Simplify industrial control modernization with Red Hat

Breaking through industrial automation barriers

The roles and required skills of today's industrial controls engineers are rapidly evolving. Traditionally, the role was focused on operating control devices to automate repetitive manufacturing tasks with minimal human intervention. Now, as industries strive to remain competitive, advanced software and conventional IT tools are increasingly integrated into industrial automation. This expanding technology ecosystem is reshaping and challenging the traditional responsibilities of controls engineers, demanding broader knowledge and more adaptable skills to meet new operational requirements.

This convergence of operational technology (OT) and IT represents a critical shift from historically isolated hardware-centric systems to interconnected, data-powered architectures; those focused on old methods will be left behind by the new.

Several factors push industrial enterprises to modernization.

- **The increasing adoption of analytics and AI technologies** demands flexible infrastructures capable of handling large volumes of data in real time from many now-connected systems. Traditional, vendor-specific hardware and closed software systems limit organizations by restricting flexibility and scalability, making modernization efforts complex, costly, and difficult to sustain.
- **Compatibility challenges posed by proprietary systems** increase integration costs and complexities, further accelerating the need for open standards. These closed architectures hinder the deployment of new technologies, prevent interoperability, and slow down innovation.
- **Organizational barriers separating OT from IT** teams compound modernization difficulties. Historically, these divisions prevented effective collaboration, impeding the adoption of innovative tools and practices. Bridging these organizational gaps is essential to use emerging technologies fully, and to optimize operational efficiency.

Addressing these challenges requires a strategic approach that prioritizes open and adaptive control environments. Organizations must adopt platforms that facilitate the integration of IT and OT systems, support real-time operational requirements, minimize downtime, and offer scalability across plant and edge locations—all while maintaining a strong cybersecurity posture. Embracing such open architectures allows industrial organizations to maintain the long-term viability and competitive advantage essential for the modern technological landscape.

A unified platform for modern industrial automation

Aligning IT and OT roles in modern industrial environments

Modernizing industrial environments requires clearly defined roles between IT and OT. As container platforms and cloud-native tools expand into OT, tight collaboration between both teams becomes essential.

Traditionally, OT focused on production uptime and efficiency. But IT systems bring added tasks such as patching and platform management that stretch OT resources and increase risk. Meanwhile, IT teams often lack the context to manage OT-specific needs, straining overall efficiency.

Red Hat reduces these pressures by providing a unified platform built on Linux®. IT teams can apply familiar practices to OT systems, easing the burden on controls engineers and letting them focus on production goals and tech innovation.

Red Hat's platform supports operations across cloud, datacenter, and edge, combining community-powered innovation with full enterprise support. This approach simplifies Linux® lifecycle management and allows teams to prioritize business outcomes over infrastructure upkeep.

Here are the core tools that make up Red Hat's platform:

- **Red Hat Enterprise Linux**
  Red Hat® Enterprise Linux is the foundation for enterprise automation, delivering a security-focused, stable, and certified operating environment. In industrial settings, Red Hat Enterprise Linux supports consistent operations across IT and OT systems and provides a reliable base for deploying modern workloads alongside traditional infrastructure.

- **Red Hat OpenShift**
  Red Hat OpenShift® is a Kubernetes platform for building, deploying, and managing containerized applications. For industrial teams, Red Hat OpenShift allows for scalable orchestration of automation workloads across hybrid environments and integrates with other Red Hat technologies to streamline lifecycle and performance management.

- **Red Hat Ansible Automation Platform**
  Red Hat Ansible® Automation Platform standardizes and reduces the complexity of managing automation across infrastructure and applications. In industrial use cases, it supports repeatable deployment processes, automates patching and configuration tasks, and helps manage complex environments with improved consistency and reduced manual effort.

- **Red Hat Advanced Cluster Management for Kubernetes**
  Red Hat Advanced Cluster Management for Kubernetes gives industrial organizations unified control over their entire set of IT tools across factories, datacenters, cloud, and edge sites—all from a single console. Built-in policy enforcement and automation simplify day-to-day operations by helping deploy applications, manage cluster lifecycles, and maintain consistent security policies and compliance at scale. Included with Red Hat OpenShift Platform Plus, it extends the value of Red Hat investments with centralized visibility and control across diverse and distributed environments.

- **Red Hat OpenShift Virtualization**
  Red Hat OpenShift Virtualization, included with Red Hat OpenShift, provides a modern platform to deploy and manage both new and existing virtual machine (VM) workloads. It simplifies migrating traditional VMs onto a trusted, consistent hybrid cloud platform, protecting existing investments while adopting modern, cloud-native management practices. OpenShift Virtualization forms the core of Red Hat's unified approach to virtualization, combining familiar workflows with modern capabilities.

- **Red Hat AI**
  The Red Hat AI suite of solutions (including Red Hat Enterprise Linux AI, Red Hat OpenShift AI, and Red Hat AI Inference Server) puts an organization in control of predictive and gen AI for industrial environments, whether in factories, edge locations, datacenters, or cloud environments. Red Hat AI helps rapidly deploy scalable inference, using the organization's choice of AI models and accelerators, to support real-time decision making, optimize operations, and increase productivity across the organization.

- **Red Hat Device Edge**
  Red Hat Device Edge is purpose-built to bring lightweight enterprise capabilities to remote environments. It helps industrial organizations run workloads on small-footprint devices, combining edge-optimized versions of Red Hat Enterprise Linux and Red Hat OpenShift to provide consistent, scalable control at the farthest edges of the network.

How this applies in industrial environments

Some of the key capabilities the Red Hat solutions above offer to address the challenges of industrial automation include:

Flexible, software-defined architecture

A software-defined architecture helps industrial organizations move from rigid systems to open, flexible environments built for real-time operations.

It combines industrial-grade hardware with virtualized control systems and supports diverse automation applications. This simplifies integration and streamlines management across previously isolated systems.

With dynamic resource allocation and fast rollout of new functions like predictive maintenance, organizations can improve efficiency, security, and adaptability.

Comprehensive integration of IT and OT environments

Red Hat helps unify IT and OT with centralized tools that provide visibility and control.

One control plane lets teams orchestrate updates and configurations remotely. This alignment reduces inconsistencies and unifies tool chains, patches, and engineering resources.

Integrated data flows—from shop floor to cloud—support faster decisions and lay the groundwork for AI and machine learning.

Built-in security and compliance

A security focus is built into every layer of Red Hat's platform.

Automated updates and policy templates help maintain consistent protection across environments. Red Hat helps teams protect IP, simplify compliance, and enforce IT policies.

Open standards and ecosystem collaboration

Red Hat's commitment to open standards gives industrial organizations the freedom to build and evolve their environments without being locked into a single vendor's ecosystem.

Organizations can integrate with more suppliers, accelerate modernization, and align with long-term needs. Red Hat provides full commercial support and access to a global contributor community.

Real-time, deterministic control

Red Hat's platform supports deterministic, low-latency workloads for precise, time-sensitive operations.

In collaboration with Intel, Red Hat validates real-time benchmarks to support reliable behavior under load—crucial for automation and safety.

Ease of maintenance and long-term support

Red Hat streamlines lifecycle maintenance through standardized tools and environments.

This reduces custom code and isolated workarounds, helping IT and OT teams work together more effectively across long product lifecycles.

Enhanced operational efficiency

Red Hat provides consistent tools and automation across environments to help minimize errors and downtime.

With real-time kernels, self-healing features, and lifecycle automation, teams can roll out updates in less time and adapt to change without sacrificing uptime. This creates a foundation for continuous innovation and smarter use of shop-floor data.

Learn more

Connect with your Red Hat account executive to get started. Interested in learning more, discover how Red Hat can help modernize your industrial operations.

About Red Hat

Red Hat is the world's leading provider of enterprise open source software solutions, using a community-powered approach to deliver reliable and high-performing Linux, hybrid cloud, container, and Kubernetes technologies. Red Hat helps customers develop cloud-native applications, integrate existing and new IT applications, and automate and manage complex environments. A trusted adviser to the Fortune 500, Red Hat provides award-winning support, training, and consulting services that bring the benefits of open innovation to any industry. Red Hat is a connective hub in a global network of enterprises, partners, and communities, helping organizations grow, transform, and prepare for the digital future.

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