

# High-Performance Automation

Solutions for a Connected World



imagination at work

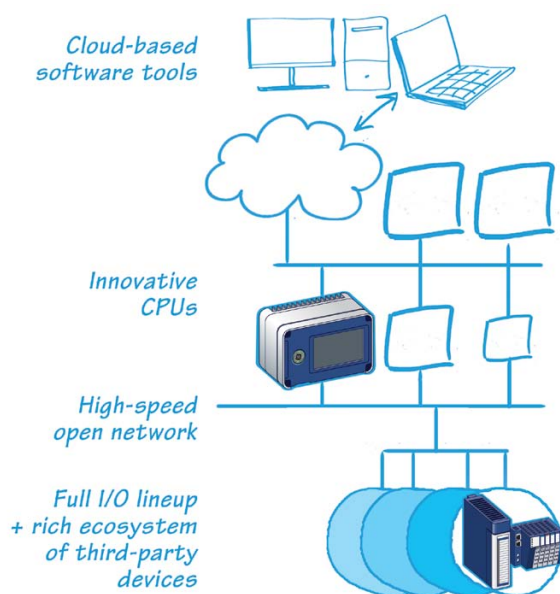
# At the leading edge of the automation revolution

GE Intelligent Platforms believes that the future of industrial automation is in the same collaborative technologies and interactive communities that empower our personal lives. Proven connectivity protocols and cloud-based collaborative environments are tools that can give companies of all sizes a major competitive advantage.



Our entire PACSystems\* automation portfolio has been designed to provide high-performance automation that transcends the hard-wired world of the past. The use of the COM Express form factor in our PACSystems controllers in varying levels of ruggedization allows upgrades to the latest chip technologies during planned maintenance schedules and without loss of critical proprietary data. And the PROFINET open standard designed into our controllers and I/O devices provides high-speed communications down to the end node of automation operations.

*The end result is a new and exciting level of machine-to-machine communications that will transform the automation arena.*



## DEVELOPMENT AND OPERATION IN THE CLOUD†

Our cloud-based architecture enables controls to be created, configured, simulated, deployed and operated from a single point of connect via any device with a browser. It provides a secure, collaborative online environment for the building of systems, the reuse and sharing of entire applications, and the exchange of ideas with colleagues.

## HIGH-PERFORMANCE COMPUTING AT THE END NODE

GE has designed in the ability to integrate control systems with the Industrial Internet so that each device gets smarter as the entire network gets smarter. Our controls architecture provides redundant high-speed PROFINET communication and Ethernet communications for HMI or plant-wide networking.

## SMART CONNECTIVITY

Search tools afford the ability to easily identify targets across the network and hashtag content on the fly for future reference. Security is never compromised because embedded OPC Unified Architecture at the controller† permits sharing of only selected data. New GE controllers self-register by name so applications don't have to change as the network and/or hardware evolves.

## PROFINET-NETWORKED I/O

Controller-to-device communications are enhanced through our use of PROFINET. This high-speed, open communication protocol facilitates the management of the massive amounts of data the devices generate.

# The cloud begins its reign<sup>†</sup>

Any automation network is more than the sum of its parts. That's why we've developed a revolutionary cloud-based platform for connected devices that gives full functionality for creating, deploying, managing and maintaining control systems.



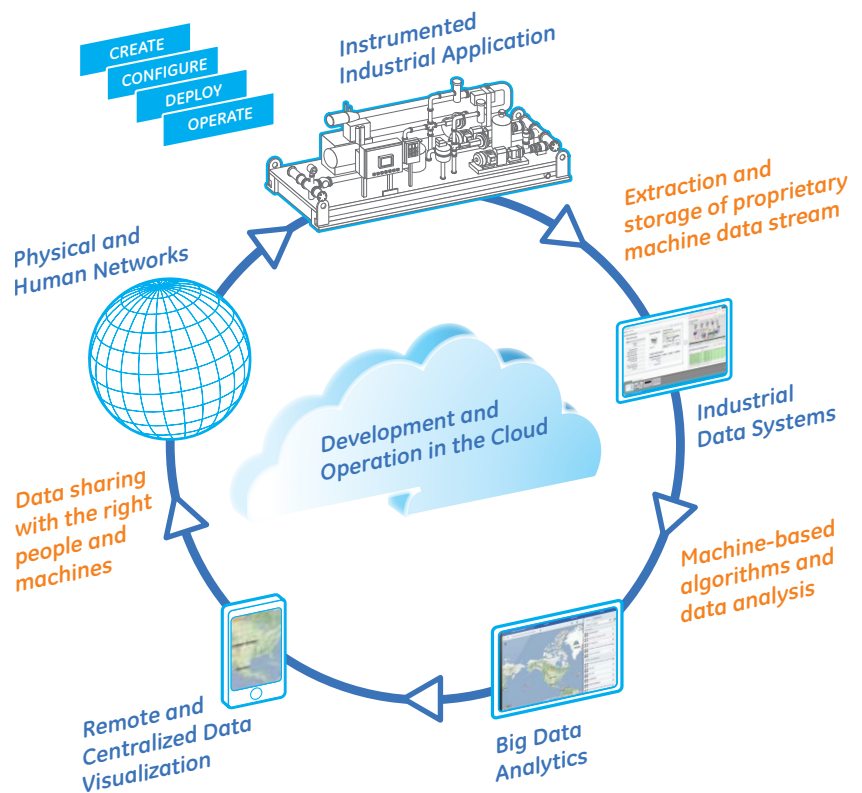
This single-point-of-configuration for lifecycle management of the controls system enables improved business performance and profitability in multiple ways:

- There is no more software to install and maintain. Instead, manage and access digital content from any device with a browser.
- Libraries of code and function blocks enable development engineers to find, co-create, and implement software solutions for the task at hand.

This highly secure and scalable platform turns a network of devices into an ecosystem primed for adaption and survival.

Building what is essentially the Industrial Internet, this platform can communicate with intelligent controllers that manage the automation system down to the end nodes and back up to the cloud. The result is far greater resolution of device-level data that can be stored in the cloud for real-time automation control and lifecycle management of all critical devices.

*We designed more secure communication options into our new RXi controller so that it can serve as the intelligent node between the control platform and all downstream devices.*



# Simplifying even the most complex automation systems

Our design strategy is to provide the highest level of computing technology in the most flexible and adaptable manner possible.



## UPGRADEABLE CPUS

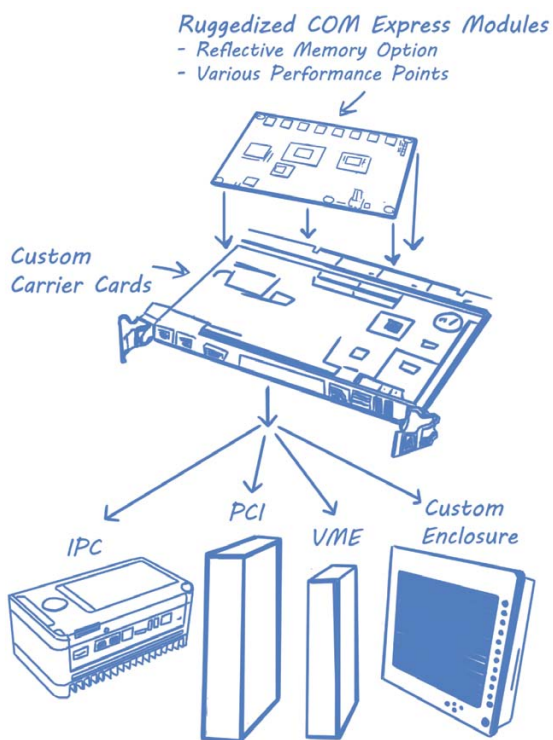
We use a COM Express computing backbone so control applications can benefit from the latest advances in ever-evolving CPU technology with plug-and-play ease. As chips evolve, new technology can be easily inserted with minimal disruption to operations and no loss of valuable operational data or control algorithms.

## CUTTING-EDGE RUGGED ELECTRONICS

We combined our embedded computing and controls expertise to provide a new level of computing power at the machine so you can take application development to a new level. The RXi uses the COM Express form factor to maximize the modularity, simplicity and portability of the intelligent node.

## MACHINE-LEVEL COMPUTING POWER

We incorporated a fast interconnect so that our high-performance industrial computer, the PACSystems RXi Modular IPC, can be easily stacked onto a PACSystems RXi controller to create a powerful platform on which to run GE Proficy and other industrial applications. Running HMI, historian and analytics applications right on the machine takes real-time automation control and integration with plant systems to a new level.



*Enclosures in Multiple Form Factors for a Perfect Fit*



# Leveraging the performance flexibility of PROFINET

GE Intelligent Platforms has based its entire portfolio around the industry-leading PROFINET open communication protocol because it enables easy setup and ultra-fast control.



PROFINET is a high-speed network with the ability to drop large amounts of I/O without compromising performance. Among its strengths is the ability to operate in high-noise areas and cover large distances in real time with an elegant redundancy capability to maximize uptime.

This solution is ideal for businesses moving from centralized control systems to distributed structures where leveraging

Ethernet-based communication in all levels of automation and implementing open IT standards affords a strong competitive position. PROFINET provides flexible deployment that minimizes hardware and configuration issues, and improves application uptime with minimal cost. In addition, PROFINET provides higher performance and better access to real-time plant floor data taking the worry out of volume, latency and throughput.

The use of media redundancy protocol (MRP) in a ring topology allows customers to take a node down for maintenance, or survive a failure or cut of a wire without ever shutting down the application. This powerful feature augments the PACSystems high-availability offering without adding external devices.

## THE RIGHT I/O CONNECTIONS - PROFINET

### Leading I/O network

Ultra-fast and easy to set up.

### "Click" simplicity

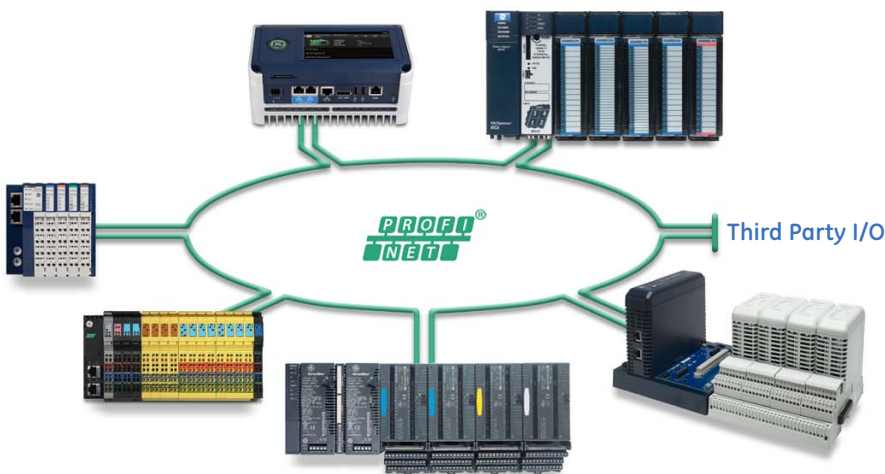
Integrated switch technology minimizes setup time, reduces rack space and simplifies wiring.

### I/O flexibility

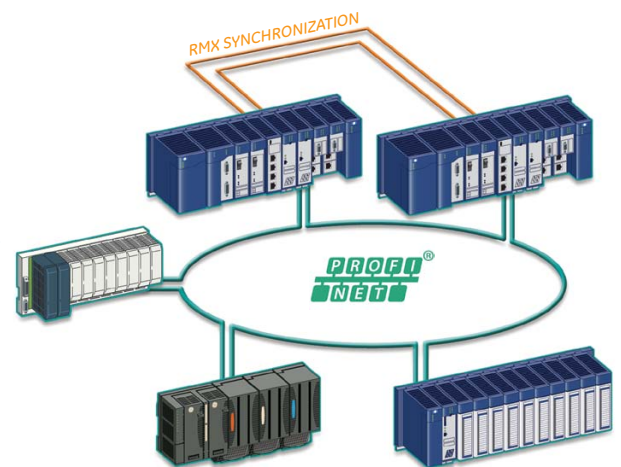
- Connect to a full range of I/O, from simple discrete to machine safety and process I/O.
- Extend with solutions from the PROFINET ecosystem.

### Expect more uptime

- Single-wire MRP ring redundancy minimizes the likelihood and impact of network failures.
- Maintain and update the system without stopping the process.



## REDUNDANCY



# The right I/O options for the job at hand

Equipment builders are continuously looking for ways to improve the performance of their equipment while augmenting usability, and reducing size and complexity.

## KEY FEATURES

- Up to 1000Mbps high-performance I/O network and up to 1msec network update rates
- More uptime with Media Redundancy Protocol (MRP)
- Lower total cost of ownership with simplified installation, standard cabling and third-party device integration
- Packaging designs to meet harsh environmental standards
- I/O based on open and global standards
- Advanced integrated development tools

These requirements extend to the I/O used. GE provides high-performance control I/O solutions with best-in-class integration of distributed (networked) I/O ideally suited for demanding applications. We provide a range of I/O solutions for simple discrete, machine safety, mission critical, process and harsh environment applications.

*Our integrated PROFINET I/O solutions provide productivity and performance advantages necessary for virtually any type of control application in a range of industry verticals.*



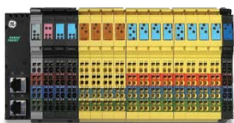
## PACSystems RSTi I/O

The RSTi Slice I/O's small footprint delivers highly flexible distributed I/O capabilities to equipment builders and end users. The low-density modules available in the RSTi line allow the user to more closely match what they purchase with the exact I/O requirements of each drop.



## PACSystems RX3i I/O

The RX3i rack-based I/O provides high-performance I/O capability for a wide range of applications such as mission critical, process and discrete manufacturing. Key benefits of the RX3i are the advanced I/O modules, hot swap, redundant power supplies and advanced diagnostics.



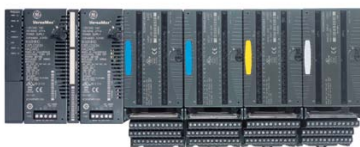
## VersaSafe I/O

VersaSafe is a highly distributed line of slice I/O that integrates with PACSystems and provides a TUV-certified SIL3 machine safety solution. The VersaSafe I/O and integrated safety controller simplifies installation and integration for critical machine safety applications.



## PAC8000 I/O

PAC8000 Process I/O is designed for demanding industrial processes. For applications that are corrosive or explosive, have extremes of temperature or are subject to shock and vibration, PAC8000 I/O is the ideal solution. SIL 2 SafetyNet I/O is also available with the same environmental capability.



## VersaMax I/O

The VersaMax I/O is a modular design to address a wide range of discrete and process applications. VersaMax provides redundant power supplies, hot swap, copper and fiber interface with MRP support.



## VersaMax IP

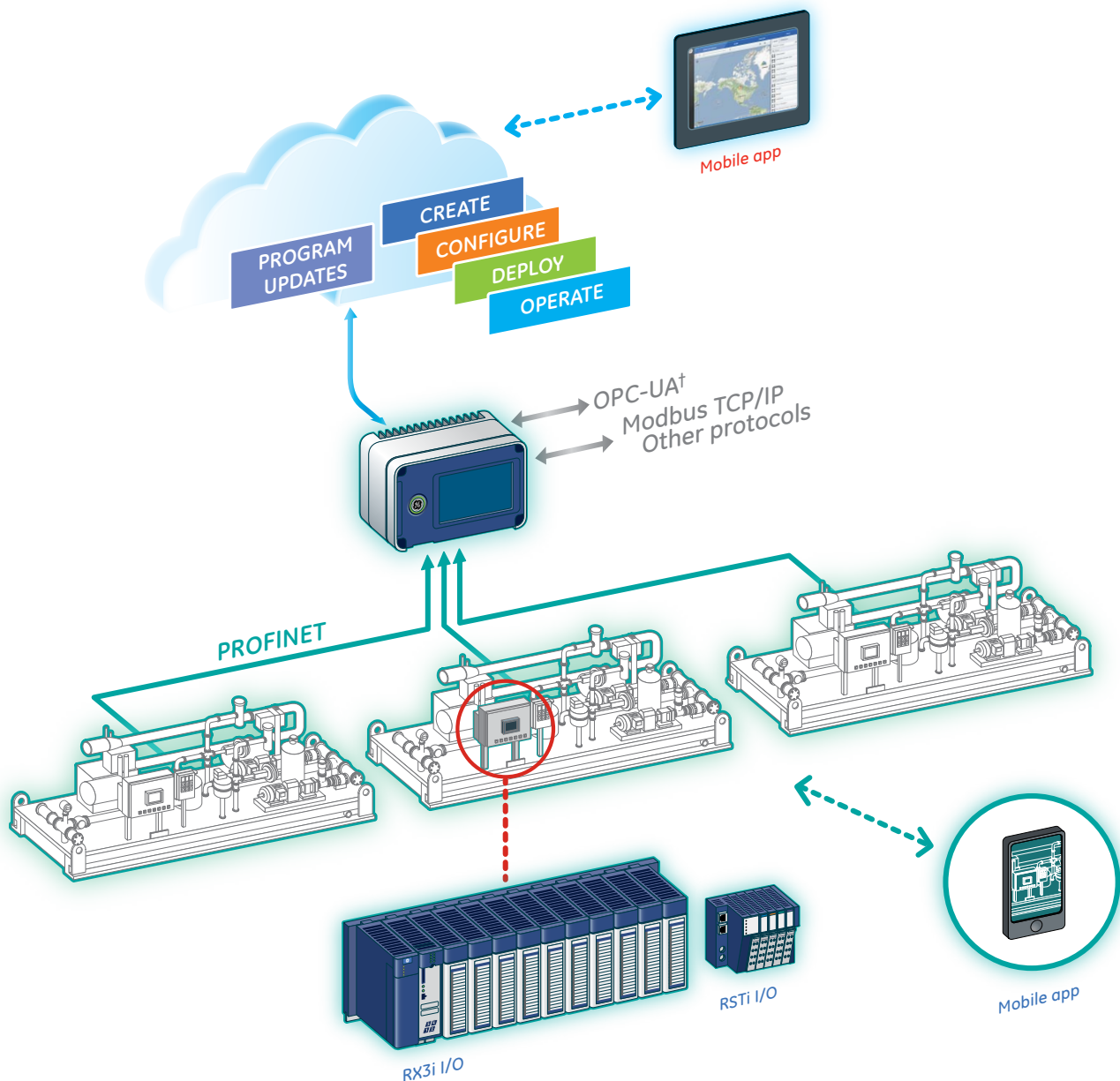
VersaMax IP is a modular distributed I/O system designed for harsh environmental conditions. These modules are IP67 protection rated, so they can be bolted directly onto the control equipment without the need for an enclosure. Plug-on M12 connectors simplify wiring and reduce replacement time.

# High-performance automation for a connected world

PACSystems automation solutions with PROFINET empower operators and engineers with secure cloud-based management of end-node devices and the data they generate.

## KEY FEATURES

- Remote management of machines from any Internet-enabled device
- Devices identified by names, not IP addresses
- Controller serves as the intelligent liaison between the control platform and all end node devices
- Controller identifies all components, routing instructions from cloud-based control platform, and monitors operating conditions
- Data can be easily hashtagged for later review





### **GE Intelligent Platforms Contact Information**

Americas: **1 800 433 2682** or **1 434 978 5100**

Global regional phone numbers are listed by location on our web site at [www.ge-ip.com/contact](http://www.ge-ip.com/contact)

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†Planned Release in 2013