

GE Energy Connections



Industrial Internet Control System

# Control Server

Optimizing server-grade  
supervisory control for the  
digital industry thread

[geautomation.com](http://geautomation.com)

A high-angle photograph of four industrial workers in a factory setting. They are wearing white hard hats and high-visibility orange and dark blue work jackets. They are gathered around a large piece of industrial machinery, possibly a turbine or engine, and appear to be inspecting or working on it. The scene is dimly lit, with some light reflecting off the metal surfaces of the machinery.

# Make better decisions faster

Built on GE's deep domain expertise of building state-of-the-art control solutions for all types of industrial environments around the world, GE's next generation of Automation & Control solutions have been developed to extract greater value from the Industrial Internet.

Achieving greater production efficiency, increased uptime, and reduced cost is complicated by the complexity of gathering and analyzing large quantities of industrial data from a large variety of industrial devices. The problem is further compounded by lengthy and inefficient workflows required for timely action. GE's Industrial Internet Control System solutions solve this problem by augmenting real-time control with external intelligence delivered through market analysis, fleet and enterprise data, and asset/process knowledge, enabling easy and dynamic adaption to changing business objectives.

# Total Plant Technology for Today's Cyber-aware Environment



Today's power plants are faced with constantly increasing cyber-security regulations, a need to reduce operating costs, and a desire to use data to extract more benefit out of running assets and tapped-out profitability models. The Control Server is a scalable platform and key enabler to addressing these needs as part of GE's Industrial Internet Control System (IICS). Control Server is the most capable Field Agent\* platform, enabling intensive optimizing apps like Model-based Optimizing Control (MBOC) to inject performance improvements that deliver greater profitability. Built-in security features reduce attack surface and improve compliance to regulations. Operating and maintenance costs are reduced through consolidation of PC functions provided by virtualization technology on a server-grade platform.

## Why GE customers choose Control Server -



### Grow profits with optimizing controls

From simple business apps to complicated physics based models, the Control Server provides the tools to optimize assets to save fuel, increase output, prevent outages and extend life for improved profitability throughout plant life cycle.



### Increased security

Seamless integration into the control network provides system wide access control, enables secure communication and reduces the overall cyber attack surface.



### Reduce cost through productivity

Virtualized environment reduces the quantity of PCs while providing centralized management of regular maintenance, freeing up resources for improving productivity.

# High Capacity Edge Computing

Securely deploy, design, and maintain advanced computing infrastructure by incorporating multiple supervisory control applications into one easy-to-maintain virtualized server. Control Server, with Field Agent technology, is GE's highest capacity cloud-connected edge-computing platform. Control Server uses server class hardware to integrate the features associated with engineering and operator workstations, historians, and advanced communication gateways with new capabilities from GE's Predix\* analytics platform.

## Predix\* Cloud Connectivity

Analytics, RM&D, APM, MBOC & Digital Twin

## Built for Security

Provides easier user management and enables Secure mode for the controller

## Powerful Computing Capability

Server-grade platform hosts multiple virtual machines for Field Agent, Predix apps, supervisory control functions, and historical data storage and analytic tools

## Increased Reliability

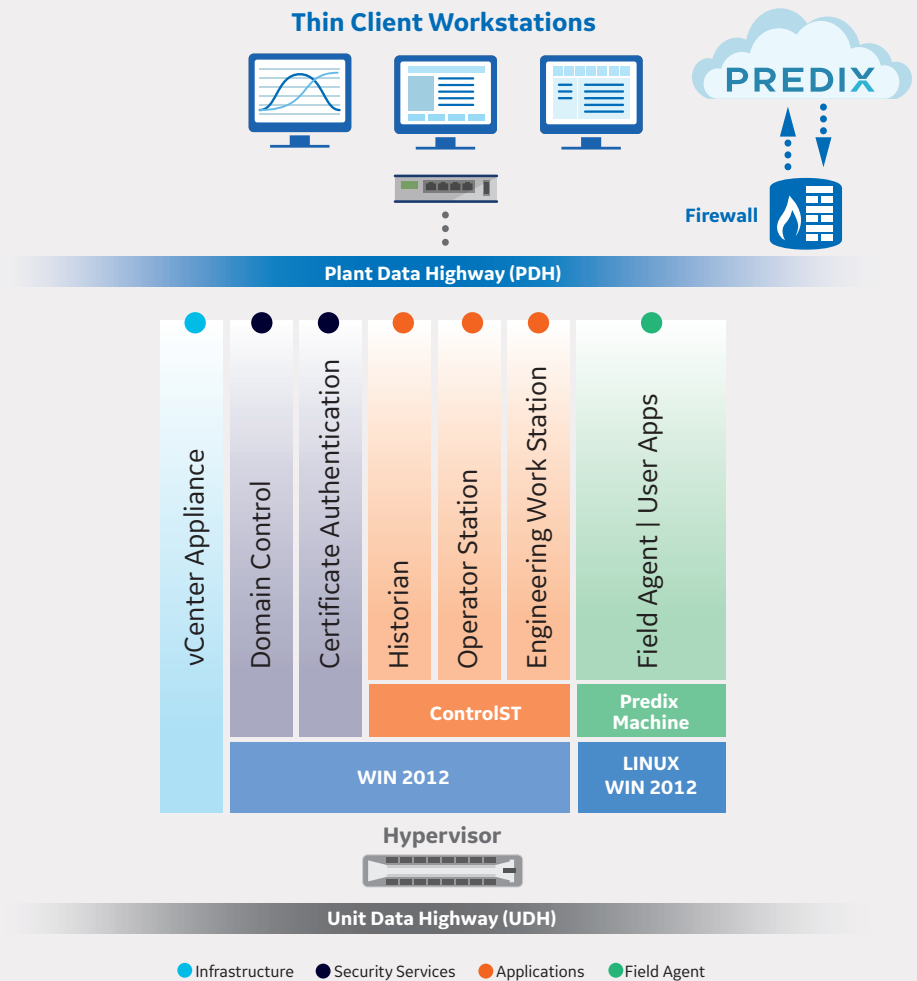
Available in both simplex and redundant configurations with high availability options to best fit the needs of the application

## Improved Maintainability

Industry standard server, leveraging hypervisor, enables centralized management of configurations and easy path for the migration of solutions

## Easy Expansion

Expand your system to meet specific application needs by adding client stations or servers in a cost-effective manner



## Model-based Optimizing Control (MBOC)

Model Based Optimizing Control (MBOC) is an edge-based smart application that leverages the vast computing power of the control server to optimize asset performance, focusing primarily on output efficiency and part life. MBOC incorporates consideration of market conditions (e.g. cost of electricity and natural gas) in conjunction with maintenance schedule (e.g. next shutdown) to optimize an overall business outcome.



## Control Server

Predix-ready\* Commercial grade server for highest-capacity edge computing and supervisory control applications, with embedded Field Agent technology.

# Unmatched capability



## Connectivity

For Industrial Internet connectivity, Virtual Field Agent technology is included in the control server as a platform for applying Predix applications as well as communication connectivity to the Predix Cloud.



## Defense-in-Depth Security

Security and antivirus protection are implemented from a centralized and secured server. Primary and secondary domain VM controllers are included for improved user and password management of the system. A certificate server is included as well to provide a secure connection by enabling secure mode communication with Mark VIe controllers.



## Centralized Device Management

Unlike traditional architectures that rely on separate workstations throughout the plant floor, the centralized architecture of GE's Control Server allows for managed control of all software and versions. Remotely manage security and software upgrades across your control system.



## Increased Reliability & Productivity

Centralized server-based architecture consolidates traditional PC based Workstations into a server class machine that provides simpler lifecycle maintenance and improved security for distributed control systems. High availability options assures reliable uptime for all functions.



## Extensible, Total Plant DCS

Simple system expansion from unit control to plant DCS with deployment of additional clients or server hardware as needed. Small hardware footprint supports easy installation.

# Control Server Use Case

## Challenge

Power generation customers must meet the power demand of their customers while improving operating efficiency to reduce cost and balance the maintenance requirements of their assets.

## Solution

GE has developed a unique visibility and insight analytic offering as part of its Operations Optimization solution, allowing power generators to make both short- and long-term decisions that can improve plant profitability. As a part of the Industrial Internet Control System, the Control Server equipped with Virtual Field Agent Technology can be deployed in our customers' facilities and allow for their power plant to be operated safely above baseload conditions, while the banked MW hours could be used to take advantage of peak market prices and conditions. This gives the ability to directly understand and act on the balance of peak firing with outage scheduling and, as a result, can grant their commercial teams the ability to potentially bid more MWs.

## Customer Outcomes

### Lower Production Costs



Utilize cold part load when fuel is cheaper

### Greater Flexibility



Take advantage of cold part load to bank MW hours

### High MV Capacity



Utilize MW banking during peak demand

# GE's IICS Portfolio of Solutions

## What's New

GE's Industrial Internet Control System augments real-time control with external intelligence delivered through market analysis, fleet and enterprise data or asset/process knowledge. GE's Outcome Optimizing Controllers with embedded Field Agent\* technology leverage GE's Predix\* Platform to easily collect and analyze large quantities of data in the cloud or at the edge to help businesses realize greater profitability and new revenue streams.

### Implementing GE's Controller Solutions, customers are able to achieve the following:

#### Minimize Risk

- Built-in security protocols protect against man-in-the-middle and denial of service attacks
- Broad suite of cyber security technology & tools prevent unauthorized code and application updates
- A variety of redundancy options support improved availability and reduce downtime

#### Reduce Lifecycle Costs

- Advanced functionality simplifies system architecture while dramatically reducing applied engineering costs
- Modular, innovative technology enables continuous application innovation
- Software upgrades, patches, and antivirus updates can be executed from a central location, without taking the system offline

#### Decrease Time to Market

- Scalable performance and support a wide variety of industrial applications
- Redundant power supplies and data storage increase reliability and assures easy recovery without lost production or data

#### Control Server

Commercial grade server for highest-capacity Edge computing and supervisory control applications with virtualized Field Agent\* technology



#### PREDIX



#### Smart Sensors

GE's flexible I/O solutions provide intuitive diagnostics, flexibility, and a wide range of form factors, feature sets, and price points to fit any application.



#### PREDIX



#### Outcome Optimizing Control

Dual or quad core hypervised controller with embedded Field Agent Technology



#### PREDIX



#### Field Agent Technology

Robust solution for pre-configured connectivity and secure data collection and conveyance from the machine



#### PREDIX



#### Smart Apps in the Cloud & at the Edge

Create a smart control system by utilizing apps like GE's Asset Performance Management (APM) Suite, Equipment Insight, Control System Health, or custom built analytics that help improve operational insight and reduce unplanned outages.



**To learn more about IICS applications and GE's complete line of Automation & Controls solutions, visit [www.geautomation.com](http://www.geautomation.com) or contact your local GE automation specialist.**

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