Maximize business value by modernizing the industrial edge

Red Hat's industrial edge platform is a comprehensive solution designed to optimize industrial operations by extending sophisticated enterprise capabilities to the edge of industrial networks in a user-friendly way.

Industrial transformation and the rise of edge computing

The industrial landscape is evolving, fostering technological advancements that bring substantial business value through efficiency gains, cost savings, and greater productivity. This is leading businesses to reevaluate how they approach everything from decision-making, establishing security controls, and more.

As the industrial sectors enter into an era of technological transformation, enterprise architecture is rapidly evolving. This evolution is due to the growing integration of IT frameworks and the extension of these architectures into operational technology (OT) spaces.

Organizations are looking to use their data more effectively, improve efficiency, and optimize operations. One of the critical aspects of this transformation is edge computing—the ability to process data closer to where it is generated rather than relying solely on centralized datacenters.

As computing power moves toward the edge of industrial systems, organizations gain the advantage of making real-time decisions based on data processed closer to the source. This shift enhances operational efficiency, reduces latency, and supports new applications such as predictive maintenance and real-time analytics.

The technologies underpinning this transition, such as container orchestration and virtualization, are leading to greater flexibility and scalability of infrastructure management. This means industrial systems are no longer confined to rigid hardware configurations and instead can benefit from software-defined control strategies, which are transforming automation by decoupling hardware and software.

For industrial organizations, this transformation creates opportunities for greater flexibility, the ability to make updates more quickly, and more cost-effective innovation.

The need for modern industrial edge platforms

Industrial environments traditionally relied on disconnected systems and aging hardware that limit agility and scalability. For example, individual factory floors or production lines that operate independently with little interaction between systems create inefficiencies, slow the movement of data, and limit visibility across operations.

While traditional OT environments were built for stability and longevity, they now must integrate with modern IT systems to keep pace with technological advancements. Organizations need platforms that can orchestrate and automate the deployment of applications across diverse and often fragmented infrastructures.

Red Hat Ansible Automation Platform is a unified solution for strategic automation. It combines the security features, integrations, and flexibility needed to scale automation across domains, orchestrate essential workflows, and optimize IT operations to successfully adopt enterprise artificial intelligence (AI).

Modern industrial edge platforms address these challenges by providing the tools and frameworks that help businesses to:

- **Enhance interoperability.** Interoperability is a critical component of digital transformation. Edge ecosystems have to offer paths for both traditional and modernized workloads, to ease the transition between the changing paradigms and allow organizations to scale without disruption.

  In manufacturing environments, machines on a factory floor might operate with older programmable logic controllers (PLCs) that generate valuable data, but that data is not always accessible in real time by the rest of the enterprise.

  An industrial edge platform can bring flexibility and scalability that allow for this data to be processed at the edge, transmitting relevant insights to central management systems. Interoperability helps manufacturers gain more holistic views of their operations, from raw material processing to product output, which can improve decision-making and operational efficiency.

- **Improve orchestration and security.** By integrating IT automation tools into OT environments, modern industrial edge platforms allow the orchestration and automation of previously isolated processes. This can include automating the configuration and management of OT devices, deploying applications and updates, and allowing for security policies to be uniformly applied.

  Consider a factory with multiple assembly lines that need regular updates to their control software. Without IT automation, each system would require manual configuration, a time-consuming and error-prone process. Using an industrial edge platform with IT automation, the factory can deploy software updates to all OT devices simultaneously, reducing downtime, minimizing errors, and maintaining consistent performance. This automated orchestration allows the factory to scale production without the burden or risks of manual maintenance.

- **Provide software-defined controls (SDC).** Industrial edge platforms allow for better lifecycle management of SDC by providing the infrastructure and management tools to virtualize control systems in a security-focused way. This helps manufacturers standardize control processes across multiple locations, update systems remotely, and optimize production lines with minimal disruption. It supports real-time monitoring and decision-making, which is critical in manufacturing environments.

  For example, a car manufacturer using robotic arms on the production line can implement SDC to adjust the robots' operations without needing to modify the physical hardware. If the manufacturer needs to introduce a new product variant, the control logic can be updated via software—potentially through an edge platform that manages these updates across all manufacturing sites. The result is greater agility, reduced costs for hardware upgrades, and shorter time to adapt to new production requirements.

- **Use artificial intelligence (AI) for decisioning and predictive maintenance.** Industrial edge platforms provide the necessary compute power and scalability to run AI models at the edge, close to where the data is generated. This allows for real-time decision-making and predictive analytics without needing to rely on cloud processing, which can introduce latency. Edge platforms also allow AI models to be continuously updated and deployed across multiple sites, ensuring that all systems benefit from the latest algorithms and insights.

  In large manufacturing and industrial settings, such as a food processing plant, massive amounts of data are generated every minute by sensors measuring elements such as temperature, humidity, and pressure across various production lines. An edge platform running AI models can analyze this data in real time to optimize production variables; for example, by adjusting the temperature to make sure there is consistent product quality. This immediate decision-making capability helps reduce waste, improve product quality, and increase overall efficiency.

The power of a platform approach
Integration of technologies and frameworks such as edge computing, virtualization, and software-defined controls are providing greater efficiency and agility for OT stakeholders, but require comprehensive end-to-end platform solutions to fully unlock business value.[1]

Red Hat's advanced compute platform (ACP) provides all the services and capabilities needed to enhance scalability, flexibility, and interoperability for modernized and evolving OT environments.

Modernizing industrial edge platforms is the key to unlocking the full value of technology across manufacturing and industrial environments. By unifying disconnected systems, bringing IT automation to OT spaces, and providing a platform to manage software-defined controls, new levels of efficiency, agility, and innovation are helping industries stay competitive in an increasingly data-powered world.

Adopt a platform approach with Red Hat

For decades, Red Hat has led the development of open source communities, fostering collaboration and catalyzing technological advancements that support industrial and manufacturing businesses. Red Hat's vision is to facilitate and enable services that streamline compute operations, allowing users to focus on the workflows that bring value.

Red Hat® industrial edge platforms are built on open source tools and technologies and are designed to support scalable, interoperable, and flexible compute environments. These environments are particularly important for organizations dealing with the intensive workloads that accompany AI, machine learning (ML), and edge computing. These platforms integrate several key products and services to deliver a holistic solution for managing industrial edge workloads in a security-focused, repeatable fashion.

Red Hat's advanced compute platform (ACP) is a platform to orchestrate and manage operations around data acquisition, historization, event management, and analytics workloads within a modernized OT environment. This is the essential foundation for building better interoperability, from hardware to an application programming interface (API) layer. As industrial systems evolve, ACP allows for consistent and security-focused lifecycle management for the workloads, reducing the effects of change.

ACP spans a myriad of deployment targets, ranging from a single compute node to large cluster implementations, and establishes consistent, repeatable deployment processes, minimizing manual intervention. In environments where software upgrades traditionally involved physically carrying media between sites for installation, ACP allows the administrator to define the criteria for a proper installation, and manages the deployment and health of the application ecosystem after it has been deployed. By managing both virtualized and containerized workloads, ACP facilitates different application ecosystems no matter where they land on the modernized maturity curve.

Red Hat Ansible® Automation Platform helps industrial organizations unify their automation practices by boosting consistency, reducing manual tasks, and optimizing resource usage. Traditionally, OT systems have operated independently, but Ansible Automation Platform allows enterprises to manage OT infrastructure in a similar manner as IT environments, by streamlining the orchestration and standardization of operational systems.

Red Hat's partner ecosystem enhances the industrial edge

Red Hat brings strength to the industrial edge through its extensive partner ecosystem, which includes collaborations with technology leaders that focus on enhancing various aspects of industrial operations, from real-time control and network automation to cybersecurity and device management.

Innovation through partnership

In collaboration with Intel, Red Hat announced a new industrial edge platform that provides a modern approach to building and operating industrial controls. For decades, manufacturing innovation has been hampered by the limitations of aging industrial controls and disconnected organizational structures.

1 Arnold, Patrick. "Industrial Edge Platforms are the Foundation for Modern Enterprise Architecture." Arc Advisory Group, sponsored by Red Hat, Sept. 2024.

"Open and interconnected commercial solutions will help usher in the transition from fixed function proprietary devices to flexible and dynamic software-based infrastructures."[2]

Christine Boles
Vice President, Network and Edge Group and General Manager for Federal and Industrial Solutions, Intel

This platform allows organizations to benefit from an open edge platform that allows simplified integration of components in an easy-to-use, reliable solution for industrial automation. Industry leaders like ABB, Schneider Electric, and Codesys are already working to successfully implement new industrial edge platforms like this to build modern industrial controls.

For example, ABB is running their automation solution, Ability Edgenius, on Red Hat OpenShift® and Red Hat Device Edge, which extends operational consistency for industrial use cases across edge and hybrid cloud environments.

These collaborations allow Red Hat to provide tailored solutions that meet the unique needs of industrial customers, whether it is real-time decision-making in manufacturing or security-focused device management in critical infrastructure.

As industrial architecture continues to evolve, organizations must adopt platforms that offer flexibility, scalability, and innovation. Red Hat's industrial edge platform provides a comprehensive solution for managing complex workloads at the edge, delivering consistent performance, enhancing security posture, and allowing for real-time decision-making.

"What Red Hat Device Edge and Red Hat OpenShift can provide is that consistent platform all the way from very small deployment footprints of edge devices to very large scaled out systems, so ABB can focus on what they do best."[3]

Francis Chow
Vice President and General Manger, In-Vehicle Operating Systems and Edge, Red Hat

Learn more

Discover how Red Hat's open source innovation, robust partner ecosystem, and industry-leading technologies can help your industrial enterprise confidently navigate the challenges of today while preparing for the innovations of tomorrow.

Connect with your Red Hat account executive for more information or to book your demo.

2 "Schneider Electric delivers next-generation, open automation infrastructure in collaboration with Intel and Red Hat." *Schneider Electric*, 2 June 2024.

3 Chow, Francis, Eschermann, Bernhard. "ABB and Red Hat: Delivering operational excellence at the industrial edge," *Red Hat Blog*, 24 May 2023.

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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