



Getting Started | ICONICS Suite™

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Microsoft Partner



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1 **SYSTEM REQUIREMENTS**

Before installing any products, please make sure you have the correct prerequisites installed.

ICONICS Suite

ICONICS advanced visualization, productivity, and sustainability solutions are built on its flagship products: GENESIS64™ HMI/SCADA, Hyper Historian™ plant historian, AnalytiX® solution suite, and MobileHMI™ mobile apps. ICONICS is leading the way in cloud-based solutions with IoTWorX™, which helps customers embrace the Internet of Things (IoT) and Industry 4.0. This end-to-end software solution provides remote cloud monitoring and analytics via low-cost IoT gateway devices. Delivering information anytime, anywhere, ICONICS solutions scale from the smallest standalone embedded projects to the largest enterprise applications.

Language Pack

This installation includes an optional language pack that includes localization files for the following languages:

- Chinese
- French
- German
- Japanese

ICONICS System Requirements vary between:

- Minimum Requirements
- Medium-powered Requirements
- High-powered Requirements

Note: This document contains three different hardware setups to illustrate the minimum required specifications, a standard or medium-powered setup and a high-performance machine.

	Minimum	Medium	High
CPU	Dual Core 64-bit processors (e.g., AMD Athlon 64 X2, Intel Xeon, and AMD Phenom)	Quad Core 64-bit processors or better (e.g., AMD Athlon 64 X2, Intel Xeon, and AMD Phenom)	
Memory	4 GB of RAM is required (6 GB Recommended)	8 GB of RAM or higher	16 GB of RAM or higher
	We recommend that the: <ul style="list-style-type: none"> • System page file size be a minimum of four times the size of installed (physical) RAM. • Virtual memory allotment be two times the amount of physical memory (RAM) on the system. 		
Hard Disk	At least 4 GB free hard disk space is required (10 GB Recommended)		
Video Card	DirectX 9 or 10 Video Card or better		
	Onboard Video Memory (256 MB)	Onboard Video Memory (500 MB)	Onboard Video Memory (1 GB)
Resolution Minimum	1024x768, 32-bit color		1920x1080, 32-bit color
Operating System	Windows 11 (Professional, Enterprise, or IoT Enterprise Edition) Windows 10 x64 (Professional, Enterprise, or IoT Enterprise Edition) Windows 10 x64 2021 LTSC (Enterprise or IoT Enterprise Edition) Windows 10 x64 2019 LTSC (Enterprise or IoT Enterprise Edition) Windows 10 x64 2016 LTSB (Enterprise or IoT Enterprise Edition) Windows Server 2022 Windows Server 2019 (including Server IoT 2019) Notes:		

	<ul style="list-style-type: none"> For server class operating systems that offer "Server Core" or "Desktop Experience" options, ICONICS Suite only supports "Desktop Experience." A server class operating system is highly recommended for web hosting and AnalytiX features.
.NET Framework	Microsoft .NET Framework 6, 4.8, and 3.5
Web Server	Microsoft Internet Information Services (IIS) 7.0 or higher
Web Browser	HTML5 WebHMI displays: Edge, Firefox, Safari, Chrome WPF WebHMI displays: Edge (in Internet Explorer mode), Internet Explorer 11
SQL Server	<p>Microsoft SQL Azure Microsoft SQL Server 2022 Microsoft SQL Server 2019 Microsoft SQL Server 2017 Microsoft SQL Server 2016 Microsoft SQL Server 2014</p> <p>Notes:</p> <ul style="list-style-type: none"> AlarmWorX64 MMX does not support SQL Azure. SQL Server 2014 and 2016 are not supported on Windows Server 2022. The connection to the SQL Server data source may be either local or remote. ICONICS supports SQL databases with encryption.

Note: The requirements described above are based on typical applications. Depending on your specific application, the minimum requirements may vary.

Optional Hardware

1. Ethernet adapter, Wi-Fi card, or cellular (at least 3G)
2. USB port (for hardware license)
3. Serial COM ports or other adapters (for data I/O)

2 INSTALLING ICONICS SUITE

The following steps detail the ICONICS Suite system installation.

The ICONICS Suite installation uses a standard InstallShield installer to provide you with options for installing components, adding new or existing users, configuring the database engine that you use and the size of the tables that are created, and more.

Warning: Prior to installation, verify that the system meets minimum hardware and software requirements, as described in the System Requirements section. Installation will abort if the minimum requirements are not met.

Important Note: Uninstall previous versions of the ICONICS Suite before installing the latest version of ICONICS Suite.

2.1 Starting the Installation Process

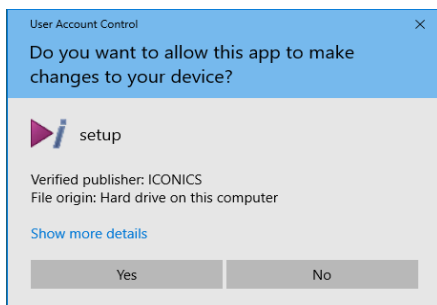
Note: You must be logged in as a local administrator to properly run the installation.

To Install ICONICS Suite:

1. Double-click the **Default.hta** file in the root folder of the DVD. Select "GENESIS64 Installation". The Prerequisites Installer Dialog appears.

The 'User Account Control' window appears.

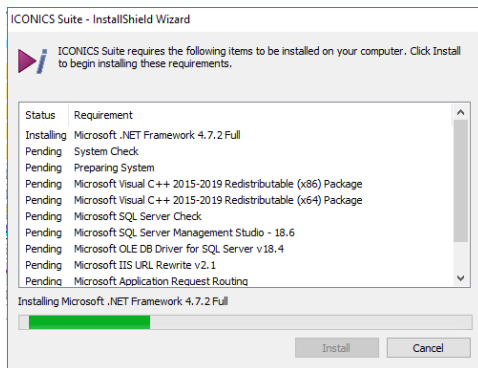
2. Click **Yes** to continue the installation.



The **ICONICS GENESIS64 – InstallShield Wizard** window appears.

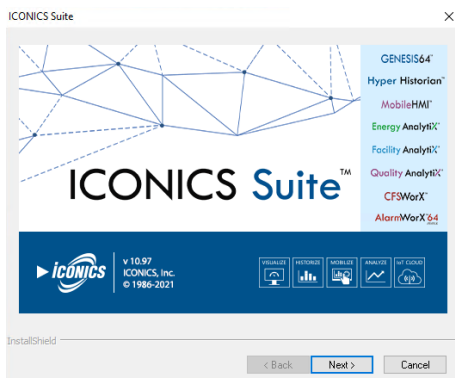
3. Click **Install**. This installs everything needed for running GENESIS64.

If you do not have SQL Server 2019 installed locally, you are prompted to install it. (Choose **No** if you plan to use an older version of SQL Server, or you are going to use a remote SQL Server).



Note: You may need to repeat steps 2 and 3 multiple times depending upon the number of dependencies being installed.

In the Welcome Dialog, click **Next** to view the License Agreement.



4. Read the License Agreement. If you agree with the terms and conditions, click **I Agree**.
5. In the Setup Type dialog, select the type of setup you wish to perform: **Suite Selection** or **Custom Selection**.
 - The **Suite Selection**, or the typical installation, allows you to select the product suites you want to install.
 - The **Custom Selection** installation allows you to specify the installation location on the computer and select individual components within a product suite.

Since the setup procedure varies slightly depending on the installation type that you choose, the installation of each is described fully in the two sections that follow. Refer to sections 2.2 "Typical Installation" or 2.3 "Custom Installation."

2.2 Typical Installation

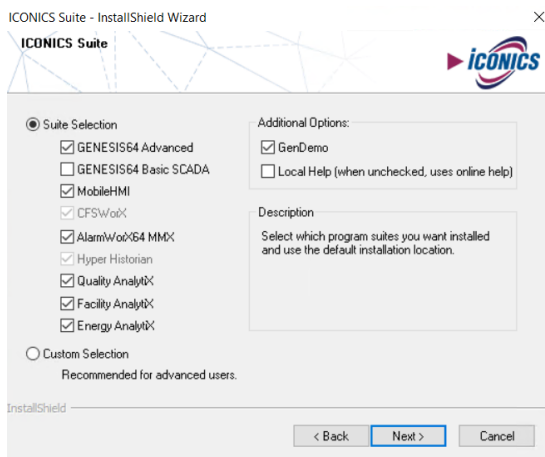
The typical installation is intended to install all GENESIS64 applications and tools. It creates all the supporting databases as necessary.

You need to provide the correct database connection and logon information. Once those steps are completed, the installation does not require much of your attention.

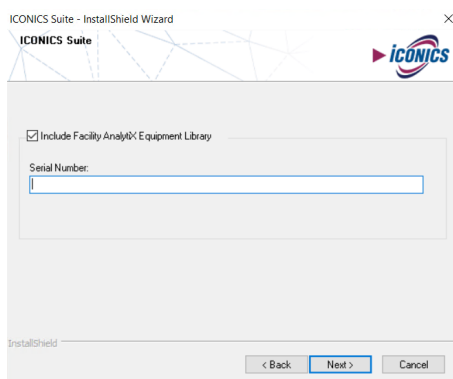
If you are installing GENESIS64 on a system that has a previous version of ICONICS products already installed, uninstall the older version before installing GENESIS64. If you have uninstalled a previous version, the setup leaves the database files intact in your system for you to use in future. The installation asks you if you want to overwrite or keep the supporting database files.

To Perform a Typical Installation:

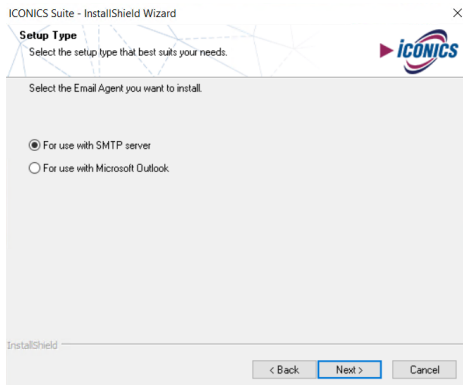
1. For a typical installation, select the Suite Selection as shown below. The setup evaluates your system for compliance with the requirements, and then posts a confirmation dialog box.



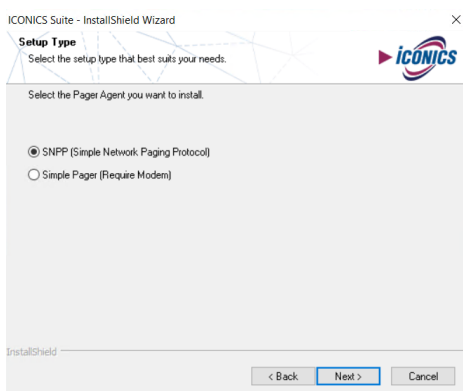
2. If you selected Facility AnalytiX, enter your Facility AnalytiX serial number, and then click **Next.**



- If you installed AlarmWorX64 MMX, select the email agent you are going to use, and then click **Next**.

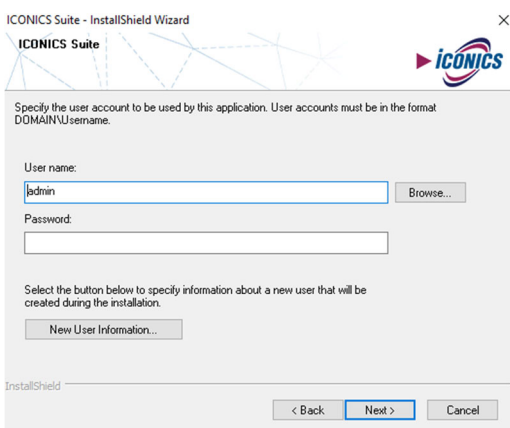


- If you installed AlarmWorX64 MMX, select the pager agent that you would like to install, and then click **Next**.

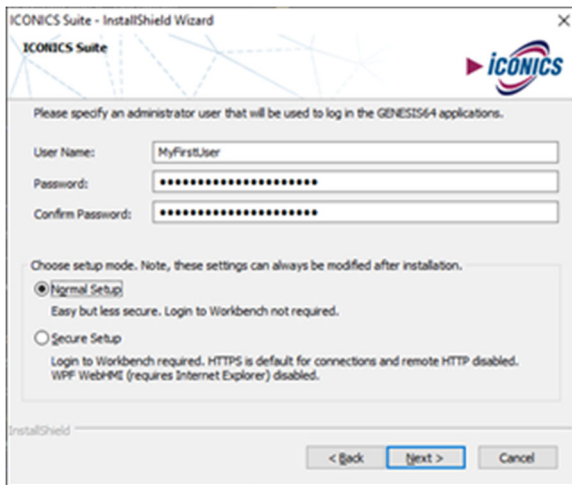


- In the Logon Information dialog, enter the username and password to be used by this application, and then click **Next**.

Note: You can choose to use either a local machine account or a domain security account, as well as create a new user or use an existing user account.



- In the Administrative User Setup, set a default security username and password for the ICONICS installation. Select **Normal Setup** or **Secure Setup**, and then click **Next**.



The Secure Setup will require a Workbench login. It uses HTTPS by default and disables HTTP for remote connections. (HTTP is still used for local connections.)

The Secure Setup disables the GENESIS64 IIS application pool, which prevents WPF WebHMI clients from connecting.

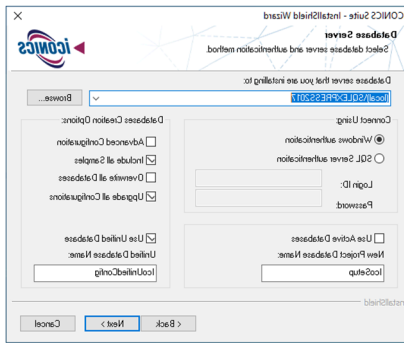
Notes:

- All installed applications will be enabled by default for both the normal and the secure setup installations.
- All settings can be changed after installation. You can choose to “secure” a normal setup or loosen the restrictions on a secure setup after the completion of the installation.

7. In the Database Server dialog, select a local or remote database, configure the database settings, and set the database server authentication.

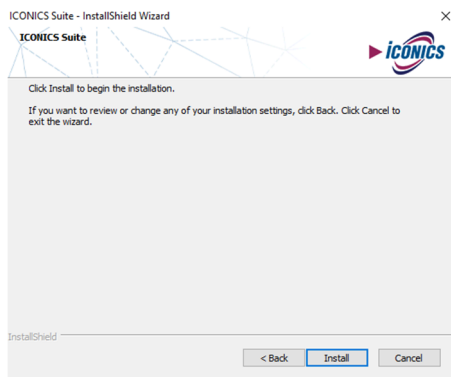
You can also change the default Database Creation Options:

- **Advanced Configuration** – When selected, an additional set of dialogs with advanced database and configuration options will appear at the end of the installation.
- **Include all Samples** – Installs sample data with which you can experiment.
- **Overwrite all Databases** – Overwrites older databases.
- **Upgrade all Configurations** – Automatically updates all configurations to their most recent version.
- **Use Unified Database** – Installs all configurations in one unified database (recommended).



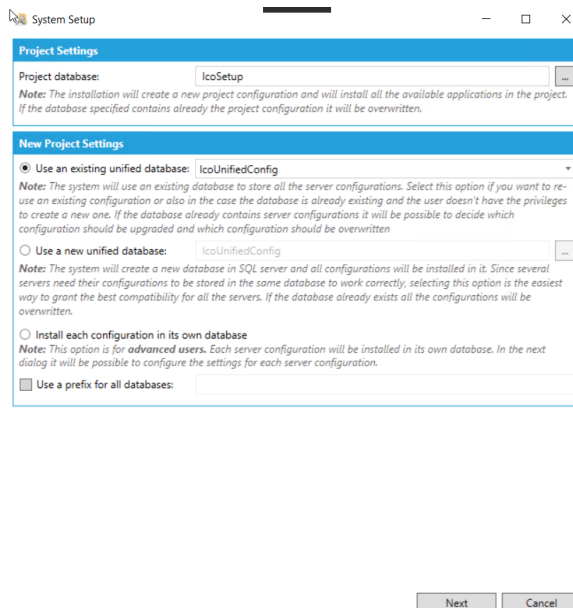
Click **Next**.

8. When the **ICONICS GENESIS64 – InstallShield Wizard** window appears, click **Install**.

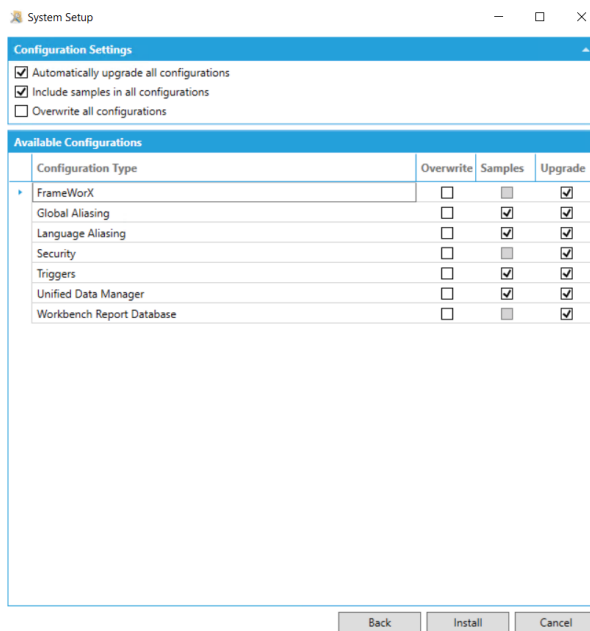


If you did not select **Advanced Configuration**, skip to step 11.

9. If you have selected **Advanced Configuration**, the System Setup dialog will now appear. Adjust the project and unified databases settings as needed, and then click **Next**.

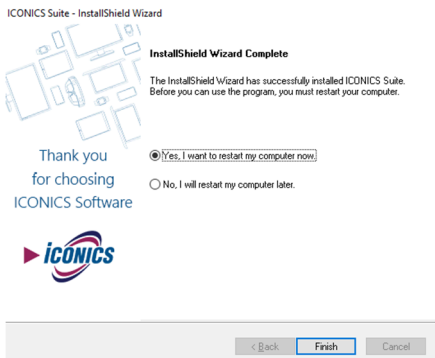


10. In the Database and Services Setup dialog, customize the configuration settings from step 7 (upgrading and overwriting the configurations and including sample data) for individual areas.



11. Click **Install** to continue the installation.

12. After completing the installation, click **Finish**. We recommend that you restart your system.

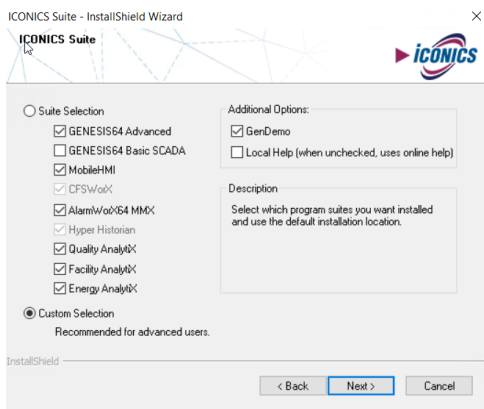


Note: If the installation seems to hang, make sure that there are no alert boxes that require dismissal before the installation can be completed.

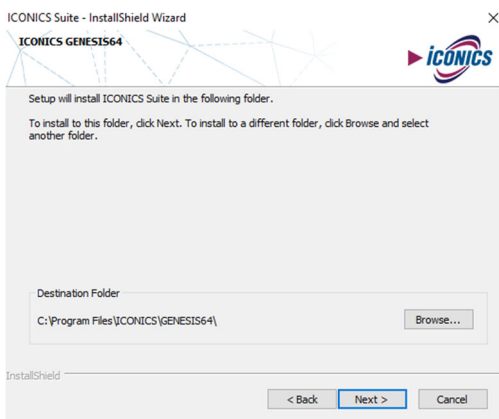
2.3 Custom Installation

Custom installation varies slightly from the typical or complete installation in that you select the components that you wish to install.

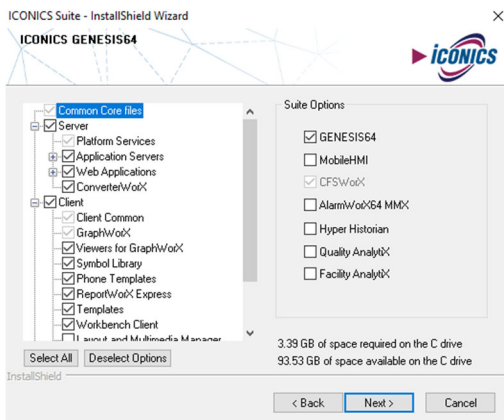
1. Select the **Custom Selection** installation set-up type, and then click **Next**.



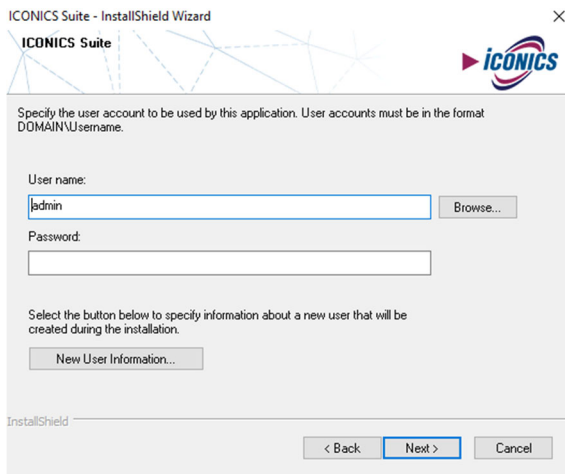
2. Select the destination location by selecting **Browse** or **Next** if the default location is correct.



3. Select the checkboxes to install the desired components, and then click **Next**.

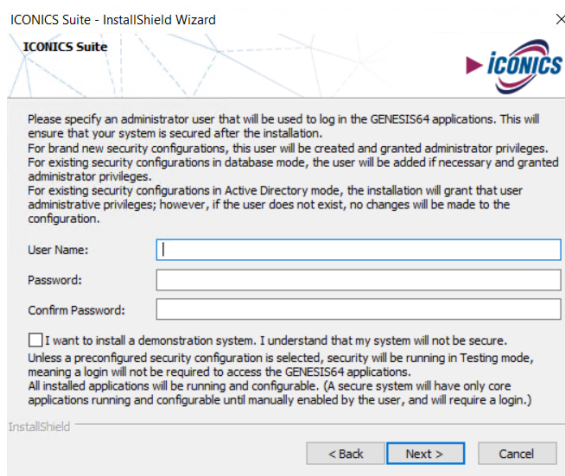


4. If you selected Facility AnalytiX, enter the Facility AnalytiX serial number, and then click **Next**.
5. If you installed AlarmWoX64 MMX, select options for email agent, and then click **Next**.
6. If you installed AlarmWoX64 MMX, select options for pager agent, and then click **Next**.
7. Specify the user account to be used by this application, and then click **Next**.



8. To set a default security username and password for the ICONICS installation, complete the fields on the screen, and then click **Next**.

(Optional) You can bypass the security by selecting the **I want to install a demonstration system** checkbox.



9. In the Database Server dialog, select a local or remote database, configure the database settings, and set the database server authentication.

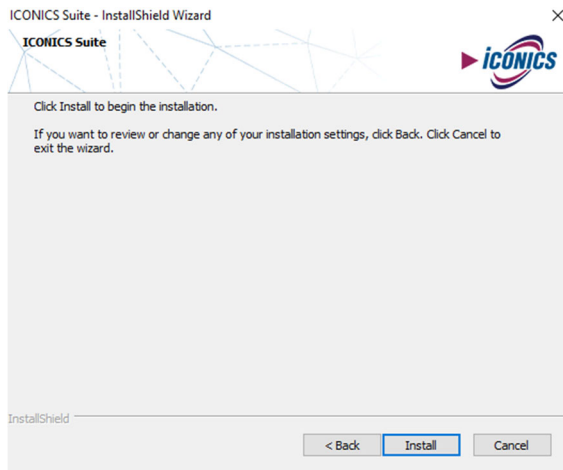
You can also change the default Database Creation Options:

- **Advanced Configuration** – When selected, an additional set of dialogs with advanced database and configuration options will appear at the end of the installation.
- **Include all Samples** – Installs sample data with which you can experiment.
- **Overwrite all Databases** – Overwrites older databases.
- **Upgrade all Configurations** – Automatically updates all configurations to their most recent version.

- **Use Unified Database** – Installs all configurations in one unified database (recommended).

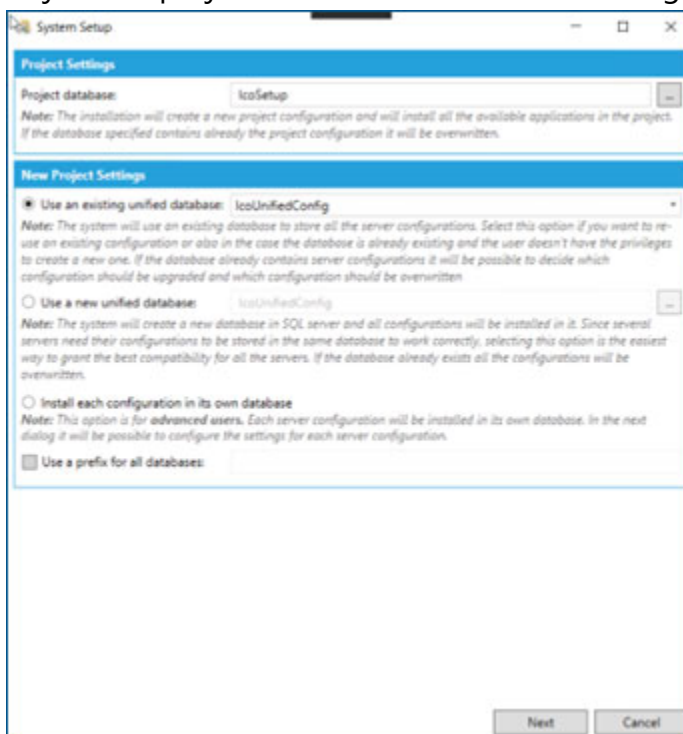
Click **Next** to continue.

10. When the **ICONICS GENESIS64 – InstallShield Wizard** window appears, click **Install**.

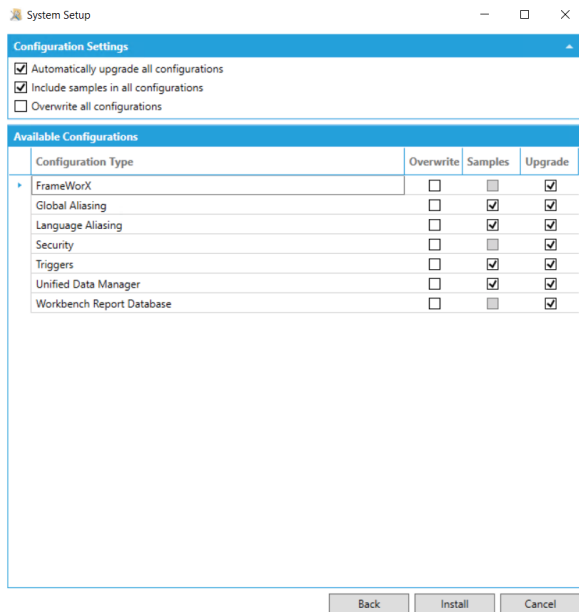


If you did not select **Advanced Configuration**, skip to step 13.

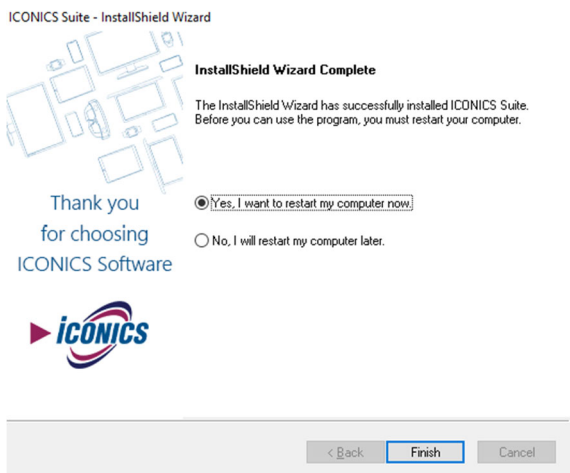
11. If you have selected **Advanced Configuration**, the System Setup dialog will now appear. Adjust the project and unified databases settings as needed, and then click **Next**.



12. In the next dialog, customize the configuration settings from step 10 (upgrading and overwriting the configurations and including sample data) for individual areas.



13. After completing the installation, click **Finish**. We recommend that you restart your system.



2.4 Uninstalling ICONICS Product Suite

You can uninstall (remove) the ICONICS Suite software from the system. We recommend that you back up all your project-related files before uninstalling. If your operating system requires a login, you must log in as an administrator to uninstall.

We recommend that you use Apps & features from Windows Settings to uninstall the applications. Removing the application via other means (such as simply deleting the files) may leave files, settings, or registry entries behind, and is not supported. If you uninstall some common components that are used by the product, you may be required to register those components again or simply reinstall the product.

To uninstall ICONICS Suite, open Windows **Settings**, select **System** > **Apps & features**. From the list, select **ICONICS Suite**, then **Uninstall**. Follow the prompts to remove **ICONICS Suite**. (Exact steps may vary depending on your operating system.)

You may want to remove other ICONICS software as well, such as **ICONICS GenDemo** or **ICONICS Help**.

Note: Do not delete the files and directories manually; doing so will leave the registry entries intact and interfere with future installations. Please use the uninstall feature of the operating system!

3 SOFTWARE LICENSING

3.1 Overview

ICONICS Product Suite licenses are registered and managed by the ICONICS Web Licensing Utility, which stores licenses on your PC and in the cloud.

DeviceXPlorerOPC Server (install from Additional Tools on the ICONICS Product Suite installation DVD) licenses are also registered and managed by the ICONICS Web Licensing Utility.

3.1.1 Types of Licenses

There are three types of licenses:

- Software key license
- Hardware key license
- Cloud license

1. Software License

This license type is stored on the hard drive of the PC.

There are three different subcategories to the software license.

1. Production license

Full access to the license with no expiration date.

2. Trial license

Valid for 30 days during a GENESIS64 trial.

3. Emergency license

Valid for 60 days for:

- A failed license kill operation on the activated PC and subsequent reactivation.
- The license kill operation succeeds on the activated PC; however, the license killed on a separate PC is still activated.

2. Hardware License

This type of license is saved to a USB device.

There is only one subcategory of this license, called the production license, which provides full access to the license with no expiration date.

3. Cloud license

An ICONICS product license is designed specifically for applications running in public, private, or virtualized environments. The license is stored on the cloud.

There are two different subcategories to the cloud license.

1. Production license
2. Full access to the license with no expiration date.
3. Emergency license

Valid for 60 days for:

- A license kill operation that fails and reactivates on an activated cloud.
- The license kill operation succeeds on an activated cloud, and the license killed on a separate cloud is activated.

3.2 Demo Mode

Without a valid license installed on your PC, it is still possible to use ICONICS Suite. The software checks for a valid hardware or software license key on initialization. If none is found, ICONICS Suite runs in demo mode, which limits you to:

- 12 hours of runtime
- 64 licensed connections (points)

Running ICONICS Suite longer than the 12-hour limit generates a message stating that the demo time has been exceeded. The demo period can be restarted by opening Workbench and selecting the message at the bottom or by restarting the PC.

If there are more than 64 tags in use, the tags beyond 64 will display in point failure mode.

Software and Hardware Keys

ICONICS Suite licensing is handled by a software key license registration system that does not require a hardware protection key. However, ICONICS does offer an optional hardware key that you can purchase.

Software Licensing

The software key is a licensing key that resides on the hard drive of a computer. Each software key is used on a single, specific computer and is used only once. It is activated using a site key (license file) that is tied to the computer that is being licensed.

An activated license is required to use the software in full production mode. This license designates which products can be used, as well as the I/O point-count limit that controls the number of active data points (tags) that can be used by a system.

For important details about registering and activating software licenses for your ICONICS Suite installations, refer to the **ICONICS_Licensing_Readme.htm** file, which is available on your ICONICS Suite installation media.

3.3 Hardware Key

The optional hardware key is a USB thumb drive (or flash drive) that you can move from system to system. AnalytiX recognizes the hardware key on the system you have the key attached to. A hardware key is an easier and more reliable way of moving a license from one machine to another than a software key.

Upon insertion of the USB key into an available USB port, the necessary drivers are automatically loaded.

A green status light displays upon successful connection. If the USB key is missing or unplugged during operation of the ICONICS Suite software, plug the USB key back in within an hour of removal or upon system reboot; otherwise, the hardware-based license will not be immediately recognized.

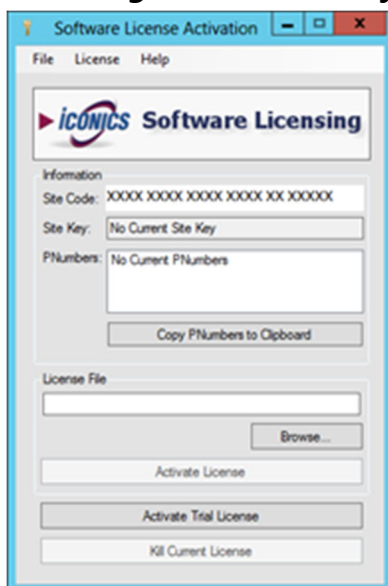
If you need a replacement key, visit <https://licensing.iconics.com>. New users must create an account through the ICONICS Web Licensing Utility to request replacement keys.

3.4 License Utility

The Software License Utility provides full authorization for use of any purchased ICONICS Suite product and its available options.

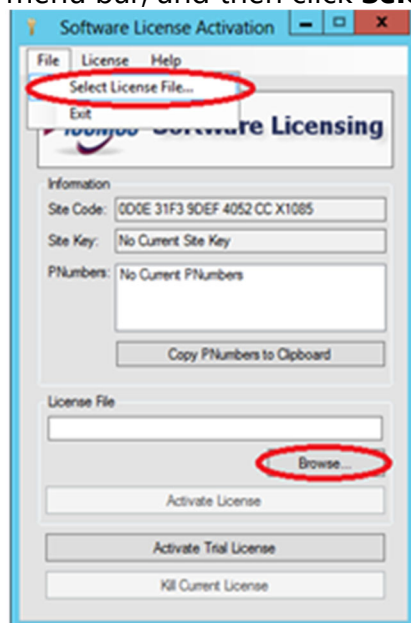
Running the License Utility

To launch the License Utility from the Windows Start menu, select **Programs > ICONICS .NET Licensing > License Utility**.



License File

Once you have opened the Software License Utility, you can browse for the Site Key (license file). Either click the **Browse** button in the License File section of the window **or** click **File** in the menu bar, and then click **Select License File**.



This displays Windows Explorer so that you can browse for the license file. Once you have located the file, double-click it, or click **Open** to proceed.

3.4.1 Activating the 30-Day Trial/Emergency License

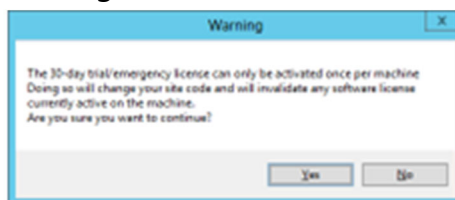
A trial or emergency license is intended for urgent back-up situations only. If you activate a trial license, it invalidates the existing license and permanently overwrites any existing license. We recommend that you use caution when deciding whether to activate a trial license.

Note: A trial license can be activated only **once per machine**.

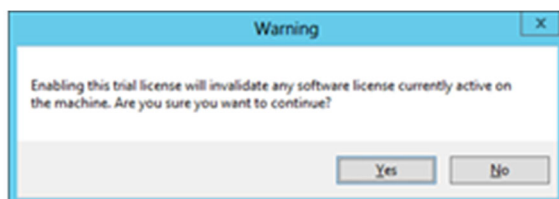
In the Software License Activation for .NET dialog, you can click the **Activate Trial License** button to activate a 30-day trial license.



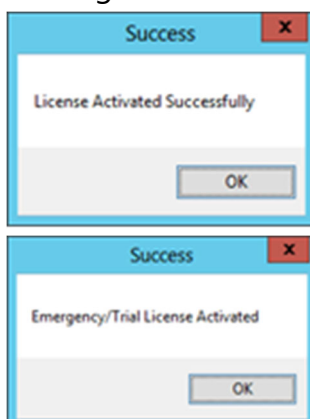
A warning message is displayed. Read the message and click **Yes** to confirm the action. Clicking **No** cancels the action and preserves the existing license.



Another warning message is displayed. Click **Yes** to confirm that you understand the message and want to activate the trial license.



After you activate the trial license, the following messages are displayed. Click **OK** to close the message boxes.



The PC is now authorized to run for a one-time only, 30-day back-up period. If you purchase a license and you want to activate your license on the system, you can do it at any time. You don't need to wait for the trial period to end.

3.5 License Viewer

When you purchase licenses, the licenses are measured in a point count that determines the number of OPC tags that you can use in your application. One point count is used for most ICONICS Suite applications. There are three different modes for using tags in point counts:

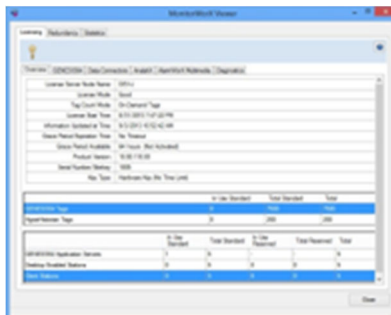
- **Advanced (On-Demand Tags).** A system for dynamically using licensed points. Points are only counted while they are actively in use. Points that are no longer being used are released and returned to the pool of available points.
- **Advanced (Configured Tags).** Like on-demand tags, except that licensed points are not released when they are no longer in use. Users are encouraged, but not required, to configure their tags in AssetWorX.
- **AssetWorX Tags.** A system in which all points are required to be configured as equipment properties in AssetWorX. This system is only in use with GENESIS64 Basic SCADA licenses—see the GENESIS64 Basic SCADA Help files or application notes for more information on the AssetWorX tags counting mode.

The modes are not interchangeable. You must buy a new license to upgrade your existing license.

At any time, you can use the License Viewer to review the license status of ICONICS products installed on that computer. To access the MonitorWorX Viewer:

- On the Windows Start menu, click **ICONICS .NET Licensing > MonitorWorX Viewer > Licensing** tab.
- From the Workbench, click the **Licensing** button on the **Tools** ribbon.

The License Viewer is displayed as shown in the following image.



The tab that displays initially is the **Overview** tab, where you can see general information about the license for the server that the node points to. You can view license information for **GENESIS64, Basic SCADA, Data Connectors, AnalytiX, and AlarmWorX64 Multimedia** product features by clicking the respective tab for those products.

The **Diagnostics** tab can be used to see where individual product features are being consumed.

Certain licenses have access to the **Simulator** tab, which lets you simulate having fewer features than your existing license. This tab can be useful for integrators who want to see how their configuration will run on an end user's license.

3.6 Web Licensing

You can use the ICONICS Web Licensing Utility to generate a new license, kill a license, or transfer a license. You can also use the ICONICS Web Licensing Utility to upgrade your license.

Using the utility requires internet access and a web browser. Internet Explorer or Edge running in Internet Explorer mode are required to program a hardware key.

3.6.1 Issuing a New Software License

1. On the machine where you want the ICONICS Suite license to reside, open the ICONICS Web Licensing Utility from the Windows Start menu by clicking **ICONICS .NET Licensing > License Utility**. This should open the Software License Activation for .NET dialog.

You will see a dialog come up with a Site Code and "No Current Site Key" in the Site Key box. Leave this window open.



2. Go to <https://licensing.iconics.com>.
3. The main page of the Web Licensing Utility will load. Enter your email address and password and click **LOGIN**. If you do not yet have an account, you can create one by clicking the **Create New Account** link near the bottom of the page.



4. Once you have logged into the website, click **Software** to access the Software License Options.



5. Click the **New License** link in the top navigation bar.
Enter your Product Registration Numbers and Customer Keys for the products to license, then click **Next**.

Note: Your Product Registration Number and Customer Key were emailed to you when your order was complete.



6. On the next screen, you will be requested to identify the end user for whom the license is being issued. You can look up a list of users that have been previously entered by clicking the **Existing End Users** link or enter a new one by clicking the **Create New** link.



7. Clicking the **Existing End Users** link will open a new window with a list of previously entered end users (either entered by you or tied to the product registration numbers entered in the previous screen). Select an end user from the list and click **Select** or double-click the selected end user.

If you are the end user yourself and you are not listed in the grid, you can click the **I am the End User** link to enter your data as a new end user. After identifying the end user, click **Next**.



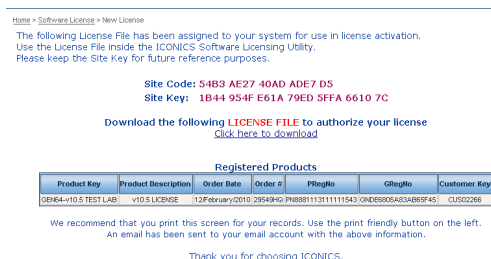
- On the next screen, you will see a list of the products that are available for you to license. Check all the products that you would like to license. Copy the Site Code from the license utility of the destination machine and paste it into the Site Code box of the current web page, then click **Next**.



- Review the license information before proceeding. Click **Generate Key** to issue a new Site Key.



- The next screen will display a summary of what will be your license, as well as your Site Key and License File.



- Download the license file (*.glic) by clicking the link. You will need this file to license the machine.

Note: If you misplace the file after receiving it, you can use the **View License** link with your Product Registration Number to download it again.

In the Software License Activation Utility, click **Browse** and look for the license file that you downloaded from ICONICS website.

12. Once you have selected the file and the **License File** textbox displays the file path, click **Activate License**.
13. You should then receive a popup message indicating the status of the license activation. You can click **OK** to close the dialog.
14. The Software License Activation Utility should now show the current license information, similar to the following image.



Notice that the Site Code may change, as expected, but the Site Key should be the same as you saw on the website.

3.6.2 Adding to an Existing Software License

1. Go to <https://licensing.iconics.com>.
2. Once you have logged into the website and accessed the Software License main page, click the **Add to License** link in the top navigation bar.
3. Enter your Existing Site Key, Product Registration Numbers, and Customer Keys, then click **Next**.



4. On the next screen, you will see a summary of the current license and the list of products that are available for you to add to the existing license. Check all the products that you

would like to license. Copy the Site Code from the License Utility of the destination machine and paste it into the Site Code text box of the current web page, then click **Next**.



5. Review the license information before proceeding. Select **Generate Key** as shown in the following image.



6. The next screen will display the new Site Key and the link to your license file. Follow steps 11 to 14 from **3.6.1 "Issuing a New Software License"** to complete the licensing process.

3.7 Cloud Licensing

3.7.1 How Cloud Licensing Works

ICONICS Cloud Licensing is a means of licensing ICONICS products that is specifically designed for applications running on public cloud, private cloud, or virtualized environments. Rather than maintaining the license locally on the machine, licenses are hosted by ICONICS on a publicly accessible data center.

During normal operations of the licensed machine, the first action it takes when starting up is to request the license information according to its License Pool ID. This request requires the machine to have access to the internet to request the information from the ICONICS cloud licensing server.

Once the license information has been successfully retrieved, the machine continues to operate using the licensing information retrieved from the web. The machine then periodically checks with the ICONICS Cloud Licensing server to validate the license. If it cannot validate the license for an extended period of time, the machine license will fail.

3.7.2 Issuing a New Cloud License

Follow these instructions to activate a license on a machine that currently has no license on it or has a license that you want to overwrite.

Note: If your machine already has a license on it, and you are looking to add another license, see the **Adding to an Existing Cloud License** section.

1. Go to <https://licensing.iconics.com>.
2. Select **Cloud** and log in with your username and password.



Note: If you do not have a username and password pair, you can register for one using the **Create New Account** link at the bottom of the window. If you have a username and password but have forgotten them, you can click the **Forgot Password** link at the bottom of the window.

3. Once you have logged into the website, click the **New License** link at the top.
4. Enter your Product Registration Number(s) and Customer Key(s) for the products.

Note: Your Product Registration Number and Customer Key were emailed to you when your order was complete.

5. Click **Next** once you have entered all your Product Registration Number(s).
6. Choose an existing end user or enter new end user information. Click **Next**.
7. On the next screen, you see a list of the products that are available for you to license. Check all the products that you would like to license on this machine. Click **Next**.
8. This page displays a summary of what is in your license. Make sure everything is correct, then click **Generate Key**. A page like the image below appears.

New License

The following License Pool has been assigned to your system for use in license activation.
Use the License Pool inside ICONICS Platform Services Configuration.
Please keep the License Pool for future reference purposes.

License Pool: **A64F9EF1-D289-4386-A34D-637CD4857ADD**

Registered Products								
Product Key	Product Description	Order Date	Order #	P. Number	G. Number	Customer Key	32-bit Version/Number	64-bit Version/Number
IC0360-SIP	1 MONTH LICENSE FOR IC0360-SIP	25/Oct/2014	55361HQ	PN1064C5805EADCF41		CU500266	0.95	10.85

We recommend that you print this screen for your records. Use the print friendly button on the left.
An email has been sent to your email account with the above information.
Thank you for choosing ICONICS.

3.7.3 Activating the License

1. Open the **Platform Services Configuration** application by going to **Start > ICONICS Tools > Platform Services Configuration**.
2. Select the **License** tab.

3. Select the radio button for **Cloud License** and enter the License Pool code that was provided by the Web License Utility. You can leave the **Password** field blank.
4. Restart the FrameWorX Service.

3.7.4 Adding to an Existing Cloud License

1. Go to <https://licensing.iconics.com>.
2. Select **Cloud** and log in with your username and password.
3. Once you have logged into the website, click the **Add to License** link at the top.
Note: It is very important to select **Add to License** and not **New License**. Selecting **New License** overwrites any existing license already activated on this machine. Make sure to select **Add to License** if you are adding products to a machine that already has a license on it.
4. Enter your existing License Pool ID and the Product Registration Number(s), and Customer Key(s) for the new products.
Note: Your Product Registration Number and Customer Key were emailed to you when your order was complete.
5. Click **Next** once you have entered all your Product Registration Number(s).
6. Choose an existing end user or enter new end user information.
Click **Next**.
7. In the next screen, you see a list of the products that are available for you to license. Check all the products that you would like to license on this machine.
Click **Next**.
8. This page displays a summary of what is in your license. Make sure everything is correct, then click **Generate Key**.

4 GENESIS64

4.1 Introduction

Welcome to ICONICS GENESIS64™, a powerful, 64-bit, web-enabled, OPC HMI/SCADA suite. GENESIS64 takes full advantage of the convergence of 64-bit-based computing machinery, the release of new Microsoft operating systems and the growing customer demand for engaging three-dimensional graphic visualization of business processes.

GENESIS64 includes several solutions that allow for connectivity from the plant floor to corporate business systems to provide a 360-degree view of an entire organization.

ICONICS GENESIS64 suite is comprised of the following products:

- GraphWorX™64
- AlarmWorX™64
- Hyper Alarm Server™ and Hyper Alarm Logger™
- Hyper Historian™ Express
- EarthWorX™
- AssetWorX™
- GridWorX™
- FDDWorX™
- ScheduleWorX™64
- Workbench
- WebHMI™
- ReportWorX™64
- ReportWorX™ Express
- RecipeWorX™
- AlertWorX™
- KPIWorX™
- System Health
- Data Explorer

This *Getting Started* manual explains how you can:

- Install the GENESIS64 software.
- Familiarize yourself with and start using Workbench configuration environment.
- Access online help and technical support.

Note: This manual is an abbreviated version of the full GENESIS64 Help documentation, which is available in the GENESIS64 Product help.

4.2 What Is GENESIS64?

GENESIS64 is a suite of tools that you can use to create state display and control software for equipment, machinery, or devices that use the OPC open process control standards of the OPC Foundation. OPC standards exist for both real-time data, alarms, and events, as well as for historical data that can be logged and replayed later.

4.3 What Is OPC UA?

OPC is a standards-based approach for connecting data sources (e.g., PLCs, controllers, I/O devices, databases, etc.) with HMI client applications (graphics, trending, alarming, etc.). It enhances the interface between client and server applications by providing a universally supported and well-documented mechanism to communicate data from a data source to any client application.

Included are not only a detailed guide on how to pass the data, but also specific information on other attributes to supplement those data, such as range information, data type, quality flags, and date and time information.

OPC UA or "Unified Architecture" unites legacy OPC standards such as OPC-AE (Alarm & Events), OPC-DA (Data Access), and OPC-HDA (Historical Data Access) into one complete specification.

The GENESIS64 automation suite supports these legacy protocols transparently, which incorporates newer communication standards while retaining backwards compatibility.

Any OPC client application can connect to any OPC server. In other words, OPC offers true Plug-and-Play capability in the fields of HMI and industrial automation. OPC server types include OPC Data Access (DA), OPC Alarm and Events (AE), and OPC Historical Data Access (HDA).

4.4 Quick Start

This chapter provides a brief overview of the following GENESIS64 products and tools:

- Basic SCADA
- GraphWorX64
- AlarmWorX64
- TrendWorX64
- EarthWorX
- GridWorX
- Workbench
- Additional tools and utilities

Note: For complete information about any GENESIS64 product, please refer to the GENESIS64 Help, which you can launch from any GENESIS64 product.

4.5 Basic SCADA

GENESIS64 Basic SCADA is a customizable entry-level package of GENESIS64. It contains many of the same components as the GENESIS64 Advanced Application Server such as alarming, trending, and visualization, but has simplified some pieces and made others optional.

4.5.1 Installing Basic SCADA

There are several options to install GENESIS64 Basic SCADA, depending on your needs. Some users may opt to install GENESIS64 Advanced.

GENESIS64 Advanced includes all Basic SCADA components, so it is possible to apply a GENESIS64 Basic SCADA license to a system that has been installed as GENESIS64 Advanced. All Basic SCADA functionality will work as intended in this case.

To install the minimum Basic SCADA components:

1. Run the ICONICS Suite installation.
2. For Suite Selection, choose GENESIS64 Basic SCADA.
3. Deselect all other items in Suite Selection.
4. Complete the installation, following the prompts.

Installing all components will make the process of applying add-ons and upgrading to GENESIS64 Advanced in the future easier.

To install all components:

1. Run the ICONICS Suite installation.
2. For Suite Selection, leave the selections at their defaults. (This means GENESIS64 Advanced will be selected and not GENESIS64 Basic SCADA.)
3. Complete the installation, following the prompts.

To install only the specific components needed for your system:

1. Run the ICONICS Suite installation.
2. Choose Custom Selection.
3. When prompted, select your desired suite options and specific modules. (Some users may wish to select GENESIS64 Advanced, which deselects the GENESIS64 Basic SCADA suite. This will still allow all GENESIS64 Basic SCADA components to work.)

4. Complete the installation, following the prompts.

4.6 GraphWorX64

GraphWorX64 is the GENESIS64 product you use to create graphical human-machine interfaces (HMIs). GraphWorX64 has dozens of tools with hundreds of parameters and combinations to create powerful, dynamic, and interactive images in two or three dimensions. Use the interactive tutorials in the GenDemo Learning Center (see the description in **Section 0**) to explore the tools that are available to you in GraphWorX64.

To launch GraphWorX64 from the Windows **Start** menu, select **ICONICS Product Suite > GraphWorX64**.

GraphWorX64 has a number of examples available to you. To use them, while in GraphWorX64, select **Open** from the **File** menu and browse to the following directory: **\Program Files\ICONICS\GENESIS64\GenDemo**. In this folder you will find subfolders with a name prefix of **GWX_**. Explore the folders and open example files to see what they offer.

4.7 Workbench

Workbench is the centralized configuration interface in which you open ICONICS Suite products and configure GENESIS64 components, runtime, and security. Every GENESIS64 component can be loaded, configured, and run inside Workbench. Projects can be packaged and deployed from inside Workbench, too.

When you select Workbench command from the Windows Start menu, Workbench loads all the applications showing in the Project Explorer. It swaps in functions with each GENESIS64 product that you load in it.

GENESIS64 providers can be opened from within the Project Explorer in Workbench.

To launch Workbench, go to **Start > ICONICS Product Suite > Workbench**. A presentation in GenDemo provides an overview of Workbench. For a complete understanding of Workbench, access GENESIS64 online Help while in Workbench.

4.8 AlarmWorX64

AlarmWorX64 is the alarm monitoring, logging, and reporting module in GENESIS64.

AlarmWorX64 consists of:

- AlarmWorX64 Viewer – Which you use to configure real-time alarms and attach them to alarm sources; display alarm notifications; make it easier to notice, respond, and acknowledge alarm conditions; and view historical alarms.
- AlarmWorX64 Server – Receives data from OPC-compliant Data Access servers and performs alarm detection and reporting.

- AlarmWorX64 Logger – Stores alarm data to a SQL database, which you can use for later replay.

To configure AlarmWorX64, open **Workbench** and go to **Alarms and Notifications > AlarmWorX64 Server** or **AlarmWorX64 Logger**.

A presentation in GenDemo (see the description in **Section 0**) provides an overview of AlarmWorX64. For a complete understanding of AlarmWorX64, access GENESIS64 online Help.

4.9 EarthWorX

Use EarthWorX to incorporate drill-down technology to quick view alarm conditions and more for any location around the world, using maps such as Microsoft Bing, Google, Esri, or OGC/WMS. EarthWorX helps you to visualize geographically dispersed assets (such as factories, facilities, or job sites) and track movable objects using GPS coordinates.

A presentation in GenDemo provides an overview of EarthWorX. Instructions for using EarthWorX are available in GENESIS64 online Help.

4.10 GridWorX

GridWorX allows users to visualize, edit and update database tables through GENESIS64. Built in two parts, the GridWorX Server can be configured within **Workbench** under **Data Connectivity > Databases**, while the GridWorX Viewer can be added to GraphWorX64 HMI screens through the **Controls** tab of the GraphWorX64 ribbon.

5 HYPER HISTORIAN

5.1 Introduction

Companies today are faced with the need to perform efficiently and competitively with fewer resources. For plant-level operations, today's systems need to connect to different infrastructures for data gathering and users need to analyze and visualize data in real time. Access to plant data is fundamental to staying competitive and efficient. The demand to produce products faster or streamline operations is increasing across the globe. ICONICS' Hyper Historian™ enterprise-wide plant historian allows you to gain that competitive advantage, by organizing all your real-time information from across the enterprise.

Hyper Historian is ICONICS' high-speed, reliable, and robust plant historian. To analyze and visualize data in real time, organizations must have access to plant data and reporting. Hyper Historian is designed to log large volumes of data, more than 100,000 updates per second, and connects to multiple data sources across the enterprise including OPC UA, OPC DA, OPC XML DA, BACnet, SNMP and many more. ICONICS Hyper Historian also provides full, web-based configuration. Optional redundant configurations are supported using redundant Hyper Historian Collectors and redundant Loggers, and Hyper Historian offers Store and Forward technology as part of its integrated redundancy solution.

Hyper Historian optionally utilizes an advanced Swinging Door algorithm to allow for high compression and takes full advantage of 64-bit hardware and software architectures, enabling it to access more CPU power and memory than traditional 32-bit-based historians and providing highest performance possible.

The Swinging Door algorithm is available with configurable compression but is based on a space-saving design that intelligently logs data without losing precision.

5.2 What Is Hyper Historian?

Features and Benefits of Hyper Historian include:

- High Performance 64-bit Scalable Plant Historian
- Archive and Compress Data at +250,000 Values/Second
- Hyper to Hyper Distributed Solutions
- Rich 2D and 3D Charts, Trends, Grids and Tables
- Desktops, Browsers, and Phones Enabled
- Performance Calculation Engine Delivers Advanced Analytics

- Integrated Redundant Architecture for Mission-critical Solutions
- Remote Collectors with Reliable Store-and-forward Technology
- Accessible via SQL Query Language OPC HDA and APIs
- Easily Merge Lab and other Offline Data with MergeWorX
- OPC, OPC UA, BACnet, SNMP, SQL, and Web Services
- Cloud Hyper Historian for Microsoft Azure

Hyper Historian can use Swinging Door data compression for storing huge volumes of quickly changing data. But, even without the Swinging Door data compression, it is capable of logging more than 250,000 data events per second on reference hardware for real-time, enterprise-wide information.

Hyper Historian also has robust, built-in software redundancy for mission-critical applications that require uninterrupted access and collection of data. Automatic store-and-forward technology ensures data integrity, in the event of system upset or communications disruption. Hyper Historian uses advanced data integration, providing unsurpassed connectivity to any device via OPC UA, OPC HDA, OPC XML, SNMP, BACnet or database values. Users can easily collect information from multiple plants, facilities or throughout the enterprise.

Data sources such as PLCs, I/O devices, HMI applications and network devices can be collected and stored for reporting and analysis.

Hyper Historian includes an industry standard SQL Query interface, enabling tight integration with Microsoft SQL-compatible database such as Microsoft SQL Server. Hyper Historian also has a unique, automated archiving feature that allows for routine or triggered scheduling of data archives, freeing up disk space and backing up files for long-term storage and/or retrieval.

Workbench inside Hyper Historian features a thin client, optimistic concurrent design, acting as the central configuration environment and operator interface. The runtime operational interface allows for complete visualization of real-time and historical data with 2D and 3D charts. Workbench's advanced configuration console performs complete service management and has integrated layout/project management and remote pack-and-go deployment capabilities.

From Workbench, operators can add fully customizable 3D trends and charts. Users can choose from a wide library of 3D charts such as X vs. Y, logarithmic, bar graph, strip chart recorder,

circular and more, to build clear and accurate representations of real-time and historical data. Intuitive ribbons and galleries help to customize trends by adding color, gradients, smooth animation, translucency/glass effects, anti-aliasing and more, making data analysis clear and straightforward. Users can drag and drop sources during runtime and view multiple trends simultaneously.

Users can trend production numbers against a target. Data can also be exported in tabular formats, and it is possible to enter operator comments, as well as manage lab data and audit trails in accordance with FDA 21 CFR Part 11 policies.

Hyper Historian can also connect with the entire ICONICS BizViz Manufacturing Intelligence/Business Visualization suite, to create best-in-class reporting, analysis, portal, or data bridging applications.

For additional information about ICONICS products, please visit the ICONICS website at www.iconics.com.

5.3 Hyper Historian Configuration - Workbench

Hyper Historian is configured through Workbench, an integral part of Hyper Historian and ICONICS Suite. Workbench loads as part of the Hyper Historian installation and is a multi-functional, centralized, configuration environment.

Workbench can also provide service management and has integrated layout/project management and pack-and-go deployment capabilities.

5.4 Starting the Hyper Historian Configuration Workbench

Launch Workbench from **Start**, > **ICONICS Product Suite** > **Workbench**, then go to **Historical Data** > **Hyper Historian**.

5.5 Using the Hyper Historian Configuration Workbench

5.5.1 Starting and Stopping the Hyper Historian Logger

The Hyper Historian Workbench contains a stoplight icon in the ribbon that lets you start or stop the Hyper Historian services.

If you are using Hyper Historian Standard Edition, the stoplight will start or stop the high-speed, in-process version of the Hyper Historian Logger and Collector.

If you are using Hyper Historian Enterprise Edition, by default the stoplight will start or stop the OPC UA-based Hyper Historian Logger and Collector, which allows for remote data collection and redundancy support.

Users of the Enterprise Edition also have the option of running the In Process version of the Logger and Collector if redundancy and remote data collection are not required.

5.5.2 Configuring the Hyper Historian Logger to Auto Start

From within Workbench, select your project name in Project Explorer, then click the **Configure Services** button or icon in the **Home** tab. Scroll to the **ICONICS Hyper Historian Logger** service, and change the **Start Mode** to **Auto**.

You may wish to configure these other ICONICS Hyper Historian services to auto-start:

- **ICONICS Hyper Historian Collector** – The out-of-process collector, available only with Hyper Historian Enterprise licenses. (Hyper Historian Express or Standard licenses will use the in-process collector, which runs as part of the Logger service. This service will perform no work when using an Express or Standard license.)
- **ICONICS Hyper Historian OPC HDA Server** – Provides Hyper Historian data to third party OPC Classic HDA clients.
- **ICONICS Hyper Historian Query Interface** – Provides a SQL-like query interface to retrieve Hyper Historian data.

Next to the Start Mode column is the Status column which can be in Running, Stopped, or Start (Pending) modes. To change the status of a service, click the traffic light icon in the left column.

5.6 Initial Hyper Historian Setup

Before using the Hyper Historian for the first time, you should use the **Historical Data > Hyper Historian > System Administration > System Settings > File Logger** tab to set:

- Data Store Directory
- Archive Data Store Directory

The Data Store Directory is the location where the Hyper Historian stores the plant data it collects. The default folder for the Data Store Directory is
C:\ProgramData\ICONICS\HyperHistorian\Data\Data Logger.

It is important to change this default path, especially if the C: drive has a low amount of free storage space.

The Archive settings tell the Hyper Historian whether it is to automatically detach older data from the system, and if it is to remove the old data, the folder location it should move this data to.

The rest of the system settings have default values that facilitate the initial start-up and operation of the Hyper Historian. For more information on the other settings, refer to “Configuring System Settings” in this guide.

5.7 Hyper Historian Tag Organization

The primary element for the grouping of tags is the **logger**. For each logger that is created, Hyper Historian creates a series of similarly named binary files to hold the plant historical data. The file creation and automatic archiving functions are based on the logger. You may create multiple loggers.

Before you begin, analyze the data you want to collect and how long you want the data to be kept online in Hyper Historian. Data that is kept online for longer periods of time should be grouped together in one logger. Data that is to be kept online for shorter periods of time should be grouped in a second logger, and so on. For example, if you want to have some data kept online for a year, some data for three months, and some for one month, you should create at least three loggers, one for each of the desired time ranges.

Loggers are made up of one or more **logging groups**. Each logging group may contain one or more **collector groups** and/or **aggregate groups**. The collector and aggregate groups are made up of **tags**, whose data is to be logged. **Note:** Logging groups can be enabled or disabled using the Configurator and can be enabled or disabled online as well.

5.8 Configuring a Hyper Historian Logger

To add a new logger, drill down **Historical Data > Hyper Historian** and right-click the **Loggers & Groups** section and select **+ Logger**. Each Logger creates a data file on the hard drive to store the collected plant data.

You will need to specify the conditions for when the Hyper Historian should create a new data file and close the current, existing file. This is used to control the amount of plant data or the time frame for the plant data that should be logged to each file. The conditions can be based on a time interval, or a list of specific dates and times.

Refer to the Hyper Historian online Help for more information about how to configure a Disk Logger and set up archiving for it.

5.8.1 Deleting a Hyper Historian Logger

Before deleting a Hyper Historian Logger, you should first verify that there are no Logger Groups using the Logger that is to be deleted. If any Logger Groups are assigned to the Logger, they need to be deleted or assigned to another Logger first.

Once you delete a Logger, the data that was previously logged as part of the group will no longer be available for playback in the trend display nor in the SQL Query Interface.

To delete a logger, right-click it, and then select **Delete** from the menu. You will see a confirmation dialog box prompting you to proceed.

5.9 Configuring a Hyper Historian Logging Group

To edit or add a new Hyper Historian Logging Group:

1. Drill down **Historical Data > Hyper Historian** and right-click the **Loggers & Groups** section and select the Logger for the group. Then click **+ Add Logging Group**. Enter the **name** of the Logging Group.
2. Ensure the **Enabled** checkbox is checked.
3. Select the Logger that this Logging Group is to belong to from the **Snapshot Logger** drop-down list.
4. Click the **Apply** button.

5.10 Configuring a Hyper Historian Collector Group

To edit or add a new Hyper Historian Collector Group:

1. Drill down **Historical Data > Hyper Historian > Loggers & Groups** and select the Logger and Logging Group for the Collector Group to be created. Then click **+ Add Collector Group**. Enter the name of the Collector Group.
2. Select the Collector from which this Collector Group is to get its data from the drop-down list.
3. If the **Collector overwrites Source Timestamp of data with its actual UTC time** is checked, the Hyper Historian logger applies its own time stamps to the collected data instead of using the time stamps provided by the OPC Server. This feature can be used if the OPC Server cannot provide accurate or reliable time stamps.

4. Specify the Data collection rate. The data collection rate is the rate at which the Collector collects the raw data samples from the data source.
5. Specify the Calculation period. The Calculation period is the frequency of which the Collector is to perform its Advanced Filtering calculations for the tags within this group. (For more information on the Calculation period, see section 5.11, "Configuring a Hyper Historian Tag" later in this section.)
6. If you wish to set a **Collecting Condition**, click the **Collect On Condition** checkbox. The condition can be based on a trigger. To select a conditional trigger, browse for the trigger by clicking the ellipsis button [...] on the right side, or type in the trigger name.
7. Enter the Description of the Collector Group.
8. Click the **Apply** button to save the changes.

The **Refresh** button refreshes the screen with the current configuration settings for the collector group by reading it from configuration database.

Once the Collector Group has been created, you can access further options by right-clicking the group in the left-side navigation pane. Options include Edit, Delete, Paste, Cut, Copy, Multiply, Refresh, and Refresh Parent.

5.11 Configuring a Hyper Historian Tag

To edit or add a new Hyper Historian tag to collect data from a signal:

1. Select the **Data Collections** section of the Hyper Historian Project Explorer and click **+ Tag** to add a tag. This opens the New Tag tab.
To create a folder of tags, click **+ Folder** instead. There are also buttons to add specific types of tags, calculated conditions or events, or add multiple tags at once.
2. Enter a name for the tag.
3. Select the signal to be logged by clicking the ellipsis button [...] to the right of the **Signal Name** field and browsing for the tag whose data is to be logged.
4. Enter a **Description** for the tag.
5. Select the Collector Group this tag belongs with in the **In Group** field.
6. Select the **Data Type** from the next drop-down list. Options include Native, Boolean, Int8, UInt8, Int16, UInt16, Int32, UInt32, Int64, UInt64, Float32, Float64, String, DateTime, and Duration.

Note: Hyper Historian requests the selected data type from the data source (that is, the OPC server). The UInt64 and Float64 data types are not supported by OPC DA Servers running on Windows 2000.

7. Click the **Support Operator Comments** to enable this feature if it is desired.
8. Select the **Stepped Interpretation** option if desired.
9. Enter the **Engineering Units**.
10. Enter the ranges for the **Range** in the provided text entry fields. Note, these limits are used by the filter algorithms. For more information, see the "Deadband Filter Configuration" and "Swinging Door Filter Configuration" sections in this guide for information on how the limits are used.
11. If desired, apply **Filtering** to the tag by selecting either **Deadband** or **Swinging Door** in the **Filter Type** dropdown menu.
12. If you enabled a **Deadband** filter, select the type of deadband filter to be used (Absolute or Percentage) and enter the filter setting.
13. If you enabled a **Swinging Door** filter, enter the Threshold settings and the Period settings.
14. Open the **Logging Options** tab of the dialog and select the **Aggregate Type** option. You can request that all collected raw samples be logged, or you can alternatively request the Hyper Historian to perform an advanced filter. The Advanced Filter options include Moving Minimum, Moving Average and Most Recent On Time.
If you choose an advanced filter such as the Moving Average, the Hyper Historian collector will perform the Moving Average calculation on the raw samples over the defined calculation period (defined when setting up the Collector for the tag). The result of the calculation will be logged at the end of each calculation period.
15. The **Aggregates** tab is described later in this section where aggregate folders and aggregate tags are described. For information about the **Tag Logging Options** tab, refer to the Hyper Historian online **Help**.
16. Click the **Apply** button to save the changes.

5.11.1 Logging Options Configuration

The Logging Options configuration allows you to specify if all samples collected by the Collector are to be logged to disk or if the collector is to aggregate samples instead. The Aggregate Type options include:

- All Samples
- Max (Maximum)
- Min (Minimum)
- Avg (Average)
- Std. Dev (Standard Deviation)
- Running Max
- Running Min

- Running Avg
- Moving Avg
- Moving Max
- Moving Min
- Totalizer
- Most Recent On Time

The calculation period for the Aggregate Type is specified in Collector group configuration.

5.11.2 Deadband Filter Configuration

The Deadband filter is performed by the Collector on incoming data. It serves as the front-line for all the filtering logic. The deadband filters out values based on difference of values of consequent changes – if the difference is below a defined threshold, new value is ignored.

Parameters:

Deadband configuration is straightforward:

- It can be either disabled or enabled.
- If enabled, it is possible to configure its range.
 - As an absolute value (non-negative)
 - As a percentage of value range (max - min) defined for the tag

Note that the value configured is the minimum difference between values to allow subsequent values to become a “base value” for deadband ranges. The actual range around base value spans both up and down.

5.11.3 Swinging Door Filter Configuration

The Swinging Door filter is a generalization of a deadband filter. It is implemented by the Logger on incoming values it receives from the Collector. It serves as the last line of filtering logic. The swinging door filters values based on difference of later values based on a linear trend – if the difference is below a defined threshold, any new values are ignored.

Detailed operation

Swinging door filters values that follow certain linear trends. It starts with one value (the first one is always forwarded to storage).

Two tangents are considered, originating above and below the base value in a defined filter range. Tangents are effectively defined by the second value in filter. As the Logger processes subsequent values, the tangents are adjusted to form a geometrical region encompassing all values in filter so far.

Geometrically, as long as tangents don't intersect prior to the base value (i.e., the region defined by tangents is not broadening – hence the commonly-used filter name), the filter is valid.

When a new value causes the region to open, the filter is flushed – the last value prior to breaking one is dumped to storage and the filter is reinitialized using that value and the breaking one.

There are certain guarantees about the maximum deviation of filtered values (the difference of ignored values from the stored trend can't be higher than the distance between points used to draw tangents above and below the base point, for example).

Parameters: Filter configuration is similar to deadband:

- It can be either disabled or enabled.
- If enabled, it is possible to configure its range.
 - As an absolute value (non-negative)
 - As a percentage of value range (max - min) defined for the tag

Besides these parameters, there are two additional ones:

- Minimum distance between values
 - If two subsequent values are closer (timewise) than defined threshold, the new value is ignored.
- Maximum distance of values
 - If the distance between the last stored value (physically) and an incoming value is higher (timewise) than the defined threshold, the filter is flushed as if the new value would be one to break the filter.

Calculated Tags

In Hyper Historian, you can use calculated tags and calculation triggers to configure complex calculations. You can use performance calculations to provide totals over time or statistics for analysis. These calculations are performed only on historical data stored in Hyper Historian.

You can also use these calculations for setting up alarms or faults for certain conditions that may occur over time.

For example, you may want to schedule maintenance for a machine every 10,000 hours of run time or every 1,000 cycles. In this case, you can create a calculation tag that calculates the

amount of time the tag is in the TRUE state, and another calculation tag that counts the number of times the machine has been switched on. A third calculation tag can monitor the incoming values for the first two tags and can generate an alarm when a predetermined threshold has been reached for maintenance.

Performance calculations can be triggered periodically or on any data change event, using a flexible new date/time and many different mathematical, string and historical data retrieval functions that are part of the ICONICS Expression Editor. Calculations can use scalar values, historical values, or string operations, along with a wide variety of functions within an enhanced version of the ICONICS Expression Engine, and results are calculated automatically on each trigger, or can be recalculated manually on demand.

Calculated tags take as their input normal incoming values from Hyper Historian tags and perform calculations on historical data. The results of these calculations are stored in the Hyper Historian database. You can nest calculated tags so that they can be used as input to other calculated tags. These calculations are triggered using calculation triggers – these are triggers that are created specifically for use with calculated tags. Calculation triggers are different than regular triggers because they can point to historical dates and times, whereas regular triggers cannot.

Calculation triggers also make use of special functions that are available only to them, for use with calculation tags.

Configuration of a new Performance Calculation tag is easy. Simply add a new Calculated Tag in the existing hierarchical structure of the Hyper Historian Workbench configurator; you can organize calculated tags in folders and subfolders.

Each Performance Calculation appears as a new tag in the Hyper Historian browser, and can therefore be accessed, replayed, analyzed, and reported on just like other Hyper Historian data values.

Hyper Historian offers several preconfigured calculations out-of-the-box such as standard deviation and variance, and you can customize your own Performance Calculations using the Expression Editor, with equation parsing and syntax checking.

To configure calculated tags, you must do the following:

- Add calculated tags to the folders where you store your Hyper Historian tags.

- Create calculation triggers that will execute the calculations and add these triggers to your calculated tags.
- Set up recalculation options in the System Administration node.

5.11.4 Configuring a Calculated Tag

To create a calculated tag in Hyper Historian, follow the steps on the following pages. Each calculated tag that you create will store calculated values in the Hyper Historian database. You will be creating the calculated tag in the folder where the Hyper Historian tags you will be using as input are located. This is for organizational purposes only.

The calculated tags that you create can reside anywhere in the Data Collections node. In fact, you can put them into a folder of their own if you like.

1. In Workbench, make sure you are looking at the Hyper Historian provider. Expand the Data Collections node so that you are in the folder where you want to create the calculated tag.
2. Right-click the folder where you would like to add a new calculated tag, and select **Calculated Tag**, as shown below. This opens the Calculated Tag window with the Properties tab on top.
3. In the Hyper Historian Calculated Tag form that opens (shown in the following figure), enter a name and display name for the calculated tag.

Leave the **Enabled** checkbox unselected until you are ready to begin using the calculated tag. Enter a description that describes how the calculation is used; include information that will be helpful for later maintenance of the tag.

4. Put a check mark next to **Stepped interpretation** to enable this feature if it is desired. The Stepped Interpretation check box is used primarily during playback, for interpreting the tag's data values. This feature is applied only if you request a value for a certain point of time. The returned value will be the nearest older value available. In general, if the data comes from a discrete signal such as an on/off switch (or a Boolean data type), put a check mark in this box; but if data comes from a sine wave or analog signal, leave the box empty.
5. You can optionally put a check mark in the **Support Operator Annotations** check box to allow operators to comment on the signal in displays. Later, as the tag's data values play or replay in the Trend Viewer, you may want to be able to annotate the tag's data values as you see them trending before you.

For example, you may want to note an operator action that altered the data slightly or highlight a piece of data for analysis later.

Putting a check mark in the Support Operator Annotations check box allows you to do that.

Such annotations are saved with the tag's data in its logger file, which makes the annotations available in a replay, accessible to the Hyper Historian SQL Server Interface, and archived with the tag's data.

6. Select the data type from the **Data Type** drop-down menu. Among the options available to you are: Native, Boolean, Int8, UInt8, Int16, UInt16, Int32, UInt32, Int64, UInt64, Float32, Float64, String, DateTime, and Duration.
7. Enter the **Range** of acceptable values for the data. These values are used by the filter algorithms to remove anomalous data.
8. Enter the **engineering units**.
9. In **Min. Sample Distance**, specify the **minimum** amount of time between samples. This option is helpful for limiting samples from high-frequency sampling.
10. In the **Triggers** section, add the triggers that determine when the calculations will occur. The triggers that you can add here are calculation triggers that must be predefined as described in the "**Configuring a Trigger**" topic that follows. Note that you can use the **Up** and **Down** buttons (on the right) to sequence triggers in the list. The sequence becomes important only when two triggers execute at the same time; the trigger that is higher in the list will execute first.
11. Now go to the **Expression** tab to create an expression for the calculation. This expression may include the following:
 - The **tag or tags** whose data is to be used as input to the calculation. This can include values from Hyper Historian tags and signals as well as values from other calculated tags.
Clicking the **Variables** button will open a dialog box that lets you choose any tag that is in the Hyper Historian tree in Project Explorer.
 - The **historical time frame** from which data is to be taken. The time frame should be relative to the execution date and time determined by the triggers. Do not hard code dates into the expression unless you always want those exact dates to be used for the calculation.
 - Any **additional selection criteria** to be used.
 - The **calculation** to be performed. Click the **Arithmetic**, **Relational**, **Logical**, **Bitwise**, and **Functions** buttons to incorporate syntactically correct elements into the calculation. Note that several functions that are specific to calculated tag logic have been developed for use.
12. Click the Syntax button at the bottom of the window to check the logical syntax of the expression. Make any necessary corrections.

13. When you are satisfied with the calculation, make sure you put a check mark in the **Enabled** check box.
14. Click **Apply** when you are done.
15. At this point you can test the calculated tag to make sure the expression is calculating the result you are looking for.

5.11.5 Creating a Calculation Trigger

In Hyper Historian, you create calculation triggers that cause the Performance Calculation Engine to evaluate calculated tags. (For more about calculated tags and their use, refer to the previous Calculated Tags topic.) Once you have created a calculation trigger, you can add it to the calculation tags for which it will execute calculations.

Calculation triggers are much like regular triggers except that they are designed to work with historical data. This topic describes how to create time triggers and data triggers for use with Hyper Historian calculated tags.

As you can see in the figure below, calculation triggers get their own **Calculation Triggers** node in the Hyper Historian tree structure in Workbench Project Explorer. This is where you will create and store the calculation triggers that you create for executing calculations for calculated tags.

In the Calculation Triggers node, notice that Periodic triggers are identified with a clock icon, and Sample Triggers with a "X=" icon. This topic describes Periodic Triggers for Calculated Tags and Sample Triggers for Calculated Tags.

5.12 Periodic Triggers for Calculated Tags

A Periodic trigger defines specific times at which the trigger is to fire. When you add a Periodic trigger to a calculated tag, the tag's calculations fire at the times indicated by the Periodic trigger. The calculated tag can have any number of triggers associated with it, but a trigger must be enabled to fire. If it is not enabled, it won't fire.

To create a Periodic trigger for calculated tags in Hyper Historian, follow these steps:

1. In the Hyper Historian Project Explorer in Workbench, expand the tree so you can see the **Calculation Triggers** node.
2. Right-click the Calculation Triggers node and select **+ Time Trigger**. The Hyper Historian Time Periodic form opens, as shown below.

3. Enter a name and display name. Enter a description that aptly describes the trigger and how it is used.
4. Enter a **Processing Phase**, which determines this trigger's relative priority if multiple triggers are activated at the same time.
5. Specify whether the trigger runs based on **UTC** time or **local** time on the server.
6. For the **Recurrence Type**, specify whether you want the trigger to run at a specified **Time Interval**, or on **Specific Dates and Times**.
7. Click the **Preview** button to see a display of the exact times at which the time trigger will fire.

Previewing the times is helpful if you are configuring a complex recurrence pattern; it can help you to understand whether you have configured it properly or not.

8. When you are done, make sure that the **Enabled** check box is checked and click **Apply**.
9. Now you can associate the trigger with a calculated tag as described in the process for "Configuring a Calculated Tag" above.

5.13 Sample Triggers for Calculated Tags

When you add a Sample Trigger to a calculated tag, the tag's calculations fire when the value of a data point equals a specified value or condition. For example, it can fire when a machine switch gets set to on, or TRUE. A calculated tag can have any number of triggers associated with it, but a trigger must be enabled to fire. If it is not enabled, it won't fire.

To create a Sample Trigger for calculated tags in Hyper Historian, follow these steps:

1. In the Hyper Historian Project Explorer in Workbench, expand the tree so you can see the **Calculation Triggers** node.
2. Right-click the **Calculation Triggers** node and select **+ Data Trigger**. The Hyper Historian Sample Trigger form opens, as shown in the following image.

3. Enter a name and display name. Enter a description that aptly describes the trigger and how it is used.
4. Enter a **Processing Phase**, which determines this trigger's relative priority if multiple triggers are activated at the same time.
5. In the **Trigger On** drop-down list, choose the condition in which the trigger is to fire. The trigger can fire upon **Any Datapoint Change** or using an **Expression** in which you can specify any condition to execute the trigger. For more information about creating an expression that fires, refer to the "Expression Editor" topic in your Hyper Historian online help documentation.
6. In the **Data point** field, specify the tag for the data point to be tested by the trigger.
7. Specify whether you want to **ignore Bad** or **Uncertain quality** tags.
8. When you are done, make sure that the **Enabled** check box is checked and click **Apply**.
9. Now you can associate the trigger with a calculated tag as described in the process for "Configuring a Calculated Tag".

5.14 Organizing Tags into Folders

A Hyper Historian folder can be useful to gather individual Hyper Historian Tags. To add a new folder:

1. Right-click **Data Collection** and select **+ Folder**.
2. Enter a name in the text entry field and a description.
3. Click **Apply** or **Refresh** to proceed.

You can now create a Hyper Historian tag on the same level as the Data Collection or within a newly created Hyper Historian folder. Right-click either a data collection or a hyper historian folder and select **Tag** to proceed.

5.15 Configuring a Hyper Historian Aggregate Group

In this version of Hyper Historian, an aggregate group represents an interval for collecting data from one or more OPC tags in a logging group. For example, you may have a logging group for which you want to collect data every 2 minutes, every 30 minutes, every 12 hours, at the end of each day, and at the end of each week – so you would create an aggregate group for each of these time intervals.

To edit or add a new Hyper Historian Aggregate Group:

1. To add an Aggregate Group, navigate to the **Loggers & Groups** area in the Hyper Historian Project Explorer, right-click the Logging Group, then click **+Aggregate Group**.
2. Enter the name of the Aggregate Group.

3. Specify the **Calculation Period**. The calculation period is the interval at which the Hyper Historian Logger is to perform the aggregate calculation.
4. Specify the **Percent Good** amount that the data must satisfy for the aggregate to be considered "good," as well.
5. Decide whether you want to treat uncertain data points as bad.
6. Enter a **Description** of the Aggregate Group.
7. Click the **Apply** button to save the changes.

5.16 Configuring a Hyper Historian Aggregate Tag

5.16.1 Behavior of Aggregate Tags

Hyper Historian provides functionality to evaluate OPC HDA aggregates of managed tag data on the fly – each such configured evaluation is called an **aggregate tag**. An aggregate tag is defined in the tag configurator using the **Aggregates** tab; here you simply define the aggregate groups to be used for an OPC tag. (Aggregate tags no longer appear as nodes in the navigation tree.)

The aggregate tag's name is generated automatically, using the aggregate evaluation properties (the name of aggregation type and the sampling rate) that you define for it. The aggregate name abbreviates these properties, so a longer, more descriptive Display Name is available, too.

When a new aggregate tag is defined, its values may get evaluated backwards as well, depending on the value of ancestor sampling group's property "recalculate all"; however, changing the property value has no effect on currently defined tags.

You have the option of disabling an existing aggregate tag's evaluation so that its value changes are ignored. Note that a disabled aggregate tag can be re-enabled again at any time.

Evaluation of Sampled Data

The Aggregate Tag evaluation runs in the background independently, and its results are stored in the Hyper Historian logger based on the parameters defined for it. The evaluation abides to simple rules:

- R1: Evaluation logic monitors incoming data values and reevaluates aggregates whose values might change as a result of changed source data.

- R2: The evaluation is performed periodically on specified time intervals where data is detected as *changed* since the last evaluation; the initial evaluation of an interval occurs with at least a 1-minute delay.
- R3: Sampling intervals are aligned to the nearest earlier occurrence of the nearest higher time bin boundary. For example, a sampling rate of seconds yields sampling intervals aligned to a minute – having a sampling rate of 5 seconds yields intervals starting at +0, +5, +10...+55 seconds within a minute.
- R4: Note, however, that sampling rate value that is not a divisor of the given time bin may yield anomalies in sampling interval alignment during re-evaluations. For that reason, you should restrict available sampling rates to divisors.

5.16.2 Aggregate Tag Configuration

To edit or add a new Hyper Historian Aggregate Tag:

1. Double-click the Hyper Historian tag for which you want to define aggregates. The tag's configurator opens.
2. Select the **Tag Aggregates** tab. Here you can define any number of aggregates to be collected for the Hyper Historian tag. For each aggregate, specify the information described in the steps that follow. Note that an informative **Aggregate Name** and longer **Display Name** are generated for you automatically.
3. Select the **Enabled** check box to collect data for the aggregate.
4. Select the **Aggregate Type**. The following types of aggregates are supported by the Hyper Historian:
 - Annotation Count
 - Average
 - Count
 - Delta
 - Delta, with bounds
 - Duration Bad
 - Duration Good
 - End
 - End, with bounds
 - Interpolative
 - Maximum
 - Maximum Actual Time
 - Maximum Actual Time, with bounds
 - Maximum, with bounds
 - Minimum

- Minimum Actual Time
 - Minimum Actual Time, with bounds
 - Minimum, with bounds
 - Number Of Transactions
 - Percent Bad
 - Percent Good
 - Population Standard Deviation, N
 - Population Variance, N
 - Range
 - Range, with bounds
 - Sample Standard Deviation, N-1
 - Sample Variance, N-1
 - Start
 - Start, with bounds
 - Sum
 - Time Average, with bounds
 - Time Average, with complex bounds
 - Total
 - Total, with bounds
 - Worst Quality
 - Worst Quality, with bounds
5. Select the **Aggregate Group** that has the calculation interval you want to use for the aggregation. If you don't see the group, you are looking for in the drop-down list, click the **Refresh Aggregate Groups** button, then try again. The Aggregate Group must be created before it can be selected.
 6. You can optionally set an override (in hours, minutes, and seconds). To do so, put a check mark in the **Override Calculation Period** check box in the **Logging Options** tab and set the hours, minutes, seconds and/or milliseconds for the override.
 7. Click the **Apply** button to save the changes.

5.17 SPC Configuration in Hyper Historian

For Quality AnalytiX customers, SPC configuration is included in your installation of Hyper Historian. This enables you to configure rules and tags related to SPC charts that monitor the capability and reliability of your system. First you configure *rules* that then apply to specific *tags* that you configure for display in SPC and histogram charts.

For more in-depth instructions regarding the configuration of SPC distribution rule sets and tags, consult your online documentation for Hyper Historian or Quality AnalytiX.

Configuring SPC Distribution Rules

To configure an SPC distribution rule in Hyper Historian:

1. Navigate to the SPC Distribution Rules area of the Hyper Historian Project Explorer.
2. Right-click the "SPC Distribution Rules" folder and select **+ SPC Distribution Rule Set**.
3. Enter a name and a description for the rule set.
4. In the **Rules** area, click the "Enabled" check box to add a rule to the rule set.
5. Specify one of the following rule types:
 - a. Outside Sigma Limit
 - b. Outside Upper Sigma Limit
 - c. Outside Lower Sigma Limit
 - d. Outside Sigma Limit Single Side
 - e. Trending
 - f. Trending Up
 - g. Trending Down
 - h. One Side of Center Line
 - i. Above Center Line
 - j. Below Center Line
 - k. Within Sigma Limit
 - l. Alternating
 - m. Alternating Lower Sigma Limit
6. Enter the number of total values, a violation count, and sigma total (NSigma) associated with your rule.
7. Press the **Up** and **Down** arrow buttons to adjust the relative priority of the rules in the rule set. Rules appearing closer to the top of the chart receive higher priority.

Configuring SPC Tags

To configure a tag for use in SPC charts and reports:

1. Navigate to the Data Collections area in the Hyper Historian Project Explorer.
2. Right-click the folder that should contain the SPC tag and select **+ SPC Tag**.
3. Give the SPC tag a name, an optional display name, and a description.
4. In the Properties section, select the logging group and data source that should be associated with this SPC tag.
5. In the Properties section, select the SPC distribution rule set that this tag should follow.

6. In the Properties section, select the summary statistics **Collection Type** for the tag. For this example, choose MedianR to see all possible settings.
7. In the Properties section, set the **Hi Limit** and **Lo Limit** for the chart displaying data from this tag.
8. In the Properties section, specify any triggers that, when activated, cause the tag to associate incoming data from the data source with a new group of values.
9. In the Control Limits tab, specify whether the control limits associated with this tag should be constant values or based on the tag's data.
10. In the Statistics tab, specify the types of summary statistics that Hyper Historian should calculate for this SPC tag.

5.18 Configuring a Trigger

5.18.1 Starting Triggers

If you already have a component running with Workbench, navigate to **Triggers** or **Actions** > **Triggers**.

5.18.2 Creating a Trigger

To create a new trigger, expand the **Triggers** selection (next to the lightning bolt icon) to show the trigger options.

5.18.3 Configuring a Data Trigger

1. To add a new Data Trigger, right-click **Data Trigger** and then click **+ Data Trigger**.
2. Ensure the **Enabled** checkbox is checked.
3. Enter the **Name** for the trigger.
4. On the Basic tab, enter the optional **Description**.
5. On the Basic tab, select the Trigger type. The following types are supported:
 - On any data change (event)
 - When data tag changes to TRUE
 - When data tag changes to FALSE
 - While data tag is TRUE
 - While data tag is FALSE
6. On the **Basic** tab, select the data tag that is to be monitored and used as the basis for the trigger. You can browse for the tag or type in (or copy in) the tag name.

7. On the **Advanced** tab, enter any of the optional advanced trigger conditions, as desired or needed.

The (optional) advanced conditions include:

- Time zone (either local server time or UTC)
- Start time for monitoring the data tag
- Stop time for monitoring the data tag
- Trigger delay
- Trigger repeat function
- Trigger enable tag (the trigger is active only when this tag is TRUE)

8. Click the **Apply** button to save the changes.

5.18.4 Configuring a Time Trigger

1. To add a new Time Trigger, right-click **Time Trigger** and then click **+ Time Trigger**.
2. Enter the Name for the trigger.
3. Ensure the Enabled checkbox is checked.
4. On the **Basic** tab, you may enter an optional Description.
5. On the **Basic** tab, select whether the time trigger is to be a condition or an event. If it is a condition, the Trigger tag will remain TRUE for the specified duration time.
6. On the **Basic** tab, select the Recurrence type. The types include:
 - One time only
 - Time interval
 - Specific dates and times
7. If the Recurrence type is **One time only**, select the date and time the trigger is to occur.
8. If the Recurrence type is **Time Interval**, select the starting date and time, and the Recur interval.
9. If the Recurrence type is **Specific dates and times**, select the Recur interval. Note, depending on the units selected for the Recur interval, you will be prompted with different Recurrence details to enter.
10. On the **Advanced** tab, enter any of the optional advanced trigger conditions, as desired or needed. The (optional) advanced conditions include:
 - Time zone (either local server time or UTC)
 - Stop time for the Time Trigger execution
 - Trigger delay

- Advance notification
- Trigger enable tag (the trigger is active only when this tag is TRUE)

11. Click the **Apply** button to save the changes.

5.19 Node Setup and Redundancy

The Hyper Historian installation initializes the Node Setup and Redundancy configuration. Its default settings are for a non-redundant single workstation setup (that is, a non-redundant Hyper Historian logger with one local collector).

Use the Node Setup and Redundancy configuration to perform any of the following changes:

- Change the name or description of a collector or logger.
- Add or delete remote collector(s) (Enterprise Edition).
- Specify the redundancy settings for a collector (Enterprise Edition).
- Specify the redundancy settings for a logging server (Enterprise Edition).
- Set up Store and Forward to cache and forward data if the connection to a collector is lost (Enterprise Edition).

5.19.1 Configuring a Collector Node

1. To add a collector, right-click the Node Setup and Redundancy icon and select **+ Collector**.
Note: If you want to edit an existing collector, double-click the icon of the existing collector.
2. Enter the **name** of the collector.
3. Make sure the **Enabled** checkbox is checked.
4. Enter an optional **description**, if desired.
5. Specify information for the **Store and Forward** feature on the Store and Forward tab. This feature caches data if the connection to a collector is lost. When the connection to the collector is restored, the cache will be flushed, and the two (primary and secondary) databases will be automatically synchronized. Options are:
 - The **maximum storage size on disk** in megabytes
 - The **maximum storage size in memory** in megabytes
 - The **maximum number of packages** stored in memory
 - If you want the most recently collected data to be stored and forwarded before all other data, put a checkmark next to **Send Most Recent Data first**.
 - Your **discard policy** (discard oldest data first OR discard newest data first)
6. Next, select one of the following in the **Properties** tab:

- Select **In-Process Collector** if you have installed one collector that resides on the same server as the logger. Go to step 14 for your remaining options, then proceed to the next section, "Configuring the Logging Server" on page 5.20.
 - Select **Standalone Collector** if you have the Enterprise edition of Hyper Historian **and** one or more *separate* standalone collectors have been installed, then *follow the remaining steps, below the figure*.
7. From the **Protocol** drop-down list select the appropriate protocol. Which you choose depends on how the separate collector is configured to communicate with FrameWorX. Options include:
 - HTTP Direct
 - TCP Direct
 - HTTP over FrameWorX
 - TCP over FrameWorX
 - HTTPS over FrameWorX
 - WSHHTTPS over FrameWorX
 - Use Local FrameWorX as Mediator
 8. Enter a name for the **Primary Node** or select one from the drop-down list. The URL field below it will be pre-filled from your primary node selection. (To modify the URL, see step 12.)
 9. Now you have the option to create a backup node by putting a check mark next to **Enable Redundancy** in **Secondary Node**. Steps 10-12 assume you have proceeded with configuring a backup node.
 10. Enter a **name** for the secondary node or select one from the drop-down list. The URL field below it will be pre-filled from your backup node selection. (To modify the URL, see step 12.)
 11. Click the checkbox next to **Auto Fail-back** to switch from the secondary node to the primary node when the primary becomes active again.
 12. Click the checkbox next to **Use advanced configuration** to allow further configuration. Once the box is checked, you can click on the **Advanced Configuration** button at the bottom of the window to open the Advanced Redundancy Configuration window, where you can modify the Primary Node URL and/or Secondary Node URL directly. Note that changes to this configuration may require equivalent changes in the nodes configuration. Click **OK** to proceed.
 13. A heartbeat can be enabled for collectors to alert you to failed communication. To do so, click the checkbox **Enable Heartbeat** and select the data point that will record the result.

14. Compression can be enabled for both data and the configuration by selecting the compression type from the dropdown lists in the **Compression** section.
15. Click the **Apply** button to save the changes.

5.19.2 Configuring the Logging Server

1. To edit the Logging Server, double-click the icon of the existing Logging Server.
2. Enter the **name** for the Logging Server.
3. Ensure the **Enabled** checkbox is checked.
4. Enter an optional **description**, if desired.
5. Optionally, to make the server's historical data read-only, put a checkmark in the **Disable HDA Editing** checkbox. If you do this, you won't be able to edit any Historical data being logged on the server using *any* programmatic interfaces.
6. Now you have the option to click the checkmark next to **Redundancy** to enable it. *Steps 7-11 assume you have selected to enable **Redundancy**.*
7. Select your desired Protocol (HTTP or TCP) by using the drop-down list.
8. Enter a name for the **Primary Node** or use the drop-down list to select one. The URL field below will be pre-filled depending on your selected primary node. (To modify the URL, see step 11.)
9. Enter a name for the **Secondary Node** or use the drop-down list to select one. The URL field below will be pre-filled depending on your selected backup (secondary) node. (To modify the URL, see step 11.)
10. Click the checkbox next to **Auto Fail-back** to switch from the secondary node to the primary node when the primary becomes active again.
11. Click the checkbox next to **Use advanced configuration** to allow further configuration. Once the box is checked, you can click on the **Advanced Configuration** button at the bottom of the window to open the Advanced Redundancy Configuration window, where you can modify the Primary Node URL and/or Secondary Node URL directly. Note that changes to this configuration may require equivalent changes in the nodes configuration. Click **OK** to proceed.
12. A heartbeat can be enabled for collectors to alert you to failed communication. To do so, click the checkbox **Enable Heartbeat** and select the data point that will record the result.
13. Compression can be enabled for both data and the configuration by selecting the compression type from the dropdown lists in the **Compression** section.
14. Click the **Apply** button to save the changes.

5.20 Configuring System Settings

You will need to restart the Hyper Historian logger after making changes to the system settings. This can be done by clicking the traffic light icon in the top ribbon and waiting for it to turn red (indicating the logger has stopped) and then clicking it a second time to restart the logger.

5.20.1 Configuring License Mode

The Hyper Historian is available in two major editions, Standard Edition and Enterprise Edition. Both editions support the connectivity, data collection and logging, archiving, and data playback capabilities of the Hyper Historian.

In addition to supporting these core capabilities, the Enterprise edition includes support for remote or standalone distributed data collection, redundancy (both at the collector level and the data logger/database level), store and forward capability, and optimization for multi-core and multi-processor systems.

The Enterprise Edition is optimized for performance in a distributed data collection environment where the data collection is performed on separate machines, not on the PC/workstation running the Logger. The Standard Edition, on the other hand, is optimized for a single PC / workstation system where the entire Hyper Historian is running on one machine.

The Hyper Historian Enterprise Edition users can run Hyper Historian Logger in Enterprise or Standard mode if the Hyper Historian is running on a single PC/workstation (that is, a non-redundant single workstation). Running the system in Standard mode provides better logging performance and the possibility of achieving high throughput rates on a single PC solution.

In the **System Settings**, listed under System Administration in the Project Explorer, Enterprise edition users can set the License Mode.

1. Selecting the auto mode results in Hyper Historian using the mode version of Hyper Historian Logger and Collector that matches the configuration of the collectors (**InProc** if using local collectors, OPC UA version if using remote collectors). This is the default license mode for Enterprise edition users.
2. Selecting the standard mode results in the Hyper Historian using the **InProc** version of the Hyper Historian Logger and Collector, which is optimized for single PC/workstation performance.

3. Selecting the Enterprise mode results in the Hyper Historian using the OPC UA version of the Hyper Historian Logger and Collector, which is optimized for a distributed system, and one that supports redundancy, store-and-forward, and optimized performance on multi-CPU systems.

It is also important to set the **Disk Space Management** settings. With these settings, you can set:

1. The amount of disk space remaining (in megabytes) before you receive a warning.
2. The amount of disk space remaining (in megabytes) before you receive an error message, and the Data Logger stops logging.

5.20.2 Configuring Archive Settings

Use the System Settings for the overall configuration of the Hyper Historian Archive function. The Hyper Historian Archive function automatically detaches older data from the system and moves the detached data to a specified location (that is, a specified folder).

After archiving is enabled and the Hyper Historian has begun creating archived files, the archive files created by the Hyper Historian should be backed up to CD, DVD, tape, or some other *permanent* storage media for long term storage.

To open the Archive settings screen, expand **System Administration** in the Project Explorer, select **System Settings**, and verify the Options tab is selected. Note the additional tab called **File Logger**. Here you can set up archival parameters for your file logger. Each is described separately on the pages that follow.

Archival for File Logger:

To archive data from a file logger, click the **File Logger** tab. Use the **Cache, Logger, Master Logger, Logger Data Store**, and **Master Logger Data Store** sections to fine tune your archiving requirements.

Using the Hyper Historian Archiving Management

Once the Hyper Historian's logged data is archived (detached from the system), the data is no longer available for playback on the trend display or available through the SQL Query interface.

However, previously archived data can easily be reattached to the system and again made viewable on trend displays and accessible via the SQL Query interface. This is done via the Hyper Historian Archiving Management screen.

To access the Archiving Management screen, double-click the Archiving Management Icon located under the System Administration Icon in the Project Explorer. Your Archiving Configuration should be pre-filled from the information added within the System Settings.

You will then be able to re-attach previously archived files by clicking the button and browsing to the folder containing the archive files to be reattached. You can multi-select files (using the Shift or Control keys).

Note: The following naming convention is used for the Archive files: <Logger Name>_<Start Date>_<Start Time>_<End Date>_<End Time> where the format for the Date is yyyy/mm/dd and the format for the Time is hh/mm/ss.

The re-attached archive files will be listed in the Attached Archive Files window. If you had selected **Generate Metadata for Archiving Files** in the System Settings, that metadata would appear in the window to the right.

6 MOBILEHMI

6.1 Introduction

In an increasingly web-connected environment operators from many industries have begun benefiting from mobile applications aimed at providing optimized operational experiences for everyday tasks. Expectations of software companies have centered on providing limitless access to information over wired, wireless, and cellular connections. Due to this trend and the advance of mobile technologies, ICONICS has responded by completely renewing the MobileHMI product that is now available on the major providers of mobile devices – Microsoft, Apple, Amazon, and Google – ICONICS MobileHMI is a full HMI/SCADA client on any device.

Spanning desktops, tablets, and phones, ICONICS products have always been centered on visualization of data. With MobileHMI, tablets and phones now include a fully featured mobile client designed for operations on the go. With configuration enhancements meant to simplify development of screens for mobile users, it is easier to provide a clean experience on all devices without incurring the extra cost of development time. Additionally, preconfigured templates and the ability to target specific devices with displays makes MobileHMI ready to handle any composition of devices.

MobileHMI addresses the growing need for connectivity away from operator stations which allows personnel to access information from anywhere, reducing the time it takes for issues to be recognized and fixed. The availability on all devices with consistent experiences also serves to unify efforts to mobilize operational teams without requiring upfront investment in device standardization.

Built on Industry Open Standards

Using ICONICS' Platform Services, MobileHMI is built on universal connectivity, allowing users to connect to system data from anywhere in the world. Native implementations of connectivity protocols allow MobileHMI to provide an unparalleled view of a wide variety of data types.

Instant KPIs and Alerts

Instantly receiving KPIs and alerts day or night on your mobile device allows you to be informed 24/7. This enables managers to monitor performance metrics in real time and operators to receive updates on-the-go.

Quick Deployment to Any Device

Deployment is instant after downloading the free app, allowing remote monitoring of your enterprise immediately. Devices can include Microsoft Surfaces, Windows 8 Phones and tablets, Apple iPads and iPhones, Amazon Kindle tablets, and Android phones and tablets.

Dazzling Graphics, Alarms, Trends, Charts and Grids

With mobile optimized alarms and assets (categorized by importance), quickly view your top priority alarms and act faster with better information. Accessing the high-powered .NET graphical controls from any device reduces engineering time of mobile-ready displays and utilizes small screen sizes efficiently.

Overlay Real-time Data on Detailed Maps

Along with the real time data collected, implement mapping (integrated with Google, Bing, and ESRI map data) to show moving or geographically dispersed assets. Contextualize data into easy-to-comprehend information by positioning interactive assets virtually on a map.

Easily Design HMI Displays for Multiple Devices

Using GraphWorX64, create single displays that scale dynamically for any device, form factor or resolution. Vector graphics scale seamlessly allowing content created for one device to be resized for another without losing quality.

Standardized on ISA-95 Asset Navigation and Organization

Creating and navigating assets is easy using the ISA-95 organization. Allowing users to drill down for more data, the ISA-95 Asset Navigation can provide easy access to real world assets, as well as integrate commands to control their application.

Smart Tiles with an Intuitive Interface

ICONICS enables many natural user interface-based productivity features delivered by the latest smart devices. Smart Tiles are similar to Microsoft's Live Tiles but can be used within HMI displays on multiple devices.

Remote Monitoring of Critical Infrastructure

Remote monitoring with this application is ideal for industries such as Water & Wastewater, Wind, Solar and Renewable Energy, Process Manufacturing, Pharmaceuticals, Biotech, Oil & Gas and Electric Utilities. Remote Monitoring is also useful for the management of scorecards and Data Centers.

Ideal for Operators, Executives and Maintenance

This mobile solution allows operators to stay informed, even while traveling, by viewing assets with navigation. Executives can visualize business performance and improve enterprise-wide communications. With real-time updates and information delivered through remote monitoring, maintenance is easier than ever to plan and schedule.

KPIWorX Self-Service Dashboards

KPIWorX allows for the creation, saving and loading of dashboards, providing a user-friendly interface. Users can drag and drop data, configure widgets, split screens to add new widgets and save dashboards into a Favorites location. KPIWorX is accessible through MobileHMI as well as within GraphWorX64 (which can handle more complex displays).

KPIWorX contains several preconfigured widgets, such as gauges, process points, trends, alarms, and grids. Primarily a mobile feature, all functionality is also available on the desktop via HTML5-compliant browsers.

Augmented Reality – Location Services

Location Services are a group of Augmented Reality MobileHMI features that allow displays to automatically load and display data based on the users' location and proximity to devices and meters. These services include QR codes, barcodes, NFC, OCR, and GPS.

7 ANALYTIX

7.1 Introduction

Welcome to ICONICS AnalytiX®, a new generation of Manufacturing Intelligence software designed to help you increase profitability, reduce energy and maintenance costs, control operating costs, and react to emergent situations before they negatively impact your bottom line.

AnalytiX empowers decision makers at all levels of the enterprise with real-time information to help them drive global operational efficiency and strengthen competitive market advantage. ICONICS AnalytiX solutions leverage the latest Microsoft technologies including the Windows Server platform and SQL Server for rich, IT-friendly visualization components.

ICONICS AnalytiX is comprised of the following products:

- AnalytiX® Suite*
- Facility AnalytiX®
- CFSWorX™
- BI Server
- BridgeWorX64™
- ReportWorX64™

* The AnalytiX Suite installation is comprised of the following options:

- **Platform Services** – Core connectivity and communications layer shared between products
- **Facility AnalytiX** – Predictive Software for Facilities Management
- **Help** – Product Documentation

ICONICS AnalytiX Installation also includes Workbench multi-functional, centralized web-based environment.

This *Getting Started* manual explains how you can:

- Install the AnalytiX software.
- Familiarize yourself with and start using Workbench.
- Access online help and technical support.

Note: This manual is an abbreviated version of the full AnalytiX Help documentation, which is available in the AnalytiX product installation.

7.2 Quick Start

This chapter provides a brief overview of the following AnalytiX products and tools:

- Workbench
- Facility AnalytiX
- CFSWorX
- BI Server
- BridgeWorX64
- ReportWorX64
- Quality AnalytiX
- Additional tools and utilities

Note: For complete information about any AnalytiX product, please refer to the Help documentation, which you can launch from the ICONICS product itself.

7.3 Workbench

The ICONICS Workbench is a multi-functional, centralized web-based environment and is included as part of the Platform Services in the AnalytiX suite installation.

In Workbench, you can:

- Organize data sources based on a hierarchical structure of assets and equipment, using AssetWorX.
- Locate and react to Facility AnalytiX faults if the FDDWorX provider is installed.

Many configurations can be done from within Workbench.

To open Workbench from the Windows **Start** button, select **ICONICS Product Suite > Workbench**.

When you open Workbench for the first time, you will be able to see all the applications, tools, utilities, and services listed in the Project Explorer that you can open within Workbench.

It is made up of:

- The **Ribbon bar** (along the top).
- Two **Project Explorers** that you can hide or show:

- 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.

Ribbon:

The ribbon for Workbench is designed to help you quickly find the commands you need to complete a task. Commands are organized into logical groups.

The **Home** tab provides general tool bar functions and changes depending on the item that is selected in the Project Manager. In addition, ProjectWorX allows you to utilize new features for your database. Examples are shown below.

You can minimize the ribbon by double-clicking the ribbon tabs.

Development and runtime modes of all installed and licensed ICONICS (AnalytiX and GENESIS64) products can be accessed and used in Workbench.

Even though all the providers are available in Workbench, you can pick and choose which providers appear in Workbench Project Explorer.

7.4 Facility AnalytiX/FDDWorX

Facility AnalytiX is a predictive building automation solution powered by ICONICS' powerful FDDWorX engine with advanced Fault Detection and Diagnostics (FDD) technology at its core to detect and predict faults in equipment. It incorporates algorithms that weigh the probability of faults and advises management, operators, and maintenance personnel of actions to prevent equipment failures or excessive use of energy.

With Web-based configuration, Facility AnalytiX is easy to set up and deploy, integrating with the most popular BAS, SCADA and building systems. An extensive library of standard equipment diagnostic models speed setup and configuration, while a rules-based editor lets you easily customize and add new equipment diagnostics models.

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.

Information obtained from Facility AnalytiX can be used to:

- Predict, reduce, and eliminate equipment downtime.
- Automate fault detection and real-time notifications.
- Reduce maintenance and determine probable causes.
- Improve reliability and control.
- Improve overall environmental quality.

To configure Facility AnalytiX, open **Workbench**, then go to **AnalytiX > FDDWorX**.

7.5 CFSWorX

ICONICS CFSWorX is a Connected Field Services solution containing a set of digital tools that provide:

- Realtime Monitoring of Field Equipment
- Realtime Monitoring of Service Worker Availability and Location
- Alerts to Field Workers when Field Equipment Requires Service
 - Equipment status alerts (alarms) available to all Field Workers
 - Can auto-notify Field Worker(s) of Field Equipment Failures
 - Can Choose the Most Appropriate or Closest Service Worker
 - Monitors Responses from Notified Service Workers
 - May Notify Backup Worker(s) in case Primary is Not Available
- A Maintained Audit Trail of Notifications and Activity

CFSWorX is comprised of multiple entities including:

- Monitoring (of both Field Equipment and Field Workers)
- Workflows
- Alerting (via Notifications)
- Mobile App

7.5.1 Monitoring - Field Equipment

The monitoring of field equipment involves a backend of data source connectivity options (CFSWorX can work with any Platform Services real-time data source such as OPC UA, Modbus, SNMP, etc.) and a robust monitoring engine (using AlarmWorX64 Server, Platform Services, and AnyGlass Engine technology). The front end involves alarms (exposed as A&E events), and the mobile client (providing an alarm viewer for alarm details, alarm acknowledgment, and availability response options).

7.5.2 Monitoring - Field Worker Availability

CFSWorX can maintain a database of an organization's field workers. Users also have the option of syncing the database with third-party identity databases such as Active Directory or CRM. Users can also decide whether to sync external data or use local definitions - using information such as contact info (name, email, cell number for SMS, etc.) or CRM calendar. In addition, CFSWorX can associate ICONICS solution-provided data such as schedules (if not external), alarms, assets, mobile device health data (updated periodically), security ID, and groups.

CFSWorX also includes Field Worker Mobile Health Monitoring. This includes Signal Strength, Battery Life, and Location (GPS).

7.5.3 Workflows

CFSWorX utilizes a customizable workflow engine, based on existing ICONICS Workflow components. CFSWorX's workflow engine provides the ability to both receive and consume alarms. It also supports additional states (including rejected, busy, and accepted) via association between alarms and users. Generated alarms can be logged by ICONICS' alarm logger component, can be viewable by alarm viewer, and can be optionally sent via SMS or Email Alerts.

CFSWorX workflow includes transaction execution options, including alarm source. It also uses activity blocks, like those used within ICONICS Bridging and standalone Workflow components.

These include:

- Alarm Event Output
- Conditions Common:
 - Ack
 - Alarm
 - Normal
- Conditions CFS:
 - Fixed Contact List
 - Worker Lookup
 - Accept
 - Busy

- Reject
 - Assign
- Communication Channel Send
 - SMS
 - ATT
 - Twilio SMS
 - Twilio WhatsApp
 - Others (future)

Note that the following Workflow Blocks are not available for use with CFSWorX:

- CSV File Reader
- XML File Reader
- CSV File Output
- XML File Output
- Data Set Reader
- Historical Input
- Historical Alarms Input
- Bulk Real Time Input
- Bulk Real Time Output
- Bulk Data Manipulator
- Data Manipulator
- Data Set Transformer

7.5.4 Notifications

CFSWorX' Alert Engine architecture uses a REST API to work with third-party services. It supports SMS acknowledgements, as well as alarms. It also logs activity to an audit log. The pluggable architecture supports continued enhancements.

Users can configure both reliable and "best effort" Device Notifications. Reliable notifications utilize ICONICS' FrameWorX to FrameWorX Mobile technology to transmit alarms. This channel supports Error Notification as well as Retry. The "best effort" notifications involve SMTP (email) and SMS (text messaging) technologies.

That being understood, data sent in this manner cannot be guaranteed. These efforts are used only to notify users to launch a native application. Communications may go through a service provider such as ATT, Twilio, etc.

7.5.5 CFSWorX Mobile Displays

CFSWorX provides mobile displays for ICONICS' MobileHMI app, available for iOS and Android devices. It can collect and report mobile device health. It displays alarms in a MobileHMI Alarm Flip View. The mobile app supports CFS worker response options, including Accept, Busy, and Reject. The displays (including operator/dispatcher dashboards) are customizable.

7.6 BI Server

The landscape of data in today's applications is of very diverse nature: systems are made of a large variety of components, many of which have their own data storage and their own interface to provide access to stored data – whether it is a web service, a database, an historian, etc.

This scattering of information often makes it difficult to provide a cohesive view of a system and, even in cases where all the data can be visualized together, it might not be shaped logically for the end user. Correlating these different datasets with each other is challenging and trying to query them using a common set of filters or parameters is difficult.

AnalytiX-BI was created to address these problems. Data is organized in user-defined Data Models, representing collections of datasets that are logically related to each other, irrespective of their physical origin. Data Models are connection to actual data using Data Flows; ETL processes that allow multi-step transformations of the ingested data for better shaping and filtering before loading it in a model.

7.6.1 AnalytiX-BI Overview

There are many ways to use AnalytiX-BI, but the diagram below outlines the most common and most powerful architecture, and the way the pieces are designed to work together.

Following the data from the bottom up, your original data sources can be just about any piece of data that ICONICS can connect to, whether it be OPC, web services, Hyper Historian, AssetWorX, or a custom database. This data is pulled into data flows. Each data flow is a sequence of steps to modify and shape the data to best fit the data model. Data flows can be parameterized, so clients can get only the specific data they need.

Note: Data flows are not cached. Each time a data flow is accessed, the data is read from the data sources anew and all steps are followed.

Once the data has been shaped by data flows, it is pulled into data tables inside a data model. The data model defines relationships between the tables. These relationships make it easy to query the data. Data models cache the data and use several techniques to optimize memory use and performance. (See Performance Considerations.)

Data from a data model can either be queried directly by clients such as GraphWorX64 or KPIWorX, or the user can predefine views for a data model. Views can be based on the data tables, or on other views. Due to the predefined relationships, it is very easy to query the data model without having to worry about the proper JOINS between tables.

Since the data model is cached, triggers can be defined on each data table in the model to re-query its data source. Triggers can tell the table to be dropped and recreated anew, or only update the records that have changed. Each table can have multiple triggers, so you can define the best scheme to ensure your table is refreshed in the manner best suited for it. Triggers can work with parameters of data flows to only pull in data since the last data model refresh.

This architecture takes full advantage of all the features of AnalytiX-BI, but it is flexible, and many of its parts are optional. If there is no need to shape or parameterize your data, you can pull a data source directly into a table inside a data model without using a data flow. You can connect your clients directly to data flows without a data model if you only need to do some shaping and have no need to cache the data. You can forego views, and simply connect your clients directly to the model, writing your query within a point name.

7.7 BridgeWorX64

The Bridging provider in Workbench, based on ICONICS' BridgeWorX64 technology, provides graphical data bridging.

It also fully integrates with ICONICS Platform Services, including:

- Common Workflow Execution Engine
- Data Flow Library
- GridWorX
- Web Services

- BI Server
- OData (REST)
- Facility AnalytiX, AlertWorX, ReportWorX, etc.

The Bridging provider in Workbench provides multiple user benefits, including:

- Transaction Workflow Execution
- Transaction Triggering
- Enterprise Service Design
- Transaction Recovery Option

7.7.1 Transaction Workflow Execution

Transaction Workflow Execution includes:

- Diagram Designer - providing custom control flow logic
- Drag & Drop configuration of Transaction Diagram Activities
- Connectivity to heterogenous data sources
- On Complete, On Success, On Fail, On True, On False control flow branching
- Ability to execute custom .NET code in a transaction

7.7.2 Transaction Triggering

Transaction Triggering provides the following trigger types:

- Manual
- Periodic
- On OPC Data Value Change
- On Alarm
- On Database Value Change
- On File/Directory Change
- On NT Event posted

7.7.3 Enterprise Service Design

Enterprise Service Design provides:

- Multithread/multicore design with Parallel Task Library
- Concurrent Transaction execution on a Thread Pool
- Workflow Priorities: Normal, Below Normal, Above Normal

- If the Workflow Engine is already running at maximum capacity, then other submitted workflows are enqueued in the Priority Queue.
- Powerful transaction options for enqueueing transactions:
 - Queue and Execute immediately
 - Queue and Execute if no other similar transactions are running
 - Queue and Execute if no other similar transactions are running or enqueued

7.7.4 Transaction Recovery Option

The Transaction Recovery Option provides:

- Heartbeat of running Transaction
- Recovery Options
 - No Recovery
 - Re-Execute from Start

7.7.5 Transaction Data Sources

All transaction data sources will come from the BridgeWorX64 dataflow engine. Real 'live' data sources (i.e., those driven by subscription-based callbacks) are converted into datasets at the moment of consumption.

Single values (e.g., OPC DA, BACnet, SNMP, etc.) are represented as a simple data set containing at least a value, quality, and timestamp. However, they may include any additional properties requested by the user (e.g., engineering units, high/low range, etc.).

Current alarms (e.g., OPC A&E, BACnet, custom point managers, etc.) are transformed into a dataset (table) when activity executes (like a snapshot of a "current" active alarms pattern).

Data sources that are not subscription-based, but require polling, will make use of reader blocks to control exactly when the Read is executed, including:

- Datasets (e.g., Web Services, Database Queries, custom point managers)
- Historical Data (e.g., OPC HDA, BACnet, custom point managers, etc.) are transformed into a dataset (table)
- CSV files
- XML files
- JSON files

7.7.6 Transaction Activities

Transaction Blocks (activities) are used to manipulate the data. Internally, they handle data as in-memory datasets.

All Reader Activities will have at least one output dataset.

The Expression Syntax allows users to use any Activities output value of row X, column Y in expression calculations.

7.7.7 Variables

Global and local variables in Bridging in Workbench are typed data sets. Schema defines column names and column data types. Global Variables are exposed by BridgeWorX64 Point Manager as data sets.

Elements of Global, Local, Trigger Variables or Parameters could be used as data sources or in expression calculations.

7.7.8 Configuration

Bridging configuration is easy to use and maximizes available space within the Workbench tool. It is possible to use Drag & Drop within transactions. Each activity has an intuitive configuration tool, with no popups. A handy library of activities is available, as well as visual feedback about any errors within diagrams.

7.8 ReportWorX64

Reports are integrated in the system in a similar way as alarms or historical data.

Reports in Workbench in GENESIS64 contain multiple features, including:

7.8.1 Report Dashboard

Data Integration

- Uses simple drag-and-drop interfaces to create flexible, interactive data visualizations.
- Integrates with the AnalytiX BI Server.
- Contains drill-down capabilities.
- Can share data to any device.
- Uses Responsive Design - for access on any device any time in any location.

7.8.2 Report Server

- Supports features of ICONICS ReportWorX 32-bit-based reporting product.
- Integrates with ICONICS FrameWorX Server.
 - Data can be consumed by any client.
 - Utilizes unified security and licensing.

- Does not require Microsoft Excel to be installed on the server.
- Uses standard OpenXML SDK to manipulate reports.
- Each report exposes a list of tags that can be browsed.

7.8.3 Report Sources

- Data sources are unified for a complete view of information.
- Utilizes a Data Flow Library.

7.8.4 Report Generation

Reports can be scheduled at specific times or under specific conditions. Actions (Workflows, Schedules, Triggers) can be used to execute reports.

Reports can also be manually generated. A Report Control Page can be utilized on any glass, similar to ICONICS Health Monitoring System.

7.8.5 Report Execution

Report Execution is performed when the server retrieves the template from the configuration. The OpenXML SDK is used to generate reports. (Note that Microsoft Excel is not required on the server side.) The generated report is saved in a runtime database, which is not tied to the configuration database.

Users can use the system to deliver customized reports anywhere automatically. In addition, generic commands can be executed when reports are successful, are failing or simply when completed.

ICONICS' commanding abilities have been enhanced to support the ability to attach reports. For example, a "Send Email" command could forward a report to AlertWorX.

7.9 Quality AnalytiX

Quality AnalytiX is part of the AnalytiX product suite for GENESIS64. With Quality AnalytiX, you can monitor the efficiency and reliability of any system using statistical methods. These tools allow you to detect and correct anomalies in your industrial process more easily than ever before.

This component of the AnalytiX suite allows you to access and configure SPC tags, distribution rules, and statistical calculations in Hyper Historian. You can also create and view trends and alarms associated with SPC tags and calculated tags within TrendWorX64 or AlarmWorX64.

Quality AnalytiX also supports:

- New chart types in TrendWorX64 (Histogram and SPC)
- Integration with ReportWorX Express
- Dashboard customization in PortalWorX

Quality AnalytiX delivers charts, KPIs, data, and alerts to any device, at any time. It also provides an extensive set of viewing options to create dazzling displays and dashboards for your device. These views allow you to monitor your processes, identify issues, and fix them in a proactive manner to achieve better performance for your system.

8 ALARMWORX64 MMX

8.1 What Is AlarmWorX64 MMX?

AlarmWorX64 MMX is the next generation of modular automation for advanced OPC-based HMI and Visualization by ICONICS. It is an option of AlarmWorX64 64 that provides OPC-compliant multimedia technology for remote alarm notification, enabling you to send and receive alarms using various multimedia agents.

Use the AlarmWorX64 MMX provider in Workbench to configure alarms on several different types of media agents that can notify anyone, anywhere, of an occurring alarm.

You can also use it to:

- Configure alarms, alarm action sets, multimedia agents, and alarm acknowledgement codes.
- Create subscriptions to OPC Alarm and Event (AE) servers.
- Configure schedules and destinations for alarm notification messages.

Multimedia agents you can use include:

- **Telephony** agents, which include call-out agents, call-in agents, and public address (PA) agents for delivering and receiving alarm notifications.
- **Pager** agents that page you when an alarm occurs.
- **Video** agents that play prerecorded video or video captured at the moment of an alarm.
- **Email** agents that use standard email for alarms, acknowledgements, files, and more.
- **Social Media** integration to services such as Viva Engage for improved collaboration.
- **Skype messaging** agents that deliver instant text messages to any Skype account.
- **Marquee** agents that send alarms and event messages to a computer's scrolling marquee (software marquee agents) and external scrolling marquees (IP device marquee agents).
- **Sound/text-to-speech** agents that play prerecorded sounds and speech over the network.
- **Fax** agents that use a fax machine to send alarm notifications.
- **Popup** agents that launch applications, provide alarm messages, and execute files on a computer.

- **Task tray** agents that deliver pop-up messages to the Windows task bar.
- **Custom** agents that let you create your own multimedia agent.

8.2 Starting the MMX Manager

To configure AlarmWorX64 MMX, go to Start > **ICONICS AlarmWorX64 MMX** > **AlarmWorX64 MMX**. This will launch the MMX Manager.

8.3 Creating Alarm Configurations

To create alarm configurations in AlarmWorX64 MMX, follow these steps:

- **Connect to an AlarmWorX64 MMX database.**
- **Create subscriptions.** A subscription defines a connection to an alarm server, and specifically describes alarms that the MMX component is interested in.
- **Create alarm filters.** Alarm filters allow you to filter an alarm subset. You can make filters that only filter a specific alarm tag or filters that filter a group of alarms. The MMX Server uses alarm filters to specify which subset of alarms will be used to initiate a multimedia action.
- **Create multimedia agents.** An agent is the means for notifying operators when an alarm reports. The means can be any of the supported multimedia in AlarmWorX64 MMX. Once you have defined an agent, you can use it (along with any other agents) in any action sets. As a result, when an alarm reports, its subscription's action set knows which media to use to notify operators.
- When creating most agents, you can also specify the person to be notified. You can even set up schedules so that notifications are sent to the person on duty at the time the alarm occurs. To do this, you **set up roles and schedules**. This is an optional step for getting started but is a handy feature for setting up alarm notifications and acknowledgements.
- You also have the option to **create media templates** for any agent. Templates are helpful if you are creating many agents for one type of multimedia device.
- **Create alarm configurations.** Each new database you create will have a default alarm configuration; this is the alarm configuration you should plan to use if you are just creating one alarm configuration for your computer to follow.
If you create a new alarm configuration with a name other than "Default," you will also need to create a new node configuration and link it to your alarm configuration.
- **Create action sets.** An alarm action set is a set of actions that the MMX Server will enact whenever an alarm from that subscription occurs.

- **Make the database active.**
- **Start the MMX Server.**

Each step is described in the online **Help** that is available in AlarmWorX64 MMX.

8.4 Starting the AlarmWorX64 MMX Server

For the AlarmWorX64 MMX Server to use the information in the configuration database, the server must be in "runtime" mode. To start the server:

- Click the stoplight button on the **Home** ribbon in the MMX Manager.
- Verify that the server is connected to the configuration database by checking that the MMX Server journal log is receiving alarms. You can access the log from within AlarmWorX64 MMX tree in the MMX Manager ([*Database name*]\System Tools\Server Journal Log).

9 GENDEMO

9.1 Introduction

You can get a sense of the rich applications that can be created by using ICONICS' GenDemo. GenDemo is a set of GraphWorX64 display files installed with your system to help you explore and learn about the features of GENESIS64, AnalytiX, MobileHMI, and Hyper Historian, as well as to find out how ICONICS applications are adaptable to different industries.

This chapter provides a brief overview of GenDemo. You are strongly encouraged to explore all the available files.



To launch GenDemo, from the Windows **Start** menu, select **ICONICS Tools > GenDemo**. This opens the GenDemo home page, shown above. This can also be reached by navigating to <http://gendemo.iconics.com>.

9.2 GenDemo Options

On the GenDemo screen, there are several configurable options that are located at the bottom of the left pane. One of the options that might be useful when navigating the application is **Run in Carousel Mode** in **Advanced Settings**.

This setting opens the carousel and enables carousel mode which automatically advances through a set of displays in the selected playlist. You can edit the predefined playlists or create your own in the Carousel Controller dialog that opens when the carousel mode is activated.

9.3 Industry Case Studies and Examples

As stated earlier, GenDemo contains a large number of example projects, many of which have been used by customers. You can find specific examples related to a particular industry in the respective topics under **Industry Examples**, or you can open the complete list of demos separately. The list of demos can be found in the menu under **Industries > Customer Examples**. This opens a display containing all the GENESIS64 examples that come with

GenDemo. You are encouraged to look through these and see how the graphics have been developed. If you would like to learn more about how any of the examples work, you are encouraged to open the files themselves, in configuration mode, from the **GenDemo > Examples** directory where you installed GENESIS64.

10 ADDITIONAL TOOLS

In addition to the many products and tools already described in this guide, there are additional tools and utilities installed with ICONICS Suite. A brief description of each is described below. For more information about a tool or feature, refer to the online Help, which you can access from any ICONICS Suite product or tool.

- Use **Global Aliasing** to set up aliases for use across GENESIS64 products. From **Workbench**, go to **Platform Services > Global Aliasing**.
- Use **Security** to restrict operator and workstation runtime access. Privileges can be granted by several means, including application action, points, alarms, files, stations, assets, and more. To work with security, open **Workbench**, and then go to **Security**.
- **TraceWorX** provides online diagnostics and tuning of applications running in ICONICS Suite. TraceWorX is intended for use by systems integrators, OEMs and customers who want to have tools for doing their own troubleshooting and diagnostics. To work with TraceWorX, go to **Start > ICONICS Tools > TraceWorX Configurator** or open **Workbench** and go to **Tools > TraceWorX**.
- **Configure System** (in **Start > ICONICS**) allows you to reconfigure the product similar to the options you were provided during installation.
- Use the **SNMP Connector** to create, monitor, and manage your own Network Management Systems through GENESIS64, giving Network Managers access to information from nearly every device connected to the network, all from one application. To work with the SNMP Connector, click its button or icon in the Project Explorer in Workbench.
- Use the **ICONICS BACnet Connector** to integrate BACnet communications into GENESIS64 and ICONICS Suite. To configure the BACnet Connector, open Workbench and go to **Data Connectivity > BACnet with SC**.

11 ONLINE HELP

ICONICS software provides online Help with descriptions and explanations of each application. Help is available throughout ICONICS Suite. You can access Help in the following ways:

1. Go to <https://documentation.iconics.com>.
2. Click the Help  icon in Workbench or GraphWorX64. This opens the Help for that application.
3. Press the **F1** key to display context-sensitive help.
4. Click the **Help** button in any dialog to display context-sensitive help.
5. Hover over an icon and pause for a moment to display tool tips for quick help.
6. From the Windows **Start** menu, select **ICONICS Help > Help**. (This option is only available if local Help is installed.)

Global Support Offices

Americas

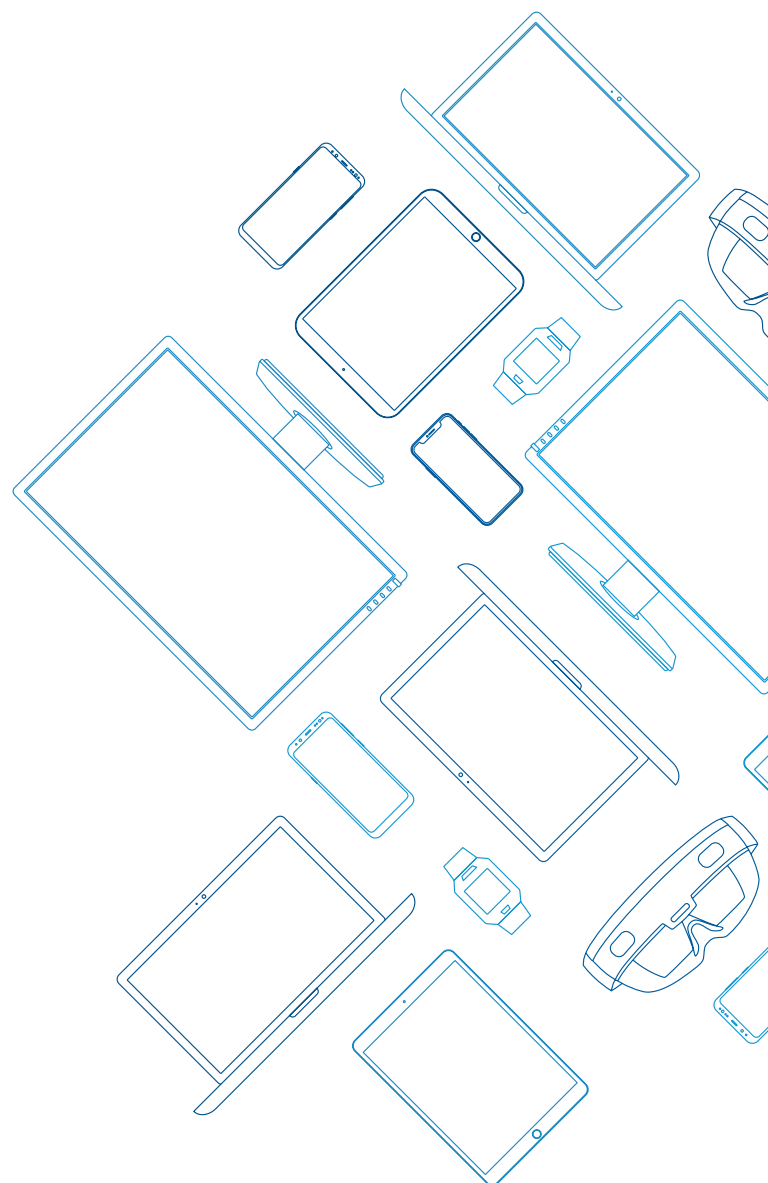
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To open a support case, please visit our ICONICS Community Portal at partners.iconics.com



For more, visit iconics.com

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