

OPC UA: Enabling the Industrial Internet

Reducing Costs and Saving Time with Greater Interoperability

Every OPC standard has been widely accepted by the automation industry to improve interoperability. The OPC Foundation's latest set of standards, OPC UA, aren't new. However, additional sections are still being released, including the discovery-related Part 12, to address the changing needs of the automation market.

Standards for interoperability are even more critical today, as key enablers of the Industrial Internet. In order to "Get Connected," our devices and systems must communicate – and do so using secure-by-design methodologies.

OPC UA facilitates this journey to improved communication, enhanced security, and self-configuring systems. Also, as more and more OPC UA-based products become available, the industry reaches a critical mass to ease communication and modeling.



OPC Classic Specifications

- → OPC Data Access (OPC DA): Defines the exchange of data including values, time and quality information
- → OPC Alarms & Events (OPC AE): Defines the exchange of alarm and event type message information, as well as variable states and state management
- → OPC Historical Data Access (OPC HDA): Defines query methods and analytics that may be applied to historical, time-stamped data

OPC Unified Architecture (OPC UA):

A platform-independent, serviceoriented architecture that integrates all the functionality of the OPC Classic specifications and is backward compatible with OPC Classic

*Information from www.OPCFoundation.org

3 Ways OPC UA and GE Enable the Industrial Internet

Industry Standard Protocols

Working closely with the OPC Foundation, GE is the first company to implement and release a new Global Discovery Server (GDS) based on the pending* OPC UA Part 12 – which enables the Industrial Internet with improved ease of secured connectivity across devices and equipment. The GDS automatically discovers OPC UA devices on the network and connects to them with no configuration, saving time and reducing costs.

GE has standardized on OPC UA as an interoperability standard across several GE businesses. With OPC UA and the Global Discovery Server, GE further enables the Industrial Internet with:

- → Improved ease of connectivity across devices and equipment (Standards)
- → Enhanced secure-by-design methodologies (Security)
- → Significantly richer context for data (Models)

*Pending as of June 2015

Systems that speak the same language
Modbus
Profinet
ECAT
Security
Trusted communications
Authenticate
Data Models

GE Intelligent Platforms

EGD

Proprietary

Knowledge

Information

Data





Evolving OPC Standards for Greater Interoperability

As an interoperability standard, OPC UA is a lot richer in terms of the types of information and context. Key differences between OPC UA and the past standards include:

- → OS independent communication standard Going well beyond Microsoft Windows[®] to also include UNIX, Android, iOS, and more.
- → Client server architecture The clients request data from the server or can receive unsolicited information from the server. In a typical industrial environment, the server is the PLC, and a system such as the SCADA represents the clients. The SCADA can also be a server to other clients. With OPC UA, you have significant architectural flexibility.
- → All encompassing Data, alarms and conditions, historical data with added context.
- → Robust data modeling More than just a data point, you can model an asset or an object with properties such as a motor with speed, temperature, and other properties.
- → Secure-by-design, IT-friendly communications.





Intelligent Platforms

GE

OPC Then and Now*

In 1996, the OPC Foundation released its first standard – which facilitated exchanges between PLCs and HMI/ SCADA. At the time, there were many proprietary communication protocols, mostly developed by PLC vendors, which created isolated islands of information.

Today, the OPC UA specifications address new security and data modeling challenges associated with service-oriented architectures, and at the same time provide a feature-rich technology open-platform architecture that is future proof, scalable and extensible.

*Information from www.OPCFoundation.org





Driving the Right Outcomes in Your Business With OPC UA, you can:



Discover Data

Configure

Reduce your communications configuration time and costs:

With a standard way to communicate, you can ease configuration, discover devices and connect faster." Instead of "With a standard way to communicate . Also, OPC UA makes it easier to maintain your systems. Commissioning of systems is faster, and it is easier to make changes – which saves you time and ultimately reduces costs.

Drive secure-by-design connectivity:

OPC UA provides encryption and certificate management in order to enable secure-by-design connectivity.

Improve reliability and redundancy for higher uptime:

With OPC UA, you can take advantage of all the ways to build a system that stays up and running. OPC UA supports redundant cabling. As an example, you can have a SCADA server with redundant OPC UA clients. Also, for reliable communications, OPC UA provides mechanisms to ensure your data gets transferred.

Connect to your multiple platforms for greater flexibility:

OPC UA supports more than just Windows applications, so you're not bound by one OS. If you have clients and servers that are not Windows based, such as PLCs, Android devices and iOS devices, you can still take advantage of OPC UA compliant connectivity.

Leverage data from legacy systems for improved intelligence:

Don't forget about your old islands of data. With OPC UA, you can capture that data and add context to it. For example, if you would use GE HMI/SCADA software as your OPC UA server to collect data from devices, your HMI/ SCADA then acts as an aggregator for those legacy systems. You can even use the HMI/SCADA to send all of the collected data above the plant floor, enabling higher level systems.

GE Global Discovery Server: An Industry First

The GE Global Discovery Server is based on OPC UA Part 12. This leading-edge technology is the first of its kind and brings you new ways to reduce configuration time and costs while enhancing security. The GDS provides:

1. Server discovery

- → Local discovery and global discovery
- → Compliant servers broadcast their endpoints
- → Provide list of available endpoints to clients for ease of configuration

2. Certificate management

- → Acts as a certificate authority and store for UA client and server connections
- → Facilitates the exchange of certificates to enable easier configuration









Before and After OPC UA and GE GDS

Steps toward self-configuration and faster time to value – plus easier maintenance without IT resources

BEFORE	AFTER
Manual entry of end point address	Automatically locate devices quickly and easily throughout the site
Certificate Management was painful – time consuming	Facilitates the exchange of certificates on behalf of the user
Manual synchronization of certificates	Take advantage of existing authentication services
Some devices cannot talk ("headless")	Implements push/pull for client/servers – Device initialization







Because OPC UA is so new, many of your devices aren't OPC UA compliant. And, that's no problem.

You can leverage a GE gateway, which provides a bridge from the traditional OPC DA or protocol-specific devices to the OPC UA standard. This allows you to still maintain a secure-by-design connection with the bridge.

For devices that are unaware of the GDS, you can use the GE Global Discovery Server Agent. The Agent registers devices in the GDS for it. Also, the Agent can help manage the trust list and certificates, so you can enhance security even if devices are not GDS aware.





Continuing the Journey to Self-Configuration

Managing Systems without IT Support

With OPC UA, you can take another step toward self-configuration, increasing use of secure-by-design methodologies, and managing systems without IT support with capabilities such as certificate management. Additionally, you can use OPC UA's object-based context with the structured data to improve operations. You can automatically configure your database in a structured manner by creating objects instead of just adding points or tags.

Working with GE and OPC UA, you will see a much more integrated experience between hardware and software – including third-party devices. By autoconfiguring the HMI/SCADA application, you can save significant time and money, whether implementing systems yourself or through a partner. GE and OPC UA move toward selfconfiguration

- → Plug and play user
 experience to provide
 faster time to solution
 and value reducing
 costs
- → Model for configuring GE and other smart devices
- → Integrated user experience for control and SCADA
- → Integrated user experience for third-party hardware



Get Connected:

Your Assets, Your Plant, Your Global Sites

Aggregating Data Vertically and Horizontally – with Scalability

With newer standards and technologies, you have more power to aggregate data – moving information both horizontally and vertically across assets and systems. Consider aggregating data to a server, then up to another server, then another. This capability enables you to leverage the power of the Industrial Internet and other advanced functions.

Your communication is not limited to data flowing between a SCADA and your PLCs. You have greatly enhanced abilities to aggregate and use data and information across devices and systems.

You can scale this communication and data aggregation not only locally but across multiple sites around the world. That's a new level of data- and information-sharing to improve decision making in your business and drive toward key outcomes.



For more information, visit: www.OPCFoundation.org www.geautomation.com

GE Intelligent Platforms

GE Intelligent Platforms provides industrial software, control systems and embedded computing platforms to optimize our customers' assets and equipment. Our goal is to help our customers grow the profitability of their businesses through high performance solutions for today's connected world. We work across industries including power, manufacturing, water, mining, oil & gas, defense and aerospace. A division of GE, we are headquartered in Charlottesville, VA.

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