

GENESIS64™

Product Brief v10.95

November 2017



Gold
Microsoft Partner



Make the Invisible Visible™

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GENESIS64™ HMI/SCADA Overview

Customers continuously seek to stay informed, driven by the need to act immediately in order to maintain or improve efficiency. Many companies must achieve these continuously stretching goals with a shrinking and often mobile workforce. ICONICS GENESIS64™ is a suite of products that provides a quick deployment platform that integrates all available plant and business data into a high performance, real-time, distributed platform. GENESIS64 includes all of the tools necessary to create and deliver rich visualization of actionable information, in real-time, anywhere, anytime, and at any time.



At the highest level, GENESIS64 is comprised of the following components and technologies:

- Universal Connectivity – OPC, OPC UA, SNMP, BACnet, Web Services and any Database
- GraphWorX™64 - Vector-based 2D and 3D Real-time Graphics to Contextualize Data
- AlarmWorX™64 - Distributed Enterprise-wide Alarm Management
- TrendWorX™64 - Application-wide Data Collection, Logging, Charting and Analysis
- EarthWorX™ - GEO SCADA Visibility for Geographically Dispersed Assets
- AssetWorX™ – ISA-95 Intelligent Asset Technology
- GridWorX™ - Database Visualization of Any Data Set
- Workbench – Centralized Configuration and Runtime Interface
- FDDWorX™ – Fault Detection and Diagnostics
- ProjectWorX™ – Application Reporting and Deployment
- ReportWorX™ Express – Quick Access to Any ICONICS Data Source via Excel Add-in
- ScheduleWorX™64 - Advanced Time/Date Event Scheduling
- Windows Presentation Foundation and Web-integrated Displays – Client Flexibility
- WebHMI™ – Web-based Read/Write SCADA Functionality
- Redundancy – Mission Critical HMI/SCADA Solution

Optional Products:

- Hyper Historian™ - High Speed, Reliable and Robust Plant Historian
- AlarmWorX Multimedia™ - Multimedia Alarming with Text, Email, Phone and More
- MobileHMI™ - Instant KPIs and Alerts, Anytime, Anywhere

Product Introduction

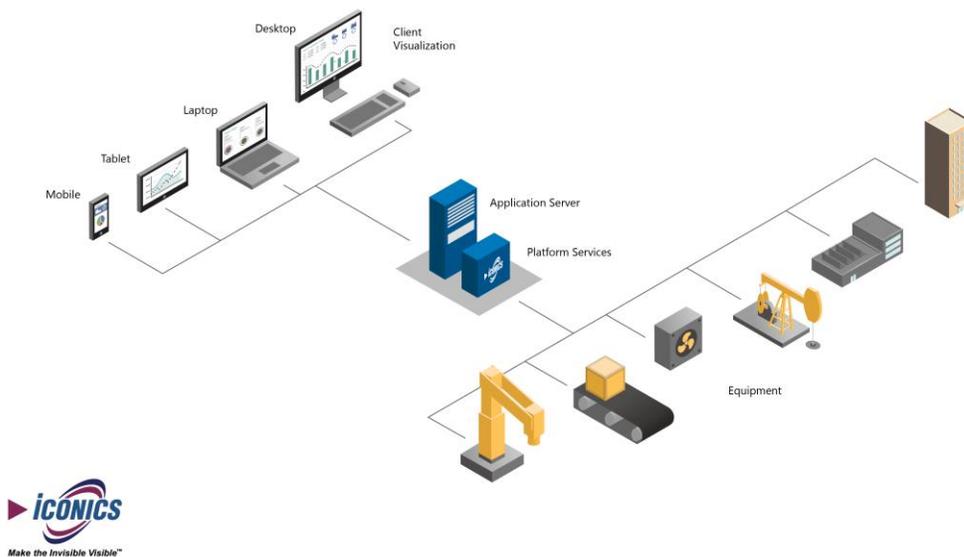
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ICONICS GENESIS64 provides a complete solution for all HMI/SCADA applications. GENESIS64 bridges data connectivity, aggregation and visualization to provide the most flexible and comprehensive software suite for your HMI/SCADA needs, across all industries, now and in the future. As a Microsoft Gold Certified Application Development Partner, ICONICS is uniquely positioned to utilize the most advanced technology available.

Microsoft Partner
Gold Application Development

GENESIS64 is the product of this relationship, but its working relationship with Microsoft has also lead to awards such as Microsoft's Application Development Partner of the Year and Microsoft Singapore CityNext Partner of the Year in 2017, CityNext Partner of the Year in 2014, and Sustainability Partner of the Year in 2012. The HMI/SCADA package seamlessly combines the newest proven technologies while leveraging years of experience gained from its predecessor, GENESIS32.

GENESIS64 Architecture



ICONICS' automation philosophy is to offer full software-based customization to achieve exactly what is needed for customer applications. An important part of that philosophy relates to the universal connectivity provided by the specifications of data protocols. It is this commitment that has driven ICONICS to gain OPC UA Certification, VMWare certification as well as BACnet Advanced Workstation (B-AWS) Certification. ICONICS believes that anyone who wants to enjoy the benefits of HMI/SCADA should be able to use software without upgrading their devices. That is why ICONICS is an open standard software vendor that can easily connect with hundreds of devices regardless of brand or protocol.

ICONICS GENESIS64 was the first of its kind in the world. Based on 64-bit computing, its architecture is designed at the core to take advantage of the multi-processing, multi-threading and hardware acceleration of graphics. The larger addressable memory not only improves performance, but also allows more information to get to operators, letting them contextualize, consume and act faster. The 64-bit revolution has been growing for a few years now and ICONICS made sure that GENESIS64 is based on true 64-bit technology. ICONICS has gained an advantage by not only utilizing the best proven technologies of the day, but also investigating new technologies going forward into the future.

GENESIS64 has been designed to take advantage of the latest technology that includes:

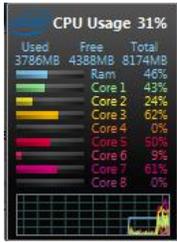
FEATURE	PROVIDES
Microsoft .NET Framework	Enhanced computing experience with highly integrated communications and information. .NET includes secure, reliable and transacted messaging and interoperability.
Windows Presentation Foundation (WPF)	Real-time visualization in 2D or 3D through GraphWorX64.
Microsoft SQL Server	Comprehensive data management platform. Utilized for configuration and logging databases.
Microsoft Office Style	Ribbon and gallery technologies for user-friendly interface and easy-to-access operations for rapid development.
Microsoft Operating Systems	Integration and Support for all of the latest Windows Operating Systems including Windows 7, Windows 8, Windows 10, Server 2008 R2 and Server 2012.
Bing, Google and Esri Maps	Real-time visualization of widely dispersed assets via EarthWorX
Hardware-accelerated 3D Graphics	High speed 3D imaging capability through GraphWorX64.
Scalable Vector-based 2D Graphics	Object based graphics fit any screen and can be reused at any size with absolute clarity.

Evolution

In 2008, ICONICS first released GENESIS64. At the time, 64-bit applications were starting to enter various software markets. However, before 64-bit applications like GENESIS64 could take advantage of the new architecture, there needed to be a change in the perception of computing. As is the case with technology, 64-bit computers quickly began to permeate the market of desktops, laptops and large-scale server applications. With its arrival to the mainstream, users started to reap the benefits of the advanced hardware and software. Today, GENESIS64 is in a league of its own, having emerged from its initial design to a full featured, independent force in automation.

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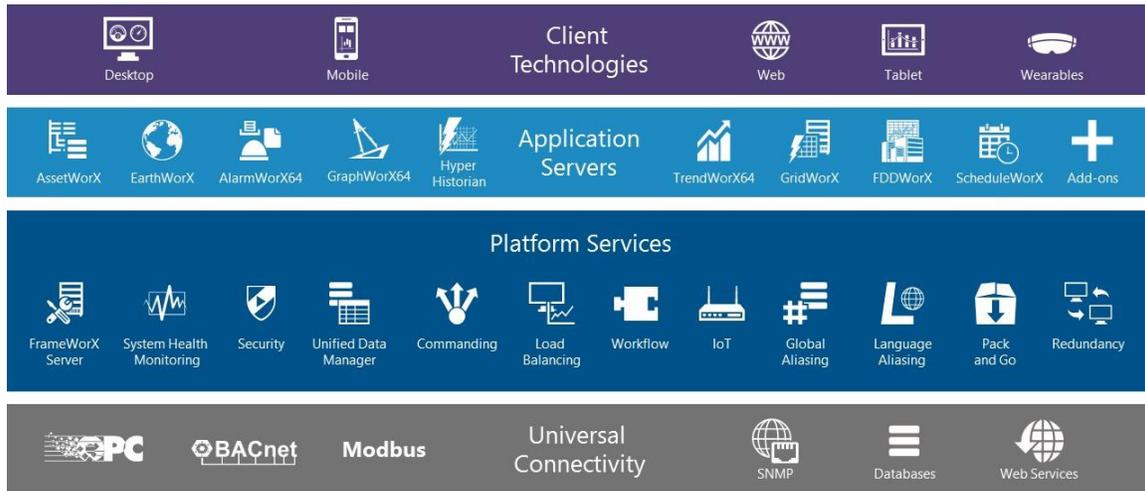


When 32-bit systems emerged, 4 gigabytes of memory may have seemed more than enough for typical PC-based applications. Soon, however, the cost of memory fell, making higher bit processing more prevalent. 64-bit processors, including those from AMD and Intel, are found in the latest products from all major suppliers. The 64-bit architecture increases the memory capacity to 264 addresses, equivalent to 16 Exabytes (over 17 billion Gigabytes) of RAM. The introduction of multi-processor architecture to more servers also opened up a significant performance benefit to applications. The ability to split tasks on to parallel processing units or cores allows applications to run processes in tandem (asynchronously) instead of doing them one by one. Hyper-threading also allows the physical computer to use more “virtual cores” simultaneously, although only a fraction of physical cores exist in the hardware. This technology further supports applications requiring more resources.

Currently, most software, including a great deal of what appears in industrial automation, is built as 32-bit code, not 64-bit code. Applications that take advantage of the memory and speed increase, as well as improved multi-tasking, stress testing and clustering capabilities of 64-bit technology, will be perceived as vast improvements over any 32-bit counterparts.

The ICONICS GENESIS64 web-enabled OPC HMI/SCADA suite is the result of ICONICS working early on during Microsoft’s development of new Windows operating systems. ICONICS’ partnership with Microsoft allows developers to work in tandem for high level integration. ICONICS has leveraged this relationship to include new certifications for multiple Microsoft Window operating systems.

Combining the strength of the Microsoft platform with innovative engineering from ICONICS, GENESIS64 has evolved far beyond competitors. Architected with the highest levels of interoperability, the GENESIS64 product suite is truly the future of automation.



Platform Services

With the organization of GENESIS64 into Platform Services, ICONICS has centralized a key development concept. With the centralization of data, services and redundancy, GENESIS64's performance and communication is better than ever. Real-time connectivity to multiple data sources, as well as the shared services essential to applications, is included within the Platform Services. The shared services include the Unified Data Manager (UDM), Global Aliasing Engine and Expression Engine.

Shared Services

With the Platform Services organization, much of GENESIS64's core functionality can be found within the Shared Services such as Global Aliasing for indirect addressing, Language Aliasing for localization and the Rules/Expression Engine for triggers or expressions. The Unified Data Manager (UDM) has been updated with an OPC third party interface to allow the UDM to be exposed as an OPC DA data source to outside applications. With the updates and new organization, the Workbench and contained Platform Services are more powerful than ever.

Real-Time Connectivity

ICONICS is committed to providing the most open HMI/SCADA solution with full support for OPC standards. GENESIS64 is able to natively communicate through OPC UA, but support for OPC Classic (DA, HDA and A/E) and OPC .NET is included for full integration of OPC standards. Aside from OPC, GENESIS64 Platform Services includes native support for Web Services, database access, BACnet and SNMP devices.

- OPC Classic: DA, A/E, HDA
- OPC Unified Architecture (UA): UA DA, UA A/E, UA A/E Historical, UA HDA, UA PubSub
- BACnet: BACnet Advanced Workstation (B-AWS) Certified
- Simple Network Management Protocol (SNMP): Versions 1, 2 and 3

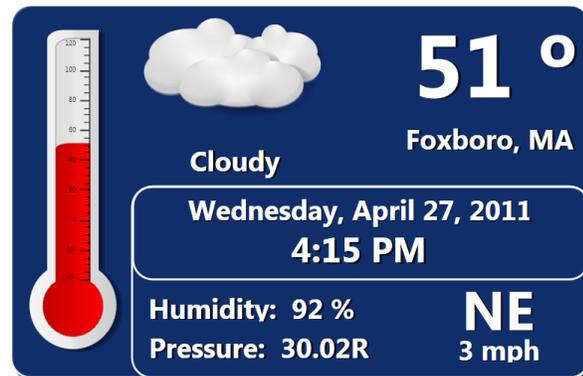
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- Databases
 - Microsoft SQL 2000, 2005, 2008, 2012, 2014
 - Oracle
 - MySQL
 - SAP
 - x64 OLE DB
 - x64 ODBC

ITFrameWorX

Included in the Platform Services is the new categorization of ITFrameWorX which includes support for Web and Database Services. Web Services are new to GENESIS64 and the product will come pre-configured with a Weather Web Service from NOAA. Standard symbols are pre-configured within the Symbol Library to take advantage of the default Web Service to get users up and running with Web Services quickly and easily.



Other Web Services can include any type of SOAP Service, but examples include oil prices, electricity prices, exchange rates and conversions. Database Services include a number of data sources such as SQL, SAP, x64 ODBC, x64 OLEDB, MySQL, Data Sets and more.

Commanding

With the introduction of assets to GENESIS64 through AssetWorX, ICONICS has added unified commanding to improve integration of product modules and significantly reduce scripting needs throughout the product. With the use of the AssetWorX Navigator for selection and navigation users can trigger commands directly from assets. Commands range from simple "Load" instructions to parameterized AlarmWorX64 Acknowledgement.

Specifications

Commands	
General	Set Language, Custom, Set Global Alias, Save Configuration, Group, Sort, Expand/Collapse, Refresh, Set Global Color Theme, Zoom
AlarmWorX64	Load Configuration, Set Filter, Acknowledge
AssetWorX	Select Asset
BridgeWorX	Run Transaction (Server Side)
EarthWorX	Go To Location
Energy AnalytiX	Load Configuration
Facility AnalytiX	Load Configuration
GraphWorX64	Open URL, Call Method, Write Value (Server Side), Load Display, Set Visibility, Navigate, Print, Export Image
GridWorX	Load Configuration, Select Element
MobileHMI	Send SMS, Phone Call, Send Email, Load Mobile Layout
ReportWorX	Run Report (Server Side), Load Report, Load Executed Report
ScheduleWorX64	Load Schedule Control Configuration, Schedule Clear Override, Schedule Override
OPC Connectivity	
OPC A/E	Server/Client
OPC DA	Server/Client
OPC HDA	Server/Client
OPC UA	Server/Client
BACnet	
Object Discovery Type	Automatic
BBMD Functionality	Yes
SNMP	
Version	v1, v2, v3
MIB	
<i>Discovery Type</i>	Pre-configured and Automatic
<i>Browsing</i>	Yes (Uses MIB Dictionaries to Load MIB Data)
<i>Import Custom</i>	Yes (Import any MIB file)
<i>Walk Mode</i>	Yes (Discover All OIDs Before Building Tree)
Traps	
<i>Receive Traps</i>	Yes
<i>Convert to Alarms</i>	Yes

Other Data Protocols

ICONICS OPC UA Standard	Allen-Bradley (1609 UPS Driver, Bulletin 900, ControlLogix, DH+/DH485, DF1, Ethernet, Unsolicited Ethernet); Analog Devices; Aromat (Ethernet, Serial); AutomationDirect (EBC, ECOM, DirectNET, K Sequence, Productivity 3000 Ethernet); Beckhoff TwinCAT I/O; BUSWARE Ethernet; Contrex (Serial, M-Series); Custom Interface Driver – CID; Cutler-Hammer (ELC Ethernet, ELC Serial, D50/D300); Dataforth isoLynx; DDE Client Driver; Fuji Flex; GE (CCM, Ethernet, Ethernet Global Data (EGD), SNP, SNPX, Focas Ethernet, Focas HSSB); Hilscher Universal Driver; Honeywell (UDC Ethernet, HC900 Ethernet, UDC); IA Super SEL; Idec; IOtech PointScan 100; Krauss Maffei MC4 Ethernet; Mettler Toledo Continuous Mode Serial; Micro-DCI; Mitsubishi (CNC Ethernet, Serial, Ethernet, FX, FX Net); Modbus (ASCII Serial, Ethernet, Plus, Serial, Unsolicited); ODBC Client Driver; Omron (FINS Ethernet, FINS Serial, Host Link, Process Suite, Toolbus); OPC (DA Client Driver, UA Client Driver); Optimization OptiLogic; Opto 22 Ethernet OPC Server; Partlow ASCII; Philips P8/PC20; SattBus (Ethernet, Serial); Scanivalve Ethernet; Siemens (S5, S5 (3964R), S7-200, S7 MPI, TCP/IP Ethernet, TCP/IP Unsolicited); Simatic (505 Ethernet - CTI 2500 Series, 505 Serial - CTI 2500 Series); Advanced Simulator; Memory Based; SIXNET (EtherTRAK, UDR); SquareD; System Monitor; Uni-Telway; Thermo Westronics (Ethernet, Serial); TIWAY Host Adapter; Torque Tool Ethernet; Toshiba Ethernet, Serial; Toyopuc (Ethernet PC3/PC2, Serial); User Configurable Driver; Wago Ethernet; WeatherBug Driver; InTouch Client Driver; Yaskawa (Memobus Plus (SA85), MP Series Ethernet, MP Series Serial); Yokogawa (Controller Serial, CX, Darwin Ethernet, Darwin Serial, DX Ethernet, DX Serial, DXP, HR, MW, MX, YS100);
ICONICS OPC UA Premium	DNP (Master Ethernet, Master Serial) [Premium]; Fisher ROC (Serial, Plus Serial) [Premium]; Ping [Premium]; Triconex Ethernet [Premium];

Database Support

Standard	SQL, SAP, ODBC, OLEDB, DB, DB2, SQL Query, MySQL, Dataset
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Web Services

Weather	CDYNE: http://wsf.cdyne.com/WeatherWS/Weather.asmx
Custom	Requires WSDL URL (Configure in Workbench)

Expressions

Arithmetic	
<i>Basic</i>	Addition, Subtraction, Multiplication, Division, Modulus, Parenthesis
<i>Functions</i>	Sine, Cosine, Tangent, Arcsine, Arccosine, Arctangent, Square Root, Power, Logarithm, Natural Logarithm, Exponential, Absolute Value, Integer Ceiling, Integer Floor, Integer Round, Round to Decimal Places, Minimum, Maximum
<i>Constants</i>	Circumference/Diameter (pi), Natural Logarithm Base (e)

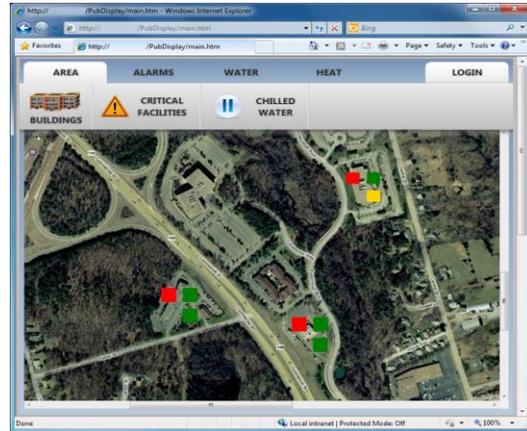
Relational	
<i>Basic</i>	Less Than, Greater Than, Less Than or Equal, Greater Than or Equal, Equal To, Not Equal To
Logical	
<i>Basic</i>	And, Or, Not
<i>Functions</i>	IF THEN ELSE
<i>Constants</i>	Boolean True, Boolean False
Bitwise	
<i>Basic</i>	And, Or, Not, Xor
<i>Functions</i>	Shift Left, Shift Right, Bit Test
<i>Constants</i>	Hexadecimal (0x), Octal (0t), Binary (0b)
Functions	
<i>OPC</i>	Quality, Set Value
<i>Conversion</i>	To String (Culture Invariant), To String (Current Culture), To Format (Culture Invariant), To Format (Current Culture), To Number (Culture Invariant), To Number (Current Culture), To Number Base , To Boolean, To Boolean (Current Culture), ASCII to Char, ASCII to WChar, Char to ASCII, WChar to ASCII
<i>String</i>	Wildcard String Compare, String Length, Exact Substring, Left Substring, Right Substring, Concatenate Strings, String Search, String Replace, Trim Left and Right, Trim Left, Trim Right, To Lowercase, To Uppercase
<i>Date and Time</i>	Convert to DateTime (Culture Invariant), Convert to DateTime (Current Culture), Convert to TimeSpan (Culture Invariant), Convert to TimeSpan (Current Culture), TimeSpan from Milliseconds, TimeSpan from Seconds, TimeSpan from Minutes, TimeSpan from Hours, TimeSpan from Days, Total Milliseconds from TimeSpan, Total Seconds from TimeSpan, Total Minutes from TimeSpan, Total Hours from TimeSpan, Total Days from TimeSpan, Elapsed Time Since Last Value Changed, True for Duration, Get Current Local Date and Time, Get Current UTC Date and Time

Clients

GENESIS64 offers a number of options for viewing displays and interacting with data. For GraphWorX64, the following clients are used to access HMI displays at any time from a variety of devices. To learn more about our mobile device support and further client capabilities reference the MobileHMI Product Brief.

WebHMI

Fully utilize the capabilities of GraphWorX64 by publishing your displays to the Web. View them through a multitude of client types and retain full control of your application wherever you are. Through the GraphWorX64 Web Publishing Wizard, any display can be published for consumption and bring the display to the operators. Displays can be published based on Windows Presentation Foundation (WPF) or Web-based technologies. While WPF displays can be consumed through traditional Web and desktop clients, Web-based displays can be adapted for viewing on mobile devices, Web-based clients and placed into PortalWorX dashboards for a full range of client viewing methods. Regardless of the desired client type, features can be configured once through GraphWorX64 and saved or published in bulk for the different client types afterwards. While limitations exist based on the technologies themselves, most features can be used in all types.



PortalWorX-SL™

PortalWorX-SL is an innovative frame-based runtime environment used to force an organized screen layout typically referred to as a portal or dashboard. PortalWorX-SL will make it easier and faster to configure complex dashboards and layouts for functions such as alarm monitoring or operational control. Using Microsoft Silverlight, PortalWorX-SL requires very little setup and can be deployed easily on any system. The frame-based dashboards allow anyone to create and customize an organized environment with almost no training. Central to the frame-based environment is the AssetWorX Navigator, which will allow navigation and organization of assets for faster access to data. As a layer of further integration, AssetWorX Commanding will also provide options to send messages between frames such as GraphWorX64 displays, AlarmWorX64 Viewers, TrendWorX64 Viewers, FDDWorX Viewers and Energy AnalytiX Viewers.

Workbench

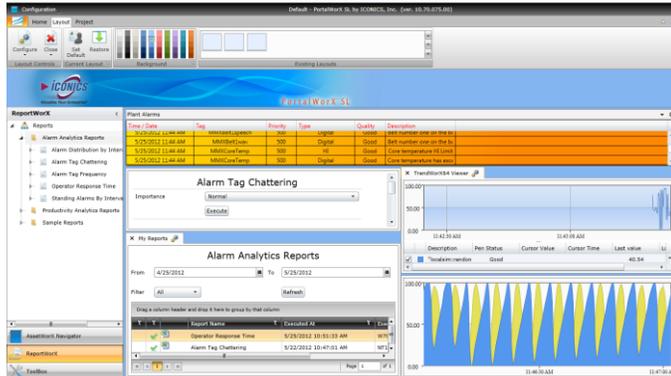
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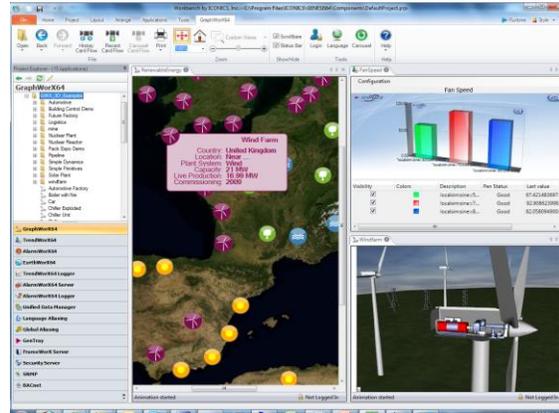
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Workbench is the centralized Web-based configuration environment for all GENESIS64 components. The Workbench can also act as a simple operator interface for service management and has built-in project management functionality such as project Pack and Go, layout tools and a file browser interface. The Workbench can be used as a Windows Presentation Foundation (WPF) application on the desktop or Web and can also be used via Web browsers.



Workbench

- WPF-based Web or Desktop Use
- Redundancy Configuration
- Server Configuration
- Built-in Runtime Mode
- AssetWorX Configuration
- Analytix® Add-On Configuration
- PortalWorX-SL for Runtime Mode



Configuration and Project Management

The Workbench is the centralized configuration environment with mass import and export tools for moving or editing application data. The Workbench allows configurations to be exported into Microsoft Excel, .CSV and .XML formats. Whole or partial configurations can be moved for easily making mass edits or batch changes. With the Pack and Go Wizard in the GENESIS64 Workbench, users can use the simple step-by-step process to move configurations into a package for deployment. Features like Find and Replace node names or changing asset names beforehand guarantee a working application. Incremental Pack and Go also allows for versioning support and delta roll-out where developers need only move what has changed and the software does the rest. Other options like project statistics, packing log and security through encryption are available.

Web-Based Configuration from Anywhere



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All GENESIS64 configurations can be created from the Workbench, allowing for faster development and cost savings in building any application. Workbench offers remote configuration in Internet Explorer, the ability for concurrent configurations and support for online changes.

Runtime Operation

Using the Workbench as a runtime environment is also supported, allowing users to open up GraphWorX64 displays, TrendWorX64 trends, and AlarmWorX64 alarm grids at once to visually compare and relate the information provided at any one moment by the SCADA system. With customizable runtime layouts and multi-monitor support the Workbench is an invaluable tool for any enterprise SCADA application.

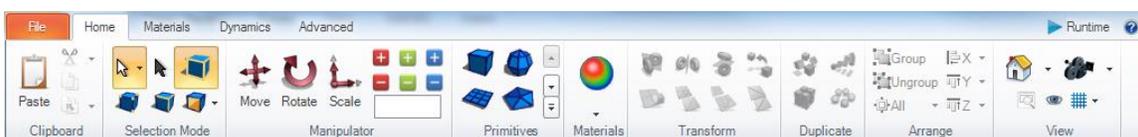
GraphWorX™ 64

GraphWorX64 is at the heart of the visualization in GENESIS64. With an intuitive and instantly familiar interface, the power is in your hands to easily develop displays and connect data meaningfully. GraphWorX64 offers a rich and powerful set of drawing and animation tools as well as customizable dynamics to any object. The GraphWorX64 interface can create powerful and elegant graphics without requiring advanced scripting knowledge. Using intuitive menu systems and property lists, users can point and click their way to enterprise graphics. Additionally, save yourself time and effort with simple import, export, publishing tools, smart symbols, shared objects and many other useful features.



GraphWorX64 takes maximum advantage of Windows Presentation Foundation (WPF) and Web-based technologies for rich HMI and SCADA data visualization. It allows users to build scalable, vector-based graphics that scale and can be reused time and again. GENESIS64 also takes advantage of the Windows Office look and feel with contextual ribbons. Users can quickly browse through galleries that provide a rich preview of available actions.

For instance, an operator may wish to add alarming or trending to their HMI display and with GENESIS64 this task is done with just a few simple clicks, truly unleashing the power behind GraphWorX64.



Unsurpassed Development

Windows Presentation Foundation and XAML are at the core of GraphWorX64 and are widely used to provide real-time visualization of any manufacturing and business intelligence information. GENESIS64 exploits both the 2D and extensive 3D capability of WPF to deliver real-time data in a variety of visualization options, giving users the richest client user experience found today. GraphWorX64 also offers a seamless switch to thin-client displays that are configured and deployed in exactly the same way, but can be viewed in multiple Web browsers like Firefox, Chrome or Safari.

GENESIS64 also takes advantage of state-of-the-art graphic hardware acceleration through DirectX11, powered by .NET 4.5 and the latest operating systems. GraphWorX64, integrated with the Windows Presentation Foundation, provides users with a compelling 3D view of their operations in real-time with live data. Imagine the ability to view how equipment is running, in real-time, from any angle and from anywhere. For thin and fast 2D graphics, GraphWorX64 leverages the power of web-based technologies; ideal for thin-client Web-based solutions.

2D Visualization

Featuring a rich set of vector drawing tools for easy scaling, GraphWorX64 for 2D graphics is unparalleled. Offering a base standard set of shapes and objects, GraphWorX64 includes a multitude of dynamic animations that can be applied to any object as well as layered on an object for synchronous dynamics, allowing for multiple responses to occur from single clicks. Dynamics range from object motion and rotation to advanced pick actions that 'on click' can set Global Aliasing Value, Open Displays or provide Webpage-like navigation. GraphWorX64 makes configuration quick and easy without sacrificing the allowance for creativity and power. 2D designs can be created for desktop and Web deployment, as well as be saved out for multiple client types.



Time Saving Controls

To aid in design, GraphWorX64 offers a few objects to speed up development. The Scale control object can be used to quickly configure vertical, horizontal or radial gauges for temperature, revolutions per minute, tank levels and quantities for KPIs. The Scale control is also easily configurable, customizable and reusable. A 2D Pipe control is also included to create simple or elaborate piping schematics. Helpful tools like copying the pipe path to a location dynamic will also add extra pop to your displays, as objects can follow the path of a pipe with a few simple mouse clicks.

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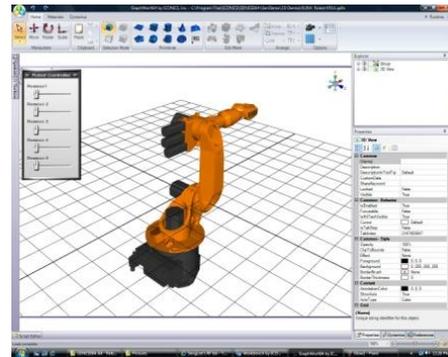


Smart Tiles

Smart Tiles are simple .NET controls that allow users to create a simple and elegant way of displaying concise, actionable information that is easily identified. Flexible and customizable, Smart Tiles can be used in GraphWorX64 and MobileHMI for many purposes. Smart Tiles can be created to display: Key Performance Indicators (KPIs), Alarms and Alerts, Dynamic Labels and Navigation Buttons.

3D Visualization

GraphWorX64 is unique in its ability to offer 3D hardware-accelerated graphics through WPF. With an integrated, fully capable 3D editor and drawing tools, users have three options to create stunning 3D worlds that reflect their applications. Users can use native GraphWorX64 drawing tools or import 3D designs from other software using a number of industry standard formats. ICONICS has worked with customers and partners to offer advanced tools for 3D display creation and management. The GraphWorX64 3D Pipe primitive allows users to create bends and intricate piping scenarios quickly and easily. GraphWorX64 supports the import of other 3rd party 3D models from Autodesk (.dwg, .dxf) and other standard file formats like .3ds, .dae (COLLADA) and .obj. Customers with existing models can import and use them for HMI displays. Users can also combine EarthWorX with their 3D models by using the 3D Terrain feature. By adding a Terrain primitive to a 3D View and selecting EarthWorX as the Elevation Bitmap users can select a portion of an EarthWorX map to texture and create a height profile for the primitive.



Collision Detection & Polygon Reduction

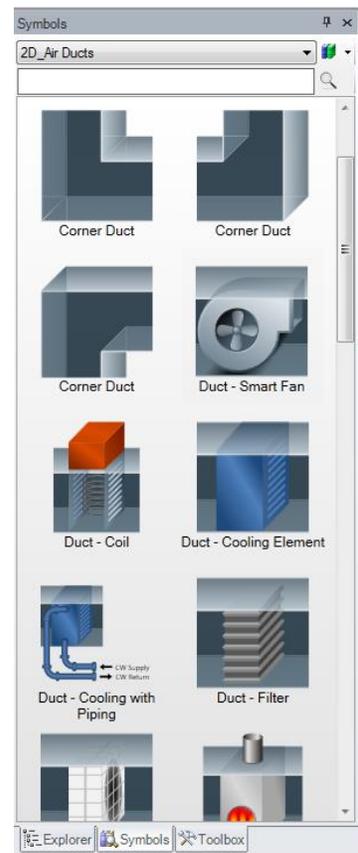
GraphWorX64's ability to detect intersecting objects has added capabilities to visualize alarms or issues in 3D by setting up collision bodies or objects likely to intersect and allow you to show discoloration to indicate a collision. Connected to live data, this information can give operators visual feedback that is invaluable during alarm conditions. With the introduction of 3D into HMI/SCADA, ICONICS realizes that 'real-time' requires a level of responsiveness that is difficult when dealing with large 3D objects. To combat speed drops and optimize displays, Polygon Reduction is now offered to reduce the "size" of imported objects without losing clarity. By using internal algorithms, GraphWorX64 3D can decrease the mesh of objects, saving computer processing power and releasing it for use with your data.

Day/Night Mode

Due to requirements from some applications to support for color switching modes GENESIS64 includes a Global Color Palette. The Palette can be configured as part of the Unified Data Manager and allows users to name colors. In GraphWorX64 and embedded controls (e.g., AlarmWorX64) these names can be used to represent a global color. Updating or dynamically switching these colors later will propagate to all displays that utilize the named color.

Advanced Symbol Library

GraphWorX64 empowers users to take graphics to a whole new dimension with 3D visualization and provides over 200 preconfigured symbols to start off users with designing their 3D applications. GraphWorX64 3D Symbols are true 3D symbols, not just images or backgrounds. Users can fine-tune and modify any symbol to meet specific needs and save the results to the library, providing creative flexibility and the freedom to create captivating 3D graphics. Over 1,500 2D symbols are also available to get any user started. The 2D symbols have all the benefits of the 3D symbols, with the added bonus that you can create Smart Symbols that expose properties like data sources at the top level of any symbol. For ultimate control, Smart Symbols allow users to configure symbols that can just be dragged on to displays and immediately used after seconds of configuration.



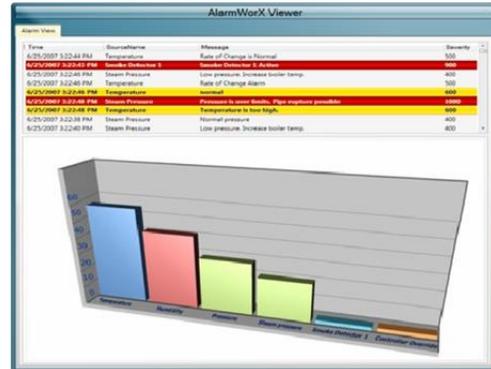
Specifications

Displays	
Types	Windows Presentation Foundation (WPF)
Size/Resolution	Unlimited
Support	
<i>Layers</i>	Yes
<i>Zoom</i>	Yes
<i>Declutter on Zoom</i>	Yes
<i>Windows</i>	Turn on/off menus, scrollbars, resize options and behaviors
2D Shapes	
2D Drawing	Line, Spline, Arc, Polyline, Rectangle, Ellipse, Polygon, Text, Label
2D Image	
<i>Embedded</i>	JPG, JPE, JPEG, PNG, GIF, TIF, TIFF, JFX, BMP, ICO, WMF, EMF, SVG, SVGZ, DWG, DXF
<i>Referenced</i>	JPG, JPE, JPEG, PNG, GIF, TIF, TIFF, JFX, BMP, ICO, WMF, EMF, SVG, SVGZ, DWG, DXF
2D Advanced	Smart Symbol - expose data and properties to top object level Update Shared Keyword - update symbols across displays
2D Symbols	Over 1,500
3D Shapes	
3D Drawing	Cube, Sphere, Plane, Polygon, Torus, Cone, Cylinder, Terrain, Pipe, Annotation
3D Import	XAML, OBJ, 3DS, DAE (Collada), DWG, DXF
3D Advanced	Collision Detection - designate collision bodies for calculation Polygon Reduction - reduce mesh size
3D Symbols	Over 300
Color	
Fill	RGB, Gradients, Image Tiling
Stroke	RGB, Gradients, Image Tiling
Effects/Style	
General	Opacity, Bevel, Drop Shadow, Glow, Blur
Objects	Line Style, Line Width, Line Cap, Line Miter
<i>Rectangle</i>	Rounded Corners (X and Y)
<i>Ellipse</i>	Radius (X and Y)
<i>Polygon</i>	Vertex Manipulation
Dynamics	
Text Based	Process Point, Data Entry, Time/Date
Buttons	Button, Check Box, Radio Button, Display Button
Dimensions	Size, Location, Rotation
Color	Object Fill Color, Object Line Color, Disable, Hide, Text Background Color, Text Foreground Color, Text Border Color
Selection	State, Range
Pick Actions	
<i>Window</i>	Close Window
<i>Navigation</i>	Display Back, Display Forward
<i>Display</i>	Load Display, Popup Menu, Set Object Visibility, Set View

<i>Aliasing</i>	Set Global Alias, Set Language, Set Local Alias
<i>Values</i>	Write Value, Toggle Value
<i>Application</i>	Start Application
<i>Scripting</i>	Run Script
<i>ICONICS</i>	Update Database, Run Report (ReportWorX), Run Transaction (BridgeWorX)
<i>Security</i>	Login/Logout Dialog
.NET Controls	
Modules	AlarmWorX64, Asset Navigator, EarthWorX, GraphWorX64, GridWorX, Energy AnalytiX, FDDWorX, TrendWorX64
Design	Pipe, Scale, Smart Tile
Video	
<i>Static Protocols</i>	WMV, AVI, MPEG, MOV, MP4
<i>Steaming Protocols</i>	HTTP, HTTPS, MS-WMSP (MMS and RTSP)
GEO-SCADA	SmartPin, PushPin (EarthWorX)
Display Extensions	
WPF	GDFX
Template	TDFX
Silverlight	GDFXS
Portable	GDFXP
Portable Template	TDFXP
Compressed Versions	GDFXZ, TDFXZ, GDFXSZ, GDFXPZ, TDFXPZ
Symbol Library	SDFX

AlarmWorX™ 64

AlarmWorX64 is a distributed enterprise-wide alarm and events management system that incorporates auto-synchronization and optimistic concurrency as standard features. Available in the standard GENESIS64 suite of applications, or as a stand-alone open series component, AlarmWorX64 offers the tools you need to deliver real-time and historical alarm information throughout your system.



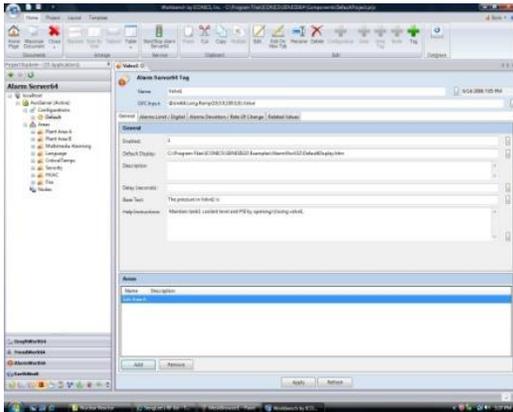
AlarmWorX64 contains a 64-bit native server and logger and interoperates with OPC-DA and OPC UA Servers. Its integration with OPC and power afforded by the Alarms and Events (A/E) standard make it the most open alarm management solution in the market. The features within AlarmWorX64 represent an industry leading aggregation of options for developers and operators. Listed below are some of the benefits recognized by customers of the GENESIS64 AlarmWorX64 users.

Developer Benefits Include:

- **Ease of Use** – from AlarmWorX64’s task-centric user interface with Ribbons
- **Rapid Development Capability** – utilizing Galleries for one-click styling
- **Quick Deployment/Easy Maintenance** – via a centralized work environment
- **Robust and Secure Communications Platform** – due to OPC UA Connectivity

Operator Benefits Include:

- **Live Sorting, Filtering and Grouping** – Operators have full control over what alarms they see or don’t with live filtering or they can show specific areas or levels of severity.
- **Acknowledgement Dialogs** – Simple to understand and easy to acknowledge one or multiple alarms. Operators can comment on the alarms for revisiting, if desired.
- **Easier High Level Viewing** – Using tabs, multiple grids or side-by-side, AlarmWorX64 Viewers can be placed to give operators alarms from every aspect of an application at once.



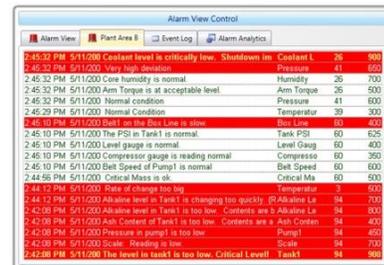
AlarmWorX64 Configurator

Based on the next generation for toolkits and part of the GENESIS64 Workbench, the AlarmWorX64 Configurator supports remote operations and is truly a thin-based client, allowing it to run inside Microsoft Internet Explorer. The Configurator supports online configuration changes and implements Optimistic Concurrency when used in a multi-user enterprise environment. Alarm configuration has never been this easy.

As part of configuration, AlarmWorX64 supports definable alarm conditions that allow for intelligent alarms with simple setup. Alarms can be associated with areas for logical groupings as well as easier runtime filtering.

AlarmWorX64 Viewer

Create both real-time and historical alarm views in the same OPC UA-enabled Windows Presentation Foundation or Web-based viewer. View from multiple data sources while adding new visualization features such as color translucent gradients for identifying key alarm conditions to improve operational response. Drop as many or as few AlarmWorX64 Viewers into your displays to show operator specific areas or every alarm that's active. With client and server-side filtering, developers can limit what alarms are shown or allow operators to set filter themselves, providing ultimate flexibility on how your operators work and how quickly they can react.



Additional features include more formatting power for individual alarms, server-side OPC UA filtering of alarms, client-side filtering in charts and grids, multi-level grouping and sorting capabilities, the ability to use images and hyperlinks in grid cells, and the translation of raw server data.

Alarm Charting and Reporting

Alarms logged to a database can be a chore to sort through and analyze. The powerful Historical Alarm Analysis/Reporting solves this problem by easily creating filtered reports, pie charts, bar plots and more. At the click of a button, you can find out which alarm is occurring most often and see if there are certain "trouble-spots," review downtime, and more.

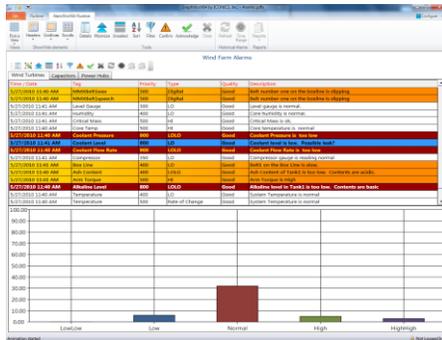
Product Introduction

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AlarmWorX64 allows reporting (user-configured or preconfigured) and graphing of alarms. The source of the Alarm data can be live alarms, alarms previously logged by the Alarm Logger, or a combination of both. The Alarm Report can be dropped within any GraphWorX64 HMI Display or directly in the Workbench.

AlarmWorX64 Logger

The GENESIS64 AlarmWorX64 Logger is easy to set up and simple to manage. Pre-configured to log the local OPC A/E AlarmWorX64 Server and the GenEvent Event Server, logging can begin with the click of a button. The powerful AlarmWorX64 Logger can be accessed through a Historical Alarm Subscription through the AlarmWorX64 Viewer. Historical and Real-time subscriptions can coexist in the AlarmWorX64 Viewer on multiple tabs, grids or controls in GraphWorX64 displays. This database logger also includes options for Audit Trails and Event Logging. Connecting your historical alarms has never been easier.



Specifications

OPC Connectivity

OPC UA	Client [A/E]
OPC Classic	Server [A/E], Client [A/E]

AlarmWorX64 Server

Basic Alarm Types	Limit, Digital, Deviation, Rate of Change
Advanced Alarm Types	Rate Limit, Trigger Limit
Support	
Alarm Areas	Yes
Alarm Templates	Yes
Associated Values	Yes
Online Changes	Yes

AlarmWorX64 Logger

Logger Type	Database
Logger Configuration	Subscription Based
Support	
Multiple Configurations	Yes
Redundancy	Yes
Database Table	Yes
Management	
Printer Logging	Yes
Translation Logging	Yes

AlarmWorX64 Viewer

Extension	AWXX (WPF Format), AWXXS (Silverlight)
Data Type	Real-Time, Historical, Event (A/E, Logged Alarms & Events)

Embeddable Support	Yes [GraphWorX64]
<i>Multi-Grid</i>	Yes
<i>Multi-Tab</i>	Yes
<i>Custom Styles</i>	Yes
<i>Live Filtering</i>	Yes
<i>Live Grouping</i>	Yes
<i>Live Sorting</i>	Yes

AssetWorX™

AssetWorX is an additional architectural layer within GENESIS64 that enables the system to be engineered and operated based on an intelligent asset technology configured to represent a customer’s enterprise. Assets can be defined in a hierarchical model as defined by the ANSI/ISA-95 standard.

Consistent and Distributed System Organization

When utilizing AssetWorX, users define Asset Classes to represent all similar entities that should be represented and operated in a similar way. For example, pumps, heat exchangers, turbines, chillers, buildings and building zones, and plants can all be defined as asset classes. An asset class contains all properties, equations, commands and operations that any user might issue, as well as graphic templates, smart symbols, and trends that are needed to visualize and provide insight for that type of equipment. Once defined, the user simply instantiates the class as many times as necessary, at the appropriate level of the enterprise hierarchy, to fully define all equipment and entities to be monitored. For larger applications distributed asset trees can be used to create a hierarchy of AssetWorX servers. Splitting assets into subdivisions based on a logical tiered structure allows for security layers and enables cloud architectures.

Commanding

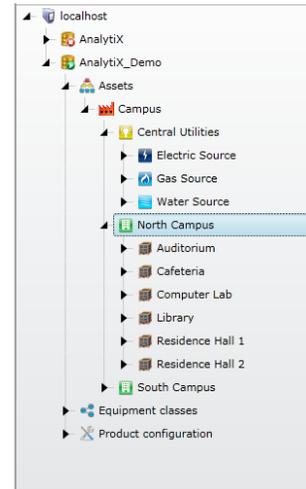
Within AssetWorX, users will find the integration of extensive commanding capabilities. Commanding allows users to send information and direction between modules. From the AssetWorX Catalog, users will be able to load displays or other applications, set global Aliases or Alarm Filters, and command set points and status changes.

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AssetWorX Navigator

The AssetWorX Navigator is provided as a Windows Presentation Foundation (WPF) object and a Web-based Control. This provides the flexibility to apply the navigator as an embedded component inside a graphic, or execute the navigator as a standalone component inside a PortalWorX-SL portal to launch or command other applications in the same portal. The AssetWorX Navigator enables operators to quickly and intuitively navigate to the subject of interest.



The advantages of using AssetWorX include

- Greatly reduced engineering time - All like items are only constructed once
- Operator Consistency - All like items are configured exactly the same
- Virtual Naming - Operators no longer must relate to sometimes cryptic tag/item names. All information can be accessed by logical, meaningful names.
- Easy Navigation through the AssetWorX navigation tree
- Simple roll-up and drill down to the summarization or detail of interest
- Virtually unlimited scalability - All asset property data is stored in SQL Server, with caching to all current users. Utilization of SQL Server and the optimization included supports IT level scalability.

Specifications

Organization	
Equipment Classes	Yes
Level Definition	Yes
Product Enabled Selection	Yes
Equipment Properties	Yes
Real-Time Data Connection	Yes
Historical Data Connection	Yes
Blank Assets (Folders)	Yes
Customizable Levels	Yes
Customizable Icons	Yes
Caching	Yes
Commanding	Listed under Platform Services by Module
Client Availability	
PortalWorX-SL	Yes
GraphWorX64 WPF	Yes
MobileHMI	Yes (via Asset Catalog)
AssetWorX Navigator	
Tree	ISA-95 Compliant
Number of Assets	Unlimited (Dynamic Load)
Commanding	Via Right-Click

<i>Drag and Drop</i>	Yes, Configurable
<i>Command Targeting</i>	Yes, by Name
<i>Out of Process</i>	Yes

TrendWorX™ 64

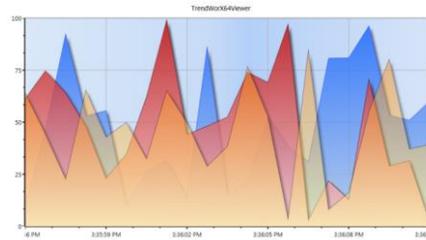
TrendWorX64 is an enterprise-wide data collection, logging, charting, reporting and analysis solution. Available in the standard GENESIS64 suite of application, or as a stand-alone Open Series component, TrendWorX64 offers the tools you need to trend and chart real-time and historical data from all your enterprise assets.



TrendWorX64 is OPC UA-to-the-Core™ and provides open connectivity to any OPC/OPC UA data source, making it an extremely versatile and comprehensive OPC trending application. This means it can easily plug and play with not only ICONICS servers and trend components, but with other 3rd-Party trending solutions, as well. Allow your operators to see what's happening in real-time or what's happened historically to give them true predictive ability.

Developer Benefits Include:

- **Rapid Customization of Trends, Pens and Plots** – via Galleries and one-click styling. TrendWorX64 is easy to use due to the task-centric user interface based on Ribbons.
- **Ability to Use Vector-based Instead of Raster-based Graphics** – due to interaction with Windows Presentation Foundation technology, which also helps to make trend graphics screen-size-independent and provides smooth animations
- **Allows for Concurrent Changes Via the Web** – with interactivity between remote online configuration sessions
- **Multiple Data Source Availability/Historical and Real-Time Data Simultaneously Accessible** – as data is collected through OPC UA technology



Operator Benefits Include:

- **Powerful Runtime Controls** – Operators can add more pens, freeze time and review past trends or change the range of the charts through the helpful Trend Period Toolbar.
- **Predictive Tools** – Use trending to your advantage with optional alarm lines to indicate when trends may go into alarm.



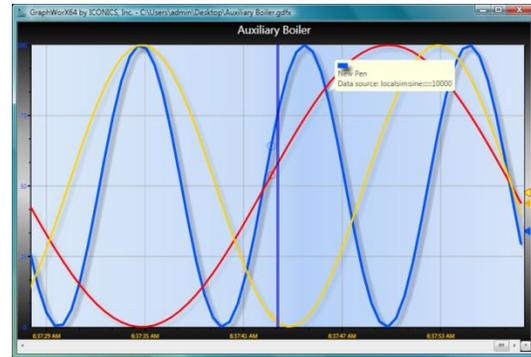
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- **Time Changes in Real-Time** – See data change in real time visually and use time periods to give more or less detail.
- **Summary View** – View high level information first and drill down for details.
- **2D/3D Plots** – Operators can view data in 2D and 3D to customize trends for better understanding.
- **Contextual Details** – Users can hover to see details for each data point or trend.

TrendWorX64 Configurator

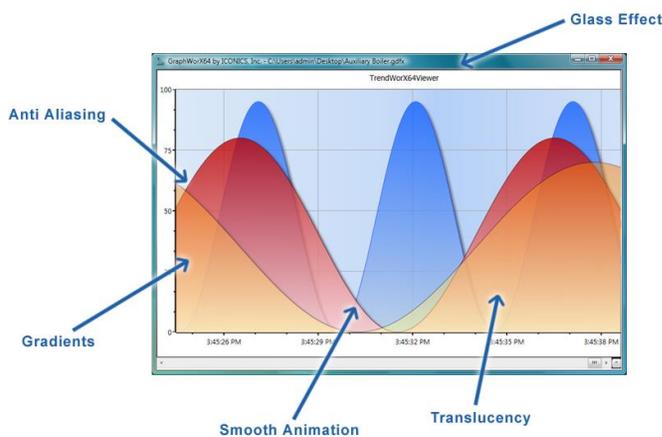
Release the power of trending with TrendWorX64. Using GENESIS64 Workbench or GraphWorX64 to configure trends and charts is fast and easy with the TrendWorX64 Configurator. Integration with Windows Communication Foundation (WCF) allows users to build the most secure, reliable, transacted and interoperable distributed trending applications. Trends are fully customizable and intelligent allowing



developers to give operators as much information as possible. Allow operators to predict faults and warnings by giving them a simple, easy to understand display.

TrendWorX64 Viewer

Trend and chart data in the standard Time Based Chart or quickly choose any of the following from the styling gallery: X vs. Y, Logarithmic, Bar Graph, the popular Strip Chart Recorder, Circular Charts and more. The TrendWorX64 Viewer toolbar allows operators to change time periods, show or hide the legend, freeze time and look back at trends during runtime.



Use the intuitive ribbons and galleries to customize your trend or chart by adding color, gradients, smooth animation, translucency, glass effect, anti-aliasing and more. Drag and drop data sources during runtime, view multiple synchronized trends, change the period with the customizable Trend Period Toolbar or create and visualize different plot types on the same trend.

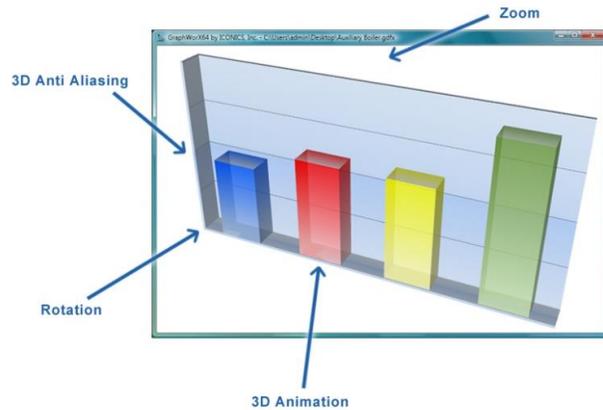
GENESIS64™

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Plotting both real-time and historical data in the same trend plot allows you to compare last week's data, for instance, to current information. Trend production numbers against a target. Users can also plot batch data against a known recipe curve. Utilizing an "ideal" pen can also give further information on current versus normal operation.

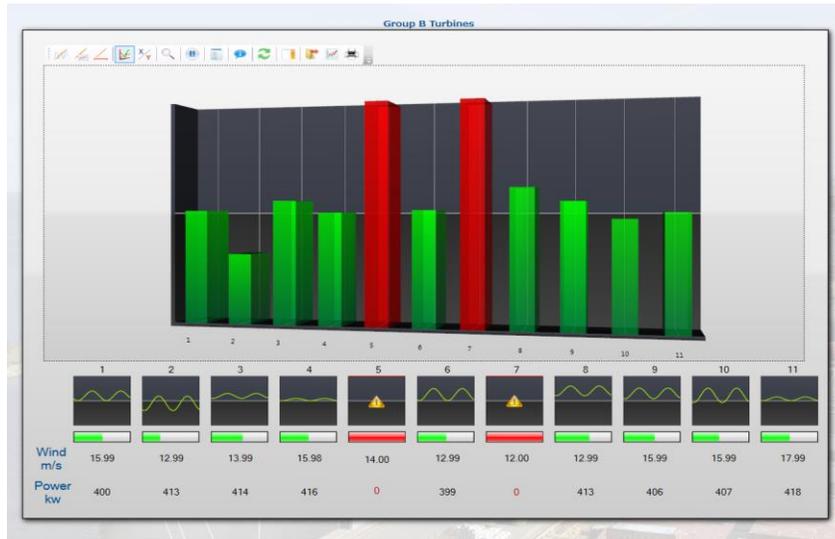


TrendWorX64 Logger

Easily configure logging for your trends with the TrendWorX64 Logger. The TrendWorX64 Logger is a SQL Database logger recommended for up to 25,000 tags and can be connected to the TrendWorX64 Viewer as you would for OPC DA data. The data can easily be shown in displays and includes advanced Pen Aggregations for OPC HDA (Historical) data. Aggregations can be performed in runtime to generate trends for Totalizers, Averages, Minimums, Maximums and Ranges. Through OPC Quality monitoring, operators can get extra information on the percent of values that are good or bad quality.

Universal Connectivity

- OPC-DA
- OPC HDA
- GENESIS64 Hyper Historian
- Web Services
- TrendWorX32 Server
- TrendWorX64 Server
- OPC UA
- OPC UA HDA
- BACnet
- SNMP
- 3rd Party Databases/Plant Historians



Specifications

OPC Connectivity

OPC UA	Client [DA, HDA]
OPC Classic	Client [DA, HDA]

TrendWorX64 Logger

Logger Type	Database
Logger Configuration	Tag Based
Maximum Capacity	5,000 Tags (Recommended)

Support

Multiple Logging Groups	Yes
Multiple Database Groups	Yes
Store and Forward	Yes
Start/Stop Conditions	Yes
Database Table	Yes

Management

TrendWorX64 Viewer

Extension	TWXX (WPF Format), TWXXS (Silverlight)
Data Type	Real-Time, Historical (DA, HDA)
Embeddable	Yes [GraphWorX64]
Number of Trends	Over 250 (< 25 Recommended for Readability)
Time & Rate	Trend Period, Summary Period, Data Collection Rate, Display Refresh Rate, History Refresh Rate,
Time & Date	UTC, Local
Time Format	None, Long, Short, Custom (h, H, m, s, t)
Date Format	None, Long, Short, Custom (M, d, y)
Plot Types	
Line	Time, Time Spline, Step Time, XY
Area	Time Area, Time Spline Area, Time Step Area
Other	Bar, Histogram, Circular, Pie, SPC Control Chart
Pen Types	

<i>Stroke</i>	Solid, Dashed, Dotted, Dotted-Dash, Custom
<i>Markers</i>	None, Circle, Square, Triangle
<i>Numeric Format</i>	Currency, Decimal, Exponential, Fixed-Point, General, Number, Percent, Hexadecimal
<i>Range</i>	Auto, Auto Scale, Fixed (Minimum, Maximum)
Support	
<i>Bad Quality Markers</i>	Yes
<i>Multi-Grid</i>	Yes
<i>Multi-Tab</i>	Yes
<i>Multi-Chart</i>	Yes
<i>Custom Styles</i>	Yes
<i>Freeze Trends</i>	Yes
<i>Alarm Lines</i>	Yes
<i>Ideal Pen</i>	Yes

Product Introduction

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EarthWorX™

EarthWorX, GENESIS64's integrated mapping provider allows for real-time visualization to widely dispersed assets such as factories, facilities, oil fields and many others. ICONICS supports multiple mapping technologies and combines them with the power of the GENESIS64 HMI/SCADA solution to generate powerful GEO-SCADA consoles. GEO-SCADA can be used to geospatially contextualize data for operators bringing meaning to HMI/SCADA displays. ICONICS' unique SmartPin™ technology allows for an innovative drill-down capability to quickly view alarm conditions and status for any location around the world. Within seconds, that asset can be identified and located through GENESIS64's integration with Google Maps, Microsoft Bing Maps, Esri Mapping and maps conforming to the Open Geospatial Consortium's Web Map Service (OGC WMS) standard.



Developer Benefits Include:

- **Multi-layer GraphWorX64 Integration** – Bringing base maps and data layers to your HMI displays; EarthWorX can easily be embedded in any application.
- **Easy Contextualization of Data** – via state-of-the-art Geographic Information Systems (GIS) and GPS Exchange Format (GPX) capabilities.

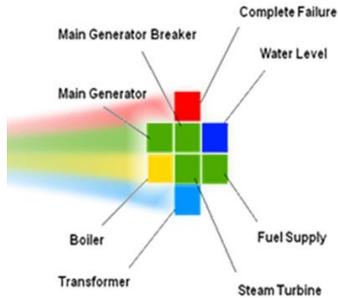
Operator Benefits Include:

- **Ability to Correlate Information Geographically** – This allows operators to strategically deploy maintenance where they need to be and supports the contextualization of data.
- **Immediate Geographical Analysis** – Let operators know visually if errors and alarms are related graphically.
- **Runtime Controls** – Switching Map Types (e.g., Road to Aerial) and zoom controls through the Runtime Ribbon Menu.

Map Providers

EarthWorX can no integrate with a number of different providers offering different base map types. Developers can choose between Bing, Google, Esri and custom WMS map tiles for displays. Each can be designated for a specific EarthWorX map layer to provide the operator with a choice or to include data layers from providers like Esri.





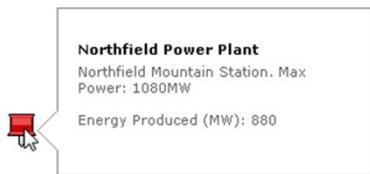
Smart Pin Technology

Smart Pins are completely customizable and can be made to look like any shape. They are used to quickly visualize the performance of an asset by the color of the pin. Green can indicate all systems are OK, yellow a potential problem and red an alarm condition or immediate action is needed. Smart Pins are a valuable tool when needing to quickly identify a large number of geographically dispersed assets.

Smart Pins can be made into any shape, convey any signal and contain any number of Smart Icon “squares”. Their color-based interpretive ability makes it possible to immediately understand and analyze huge amounts of data. Smart Pins add context to maps to understand potential problems due to geographical aspects (for instance, weather or available power supplies). Add flashing colors or customized tool tips for more information. Links can be added to bring operators to appropriate alarm displays, open up a manual of actions or bring up more detail through any other means.

Layering

With the introduction of new map providers EarthWorX now supports multiple EarthWorX layers within the same document. This provides the ability to put multiple map types (aerial, road, etc.), different data layers (Esri data layers, OGC WMS custom maps, etc.). With a button on the ribbon and integration with the Object Explorer each layer can have a different map tile source for a flexible and customizable solution for any application.



PushPins

PushPins can convey a basic-level element on a map and can use a variety of custom or pre-configured images, appropriate to the industry or application.

EarthWorX Configuration and Runtime

Configuring EarthWorX is quick and easy with the GENESIS64 Workbench. The EarthWorX ribbon can be shown or hidden during runtime. The options to change the map appearance and zoom to different views are always available via the right-click context menu during runtime.



Track Movable Assets

Are your assets constantly moving? Users can track movable assets during transportation via GPS coordinates. Assign custom icons and configure them with fully customizable pop-

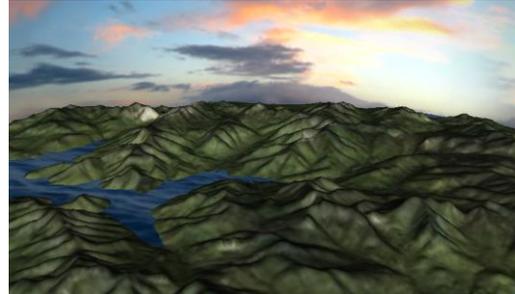
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up information boxes. Import .GPX data right into the display and configure options to place pins for waypoints, stops and directions.

3D Terrain Mapping

Users can now combine EarthWorX Bing Maps with the 3D Terrain Primitive available in GraphWorX64 3D Views. By utilizing the Elevation Bitmap Property of the Terrain Primitive a portion of the world map can be used to create elevation profiles and textures to apply to 3D models creating an element of realism not previously possible without hours of work. Now with a few quick clicks anyone can have beautiful 3D terrains to further contextualize data in the real world.



Specifications

Map Sources

Bing	Road (Shade, No Shade), Hybrid, Aerial
Esri	Imagery, World Boundaries, Streets, Topographic, Canvas, National Geographic, Oceans
Google	Roadmap, Satellite, Terrain, Hybrid
OGC WMS	Custom

EarthWorX Viewer

Zoom	
<i>Levels</i>	1-16
<i>Region</i>	Configurable Bounds
Layers	
<i>Opacity</i>	Configurable
<i>Visibility</i>	Configurable – Dynamics can be attached (default: visible)
Credentials	
<i>Bing</i>	Bing Maps Key
<i>Esri</i>	Username, Password, Root URL
<i>OGC WMS</i>	Provider Address, Additional Parameters

Smart Pins

Placement	GraphWorX64 Object, Latitude/Longitude
Configuration	Dialog
<i>Size</i>	Add/Remove Rows and Columns
<i>Color</i>	Per Smart Icon
<i>Data Connection</i>	OPC, OPC UA, Global Aliasing, Language Aliasing, Simulation, Expressions, Local Aliasing
<i>Tooltip</i>	Configurable, Data-enabled

Push Pins

Placement	GraphWorX64 Object, Latitude/Longitude
Configuration	Fill, Zoom, Shadow

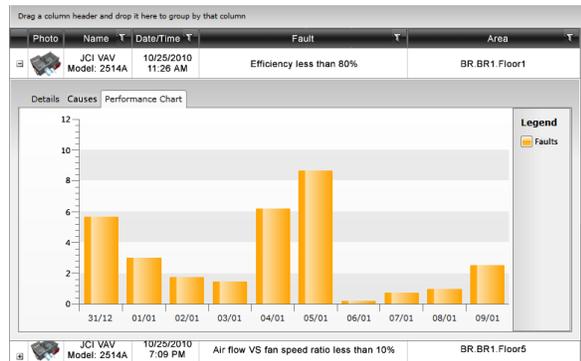
GENESIS64™
Product Introduction

GENESIS64™

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FDDWorX™

FDDWorX represents the inclusion of a predictive equipment diagnostic solution that uses an advanced Fault Detection and Diagnostics (FDD) Engine within GENESIS64 to allow users to analyze all available information 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.



When equipment failures occur, advanced software technology analyzes current and historical information along with symptom/cause relationships that the system has been taught, executes probability algorithms, and provides the user guidance with a list of probable causes sorted by probability. This immediate guidance reduces mean time to diagnose and repair, reduces equipment downtime, and lowers overall maintenance costs.

Fault Detection

Detection is based on definable logic that aggregates all available past and present data to detect current or future faults. Faults can be defined in many different ways, but are far more specific than alarm conditions, allowing users to specify enabling conditions that must be met and parameters that can help determine if a fault has occurred.

Photo	Name	Date/Time	Fault	Area
	JCI VAV Model: 2514A	10/25/2010 11:26 AM	Efficiency less than 80%	BR BR1.Floor1
Details Causes Performance Chart Name: JCI VAV Model 2514A Area: BR BR1.Floor1 Faults this week: 3				
	JCI VAV Model: 3152A	10/25/2010 12:06 PM	Not operating within parameters	BR BR1.Floor10
	Hurst Boiler Model: B145	10/25/2010 12:31 PM	Heating ratio less than 20%	BR BR1
	Carrier Chiller Model: C52	10/25/2010 3:18 PM	Chilling ratio less than 20%	BR BR1
	JCI VAV Model: 2514A	10/25/2010 7:09 PM	Air flow VS fan speed ratio less than 10%	BR BR1.Floor5

Fault Diagnostics

Diagnostics is about capturing knowledge from existing workers, work order history, alarm history, manuals and device symptoms into a single place. By aligning conditions with symptoms and probability-ranked causes, fault diagnostics can be used to present the most likely cause of a fault as soon as one occurs.

Possible Causes	Diagnostic Symptoms	High airflow alarm	High discharge temperature alarm	High zone temperature alarm	Low airflow alarm	Low discharge temperature alarm	Low zone temperature alarm	UI
Zone temperature sensor drift/failure	0 (0%)	0 (0%)	1 (9%)	0 (0%)	0 (0%)	1 (9%)	0 (0%)	0
Airflow (DP) sensor drift/failure	1 (17%)	0 (0%)	0 (0%)	1 (11%)	0 (0%)	0 (0%)	0 (0%)	1
Discharge temperature sensor drift/failure	0 (0%)	1 (33%)	0 (0%)	0 (0%)	1 (33%)	0 (0%)	0 (0%)	0
Damper stuck or failed	1 (17%)	0 (0%)	0 (0%)	1 (11%)	0 (0%)	0 (0%)	0 (0%)	1
Damper actuator stuck or failed	1 (17%)	0 (0%)	0 (0%)	1 (11%)	0 (0%)	0 (0%)	0 (0%)	1
Reheat coil valve stuck or failed	0 (0%)	1 (33%)	1 (9%)	0 (0%)	1 (33%)	1 (9%)	0 (0%)	0
Reheat coil valve actuator stuck or failed	0 (0%)	1 (33%)	1 (9%)	0 (0%)	1 (33%)	1 (9%)	0 (0%)	0
AHU Supply air too warm	0 (0%)	0 (0%)	1 (9%)	0 (0%)	0 (0%)	1 (9%)	0 (0%)	0
AHU Supply air too cool	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0

GridWorX™

When viewing a large amount of data, it's often helpful to align values into grids for spreadsheet-style visualization. With GridWorX, users can customize data sets and create large grid-based data visualization. Using the concepts developed with AlarmWorX64, TrendWorX64 and EarthWorX, the GridWorX control can be added to GraphWorX64 displays quickly and easily. With support for SQL Server, OLEDB (x64), ODBC (x64), Oracle (via ODP.NET) and SAP data, GridWorX is a powerful tool for visualization that saves time in development.

GridWorX Development

Organize your data simply and logically with GridWorX. Utilize the power of spreadsheet visualization with filtering and sorting of data in real-time. Configure dynamic data sources into grids easily and save on engineering time, while providing a powerful tool to your operators. Centrally configured in the Workbench, the data sets that drive GridWorX can be reused multiple times or updated via online change support. Add multiple grids and tabs or put grids next to each other to give the whole picture of operations.

Fac Desc	Status	Engine Speed	Suction Pressure	Discharge Pressure	Suction Temp	State
UNIT198	0	156.9	0	1106.8	66.3	Error
UNIT1A	0	160.6	0	1074.5	74.5	OK
UNIT1B	0	158	0	1131.4	72.7	OK
UNIT20A	0	170.4	0	1114.8	70.6	Error
UNIT20B	0	165.5	0	1081	70.2	Uncertain
UNIT20C	0	162	0	1096.7	71.1	OK

Discharge Pressure	Suction Temp	Discharge Temp	Run Time	Available HP	Column #10
1106.8	66.3	118.7	92.7	161.2	Error
1074.5	74.5	110.7	85.5	162.8	OK
1131.4	72.7	111.6	90.9	158.9	OK
1114.8	70.6	109.3	88.4	162	Error
1081	70.2	117.4	92.8	171.8	Uncertain
1096.7	71.1	110.3	93.5	161.2	OK

GridWorX Operator Runtime

GridWorX natively supports read and write capabilities to allow operators to not just visualize data, but interact with it. Operators can view, sort, filter and group objects in real time. Sorting columns can bring the most important data to the operator and grouping can quickly create ways to visualize data in context of related data. Dynamic color changes can be included to increase the visibility of issues within data sets.

Fac Desc	Status	Engine Speed	Suction Pressure	Discharge Pressure
UNIT198	0	156.9	0	1106.8
UNIT20A	0	170.4	0	1114.8

The screenshot shows a user interface for the GridWorX operator runtime. At the top, there are two dropdown menus labeled 'Engine Speed' and 'Status'. Below them is a data table with columns for 'Fac Desc', 'Status', 'Engine Speed', and 'Suction Pressure'. The table contains two rows of data: UNIT198 and UNIT20A. The interface includes interactive elements such as expand/collapse arrows and sorting arrows for each column.

Specifications

Data Sources	
OPC	OPC DA, DB OPC (Matrix)
SQL	SQL 2005, SQL 2008
OLEDB	x64
ODBC	x64
SAP	
Oracle	ODP .NET
Array	Dataset
GridWorX Viewer	
Refresh	
<i>Manual</i>	Configurable
<i>Automatic</i>	Configurable (in milliseconds)
Maximums	
<i>Rows</i>	No Hard Coded Limit (Recommended: 1,000,000 rows)
<i>Columns</i>	No Hard Coded Limit (Recommended: 100 columns)
Changeable Style	Background, Foreground, Font Size, Font Weight, Font Family, Font Style
Row Data Formats	Boolean, String, DateTime, Int16, Int32, Int64, Double UInt16, UInt32, UInt64, OPC UA StatusCode
Support	
<i>Live Filtering</i>	Yes
<i>Live Grouping</i>	Yes
<i>Live Sorting</i>	Yes
<i>Read</i>	Yes (For Readable Points)
<i>Write</i>	Yes (For Writable Points)

ProjectWorX™

Project Reporting is a development tool that enables data source analysis and reporting for applications. The tool allows users to detect what points are being used in their project, helping identify good and bad quality data. Reporting tools are located in in the Project Analysis section of the Projects menu in the ribbon bar:



There are three types of available reports, each with a different goal listed below.

- The **Availability Report** searches across all selected providers and collects tags and tag properties of each available item that is exposed in the server or point manager address space.
- The **Usage Reports** work similar to input collectors and parsers for all available objects. This means they will parse and describe all input strings, numbers and tags used in every item in the currently active configuration of the particular provider including expressions and global aliases.
- The **Runtime Collection** is a feature for monitoring the newly subscribed tags, collecting their available information into a common database (point name, point URL, which application uses the specified tag, name of the server that hosts the application, object name, usage, file name and application).



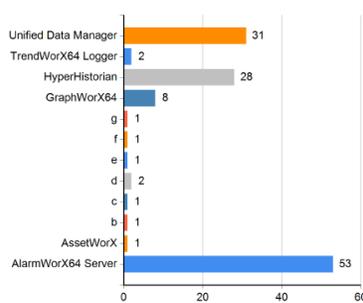
Project:
Version:

Point Usage Report

All Bad Quality Points

Author:
Executed: 8/5/2014 5:32:47 PM

Bad Points Distribution Across Applications



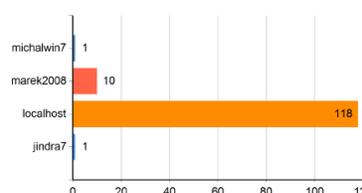
Product Version:

1/13

Point Quality Distribution Overview



Bad Points Distribution Across Servers



Report ID: 12

ReportWorX™ Express

ReportWorX Express is a lightweight Excel add-in that allows the user to pull in data from a variety of data sources. Although it differs from the stand-alone ReportWorX product in several key ways, ReportWorX Express is intended to be a simple way to quickly report on ICONICS data sources. Integrating with GENESIS64 Security and including support for numerous data types including OPC, OPC UA, TrendWorX Logger Databases, Hyper Historian, AlarmWorX Logger Databases, Energy Star and Quality AnalytIX®, ReportWorX Express will satisfy many reporting needs without requiring the overhead of a full ReportWorX installation.



ReportWorX Express is an on-demand reporting tool that works with both 32-bit and 64-bit Microsoft Excel. Using Excel Task Pane integration, parameterized browsing for dynamic updates and a contextual Ribbon menu, ReportWorX Express allows users to select historical data by product or data source for inclusion. Each data connection can be formatted for a specific time range and due to the power of Excel, multiple worksheets can be saved together to create comprehensive reports for use by operators and executives alike. Excel cell collision detection and the use of Excel Formulas allow for simple configuration. With a small footprint standalone installation, ReportWorX Express is a lightweight reporting solution that can be utilized alongside GENESIS64 with ease. Familiar data browsing will also be seen when looking for current values or historical information to include in each report.

Historical Alarms ✕

Please click on the Output Cell Range Button to select a range

Data Source Tag:

Output Cell Range:

Start Date Type: Custom

Start Date: Start Time:

End Date Type: Custom

End Date: End Time:

Filtering Expression:

Page size (Number of Alarms):

Select Event Fields:

- SourceNameBaseEventType
- ActiveTimeBaseConditionType
- ConditionNameBaseConditionType
- StatusCodeBaseConditionType

dynamic updates and a contextual Ribbon menu, ReportWorX Express allows users to select historical data by product or data source for inclusion. Each data connection can be formatted for a specific time range and due to the power of Excel, multiple worksheets can be saved together to create comprehensive reports for use by operators and executives alike. Excel cell collision detection and the use of Excel Formulas allow for simple configuration. With a small footprint standalone installation, ReportWorX Express is a lightweight reporting solution that can be utilized alongside GENESIS64 with ease. Familiar data browsing will also be seen when looking for current values or historical information to include in each report.

The screenshot shows the Microsoft Excel interface with the ReportWorX Express ribbon. The task pane on the right is titled 'Historical Aggregate Values' and contains the same configuration options as the 'Historical Alarms' pane, but with an additional 'Resampling Interval (mins):' field set to 1 and an 'Aggregation Type:' dropdown set to 'Maximum'. The 'Select Display Columns:' section shows a list of columns: Name (checked), Server Timestamp, Status Code, Value (checked), and Server Name.

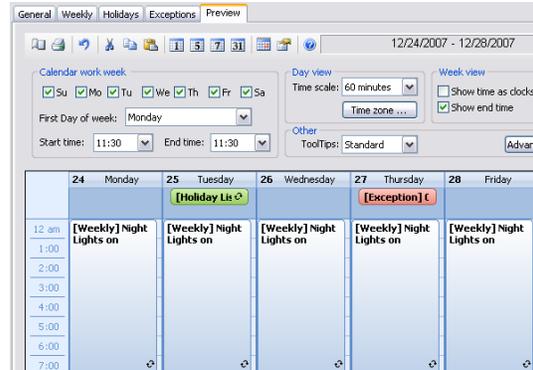
Name	Value
@ICONICS.TWXSQSVr64.1.Database Group.Logging Group.Sine.History	99.94884
@ICONICS.TWXSQSVr64.1.Database Group.Logging Group.Sine.History	99.97533
@ICONICS.TWXSQSVr64.1.Database Group.Logging Group.Sine.History	99.99605

GENESIS64™

Product Introduction

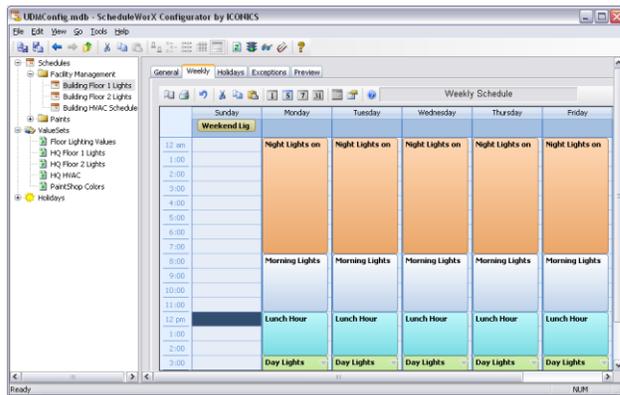
ScheduleWorX64™

Any optimized SCADA application requires a level of scheduling. Create schedules for data to lower temperatures, turn off lights and generally control your operations based on timed schedules. Now included in GENESIS64, ScheduleWorX64 includes a Microsoft Outlook styling that makes it easy to configure times and dates for data control. Sequencing, exceptions and manual scheduling overrides have also been integrated.



Simple Scheduling

Development is easy with ScheduleWorX64, allowing developers of your application to indicate full day or partial day events for weekdays and weekends. Connect OPC-DA and OPCUA DA data to value sets for multiple actions per schedule. Rebuild or reuse schedules as much as needed with the intuitive control. Utilize command sequencing to set up a chain of events for particular points. As with all of GENESIS64, ScheduleWorX64 is configured centrally and leverages all of the advantages of the Workbench such as import, export and Pack and Go deployment.



Flexible Scheduling Support

ScheduleWorX64 allows for advanced control via Value Sets. With Value Sets, ScheduleWorX64 allows multiple points to be governed by a single schedule. Support for specific non-standard events is also central to the ScheduleWorX64 product. By allowing users to configure exception events by creating override schedules, ScheduleWorX64 is truly flexible.

Override Events Include:

- **Holidays** – Configure specific days of the year or utilize the pre-configured holidays to alter the commands to your data points for a day or more.
- **Seasonal** – Configure months or weeks of the year where the schedule should change.
- **Exceptions** – Create general default schedule events and add exceptions for unparalleled control of your application.
- **Manual Override** – Don't sacrifice control of your application and maintain the option to override for unique situations.

Specifications

Configuration	
Data Sources	OPC DA, BACnet, SNMP, Value Sets
Databases	SQL 2005, SQL 2008
Schedule Types	
Recurring	General, Weekly, Holiday, Seasonal
One Time	Overrides, Exceptions
View Types	Day, Week, Month, Timeline
Support	
<i>Outlook Style</i>	Yes
<i>Remote Configuration</i>	Yes
<i>Live Monitor Mode</i>	Yes
<i>Security</i>	Yes
<i>Manual Overrides</i>	Yes

BACnet Connectivity

The most widely used open communications standard in the Building Automation Industry is BACnet. ICONICS GENESIS64 is the first 64 bit Building Automation system to be certified to the highest level of BACnet Compliance, the B-AWS (BACnet Advanced Workstation Profile) by the independent BACnet Testing Laboratory. For our customers this certification provides



- The ability to modernize and automate most existing installed Building Automation systems by simply installing the software and connecting to the network
- Freedom of Choice for the future- The ability to upgrade and extend current systems with building control hardware from any major supplier. Select the best and most cost advantageous control equipment currently available.

The achievement of this certification required the successful completion of in excess of 300 tests including the verification of interoperability with equipment from many vendors. The advanced functionality provided, and required by the B-AWS profile includes.

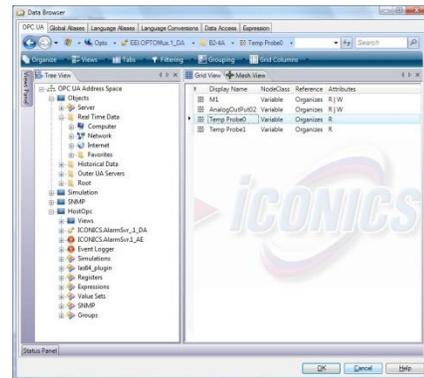
- Alarm and Events – The ability to subscribe for, receive, filter, and support alarm acknowledgement from all BACnet compliant network equipment
- Trending – Support for configuring trends in BACnet compliant devices and the ability to receive trend data sets for trend viewing and automatic merging into long term history
- Building wide schedule coordination – Achieves the critical building function of creating and modifying a buildings automatic calendars and schedules, that are executed in compliant building control devices
- Auto Discovery – The ability to scan all networks for new devices and new objects in devices and provide all necessary information to facilitate interoperability with all devices
- High Speed, Optimized communication performance - The full list of network optimization features provided by BACnet to provide rapid response times and minimal bandwidth utilization are implemented.

Product Introduction

November 2017

OPC UA Connectivity

OPC Unified Architecture (OPC UA) is a robust, secure and scalable expansion of the highly successful basic COM/DCOM-based OPC standard communication protocol. OPC UA allows the interoperability of best-of-breed, real-time alarm management and historian systems. This allows for a standard model of plant floor integration with the enterprise. Any plant system that is currently using OPC communications can easily add OPC UA applications to their existing system, giving them the added value of Web services that allow for more enterprise connectivity.



ICONICS' GENESIS64 is truly "OPC-To-The-Core™", exemplifying the next generation of OPC Data Access, OPC Alarm and Events and OPC Historical Data Access. The built-in technology allows for secure, open connectivity from plants and facilities to the enterprise level.

ICONICS is a charter member of the OPC foundation and played a key role in developing the OPC UA specification. ICONICS president and CEO Russ Agrusa is an OPC Foundation (www.opcfoundation.org) Board Member,



helping to lead the Foundation's efforts in marketing OPC technology and generating new members. ICONICS was first to introduce an OPC production-grade toolkit to the market, and more than 300 companies depend on ICONICS for their OPC toolkit today.

System Requirements

GENESIS64 requires the following hardware and software components as Minimum Requirements. System requirements may vary based on application size, system performance requirements, and loading factors.

Minimum Hardware and Additional System Requirements:

Component	Requirement
CPU	Dual Core 64-bit processors (e.g. AMD Athlon 64 X2, Intel Xeon, or AMD Phenom)
Memory	<i>Minimum:</i> 4 GB of RAM <i>Recommended:</i> 6 GB of RAM Note: It is recommended that the system page file size be a minimum of four (4) times the size of installed (physical) RAM.
Hard Disk	At least 4 GB of free hard disk space is required. (10 GB Recommended)
Drive	DVD Drive for installation
Video Card	Onboard Video Memory (256 MB) Display resolution minimum – 1024x768, 32-bit color DirectX 9 or 10 Video Card or better
Operating System	Windows 10 x64 (Pro or Enterprise Edition) Windows 8.1 x64 (Pro or Enterprise Edition) Windows 8 x64 (Pro or Enterprise Edition) Windows 7 SP1 x64 (Professional or Enterprise Edition) Windows Server 2016 x64 Windows Server 2012 R2 x64 Windows Server 2012 x64 Windows Server 2008 R2 SP1 x64
.NET Framework	Microsoft .NET Framework 4.6
Web Server/Access	Microsoft Internet Information Services (IIS) 7.0 or higher Edge, Internet Explorer, Firefox, Safari, Chrome
SQL Server	Microsoft SQL Server 2016 Microsoft SQL Server 2014 Microsoft SQL Server 2012 Microsoft SQL Server 2008 R2 SP1 Notes: <ol style="list-style-type: none"> The connection to SQL Server data source may be either local or remote. ICONICS supports SQL databases with encryption.

Optional Hardware

- Ethernet adapter (for remote PC connections or Ethernet I/O)
- USB port (for hardware license or license transfer)
- Serial COM ports or other adapters (for data I/O)

NOTE: The requirements described above are based on typical applications. Depending on your specific application, the minimum requirements may vary. In all systems we recommend that the virtual memory allotment be two times the amount of physical memory (RAM) on the system.



Founded in 1986, ICONICS is an award-winning independent software provider offering real-time visualization, HMI/SCADA, energy management, fault detection, manufacturing intelligence, MES, and a suite of analytics solutions for operational excellence. ICONICS solutions are installed in 70 percent of the Fortune 500 companies around the world, helping customers to be more profitable, agile and efficient, to improve quality, and to be more sustainable.

ICONICS is leading the way in cloud-based solutions with its HMI/SCADA, analytics, mobile and data historian to help its customers embrace the Internet of Things (IoT). ICONICS products are used in manufacturing, building automation, oil and gas, renewable energy, utilities, water and wastewater, pharmaceuticals, automotive, and many other industries. 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. Delivering information anytime, anywhere, ICONICS' solutions scale from the smallest standalone embedded projects to the largest enterprise applications.

ICONICS promotes an international culture of innovation, creativity, and excellence in product design, development, technical support, training, sales, and consulting services for end users, systems integrators, OEMs, and channel partners. ICONICS has over 350,000 applications installed in multiple industries worldwide.

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