4 key considerations in modernizing industrial controls

The convergence of IT and operational technology (OT) is rapidly reshaping the factory floor with industrial automation, but legacy industrial controls can hinder the process. To successfully modernize industrial controls, organizations must think strategically. Here are 4 critical considerations to guide your modernization journey.

1 Identify your required business capabilities

Success depends on building a foundation that is flexible, adaptable, and security-focused. Here are core capabilities your organization should consider prioritizing:

- **Centralized, scalable management.** The ability to gain full visibility and control of your entire automation environment allows you to configure, update, and orchestrate from a central platform without manual fieldwork.
- **Built-in security and compliance tools.** Safeguard operations and meet growing cybersecurity regulations (for example, ISA/IEC 62443, NIS 2, and Cyber Resilience Act) with automated updates and templated security policies.
- **Integrated data management.** Make sure your organization has data connectivity from cloud to edge environments in order to maximize the full potential of the data pipeline—spanning controls and monitoring, analysis, real-time decision making, and the use of AI.
- **Open and interoperable architecture.** Avoid vendor lock-in and the costly burden of custom code by choosing platforms built on open standards. Standards-based solutions simplify integration, allowing you to adopt best-in-class technologies from multiple suppliers with less expense and fewer ongoing maintenance issues maintenance issues.
- **Long-term support and maintainability.** Consider how long your system will remain commissioned and the effort required to maintain it. Select a platform with a long support lifecycle.
- **Spare parts management.** Prioritize application portability and interoperability to break hardware supply chain restrictions. Select a hardware-agnostic platform to broaden your options.

2 Remain competitive

The old model of install-and-forget no longer fits industrial automation. Plants need systems that are upgradeable, adaptable, and ready for new technologies in order to thrive in the market. To remain competitive, you should focus on:

- **Innovating more rapidly.** Open source community-powered development helps deliver more rapid feature updates, security patches, and technology evolution.
- **Keeping up with technology.** Flexible, software-defined infrastructure allows a transition from rigid, hardware-tied systems to a virtualized, software-based control solution that supports constant modernization.
- **Ease adoption.** Make it easier to take on new technologies such as AI, machine learning (ML), and edge computing without overhauling infrastructure.
- **Scaling solutions with business needs**. Support modular expansion and adapt to new use cases by future-proofing your investment with a solution that can efficiently adopt and adapt to new technologies.
- **Avoiding rip-and-replace approaches.** Choose solutions that can be layered over existing infrastructure for incremental modernization and minimized breaking changes.
- **Decoupling the hardware lifecycle from the control layer.** Costs are reduced when software innovation does not require the replacement of expensive hardware.

3 Avoid hidden costs of proprietary systems

Open source software offers interoperable, customizable, and cost-effective solutions. Red Hat combines community-powered innovation with the integration, lifecycle management, and support expected from enterprise technology. This provides:

- **Community development and support.** Accelerate the addition of new capabilities and the remediation of vulnerabilities using open source solutions developed and maintained by a community of developers and backed by professional, subscription-based support from providers such as Red Hat.
- **Cost efficiency.** Open source platforms offer lower licensing fees and reduced long-term total cost of ownership (TCO) compared to proprietary platforms.
- **Improved security posture.** Transparent code promotes broad peer review and faster patching to support compliance with evolving standards.
- **Scalability and flexibility.** This supports containerization, virtualization, and modular deployments for changing operational needs.
- **Modern workload support.** This is built for AI/ML, containerized software, and cloud-native applications in industrial environments.
- **Transparency and auditability.** Access to code bases supports trust, validation, and customization.
- **Improve time to value.** Proven frameworks and tools streamline development and deployment.

4 Consider a platform approach

A common platform that spans IT and OT environments streamlines operations, uses common resources and tools, improves security posture, and reduces downtime. By standardizing on a platform such as Red Hat® Enterprise Linux®, organizations can scale consistently across the enterprise while avoiding the complexity of managing disparate systems.

A unified platform allows you to:

- Use shared management tools to patch, provision, and orchestrate workloads.
- Reduce security exposure by limiting inconsistencies across environments.
- Train and deploy staff across more areas of your infrastructure on a common architecture.
- Standardize your development environment and tool chains.
- Run workloads where resources are available, either on different hardware or in different locations.
- Improve recovery time through consistent tooling and processes.
- Streamline support with a single vendor across all environments.
- Gain the flexibility and transparency of open source.

This consistency at all levels, from control systems to cloud, supports data pipelines, simplifies operations, and helps meet evolving security standards, such as ISA/IEC 62443.

Explore industrial solutions from Red Hat

Read more about industrial automation from Red Hat, or visit the industrial solutions page to learn how Red Hat helps organizations modernize operations, improve security focus, and scale with open source.

About Red Hat

Red Hat helps customers standardize across environments, develop cloud-native applications, and integrate, automate, secure, and manage complex environments with award-winning support, training, and consulting services.

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