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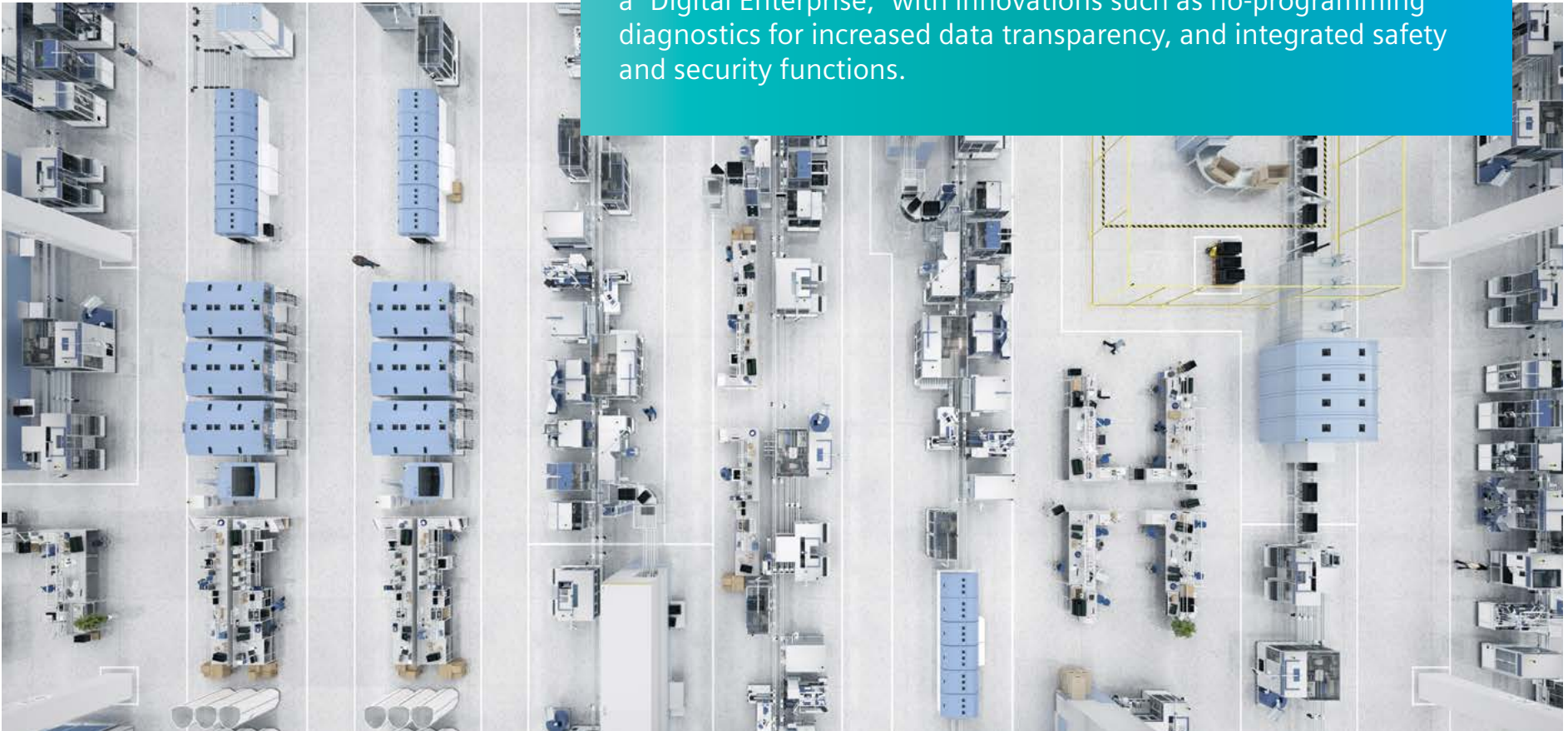
Digital Factory

The Engineer's Guide to Controller Replacement: Plan Your Strategy

usa.siemens.com/modernize

As an engineer, you're constantly seeking ways to improve system reliability, data quality and control. But you can't afford any of the disruptions that often occur when transitioning to new controllers or vendors. To leverage the full benefits of digitalization, you need a controller-replacement strategy that factors in your current equipment and capabilities, maintenance needs, budget and future operational goals.

Digitalization is the convergence of technologies, such as data analytics, the cloud and the Internet of Things, to merge the virtual and real worlds. This enables substantial productivity increases across the entire value chain, from design and engineering to sales, production and service. Digitalization can transform your plant into a "Digital Enterprise," with innovations such as no-programming diagnostics for increased data transparency, and integrated safety and security functions.



The Challenges of Controller Replacement

Here are three major hurdles that you're likely to face as you plan a controller-replacement strategy.

Challenge

Solution

1. The need to understand the benefits of possibly disrupting operations to change vendors.

You're responsible for making sure system designs improve overall performance and don't lead to extensive downtime or maintenance requirements.

Advanced controllers allow you to boost productivity, data transparency and flexibility with the following features:

- The ability to connect to third-party controllers for data sharing
- Integrated, no-programming diagnostics
- Integrated communication tools

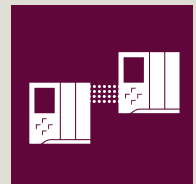


2. The need for a system that requires very little training so you can minimize expenses.

Even if you stay with the same brand when upgrading components, you will need to convert code because I/O and other features likely have changed. So although you know that an upgrade is critical, you're worried that a new controller will require additional training.

Look for vendors that offer:

- No-charge code-conversion services that allow you to retain your current structures and naming conventions
- A single engineering framework that integrates controllers, distributed I/O, HMI drives, motion control and motor management
- Intuitive system functions, such as implementation wizards and drag-and-drop between editors

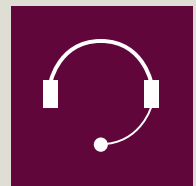


3. The need to ensure maintenance can easily and quickly work on new controllers to minimize downtime.

Switching to a new controller, especially one from a different vendor, could result in costly downtime or shutdowns if maintenance cannot quickly diagnose and address issues.

Partner with a vendor that helps maintenance identify and fix problems quickly with:

- No-programming diagnostics automatically displayed on all system devices
- A pictorial overall system view which becomes active when online, showing information from hardware faults to network failures



Planning Your Controller Replacement Strategy

To address these challenges, there are a number of key attributes, including integrated controller functionality, that engineers should consider when selecting a new controller or vendor. Below are three guidelines for planning your strategy.



1. Select a controller that minimizes disruptions while enhancing productivity, data transparency and flexibility.

The most advanced controllers provide integrated features with an open-system architecture that offers maximum interoperability across all automation components. With consistent data management, global standards, and uniform hardware and software interfaces, truly modern controllers can minimize engineering time, reduce costs and boost flexibility.



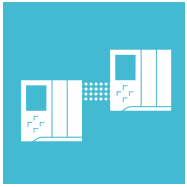
To be sure your new controller is giving you the most intuitive features available that enable seamless modernization, look for:

- Integrated, no-programming system diagnostics automatically generated during device configuration
- Ability to make code modifications without stopping the PLC
- Compatibility with current installed controllers through built-in communication options and connections to share data via EtherNet/IP without code modifications
- Integrated safety, offering a single controller, communication and programming environment for standard and fail-safe controllers
- Flexibility to support various network protocols, including PROFINET and EtherNet/IP
- Application-specific software libraries and examples
- Interoperability of system-tested components, which improves overall performance

No-charge code conversion services ensure that years of accumulated knowledge are not lost while upgrading to state-of-the-art automation technology. Your plant can experience the benefits of digitalization and integrated automation while preserving your current program structures and tag-naming conventions. The Siemens Totally Integrated Automation (TIA) Portal accomplishes this by retaining your current structures and naming conventions, allowing for familiarity from the start. This will allow you to meet the challenges of future automation architecture.

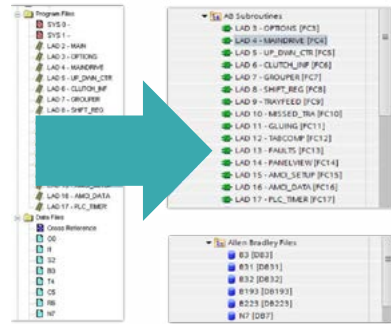
Siemens Totally Integrated Automation (TIA) is an open system architecture that covers the entire production process and offers maximum interoperability across all automation components. This is accomplished by the following shared characteristics: consistent data management, global standards, and uniform hardware and software interfaces — which minimize engineering time, reduce costs and boost flexibility.

The TIA Portal is a single engineering framework that seamlessly integrates controllers, distributed I/O, HMI, drives, motion control and motor management. The TIA Portal offers no-programming diagnostics, seamless program logic and intuitive functions, such as implementation wizards and drag-and-drop between editors



2. Select a controller that will minimize training with easy-to-configure hardware and software.

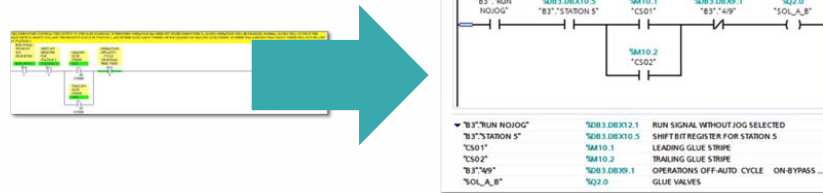
Siemens Migration Studio converts projects to state-of-the-art TIA Portal (S7-1200 or S7-1500), retaining your current structures and naming conventions, allowing familiarity from the start!



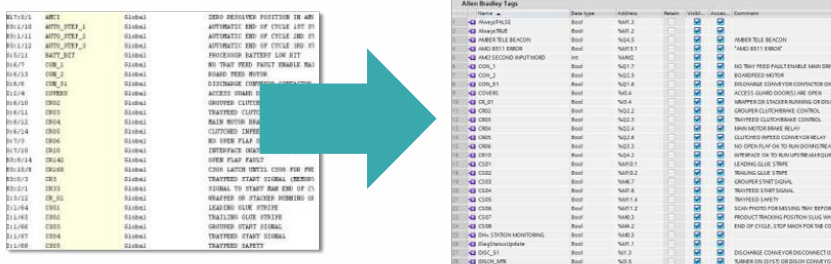
Your controllers have gone through many changes during their installed life, and you don't want to lose the preserved knowledge of both current and previous programmers. Choose an automation solution partner that understands the value of your current assets and makes it simple to preserve them as you move to newer, more advanced controller technology.

- Siemens offers no-charge code-conversion services, as well as HMI tag converters, I/O conversion tools, control-product cross references and guidelines for selecting replacement parts. Siemens TIA components are designed with the ability to integrate with other brands, regardless of the replacement path. For example, when replacing HMI systems, conversion tools in the TIA Portal allow for existing process data to be imported into the configuration tool. When overlaying a legacy PLC system with a Siemens solution, custom libraries developed within the TIA Portal can mimic the functionality and zv the learning curve for engineers and maintenance technicians, and reduce future engineering time.

Ladder logic is still ladder logic. All comments are retained.



Tags names are identical and comments are retained.



- Siemens also offers implementation wizards and drag-and-drop between editors for fewer clicks and faster engineering.

3. Select a vendor that provides transparency into systems diagnostics to avoid costly downtime.

As an engineer, you must consider how the system design will impact all aspects of the operation. One of the most important attributes is the ability to quickly diagnose and resolve issues within the automation system. This is where easy-to-understand diagnostic capabilities are critical.



- Siemens offers integrated diagnostics that provide technicians with vital information about system performance. For example, within Siemens Totally Integrated Automation (TIA) Portal, if an input module on a controller fails, identical fault notifications appear on the HMI, in the web server and on the CPU's display. Maintenance technicians, engineers and other responsible parties can receive alerts on their mobile devices. Upon receiving an alert, they can securely log into the system to assess and make a recommendation to correct the situation using standard Windows tools.
- Pictorial diagrams offer a bird's-eye view of complex networks by showing how all the devices are interconnected. These diagrams can become active even when the equipment is in operation, providing a clear, real-time picture of what's happening on the networks. When faults or connection problems occur, the diagram pinpoints exactly where they are in the actual equipment.

You may want to consider taking a phased approach to modernizing your controllers. This allows you to upgrade to the latest automation technology on your terms.

In a phased approach, your plant can decide where to start the modernization process — whether it's with legacy controllers, HMI panels, drives, I/O modules or other components — and can make the replacement process fit into your current shutdown schedule. Be sure your vendor offers advanced controllers that can coexist with your existing controllers while still enhancing performance.

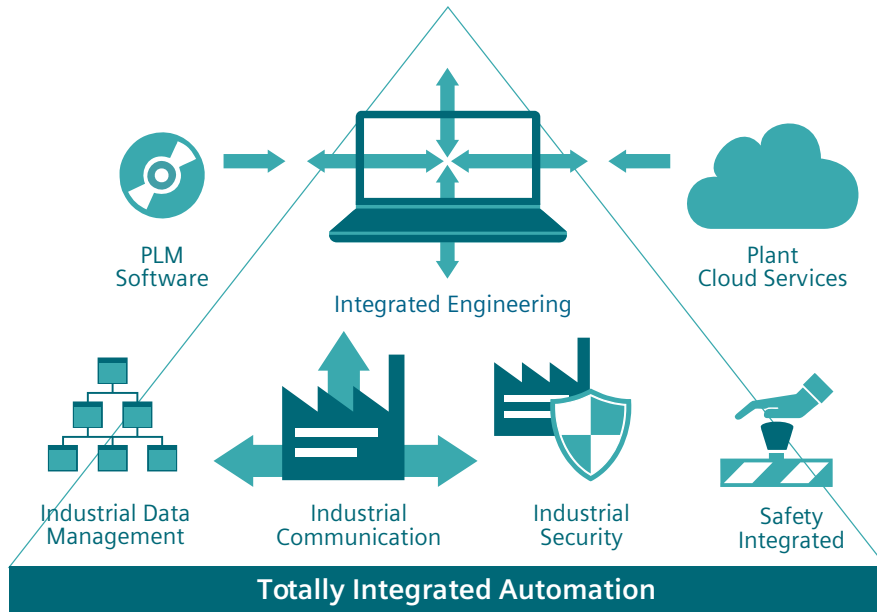
The Siemens Solution for Modernizing with Ease

More broadly, Siemens helps maintenance professionals address the challenges of controller replacement through Totally Integrated Automation (TIA) — a digitally driven, total-systems approach that increases productivity and efficiency through better machine performance, rapid diagnostic capabilities, high system flexibility and improved access to data.

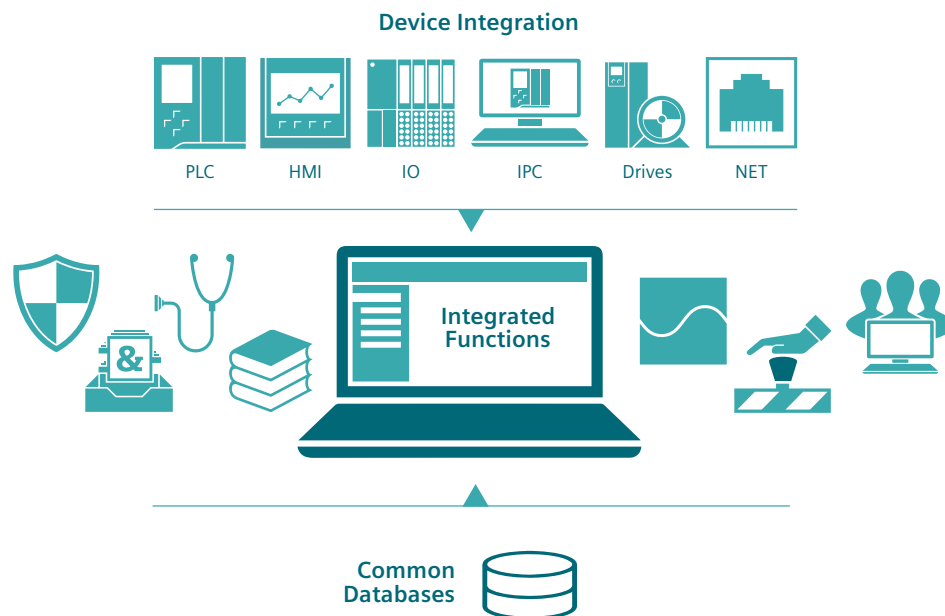
TIA optimizes the entire manufacturing process, leading to improved efficiency and productivity by:

- Minimizing downtime by applying integrated diagnostic functions
- Boosting production flexibility through the use of integrated communication tools
- Enhancing plant and network security through integrated security functions
- Improving safety with technologies that protect personnel, machinery and the environment
- Optimizing data quality with a single, streamlined database
- Improving access to data for smarter decisions
- Simplifying implementation of automation solutions with global standards
- Improving overall performance through the interoperability of system-tested components

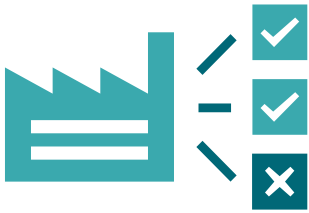




The key to unlocking the full potential of TIA is our TIA Portal, which offers no-programming diagnostics, seamless program logic and intuitive functions, such as implementation wizards and drag-and-drop between editors.



Increase your engineering efficiency — up to 30% across the design, commissioning and maintenance phases as determined by users.



Significant TIA Portal features and benefits that enable you to reduce your engineering time while increasing your level of transparency and diagnostics include:

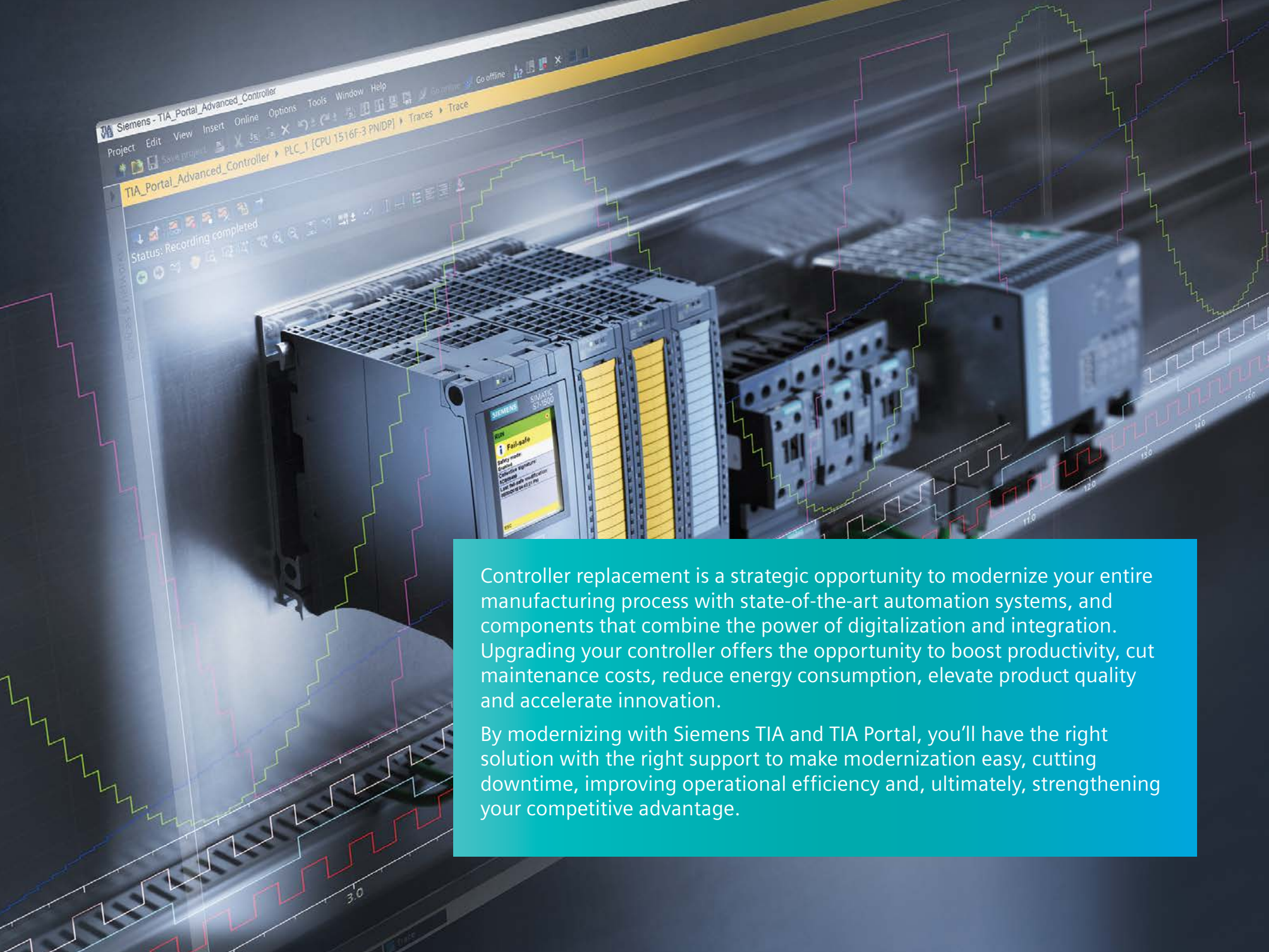
- One common tag database for fewer mistakes
- Ability to create custom libraries to be shared across your corporate servers for easy creation of company standardization for projects
- An overall project management tool that allows for complete system (multiple controllers, HMIs, networks, etc.) to be programmed, monitored, saved and stored all in one software package

- Additional time-saving functions, such as online/offline comparisons, pictorial system view with online diagnostics, no-PC-required trace functions and the ability to make code modifications while in "run" state without stopping the PLC

The TIA Portal takes advantage of the fact that all Siemens devices are engineered at the firmware level to share information with each other. The controller knows the state of every device on the network automatically, without engineers having to write any

programming. Since this is independent of the program, these functions continue even when the system is in stop mode. Problems on the network appear in the pictorial diagram describing exactly what's wrong, such as a wire break on I/O Card 6, Channel 2.





Controller replacement is a strategic opportunity to modernize your entire manufacturing process with state-of-the-art automation systems, and components that combine the power of digitalization and integration. Upgrading your controller offers the opportunity to boost productivity, cut maintenance costs, reduce energy consumption, elevate product quality and accelerate innovation.

By modernizing with Siemens TIA and TIA Portal, you'll have the right solution with the right support to make modernization easy, cutting downtime, improving operational efficiency and, ultimately, strengthening your competitive advantage.

Siemens provides automation and drive products with industrial security functions that support the secure operation of plants or machines. They are an important component in a holistic industrial security concept. With this in mind, our products undergo continuous development. We therefore recommend that you keep yourself informed with respect to our product updates and that you use only the latest versions. Please find further information on this subject at:

support.automation.siemens.com.

Subject to changes and errors. The information given in this document only contains general descriptions and/or performance features which may not always specifically reflect those described, or which may undergo modification in the course of further development of the products. The requested performance features are binding only when they are expressly agreed upon in the concluded contract.

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