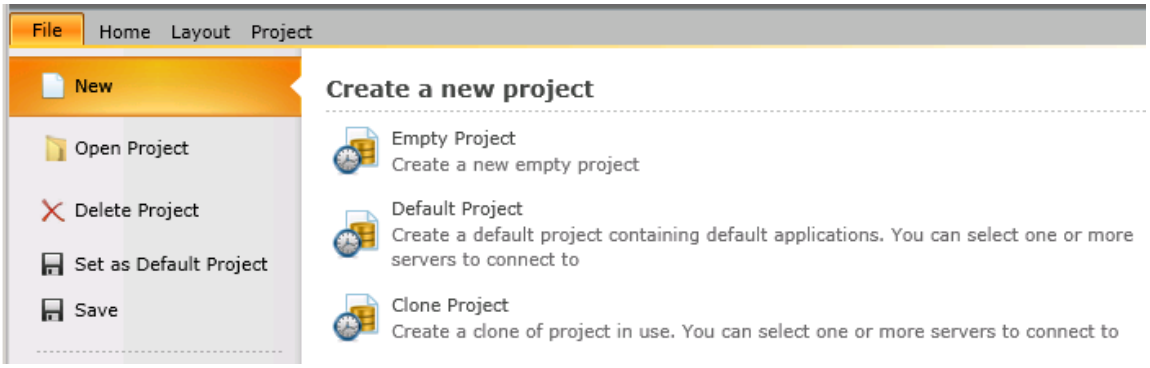

Figure 4.6 - New Project Options

Open Project -Clicking on 'Open Project' allows you to select from previously saved projects, including whichever one has been set as 'Default'.

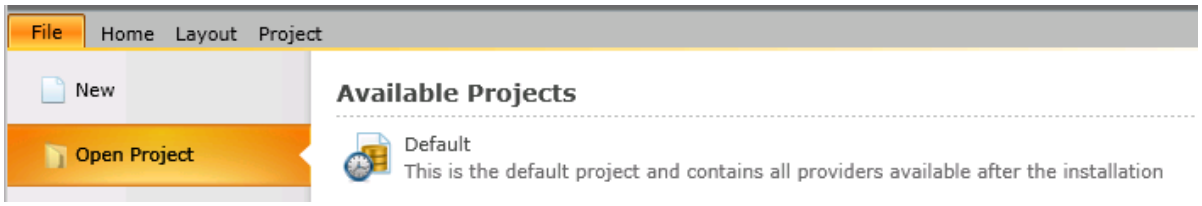

Figure 4.7 - Open Project Options

Delete Project - Clicking on 'Delete Project' allows you to delete previously saved projects. You cannot delete the 'Default' project.

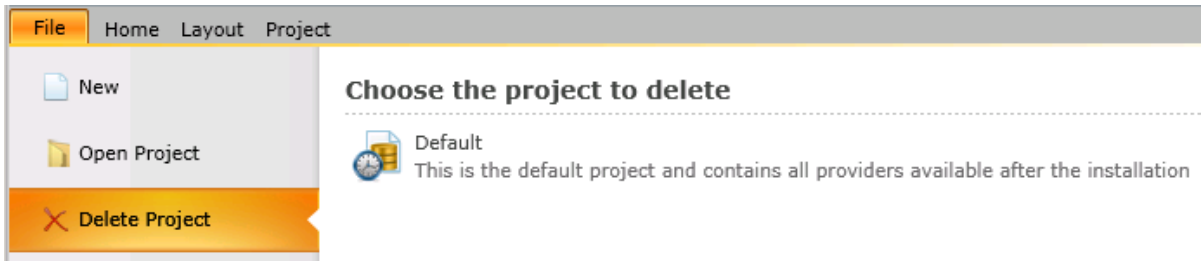

Figure 4.8 - Delete Project Options

Set As Default - Clicking on 'Set As Default' sets the project as the default one. When you reload PortalWorX-SL on the same machine, the project you set as Default will be loaded automatically.

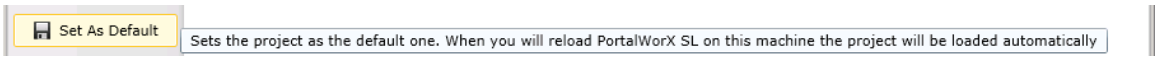

Figure 4.9 - Set As Default

Save - Clicking on 'Save' saves recently made changes to the existing project.

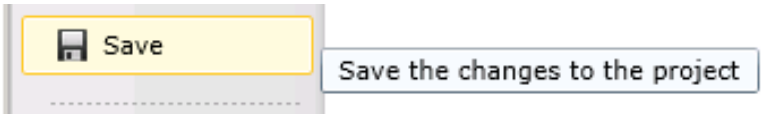

Figure 4.10 - Save Option

Login/Logout - Clicking the 'Login/Logout' button opens the Security Login Window, which allows you to enter your User Name and Password to Login, Log Out or Change Password.

Figure 4.11 - Login/Logout Button

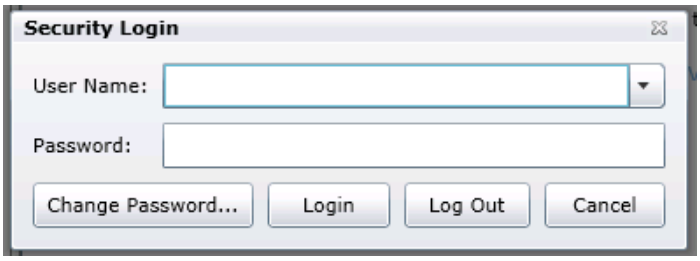

Figure 4.12 - Security Login Window

Figure 4.13 - Change Password Window

Exit - Clicking 'Exit' brings up a confirmation message asking if you would like to close the browser window (and thereby end that particular PortalWorX-SL session).

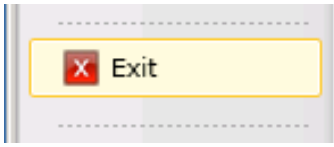

Figure 4.14 - Exit Button

Click 'Yes' to proceed to close the application.

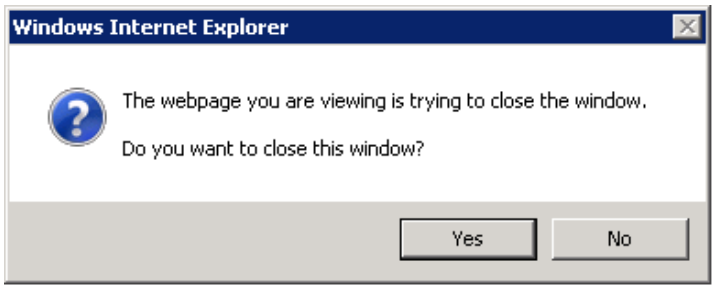

Figure 4.15 - Close Browser Window Confirmation

About - Clicking 'About' brings up the About box for PortalWorX-SL. Click 'OK' in the About box to close it and return to the application.

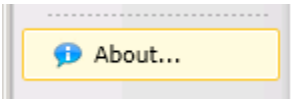

Figure 4.16 - About Button

Figure 4.17 - PortalWorX-SL About Box

4.4.2. Home Ribbon

The Home Ribbon in PortalWorX-SL contains two sections.

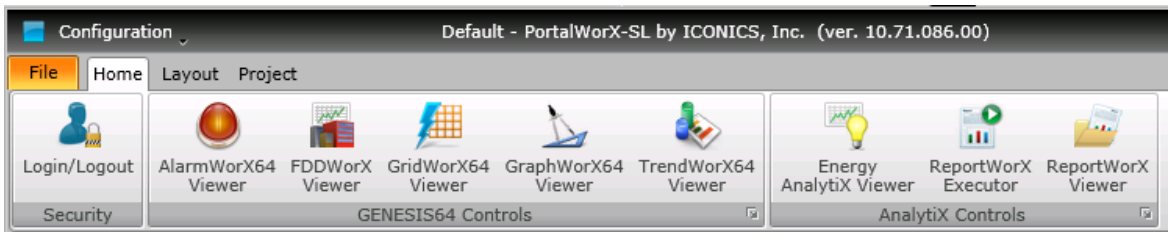

Figure 4.18 - PortalWorX-SL Home Ribbon

4.4.2.1. Security

The first section, **Security**, contains the following item:

Login/Logout - Clicking the 'Login/Logout' button opens the Security Login Window, which allows you to enter your User Name and Password to Login, Log Out or Change Password.

Figure 4.19 - Login/Logout Button

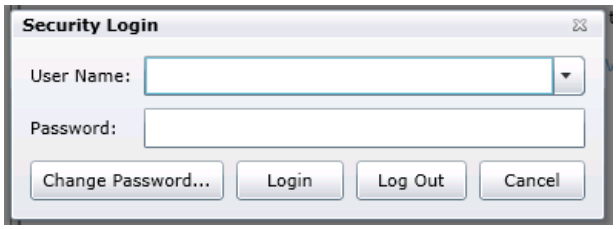

Figure 4.20 - Security Login Window

Figure 4.21 - Change Password Window

4.4.2.2. Controls

Controls - The second section (or sections) are set by which Controls are added based on which ICONICS products you have installed on your PC. PortalWorX-SL may show controls from a GENESIS64 installation or from an AnalytiX installation.

For instance, in the example below, the following controls have been added via a GENESIS64 product installation.

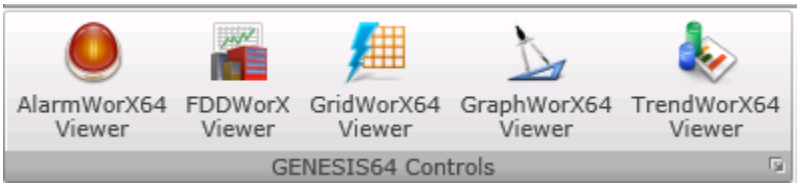

Figure 4.22 - GENESIS64 Controls

Clicking on the small square in the bottom right of the Controls section ( ) brings up the following window, which allows you to rename Providers (Controls) and add any missing provider (control) that may not have initially been loaded with the application (for instance, from a subsequent ICONICS product installation).

You can rename a provider/control as you add it by entering a new name in the text entry field, selecting the desired provider/control from the pull-down menu, then clicking on the 'Add' button. Click 'OK' to save your changes and return to the main PortalWorX-SL screen.

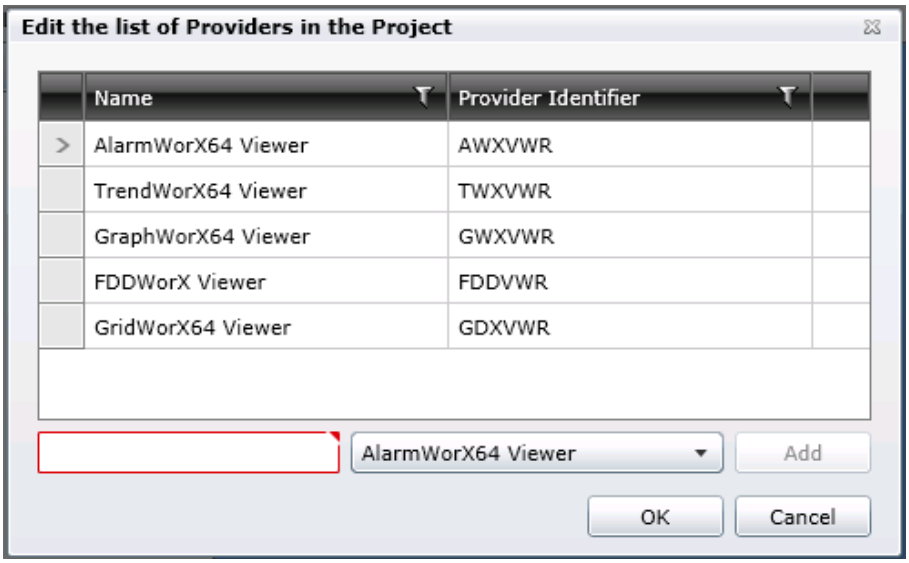

Figure 4.23 - Provider Editor

4.4.3. Layout Ribbon

The Layout Ribbon in PortalWorX-SL contains four sections.

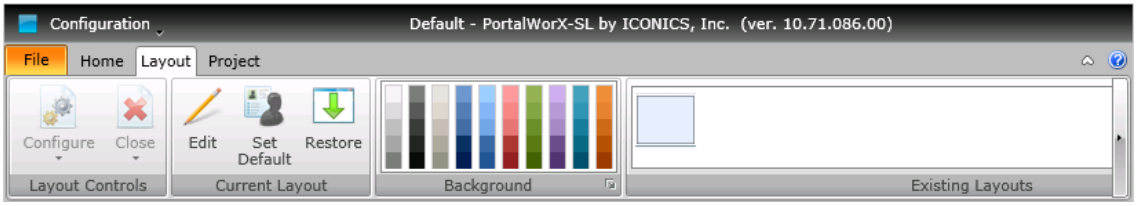

Figure 4.24 - Layout Ribbon in PortalWorX-SL

4.4.3.1. Layout Controls

The first section, **Layout Controls**, is activated (no longer grayed out) when you have selected at least one control for your present project. It contains the following:

Configure - Clicking the 'Configure' button allows you to, first, select which control you would like to configure and then input the required information for that control, as shown in the following image. This is the same action taken when you click on the Configure logo ( ) within a control tab.

Figure 4.25 - Configure Button

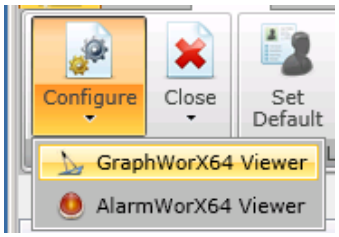

Figure 4.26 - Selecting the GraphWorX Viewer to Configure

The **Configure Web Part Window** allows you to provide a title, name and URL.

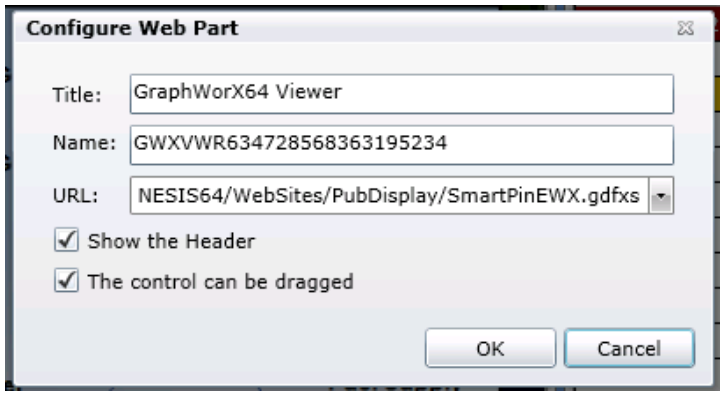

Figure 4.27 - Configure Web Part Window

Close - Clicking the 'Close' button closes the selected layout.

Figure 4.28 - Close Button

4.4.3.2. Current Layout

The **Current Layout** section contains the following:

Edit - The Edit button brings up the following '**Specify layout properties**' window.

Figure 4.29 - Edit Button

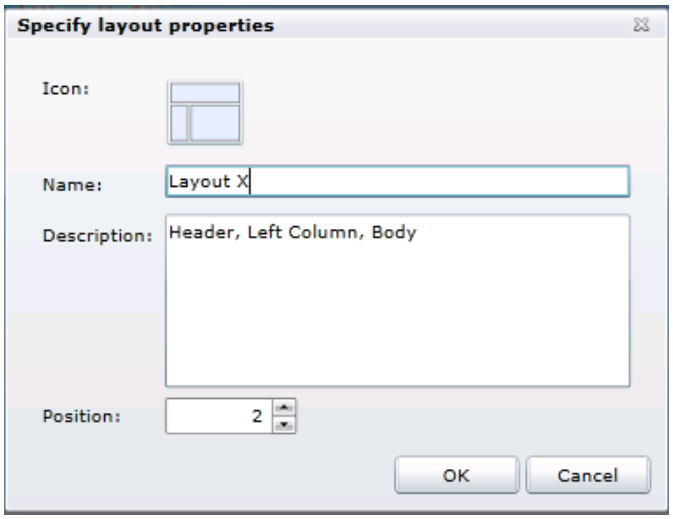

Figure 4.30 - Specify Layout Properties Window

If you click on the image next to 'Icon:', this will open a file browser so that you can select a new representational image (.jpg or .png) for your selected layout. For instance, the Icon in the image above signifies that the layout has a wide top section (the "Header" noted in the 'Description' box), with a shorter width left box (the "Left Column") and longer width right box (the "Body") below it. However, you can use any image (at 48x48 pixels) with whatever significance you choose.

Ultimately, what you select will be shown in the Existing Layouts section (described below) for easy layout selection. Once you have an Icon set, enter a Name and Description, then click on 'OK' to proceed. The Position field allows you to change the position of the layout in the Layout Gallery and in the Layout menu

About User and Public Profiles

In PortalWorX, every user can customize his own portal. The administrator can create a default portal that gets stored in the “PUBLIC PROFILE”. When the user logs in for the first time, he will see this “public profile" portal. At that point, he can change it and then proceed to save any changes. These changes will be seen by that specific user only and the settings will be stored in his own “USER PROFILE”. The profiles can be compared to similar settings within Microsoft SharePoint, where each user (if he is allowed) can change and configure the portal as he likes, but the changes are then seen by that specific user only.

The administrator can, at any moment:

- change the default portal for the new user, and/or
- change the default portal for new and existing users.

The user can, at any moment:

- discard the changes he did in his own portal and restore the default portal created by the administrator.

Set Default - Clicking the 'Set 'Default' button sets the default layout for the user profile.

Figure 4.31 - Set Default Button

Restore - Clicking on the 'Restore' button restores the current layout using the public profile.

Figure 4.32 - Restore Button

4.4.3.3. Background

The **Background** section of the Layout Ribbon allows you to set a color behind the controls in the main window within PortalWorX-SL. Hovering over a color box within the color palette shows the colors hexadecimal color code. Click on the color and it will automatically appear in the background of your selected layout.

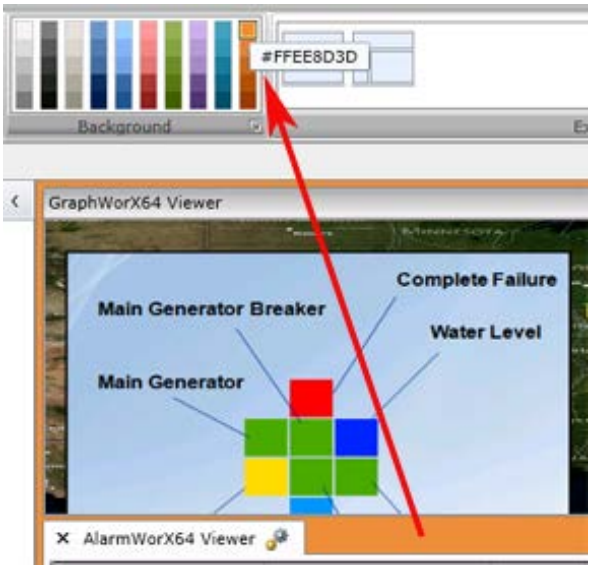

Figure 4.33 - Selecting a Background Color from the Color Palette

Clicking on the small square in the bottom right of the Background section ( ) brings up the following '**Pick a color**' window. You can fine-tune the color selection by selecting a color profile from the pull-down menu.

Choices include CMYK, HLS, HSV or RGB. Depending on your color profile selection, you'll then be able to either use the color picker tools/sliders to the left and right of the text entry fields or enter numbers directly into the fields (including the hexadecimal color code [next to the '#'] if HLS, HSV or RGB were selected). Once you have selected your preferred background color, click OK to return to the main PortalWorX-SL window.

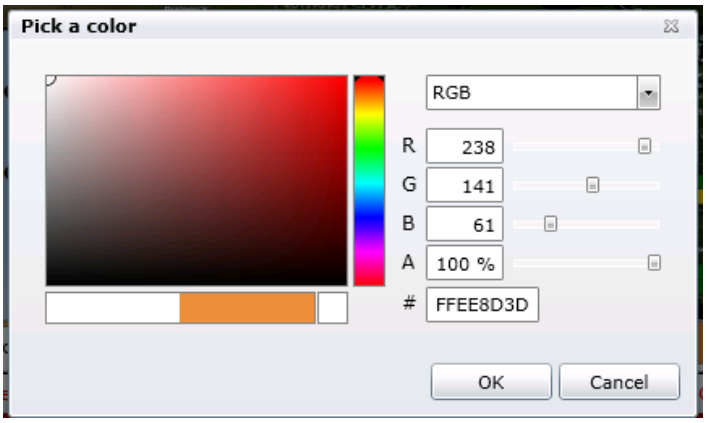

Figure 4.34 - Pick a color Window

4.4.3.4. Existing Layouts

The Existing Layouts section of the Layout Ribbon shows existing selections (as icons that can be set via the Current Layout section of the Layout Ribbon) to replace the currently selected layout. Hover over any of the shown layouts to see its name (as shown below). Click on the icon to enable it. When there are multiple existing layouts, you can use the Up, Down and Expand Window buttons to the right to view them all.

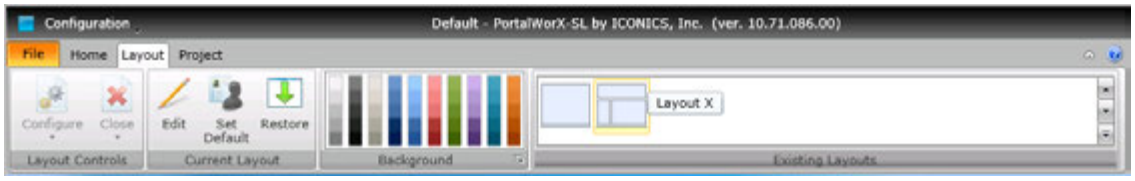

Figure 4.35 - Layout Selection Options

4.4.4. Project Ribbon

The Project Ribbon in PortalWorX-SL contains five sections.

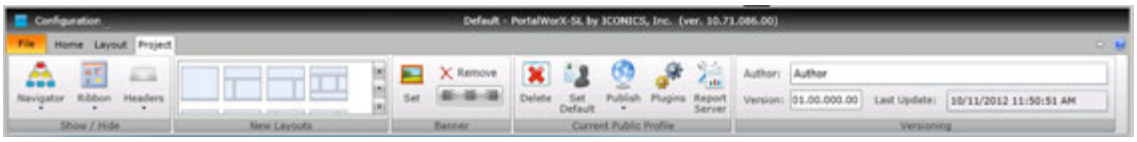

Figure 4.36 - Project Ribbon in PortalWorX-SL

4.4.4.1. Show/Hide

The **Show/Hide** section contains buttons to either show or hide different elements within PortalWorX-SL. These include:

- **Navigator** - The Navigator button specifies which elements are visible in the navigator.

Figure 4.37 - Navigator Button

Clicking on the 'Navigator' button brings up a list of the elements that you can Show or Hide, including Assets, Reports and the Toolbox.

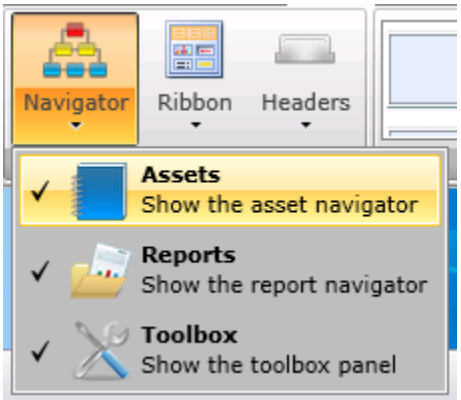

Figure 4.38 - Show/Hide Navigator Button Options

Assets - Shows or hides the Asset Navigator tool in the Project Explorer.

Reports - Shows or hides ReportWorX in the Project Explorer. This ReportWorX selection will not be functional unless a Report Server has also been installed.

Toolbox - Shows or hides the Toolbox, which provides a listing of the available controls/viewers.

- **Ribbon** - The Ribbon button specifies the visibility of the ribbon, the title and the menu.

Figure 4.39 - Ribbon Button

Clicking on the 'Ribbon' button brings up the following list of options:

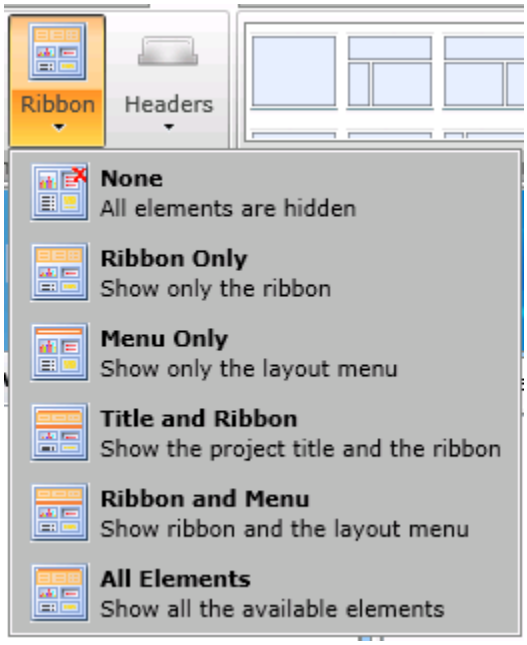

Figure 4.40 - Show/Hide Ribbon Options

If you select 'None' or 'Menu Only', since Ribbons are needed for configuration of PortalWorX-SL's runtime environment, you will first see an Error message notifying you that administrators will be able to retrieve the Ribbon again but normal users will not. Once you click OK, the Ribbons will disappear.

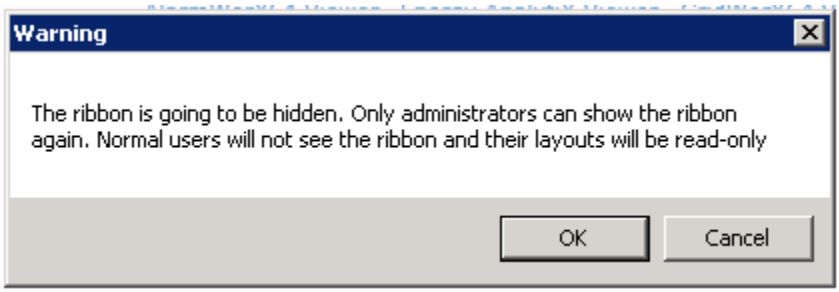

Figure 4.41 - Hiding Ribbon Notification

For administrators, the following message will appear at the top of the screen for a few seconds to let you know you know how to retrieve the hidden Ribbons (CTL+F1):

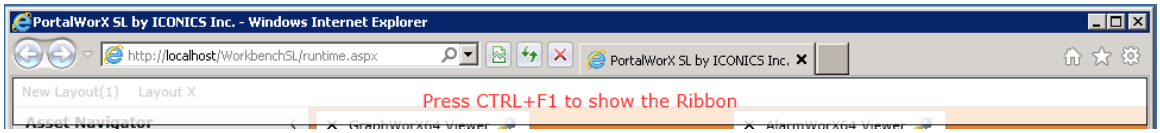

Figure 4.42 - Ribbon Retrieval Reminder

- **Headers** - The Headers button specifies the visibility for all the headers in the current layout.

Figure 4.43 - Headers Button

Clicking on the 'Headers' button brings up the following options:

Figure 4.44 - Show/Hide Headers Options

4.4.4.2. New Layouts

The **New Layouts** section contains pre-loaded layout templates in multiple viewer window configurations that users can select to replace the currently loaded layout. You can use the Up, Down and Expand Window buttons to the right to view them all. Hovering over a selected layout template, as shown below, shows the layout's description.

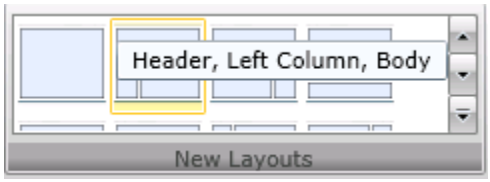

Figure 4.45 - Hovering Over a Selected Layout Template

Clicking on a selection opens the 'Specify layout properties' window, as shown in the following image.

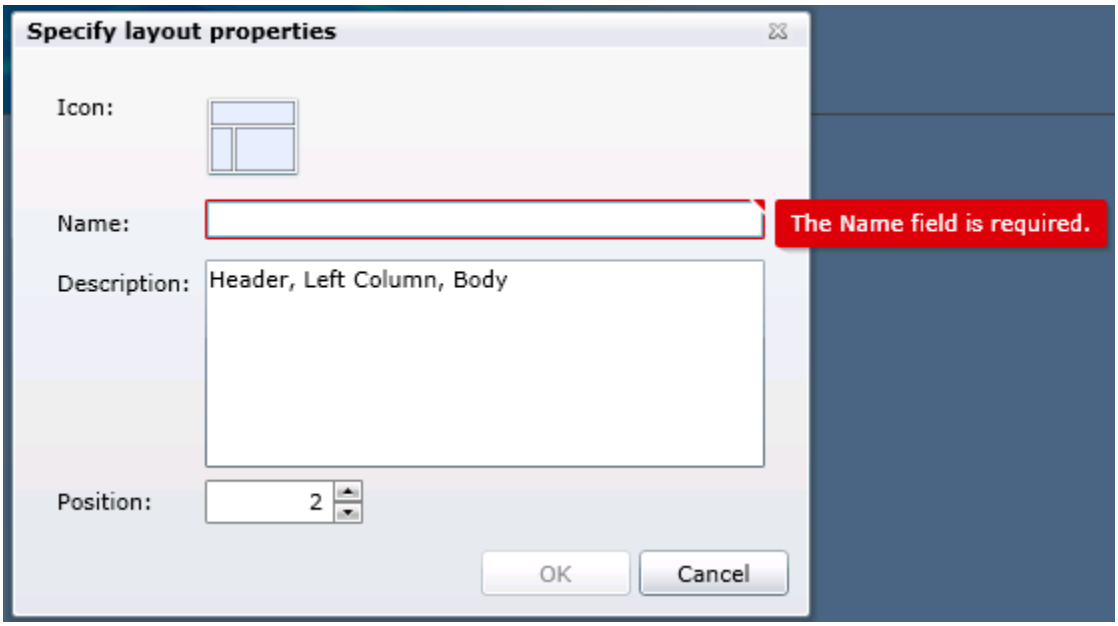

Figure 4.46 - Specify Layout Properties Window

If you click on the image next to 'Icon:', this will open a file browser so that you can select a new representational image for your selected layout. You may wish for the Icon to be accurately representative of the layout or you can use a different image with your own assigned meaning. You can use any image (at 48x48 pixels) with whatever significance you choose. Ultimately, what you select (and save) will be updated in the Existing Layouts section of the Layout Ribbon for easy selection. Once you have an Icon set, enter a Name and Description, then click on 'OK' to proceed.

4.4.4.3. Banner

The **Banner** section of the Project Ribbon allows you to set an image to appear at the top of the PortalWorX-SL screen; for instance, as an identifier for your company/organization or specific department, division or project.

Set - The Set button opens a file explorer window to select your desired image. Keep in mind that you will want to select an image that is sized appropriately to allow you to see your configured viewer windows beneath it.

Figure 4.47 - Set Button

Once you have selected a banner image via the file explorer, it will appear immediately underneath PortalWorX-SL's Ribbons, as shown in the following image.

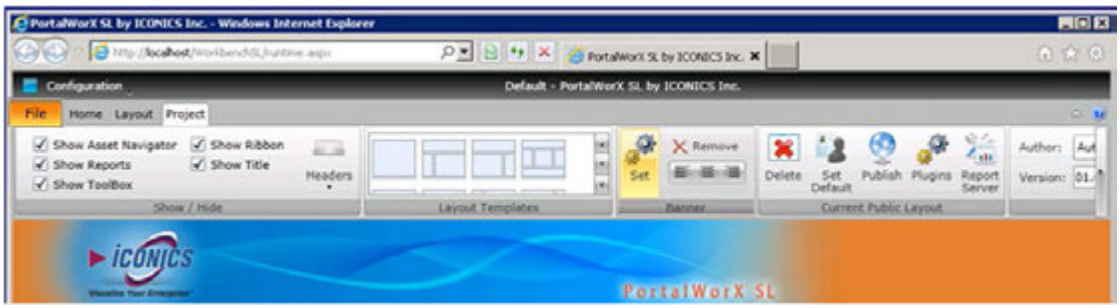

Figure 4.48 - A Sample ICONICS Banner in PortalWorX-SL

Remove - Clicking the 'Remove' button deletes the loaded banner from the PortalWorX-SL main window.

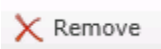

Figure 4.49 - Remove Button

Alignment Buttons - Once you have added your Banner to PortalWorX-SL, you can use the Alignment Buttons to align it to the left, center or right of the top of the screen.

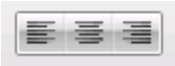

Figure 4.50 - Alignment Buttons

4.4.4.4. Current Public Layout

Each portal can have multiple layouts. The users can switch the layouts using the ribbon gallery or the title menu (right below the ribbon, hidden by default). The current layout is the layout currently visible. The Current Public Layout is the default version of the layout created by the administrator associated with the currently visible layout.

The **Current Public Layout** section of the Project Ribbon contains the following:

Delete - Clicking the 'Delete' button removes the current layout from the public profile as well as from all of the user's profiles. Once you click on the 'Delete' button, you'll see a warning message, shown below, to ensure you wish to remove the current layout.

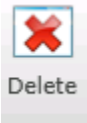

Figure 4.51 - Delete Button

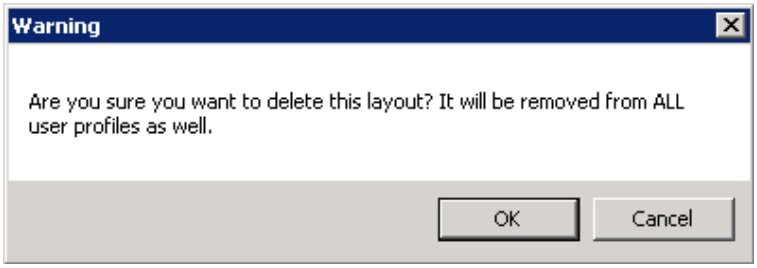

Figure 4.52 - Layout Deletion Warning

Set Default - Clicking the 'Set Default' button sets the default layout for the public profile.

Figure 4.53 - Set Default Button

Publish - Clicking the 'Publish' button publishes the layout to the public profile.

Figure 4.54 - Publish Button

Plugins - Clicking the 'plugins' button configures the plugins used by the project.

Figure 4.55 - Plugins Button

The following window appears. Use the pull-down menu to select which controls should be included in the present project. You can customize the control names by renaming them within the text entry field to the left of the pull-down menu. If you are okay with the selection, click on the 'Add' button and the control will appear in the list. If you are okay with the entire plugin list, click 'OK' to close the window and return to the main PortalWorX-SL screen.

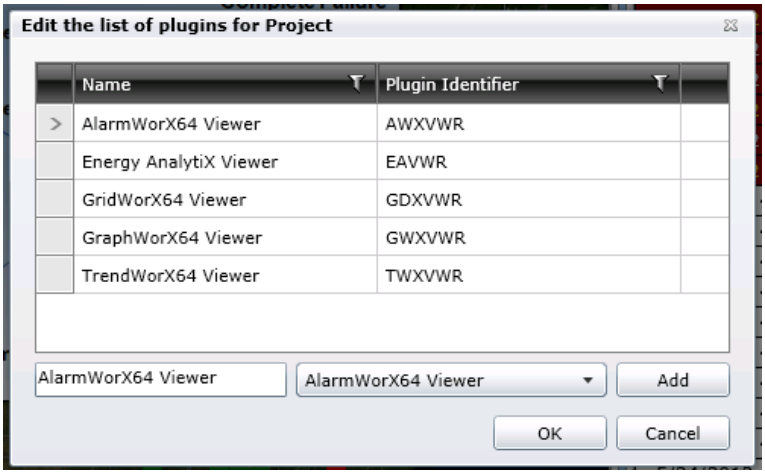

Figure 4.56 - Plugins List Editing Window

If you wish to remove a plugin/control from the list, click on it to highlight it then click on the Delete key. You'll see the following warning. Click 'OK' to proceed with the deletion. If you are okay with the entire plugin list, click 'OK' to close the window and return to the main PortalWorX-SL screen.

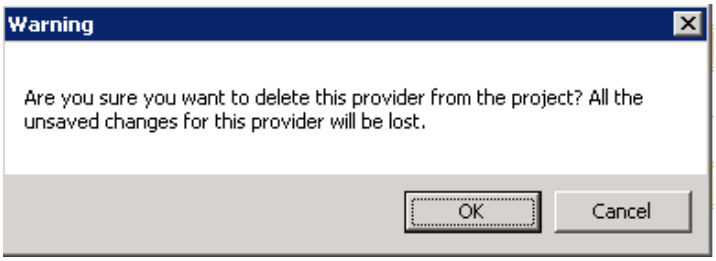

Figure 4.57 - Provider Deletion Warning

Report Server - Clicking the 'Report Server' button configures the server used for reports within the ReportWorX controls that tie into PortalWorX-SL.

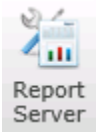

Figure 4.58 - Report Server Button

Once you click on the Report Server button, the following window will open:

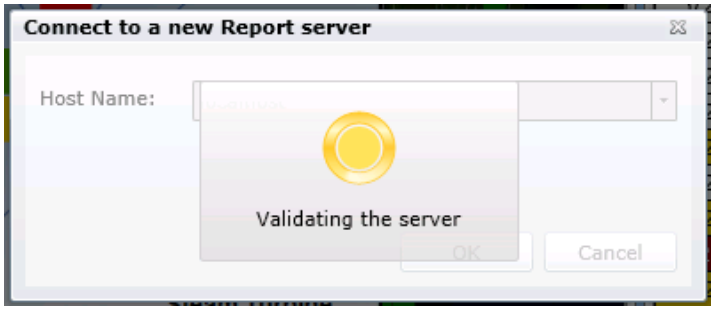

Figure 4.59 - Report Server Connection - Validation

Once the server is validated, you'll be able to select a Host Name via pull-down menu, as shown below:

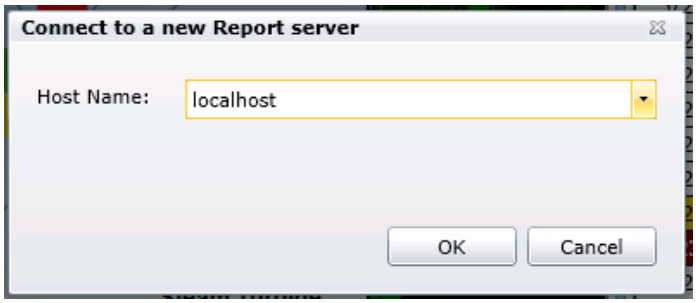

Figure 4.60 - Selecting a Host Name

4.4.4.5. Versioning

The **Versioning** section of the Project Ribbon contains the following text fields to differentiate the current project when it is saved:

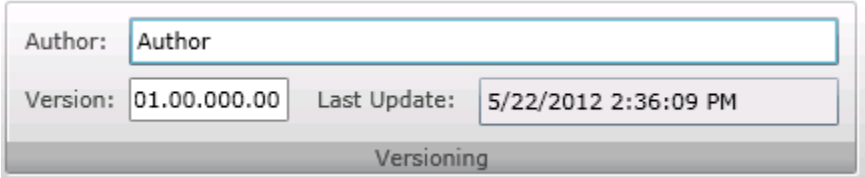

Figure 4.61 - Versioning Text Fields

Author - Enter the author of the project

Version - The Version field will let you keep track of project origination and subsequent changes.

Last Update - The Last Update field will automatically keep track of the last time the project was saved with changes.

4.5. AssetWorX Navigator

4.5.1. What is AssetWorX Navigator?

AssetWorX Navigator (located within PortalWorX-SL and also as a control within GraphWorX64) is the corresponding Runtime tool to ICONICS' AssetWorX provider (located within Workbench-SL).

AssetWorX is used to configure a tree-like structure that provides a functional hierarchy for navigation and for data roll-ups, while AssetWorX Navigator uses that same asset tree set-up in Runtime to perform pre-set functions (commands) through PortalWorX-SL's viewers/controls or as an added control within a GraphWorX64 display.

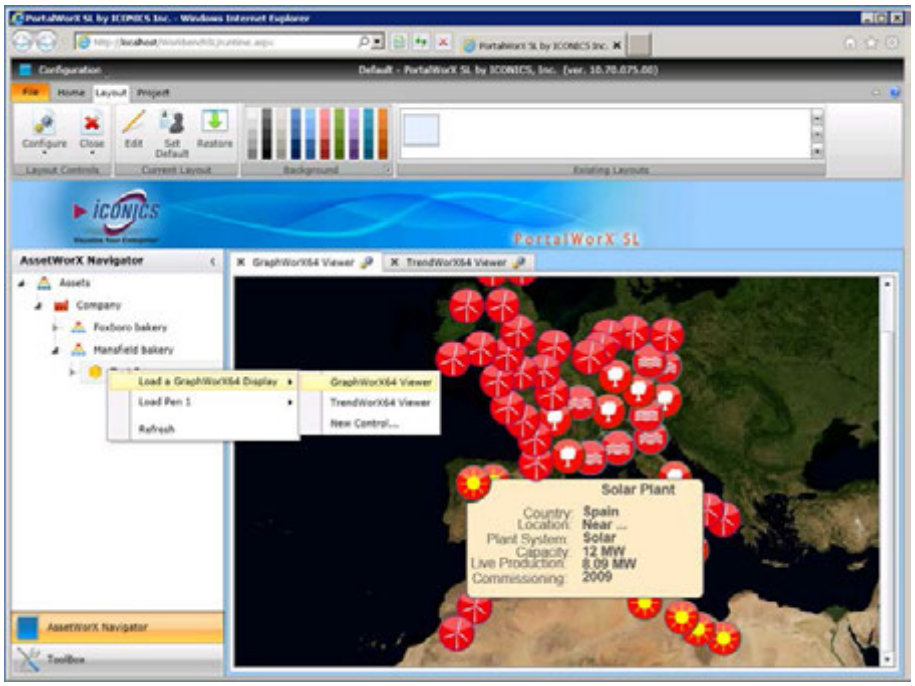

Figure 4.62 - Running a Command Through an Asset in AssetWorX Navigator

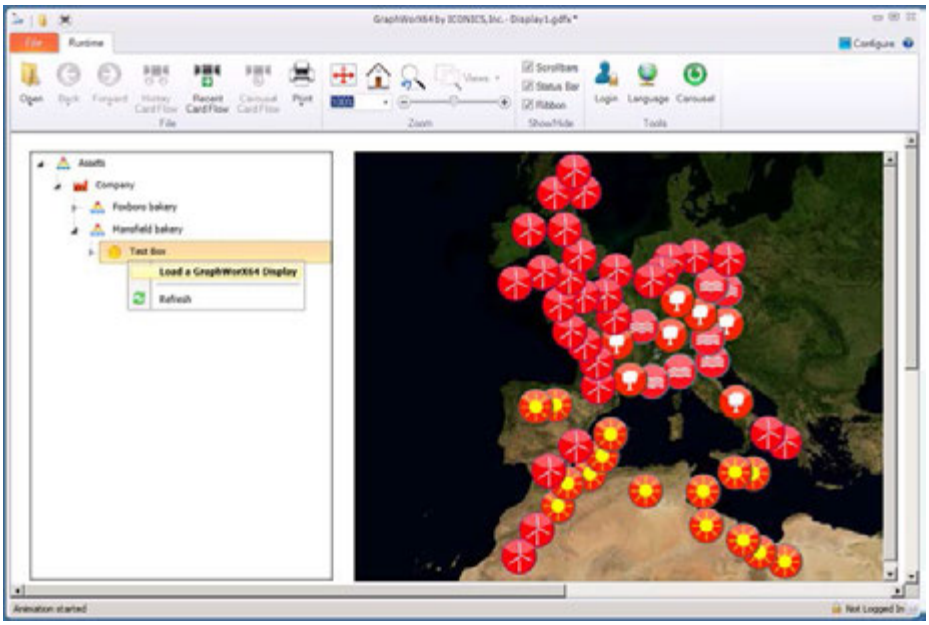

Figure 4.63 - Running a Command Through an Asset in an AssetWorX Navigator Control to a GraphWorX64 Viewer Control in a GraphWorX64 Display in Runtime

The AssetWorX Navigator provider within PortalWorX-SL will show an up-to-date view of whatever assets have been configured using the AssetWorX provider in Workbench-SL.

Note: When you first install GENESIS64, the default database in the AssetWorX provider in Workbench-SL will have sample assets, similar to what is shown below, to explore to better understand the asset tree structure and how it can be fully utilized. The AssetWorX Navigator in PortalWorX-SL will reflect any saved changes to this database.

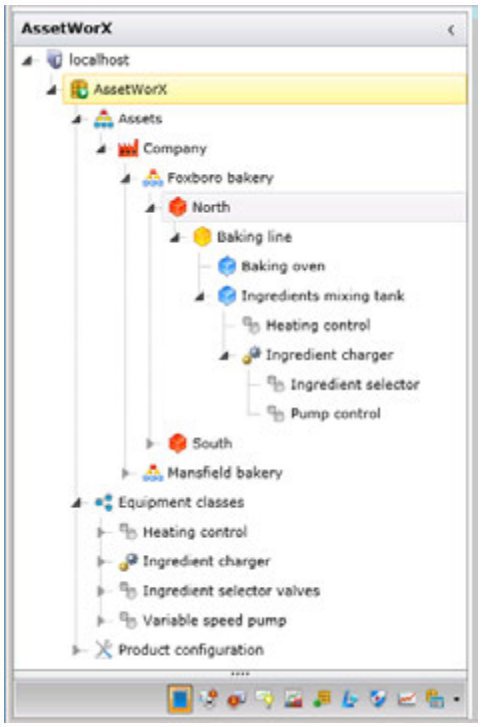

Figure 4.64 - AssetWorX (in Workbench-SL) with Sample Asset Data

4.5.2. AssetWorX Navigator in PortalWorX-SL

PortalWorX-SL initially loads with the AssetWorX Navigator visible in the left section of the browser window. The asset tree that is initially loaded here is based on what database is activated through the AssetWorX provider in Workbench-SL.

Note: When you first install GENESIS64, the default database in the AssetWorX provider in Workbench-SL will have sample assets to explore to better understand the asset tree structure and how it can be fully utilized. The AssetWorX Navigator in PortalWorX-SL will reflect any saved changes to this database, as shown below.

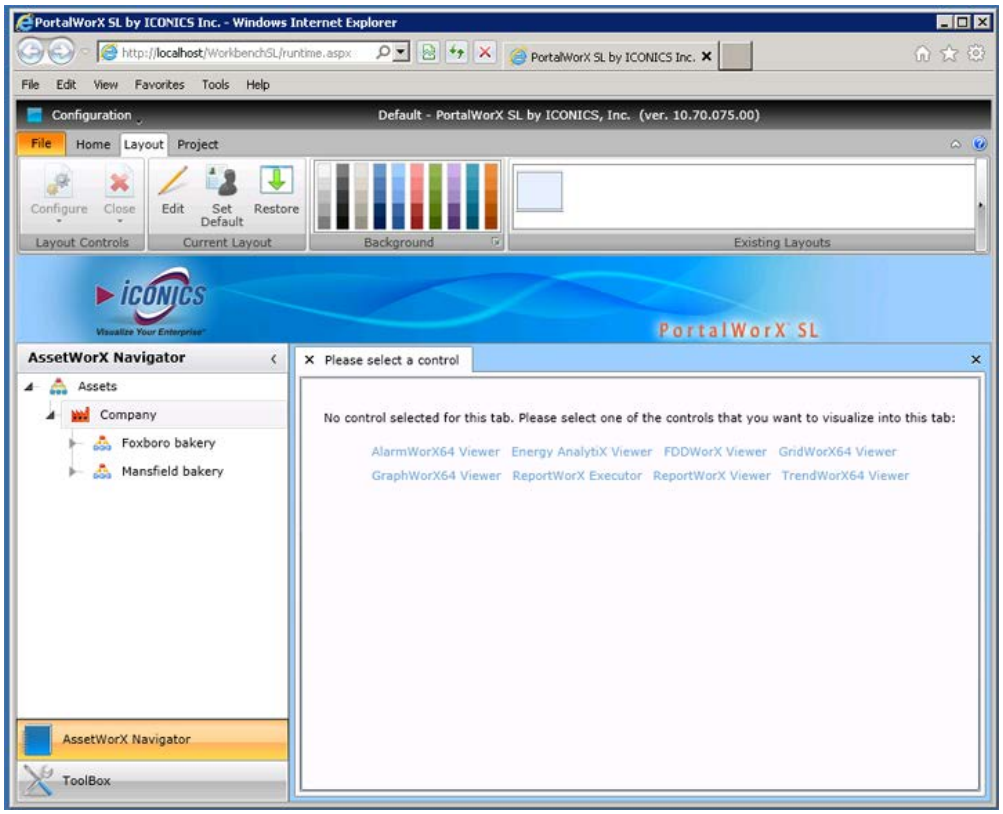

Figure 4.65 - AssetWorX Navigator in PortalWorX-SL

4.5.3. Using Commands Through AssetWorX Navigator

In addition to showing an up-to-the-minute representation of your organization's assets in tree form (that have been configured using the AssetWorX provider in Workbench-SL), the AssetWorX Navigator also allows you to run commands through the various PortalWorX-SL controls.

The following example takes you through the steps to configure a command through an asset in AssetWorX that can then be triggered through AssetWorX Navigator to a PortalWorX-SL control.

1. First, we will set a command within an Equipment asset in the 'AssetWorX' default database in the AssetWorX provider in Workbench-SL. Launch Workbench-SL from the **Start menu → All Programs → ICONICS → Workbench-SL**.

After you enter your User Name and Password, you'll see Workbench-SL open in your preferred Web browser as shown below. In the default 'AssetWorX' database, expand the tree so that you can see the 'Mansfield bakery' node.

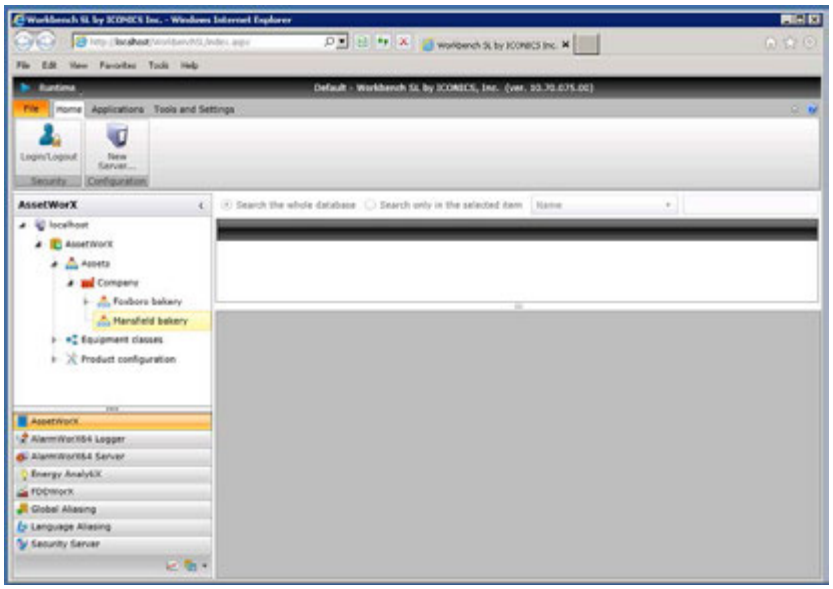

Figure 4.66 - Workbench-SL with Tree Expanded

2. Right-click on 'Mansfield bakery' in the AssetWorX provider and click on 'Add Equipment'. The Equipment properties window will open in the right side of the screen. Give your Equipment asset a Name (in our example, we have named it "Test Box"), then click on the Commands tab, as shown below.

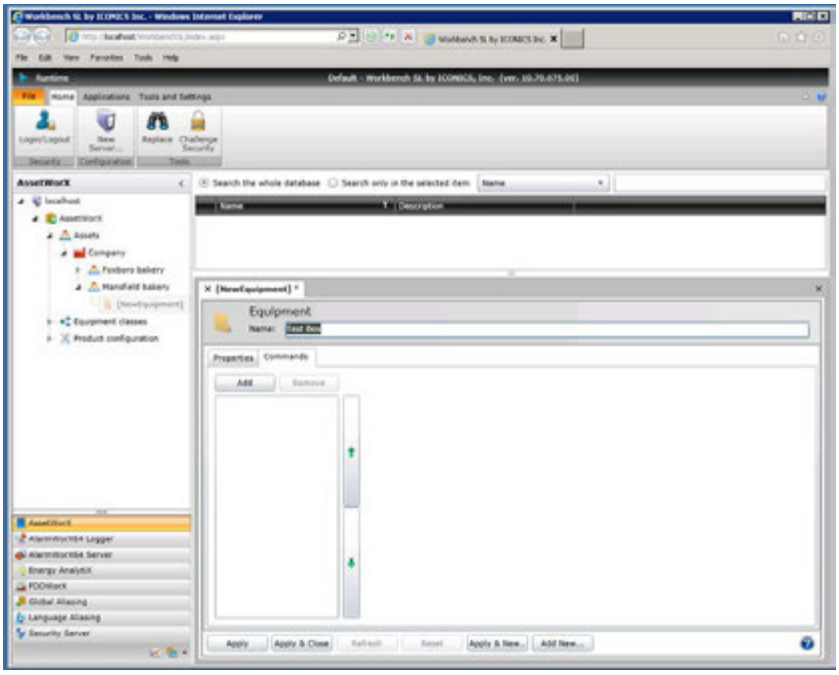

Figure 4.67 - Creating New Equipment in AssetWorX

3. In the Commands tab, click on the 'Add' button to add a command. You'll see that 'New Command' appears in the top of the box to the left and additional properties appear to the right. In our example, we want to use "Load Graphics Display", so select that from the 'Command:' pull-down bar at the top, as shown below.

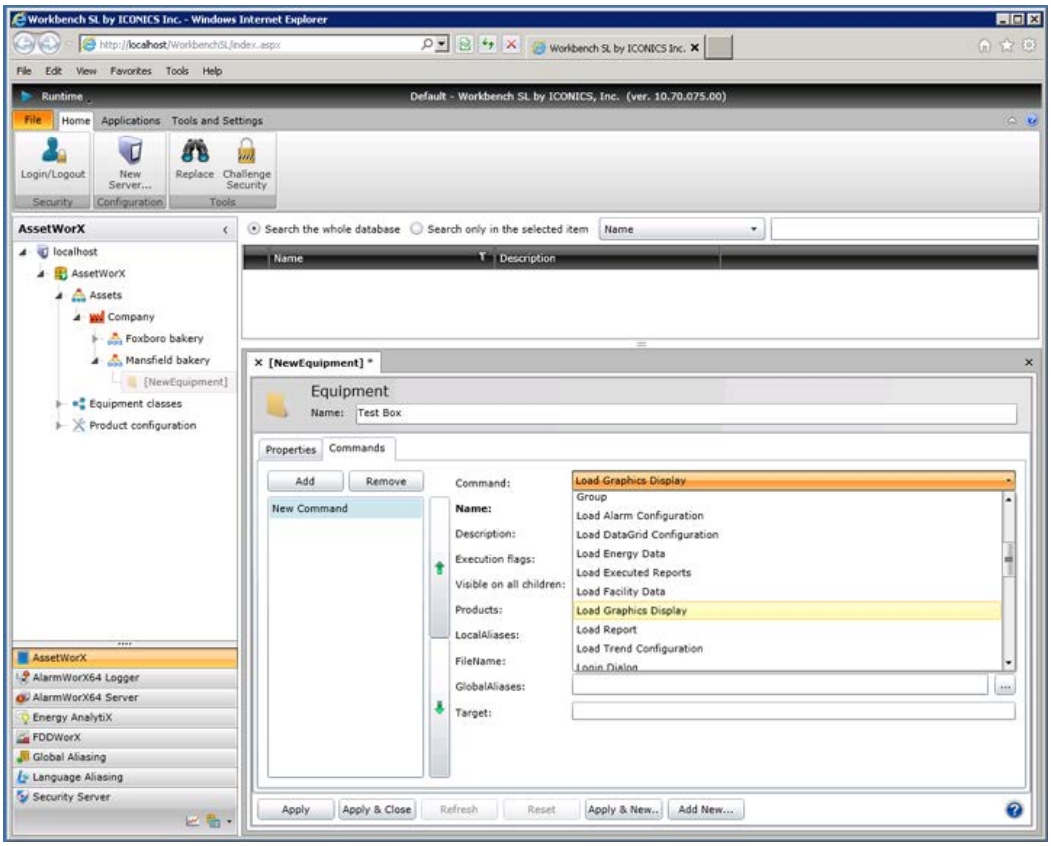

Figure 4.68 - Adding a Command to the Asset

Proceed to fill out the remainder of the Command properties. Since we are using the 'Load Graphics Display' command, we want to make sure we provide the location of our desired GraphWorX64 Silverlight display (.gdfxs) file. In our example, we're using a file called RenewableEnergy.gdfxs that we've place in the following location: http://localhost/pubdisplay/RenewableEnergy.gdfxs.

Click on the 'Apply & Close' button to save your settings.

4. Now you can open PortalWorX-SL to view the asset (with attached command) that you just created. [See "Switching Between Workbench-SL and PortalWorX-SL"]. In the image below, you'll notice that our 'Test Box' asset now appears in the asset tree in AssetWorX Navigator.

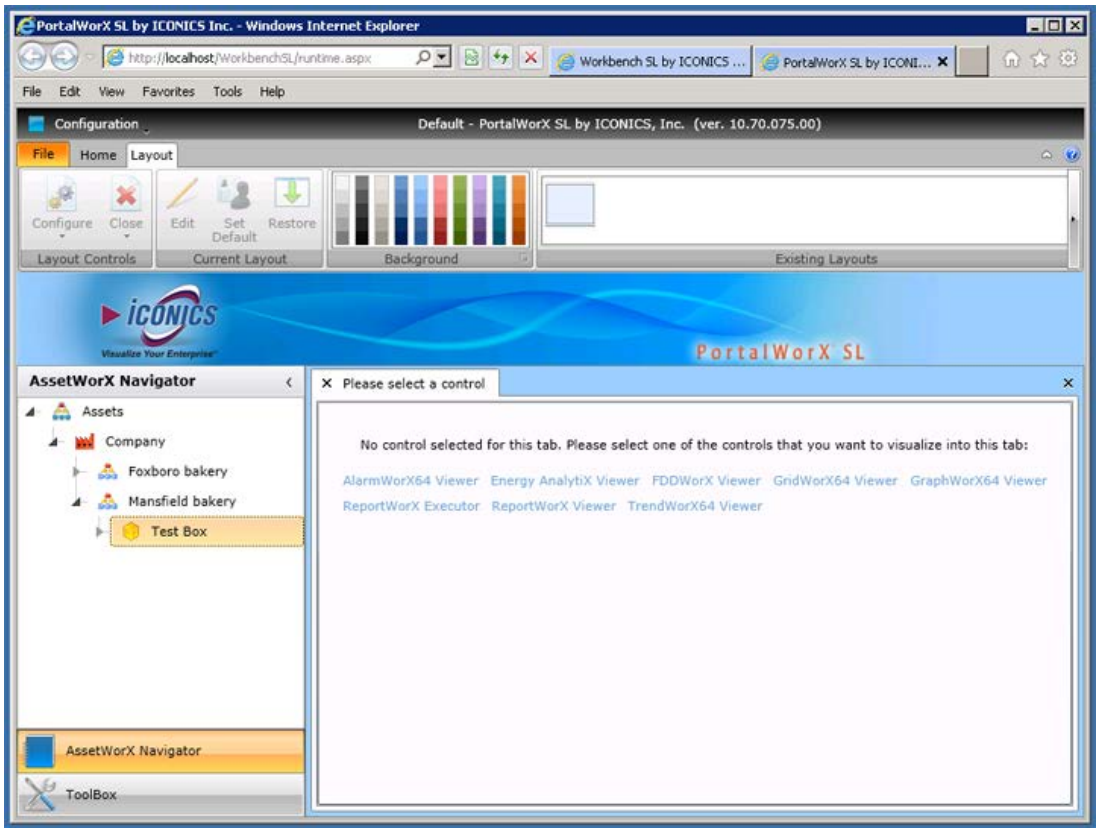

Figure 4.69 - A Configured Asset in AssetWorX Navigator

5. Right-click on the newly created asset (in our example, 'Test Box') and you'll be able to activate the attached command(s). Since we created a 'Load Graphics Display' for our 'Test Box' asset in AssetWorX, and named it 'Load GraphWorX64 Display', that is what will appear to activate the command. You'll also notice that you can activate the command into a 'New Control' as a Target name had not been previously set for the Equipment asset in AssetWorX.

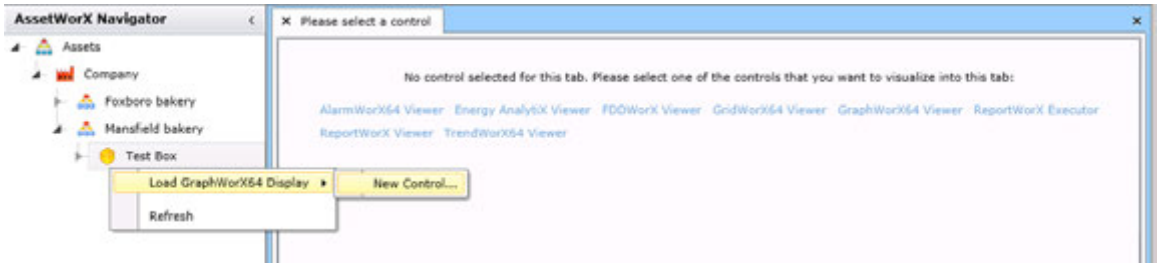

Figure 4.70 - Activating an Asset's Command in a New Control in PortalWorX-SL

If you had *named a specific Target in the Equipment properties in AssetWorX*, then the command can be activated in that specifically named Target in PortalWorX-SL, as shown below. Notice there is no carat [ ] after 'Load GraphWorX Display' in the image below, as you would have already set up the target control (named 'Target Control' in the image below) in AssetWorX. This is especially useful if you have multiple controls in your layout and want to initially set up commands in for specific controls in ahead of time.

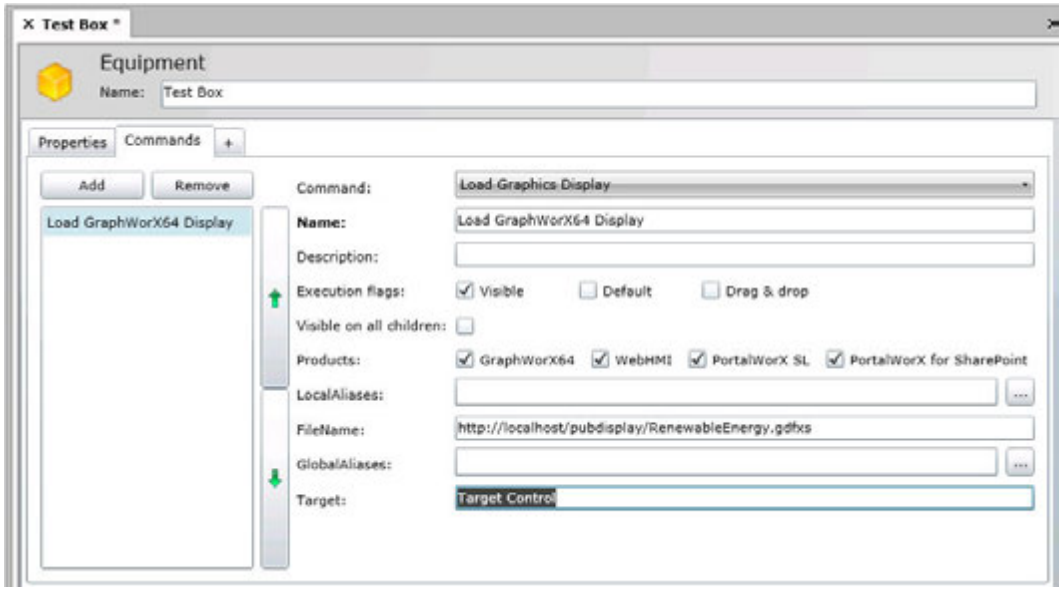

Figure 4.71 - Naming a Target Control in AssetWorX for An Asset's Command in PortalWorX-SL

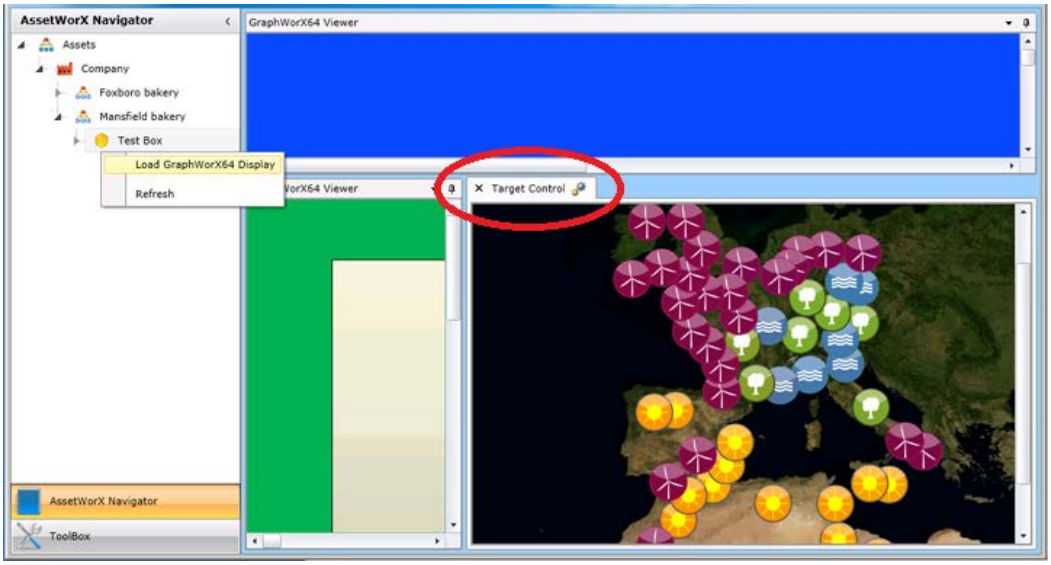

Figure 4.72 - The Same Command Sent to a Named Control in PortalWorX-SL

The name needs to be entered in the Target text field in the Command tab of either Equipment or Equipment Class properties in the AssetWorX provider in Workbench-SL.

4.5.4. Saving Files for Display in PortalWorX-SL

The example used in the previous section, Using Commands Through AssetWorX Navigator, showed how a GraphWorX64 display file can be saved specifically for use within PortalWorX-SL using Silverlight-based technology.

For the GraphWorX64 display, the target URL for the viewer/Web part is the location of the intended .gdfxs file.

For AlarmWorX64 Viewer, the target URL should be the location of a .awxxs file.

For GridWorX64 Viewer, the target URL should be the location of a .gdxxs file.

For TrendWorX64 Viewer, the target URL should be the location of a .twxxs file.

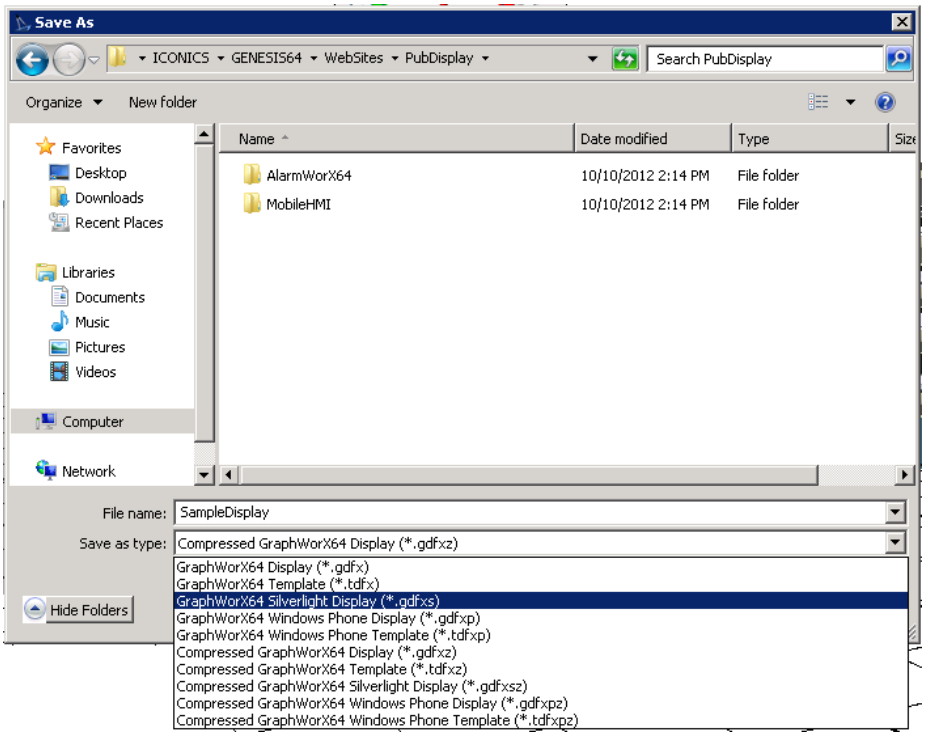

Figure 4.73 - Saving a GraphWorX64 Silverlight Display (*.gdfxs) File

4.6. Viewers

The Viewers within PortalWorX-SL are the Runtime Web Parts connected to data configured in other ICONICS components including AlarmWorX64, Energy AnalytiX, FDDWorX, GridWorX64, GraphWorX64, ReportWorX and TrendWorX. Viewers can be added into a selected layout within PortalWorX-SL and each has its own related properties for connection to existing data and runtime options (including Commands, where applicable). The viewers can also interact with the AssetWorX Navigator provider.

4.6.1. AlarmWorX64 Viewer

4.6.1.1. Adding an AlarmWorX64 Viewer in PortalWorX-SL

To Add an AlarmWorX64 Viewer in PortalWorX-SL

1. First, launch PortalWorX-SL via the **Start Menu → All Programs → ICONICS → PortalWorX-SL**. You will first see the Windows Security login in order to connect to PortalWorX SL, as shown below. Enter your User Name and Password, then click on 'OK' to proceed.

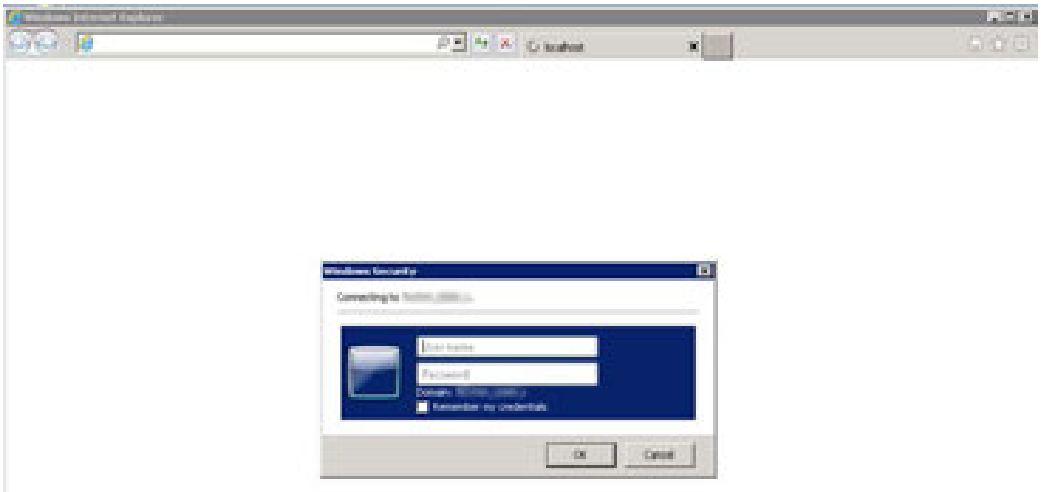

Figure 4.74 - Windows Security Login

2. PortalWorX-SL will now open in your selected Web browser, as shown below. You can launch an AlarmWorX64 Viewer in multiple ways. You can select it within the GENESIS64 Controls in the Home Ribbon OR you can select it within the main window in the lower right of the PortalWorX SL browser window OR you can select it from the list within the Toolbox in the left navigation box.

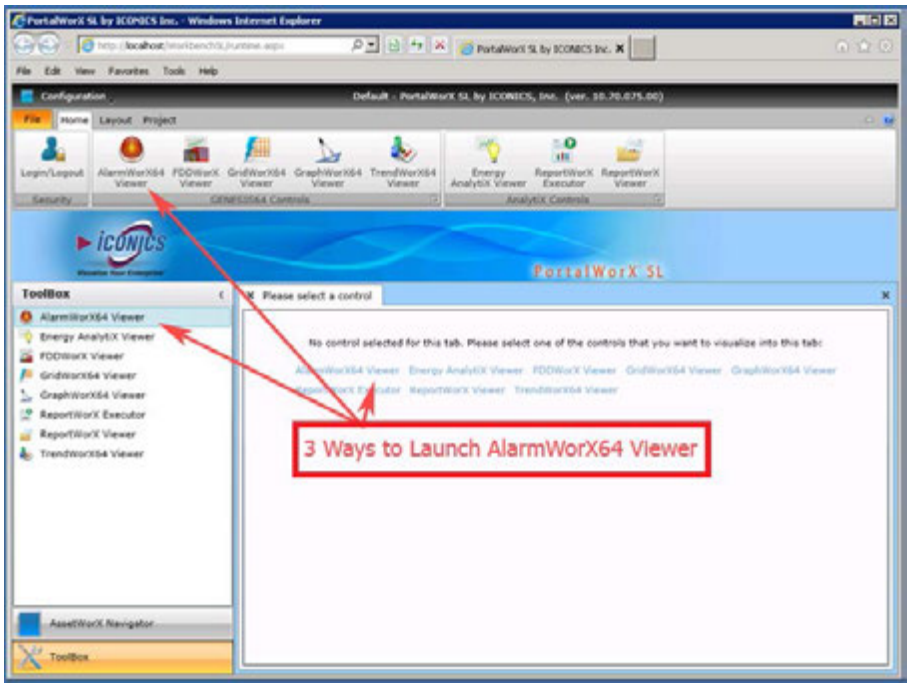

Figure 4.75 - Options for Launching AlarmWorX64 Viewer in PortalWorX SL

Once you have selected an AlarmWorX64 Viewer, it will initially connect to its configuration database (which can be set up via the AssetWorX provider in Workbench SL).

3. The following "Configure Web Part" window will then appear. You can fill out the settings or leave them as they are.

Figure 4.76 - Configure Web Part Window

- **Title** - This is the name for the Viewer itself.
- **Name** - This can be a specific name for the data that will shown within the viewer. When first launched, the AlarmWorX64 Viewer will include default characters here.
- **URL** - Enter a file name for an AlarmWorX64 Silverlight (.awxxs) file to display in the viewer.
- **Show the Header** - Click on this checkbox to include the Viewer's Header.
- **The control can be dragged** - Click on this checkbox to enable dragging for this viewer.

Once you have completed updating these settings, click on the 'OK' button to proceed.

4. You can now proceed with **Configuration**.

4.6.1.2. AlarmWorX64 Viewer Configuration (PortalWorX-SL)

ICONICS' AlarmWorX64 Viewer, shown below, allows you to monitor alarms remotely from a portal. Add this viewer to PortalWorX-SL and automatically receive real-time alerts in a scrollable view.

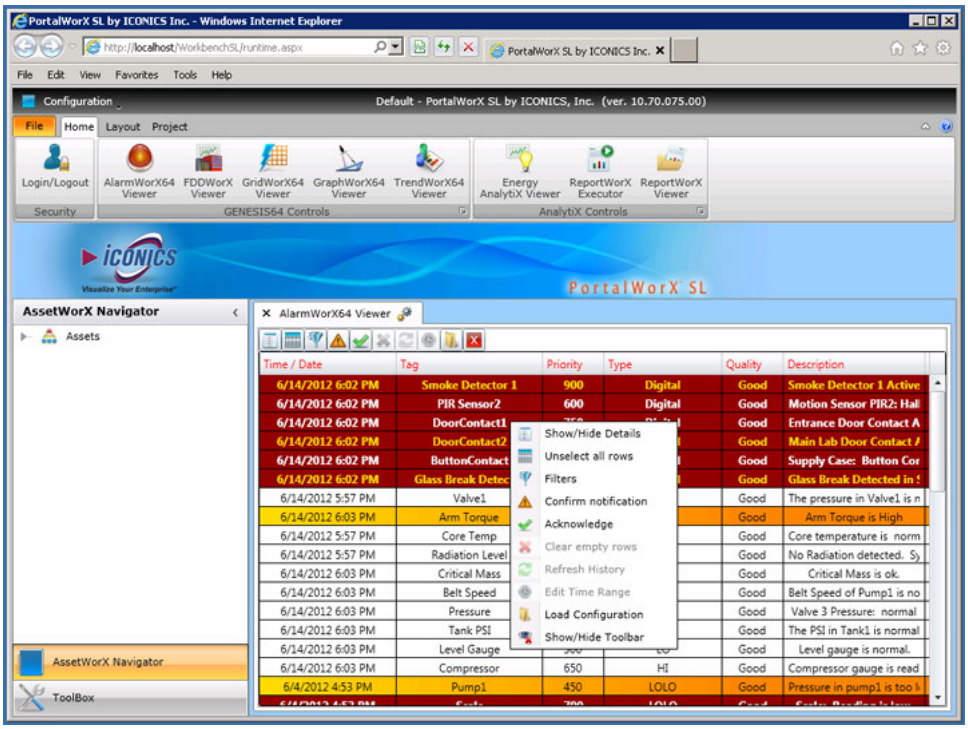

Figure 4.77 - AlarmWorX64 Viewer in PortalWorX-SL

When you right-click inside the AlarmWorX64 Viewer, you are able to select from several options, including the following:

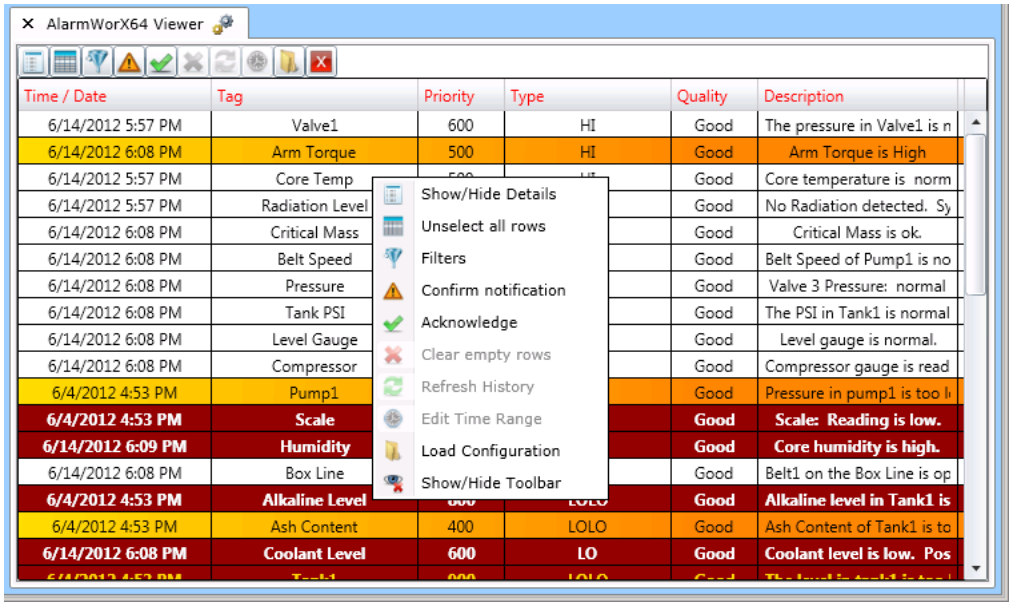

Figure 4.78 - Right-Click Options in AlarmWorX64 Viewer

- **Show/Hide Details** - Click this selection to hide (if shown) or show (if hidden) the loaded data within the Viewer. **Note**: In some instances, you may need to re-enter the Source File URL in the AlarmWorX64 Viewer Properties window and click on "Apply" to show the loaded data after hiding it.
- **Unselect all rows** - If you have previously selected any rows within the viewer, selecting this option will deselect them.
- **Edit filters** - Clicking this option opens the "Select a filter from the list" window, shown below.

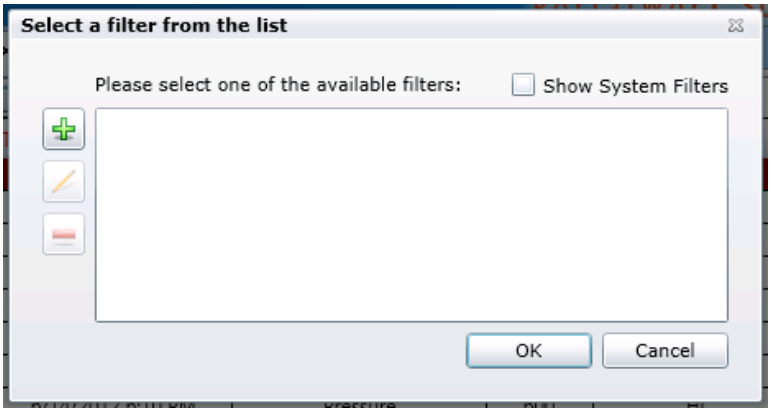

Figure 4.79 - Select a Filter from the List Window

Click on the button and the "Configure Alarm Filter" window, shown below, appears.

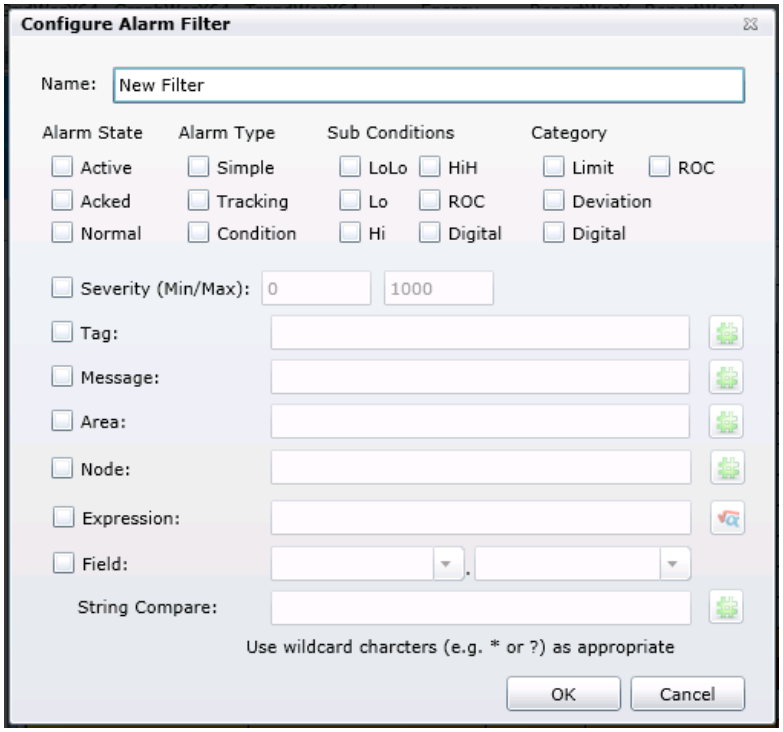

Figure 4.80 - Configure Alarm Filter Window

From this window you can set your alarm filter properties, just as you would within ICONICS' AlarmWorX64 application. Make your settings, then click "OK" to return to the Select Client Side Filter window. You'll notice that your newly added filter appears, as shown below, and the Edit ( ) and Remove ( ) buttons are now active.

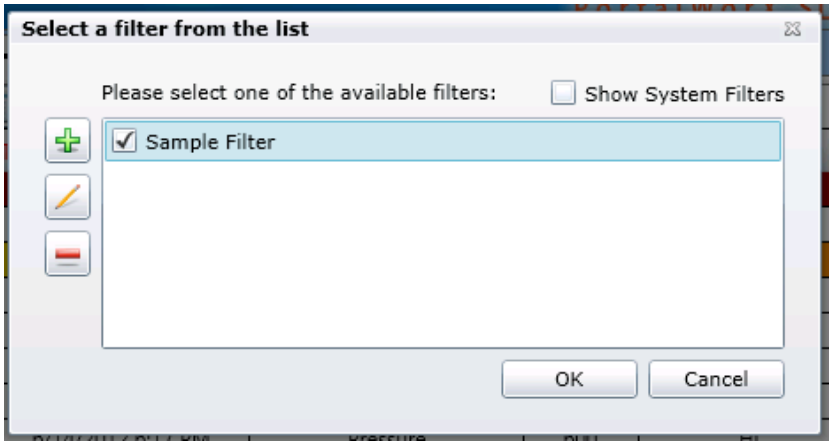

Figure 4.81 - Filter Added

Clicking on the "Show System Filters" checkbox populates the Select Client Side Filter window with pre-set filters accompanying the alarm file.

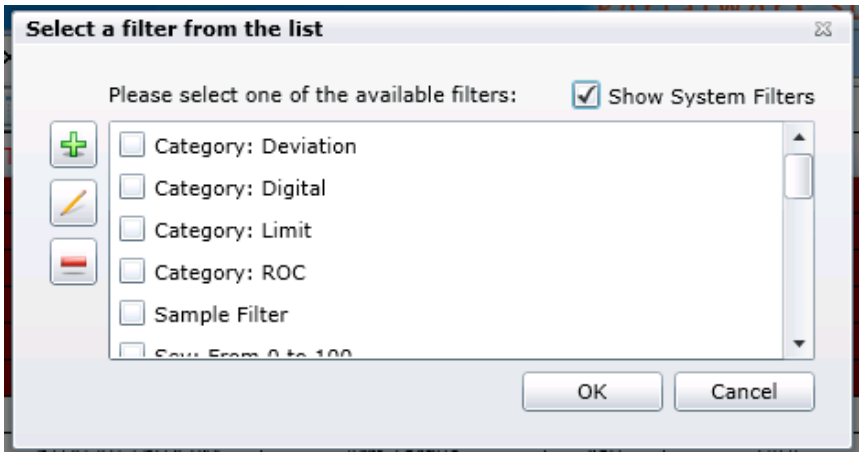

Figure 4.82 - 'Show System Filters' Enabled

Select your client side or System filter(s), then click OK to return to the viewer.

- **Confirm notification** - Click on this option within the viewer to confirm that you were notified of the displayed alarm.
- **Acknowledge** - Clicking on this option opens the "Acknowledge Alarms and Events Window", shown below.

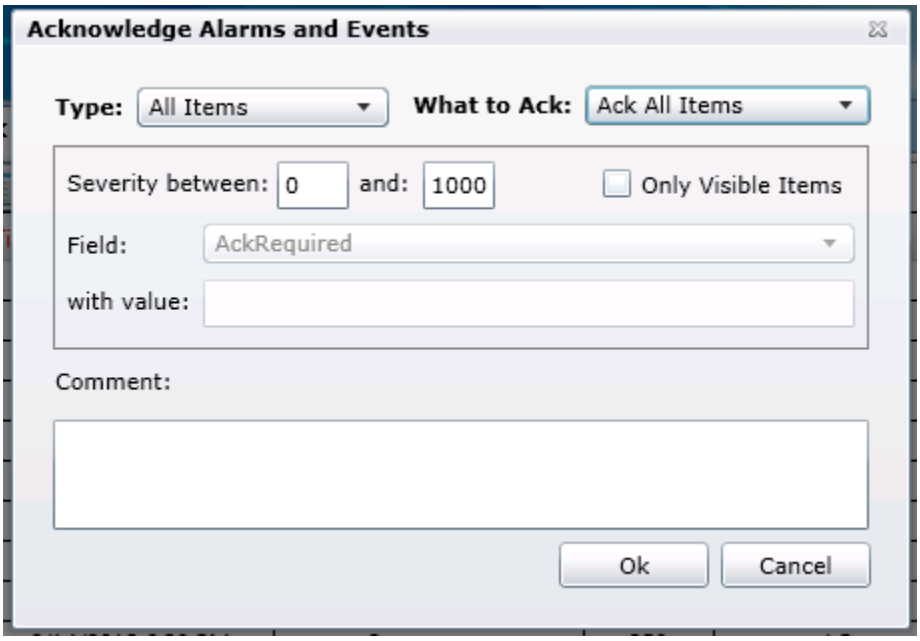

Figure 4.83 - Acknowledge Alarms and Events Window

Click on the "Type:" pull-down to select whether to acknowledge Alarms Only, Events Only, Tracking Only or All Items. Click on the "What to Ack" pull-down to select whether to Ack All Items, Ack by Comparison, Ack Filtered Items, Ack Selected Items or Ack Not Active Items.

If you selected to "Ack by Comparison", this will allow you to set a parameter for "Field:" via the pull-down menu (Ack Required, Active Time, AREA, Category, ConditionName, EventClass, EventId, EventType, Message, NewState, OriginalSource, Severity, SourceName, StatusCode or SubConditionName) and enter a value for that parameter in the text entry field.

You can also enter a Comment to help describe how you have set your acknowledgements.

Click "OK" to return to the Web Part.

- **Clear empty rows** - If enabled, this option allows you to remove blank rows from the alarm viewer within the viewer.
- **Refresh History** - If enabled, this option allows you to update the alarm viewer within the viewer so as to view more recent items.
- **Edit Time Range** - If enabled, this option allows you to set the time range for alarms to be viewed within the viewer.
- **Load Configuration** - Similar to how you first loaded the existing AlarmWorX64 Silverlight (.awxxs) file, you can enter a new file for the viewer to display.
- **Show/Hide Toolbar** - Clicking on this option opens a toolbar at the top left of the viewer containing these same viewer options. Click on the button to close the toolbar.

Figure 4.84 - AlarmWorX64 Viewer Options Toolbar

4.6.2. Energy AnalytiX Viewer

4.6.2.1. Adding an Energy AnalytiX Viewer in PortalWorX-SL

1. First, launch PortalWorX-SL via the **Start Menu → All Programs → ICONICS → PortalWorX-SL**. You will first see the Windows Security login in order to connect to PortalWorX SL, as shown below. Enter your User Name and Password, then click on 'OK' to proceed.

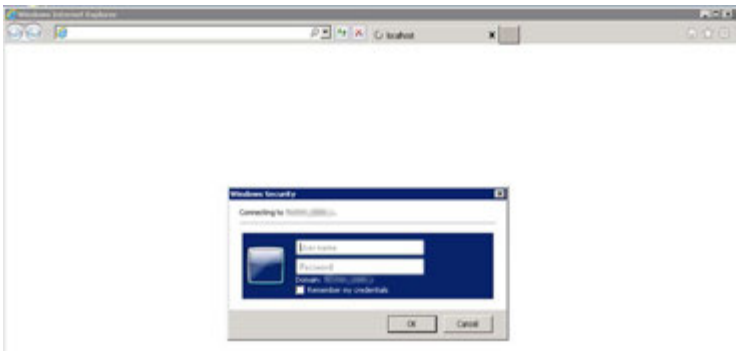

Figure 4.85 - Windows Security Login

2. PortalWorX-SL will now open in your selected Web browser, as shown below. You can launch an Energy AnalytiX Viewer in multiple ways. You can select it within the GENESIS64 Controls in the Home Ribbon OR you can select it within the main window in the lower right of the PortalWorX-SL browser window OR you can select it from the list within the Toolbox in the left navigation box.

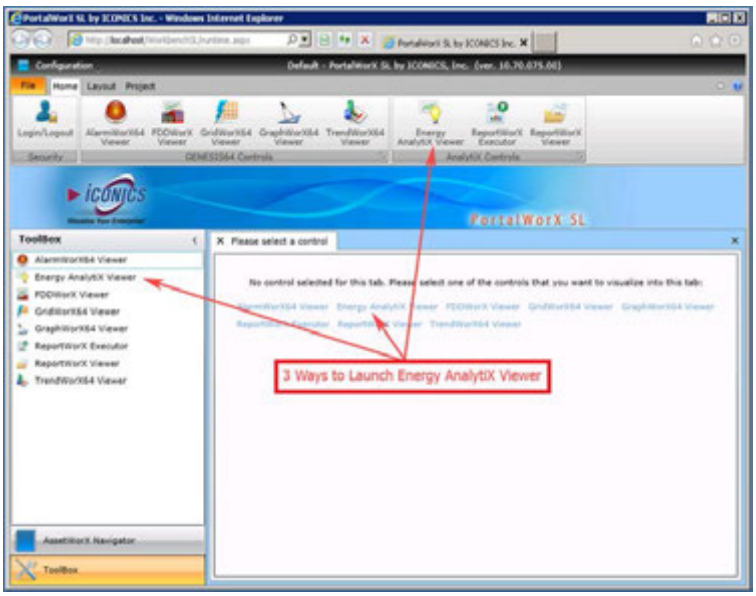

Figure 4.86 - Options for Launching Energy AnalytiX Viewer in PortalWorX-SL

Once you have selected an Energy AnalytiX Viewer, it will initially connect to its configuration database (which can be set up via the AssetWorX provider in Workbench SL), as shown below.

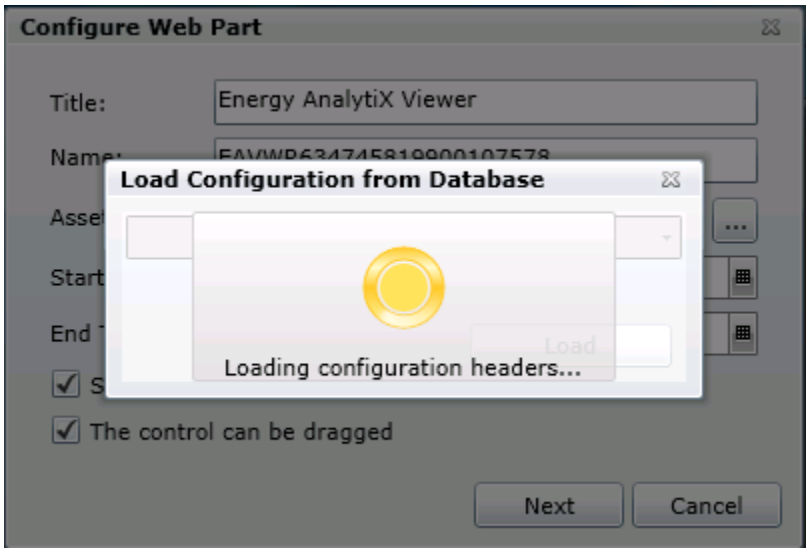

Figure 4.87 - Load Configuration from Database Window

3. The following "Configure Web Part" window will then appear. You can fill out the settings or leave them as they are.

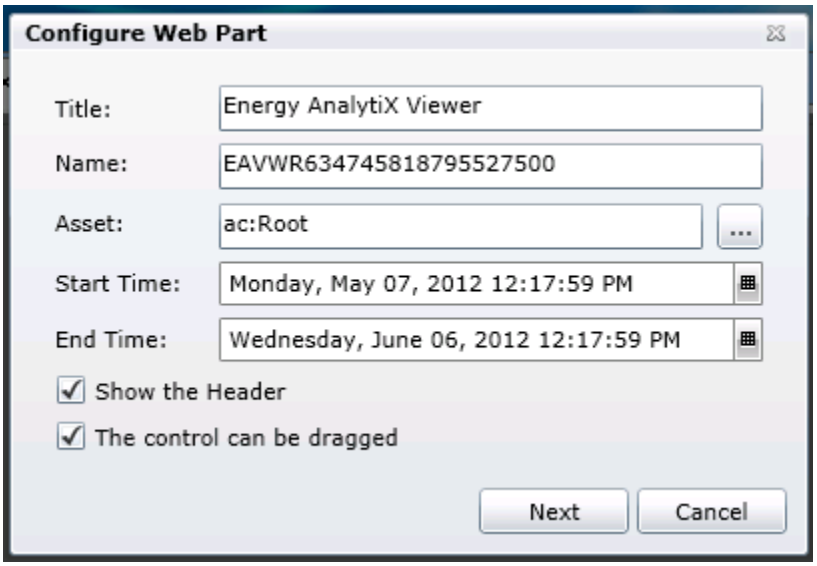

Figure 4.88 - Configure Web Part Window

- **Title** - This is the name for the Viewer itself.
- **Name** - This can be a specific name for the data that will shown within the viewer. When first launched, the Energy AnalytiX Viewer will include default characters here.

- **Asset** - This will be filled with "ac:Root" by default, but you can either enter a new asset in the text field or click on the ellipsis [...] button to open the data browser to navigate to your AssetWorX configuration database.
- **Start Time** - This is the starting point for the Energy AnalytiX data to be used within the viewer. You can enter the required information in the text entry field (in Day/Date/Time format) or click on the calendar button [ ] to set the required start time.
- **End Time** - This is the ending point for the Energy AnalytiX data to be used within the viewer. You can enter the required information in the text entry field (in Day/Date/Time format) or click on the calendar button [ ] to set the required start time.
- **Show the Header** - Click on this checkbox to include the Viewer's Header.
- **The control can be dragged** - Click on this checkbox to enable dragging for this viewer.

Once you have completed updating these settings, click on the 'Next' button to proceed.

4. You can now proceed with Configuration.

4.6.2.2. Configuring the Energy AnalytiX Viewer

The Energy AnalytiX Viewer is a Silverlight control that is used to visualize the data collected by the Energy AnalytiX server. There is a FDDWorX Viewer that can be used within PortalWorX-SL and a similar Web Part that can be used in PortalWorX SP (utilizing SharePoint).

In this Quick Start, we will configure a Energy AnalytiX viewer to display a grid with meter data. We will add a Row Detail to the grid so that when we expand the meter data, we can display more information, a chart showing the current week's distribution of meter data, and asset details.

Creating a Grid to Display Meter Data

1. In your Energy AnalytiX Viewer, right-click **Viewer** and select **Add Grid**, as shown below. A grid (called "Grid") is added to the Viewer tree.

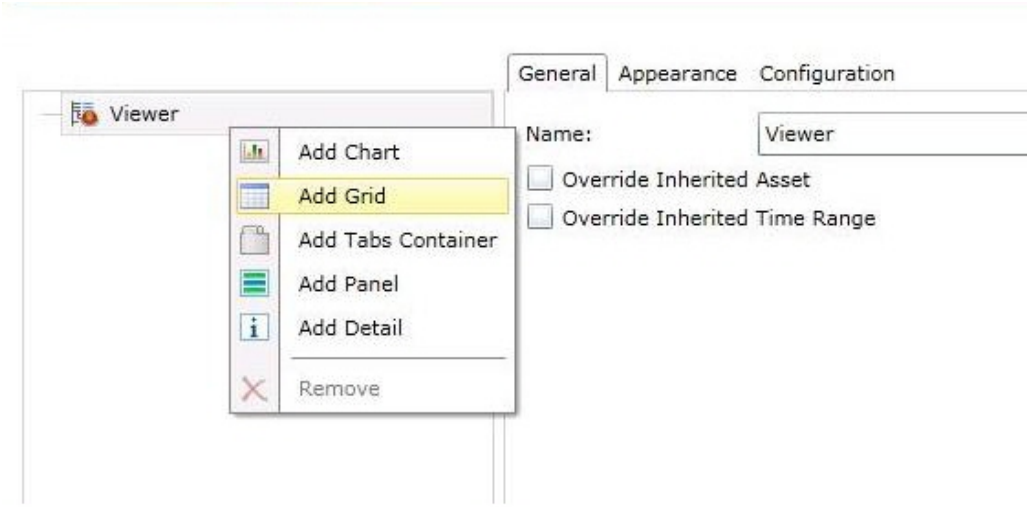

Figure 4.89 - Adding a Grid

2. Select the **Grid** in the Viewer tree, and select its **Data** tab, which is shown below. Notice your choices for selecting a **Data Query**: you can choose **Consumption** calculations, **Cost** data, **Carbon** calculations, **Meter** data, and **Weather** data. In this example, we will choose **Meter Data**. You will notice that the Data tab displays options for retrieving meter data.

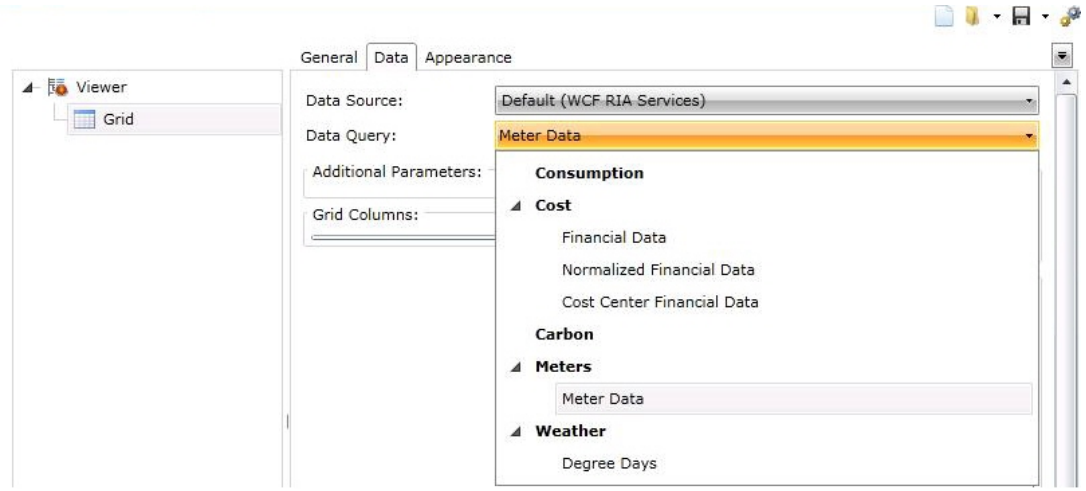

Figure 4.90 - Data Tab for the Grid

Creating a Row Detail and Panel

1. Right-click the **Grid** in the Viewer tree and select **Add Row Detail**. This adds a "Row Detail" to the grid and will allow you to expand a row in your grid to retrieve more information.

2. Right-click the new **Row Detail** and select **Add Panel**. This adds a panel to the Row Detail.

3. Click the new **Panel** in the tree and make sure that the Layout Orientation specified on the **Appearance** tab is **Horizontal**. This will ensure that if you add multiple features to this panel, they will be displayed side-by-side. If you prefer that features added to the panel be displayed top-to-bottom, you can select **Vertical** orientation.

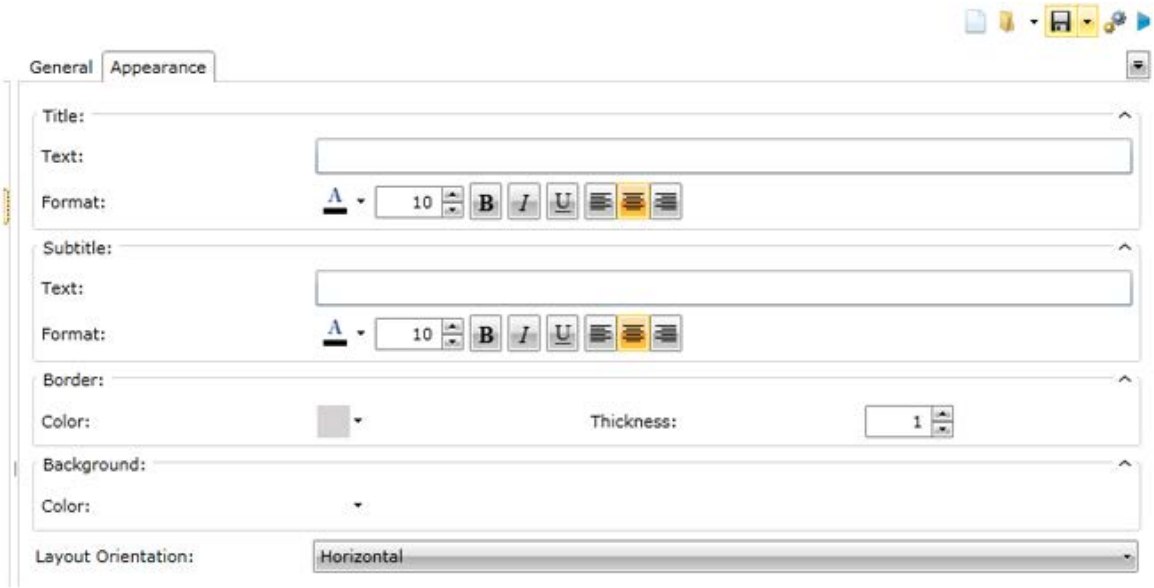

Figure 4.91 - Panel's Appearance Tab

Creating a Tabs Container and Tabs

1. Right-click on the new **Panel** and select **Add Tabs Container**. This adds a Tab Container to the panel.

2. Right-click on the new **Tab Container** and select **Add Tab**. This adds a new tab to the Tab Container.

3. Select the new **Tab** in the Viewer tree. On its **Appearance** tab, enter a title for the tab's Title text.

Creating a Chart and Series

1. Right-click the **Tab** and select **Add Chart**. Then select the new chart to display its **General** tab; here you can select a Column chart for its **Chart Type**.

2. Right-click the **Chart** in the Viewer tree and select **Add Series**. This adds a series to the chart.

3. Click on the new **Series** in the tree to display its options. For this series, we will only want to look at the meter readings that have occurred this week, so first, check the **Override Inherited Time Range** check box to display the time range override options.

4. In the **Start** section, change the start to **Preset** and **First Day Current Week**.

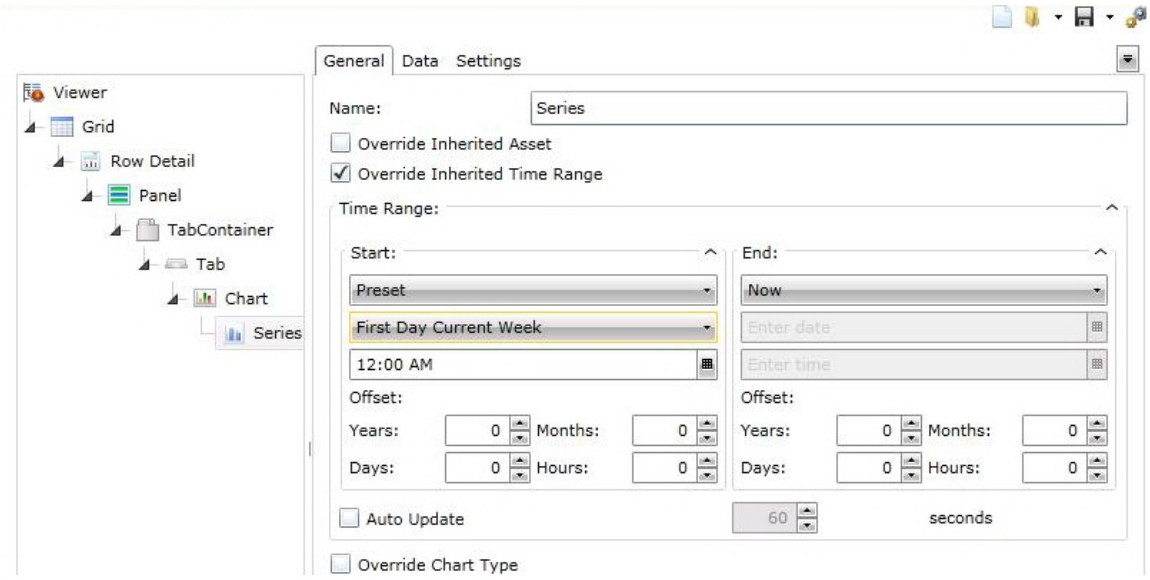

Figure 4.92 - Overriding the Time Range

5. On the Data tab, select **Meter Data** as the **Data Query**.

6. Check the **Format** check box and change the Format to D.

7. Next, create another **Tab** in the **Tab Container**. Configure this tab to display last week's meter readings.

Creating an Asset Detail

1. Next, add an Asset Detail to the panel to be shown next to the Tabs Container. Right-click on **Panel** and select **Add Detail**.

2. Select the **Asset Detail** in the tree and on its **Data** tab, choose the **Weather** > **Degree Days** query. When you are finished, your tree should look similar to the one in the figure below

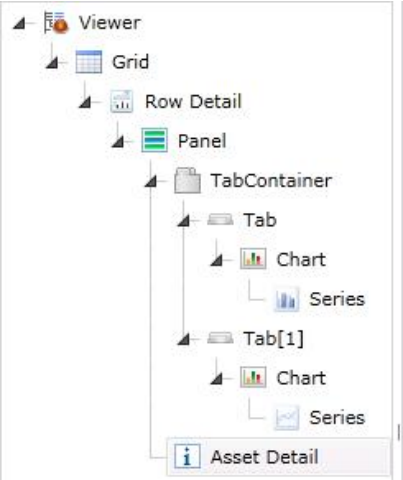

Figure 4.93 - Final Configuration

3. Click the **Save** icon at the top of the viewer to save this configuration as an .eav file.

Testing the Configuration File

1. Go to Workbench SL, select an asset (that is, an equipment node in the asset tree) and create a **Load Energy AnalytiX Data** command for the configuration file you just saved.

2. Return to the Viewer/Web part. Clicking the blue play button at the top right of the viewer will switch the viewer to Runtime mode. You won't see any results there now because the viewer is configured to use an Inherited Asset.

3. To verify that your configuration is working correctly, you can click the **Viewer** in the tree and, on its **General** tab, check the **Override Inherited Asset** check box and select **Specific Asset** and from the drop-down list select the asset whose meter data you want to see. If you switch to runtime, you will see a grid of meter readings. If you click the plus sign [+] at the beginning of any row, you will see the panel that we defined.

4.6.3. FDDWorX Viewer

4.6.3.1. Adding an FDDWorX Viewer in PortalWorX-SL

To Add an FDDWorX Viewer in PortalWorX-SL

1. First, launch PortalWorX-SL via the **Start Menu → All Programs → ICONICS → PortalWorX-SL**. You will first see the Windows Security login in order to connect to PortalWorX SL, as shown below. Enter your User Name and Password, then click on 'OK' to proceed.

Figure 4.94 - Windows Security Login

2. PortalWorX-SL will now open in your selected Web browser, as shown below. You can launch an FDDWorX Viewer in multiple ways. You can select it within the GENESIS64 Controls in the Home Ribbon OR you can select it within the main window in the lower right of the PortalWorX SL browser window OR you can select it from the list within the Toolbox in the left navigation box.

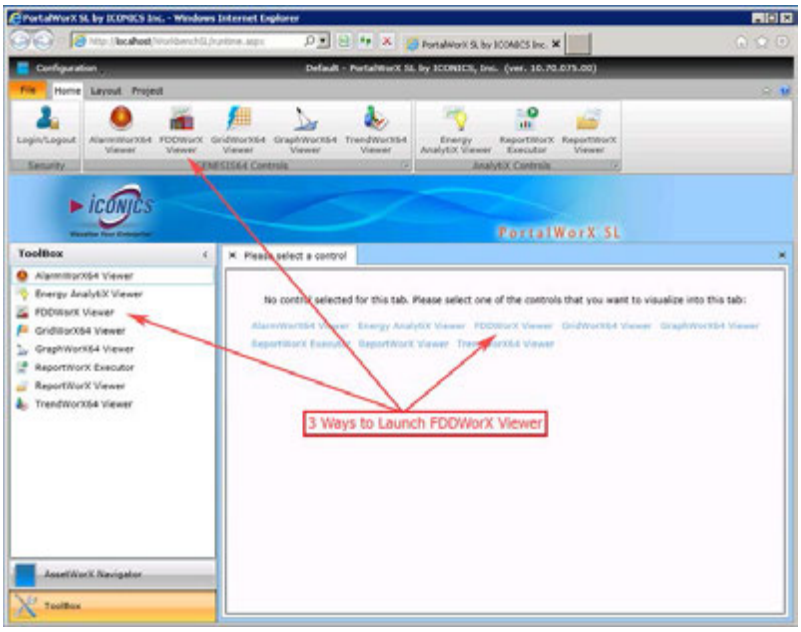

Figure 4.95 - Options for Launching FDDWorX Viewer in PortalWorX SL

Once you have selected an FDDWorX Viewer, it will initially connect to its configuration database (which can be set up via the AssetWorX provider in Workbench SL), as shown below.

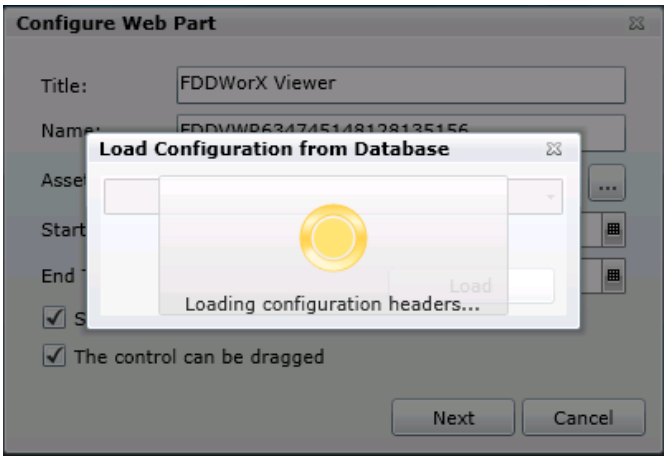

Figure 4.96 - Load Configuration from Database Window

3. The following "Configure Web Part" window will then appear. You can fill out the settings or leave them as they are.

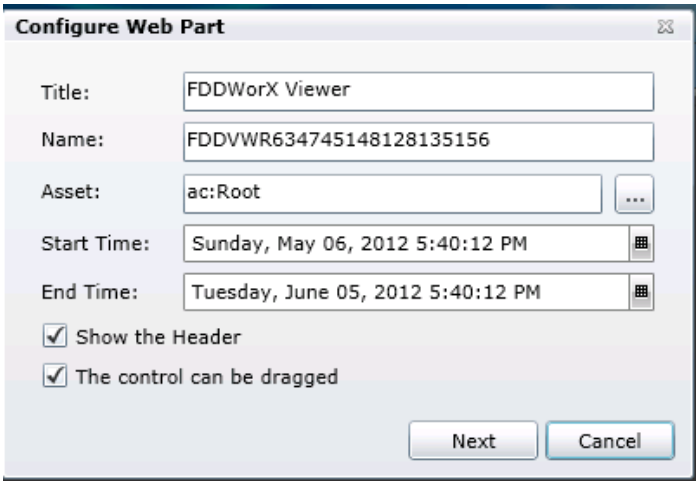

Figure 4.97 - Configure Web Part Window

- **Title** - This is the name for the Viewer itself.
- **Name** - This can be a specific name for the data that will shown within the viewer. When first launched, the FDDWorX Viewer will include default characters here.
- **Asset** - This will be filled with "ac:Root" by default, but you can either enter a new asset in the text field or click on the ellipsis [...] button to open the data browser to navigate to your AssetWorX configuration database.

- **Start Time** - This is the starting point for the FDDWorX data to be used within the viewer. You can enter the required information in the text entry field (in Day/Date/Time format) or click on the calendar button [ ] to set the required start time.
- **End Time** - This is the ending point for the FDDWorX data to be used within the viewer. You can enter the required information in the text entry field (in Day/Date/Time format) or click on the calendar button [ ] to set the required start time.
- **Show the Header** - Click on this checkbox to include the Viewer's Header.
- **The control can be dragged** - Click on this checkbox to enable dragging for this viewer.

Once you have completed updating these settings, click on the 'Next' button to proceed.

4. You can now proceed with **Configuration**.

4.6.3.2. Configuring the FDDWorX Viewer - Quick Start

The FDDWorX Viewer is a Silverlight control that is used to visualize the data collected by the FDDWorX server, including Faults, Fault Summaries, Asset Summaries and Diagnostic causes. There is a FDDWorX Viewer that can be used within PortalWorX-SL and a similar Web Part that can be used in PortalWorX SP (utilizing SharePoint).

In this Quick Start, we will configure a FDDWorX viewer to display a grid with faults. We will add a Row Detail to the grid so that when we expand the fault, we can display more information including a list of causes, a chart showing the current week's distribution of faults, and asset details.

Creating a Grid to Display Faults

1. In your FDDWorX Viewer, right-click on "Viewer" and select "Add Grid", as shown below.

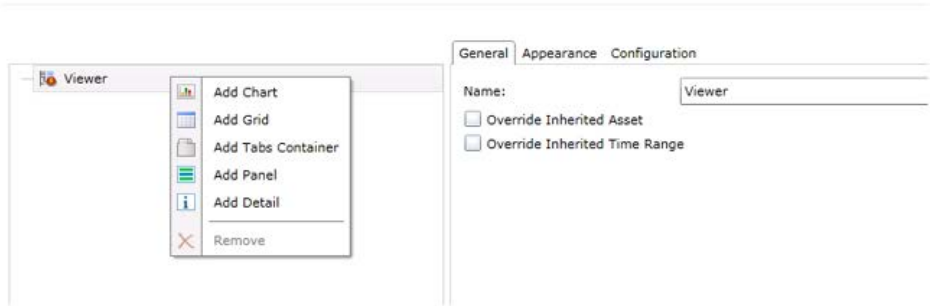

Figure 4.98 – Adding a Grid

2. Click your Grid in the tree and select the Data tab. Select "Faults" from the Data Query drop down menu

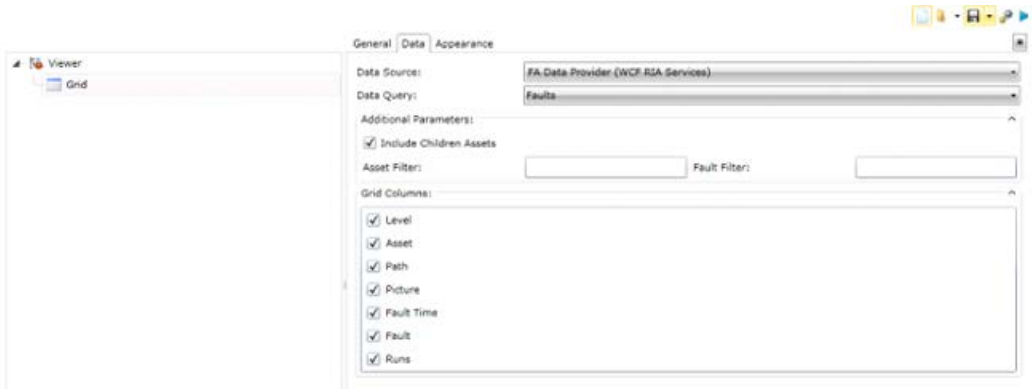

Figure 4.99 – Data Tab for Grid

Creating a Row Detail and Panel

1. Right-click the Grid in the tree and select "Add Row Detail". This will allow you to expand a row in your grid to retrieve more information.

2. Next, right-click the new Row Detail and select "Add Panel".

3. Click the Panel in the tree and make sure that the Layout Orientation specified on the Appearance tab is "Horizontal". This will ensure that if you add multiple features to this panel, they will be displayed side-by-side. If you prefer that features added to the panel be displayed top-to-bottom, you can select "Vertical" orientation.

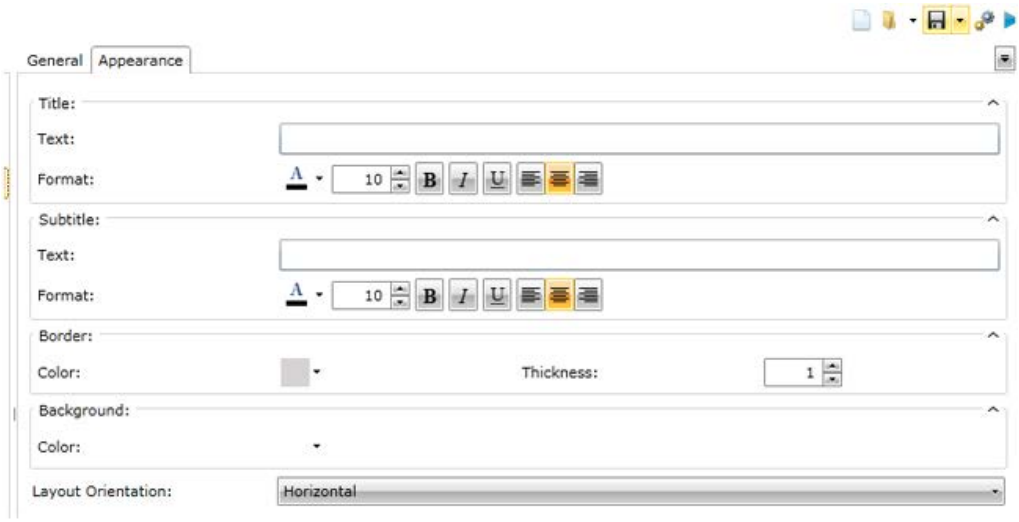

Figure 4.100 – Panel Appearance Tab

Creating a Tabs Container and Tabs

1. Right-click on the new Panel and select "Add Tabs Container".

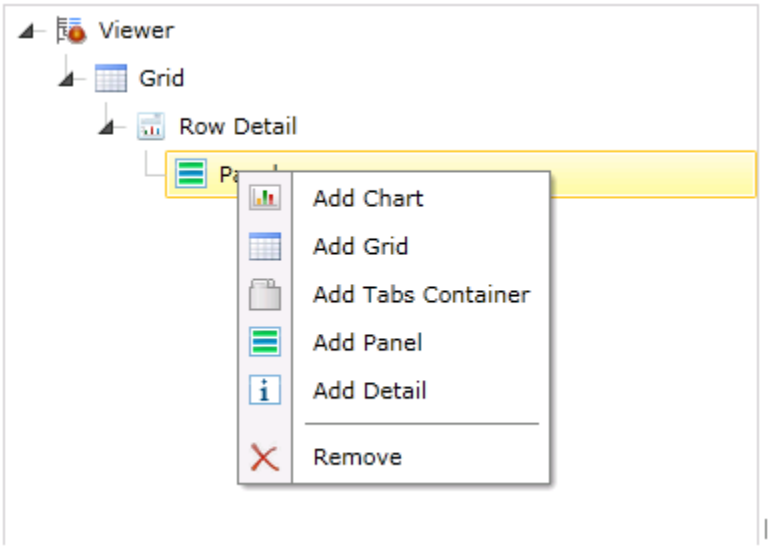

Figure 4.101 – Adding a Tabs Container

2. Right-click on the new Tabs Container and select "Add Tab".

3. Select the tab in the tree. On the Appearance Tab, enter “Distribution” for the Title text.

Creating a Chart and Series

1. Right-click the Tab and select "Add Chart". Select a Bar chart for Chart Type.

2. Next, right-click the chart and select "Add Series".

3. Click on the series in the tree. For this series, we will only want to look at the faults that have occurred this week, so first, check the Override Inherited Time Range check box. In the Start section, change the start to "Preset" and "First Day of Current Week".

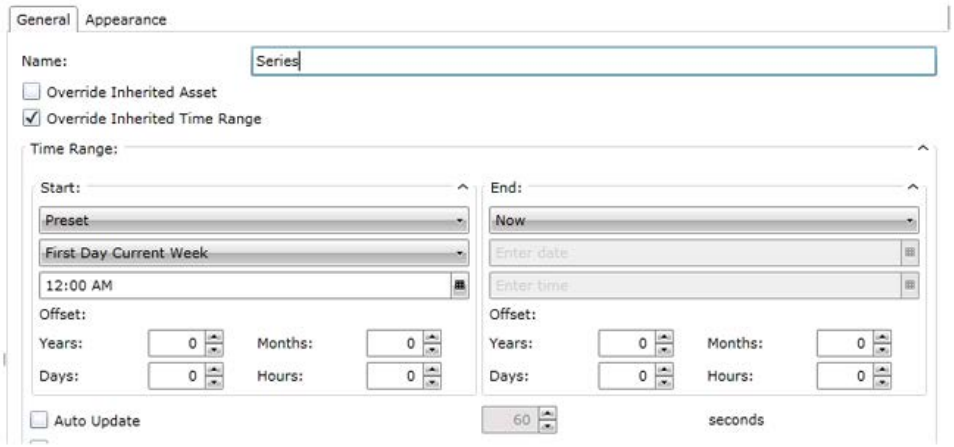

Figure 4.102 – Overriding the Time Range

4. On the Data tab, select "Distribution by asset" for the Data Query. Select "Day" as the Interval Type in the Additional Parameters section.

5. Check the "Format" check box and change the Format to MMM-dd.

6. Next, try creating another Tab for inclusion in the Tab Container. Name it “Causes” and add a Grid to it that uses the latest Causes data query.

Creating an Asset Detail

1. Next, we will add an Asset Detail to our panel to be shown next to our Tabs Container. Right-click on "Panel" and select "Add Asset Detail".

2. Select the Asset Detail in the tree and on the Data tab, choose the "Summary by asset Data" Query.

   When you are finished, your tree should look similar to the following figure.

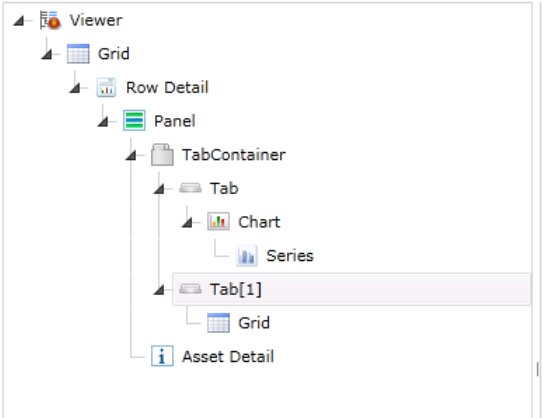

Figure 4.103 – Final Configuration

Make sure to click the "Save" button at the top of the viewer to save this configuration. Clicking the blue play button at the top right of the viewer will switch the viewer to Runtime mode. You won't see any results there now because the viewer is configured to use an Inherited Asset. This means the asset that is passed to the queries in the viewer is determined when you select an asset in the tree that has a **Load FDDWorX Data** command that was defined for it in the Workbench SL.

To verify that your configuration is working correctly, you can click the Viewer in the tree and check the "Override Inherited Asset" check box and select some specific asset for which faults have occurred. If you switch to runtime, you will see a grid of these faults. If you click the plus sign [+] at the beginning of any row, you will see the panel that we defined.

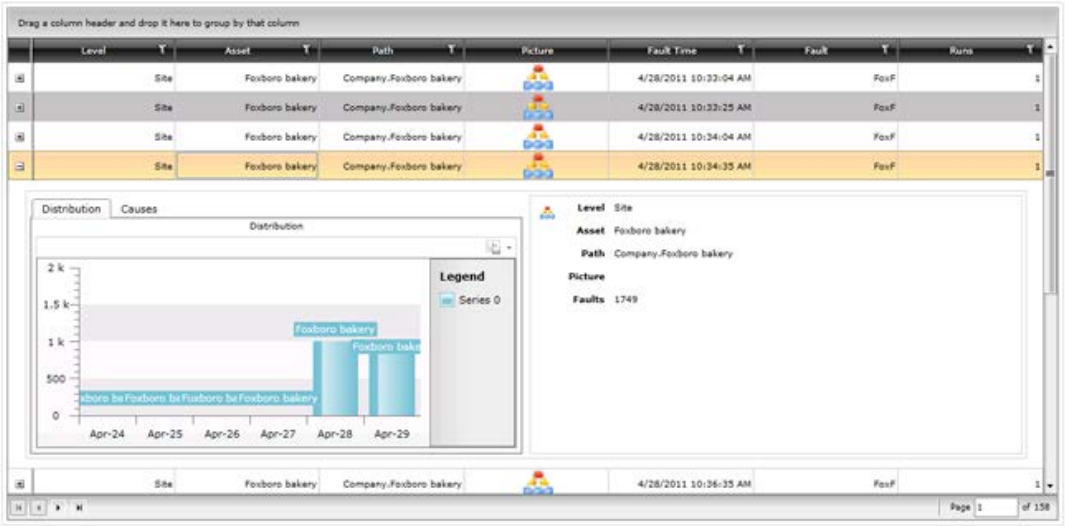

Figure 4.104 – FDDWorX in Runtime Mode

4.6.4. GridWorX64 Viewer

4.6.4.1. Adding a GridWorX64 Viewer in PortalWorX-SL

To Add a GridWorX64 Viewer in PortalWorX-SL

1. First, launch PortalWorX-SL via the **Start Menu → All Programs → ICONICS → PortalWorX-SL**. You will first see the Windows Security login in order to connect to PortalWorX SL, as shown below. Enter your User Name and Password, then click on 'OK' to proceed.

Figure 4.105 - Windows Security Login

2. PortalWorX-SL will now open in your selected Web browser, as shown below. You can launch a GridWorX64 Viewer in multiple ways. You can select it within the GENESIS64 Controls in the Home Ribbon OR you can select it within the main window in the lower right of the PortalWorX SL browser window OR you can select it from the list within the Toolbox in the left navigation box.

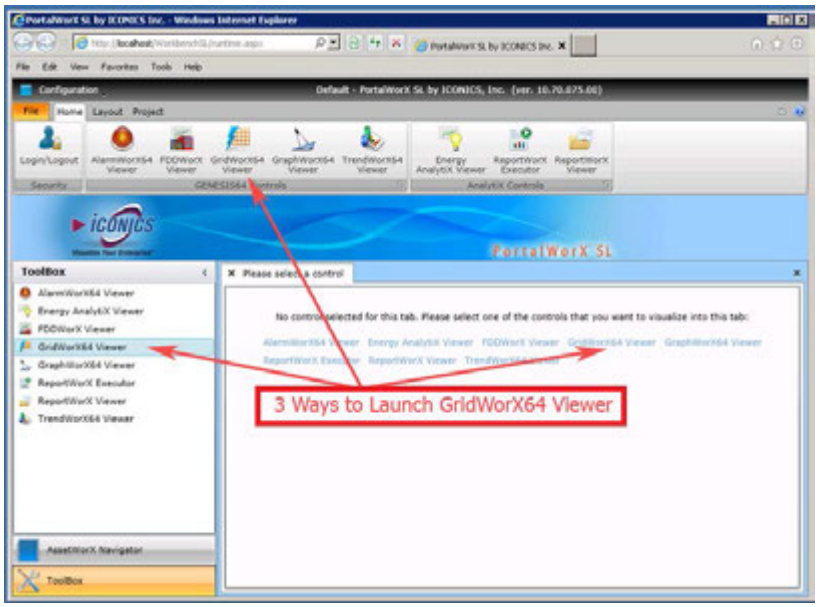

Figure 4.106 - Options for Launching GridWorX64 Viewer in PortalWorX SL

Once you have selected a GridWorX64 Viewer, it will initially connect to its configuration database (which can be set up via the AssetWorX provider in Workbench SL).

3. The following "Configure Web Part" window will then appear. You can fill out the settings or leave them as they are.

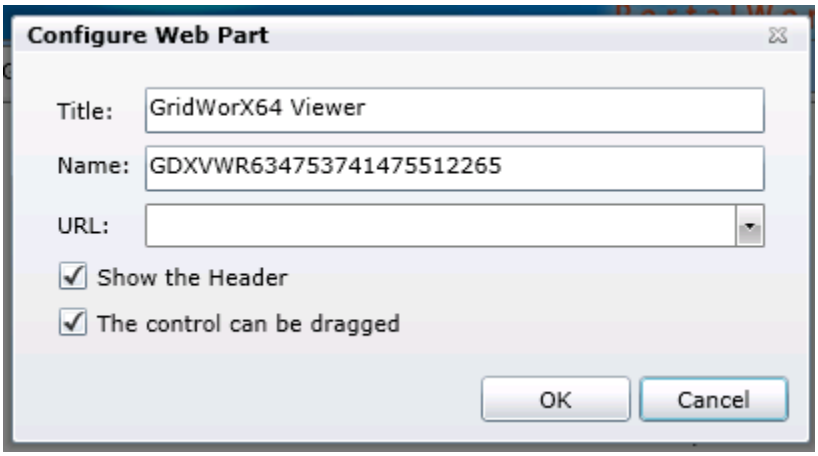

Figure 4.107 - Configure Web Part Window

- **Title** - This is the name for the Viewer itself.
- **Name** - This can be a specific name for the data that will shown within the viewer. When first launched, the GridWorX64 Viewer will include default characters here.
- **URL** - Enter a file name for GridWorX64 Silverlight (.gdxxs) file to display in the viewer.
- **Show the Header** - Click on this checkbox to include the Viewer's Header.
- **The control can be dragged** - Click on this checkbox to enable dragging for this viewer.

Once you have completed updating these settings, click on the 'OK' button to proceed.

4. You can now proceed with **Configuration**.

4.6.4.2. GridWorX64 Viewer Configuration (PortalWorX-SL)

ICONICS' GridWorX64 Viewer, shown below, allows you to visualize database data in the form of OPC-DA or through DataGrid Control. You can perform basic read and write actions along with stored procedures for connected databases. This application works similar to Data Mining OPC Server in GENESIS32.

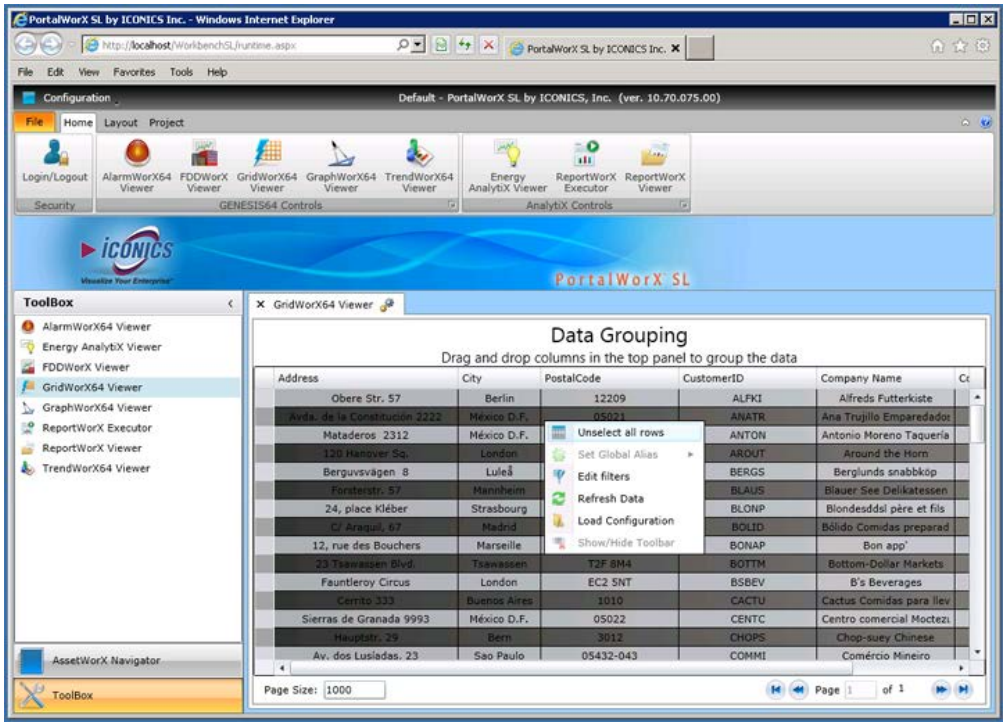

Figure 4.108 - GridWorX64 Viewer in PortalWorX-SL

When you right-click inside the GridWorX64 Viewer, you are able to select from several options, including the following:

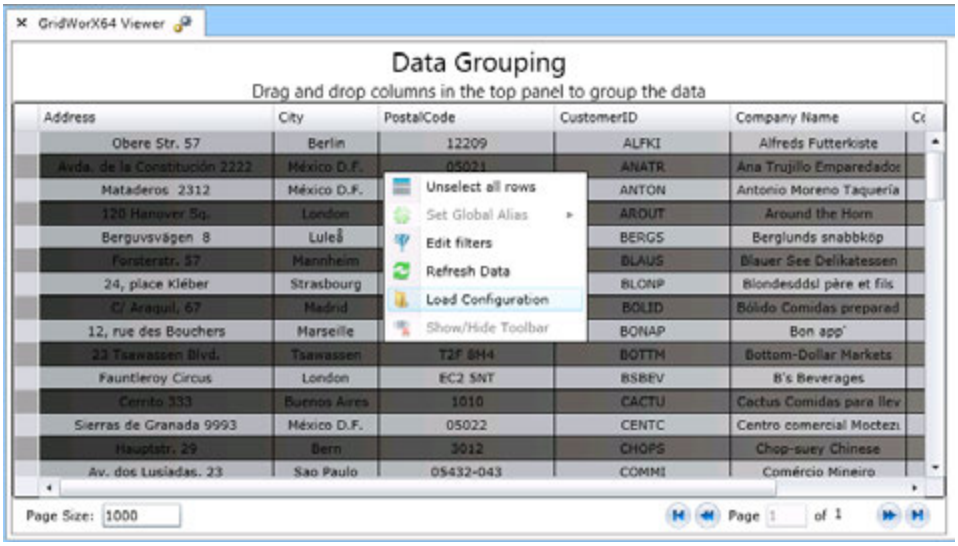

Figure 4.109 - Right-Click Options in GridWorX64 Viewer

- **Unselect all rows** - If you have previously selected any rows within the viewer, selecting this option will deselect them.
- **Set Global Alias** -
- **Edit filters** - Clicking this option opens the "Select a filter from the list" window, shown below.

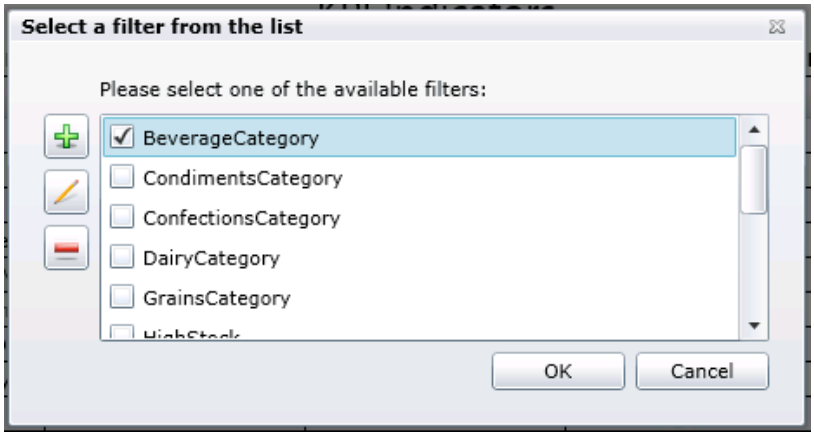

Figure 4.110 - Select a filter from the List Window

- **Refresh Data** - If enabled, this option allows you to update the alarm viewer within the viewer so as to view more recent items.
- **Load Configuration** - Similar to how you first loaded the existing GridWorX64 Silverlight file (.awxxs), you can enter a new file for the viewer to display.

- **Show/Hide Toolbar** - Clicking on this option opens a toolbar at the top left of the viewer containing these same viewer options. Click on the button to close the toolbar.

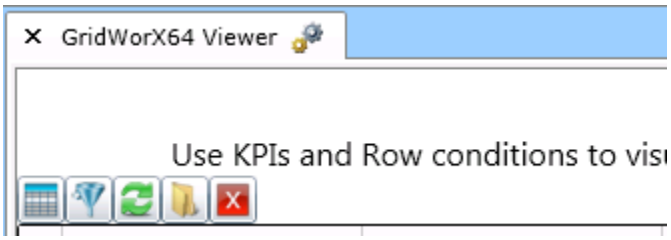

Figure 4.111 - GridWorX64 Viewer Options Toolbar

4.6.5. GraphWorX64 Viewer

4.6.5.1. Adding a GraphWorX64 Viewer in PortalWorX-SL

To Add a GraphWorX64 Viewer in PortalWorX-SL

1. First, launch PortalWorX-SL via the **Start Menu → All Programs → ICONICS → PortalWorX-SL**. You will first see the Windows Security login in order to connect to PortalWorX SL, as shown below. Enter your User Name and Password, then click on 'OK' to proceed.

Figure 4.112 - Windows Security Login

2. PortalWorX-SL will now open in your selected Web browser, as shown below. You can launch a GraphWorX64 Viewer in multiple ways. You can select it within the GENESIS64 Controls in the Home Ribbon OR you can select it within the main window in the lower right of the PortalWorX SL browser window OR you can select it from the list within the Toolbox in the left navigation box.

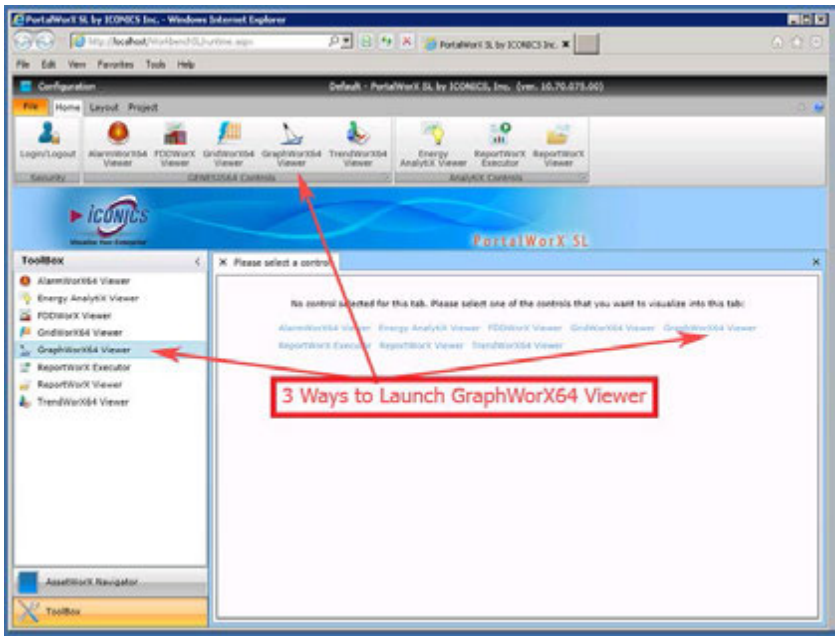

Figure 4.113 - Options for Launching GraphWorX64 Viewer in PortalWorX SL

Once you have selected a GraphWorX64 Viewer, it will initially connect to its configuration database (which can be set up via the AssetWorX provider in Workbench SL).

3. The following "Configure Web Part" window will then appear. You can fill out the settings or leave them as they are.

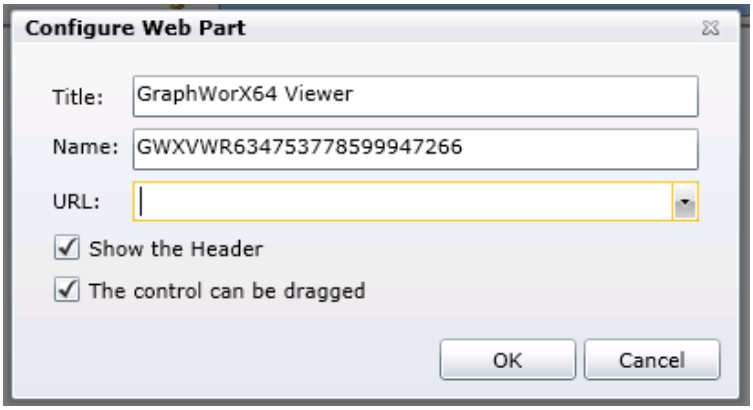

Figure 4.114 - Configure Web Part Window

- **Title** - This is the name for the Viewer itself.
- **Name** - This can be a specific name for the data that will shown within the viewer. When first launched, the GraphWorX64 Viewer will include default characters here.
- **URL** - Enter a file name for a GraphWorX64 Silverlight (.gdfxs) file to display in the viewer.
- **Show the Header** - Click on this checkbox to include the Viewer's Header.
- **The control can be dragged** - Click on this checkbox to enable dragging for this viewer.

Once you have completed updating these settings, click on the 'OK' button to proceed.

4. You can now proceed with **Configuration**.

4.6.5.2. GraphWorX64 Viewer Configuration (PortalWorX-SL)

ICONICS' GraphWorX64 Viewer, shown below, allows you to visualize important operations data in an interactive, real-time display via a portal.

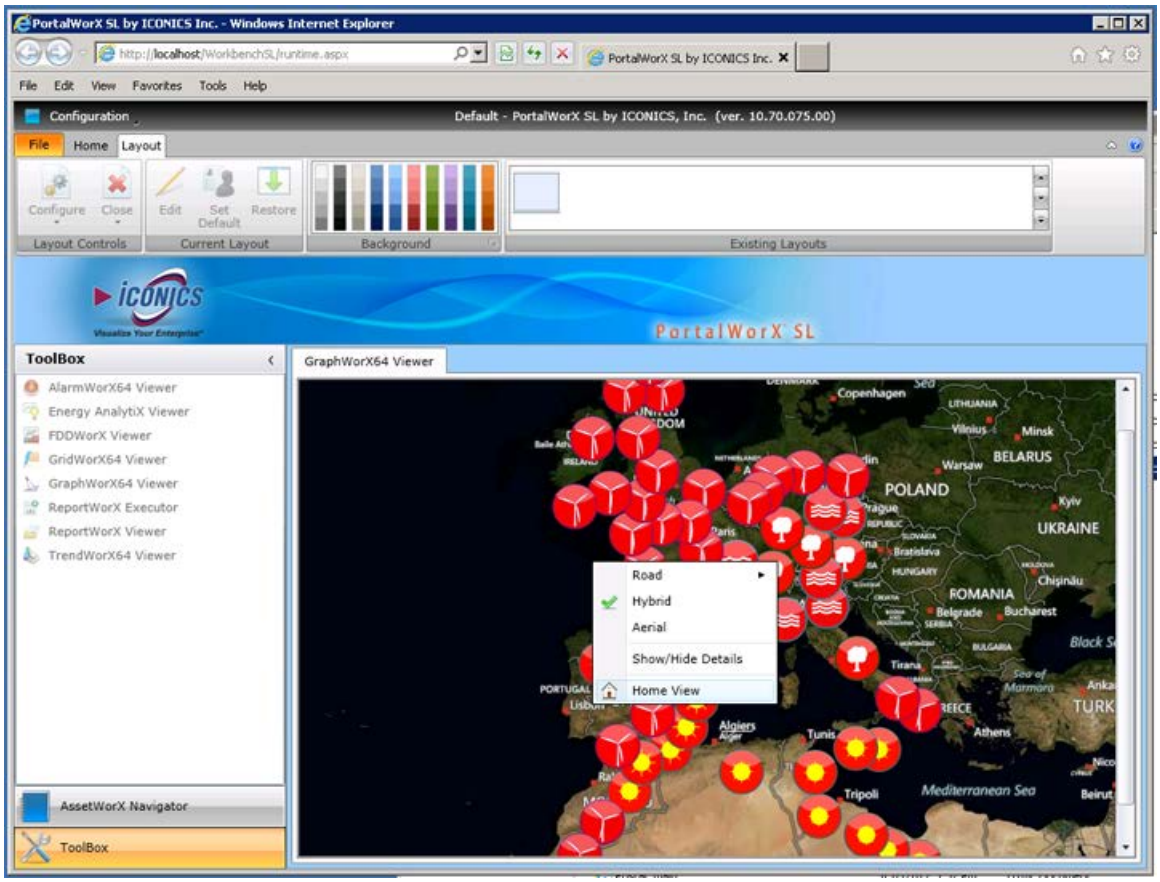

Figure 4.115 - GraphWorX64 Viewer in PortalWorX-SL

When you right-click inside the GraphWorX64 Viewer, you are able to select from the options that were originally set in GraphWorX64 and then saved as part of that specific GraphWorX64 Silverlight display. These may be different from display to display. For instance, in our example below, the display uses a map as part of the data visualization. Right-clicking within the window allows users to configure options specific to a map display such as Road, Hybrid, Aerial, Show/Hide Details, etc.

Figure 4.116 - Right-Click Options in GraphWorX64 Viewer - Example 1

In a different GraphWorX64 Silverlight display file, one in which the data is more chart-oriented, right-clicking the window brings up an entirely different set of options, as shown below.

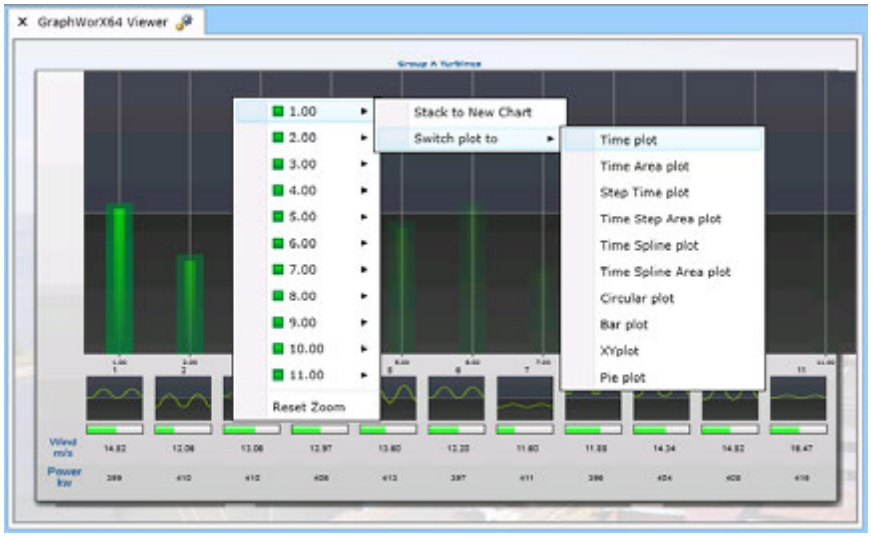

Figure 4.117 - Right-Click Options in GraphWorX64 Viewer - Example 2

Of course, in most cases, **left**-clicking within any GraphWorX64 display in Runtime is meant to allow the user to directly interact with the visual elements within that display.

4.6.6. Report Executor

4.6.6.1. Adding a ReportWorX Executor in PortalWorX-SL

To Add a ReportWorX Executor in PortalWorX-SL

1. First, launch PortalWorX-SL via the **Start Menu → All Programs → ICONICS → PortalWorX-SL**. You will first see the Windows Security login in order to connect to PortalWorX SL, as shown below. Enter your User Name and Password, then click on 'OK' to proceed.

Figure 4.118 - Windows Security Login

2. PortalWorX-SL will now open in your selected Web browser, as shown below. You can launch a ReportWorX Executor in multiple ways. You can select it within the GENESIS64 Controls in the Home Ribbon OR you can select it within the main window in the lower right of the PortalWorX SL browser window OR you can select it from the list within the Toolbox in the left navigation box.

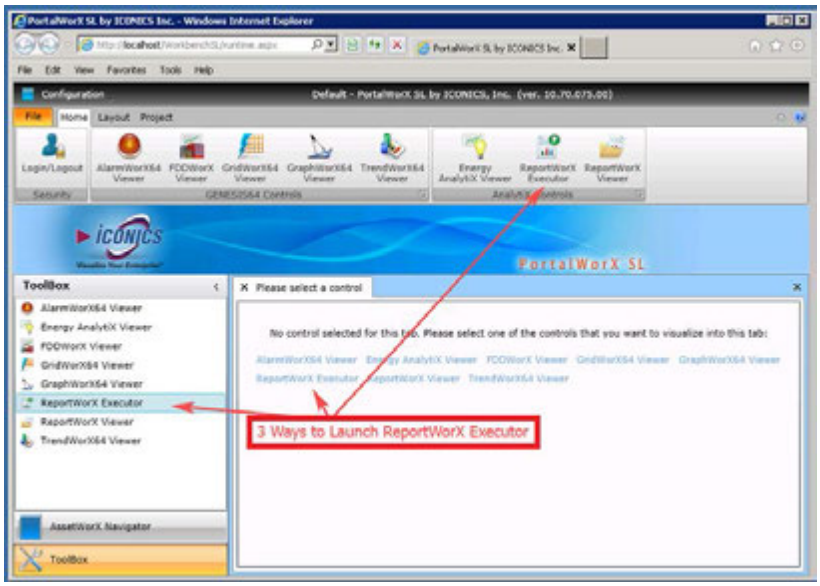

Figure 4.119 - Options for Launching ReportWorX Executor in PortalWorX SL

Once you have selected a ReportWorX Executor, it will initially connect to its configuration database (which can be set up via the ReportWorX Configurator, a component loaded from an ICONICS BizViz installation).

3. The following "Configure Web Part" window will then appear. You can fill out the settings or leave them as they are.

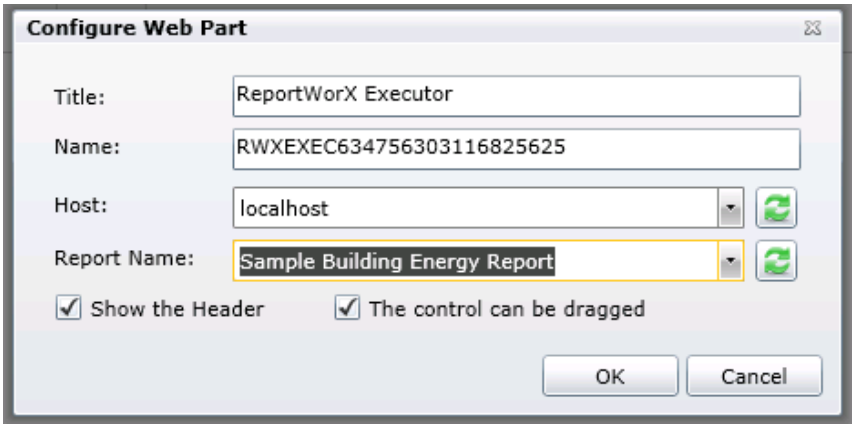

Figure 4.120 - Configure Web Part Window

- **Title** - This is the name for the Viewer itself.
- **Name** - This can be a specific name for the data that will shown within the viewer. When first launched, the AlarmWorX64 Viewer will include default characters here.
- **Host** - The machine name where the reports are located. This field may be pre-filled by the current machine name, but you can use the pull-down menu to select an alternative host.
- **Report Name** - This should be pre-filled by the reports associated to the selected Host. Use the pull-down menu to select your desired report.
- **Show the Header** - Click on this checkbox to include the Viewer's Header.
- **The control can be dragged** - Click on this checkbox to enable dragging for this viewer.

Once you have completed updating these settings, click on the 'OK' button to proceed.

4. You can now proceed with **Configuration.**

4.6.6.2. ReportWorX Executor Configuration (PortalWorX-SL)

ICONICS' ReportWorX Executor, shown below, allows you to execute reports directly within your browser. Its standalone mode allows you to specify a default report for execution.

The advantage of connecting the Report Executor to the Report Navigator is that it allows users to dynamically switch between report folders, either by right-clicking on a folder or report within the Report Navigator or clicking on the configuration icon (the gears) to the right of the viewer name.

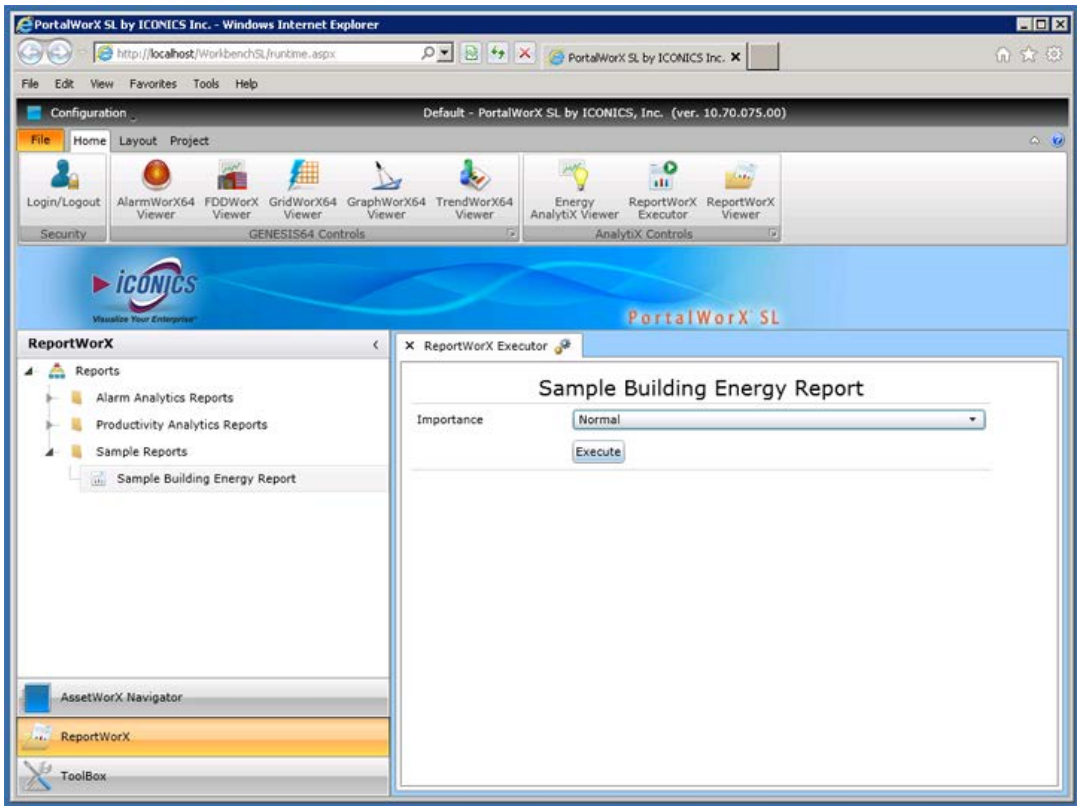

Figure 4.121 - ReportWorX Executor in PortalWorX-SL

To activate the Report Navigator, click on 'Project' to open the Project Ribbon. Next, click on 'Navigator' in the Show/Hide section of the ribbon, then click on 'Reports'. If you have previously connected to a server containing a ReportWorX database (with the reporting service currently running) via the Report Server button (via the same Project ribbon), you'll see the ReportWorX tree explorer appear with 'Reports' listed as the top item, as shown in the following image.

You can use the Report Navigator to load reports directly into an existing or new viewer window within PortalWorX-SL. Just right-click on an element in the Reports tree navigator and choose from the options that appear. In the example below, we are loading the 'Sample Building Energy Report' within the existing ReportWorX Executor window.

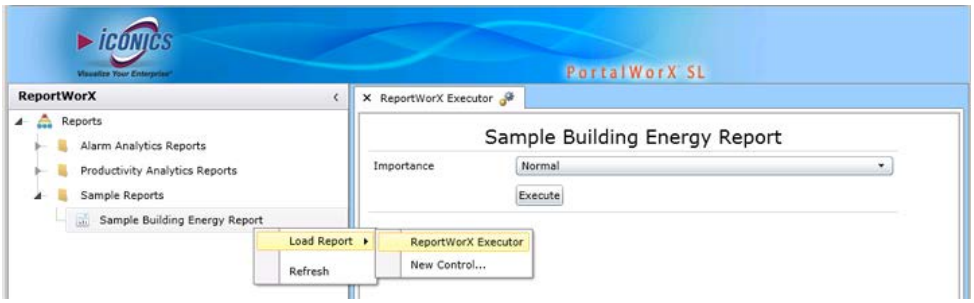

Figure 4.122 - Loading a Report through the Report Navigator into the ReportWorX Executor in PortalWorX-SL

Once the report has been loaded, you'll be able to set additional properties according to how each report was set up in the ReportWorX Configurator. The following example shows a report that includes an interval, which allows the user to set specific start and end times as well as the "value of 'n' for multiplied interval".

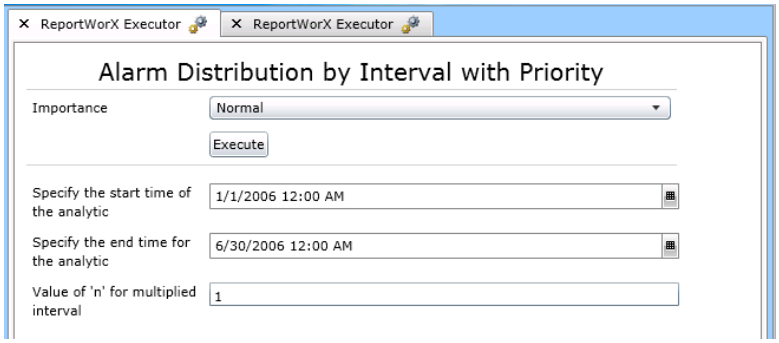

Figure 4.123 - A ReportWorX Executor Example

In contrast, the following report requires the user to only set the 'Importance'.

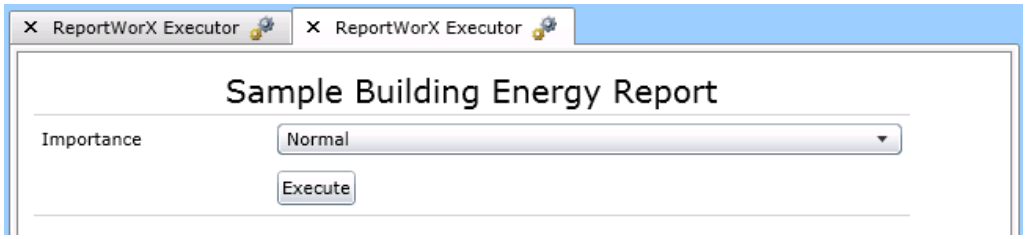

Figure 4.124 - An Additional ReportWorX Executor Example

Click on the "Execute" button to start the process within PortalWorX-SL.

4.6.7. ReportWorX Viewer

4.6.7.1. Adding a ReportWorX Viewer in PortalWorX-SL

To Add a ReportWorX Viewer in PortalWorX-SL

1. First, launch PortalWorX-SL via the **Start Menu → All Programs → ICONICS → PortalWorX-SL**. You will first see the Windows Security login in order to connect to PortalWorX SL, as shown below. Enter your User Name and Password, then click on 'OK' to proceed.

Figure 4.125 - Windows Security Login

2. PortalWorX-SL will now open in your selected Web browser, as shown below. You can launch a ReportWorX Viewer in multiple ways. You can select it within the GENESIS64 Controls in the Home Ribbon OR you can select it within the main window in the lower right of the PortalWorX SL browser window OR you can select it from the list within the Toolbox in the left navigation box.

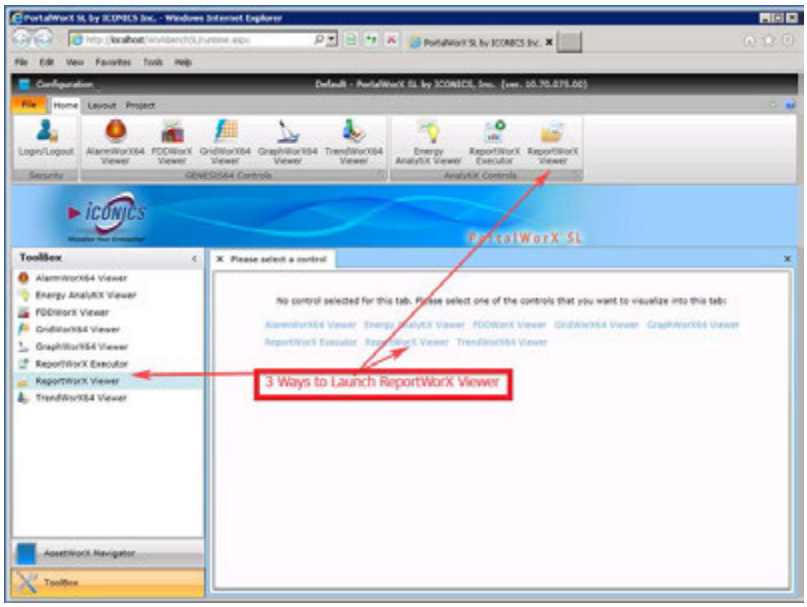

Figure 4.126 - Options for Launching ReportWorX Viewer in PortalWorX SL

Once you have selected a ReportWorX Viewer, it will initially connect to its configuration database (which can be set up via the ReportWorX Configurator, a component loaded from an ICONICS BizViz installation).

3. The following "Configure Web Part" window will then appear. You can fill out the settings or leave them as they are.

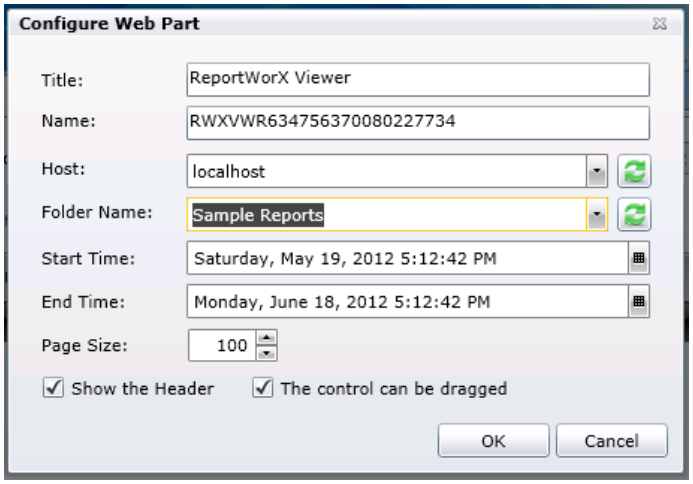

Figure 4.127 - Configure Web Part Window

- **Title** - This is the name for the Viewer itself.
- **Name** - This can be a specific name for the data that will shown within the viewer. When first launched, the AlarmWorX64 Viewer will include default characters here.
- **Host** - The machine name where the reports are located. This field may be pre-filled by the current machine name, but you can use the pull-down menu to select an alternative host.
- **Folder Name** - This should be pre-filled by the report folders associated to the selected Host. Use the pull-down menu to select your desired folder.
- **Start Time** - Select a start time for a range of data to be reported. Click on the calendar button [ ] to open the calendar tool to select a day, date and time, as needed.
- **End Time** - Select an end time for a range of data to be reported. Click on the calendar button [ ] to open the calendar tool to select a day, date and time, as needed.
- **Page Size** - Use the text field (and/or the up and down arrows) to enter the number of executed reports to display on the same page.
- **Show the Header** - Click on this checkbox to include the Viewer's Header.

- **The control can be dragged** - Click on this checkbox to enable dragging for this viewer.

Once you have completed updating these settings, click on the 'OK' button to proceed.

4. You can now proceed with **Configuration**.

4.6.7.2. ReportWorX Viewer Configuration (PortalWorX-SL)

ICONICS' ReportWorX Viewer, shown below, allows you to quickly access recently executed ReportWorX reports. It allows you to visualize reports in Excel, PDF or HTML format, based on availability.

The advantage of connecting the Report Viewer to the Report Navigator is that it allows users to dynamically switch between report folders, either by right-clicking on a folder or report within the Report Navigator or clicking on the configuration icon (the gears) to the right of the viewer name.

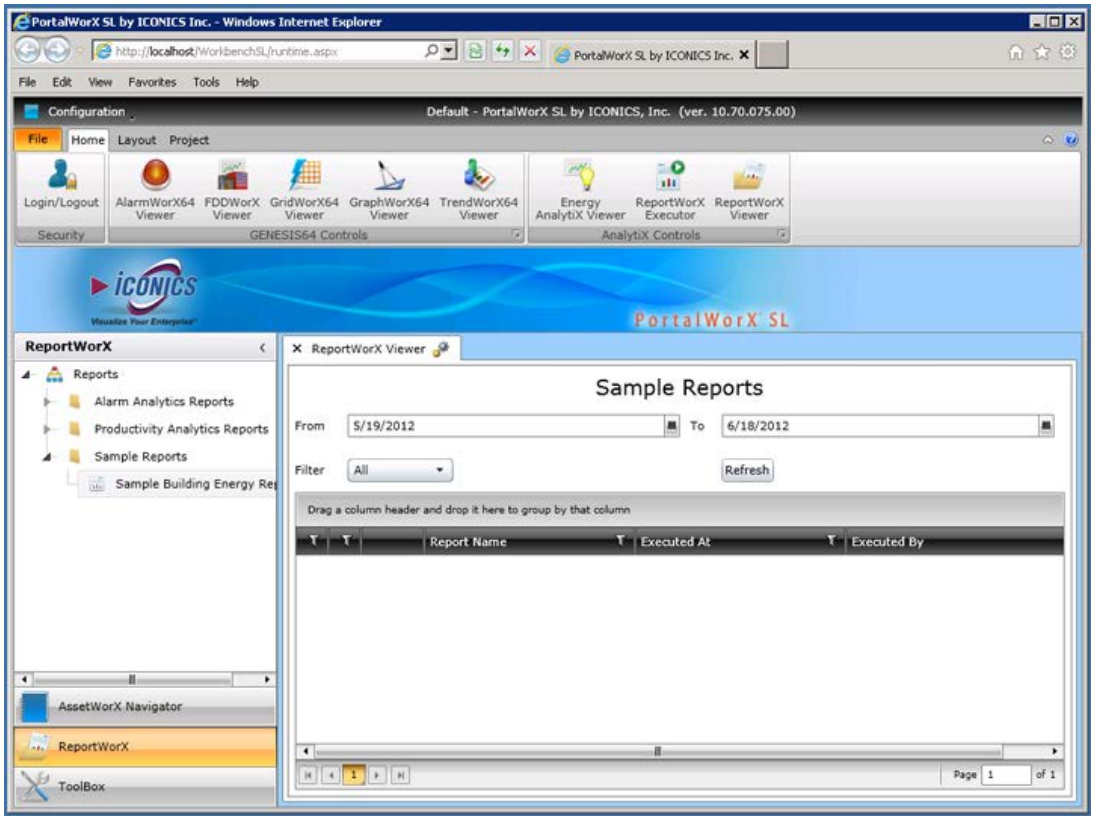

Figure 4.128 - ReportWorX Viewer in PortalWorX-SL

To activate the Report Navigator, click on 'Project' to open the Project Ribbon. Next, click on 'Navigator' in the Show/Hide section of the ribbon, then click on 'Reports'. If you have previously connected to a server containing a ReportWorX database (with the reporting service currently running) via the Report Server button (via the same Project ribbon), you'll see the ReportWorX tree explorer appear with 'Reports' listed as the top item, as shown below.

You can use the Report Navigator to load reports directly into an existing or new viewer window within PortalWorX-SL. Just right-click on an element in the Reports tree navigator and choose from the options that appear. In the example below, we are loading the 'Sample Building Energy Report' within the existing ReportWorX Viewer window.

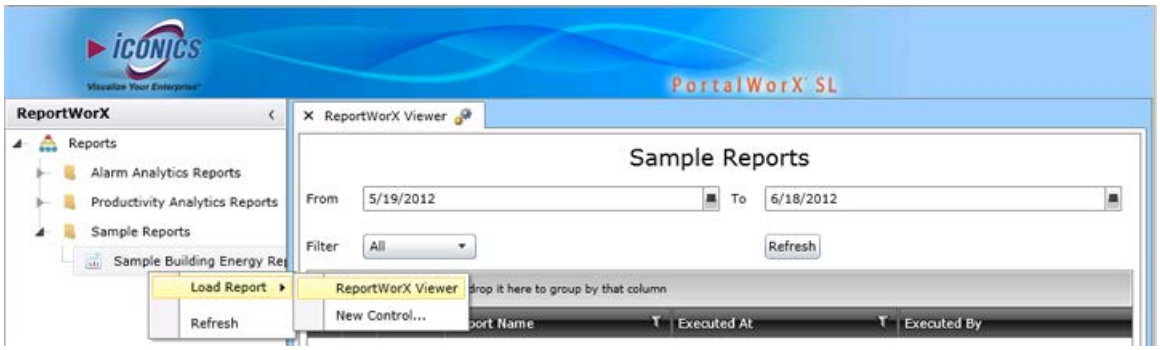

Figure 4.129 - Loading a Report through the Report Navigator into the ReportWorX Viewer in PortalWorX-SL

- **From/To** - Enter dates or click on the calendar button [ ] to select a new start ("From") or end ("To") date to find reports within your desired range.
- **Filter** - Use the pull-down to select from All, Succeeded, With Errors, Failed or Cancelled.
- **Refresh** - Click on the Refresh button to load the resulting reports from your settings.

4.6.8. TrendWorX64 Viewer

4.6.8.1. Adding a TrendWorX64 Viewer in PortalWorX-SL

Open the PortalWorX-SL application by navigating to **Start → All Programs → ICONICS → PortalWorX-SL**. Enter your credentials if a login dialog box appears.

Once in PortalWorX-SL, you can add a TrendWorX64 Viewer by clicking **TrendWorX64 Viewer** in the ***Please select a control tab*** within the viewer/executor window or by clicking the **TrendWorX64 Viewer** button in the GENESIS64 Controls group on the **Home** ribbon.

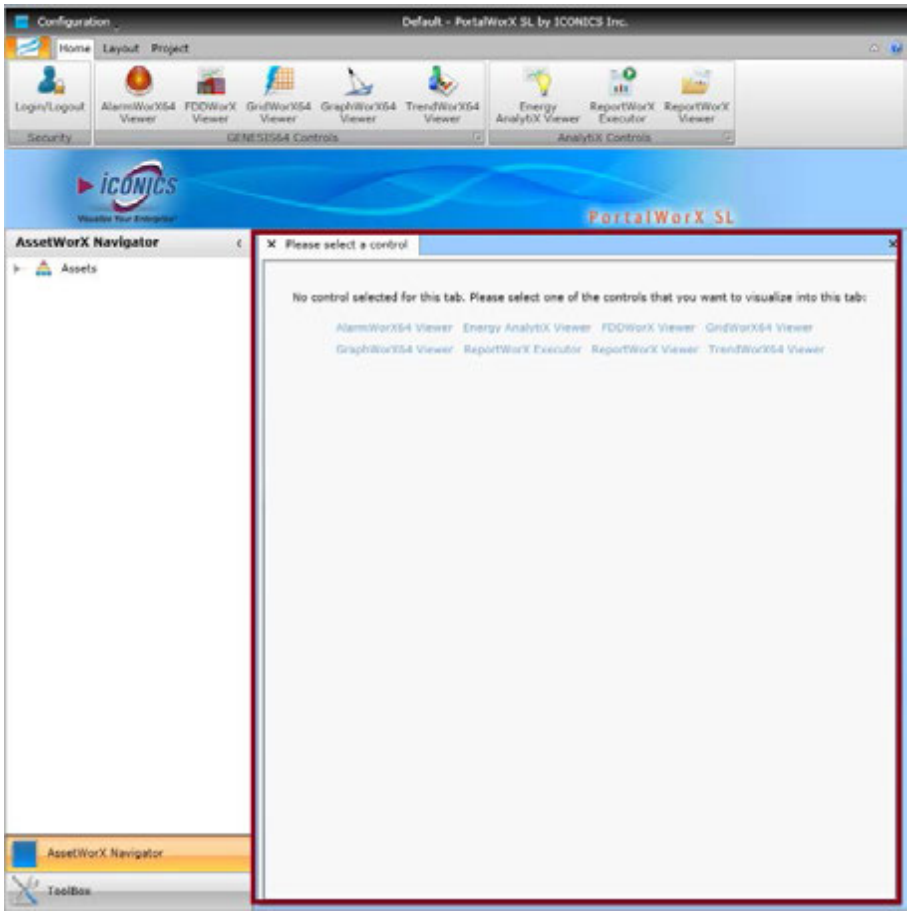

Figure 4.130 - Selecting a Viewer in PortalWorX-SL

When first added to the page, the TrendWorX64 Silverlight Web Part prompts you to select a TrendWorX64 Silverlight (.twxxs) file in the **Configure Web Part** dialog box, as shown below.

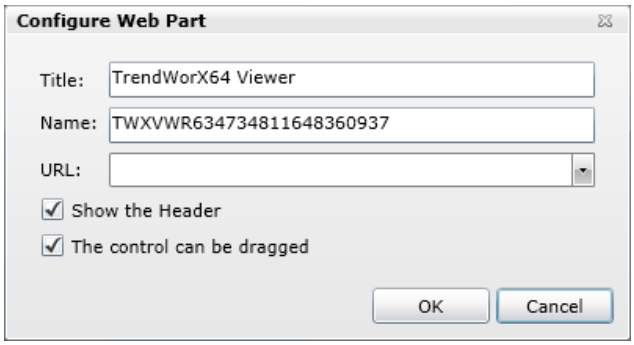

Figure 4.131 - "Configure Web Part" Selection

Enter the URL path corresponding to the location where you have placed a TrendWorX64 Silverlight display file in the **URL** box and click **OK**.

Info

Note: By default, the PortalWorX "localhost" represents the location where you have placed the GENESIS64 installation on your machine. For example, if you have saved the file "ArmRotation.twxxs" in the following folder:

C:\Program Files\ICONICS\GENESIS64\WebSites\PubDisplay

...you can enter the following URL in the **Configure Web Part** dialog box:

http://localhost/GENESIS64/WebSites/PubDisplay/ArmRotation.twxxs

It may take a few moments for the trend file to load. In this case, a status window such as the one below will appear.

Figure 4.132 - Loading the TrendWorX64 Silverlight Display File

Once the file has completed loading, you will then see your selected trend file displayed in the TrendWorX64 Silverlight Web Part, as shown in the following figure.

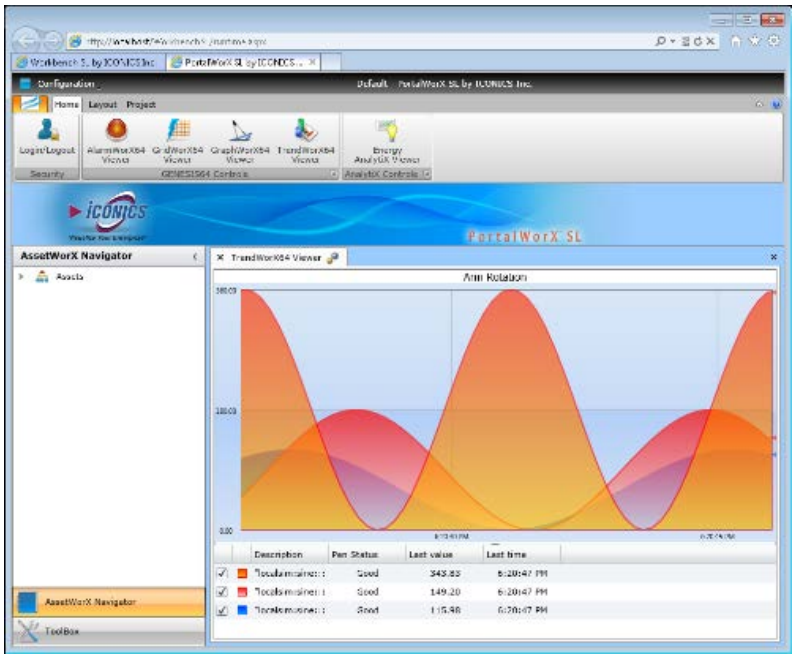

Figure 4.133 - TrendWorX64 Silverlight Web Part with Loaded TWXXS File

4.6.8.2. TrendWorX Viewer Configuration (PortalWorX-SL)

To edit the properties of the TrendWorX Silverlight Web Part, click on the Configure button to the right of the title on the control tab. You can also select the **Configure** command in the Layout Controls group on the **Layout** ribbon and choose the control that you wish to edit.

The **Configure Web Part** dialog box appears:

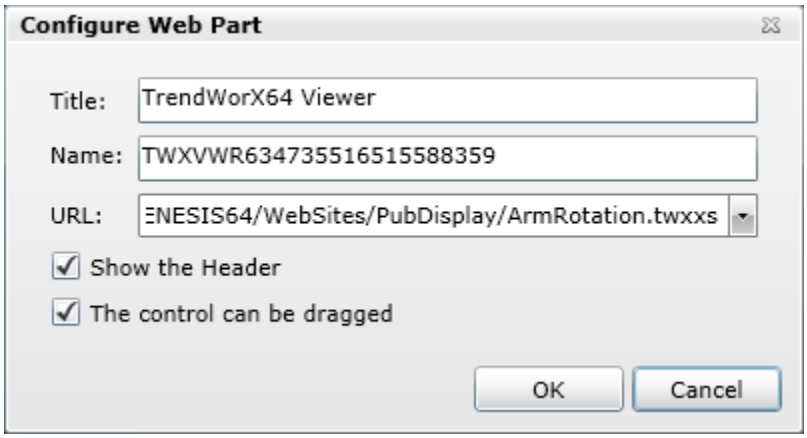

Figure 4.134 - Editing Control Properties with "Configure Web Part" Dialog Box

This dialog box allows you to edit the following properties of the TrendWorX64 Viewer control:

- **Title:** Enter the title of the control that will appear on the tab within the viewer/executor window in PortalWorX.
- **Name:** Enter the name that serves as the identifier for the control. Each control must have a unique name.
- **URL:** Enter the URL path corresponding to the location where you have placed a TrendWorX64 Silverlight display file in the **URL** box and click **OK**.

Info

Note: By default, the PortalWorX "localhost" represents the location where you have placed the GENESIS64 installation on your machine. For example, if you have saved the file "ArmRotation.twxxs" in the following folder:

C:\Program Files\ICONICS\GENESIS64\WebSites\PubDisplay

...you can enter the following URL in the **Configure Web Part** dialog box:

http://localhost/GENESIS64/WebSites/PubDisplay/ArmRotation.twxxs

- **Show the Header:** Enable this check box to display a tab above the chart display, which shows the name of the control.
- **The control can be dragged:** Enable this check box to allow moving of this control within the viewer/executor window.

Additional Options in the TrendWorX64 Silverlight Viewer

Once you have successfully loaded your TrendWorX Silverlight (.twxxs) file, you will be able to interact with the Web Part in several ways. For instance, you can show or hide a selected trend color pen by clicking on the check box in the **Visibility** column on the far left of the legend grid beneath the main trend display.

When you double-click inside the TrendWorX64 Silverlight Web Part, the runtime toolbar appears. In addition, when you right-click inside the TrendWorX64 Silverlight Web Part, you are able to select from several other options:

- If you have zoomed into the trend display, you can return to the original view setting by clicking on **Reset Zoom**.

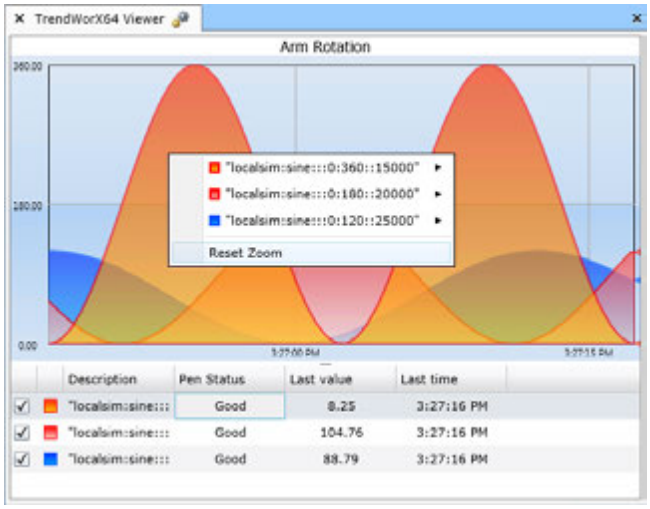

Figure 4.135 - Returning to Original Zoom Level

- You can also click on a pen color (which also lists the data source description) and then on **Stack to New Chart** to move that particular pen onto its own separate display within the control, as shown below. Once additional charts are created, you can move pens to a new chart or one of the other existing charts.

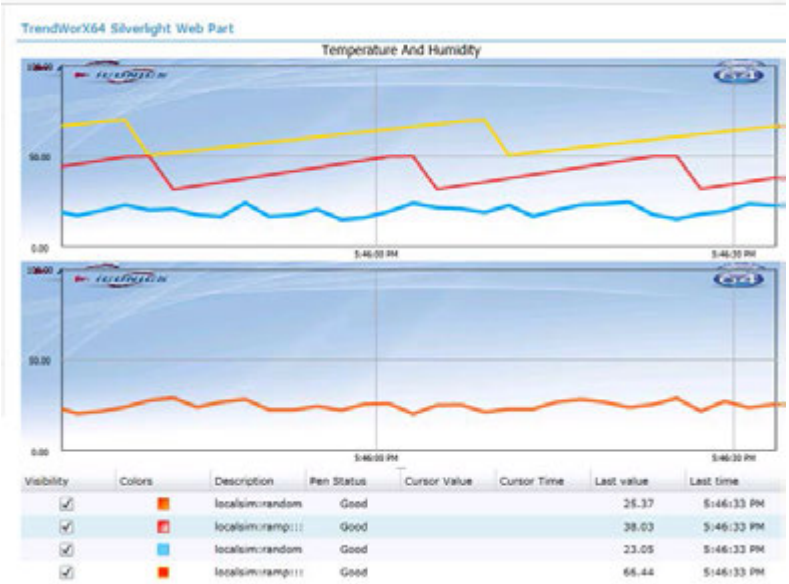

Figure 4.136 - Selected Pen Color Stacked to a New Chart

- Finally, you can select **Switch plot to** in order to use a different plot from the one originally loaded (where applicable), including: Time plot, Time Area plot, Step Time plot, Time Step Area plot, Time Spline plot, Time Spline Area plot, Circular plot, Bar plot, Histogram plot, XY plot, and Pie plot.

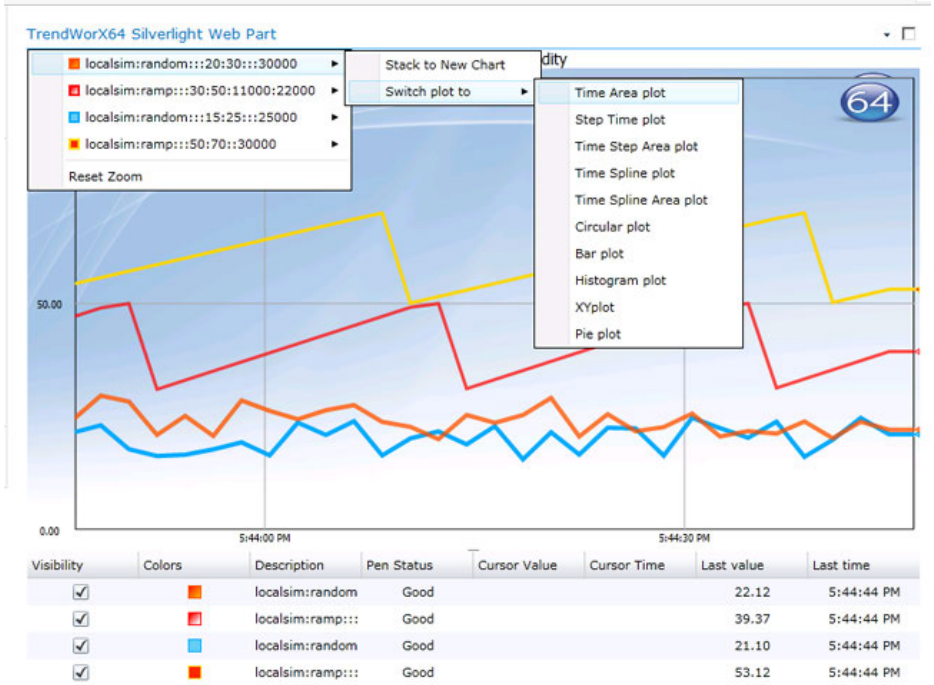

Figure 4.137 - Switching to a New Type of Plot

Lab: PortalWorX-SL

L4

4.1. Lab Overview

We've created the asset tree, configured and applied equipment classes and added a command to an asset. PortalWorX-SL is where all the pieces come together. Using the delivered web parts we will create a runtime dashboard to utilize all the aforementioned elements that we have developed. Let's move on.

Estimated time to complete this lab: 45 minutes

4.1.1. Task Checklist

In this lab, you will complete the following tasks:

- Saving existing GraphWorX64 displays, a TrendWorX64 Viewer and an AlarmWorX64 Viewer to accommodate the Internet portal that we will create.

4.1.2. Support Files

You will need the following file(s) to complete this lab. These files should already reside in your c:\Training folder.

- icTonicsTankMonitor,gdfx
- icTonicsTrends.gdfx
- icTonicsTrendViewer.twxx
- icTonicsAlarmViewer.awxx

4.2. Preparing Existing Files for Use in PortalWorX-SL

The additional features added to GENESIS64 in version 10.7 greatly improve the experience of migrating existing GraphWorX64 displays, TrendWorX64 viewers and AlarmWorX64 viewers into a portal that is viewable in a Web browser. Let's see how this works.

4.2.1. Preparing Files for Use in PortalWorX-SL

In GENESIS64 version 10.6, PortalWorX-SL was only available after installing an AnalytiX product. In version 10.7, the PortalWorX and Workbench Silverlight versions are installed as part of the GENESIS64 package.

GraphWorX64 displays and AlarmWorX64/TrendWorX64 viewers need to be saved as Silverlight versions and stored in the IIS virtual path, "Pub Display" in order to be used in PortalWorX-SL. The intent of this lab is to demonstrate how this is done. Let's get started.

4.2.2. Saving a Display as a Silverlight Version

We will save both the **icTonicsTankMonitor** and **icTonicsTrends** displays as Silverlight versions by performing the following steps.

1. Launch the Workbench Classic by selecting **Start → All Programs → ICONICS → Workbench**.

2. With the **GraphWorX64** provider, under **My Computer**, expand the **Training** folder.

   Note: If the training folder is not present in the tree, right click on My Computer, select Add/Remove folders, click Add Folder, browser to the c:\training folder, click OK and OK again.

3. Double click on the **icTonicsTankMonitor** display file. This opens the display in a GWX session.

4. Click **File → Save As** from the Workbench file menu.

5. **Important**: Save the display file in the folder **c:\program files\ICONICS\GENESIS64\WebSites\PubDisplay**

   Note: Why is saving to the PubDisplay folder important? Silverlight files are designed to be viewed in a Web browser. The PubDisplay folder is a Virtual Path on the local IIS (Internet Information Server). The URL for viewing our files is http://hostname/pubdisplay/filename. This will make more sense as we proceed.

6. After selecting the PubDisplay folder from the "Save as type:" dropdown, select **GraphWorX64 Silverlight Display (*.gdfxs)**.

7. Click **Save**.

8. Repeat the procedure and save a Silverlight version of the icTonics trends display also.

4.2.3. Saving a TrendWorX Viewer as a Silverlight Version

1. From within the Workbench Classic, select the **TrendWorX64** provider and expand the **My Computer → Training** tree.

2. Double click on the **icTonicsTrendViewer** file.

3. See the figure below to confirm you will select the correct file menu.

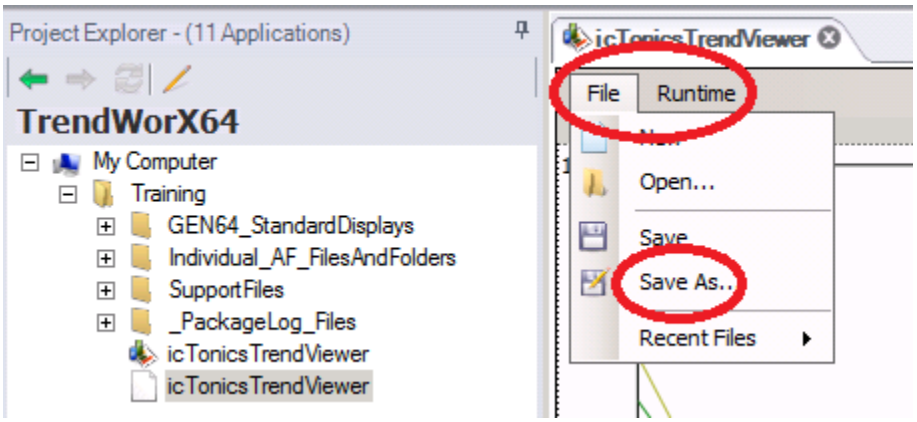

Figure L4.1 – Using the TrendWorX64 and AlarmWorX64 Viewer Menus

4. From within the TrendWorX64 configuration window, select **File → Save As**. See the figure above.

5. **Important**: Save the TrendWorXw64 viewer file in the folder **c:\program files\ICONICS\GENESIS64\WebSites\Pubdisplay**.

6. Save as type: **TrendWorX64 Silverlight (*.twxxs)**.

7. Click **Save**.

4.2.4. Saving an AlarmWorX Viewer as a Silverlight Version

1. From within the Workbench Classic, select the **AlarmWorX64** providerexpand the **My Computer → Training** tree.
2. Select the **icTonicsAlarmViewer** file.
3. From within the AlarmWorX64 configuration window, select **File → Save As**. See the figure above.
4. **Important**: Save the AlarmWorXw64 viewer file in the folder **c:\program files\ICONICS\GENESIS64\WebSites\Pubdisplay**.
5. Save as type: **AlarmWorX64 Silverlight (*.awxxs)**.
6. Click **Save**.

4.2.5. Defining Web Part Zones in PortalWorX

Creating ICONICS Web Part zones in PortalWorX-SL is easier than in Microsoft SharePoint. This is partly due to the fact that the Web Parts are native to ICONICS, where in SharePoint, the ICONICS Web Parts would have to be registered with SharePoint in order for SharePoint to know they exist. Although we won't be using SharePoint in this lab, it is a supported platform.

Our goal in this lab is to create a PortalWorX view that contains three zones and three Web parts (GraphWorX64, TrendWorX64 and AlarmWorX64). Our completed view, as it is displayed in Internet Explorer, should resemble the figure below.

Figure L4.2 – PortalWorX64 View with 3 Zones and 3 Web Parts

1. We have completed saving Silverlight versions of the files we'll use in PortalWorX. Let's proceed to create a layout.

2. From within PortalWorX-SL select the **Project** tab.

3. In the "**New Layouts**" section of the ribbon, select the layout as circled in the figure below.

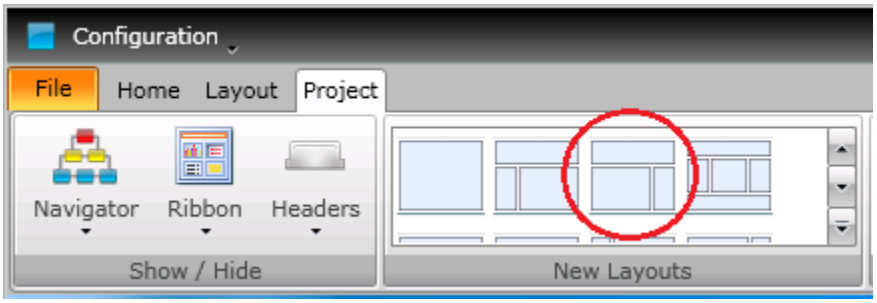

Figure L4.3 – PortalWorX64 Layout Selection

4. From within the "**Specify layout properties**" dialog, enter the **Name: icTonics Layout.**

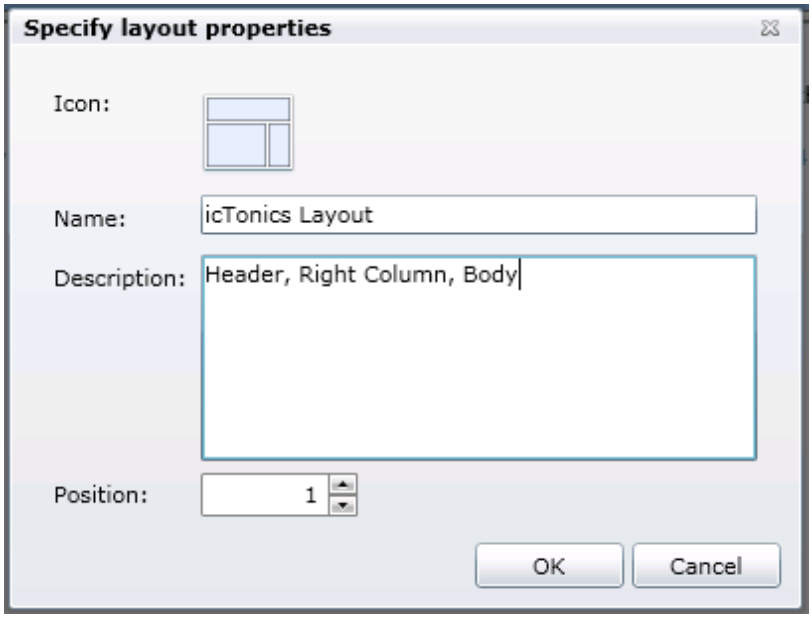

Figure L4.4 – PortalWorX64

5. Click **OK**.

6. We will reconfigure the layout by 'grabbing' a zone by the tab and relocating the zone.

7. Click the tab of the **Lower Left Zone** and hold the left mouse key down.

8. Drag the mouse to the lower middle anchor.

9. As shown in the following figure, when you cursor is on the locator where you want to anchor the zone the anchor will change color (yellow for instance). Observe the circle in the figure below.

   Note: Notice the various **anchor points** as indicated by the **shaded gray cubes**.

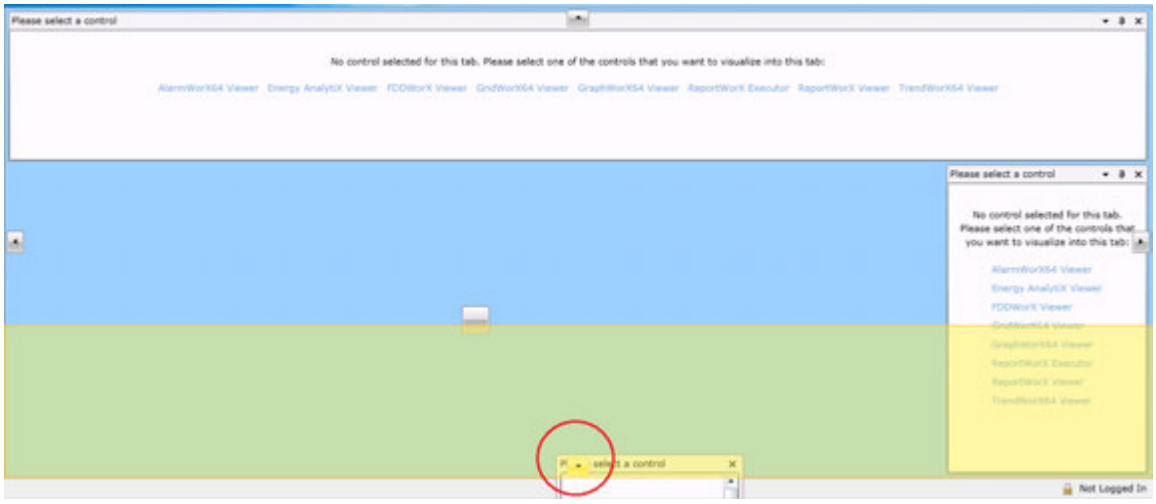

Figure L4.5 - Relocating the Lower Left Zone

10. Using the same technique, 'grab' the **Middle Zone** (on the right) and anchor it to the anchor in the **Middle Right** of the layout.

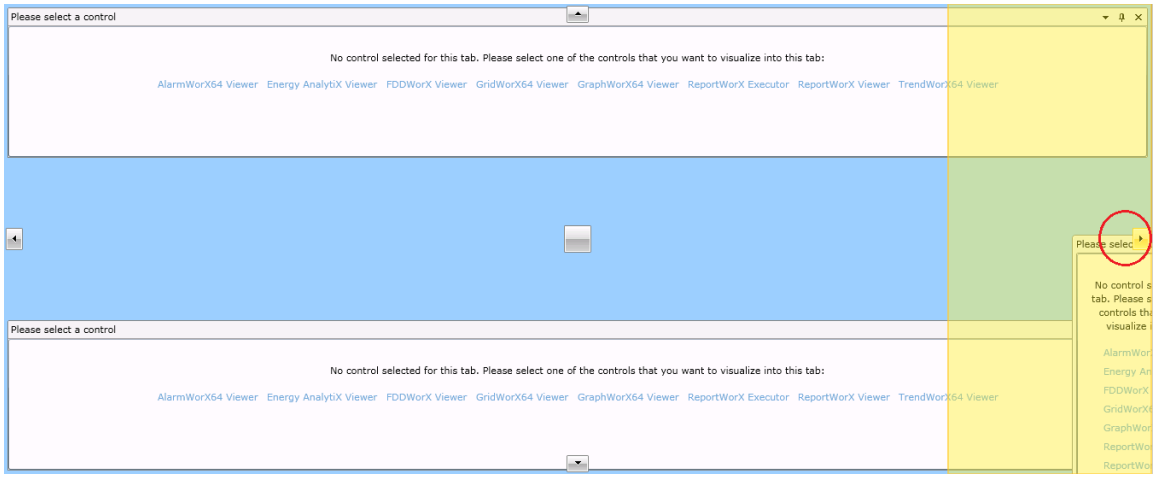

Figure L4.6 - Relocating the Middle Zone

11. Again using the same technique, ‘grab’ the tab (header) of the **Upper Left Zone** and anchor it to the **Center** anchor.

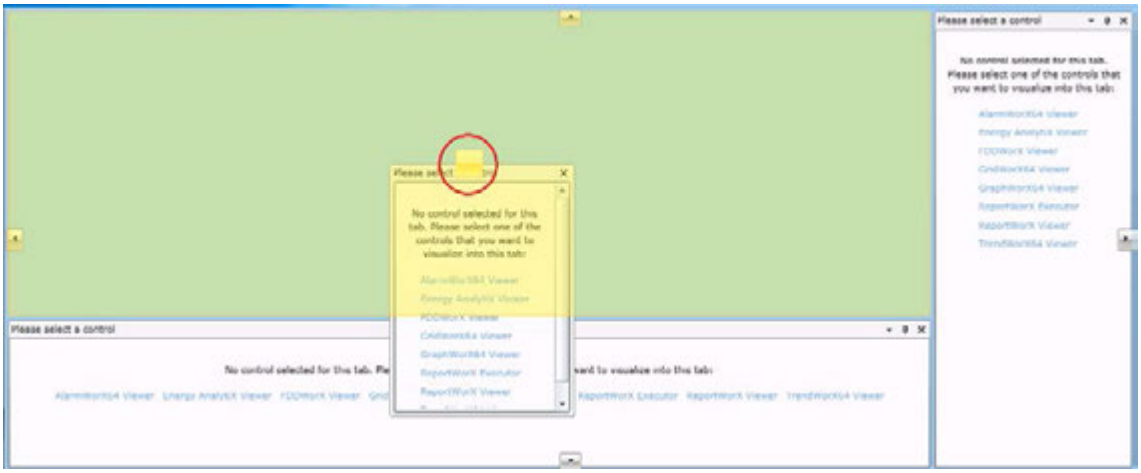

Figure L4.7 - Relocating the Upper Left Zone

12. The final **icTonics Layout** should resemble the figure below.

Figure L4.8 - Complete icTonics Layout

4.2.6. Adding Viewer Web Parts to Zones

In GENESIS64 version 10.71, we support eight different viewers. Each of the zones has the ability to be defined as any available viewer type.

In this lab, we'll be implementing the GraphWorX64, TrendWorX64 and AlarmWorX64 viewers.

Note: If the TrendWorX64 Viewer or the AlarmWorX64 Viewer needs to be **edited**, right-click on the viewer, select "Tabbed Document" and click on the **Gears icon** .

4.2.7. GraphWorX64 Viewer

1. From within the **Upper Left Zone**, click on the **GraphWorX64 Viewer** blue text.
2. This launches the **Configure Web Part** dialog. Enter the following information:
   - **Title**: GraphWorX64 Viewer
   - **Name**: icTonicsTankMonitor
   - **URL**: http://COMPUTER-B/PubDisplay/icTonicsTankMonitor.gdfxs
     - **COMPUTER-B** will be replaced with the **Local Computer Name**.
3. The completed dialog should resemble the figure below. Except for the computer name of course.

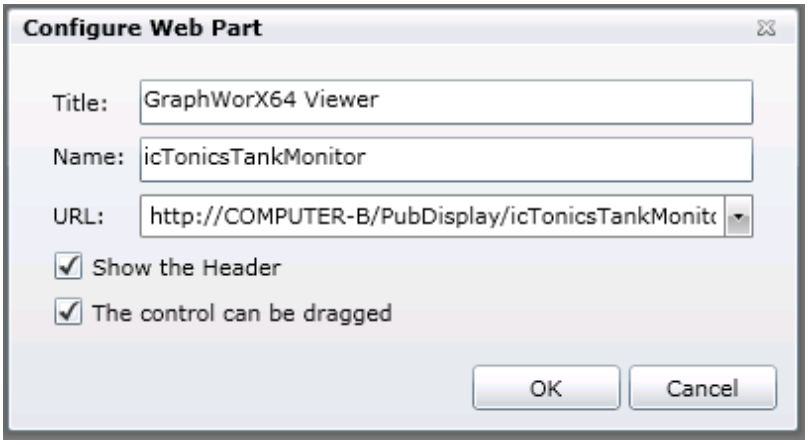

Figure L4.9 – Configuring the GraphWorX64 Viewer Web Part

4. Click **OK**.

5. Your current PortalWorX64 view should resemble the figure below.

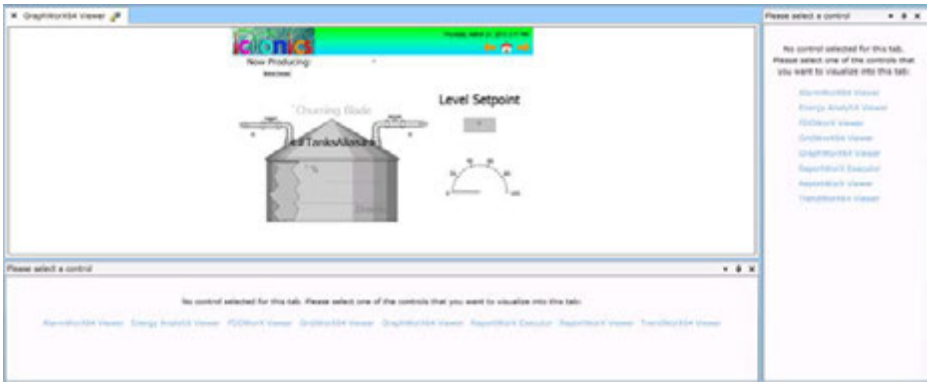

Figure L4.10 – GraphWorX64 Viewer

4.2.8. TrendWorX64 Viewer

1. From within the **Right Zone**, click on the **TrendWorX64 Viewer** blue text.

2. This launches the **Configure Web Part** dialog. Enter the following information:

   - **Title**: TrendWorX64 Viewer
   - **Name**: icTonicsTrendViewer
   - **URL**: http://COMPUTER-B/PubDisplay/icTonicsTrendViewer.twxxs
     - **COMPUTER-B** will be replaced with the **Local Computer Name**.

3. The completed dialog should resemble the figure below. Except for the computer name of course.

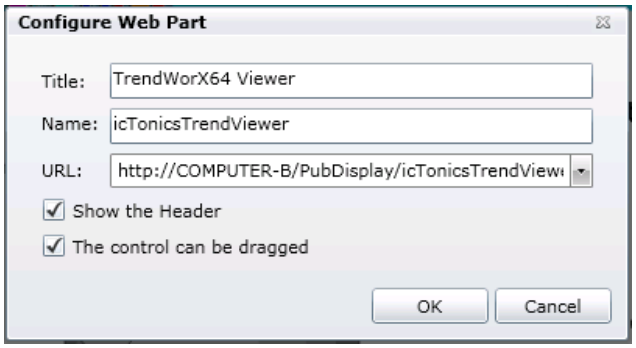

Figure L4.11 – Configuring the GraphWorX64 Viewer Web Part

4. Click **OK**.

5. Your current PortalWorX64 view should resemble the figure below.

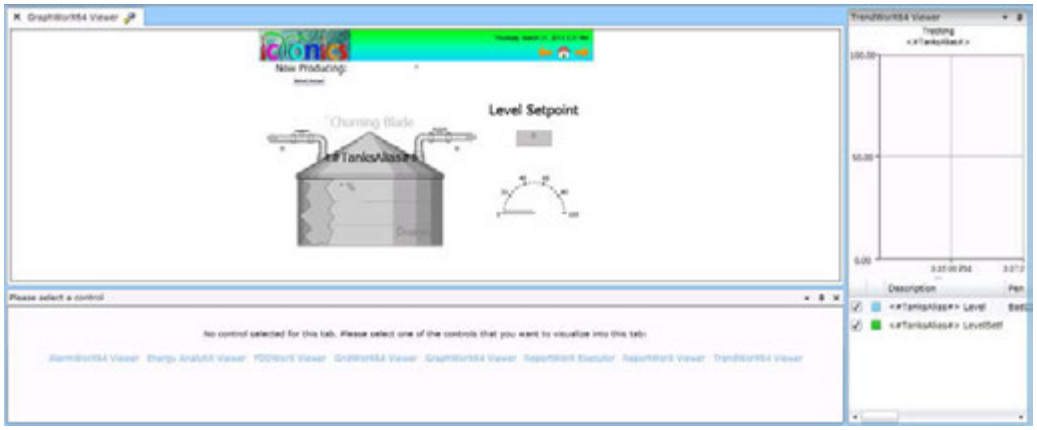

Figure L4.12 – GraphWorX64 and TrendWorX64 Viewer Web Parts

4.2.9. AlarmWorX64 Viewer

1. From within the **Bottom Zone**, click on the **AlarmWorX64 Viewer** blue text.

2. This launches the **Configure Web Part** dialog. Enter the following information:

   - **Title**: AlarmWorX64 Viewer
   - **Name**: icTonicsAlarmViewer
   - **URL**: http://COMPUTER-B/PubDisplay/icTonicsAlarmViewer.twxxs
     - **COMPUTER-B** will be replaced with the **Local Computer Name**.

3. The completed dialog should resemble the figure below. Except for the computer name of course.

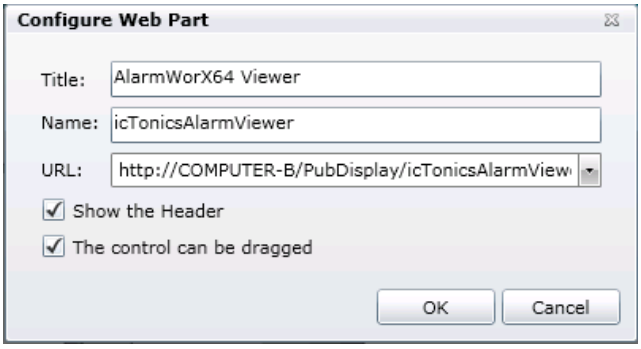

Figure L4.13 – Configuring the AlarmWorX64 Viewer Web Part

4. Click **OK**.

5. Your current PortalWorX64 view should resemble the figure below.

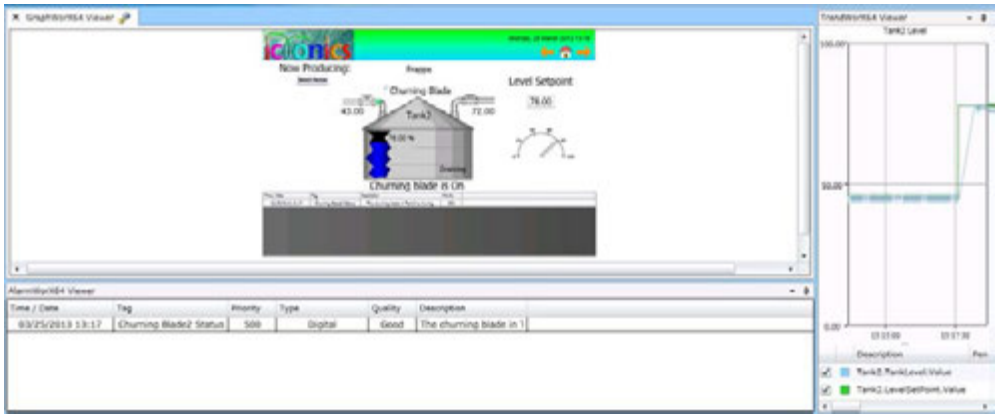

Figure L4.14 – GraphWorX64, TrendWorX64 and AlarmWorX64 Viewer Web Parts

4.2.10. Saving your Layout

1. From within PortalWorX64, click on the **File** selection in the upper left.

2. Click on the **Save** selection.

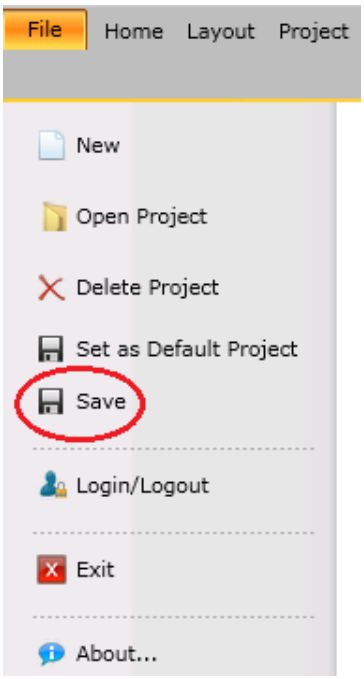

Figure L4.15 –Saving the icTonics Layout

3. Select the **Layout** tab.
4. Hover over each of the entries in the **Existing Layouts** section.
5. Verify your **icTonics Layout** exists.

This concludes this lab.

Commanding 5

In addition to the multiple new features and improvements in its latest release, GENESIS64 contains new Commanding options that can be found within both GraphWorX64 (both within the Workbench and in the stand-alone application) and within the AssetWorX provider in the Workbench SL configuration tool.

These new Commanding options help users perform wide and varied tasks throughout the GENESIS64 suite, reducing the need for specialized scripting to perform the same actions.

5.1. Objectives

After completing this chapter, you should know:

- How to Set Commands in GraphWorX64
- How to Set Commands in AssetWorX in Workbench-SL
- How to Run Commands in PortalWorX-SL

5.2. Introduction to Commanding

Commanding provides users with powerful SCADA options. No scripting is required, so these options are easy to engineer. Commands are executable from either the AssetWorX Navigator provider within PortalWorX-SL, or via Pick Actions set up via GraphWorX64. They can be targeted to run in separate Viewer providers (such as AlarmWorX64 or TrendWorX 64). They cover a wide variety of functions, from the simple (such as the Load command) to the more complex (the Acknowledge command, which requires setting a number of properties).

The commands are parameterized, allowing you to fine-tune them to your project needs and cross-process, to ensure full functionality and time saving.

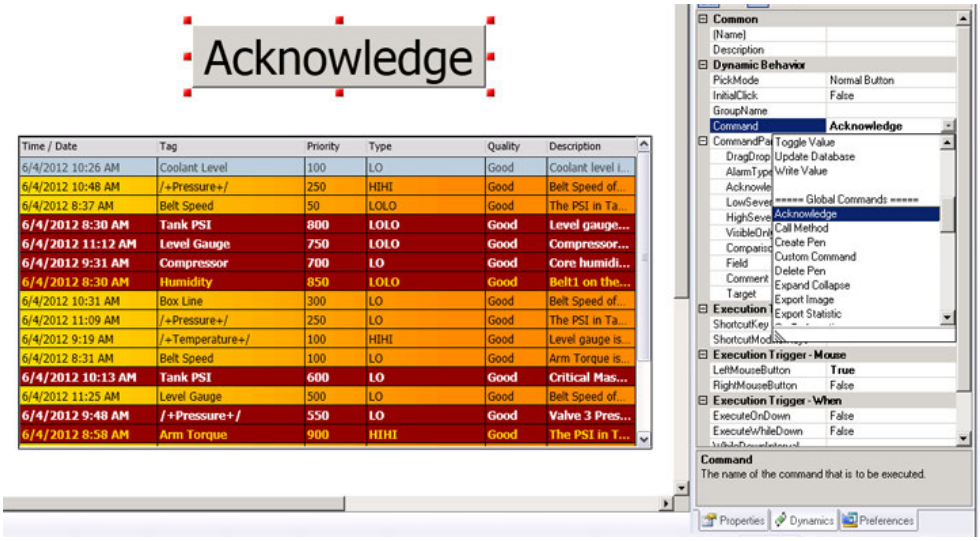

Figure 5.1 - Setting Command Properties in GraphWorX64

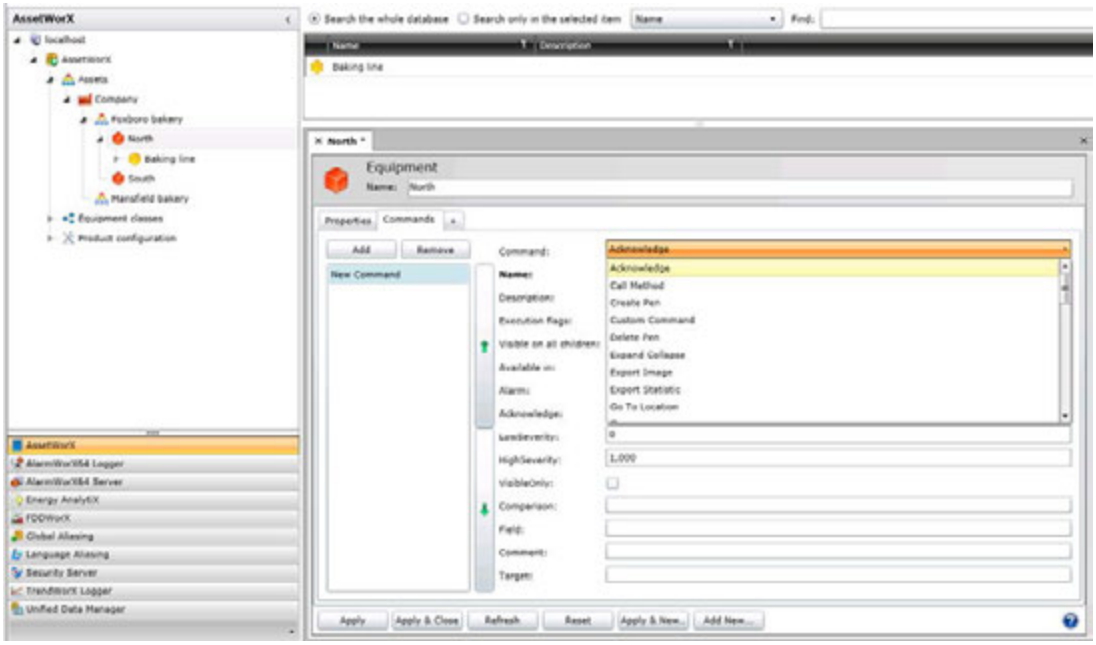

Figure 5.2 - Setting Command Properties in AssetWorX in Workbench SL

The following Commands are currently available (listed alphabetically):

- Call Method
- Create Pen
- Custom Command
- Delete Pen
- Expand Collapse
- Export Image
- Export Statistic
- Go To Location
- Group
- Load Alarm Configuration
- Load Data Grid Configuration
- Load Energy Data
- Load Executed Reports
- Load Facility Data
- Load Graphics Display
- Load Report
- Load Trend Configuration
- Login Dialog
- Navigate
- Open Url
- Phone Call
- Print
- Run Report
- Run Transaction
- Save Configuration
- Select Asset
- Select Element
- Send Mail
- Send Sms
- Set Filter
- Set Freeze Mode
- Set Global Alias
- Set Language
- Set Period
- Set Time Range
- Set Visibility
- Sort
- Switch Layout
- Write Value

5.3. About Commands

5.3.1. Commands with Targets

Commands are sent to other GENESIS64 or third-party controls with set execution parameters. Special program 'targets' can be either empty (to pop up a dynamic menu during Runtime with relative available controls) or defined (to support wild cards).

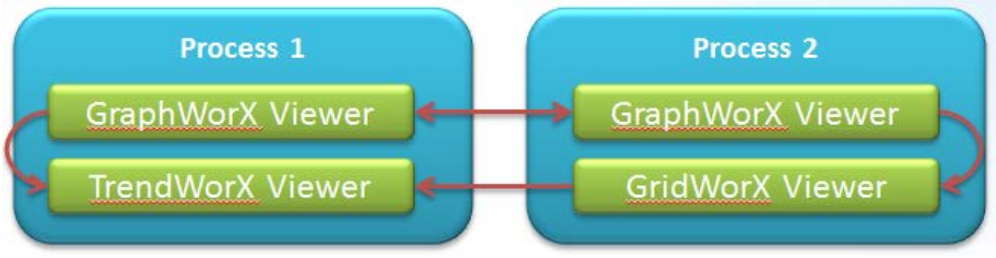

Figure 5.3 - Example Path of Targeted Command

5.3.1.1. Commands with Targets - Menus

Dynamic menus show all controls that can handle the command and that are in the configured scope. A menu within PortalWorX-SL also offers the creation of a new control, if none exists or if you want to open it in a new window.

5.3.2. Commands without Targets

The following shows common commands that do not have a set target, including Open URL, Login Dialog, and Set Language.

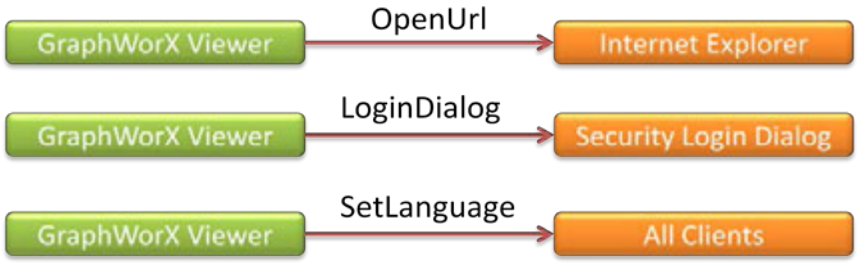

Figure 5.4 - Example of Commands Without Targets

5.3.3. AssetWorX Server Commands

AssetWorX Server Commands have the following properties:

- Used only in AssetWorX and not in GraphWorX64
- Parameter values are kept safe in the server database
- The Client invokes the command on the server side
- AssetWorX Server reads parameters from the database and executes the command.

Figure 5.5 - Example of an AssetWorX Server Command

5.3.4. Technology-Specific Commands

Some commands are technology-specific due to software or device limitations.

The following commands are specific to Windows Presentation Foundation only: Print, Export Image, Group, Sort

The following commands are specific to phones: Send SMS, Phone Call, Send Mail

5.3.5. Command Parameters

Command Parameters are those that are passed through commanding to a target control or that are used for in-place execution. The target can be specified by the operator in Runtime or can be hard-coded (using wild cards). Each configurator adds it specific properties (such as drag and drop option, visibility, etc.

5.3.6. Commands in GraphWorX64

Commands in GraphWorX64 have the following properties:

- Configured as Pick Action dynamics
- Parameters can have dynamic values
- Targets offer a list of controls embedded in the display
- Optional drag and drop

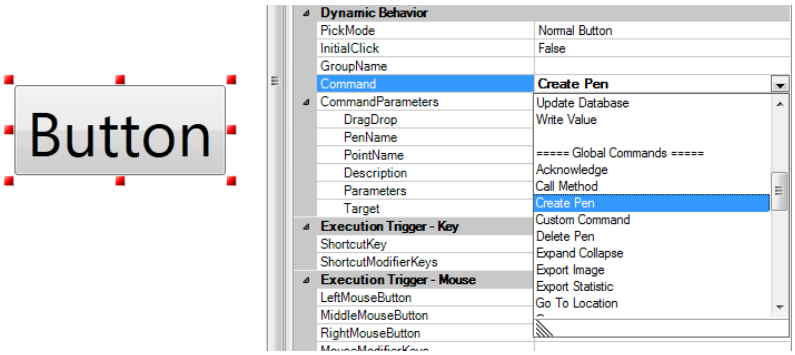

Figure 5.6 - Configuring a Button with the Create Pen Command

5.3.7. Commands in AssetWorX

Commands in AssetWorX have the following properties:

- Configured as Asset commands
- Visible Default, Drag & Drop flags
- Visible on all children
- Visible in products

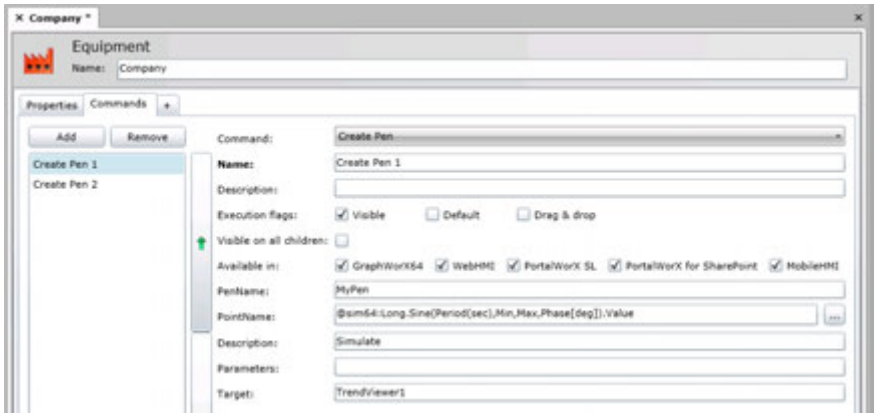

Figure 5.7 - Configuring an Equipment Asset to Use the Create Pen Command

5.3.8. Commands in Other Products

Commands can appear in other components, such as in GridWorX Viewer. For example, GridWorX Viewer has an in-grid context menu. Users are able to use a Set Time Range command, when two DateTime cells are selected. They can also use the Set Global Aliases command, which sets resolution within a selected cell.

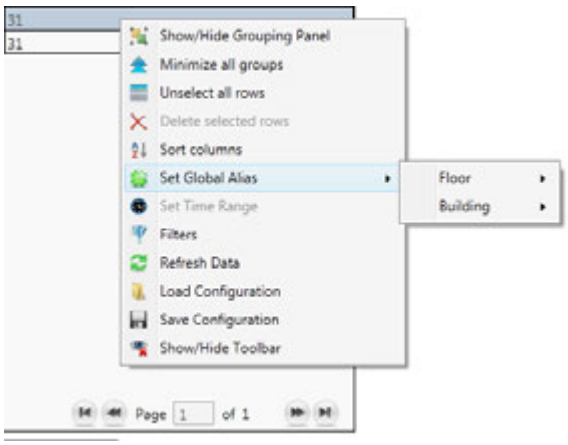

Figure 5.8 - Additional Commands within GridWorX Viewer

5.3.9. Commanding Options

You may wish to familiarize yourself with the following options that may be available when setting specific commands.

- **CommandingEnabled** - control can receive commands through commanding
- **DragAndDropCommandingEnabled** - control can receive commands by drag and drop
- **CommandingDisplayName** - user friendly name
- **MaxCommandScope** - visibility/accessibility

5.4. Command Security

Commands can be secured per User or Group in the Application Actions list within the Security Server provider. The application then checks to see if the user can execute that given command. In addition, the target control checks if the action invoked by the command i allowed (for example, the Load Display command).

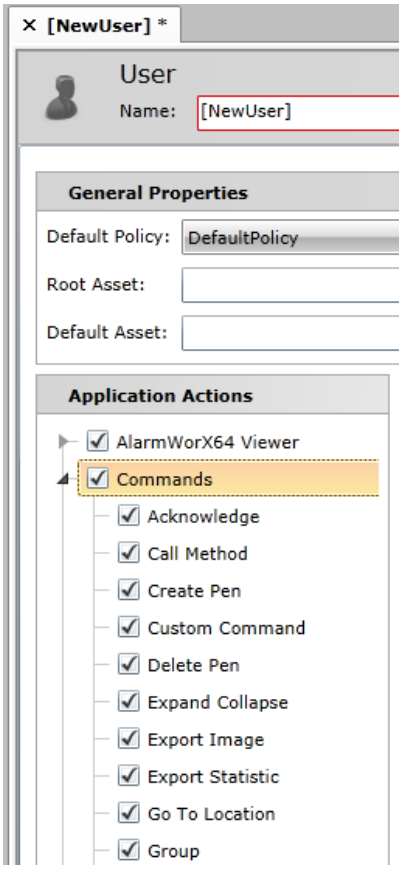

Figure 5.9 - Commands in the Application Actions List within the Security Server Provider in Workbench-SL

5.4.1. Security - AssetWorX

Within AssetWorX, assets can be hidden or disabled. You can also select which Root Asset is first visible and which is the Default asset selected after first login. This is performed through the **Security Server** provider found in both Workbench-SL and the classic Workbench. [See 2.15 'Asset Security' earlier in this manual.]

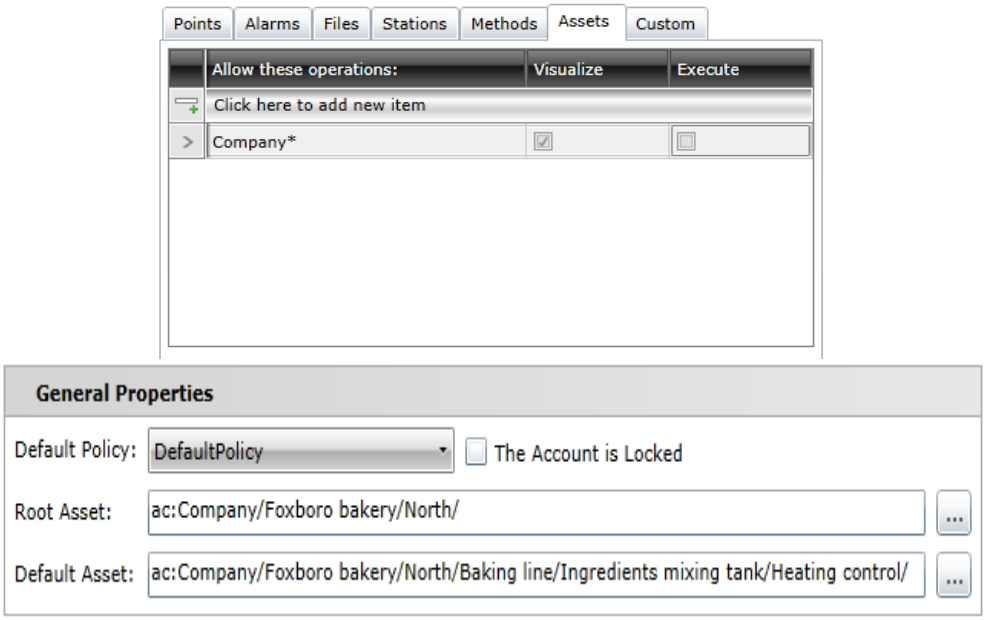

Figure 5.10 - Example of Asset Security

5.4.2. Drag & Drop - GraphWorX64

Drag and drop of commands in GraphWorX64 will override the Target definition. A single click with execute on target. This is similar to the Load Display Pick Action.

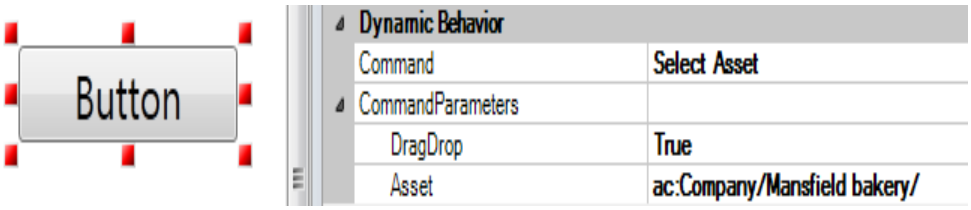

Figure 5.11 - Example of Drag & Drop Settings in GraphWorX64

5.4.3. Running Commands in AssetWorX Navigator

AssetWorX Navigator, a provider within PortalWorX-SL, provides drop-in navigation for any dashboard/HMI. It allows for right-click commands. Users can trigger targeted commands from assets and select from available targets for non-targeted commands. Changes can be easily made online. AssetWorX Navigator also features advanced integration with highly useful providers such as Energy AnalytiX, Facility AnalytiX and FDDWorX.

Figure 5.12 - AssetWorX Navigator

5.4.4. Drag & Drop in AssetWorX Navigator

Drag & Drop within AssetWorX Navigator is similar to how it is used in GraphWorX64. Within the AssetWorX Navigator provider in PortalWorX-SL, users can drag all commands marked as "Drag & drop" and can drop all commands supported by the target control (in configured order).

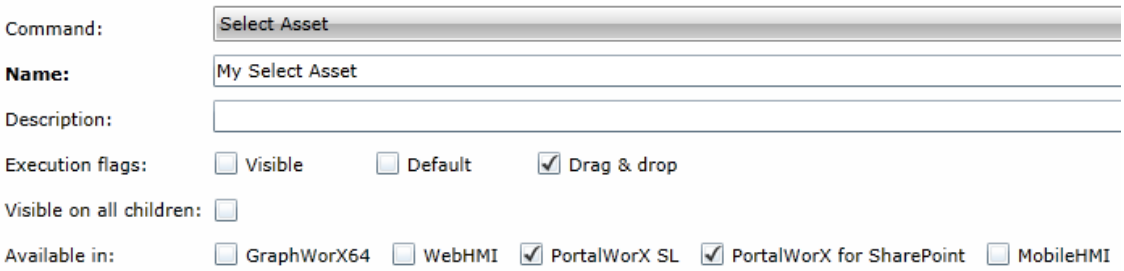

Figure 5.13 - Setting a Drag & Drop Command

5.4.5. Pick Actions Vs. Commands

The differences between Pick Actions and Commands include:

- Different parameters (different requirements for each)
- Different security configuration
- Commands can target non-GraphWorX64 controls

Command	**Load Display**
CommandParameters	
FileName	**C:\Display.gdfx**
DragDrop	False
TargetType	**Popup Window (Display Dependent)**
TargetName	**Popup1**
OverrideWindowProperties	**True**
WindowProperties	
GlobalAliases	**Floors=Floor1;**
LocalAliasCommandType	**From File**
LocalAliasCommandData	**C:\aliases.txt**

Command	**Load Graphics Display**
CommandParameters	
DragDrop	False
FileName	**C:\Display.gdfx**
LocalAliases	**alias,value**
GlobalAliases	**Floors=Floor1;**
Target	**GWX1**

Figure 5.14 - Pick Action vs. Command

5.5. Commands Tab for Equipment Classes and Equipment in AssetWorX

In AssetWorX, you can set Commands within either Equipment Class or Equipment properties, as shown in the figure below.

Tip: You can use aliasing in some command fields so that when the equipment class is used for creating equipment, prompts will allow the creator to easily fill in the blanks. For more information, refer to the Using Aliases in an Equipment Class topic.

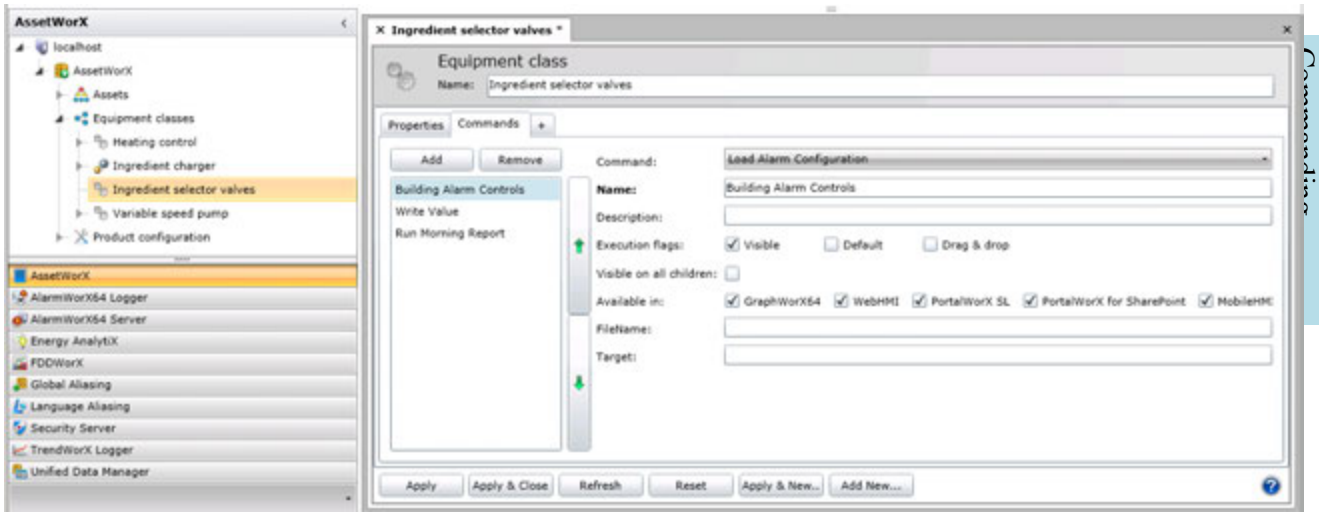

Figure 5.15 - Commands Sub-tab for Equipment Class

To open the Commands sub-tab, in the Project Explorer, click the **AssetWorX** provider button to open AssetWorX. Then in the navigation tree and expand ***localhost* > [the name of your AssetWorX database. In our examples, we've named it '*AssetWorX*'] > Equipment Classes** to access equipment classes. Create or navigate to the equipment class/equipment you are defining runtime menu commands for. This displays the Equipment Class (or Equipment) tab, with the Properties tab on top. Click the Commands sub-tab. Use this tab to define runtime menu options for the equipment class. Menu options can open displays, run reports, open reports, and more. Each prompt on this sub-tab is described in this section.

Options on the Commands sub-tab are described below:

- **Add button**: Click to add a command to the list below the button. When you click this button, a form for the Load Display command appears, right, where you can choose the command you want used for the menu item.
- **Remove button**: Click to delete the selected command from the list below the button. You cannot undo this action.

Menu Item List area: A list of the menu items that are currently defined, shown below. You can add any number of menu items. To modify a command, double-click it. You can change the sequence using the arrow buttons. Any item in bold is a default command. Note that some menu items may not be available on all platforms.

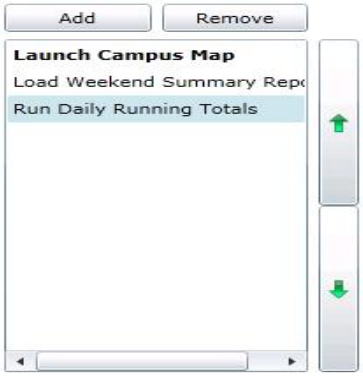

Figure 5.16 - Sample Menu Items on the Commands Sub-tab

- **Up and Down Arrow buttons**: Click one of these buttons to move the selected command up or down in the list. Commands will appear in the equipment's runtime menu in the sequence that you define here.
- **Command**: The command to be run when a runtime user clicks this command in the equipment's right-click menu. When you choose a command from the drop-down list, you are prompted for the parameters needed to run it.

Commands that you can choose include (listed alphabetically):

- Acknowledge
- Call Method
- Create Pen
- Custom Command
- Delete Pen
- Expand Collapse
- Export Image
- Export Statistic
- Go To Location
- Group
- Load Alarm Configuration
- Load Data Grid Configuration
- Load Energy Data
- Load Executed Reports
- Load Facility Data
- Load Graphics Display
- Load Report
- Load Trend Configuration
- Login Dialog
- Navigate
- Open Url
- Phone Call
- Print
- Run Report
- Run Transaction
- Save Configuration
- Select Asset
- Select Element
- Send Mail
- Send Sms
- Set Filter
- Set Freeze Mode
- Set Global Alias
- Set Language
- Set Period
- Set Time Range
- Set Visibility
- Sort
- Switch Layout
- Write Value

The following parameters are available for all commands:

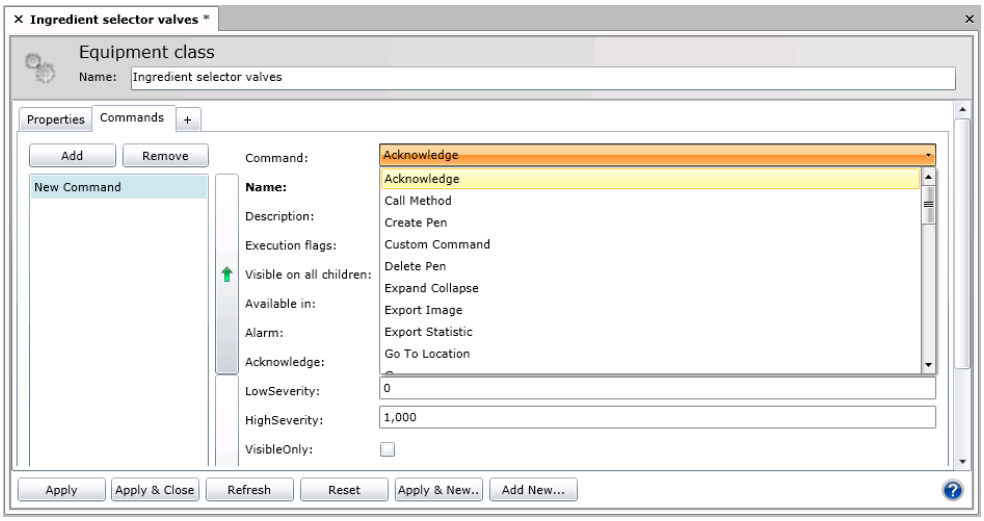

Figure 5.17 - Drop-Down List of Commands

- **Command:** Use the pull-down menu to select your desired command. The remaining parameters will change automatically once you have made your selection.
- **Name**: The text to be listed in the equipment's right-click menu at runtime.
- **Description***: A description that explains what happens when a runtime user clicks this command. This description is used for informational purposes.
- **Execution Flags**: Multiple commands on a single asset can be default. All the default commands get executed when the user left-clicks the asset and show in bold in the popup menu. Select from Visible, Default or Drag & Drop.
- **Visible on all children**: Select this option if the command is to be made available in the right-click popup menu of all child equipment nodes. This option applies only if the equipment node has child nodes.
- **Available in**: The ICONICS products on which this command will be available to runtime users, such as GraphWorX64, WebHMI, PortalWorX-SL, PortalWorX for SharePoint and MobileHMI. Select all that apply. Note that options may vary depending on the command.

* This field can contain one or more aliases, which will be used as prompts when an equipment node is created using this equipment class. For more about aliases and their uses, refer to the Using Aliases in an Equipment Class topic.

The remainder of this topic describes each command and its parameters. The examples shown are within Equipment Class properties, but are applicable within individual Equipment properties, as well.

5.5.1.1. Acknowledge Command

The Acknowledge command allows a user to acknowledge alarms in an associated AlarmWorX64 Viewer.

When an alarm requires acknowledgement, the typical steps for acknowledging the alarm are:

1. An **alarm is triggered** and is added to the alarm grid on which it is used. (Only *enabled* alarms are triggered. An alarm that is not enabled is considered to be an alarm that is not ready for use or an alarm that is being decommissioned. Alarms are enabled when they are added to the alarm server, using the General tab of the AlarmWorX64 Server tag form.)

2. A runtime operator **acknowledges the alarm**; this puts the alarm into an *Acknowledged* state.

3. When the alarm condition no longer exists, the alarm leaves the grid as long as its acknowledgement requirements have been met.

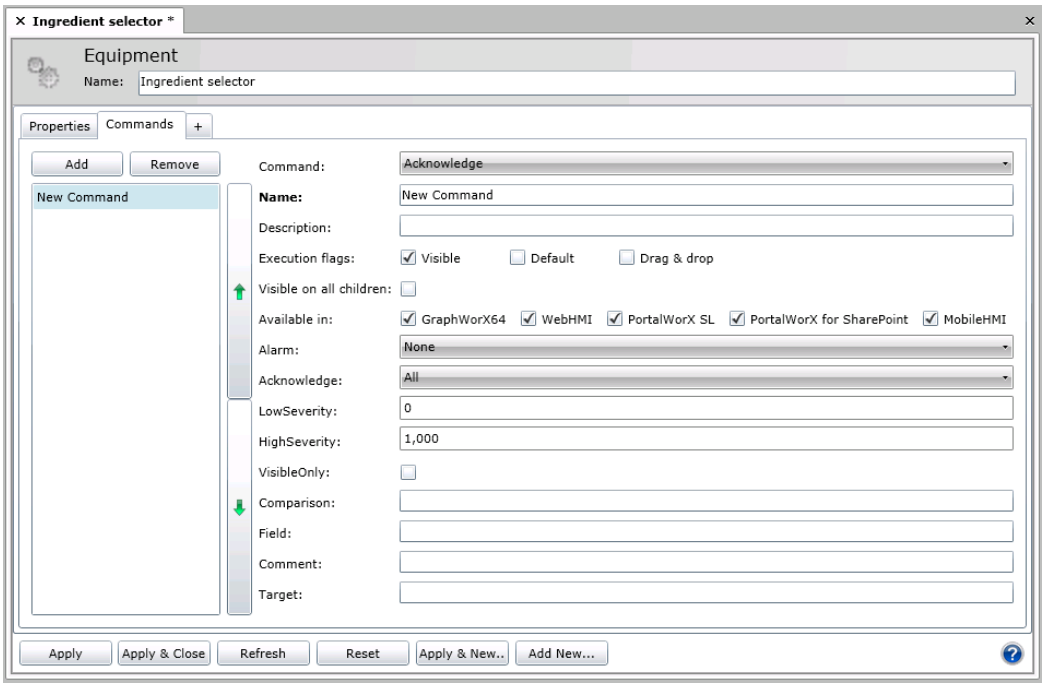

Figure 5.18 - Acknowledge Command

Parameters for the Acknowledge command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **Alarm -** This can be Condition, Tracking, Simple or None.
- **Acknowledge -** This can be All, Comparison, Filter, Selection or Inactive. When you are acknowledging alarms, you can use filters to choose a broad or limited range of alarms which you can acknowledge all at once. You can create a condition or comparison that is used to select the alarms to be acknowledged. Should you select "Comparison" in the Acknowledge Type pulldown, you can specify the range of severity of the alarms (between 0 and 1000) you are acknowledging within the Low Severity and High Severity sections. You can also decide to acknowledge "Visible Only" by clicking on the checkbox.
- **LowSeverity -** When acknowledging by Comparison, you can enter the low level of severity (between 0 and 1000) here.
- **HighSeverity -** When acknowledging by Comparison, you can enter the high level of severity (between 0 and 1000) here.
- **VisibleOnly -** Check if you wish to acknowledge visible alarms only.
- **Comparison** - Enter a comparison expression here.
- **Field -**Fields that can be used in comparison include AckRequired, Time/Date, ConditionName, NewState, Tag, Quality, Type, EventClass, EventId, EventType, Description. Priority, SourceName or Category.
- **Comment -** Enter any comments here.
- **Target -** Enter the registered name of the target control.

5.5.1.2. Call Method Command

The Call Method Command calls a method or task from within Platform Services. These methods can be parameterized or not and range from simple data writing to complex calculations or actions. Due to this, the parameters field can be filled with whatever is necessary to pass to the custom method. Methods must be coded in C# and can be used in combination with the Jscript.NET scripting engine of GraphWorX64. The Application Note "GENESIS64 – Custom Command in Platform Services" includes two examples and instructions to begin creating a custom command.

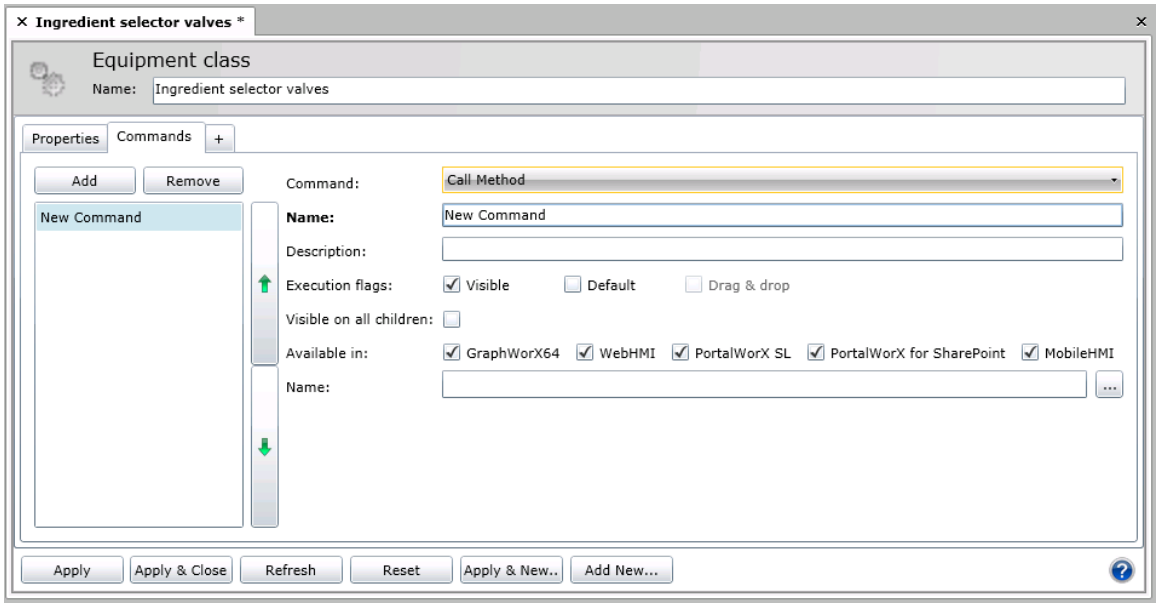

Figure 5.19 - Call Method Command

Parameters for the Call Method command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **Name** -This second Name field (separate from the top Name field for the command name) allows you to enter the full name of the call method, including the point path.

5.5.1.3. Create Pen Command

The Create Pen command adds a new pen into a target TrendWorX64 Viewer using the following parameters.

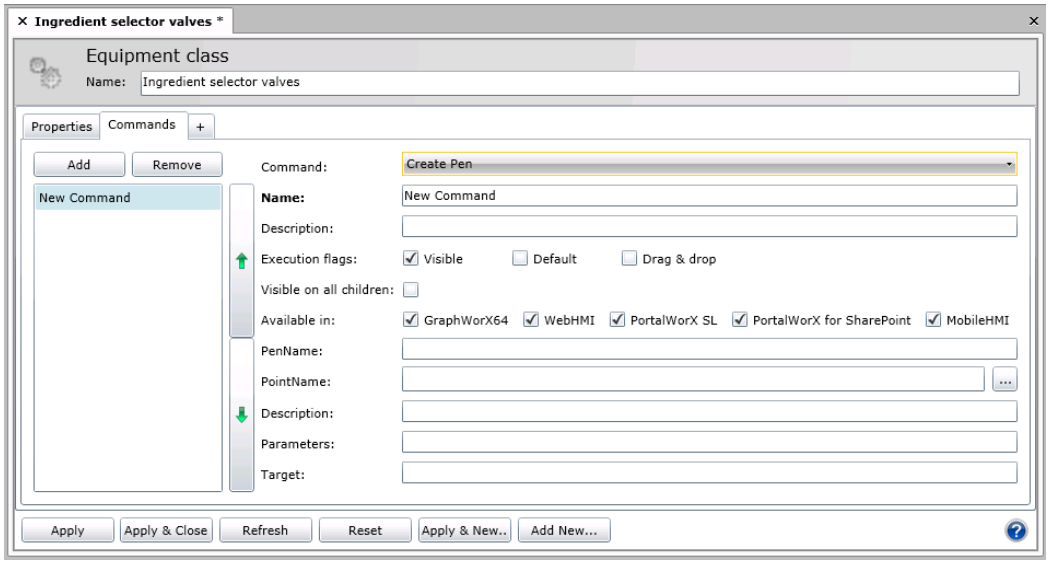

Figure 5.20 - Create Pen Command

Parameters for the Create Pen command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **PenName** - This is the value assigned to TwxChartPen.Name and used in XAML/WPF namescope for identifying display elements.
- **PointName** - The data source (i.e localsim:sine).
- **Description** - The description for the pen, typically displayed in the viewer's legend, tooltips and other GUI elements. Can contain an alias.
- **Parameters** - Typically empty, this string can optionally specify a sequence of custom settings related to aggregate in use, buffer size, and so on. The syntax has to be the same as the DataConnectorConfiguration.RawData property serialized in TrendWorX64 displays, for example: "accesslevel=13;usagetype=2;usedatachangefilter=False;deadbandtype=0;deadbandvalue=0;aggregatetype=Interpolative;rawreadmodified=False;maxsamplesforrawdata=1500;datasetvaluecolumn=1;datasettimestampcolumn=0;usedatasetstatuscode=False;datasetstatuscodecolumn=2;maxsamplesfordataset=1500;"
- **Target** -Enter the registered name of the target control.

5.5.1.4. Custom Command

The Custom Command was designed to allow future expansion to third-party integration and reference to the API. Custom Commands are virtually unlimited.

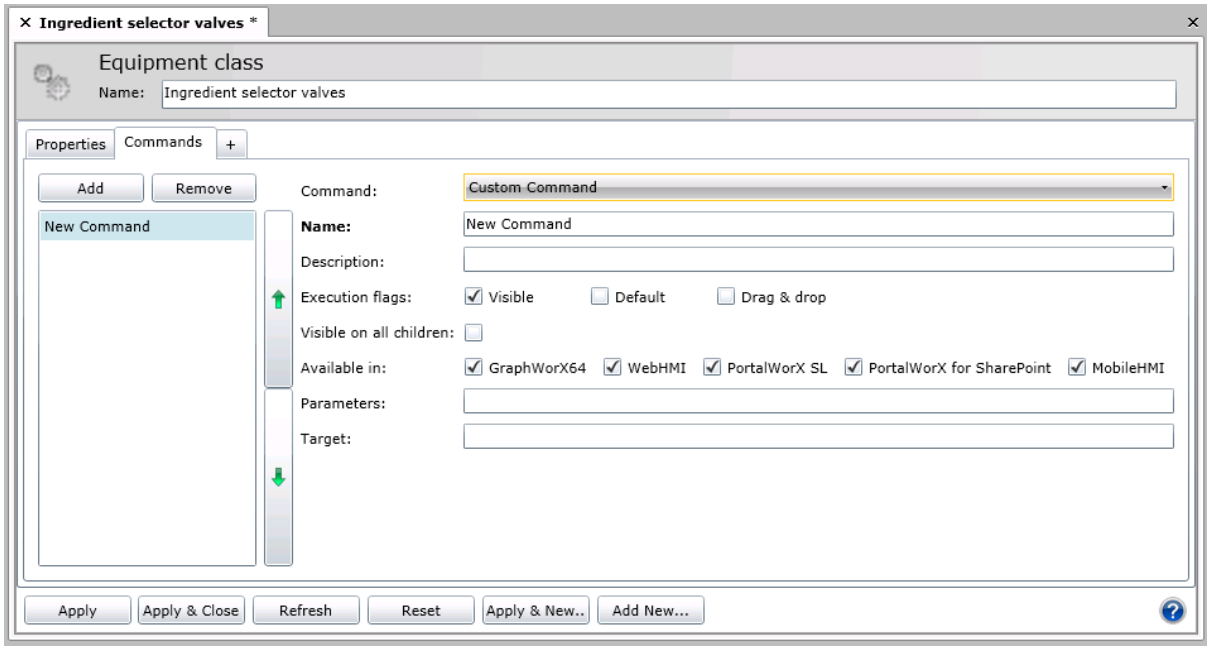

Figure 5.21 - Custom Command

Parameters for the Custom Command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **Parameters** - A string representing some input to the Custom Command representing details necessary to facilitate the desired outcome.
- **Target** - Enter the registered name of the target control.

5.5.1.5. Delete Pen Command

The Delete Pen command will remove a pen from a TrendWorX64 Viewer. This command requires a target which can be a TrendWorX64 Viewer in GraphWorX64 or PortalWorX-SL. The name of the pen and the target viewer are the parameters for this command.

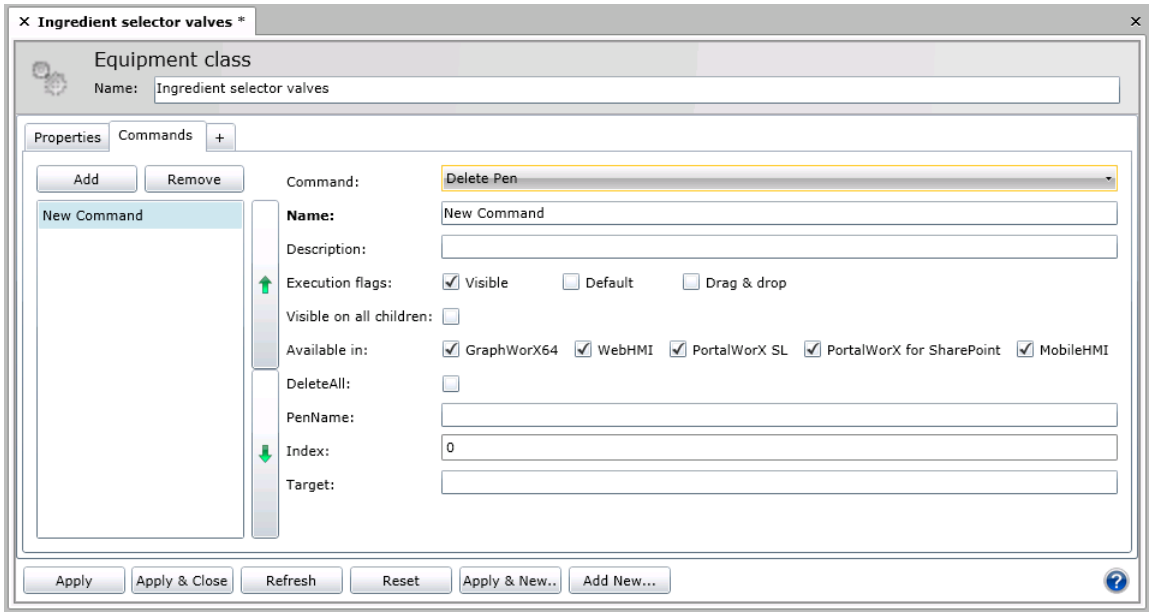

Figure 5.22 - Delete Pen Command

Parameters for the Delete Pen command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **DeleteAll** - This checkbox will enable the command to delete all currently configured pens when the command is executed on a TrendWorX64 Viwer.
- **PenName** - Name of the Pen to be removed. Named Pens will be **bold** in the TrendWorX64 Configuration.
- **Index** -Valid if empty.
- **Target** - Registered name of the target control.

5.5.1.6. Expand Collapse Command

The Expand Collapse command will allow users to change the levels shown in the Asset Navigator by expanding or collapsing the assets to a desired level

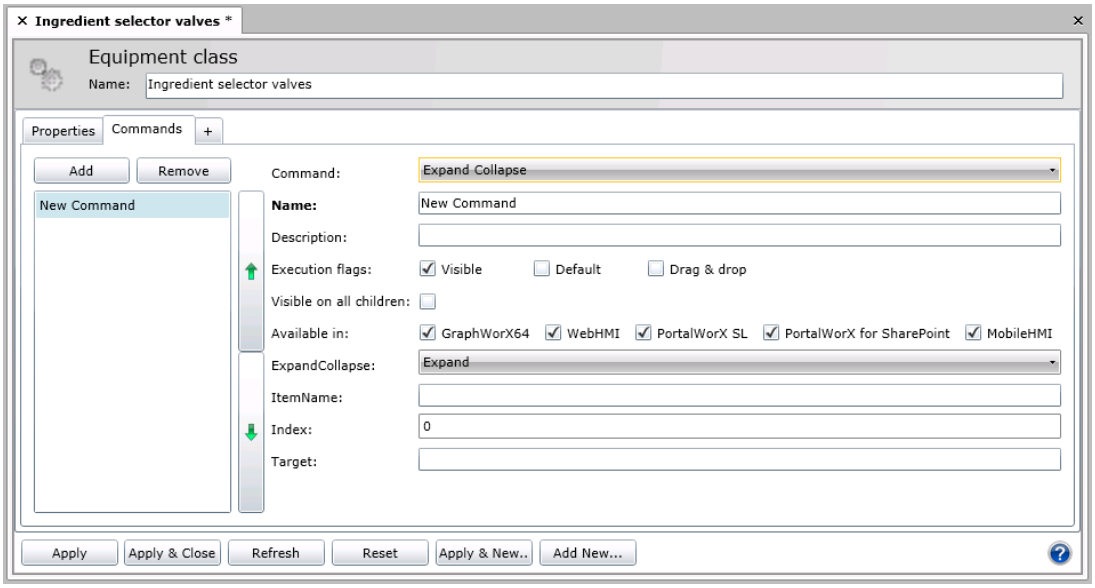

Figure 5.23 - Expand Collapse Command

Parameters for the Expand Collapse command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **ExpandCollapseType**: Use the pull-down menu to select from Expand, Collapse, Expand All or Collapse All.
- **ItemName** - Name of the parent item to Expand or Collapse within the AssetWorX Navigator tree.
- **Index** -Valid if empty.
- **Target** - Registered name of the target control.

5.5.1.7. Export Image Command

The Export Image command is a GraphWorX-64-only Command that will allow users to export an image of a GraphWorX64 file based on the current view or the entire display.

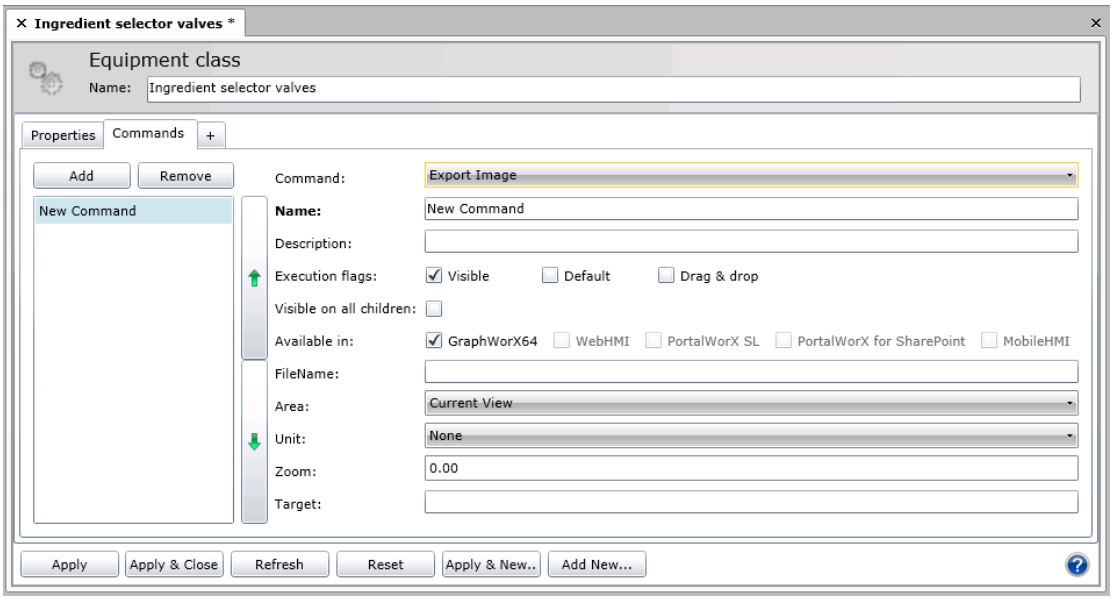

Figure 5.24 - Export Image Command

Parameters for the Export Image command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **File Name** - Enter the file name or a URL.
- **Area** - Use the pull-down menu to select either the EntireControl or CurrentView.
- **Unit.** -Use the pull-down to select from None, Percentage, Scale or Level.
- **Zoom** - Enter the preferred zoom level (by percentage).
- **Target** - Registered name of the target control.

5.5.1.8. Export Statistic Command

The Export Statistic command just shows the Export Statistics dialog using default options (no intermediate dialog is displayed). The parameter ReportName is currently unused as the report doesn't provide a dedicated field.

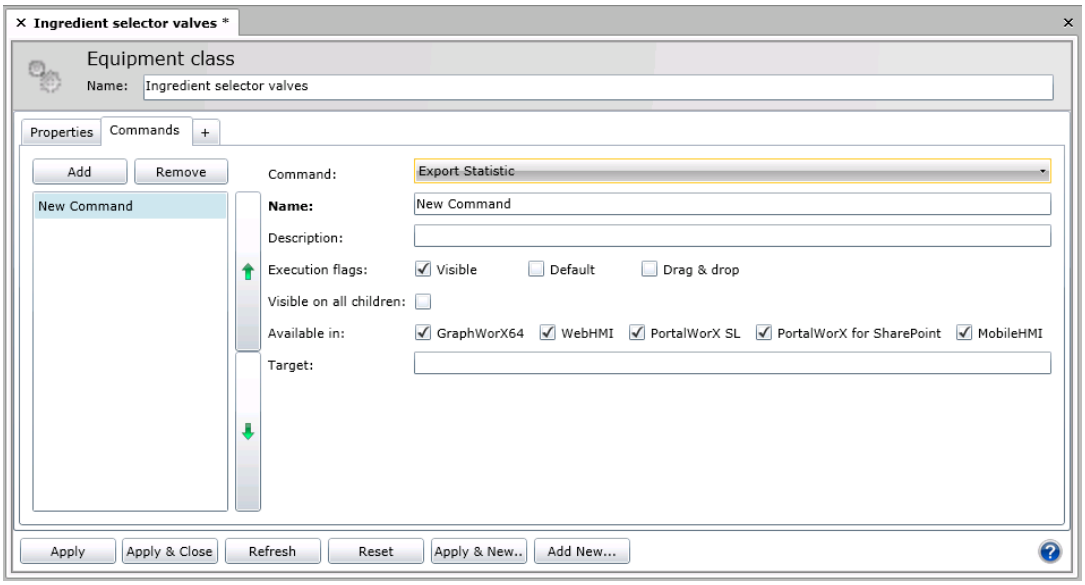

Figure 5.25 - Export Statistic Command

Parameters for the Export Statistic command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **Target** - Registered name of the target control.

5.5.1.9. Go To Location Command

The Go To Location Command, used with EarthWorX targets, works similar to the Ribbon menu option in the EarthWorX contextual Ribbon in GraphWorX64 by allowing users to input a Latitude, Longitude and Zoom (based on the Unit pull-down). Executing this command will zoom, or otherwise change, the view of the target EarthWorX window.

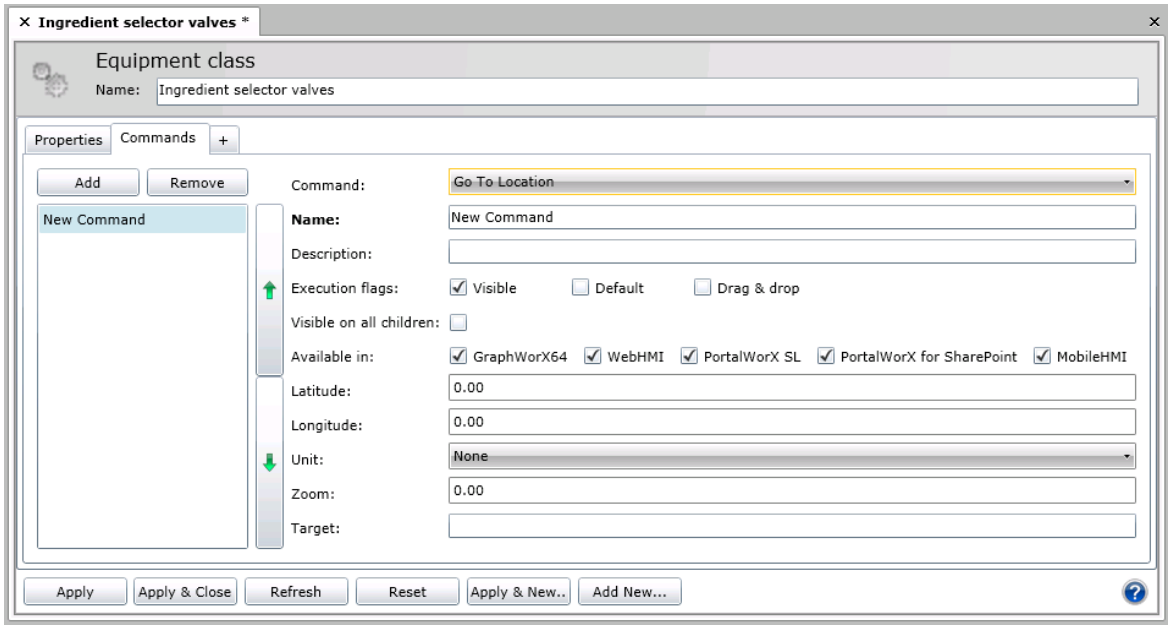

Figure 5.26 - Go to Location Command

Parameters for the Go To Location command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **Latitude** - The floating point number ranging from -90.0 (South Pole) to +90.0 (North Pole) from the Equator (0.0).
- **Longitude** - The floating point number ranging from -180.0 (South Pole) to +180.0 (North Pole) from the Prime Meridian (0.0) in Greenwich, England.
- **Unit.** -Use the pull-down to select from None, Percentage, Scale or Level.
- **Zoom** - Enter the preferred zoom level (by percentage).
- **Target** - Registered name of the target control.

5.5.1.10. Group Command

The Group Command, used to target AlarmWorX64 or GridWorX Viewers, will allow pre-configured or dynamic grouping of data grids using the parameters offered. Grouping can encompass one or more levels by using the Add Action or be removed entirely using the Reset Action.

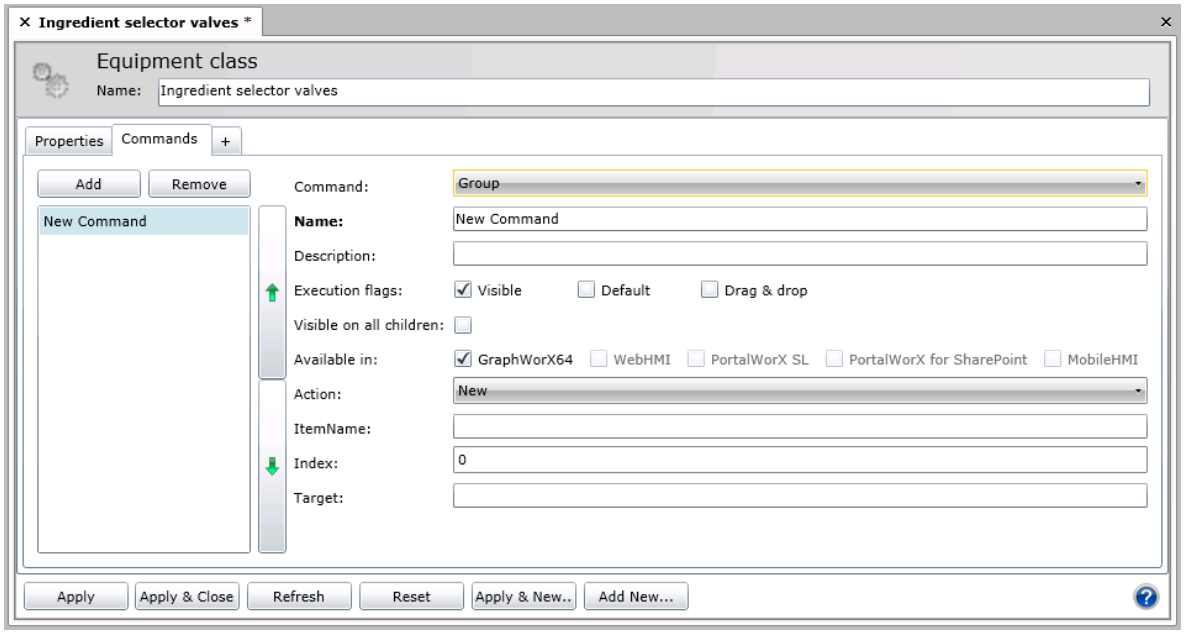

Figure 5.27 - Group Command

Parameters for the Group Location command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **Action** - Choosing between New, Add or Reset users can create a new grouping order, add a level of grouping or remove the current grouping.
- **ItemName** - Specify the name of the item that should be grouped by. This should match a value in one or more rows of the data grid. This may take advanced knowledge of the database or Alarm Server being visualized by the Viewer. If this is left blank, the Index can be used.
- **Index** -Valid if empty.
- **Target** - Registered name of the target control.

5.5.1.11. Load Alarm Configuration Command

The Load Alarm Configuration command opens an AlarmWorX file of alarms inside an AlarmWorX Viewer when a runtime user selects the menu option. The prompts you must provide for a Load Alarm Display command look like this:

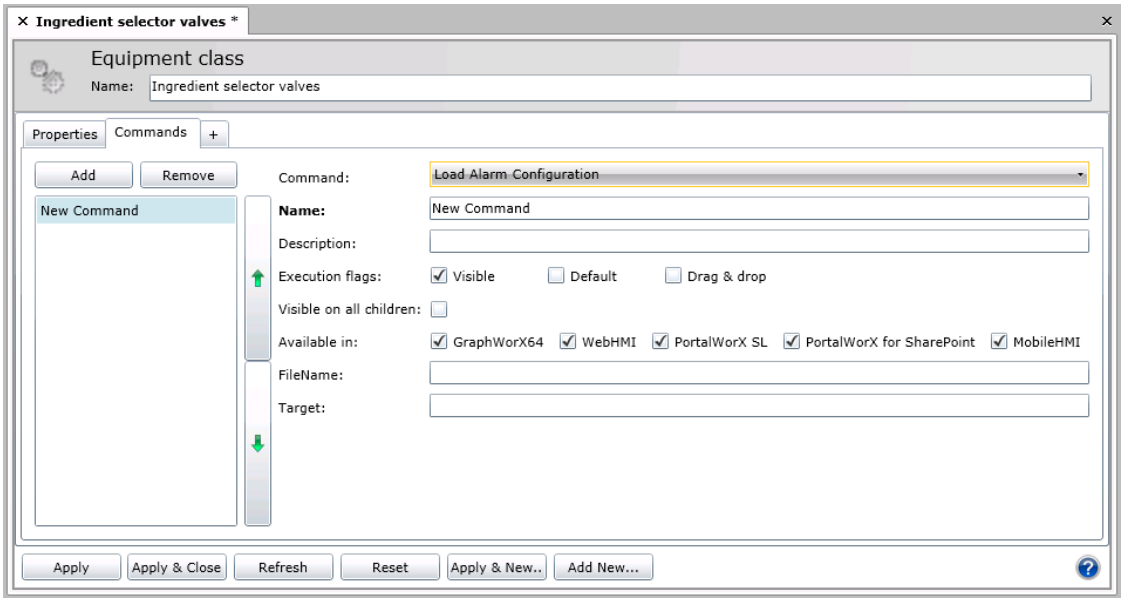

Figure 5.28 - Load Alarm Configuration Command

Parameters for the Load Alarm Configuration command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **FileName***: The AlarmWorX64 Viewer display file to open when a runtime user selects this menu item. Enter a valid, correct URL path for the AlarmWorX64 Viewer Silverlight file (an .awxxs file) to be loaded. For example, the URL for a display file might be: http://MachineName/GENESIS64/WebSites/PubDisplay/Alarm1.awxxs
- **Target** - Registered name of the target control.

* If the equipment node was created using an equipment class, and this or other fields contain aliases (that is, variables that are surrounded by /? and ?/), you can replace the aliases with values that are appropriate for this equipment node by instantiating the aliases.

5.5.1.12. Load Data Grid Configuration Command

The Load DataGrid Configuration command, used with GridWorX, will locate and load a GDWX (WPF-based) or GDXXS (Silverlight-based) file that contains GridWorX configurations. Users can specify the file name and path of the file, as well as any desired target.

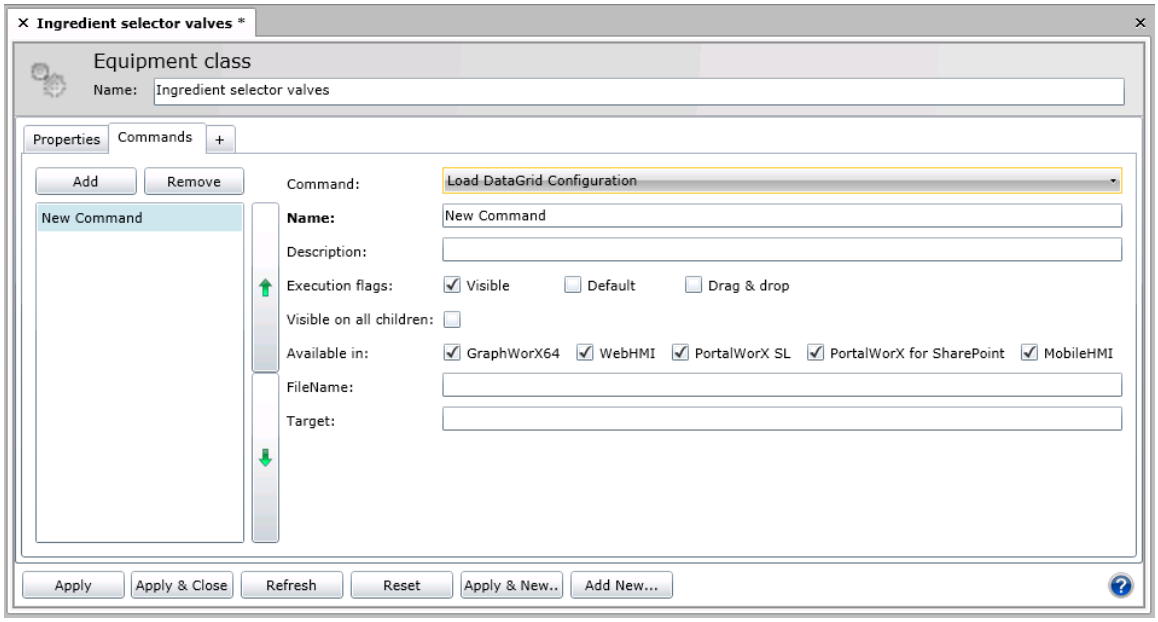

Figure 5.29 - Load Data Grid Configuration Command

Parameters for the Load Data Grid Configuration command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **FileName** - Enter a file name or URL.
- **Target** - Registered name of the target control.

5.5.1.13. Load Energy Data Command

The Load Energy Data command opens an Energy AnalytiX Configuration (.eav) file created using the Energy AnalytiX Web part.

The prompts you must provide for a Load Energy Data command look like this:

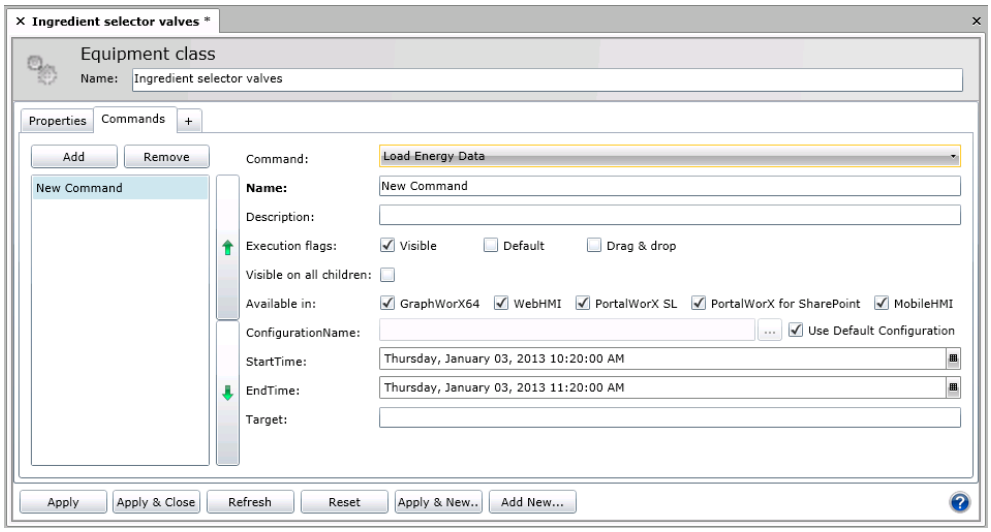

Figure 5.30 - Load Energy AnalytiX Data Command

Parameters for the Load Energy Data command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **Configuration Name***: The name of the Energy AnalytiX configuration file to be loaded for this runtime menu item. This field becomes enabled only if you uncheck the Use Default Database check box. To specify a configuration name, click the ellipsis button [...] to display all available Energy AnalytiX Configuration (.eav) files and choose one.
- **StartTime -** The Start Time will indicate in long format the date and time to begin the range of energy data that is loaded. This value can be typed or selected via the Date/Time Picker located at the right of the field.
- **EndTime -** The End Time will indicate in long format the date and time to end the range of energy data that is loaded. This value can be typed or selected via the Date/Time Picker located at the right of the field.
- **Target** - Registered name of the target control.

* If the equipment node was created using an equipment class, and this or other fields contain aliases (that is, variables that are surrounded by /? and ?/), you can replace the aliases with values that are appropriate for this equipment node by instantiating the aliases.

5.5.1.14. Load Executed Reports Command

The Load Executed Reports loads a folder of reports for viewing. Note that this command does not execute the reports, it simply displays executed reports that reside in a folder. For example, you can store energy reports in one folder and use this command to open the folder of reports for display when a runtime user selects it from the equipment's right-click menu. (Alternatively, you can use the Load Report command to open one report that has been executed.) The prompts you must provide for a Load Executed Reports command look like this:

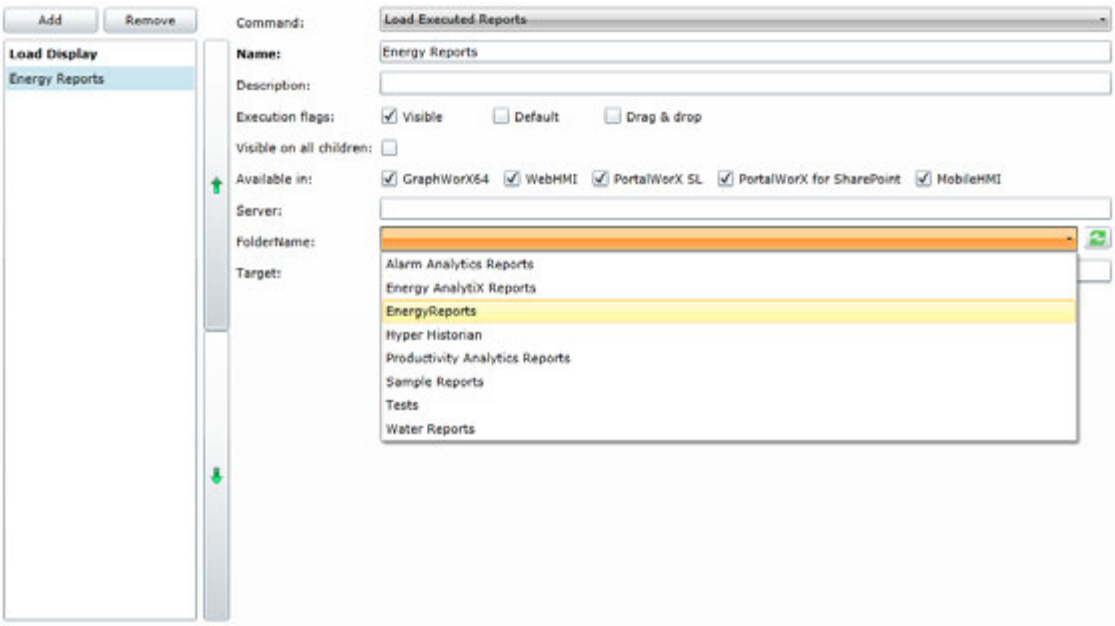

Figure 5.31 - Load Executed Reports Command

Parameters for the Load Executed Reports command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **Server***: Click the ellipsis button [...] to choose the server where the folder or executed reports resides.
- **Folder Name** - Select one of the available folder names or refresh to see an updated list.
- **Target** - Registered name of the target control.

* If the equipment node was created using an equipment class, and this or other fields contain aliases (that is, variables that are surrounded by /? and ?/), you can replace the aliases with values that are appropriate for this equipment node by instantiating the aliases.

5.5.1.15. Load Facility Data Command

The Load Facility Data command opens an FDDWorX Configuration (.fav) file created using the FDDWorX Web Part.

The prompts you must provide for a Load FDDWorX Data command look like this:

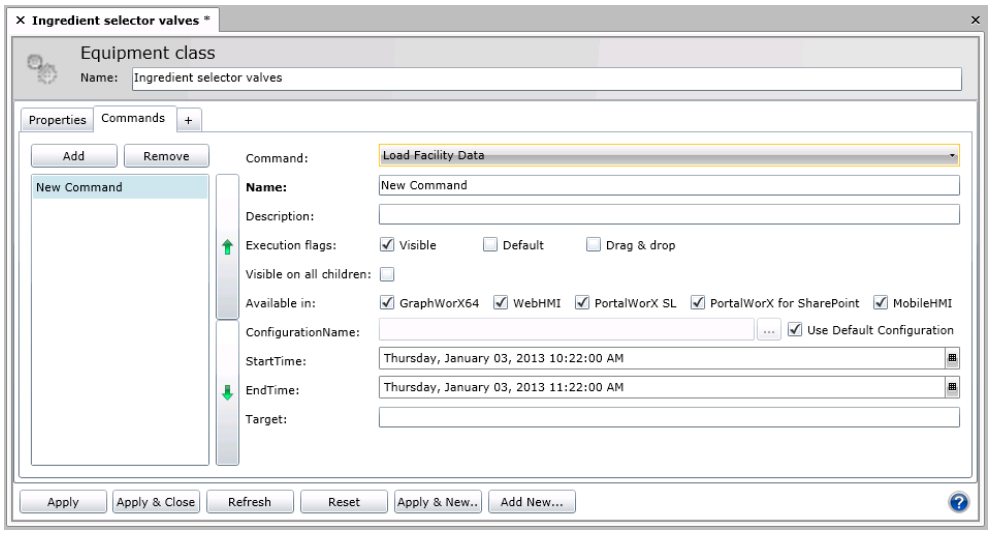

Figure 5.32 - Load Facility Data Command

Parameters for the Load Facility Data command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **Configuration Name***: The name of the FDDWorX configuration file to be loaded for this runtime menu item. This field becomes enabled only if you uncheck the Use Default Configuration check box. To specify a configuration name, click the ellipsis button [...] to display all available Facility AnalytiX Configuration (.fav) files and choose one.
- **Start Time** - The Start Time will indicate in long format the date and time to begin the range of energy data that is loaded. This value can be typed or selected via the Date/Time Picker located at the right of the field.

- **End Time** - The End Time will indicate in long format the date and time to end the range of energy data that is loaded. This value can be typed or selected via the Date/Time Picker located at the right of the field.
- **Target** - Registered name of the target control.

* If the equipment node was created using an equipment class, and this or other fields contain aliases (that is, variables that are surrounded by /? and ?/), you can replace the aliases with values that are appropriate for this equipment node by instantiating the aliases.

5.5.1.16. Load Graphics Display Command

The Load Graphics Display command opens a GraphWorX display file inside a GraphWorX Viewer when a runtime user selects the menu option. The prompts you must provide for a Load Display command look like this:

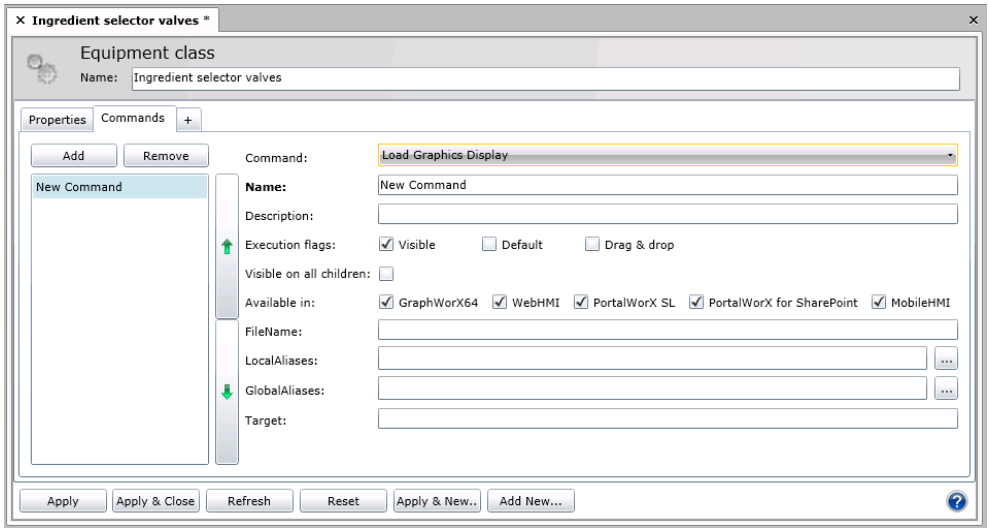

Figure 5.33 - Load Display Command

Parameters for the Load Graphics Display command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **File Name* -** The GraphWorX display file to open when a runtime user selects this menu item. Enter a valid, correct URL path for the GraphWorX64 Silverlight file (a .gdfxs file) to be loaded. For example, the URL for a display file might be: http://MachineName/GENESIS64/WebSites/PubDisplay/Display1.gdfxs

- **Local Aliases*** - The local alias settings (if any) that are used for the GraphWorX display. Click the ellipsis button [...] to select the theme and global aliases.
- **Global Aliases***: The global alias settings (if any) that are used in the GraphWorX display. Click the ellipsis button [...] to select the theme and global aliases.
- **Target** - Registered name of the target control.

* If the equipment node was created using an equipment class, and this or other fields contain aliases (that is, variables that are surrounded by /? and ?/), you can replace the aliases with values that are appropriate for this equipment node by instantiating the aliases.

5.5.1.17. Load Report Command

The Load Report command displays a report for viewing. Note that this command does not execute the report, it simply displays a report that has already been executed. For example, if a report ran over the weekend, this command can open it for display when a runtime user selects it from the equipment's right-click menu. (Alternatively, you can use the Load Executed Reports command to open an entire folder of reports.) The prompts you must provide for a Load Report command look like this:

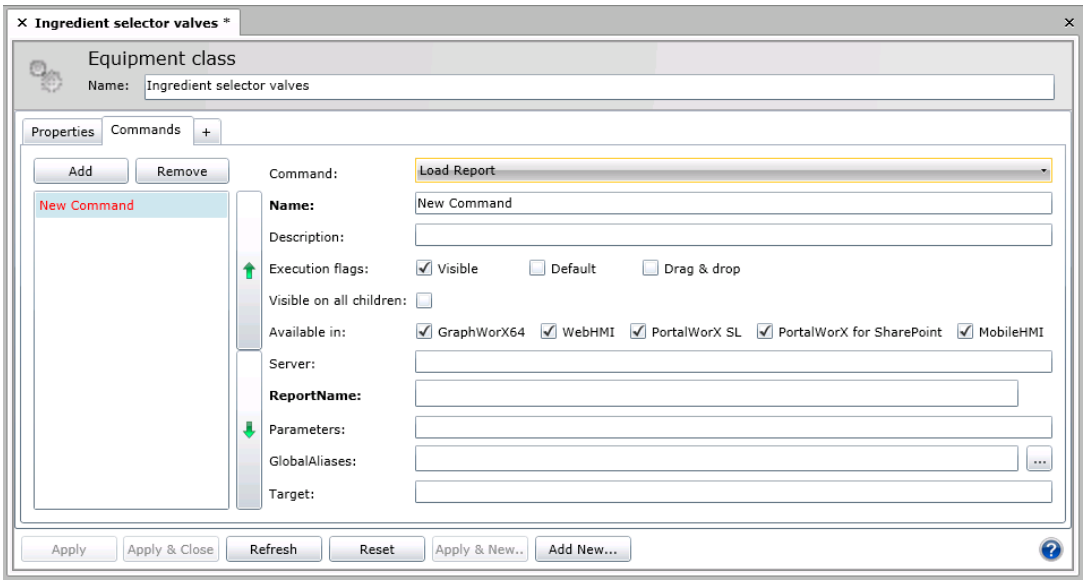

Figure 5.34 - Load Report Command

Parameters for the Load Report command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **Server***: Click the ellipsis button [...] to choose the server where the executed report resides.
- **Report Name***: Specify the executed report to be opened. After you have chosen a server, click the ellipsis button [...] to select the executed report. In the Choose a Report dialog box that opens, select the report and click OK.
- **Parameters***: This optional field allows users to specify parameters to be sent to ReportWorX for use in identifying required parameters. Each parameter needs to be separated by a | (Shift+\). For example: @param1=Line1 | @param2=MachineB.
- **Global Aliases***: The global alias settings to be used for running the report. Click the ellipsis button [...] to select the theme and global aliases.
- **Target** - Registered name of the target control.

***** If the equipment node was created using an equipment class, and this or other fields contain aliases (that is, variables that are surrounded by /? and ?/), you can replace the aliases with values that are appropriate for this equipment node by instantiating the aliases.

5.5.1.18. Load Trend Configuration Command

The Load Trend Configuration command opens a TrendWorX trend file inside a TrendWorX Viewer when a runtime user selects the menu option. The prompts you must provide for a Load Trend Display command look like this:

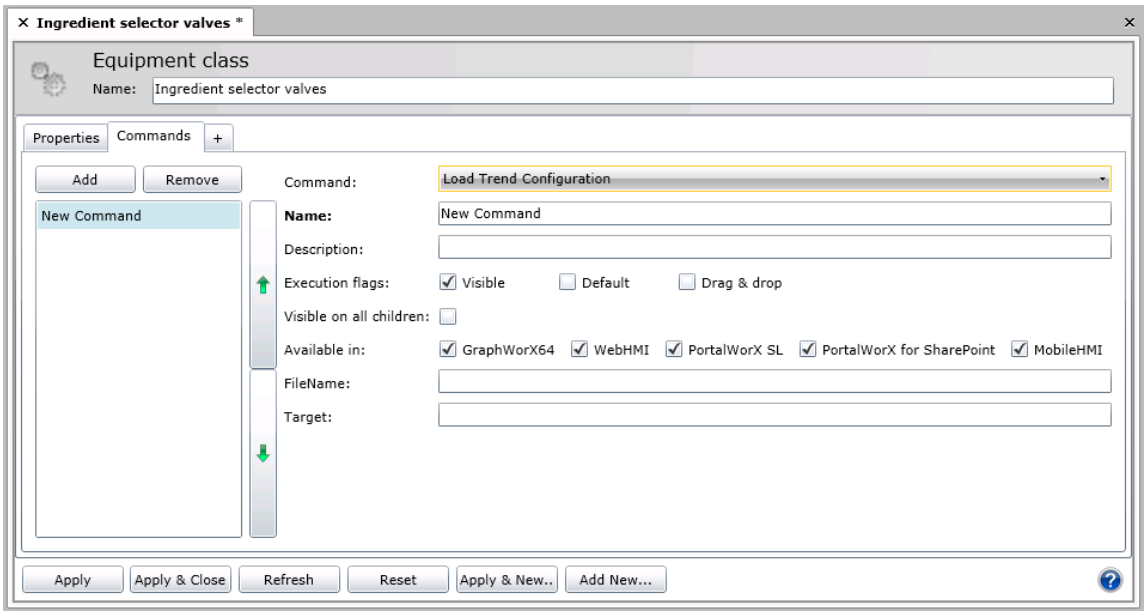

Figure 5.35 - Load Trend Configuration Command

Parameters for the Load Trend Configuration command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **FileName***: The TrendWorX Viewer display file to open when a runtime user selects this menu item. Enter a valid, correct URL path for the TrendWorX64 Viewer Silverlight file (a .twxxs file) to be loaded. For example, the URL for a display file might be: http://MachineName/GENESIS64/WebSites/PubDisplay/Trend1.twxxs
- **Target** - Registered name of the target control.

* If the equipment node was created using an equipment class, and this or other fields contain aliases (that is, variables that are surrounded by /? and ?/), you can replace the aliases with values that are appropriate for this equipment node by instantiating the aliases. For more information, refer to the Instantiating an Equipment Node's Aliases topic.

5.5.1.19. Login Dialog Command

The Login Dialog command will pop up the Security Login Dialog when triggered. Similar to the original Pick Action in GraphWorX64, this command functions similarly in PortalWorX-SL and other client types by allowing access to the dialog via command execution.

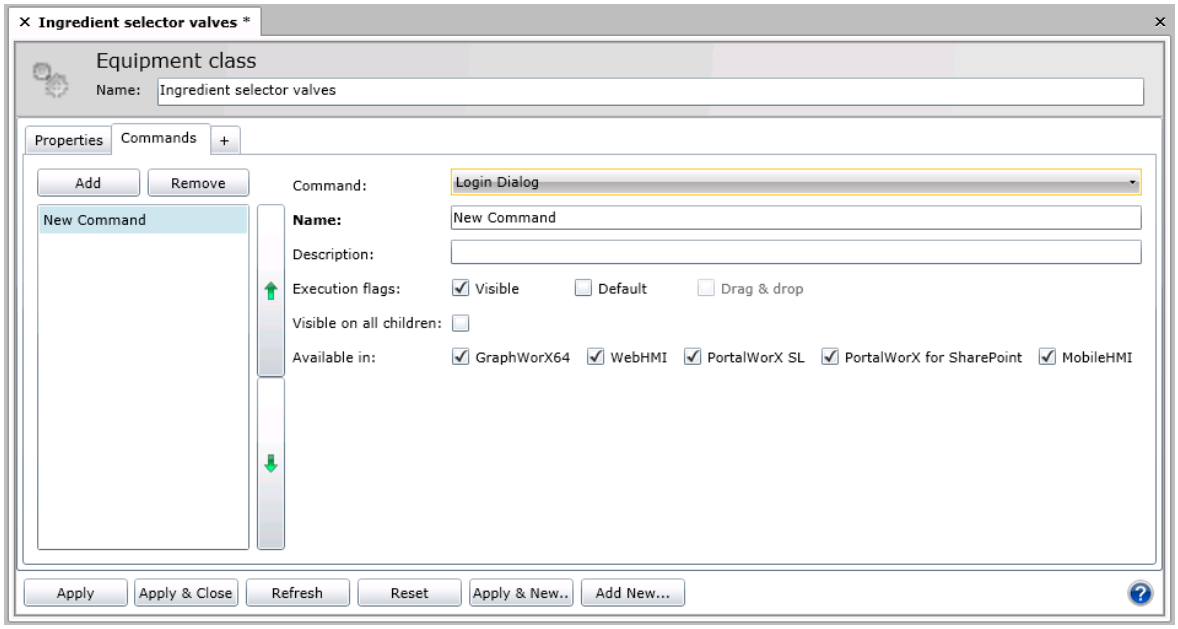

Figure 5.36 - Login Dialog Command

Parameters for the Login Dialog Configuration command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.

5.5.1.20. Navigate Command

The Navigate Command allows users to supplement web navigation buttons with GraphWorX64 buttons or Asset commands to provide alternative navigation schemes. The Steps option allows users to determine how far the navigation goes while the Navigation option allows movement backward and forward. Home, End and Now refer to the TrendWorX64 Freeze mode where they can be used to Navigate the Summary View and manipulate trend data.

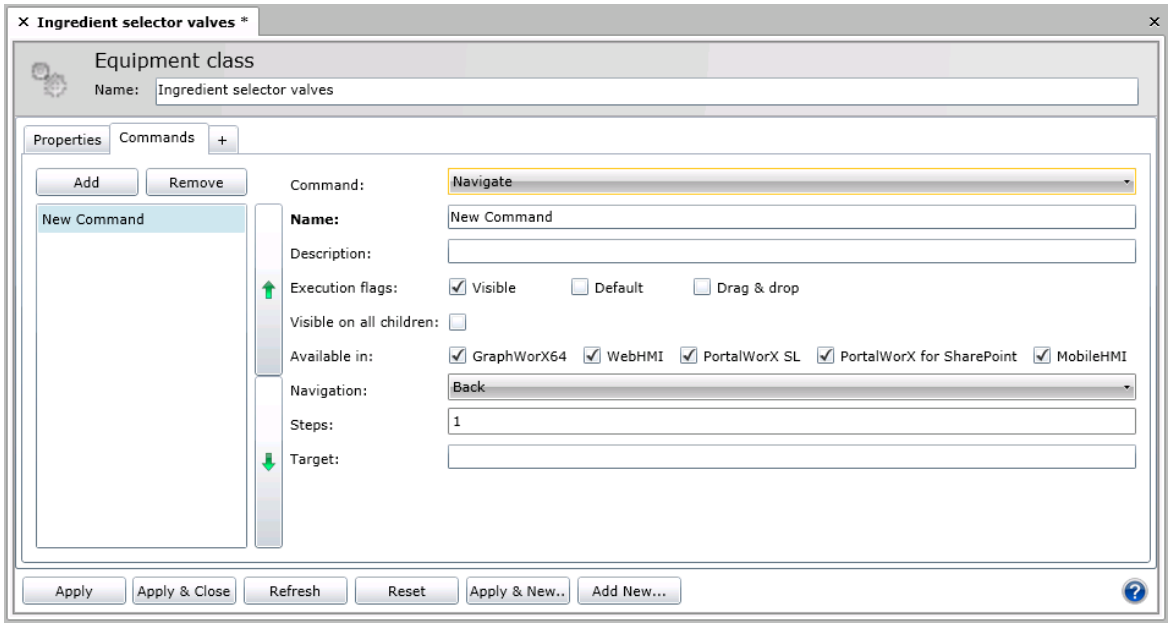

Figure 5.37 - Navigate Command

Parameters for the Navigate command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **Navigation** -Use the pull-down menu to select from Back, Forward, Home, End or Now.
- **Steps** - Enter the number of iterations.
- **Target** - Registered name of the target control.

5.5.1.21. Open URL Command

The Open URL command opens a URL when a runtime user selects the menu option. You can use this command to go to a frequently-used online tool, a corporate Web site, a vendor's page for placing an order, or an interactive page for requesting service.

The prompts you must provide for an Open URL command look like this:

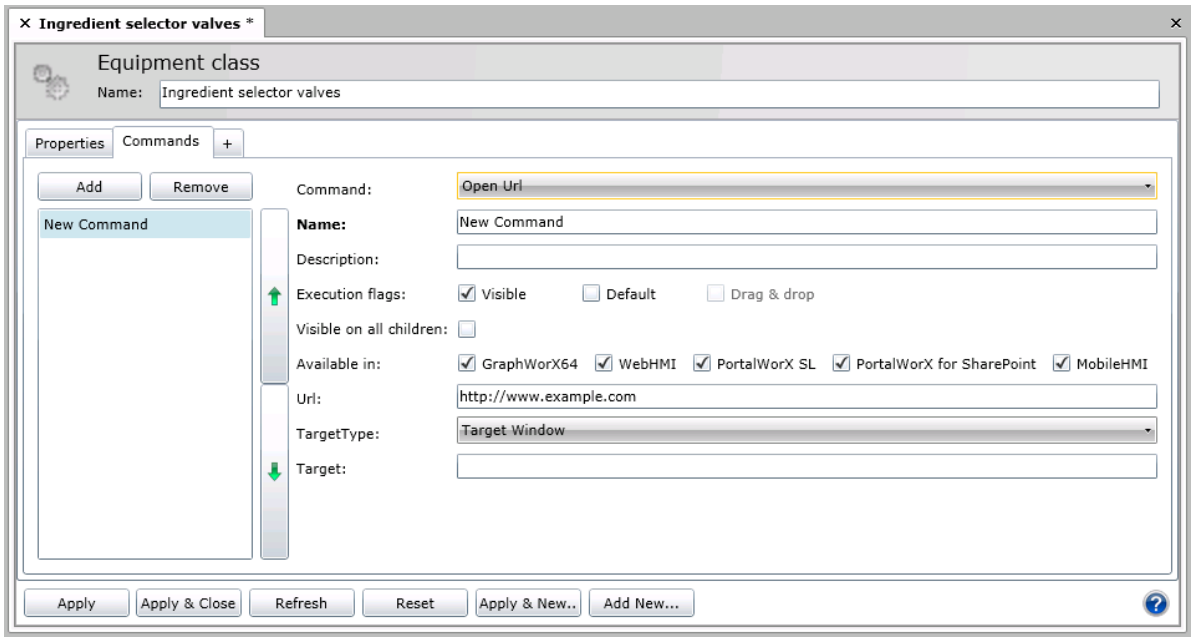

Figure 5.38 - Open URL Command

Parameters for the Open URL command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **URL* -** The URL address to be opened.
- **TargetType* -** Use the pull-down to specify whether the URL is to open in a specific **Target Window** (and then specify the window name in the Target field) or simply a **New Window**.
- **Target* -** If Target Window is selected in the Open In field, type the name of the target window in which the URL is to be opened.

* If the equipment node was created using an equipment class, and this or other fields contain aliases (that is, variables that are surrounded by /? and ?/), you can replace the aliases with values that are appropriate for this equipment node by instantiating the aliases.

5.5.1.22. Phone Call Command

The Phone Call command lets a runtime user make a phone call from a Windows phone (using MobileHMI) to a pager. Refer to the MobileHMI documentation for requirements.

The prompts you must provide for a Phone Call command look like this:

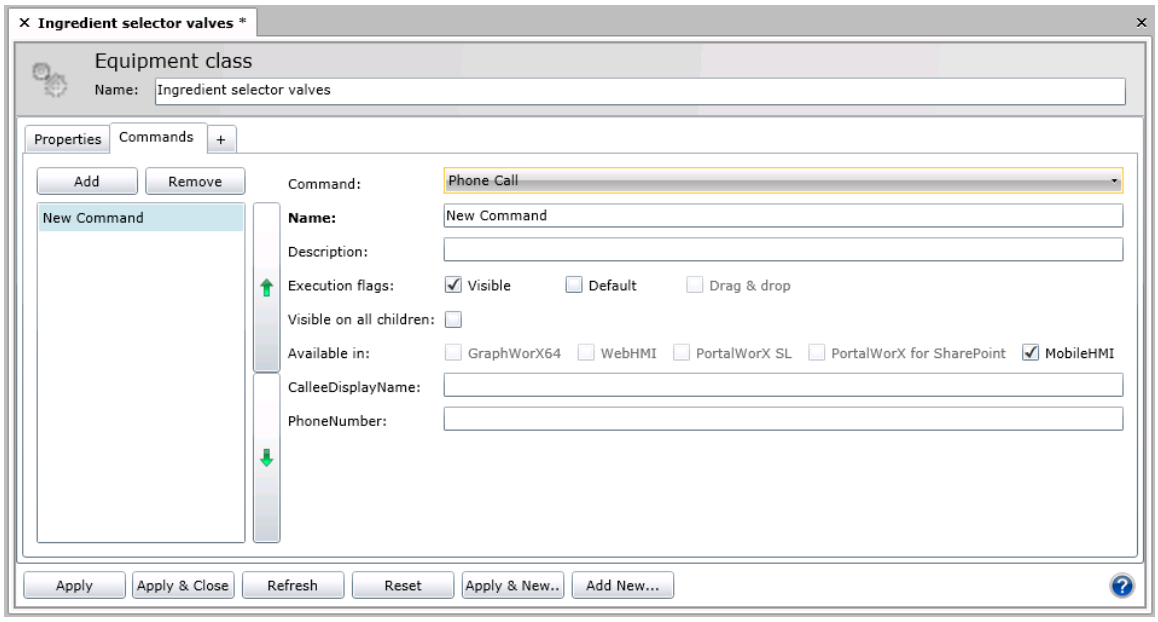

Figure 5.39 - Phone Call Command

Parameters for the Phone Call command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **CallerDisplayName* -** The name of the recipient to display on the phone so that the caller knows who to ask for.
- **PhoneNumber* -** The phone number of the recipient to receive the call. Include the country code if the call will be international. Spaces are allowed, in any format, but don't use punctuation in the phone number.

* If the equipment node was created using an equipment class, and this or other fields contain aliases (that is, variables that are surrounded by /? and ?/), you can replace the aliases with values that are appropriate for this equipment node by instantiating the aliases.

5.5.1.23. Print Command

The Print command allows users to print the current view or entire control in GraphWorX64. An option to use a White Background can be selected. Users should be careful of using white text as it may not show up with this option selected. Targeting can be used to print embedded GraphWorX64 displays.

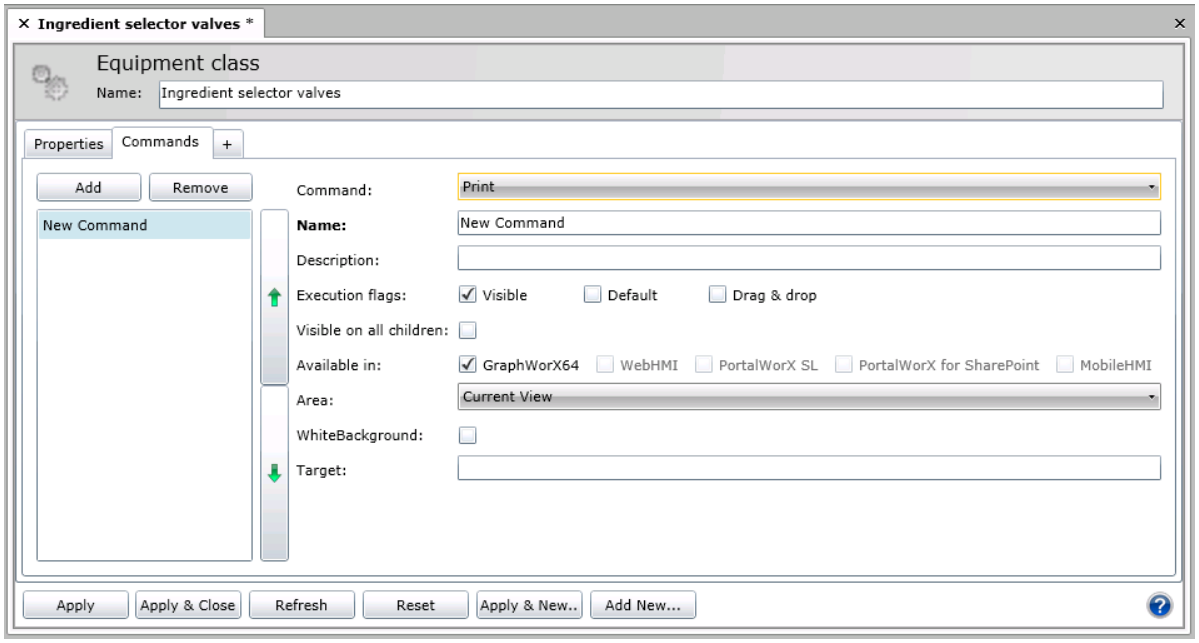

Figure 5.40 - Print Command

Parameters for the Print command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **Area** -Use the pull-down menu to select whether the Entire Control or Current View is to be printed.
- **WhiteBackground** - Click this checkbox to ensure a white background for the printed material.
- **Target** - Registered name of the target control.

5.5.1.24. Run Report Command

The Run Report command executes a report using ICONICS ReportWorX when a runtime user selects the menu option. Reports often require parameters like a start and end time or date. These parameters can be entered in the Web interface normally, but when using commands must be pre-populated. Dynamic data sources like Unified Data Manager Registers or GraphWorX64 Local Simulations can be used to store this data temporarily if users are prompted to enter it elsewhere in order to run the report. Each report is different, but using string concatenation in GraphWorX64 can allow the parameters to be generated from user input.

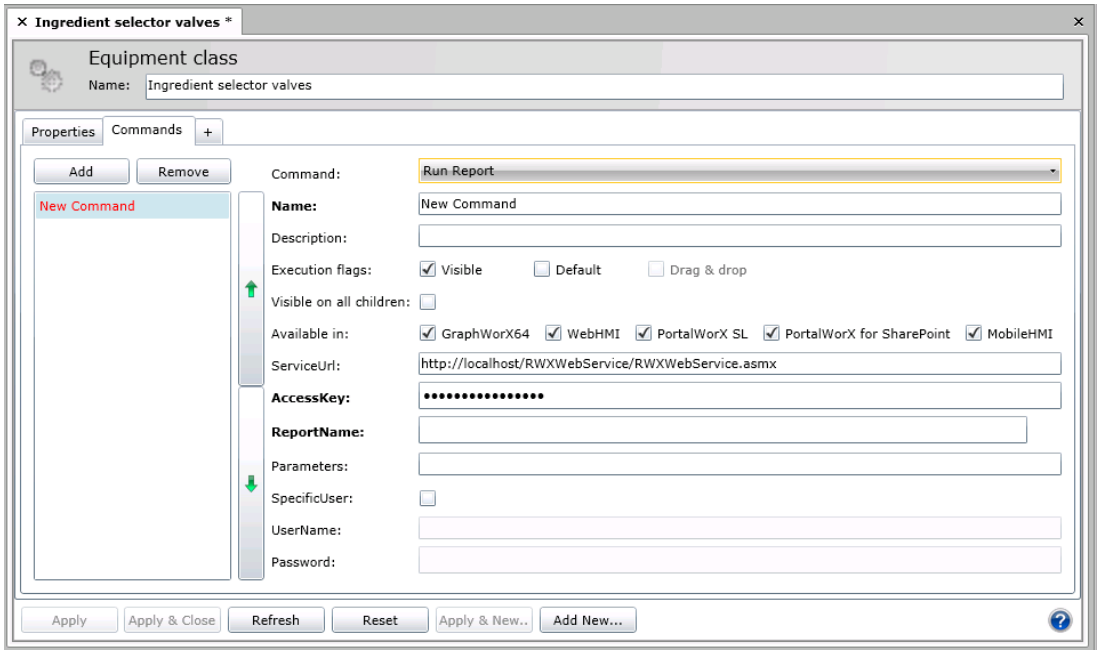

Figure 5.41 - Run Report Command

Parameters for the Run Report command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **ServerUrl* -** Enter the URL where the report to execute resides.
- **AccessKey** - Enter the password needed to access the service.
- **Report Name* -** Specify the report to be executed. After you have chosen a server, click the ellipsis button [...] to select the report to execute. In the Choose a Report dialog box that opens, select the report and click OK.

- **Parameters*** - Reports often require parameters like a start and end time or date. These parameters can be entered in the Web interface normally, but when using commands must be pre-populated.
  Dynamic data sources like Unified Data Manager Registers or GraphWorX64 Local Simulations can be used to store this data temporarily if users are prompted to enter it elsewhere in order to run the report. Each report is different, but using string concatenation in GraphWorX64 can allow the parameters to be generated from user input.
- **UseNamePassword** - Click this checkbox to use a different user name and password, which can be entered in the following text entry fields.
- **SpecificUser** - Selecting 'Specific User' will allow the command to run under different credentials than the logged in user triggering the command. This is useful when the credentials are different on a ReportWorX Server, but the reporting functionality is available to the operator. Alternatively, this command can be hidden, based on Security, to further limit the number of operators eligible to run reports without having to create multiple commands.
- **User**: If the Identity is This User, specify the ID for gaining access to the server. The ID is case sensitive.
- **Password**: If the Identity is This User, specify the password for gaining access to the server. Passwords are case sensitive.

* If the equipment node was created using an equipment class, and this or other fields contain aliases (that is, variables that are surrounded by /? and ?/), you can replace the aliases with values that are appropriate for this equipment node by instantiating the aliases.

5.5.1.25. Run Transaction Command

The Run Transaction command executes an ICONICS BridgeWorX transaction when a runtime user selects the menu option. For example, if you use BridgeWorX to populate a database table for us in reports, you can use this command to launch that service.

For more information about BridgeWorX, please refer to the BridgeWorX documentation on the ICONICS BizViz product CD.

The prompts you must provide for a Run Transaction command look like this:

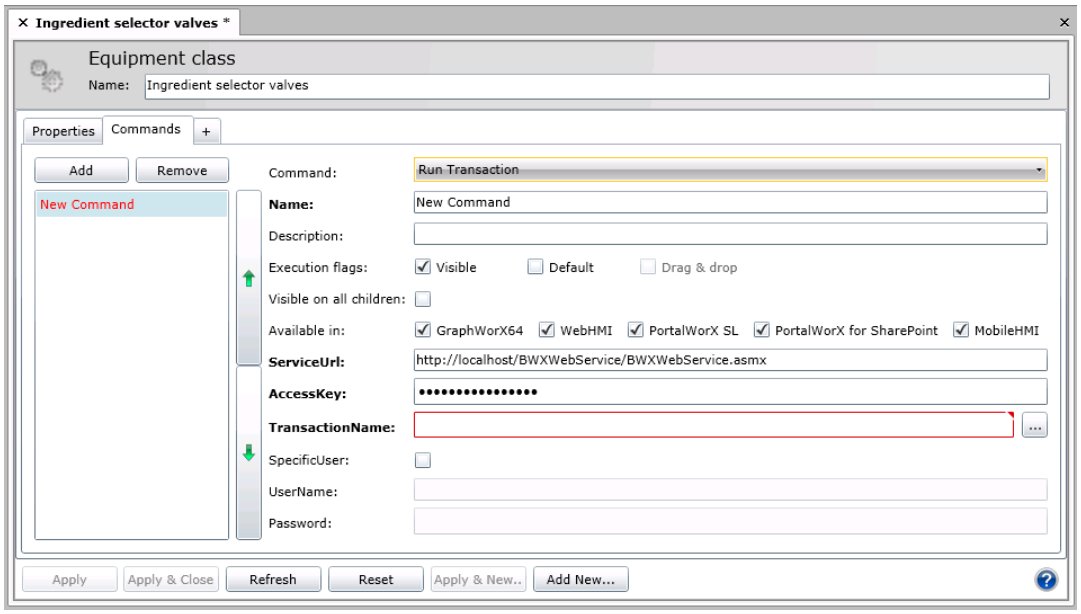

Figure 5.42 - Run Transaction Command

Parameters for the Run Transaction command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **Service URL* -** The URL address of the BridgeWorX Web Service.
- **Access Key -** The password needed to access the BridgeWorX Web Service.
- **Transaction Name* -** Click the ellipsis button [...] to select the transaction to be activated when a runtime user clicks this command. In the Transaction Name dialog box that opens, refresh the list by the clicking the Get Transactions button. Then select the transaction and click OK.

- **SpecificUser** - Selecting Specific User will allow the command to run under different credentials than the logged in user triggering the command. This is useful when the credentials are different on a BridgeWorX Server, but the transaction functionality is available to the operator.
  Alternatively, this command can be hidden, based on Security, to further limit the number of operators eligible to run transactions without having to create multiple commands.
- **UserName**: If the Identity is This User, specify the ID for gaining access to the BridgeWorX server. The ID is case sensitive.
- **Password**: If the Identity is This User, specify the password for gaining access to the BridgeWorX server. Passwords are case sensitive.

* If the equipment node was created using an equipment class, and this or other fields contain aliases (that is, variables that are surrounded by /? and ?/), you can replace the aliases with values that are appropriate for this equipment node by instantiating the aliases. For more information, refer to the Instantiating an Equipment Node's Aliases topic.

5.5.1.26. Save Configuration Command

The Save Configuration Command can be used for any of the .NET Controls (e.g., AlarmWorX64 AWXX and AWXXS files). The file type used to save the configuration is entered at the end of the file path and name in the FileName field. Select the Overwrite checkbox to allow for changing the configuration of an existing one when saving.

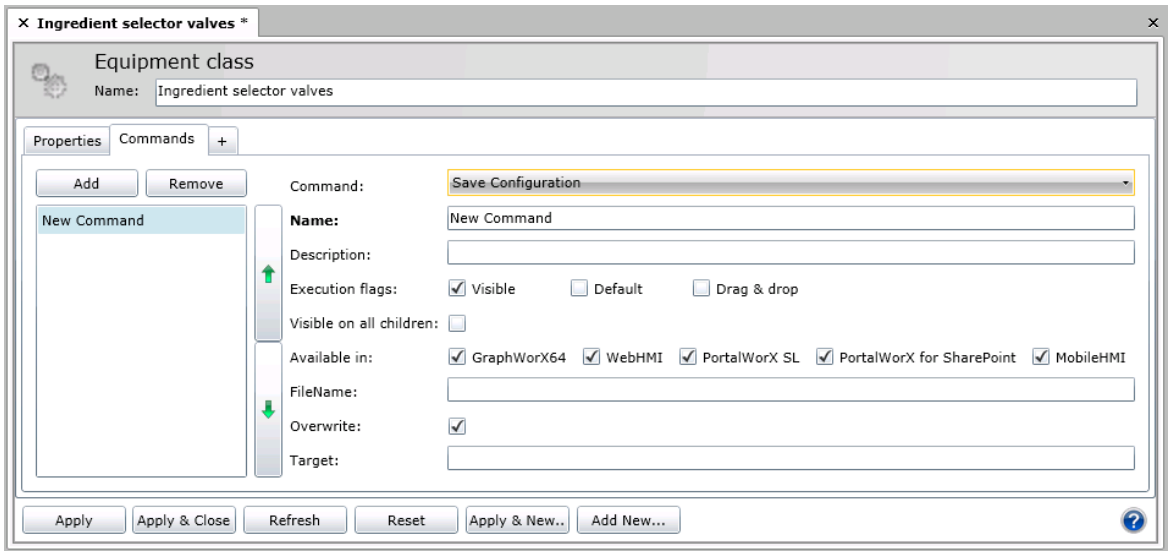

Figure 5.43 - Save Configuration Command

Parameters for the Save Configuration command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **FileName** - Enter the URL or file name here.
- **Overwrite** - Click this checkbox to allow any existing file with the same file name to be overwritten.
- **Target** - Registered name of the target control.

5.5.1.27. Select Asset Command

The Select Asset Command allows users to do a few things. First, it can target the Asset Navigator and tell the control to select an asset (more commonly triggered from GraphWorX64). Second, it can target TrendWorX64 Viewers to parse the asset's equipment properties to trend the values. No configuration is necessary for the points, as they will automatically be added as pens to the targeted viewer. Finally, the Select Asset command can allow users to dynamically switch Pivot Pages in GraphWorX64 by using the "tab" option dropdown and typing in the name of the Pivot Page (or index of the page).

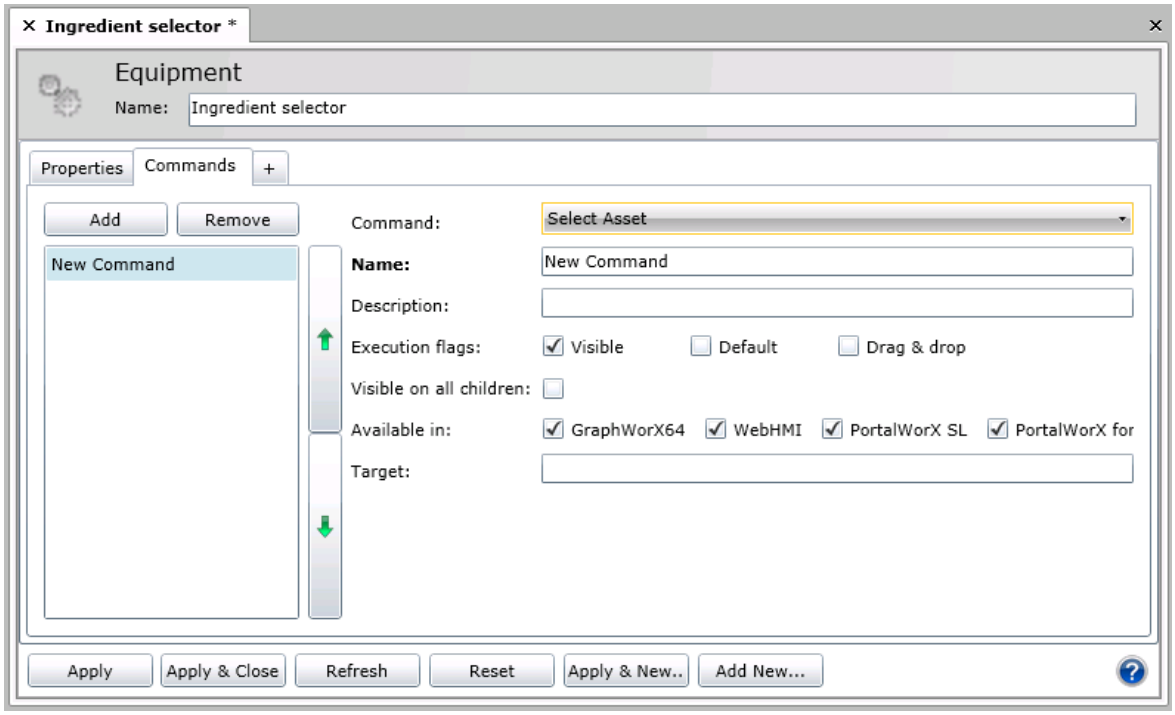

Figure 5.44 - Select Asset Command

Parameters for the Select Asset command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **Target** - Registered name of the target control.

5.5.1.28. Select Element Command

The Select Element Command allows users to provide secondary navigation for tabs, views, rows or objects separate from what is available in the .NET Viewers. Each Element must be named uniquely for Select Element to find them (this is enforced by GraphWorX64 and PortalWorX-SL already).

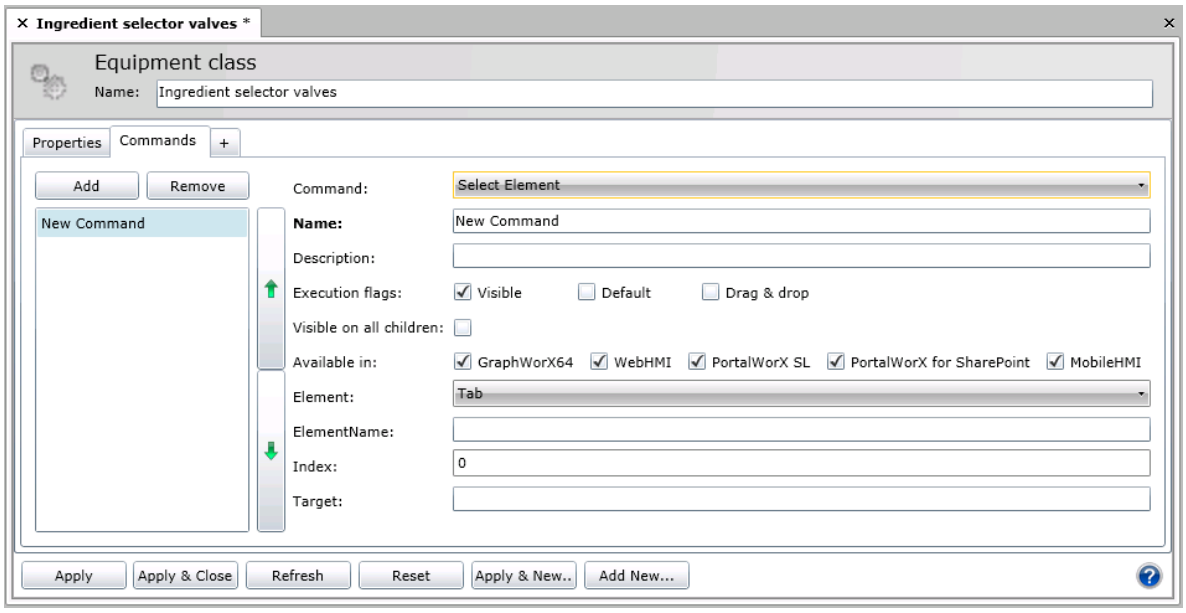

Figure 5.45 - Select Element Command

Parameters for the Select Asset command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **Element Type** - Use the pulldown menu to select from Tab, View, Row or Object.
- **ElementName** - The Element Name refers to the selection of what Element Type is desired. Enter the name of the Tab, View, Row or Object.
- **Index** -Valid if empty.
- **Target** - Registered name of the target control.

5.5.1.29. Send Mail Command

The Send Mail command lets runtime users send an e-mail from a Windows phone (using MobileHMI). Refer to the MobileHMI documentation for requirements.

The prompts you must provide for a Send Mail command look like this:

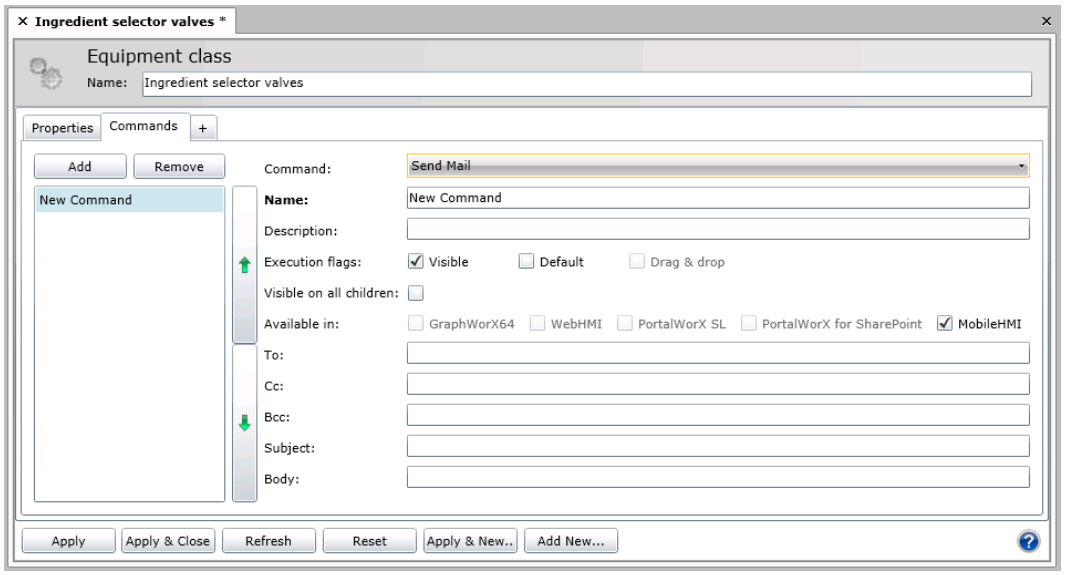

Figure 5.46 - Send Mail Command

Parameters for the Send Mail command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **To***: The e-mail address(es) to receive the e-mail. Separate multiple e-mail addresses with a semi-colon (;), for example: DeptHead@GovernmentAgency.com; Auditor@CPAFirm.com
- **Cc***: The e-mail address(es) to receive the e-mail as a CC'ed recipient. Separate multiple e-mail addresses with a semi-colon (;).
- **Bcc*** - The e-mail address(es) to receive the e-mail as a blind CC'ed recipient. Separate multiple e-mail addresses with a semi-colon (;).
- **Subject***: The text to appear in the Subject line of the e-mail by default. This text can be edited by the sender.
- **Body***: The text to appear in the body of the e-mail by default. This text can be edited by the sender.

* If the equipment node was created using an equipment class, and this or other fields contain aliases (that is, variables that are surrounded by /? and ?/), you can replace the aliases with values that are appropriate for this equipment node by instantiating the aliases.

5.5.1.30. Send SMS Command

The Send SMS command lets the runtime user send a message from a Windows phone (using MobileHMI) to a pager. Refer to the MobileHMI documentation for requirements.

The prompts you must provide for a Send SMS command look like this:

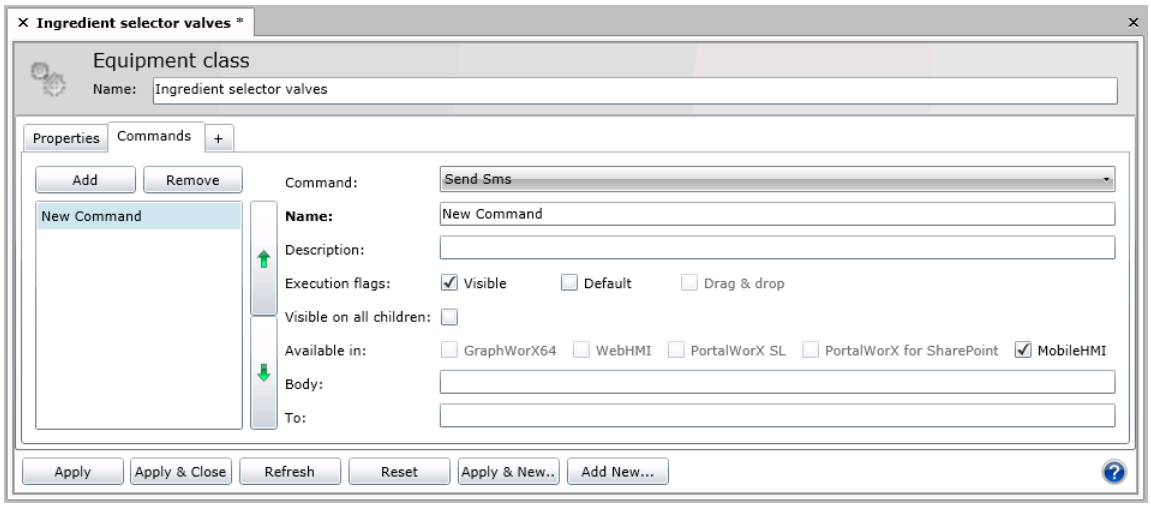

Figure 5.47 - Send SMS Command

Parameters for the Send SMS command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **Body***: The default text of the message to be sent when the sender uses this menu command. This text can be edited by the person sending the page.
- **To***: The phone number of the pager to which the message will be sent. Include the country code if the call will be international. Spaces are allowed, in any format, but don't use punctuation in the phone number.

* If the equipment node was created using an equipment class, and this or other fields contain aliases (that is, variables that are surrounded by /? and ?/), you can replace the aliases with values that are appropriate for this equipment node by instantiating the aliases.

5.5.1.31. Set Filter Command

The Set Filter Command is most commonly used with AlarmWorX64 Viewers to apply or remove filters from Viewers dynamically, but can also be applied to GridWorX Viewers, allowing users to configure a filter name or create a new filter (specifying a new previously unused filter name) based on the Filter Name and Expression. The Filters are Server Side for Historical Alarms and Client Side for Real Time Alarms.

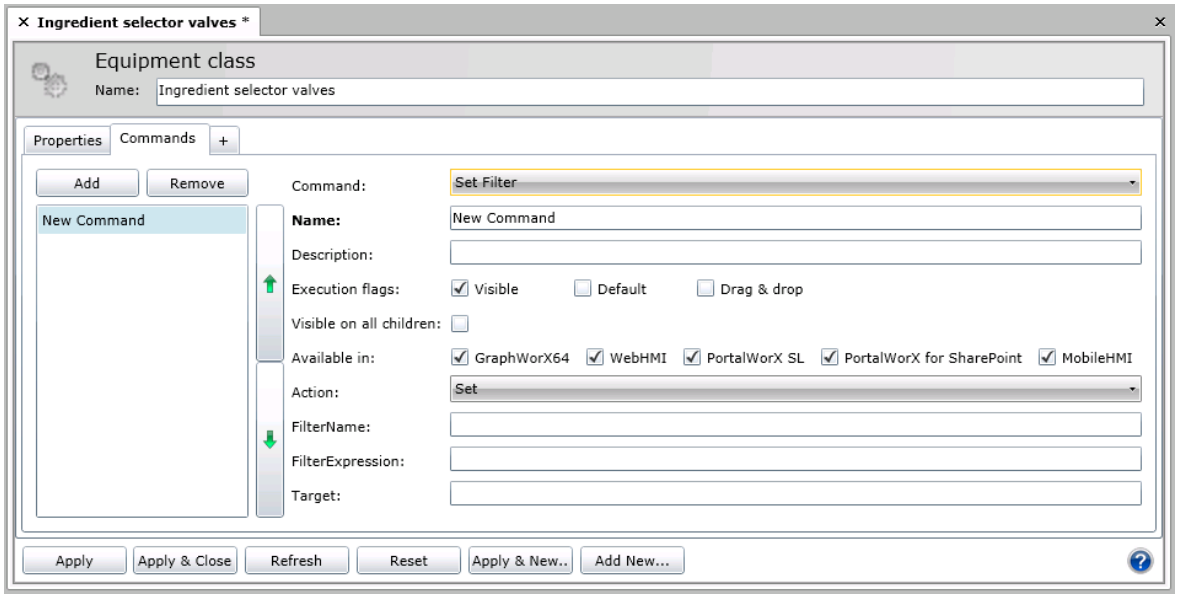

Figure 5.48 - Set Filter Command

Parameters for the Set Filter command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **Action** - Set or Unset can be selected to allow users to apply or remove a configured Filter.
- **Filter Name** - The name of the filter to execute the action on. This should match configured filters in the AlarmWorX64 Viewer for example.

- **Filter Expression** - Similar to the option available in the Filter creation dialog, the filter Expression can be a complex combination of dynamic and static values. To better understand and easily build an expression try using the dialog and click the Expression Editor button on the right of the Expression option in the Filter dialog to create a sample.
- **Target** - Registered name of the target control.

5.5.1.32. Set Freeze Mode Command

The Set Freeze Mode command, used with TrendWorX64, can toggle the Freeze Mode in a TrendWorX64 Viewer.

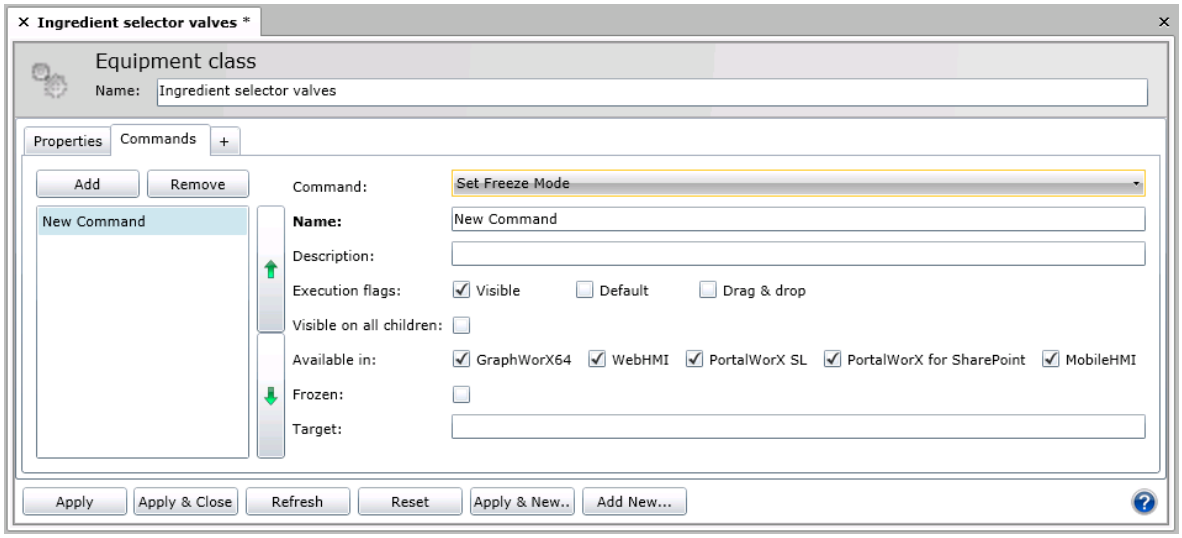

Figure 5.49 - Set Freeze Mode Command

Parameters for the Set Freeze Mode command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **Frozen** - Use this option to freeze or unfreeze the TrendWorX64 Viewer.
- **Target** - Registered name of the target control.

5.5.1.33. Set Global Aliases Command

The Set Global Aliases command sets a global alias theme when a runtime user selects the menu option. This is helpful for runtime users who must review GENESIS64 displays or reports for different locations for which unique global aliases are set.

The prompts you must provide for a Set Global Aliases command look like this:

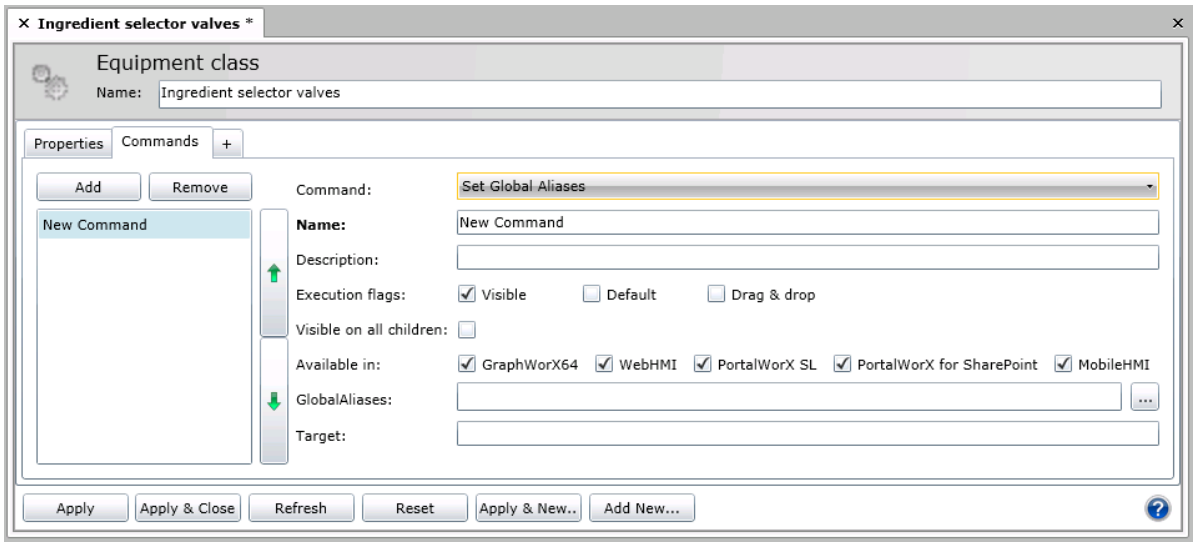

Figure 5.50 - Set Global Aliases Command

Parameters for the Set Global Aliases command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **Global Aliases***: The global alias settings to be used. Click the ellipsis button [...] to select the theme and global aliases.
- **Target** - Registered name of the target control.

* If the equipment node was created using an equipment class, and this or other fields contain aliases (that is, variables that are surrounded by /? and ?/), you can replace the aliases with values that are appropriate for this equipment node by instantiating the aliases. For more information, refer to the Instantiating an Equipment Node's Aliases topic.

5.5.1.34. Set Language Command

The Set Language command allows operators to trigger a change in language by entering in the Culture name listed in the Language Aliasing Engine. This name must match the Language Aliasing Configuration on the server in order to trigger the change. Any asset or GraphWorX64 button can be used to trigger the change.

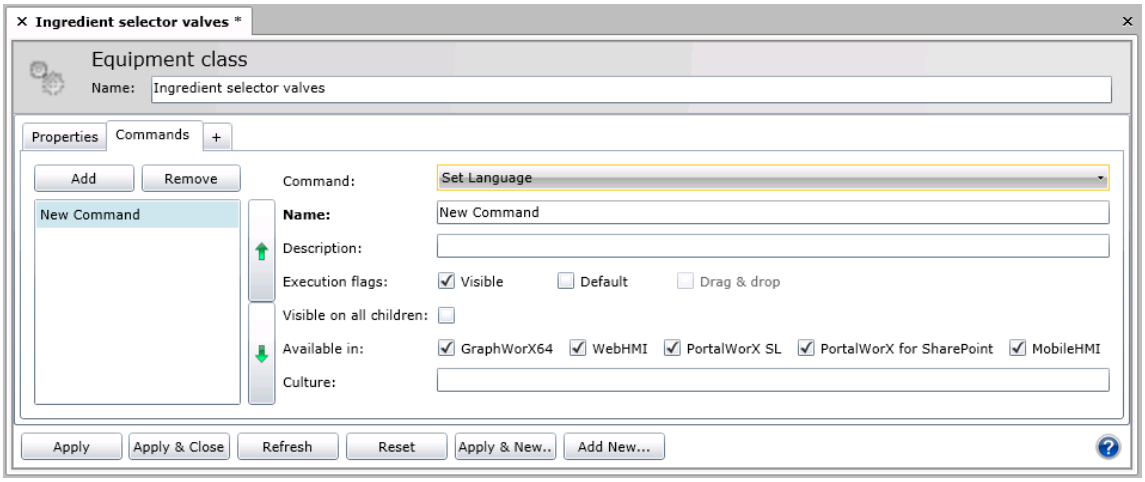

Figure 5.51 - Set Language Command

Parameters for the Set Global Aliases command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **Culture** - Enter the language (culture) here.

5.5.1.35. Set Period Command

The Set Period command, used with TrendWorX64, allows the Period to be changed from AssetWorX Assets and GraphWorX64 Pick Actions. Targeting a viewer (or enabling Drag & Drop) will allow operators to use an alternative method to changing the Period (existing methods are the Trend Period Toolbar in the TrendWorX64 Viewer and the GraphWorX64 Contextual Ribbon menu).

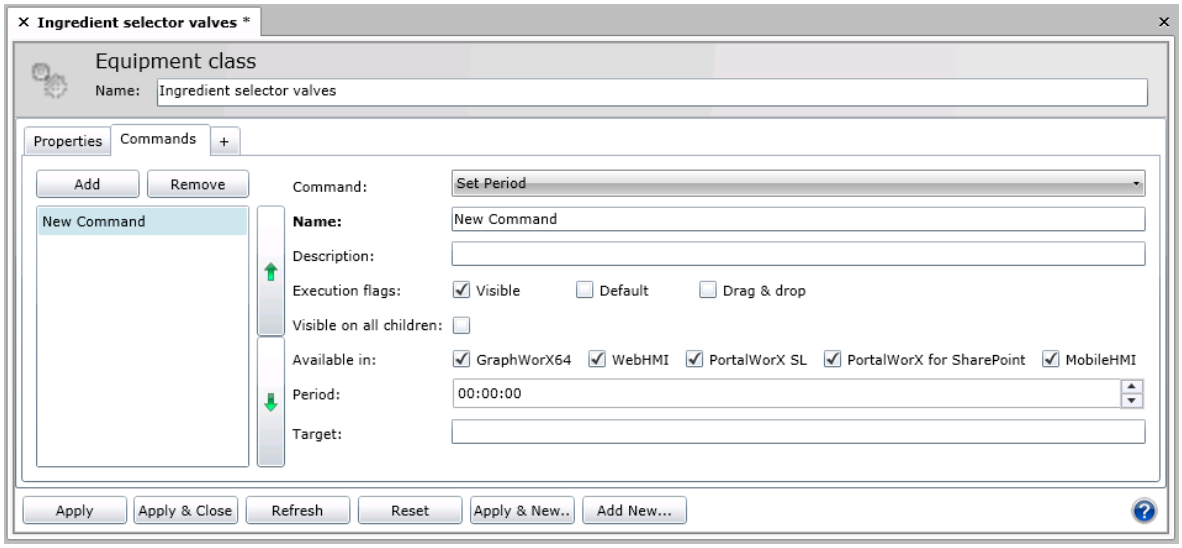

Figure 5.52 - Set Period Command

Parameters for the Set Period command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **Period** - Enter in the desired time period to view in the TrendWorX64 Viewer.
- **Target** - Registered name of the target control.

5.5.1.36. Set Time Range Command

The Set Time Range command, used with TrendWorX64, allows the time range to be changed from AssetWorX Assets and GraphWorX64 Pick Actions. Targeting a viewer (or enabling Drag & Drop) will allow operators to use an alternative method to changing the Time Range (existing methods are the options available in the GraphWorX64 Contextual Ribbon menu).

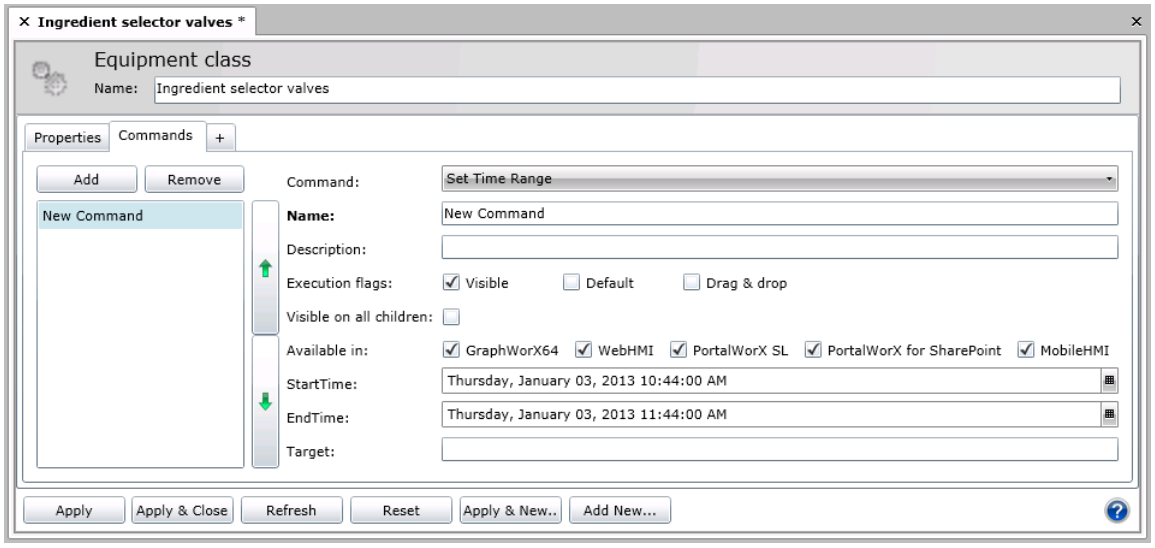

Figure 5.53 - Set Time Range Command

Parameters for the Set Time Range command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **Start Time** - Enter in the desired Start Time to the Time Range.
- **End Time** - Enter in the desired End Time to the Time Range.
- **Target** - Registered name of the target control.

5.5.1.37. Set Visibility Command

The Set Visibility command is a flexible command used to target GraphWorX64 Objects (Visual ObjectType), TrendWorX64 Pens (Pen ObjectType), and any grid-based layout like AlarmWorX64 and GridWorX (Column ObjectType). The command will allow operators to Show, Hide or Toggle the visibility of any one of these object types by issuing the command from an AssetWorX asset or GraphWorX64 Pick Action.

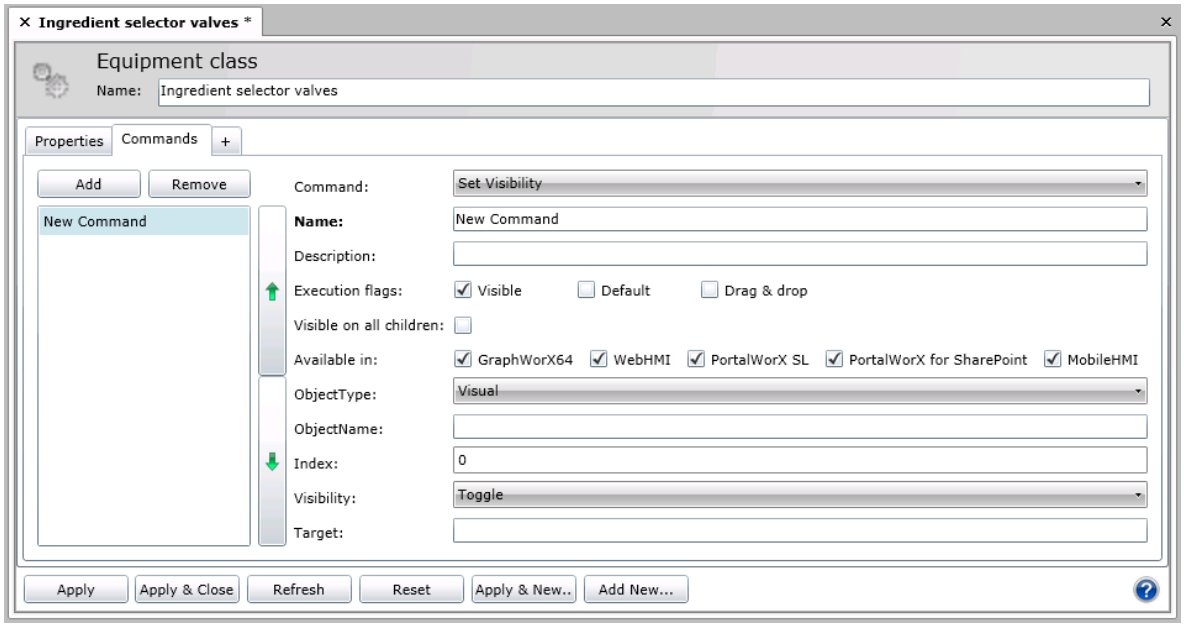

Figure 5.54 - Set Visibility Command

Parameters for the Set Visibility command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **ObjectType** -Use the pull-down menu to select from Visual, Pen or Column.
- **ObjectName** - The name of the Object, Pen or Column to Show, Hide or Toggle the visibility of.
- **Index** -Valid if empty.
- **Visibility** - Use the pull-down menu to select from Show, Hide or Toggle.
- **Target** - Registered name of the target control.

5.5.1.38. Sort Command

The Sort Command, used to target AlarmWorX64 or GridWorX Viewers, will allow pre-configured or dynamic sorting of data grids using the parameters offered. Sorting can encompass one or more levels by using the Add Action or be removed entirely using the Reset Action.

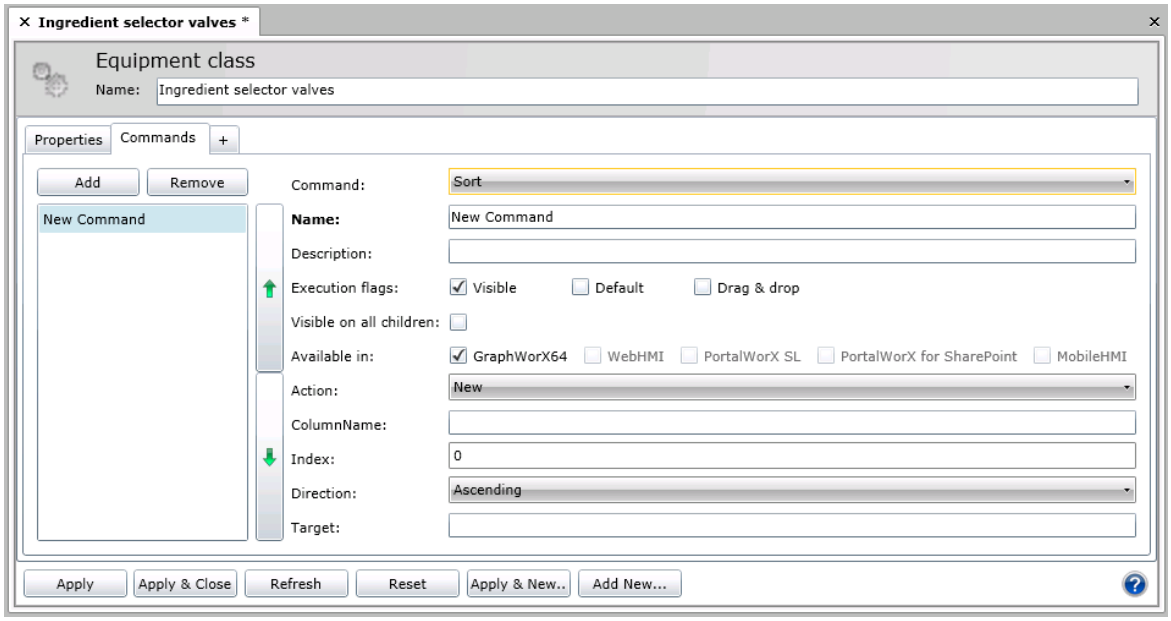

Figure 5.55 - Sort Command

Parameters for the Sort command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **Action -** Choosing between New, Add or Reset users can create a new sort order, add a level of sorting or remove the current sort order.
- **ColumnName** - The name of the Column to sort. This can be seen in the header of each data grid or this can be a dynamic value by using the […] to select a value.
- **Index** -Valid if empty.
- **Direction** - Use the pull-down to select from either Ascending or Descending.
- **Target** - Registered name of the target control.

5.5.1.39. Switch Layout Command

The Switch Layout Command, used with PortalWorX-SL, will take a new Layout Name that is already configured and apply it to the current window. Multiple commands can be used in tandem to allow dynamic switching between more than two layouts.

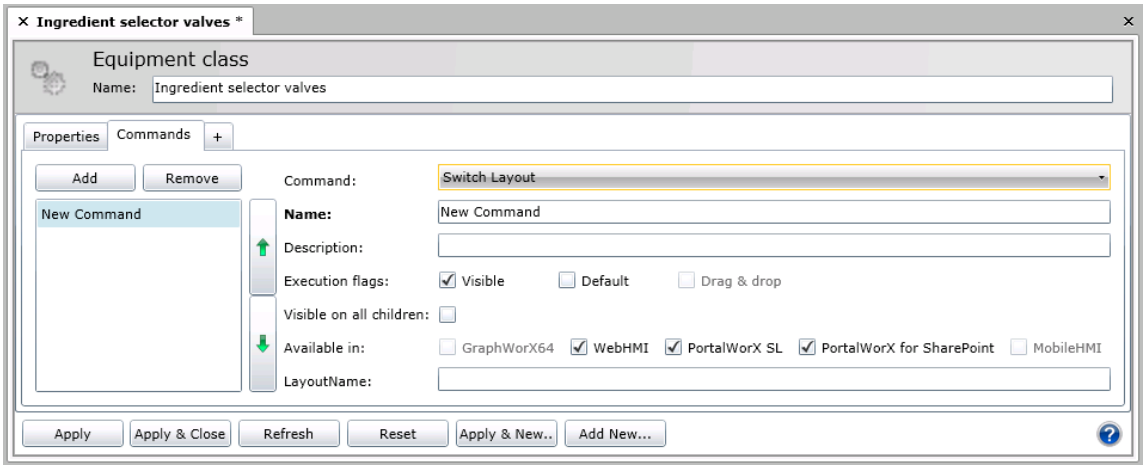

Figure 5.56 - Switch Layout Command

Parameters for the Switch Layout command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **'Available in' prompts** are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **LayoutName -** The name of the layout to switch to.

5.5.1.40. Write Value Command

The Write Value command writes a value to another tag, a global alias, a language alias, or a conversion value, when a runtime user selects the menu option. For example, you might use this command to give runtime users the ability to switch a machine "off" or to set a thermostat to a specified temperature. The prompts you must provide for a Write Value command look like this:

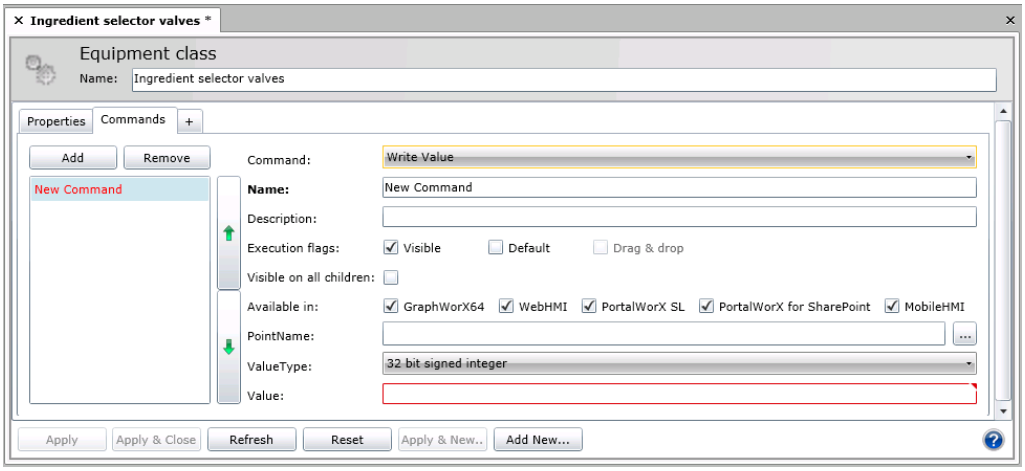

Figure 5.57 - Write Value Command

Parameters for the Write Value command are:

- The **Command, Name**, **Description***, **Execution Flags**, **Visible on all children**, and **Programs** prompts are described in the previous Commands Tab for Equipment Classes and Equipment section.
- **Point Name***: The path of the OPC tag point to be written to. Click the ellipsis button [...] to open the Data Browser, the navigate to the OPC tag, global alias, language alias, or conversion value to be written to.
- **Value Type**: The value type of the data point to be written to. Your choices are:
  - Void
  - String
  - 8-, 16-, 32- or 64-bit integer (signed or unsigned)
  - 32- or 64-bit floating point number (single or double precision)
  - Boolean value
- **Value***: The value to be written to the data point when the user clicks this menu option. Make sure the value type is suitable for the value in this field.

* If the equipment node was created using an equipment class, and this or other fields contain aliases (that is, variables that are surrounded by /? and ?/), you can replace the aliases with values that are appropriate for this equipment node by instantiating the aliases. For more information, refer to the Instantiating an Equipment Node's Aliases topic.

5.6. Commanding Matrix

The following Commanding Matrix will help you in determining which Commands are available, which targets are applicable and the associated Parameters.

Command	Targets									Parameters
	GWX64 / 3D View	TWX64	AWX64	GDX64	EWX64	RWX64	EA	FA	AN	
SendSms (Phone)										Body, Recipients
PhoneCall (Phone)										ContactName, PhoneNumber
SendMail (Phone)										Recipients, CarbonCopy, Subject, Body
OpenUrl										URL, TargetType, Target
SetLanguage										Culture
LoginDialog										
CallMethod										MethodName, Parameters
SwitchLayer (SL)										Layout (PWX-SL only!)
RunReport										ServiceUrl, AccessKey, ReportName, Parameters, Specific User, UserName, Password
RunTransaction										ServiceUrl, AccessKey, TransactionName, Parameters, Specific User, UserName, Password
WriteValue										PointName, ValueType, Value
LoadGwxDisplay	x									FileName, GlobalAliases, LocalAliases
LoadAwxConfiguration			x							FileName
LoadTwxConfiguration		x								FileName
LoadGdxConfiguration				x						FileName
LoadReport						x				Server, ReportName, Parameters, GlobalAliases
LoadExecutedReport						x				Server, FolderName
LoadEnergyAnalytix							x			Asset (not in AssetWorX), ConfigurationName, StartTime, EndTime
LoadFacilityAnalytix								x		Asset (not in AssetWorX), ConfigurationName, StartTime, EndTime
CustomCommand	**will target 3rd party control that implements our commanding interface**									Parameters
SetGlobalAlias	x									GlobalAliases
SetVisibility	x	x	x	x			x	x		ObjectType {Object, Pen, Column}, ObjectName, Index, Visibility {Show, Hide, Toggle}
Navigate	x	x	x	x			x	x		Navigation {Back, Forward, Home, End, Now}, Steps(1)
SelectAsset							x	x	x	Asset (not in AssetWorX)
SetTimeRange		x	x				x	x		StartTime, EndTime
SetPeriod		x								Period
SelectElement	x	x	x	x			x	x		Element {Tab, View, Row, Object}, ElementName, Index
CreatePen		x								PenName, PointName, Description, Parameters
DeletePen		x								PenName, Index
SetFilter			x	x						Action {Set, Reset}, FilterName, FilterExpression
Acknowledge			x							Alarm, Acknowledge, LowSeverity, HighSeverity, VisibleOnly, Compatison, Field, Comment
GoToLocation					x					Latitude, Longitude, Unit {Percentage, Scale, Level}, Zoom

Command	Targets									Parameters (Issuses)
	GWX64 / 3D View	TWX64	AWX64	GDX64	EWX64	RWX64	EA	FA	AN	
SetFreezeMode		x								Frozen
Print (WPF)	x									Area, WhiteBackground
ExportImage (WPF)	x						x	x		FileName, Area, Unit {Percentage, Scale, Level}, Zoom
SaveConfiguration		x	x	x			x	x		FileName, Overwrite
ExportStatistic		x								ReportName
Group (WPF)			x	x						Action {New, Add, Reset}, ItemName, Index
Sort (WPF)			x	x						Action {New, Add, Reset}, ColumnName, Index, Direction {Ascending, Descending}
Expand/Collapse			x	x					x	ExpandCollapse {Expand, Collapse, ExpandAll, CollapseAll}, ItemName, Index

Lab: Commanding L5

5.1. Lab Overview

GENESIS32 users have found Pick Action dynamics to be a very useful feature for many years. In AssetWorX (in ICONICS' GENESIS64 and AnalytiX products), we have similar functionality in what ICONICS calls 'Commanding'. In the preceding lecture, we listed the Commands that are available through AssetWorX. In this lab, we will apply some of these commands to assets. Here we go.

Estimated time to complete this lab: 30 minutes

5.1.1. Task Checklist

In this lab, you will complete the following tasks:

- Adding of commands to various assets.

5.1.2. Support Files

You do not need any support files to complete this lab.

5.2. Applying Commands to Assets

We have built the asset tree, now we will apply commands to assets. We will be using commands to Load Graphics Displays, Set Global Aliases, Write Values to tags defined by Equipment Properties, and Switch Layout. Let's get started.

5.2.1. Load Graphics Display Command

You may recall, in a previous lab, we added the load graphics display command to the **/?Tank?/** equipment class. With this approach, each time a new asset was created and instantiated the asset inherits the properties, including the commands, assigned to the equipment class.

Note: As a refresher, select any one of the three Tank assets. Click on the Command sub tab and review the properties. They should resemble the following figure.

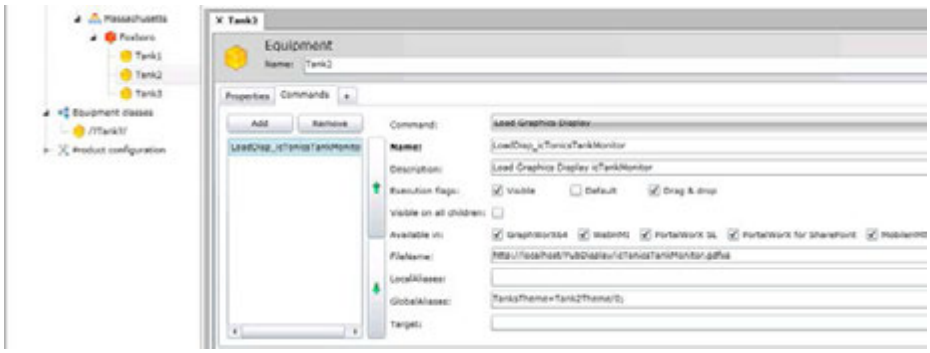

Figure L5.1 – Tank Asset with Load Graphics Display Command

5.2.2. Switch Layout Command

In one of the previous labs we created the icTonics Layout. In the following steps we will apply the switch layout command to the USA asset.

1. Launch the Workbench-SL by selecting **Start → All Programs → ICONICS → Workbench-SL**.

2. Select the **AssetWorX** provider and expand the **icTonics** tree. Your configuration should resemble the figure below.

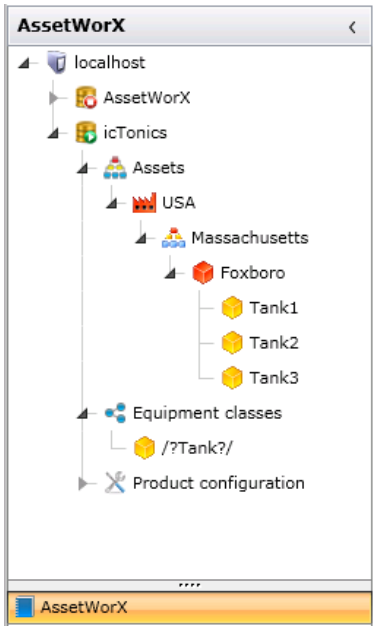

Figure L5.2 – Selecting the USA Asset for Editing

3. Click on the **USA** asset.
4. This creates a new tab and opens the **USA** asset for editing.
5. With the **USA** tab selected, click on the **Commands** sub tab.
6. Click on the **Add** button.
7. From the **Command Dropdown**, select the **Switch Layout** command.
8. Fill in the fields as described in the bullets below.
    - **Name:** icTonics Layout
    - **LayoutName:** icTonics Layout
    - **Default:** Check this checkbox
9. Click **Apply**.
10. Your finished configuration should resemble the figure below.

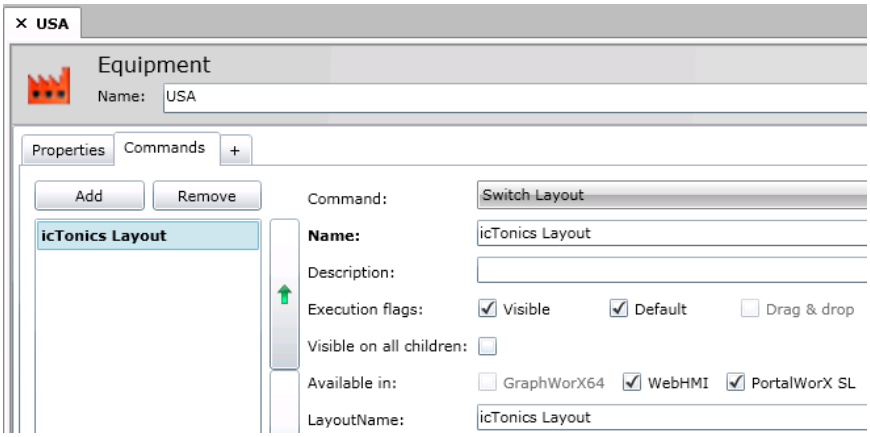

Figure L5.3 – Completed Switch Layout Command Dialog

5.2.3. Write Value Command

On weekends, we would like to set all the tank levels to a predefined level. With this, the tank operation always starts the week from the same level. We will set each tank's LevelSetPoint through a combination of a Unified Data Manager Group and the Write Value command. Here we go.

+ Add Equipment

1. Launch the Workbench-SL by selecting **Start → All Programs → ICONICS → Workbench-SL**.
2. From the **Project Explorer** on the left, select the **AssetWorX** provider.
3. Expand the **icTonics** database to expose the **Assets** tree node.
4. Right click on the **Assets** tree node and select **+ Add Equipment** with the following properties.
   - **Name:** GrpSetPt
   - **Icon:** Process Cell
   - **Description:** icTonics Weekend SetPoints
5. Click **Apply**.

+ Add Equipment Property

1. Right Click on the **GrpSetPt** tree node and select **+ Add Equipment property** with the following properties.

- **Name:** Tank1SetPoint

- **Real time data tag:**

  @ICONICS.IconicsOPCUAServer.V5\icTonics.Tanks.USA.Foxboro.Tank1.LevelSetPoint.Value

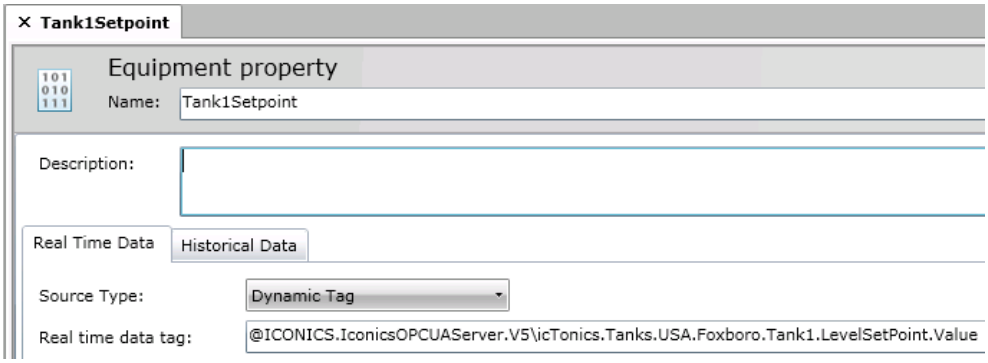

Figure L5.4 – Equipment Property for Tank1.LevelSetPoint.Value

2. Click **Apply**.
3. Right click on **Tank1SetPoint**.
4. Select **Multiply**.
5. Fill in the Multiply form with the following criteria:
   - **Number of copies:** 2
   - **Name:** Tank{0}SetPoint
   - **Realtime Point Name:**

@ICONICS.IconicsOPCUAServer.V5\icTonics.Tanks.USA.Foxboro.Tank{0}.LevelSetPoint.Value

   - **First Number:** 2
   - **Numeric Places:** 1

   Note: In the entries above, notice the {0} entries. These placeholders will be replaced with the number generated by the multiply process.

6. Click **Apply to All**.

7. Your complete **Multiply Options** dialog should resemble the following figure.

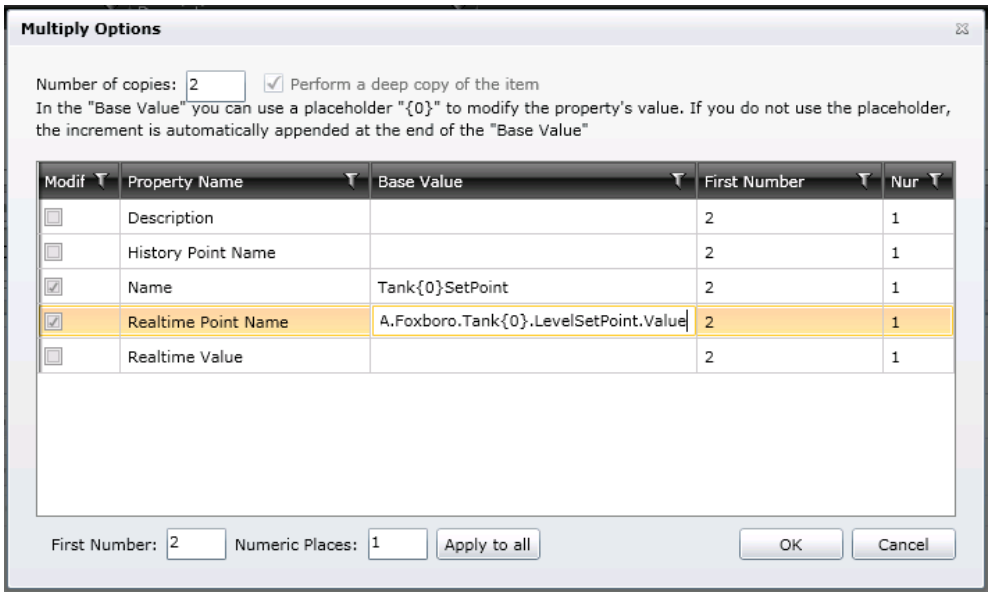

Figure L5.5 – Multiply Options

8. Click **OK**.

9. Click **Close**.

5.2.4. Create a Group in Unified Data Manager

1. From the **Project Explorer** on the left, select the **Unified Data Manager** provider.

2. Expand the **icTonicsUDMConfig** tree.

3. Right-click on the **Groups** tree node and select **+ Add Group**.

4. In the **Name:** field enter **GrpSetPt**.

5. Select the **Group Tags** tab.

6. Under the **OPC Tag** section, click on the location labeled "**Click here to add a new item**".

7. On the right end of the **tag** field, click on the **Ellipse** button to launch the Data Browser.

8. Select **Home → AssetWorX → GrpSetPt → Tank1Setpoint**.

9. Click **OK**.

10. Add a **Second** and **Third** tag respectively connected to the tags:

    a. **Home → AssetWorX → GrpSetPt → Tank2Setpoint**

    b. **Home → AssetWorX → GrpSetPt → Tank3Setpoint**

11. Click **OK** after <u>each</u> entry.

12. You completed configuration should resemble the figure below.

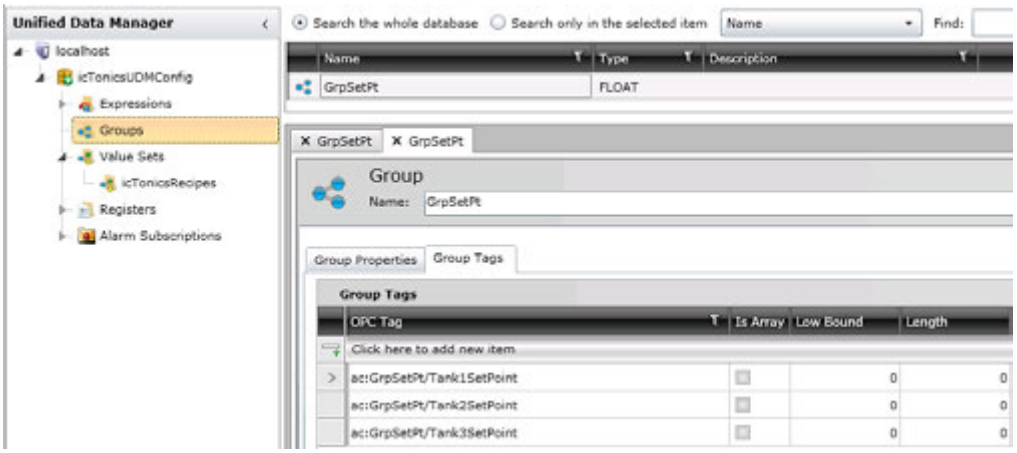

Figure L5.6 – GrpSetPt Group Configuration

13. From the Unified Data Manager ribbon in the **Service** section, click on the **Stoplight** to **Stop** the UDM service.

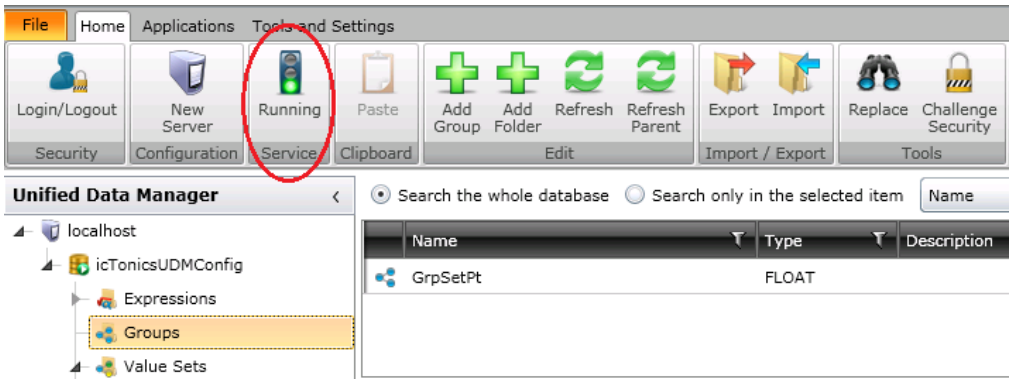

Figure L5.7 – Stopping and Restarting the UDM Service

14. Click on the **Stoplight** again to **Start** the UDM service. Verify the **stoplight** is **Green** before proceeding.

5.2.5. Add Write Value Command

1. Once again, from the **Project Explorer** on the left, select the **AssetWorX** provider.
2. Select the **GrpSetPt** asset.
3. Select the **Command** sub tab.
4. Click on the **Add** button.
5. From the **Command Dropdown**, select the **Write Value** command.
6. Fill in the fields as described in the bullets below.

   Note: For the Pointname: below, click the ellipse at the right end of the value: field. From the Data Browser select **Home → OPC Classic Servers → My Server → Groups → GrpSetPt**.

   - **Name:** GrpSetPt
   - **PointName:** @grp64:GrpSetPt.Value
   - **Value:** 25

7. Click **OK**.
8. Your completed configuration should resemble the figure below.

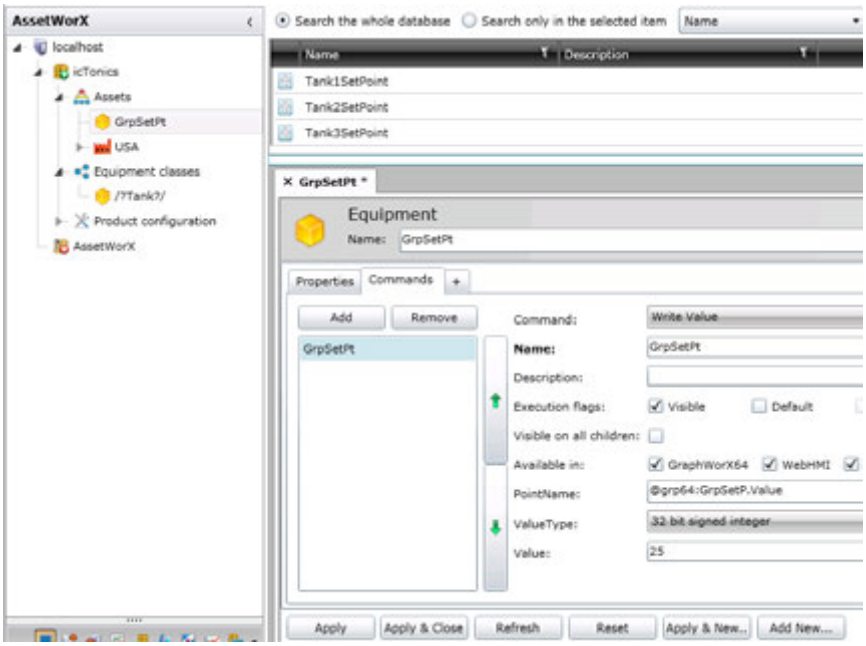

Figure L5.8 - Write Value Command Configuration

5.2.6. Set Filter Command

By defining the Global Alias resolution in the Load Graphics command that we assigned to the /?Tank?/ equipment class, we're able to drag and drop the Tank assets into the GraphWorX64 viewer and have global aliases resolve for both the GraphicWorX64 and TrendWorX64 viewers. By executing this section of the lab, we will add a filter to the AlarmWorX64 viewer so only alarms from the selected tank will populate the viewer window. Let's roll.

1. Again, from the **Project Explorer** on the left, select the **AssetWorX** provider.
2. Expand the asset tree to expose the **Foxboro** tree node.
3. Select the **Foxboro** asset and click on the **Commands** sub tab.
4. Click on the **Add** button.
5. From the **Command Dropdown**, select the **Set Filter** command.
6. Fill in the fields as described in the bullets below.
    - **Name:** Set AlarmFilter
    - **Action:** Set
    - **FilterName:** AlarmFilter
    - **Target:** icTonicsAlarmViewer
7. Click **Apply**.
8. Click on the command **Add** button again.
9. From the **Command Dropdown**, select the **Set Filter** command.
10. Fill in the fields as described in the bullets below.
    - **Name:** Reset AlarmFilter
    - **Action:** Reset
    - **FilterName:** Leave this field blank
    - **Target:** icTonicsAlarmViewer
11. Click **Apply & Close**.

5.2.7. Open URL Command

The Open URL command opens a URL when a Runtime user selects the menu option. You can use this command to go to a frequently-used online tool, a corporate Web site, a vendor's page for placing an order, or an interactive page for requesting service.

1. Once again, from the **Project Explorer** on the left, select the **AssetWorX** provider.
2. Expand the asset tree to expose the **Massachusetts** tree node.
3. Select the **Massachusetts** asset and click on the **Commands** sub tab.
4. Click on the **Add** button.
5. From the **Command** drop down, select the **Open Url** command.
6. Fill in the fields as described in the bullets below.
    - **Name:** Open Iconics Website
    - **Url:** http://www.iconics.com
7. Click **Apply & Close**.

5.2.8. Testing

If commands are not visible, right-click on an upper level asset and select Refresh. This is required in order to update the Asset tree in PortalWorX-SL after making changes to an asset's properties in the Workbench-SL.

1. As we learned previously, from within the Workbench-SL, in the upper left corner, click on the Runtime selection.

    Note: If you do not see the Runtime select, click on the **Tools and Settings** tab and confirm the **Show the Ribbon Title** field is checked.

Figure L5.9 - Initiating Runtime from Workbench-SL

2. Select any of the **Tank** assets with the left mouse key. **Drag & Drop** the asset into the **GraphWorX64 display viewer**. All the display global aliases will resolve to the tank you selected.

3. Click on the USA asset with the left mouse key. Because the **Switch Layout** command is the default command, you should see the icTonics Layout open.

4. Right click on the **GrpSetPt** asset and select **WriteWeekendSetpoint**. Your LevelSetPoint tag should change to the predefined value (25) for all tanks.

5. Monitor the **AlarmWorX64 viewer** in the **icTonics Layout** and select the **Foxboro** asset. Right click to **Set** and **Reset** the alarm filter. In order to see a reaction, you will have to generate Tank Level alarms. E.g. a tank level below 20.

6. Right click on the **Massachusetts** asset and select the **Open Iconics Website** entry. This will spawn a new Internet Explorer browser session and open the ICONICS.com website.

This concludes this lab.

AnalytiX Products A

ICONICS has developed analytical tools that can be used within the Workbench-SL/PortalWorX-SL environments, one for energy analysis and another for fault detection and diagnosis. Both can be configured within Workbench-SL and then resulting data viewed through runtime viewers in PortalWorX-SL

A.1. Energy AnalytiX

Energy AnalytiX is an off-the-shelf Energy Management System (EMS) that targets energy usage data analysis for the purpose of increasing efficiency and reducing operational costs. Operators can use real-time SharePoint and Silverlight displays to analyze energy-related data to aid in improving energy usage efficiency, reducing overall operational costs, and monitoring energy reliability. This product is suited for corporations that are looking to improve their energy usage efficiency and reduce overall operational costs, and is most-commonly used for the industries of facilities management, utilities, large industrial plants, and multi-site industries such as retail.

With the strong set of ICONICS products that collect and present real-time and historical process data, Energy AnalytiX performs industry standard analysis on the collected data and provides the results in a meaningful manner using the ICONICS off-the-shelf product approach. With Energy AnalytiX you can measure, monitor, and identify trends in energy usage across your enterprise. Energy analysis provides the ability to identify problematic trends and to get detailed energy usage summaries by site, building, work area, machine, person, and so on.

A.2. FDDWorX

Facility AnalytiX™

FDDWorX™ is a predictive building automation solution that uses an advanced Fault Detection and Diagnostics Engine. It incorporates algorithms that weigh the probability of faults and advise management, operators and maintenance personnel of actions to prevent equipment failures or excessive use of energy. When equipment failures occur, advanced software technology provides automatic guidance to a list of causes sorted by probability, resulting in reduced downtime and lower costs to diagnose and repair. You can use it inside Workbench-SL for GENESIS64.

FDDWorX collects building equipment process data (such as HVAC and DDC system data) using industry-standard data collection mechanisms. It can automatically generate alert notifications and reports. Operators can use real-time SharePoint displays to analyze relevant data such as the status of equipment operating outside rules parameters. Facility Analytics' Fault Detection and Diagnostics (FDD) Analysis technology takes into account several National Institute of Standards and Technology (NIST) concepts.

Delimiters and Syntaxes *B*

Beginning Delimiter	**End Delimiter**	**Function**
{{	}}	OPC Tag delimiters in an expression
~~	~~	Local Variable delimiters
lic:		License FrameWorX Plug-in tags
sim64:		Simulation FrameWorX Plug-in tags
localism:		Simulation tags from GraphWorX64
rdcy64:		Redundancy FrameWorX Plug-in tags
bacnet64:		ICONICS Bacnet OPC Server FrameWorX Plug-in tags
snmp64:		ICONICS SNMP Server FrameWorX Plug-in tags
exp64:		Global Expression FrameWorX Plug-in tags
grp64:		Group FrameWorX Plug-in tags
vset64:		Value Set FrameWorX Plug-in tags
rgs64:		UDM Register FrameWorX Plug-in tags
<#	#>	Global Aliasing delimiters
/+	+/	Language Aliasing delimiters
“	”	String literal in a process point
<<	>>	Local aliasing delimiters
/?	?/	Equipment Class Alias delimiters
A:AliasName		Allows dynamic global aliasing definition. The Complete syntax is *A:AliasName=“AliasValue”/ThemeScope;*. ThemeScope can be, but not limited to the following: Not defined – Relative to current document level 0 0 – Machine Level 1 – Process Level 2 – Document Level 0 3 – Document Level 1 +1 – Relative to current document level 1 +2 – Relative to current document level 2

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