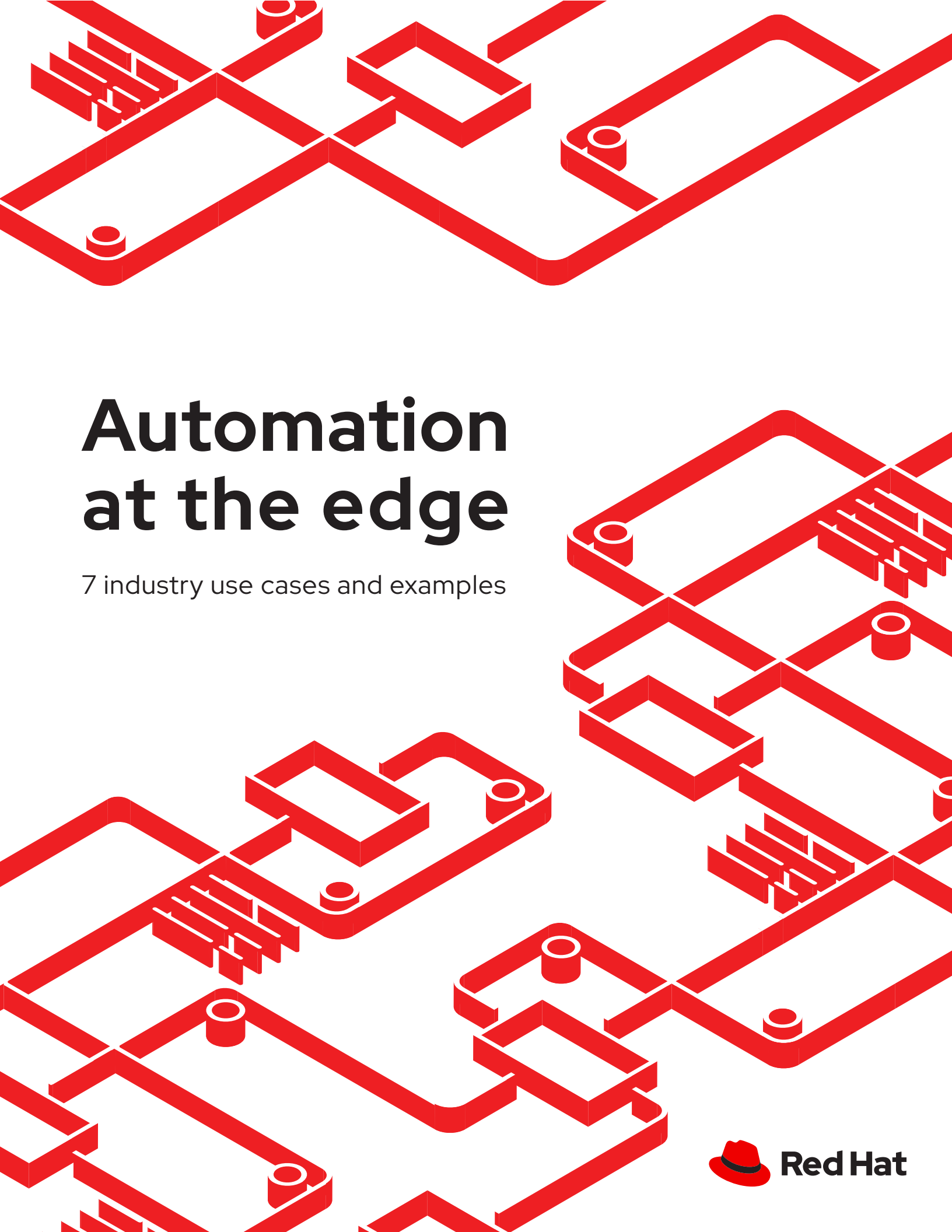
Automation at the edge

7 industry use cases and examples



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Contents

Chapter 1

Introduction:

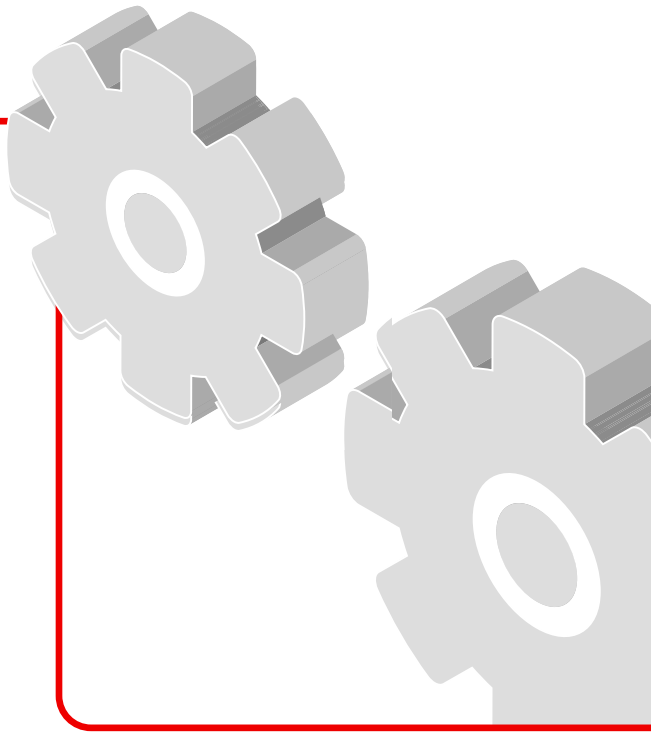
Business happens at the edge

Organizations are doing more at the edge of the network, closer to where data is generated, services are used, and end users interact with systems and devices.

IDC estimates worldwide edge technology spending will reach US$274 billion by 2025.[1] In parallel with this growing investment, the number of connected devices—all generating huge volumes of data—is seeing massive growth.

Organizations are also overseeing an increasing number of computing locations, some with intermittent connectivity and limited physical access. At the same time, privacy and security have never been more urgent.

Platforms are being pushed outside the datacenter, heterogeneous devices are spread across vast areas, and on-demand applications run closer to the data.



Adding more devices and services at edge sites means there is more to manage outside the traditional operations sphere. Platforms are being extended outside the datacenter, heterogeneous devices are spread across vast areas, and on-demand applications and services are running closer to data sources. Due to this evolving landscape, organizations have new challenges to address:

- Ensuring they have the skills to address evolving edge infrastructure requirements.
- Building capabilities that can react without human interaction in a more secure and trusted way.
- Effectively scaling at the edge with a sudden rise in devices and endpoints to consider.

Worldwide spending on edge computing is expected to be **US $176 billion** in 2022, an increase of **14.8% over 2021.** Enterprise and service provider spending on hardware, software, and services for edge solutions is forecast to sustain this pace of growth through 2025 when spending will reach nearly **US $274 billion,** according to the International Data Corporation (IDC) Worldwide Edge Spending Guide.[1]

[1] IDC Spending Guide. "Worldwide Edge Spending Guide," Jan. 2022.

Edge computing has extended hybrid cloud infrastructure for many organizations, connecting data from the remote source back to the datacenter to support business decisions. As an organization expands, devices are added, and data volumes grow, automation at the edge can simplify complexity and help organizations gain measurable benefits.

Automation at the edge can help your organization:

- **Increase scalability.**
  Apply configurations consistently across your infrastructure and scale edge devices more quickly.
- **Boost agility.**
  Adapt to changing customer demands using edge resources only as needed.
- **Focus on security and safety.**
  Run updates, patches, and required maintenance automatically without sending a technician to the site.
- **Reduce downtime.**
  Simplify network management, reduce network failure, and boost your bottom line.
- **Improve efficiency.**
  Increase performance and reduce human error with automated analysis, monitoring, and alerting.

80%

of IT leaders expect to increase their use of enterprise open source software for emerging technologies such as artificial intelligence and machine learning (AI/ML), edge computing, and the Internet of Things (IoT).[2]

Extend automation to the edge

Automation at the edge helps organizations respond to business needs by automating processes to discover, decide, and take action.

Automation helps improve security, response times, and control over the infrastructure that promotes data generation at the edge of the network. Across every industry, edge and automation can place a business at the epicenter of opportunity to help produce tangible business results.

The following chapters focus on industry-specific use cases and examples and demonstrate a selection of the opportunities for automation at the edge.

[2] Red Hat report. "The State of Enterprise Open Source," 2022.

Chapter 2

Transportation:

Mapping a route to the edge

A new destination for IT services

Across the transportation industry, customer demand is inspiring new, innovative services, but it's also creating challenges for nearly every form of transportation. An airline, for example, can have planes taking off every 60 seconds with passengers, cargo, and security to manage and monitor at every step in the journey. Railway companies face increasing customer demand for connectivity while also having to manage device configuration, security of their data and networks, and pressure to provide new innovative services for passengers.

Automating the way forward

Modernizing transportation to be smart, safe, and highly efficient is no small feat. For example, if a railway company wanted to include intelligent features such as dynamic LED information displays, without central control they would likely have to go onto every train to manually check, update, or fix each device. The time and resources to set up and maintain such a feature would make it unfeasible.

Automation of these edge devices, their configuration, and their software life cycles makes centralized control possible and helps the railway company gain a single view of all devices so that monitoring and updates happen automatically. Centralized control through automation also makes other intelligent features possible, such as digital seat booking systems, closed-circuit television (CCTV) safety monitoring, or onboard Wi-Fi access.

By automating complex, manual device configuration processes, transportation companies can deploy software and application updates to trains, airplanes, or other moving vehicles, without needing specialized, proprietary software from the same hardware vendor. This approach helps save time that teams can put toward more valuable service innovation.

Compared to a manual approach, automating device installation and management is safer and more reliable. Automating device management eliminates the need for individual technicians to physically plug in USB drives to multiple endpoints. Updates are managed by vehicle type—avoiding any fleet-wide service effect—and can even be done while a vehicle, such as a train, is in motion.

The road ahead for transportation

Automating complex deployments can help transportation companies meet shifting customer demands and help:

- Reduce device configuration times.
- Enhance security for critical transportation infrastructure.
- Establish comprehensive device access for user-friendly service updates and innovation.

Chapter 3

Retail:

Bringing efficiency in-store

A race against the clock in retail

When you're setting up a new retail store, the goal is always to get it up and running as fast as possible. Every day that the store is closed, that location isn't generating revenue.

Establishing a new store and getting its digital services online can be complex. It involves configuration management of networked devices, configuration auditing, and setting up compute across the retail facility.

After a store is set up and open to the public, the IT focus shifts from speed and scale to consistency and reliability. To achieve the latter two successfully, organizations need to reduce variability across edge computing environments.

Schwarz Group

Learn how Red Hat® Ansible® Automation Platform helped Schwarz Group eliminate time-consuming manual processes and focus on innovation. Schwarz Group operates more than 12,500 stores under the Lidl and Kaufland brands.

Read the customer story

Accelerate edge deployments with automation

Automation at the edge gives retail stores the ability to stand up new devices with speed and consistency by eliminating the possibility of misconfiguration due to human error.

On Day 1 and beyond, consistency and reliability become the most important features of a connected environment in the retail space. Any disruption to the network affects front-line service personnel. Whether it's a temperature sensor that affects the freezer in an ice cream shop or a cash register that's running slowly, every minor glitch in the performance of the various Internet of things (IoT) devices used at the edge can disrupt the interaction between the customer and public-facing employees. Automation and standardization provide the consistency of configuration and software life cycle management of these edge devices, helping to enhance the customer experience, which in turn promotes a healthy bottom line.

Redefining the consumer landscape

By eliminating the variables caused by human error, automation at the edge can help retail companies:

- Enhance the customer experience and the company's bottom line.
- Stand up, configure, and audit new devices with the speed and scalability needed.
- Maintain consistent and reliable functionality of edge devices.

Chapter 4

Industry 4.0:

Modern manufacturing—a new way of working

Retooling for new IT

Industry 4.0 is revolutionizing the way companies manufacture, improve, and distribute their products. From oil and gas refineries to smart factories to supply chains, organizations are integrating technologies such as IoT, cloud computing and analytics, and AI/ML into their production facilities and across their operations. The goal: higher production volumes, lower costs, and better quality control.

But bringing these technologies to sophisticated manufacturing operations will take more than the flip of a switch.

Organizations need to find solutions to new challenges, including:

- How to manage and process massive amounts of data to assess production quality effectively.
- How to create and deploy specialized AI models to hundreds or thousands of machines and devices on manufacturing floors.
- How to scale and maintain deployments across multiple facilities and refinery sites around the world.
- How to do all of this cost-effectively.

Automation on the assembly line and beyond

Key factors for automation at the edge in the oil and gas industry include the consistency it provides and the potential for lowering costs. With facilities and machinery spread across wide geographic areas, automation provides the opportunity for greater efficiency by reducing or eliminating the need to send expertise on site. For example, automating the launch of new software to edge devices spread across a series of refineries not only saves the time of sending a technician to the site, but it ensures the correct version is applied and maintained after deployment.

On the manufacturing floor, automation supported by visualization algorithms can help detect defects in manufactured components on the assembly line and ensure safe factory operations by identifying and alerting hazardous conditions or unpermitted actions.

Siemens

Learn how Siemens is improving communication security with Red Hat Ansible Automation Platform.

Read the customer story

Do more at the edge automatically

At the edge, connected endpoints may span thousands of sites. The ability to centrally and automatically deploy and manage these endpoints helps organizations:

- Improve quality control during manufacturing processes.
- Prevent disruptions, supporting 24x7 production.
- Minimize human intervention needed for repeatable tasks, allowing skilled employees to focus on higher-value tasks.
- Reduce downtime with more accurate, scheduled maintenance.
- Improve worker safety.

Chapter 5

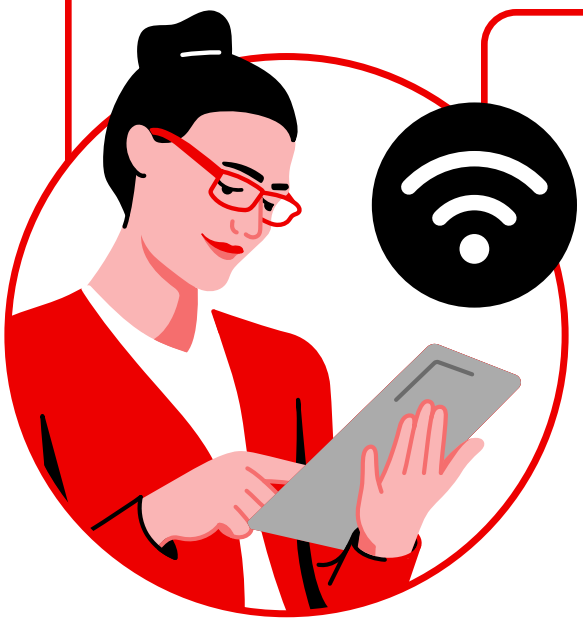
Telecommunications:

Connecting customers and applications at the edge

Modernizing a monolith

Every telecommunications company faces two common challenges as they strive to remain competitive: how to enhance the customer experience and how to improve network efficiency.

As customers demand more personalized experiences, service providers must find ways to transform data into new services and proactively deliver them to their customers. At the same time, service providers are looking for ways to reduce the amount of human interaction required to manage and maintain the expanding number of endpoints across their network.



Supporting systems and customers with automation

Edge devices for telco companies include any device that is connected to their network, typically found in customers' homes and offices. Like many connected devices, these are producing data that can provide valuable insights, which can be used to improve the customer experience through automation. For example, service providers are collecting telemetry data from their customers on an ongoing basis. Automation can help proactively turn that data into opportunities to reach out to customers who might be experiencing connectivity issues and provide assistance before they raise concern.

Another opportunity for automation is in the delivery of new services. In an ideal state, service providers can simply send a device to a customer's home or office that they can plug in and run, without the need for a technician on-site. Automating service delivery not only improves the customer experience, it creates a more efficient network maintenance process, with the potential of reducing costs.

Modernize for simplicity, flexibility, and scalability

Automation at the edge can help telco companies:

- Use telemetry data to proactively support customers.
- Shorten the time to deploy new services.
- Reduce or mitigate network downtime by automatically deploying updates and patches.
- Increase network efficiency and limit the need for human intervention.
- Improve the overall customer experience.

Chapter 6 Financial services and insurance:

Agility and stability you can bank on

Balancing new features with familiar risks

Financial agencies recognize the need for IT modernization to be more agile. Customers are demanding more personalized financial services and tools that can be accessed from virtually anywhere, including the customer's mobile devices. To meet this need, financial services providers must find ways to accelerate and de-risk the delivery of new services, scale with customer demand, and provide uninterrupted uptime while maintaining strict security standards and adherence to changing government regulations.

Extending services to new places

Banks and new entrants in the financial services industry can benefit from extending automation to the edge. Whether it's an automated teller machine (ATM) in a bank branch, a self-service kiosk outside the bank, an application running on a customer's device, or managing the IT infrastructure across branches, automation provides the speed and access that customers want, with the reliability and scalability that financial service providers need.

Imagine that a bank launches a self-service tool to help their customers find the right offering, which could be insurance, a mortgage, or a credit card. Automation at the edge not only makes it possible for that bank to scale the new service but also automatically update and meet strict industry security standards without impacting the customer experience.

Modernizing financial services for the future

Automation at the edge can help financial service providers accelerate and de-risk new tools and services, helping them to:

- Provide a more personalized customer experience.
- Shorten the time it takes to deploy new services.
- Offer reliable services with minimal downtime.
- Maintain strict security standards and adherence to changing regulations.

Chapter 7

Smart cities:

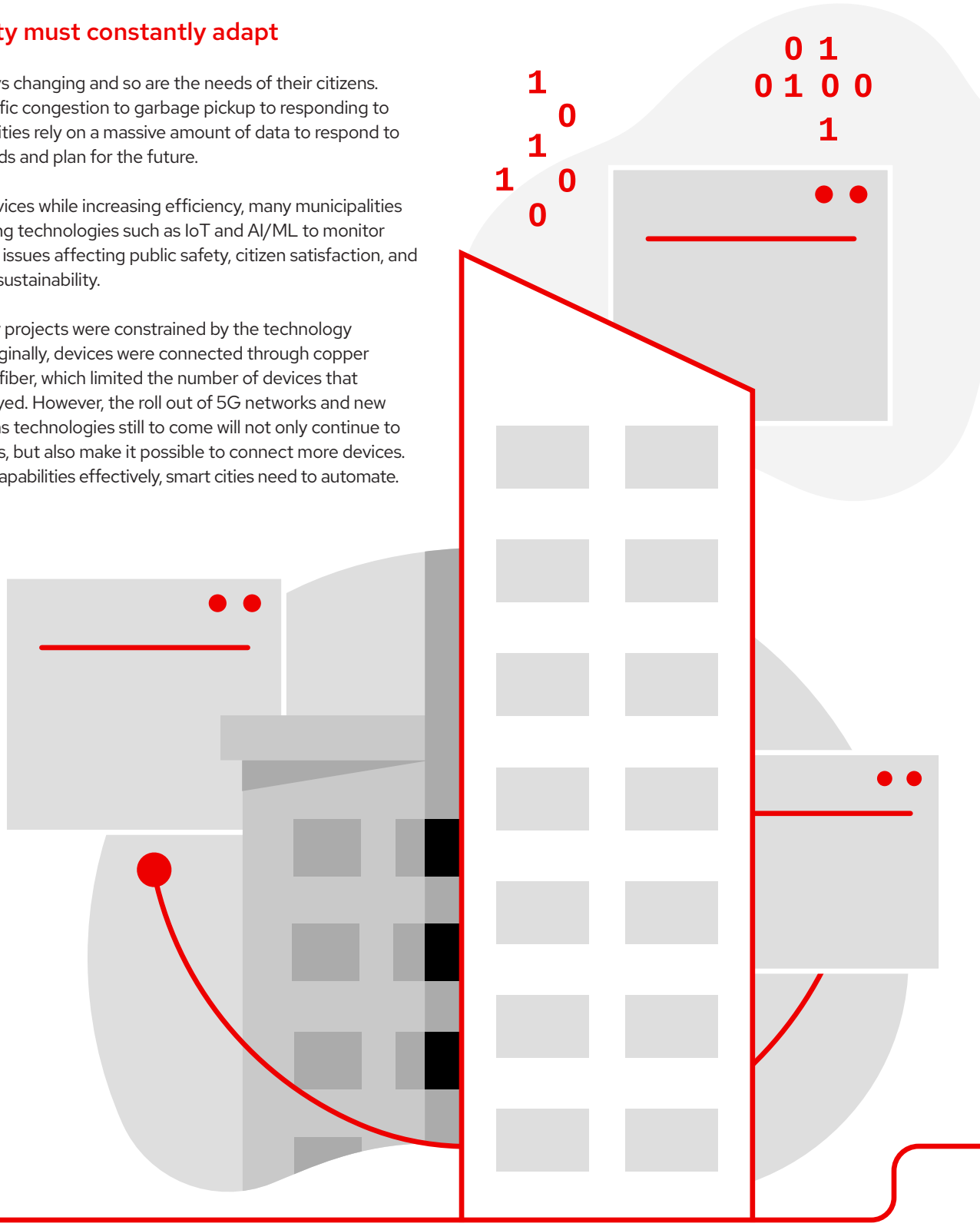
Where automation lives

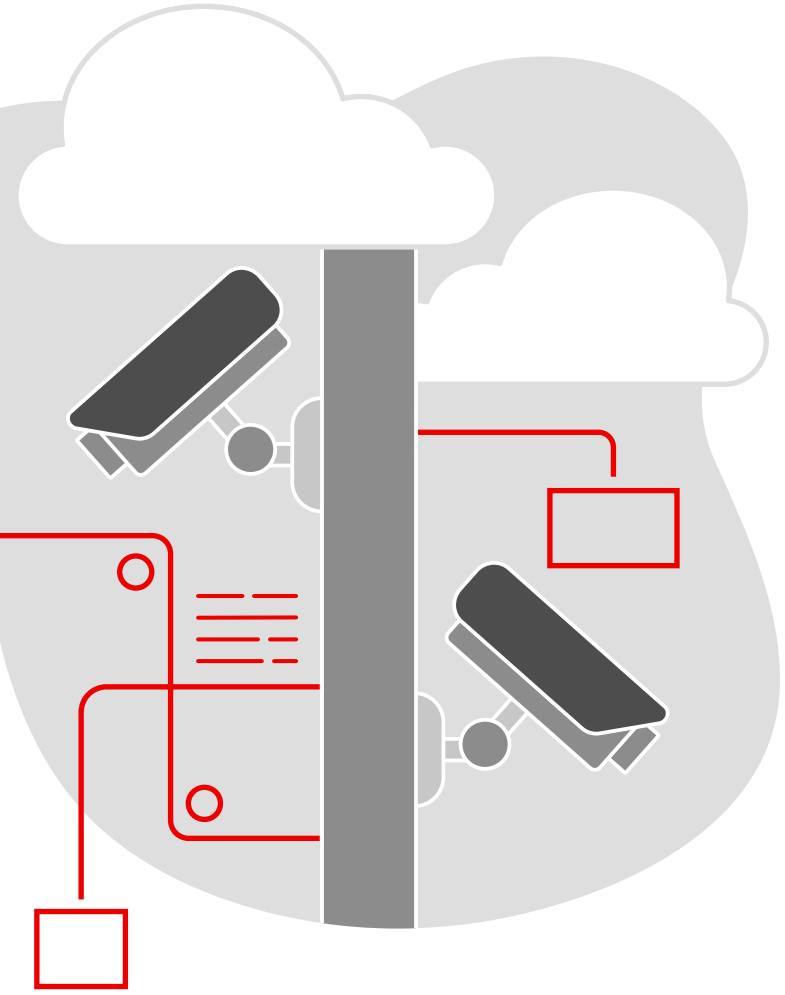
A smart city must constantly adapt

Cities are always changing and so are the needs of their citizens. From rising traffic congestion to garbage pickup to responding to emergencies, cities rely on a massive amount of data to respond to immediate needs and plan for the future.

To improve services while increasing efficiency, many municipalities are incorporating technologies such as IoT and AI/ML to monitor and respond to issues affecting public safety, citizen satisfaction, and environmental sustainability.

Early smart city projects were constrained by the technology of the time. Originally, devices were connected through copper cables or optic fiber, which limited the number of devices that could be deployed. However, the roll out of 5G networks and new communications technologies still to come will not only continue to increase speeds, but also make it possible to connect more devices. To scale edge capabilities effectively, smart cities need to automate.





Automate decisions at street level

To illustrate the opportunity of automation in smart cities, let's consider an edge device like traffic cameras. A single traffic camera has the potential to capture data about any number of variables such as road conditions, weather, traffic patterns, congestion, and emergencies. Edge computing helps these devices gather and process the data in near-real time—data that is then sent back to a datacenter so both technicians and automated processes can make decisions and take action.

To multiply this process across a large city, it would quickly become impossible for the technicians to respond to the data in a reasonable time. The added burden of security, patches, and updates would not only be unfeasible, it would increase the risk of security threats and service disruptions.

Automating the decision process at the edge can help cities deploy services efficiently, respond to emergencies, and plan for the future.

For example, a traffic camera could detect an accident at an intersection and automatically adjust traffic lights to block traffic while also notifying emergency services, all without human assistance. With these essential first response steps taken, a team member can better assess the situation and reopen lanes as necessary once it is safe to do so.

Intelligent IT grows smart cities

The ability to automatically turn data collected at edge endpoints, spread across thousands of locations, into action can help smart cities:

- Reduce the time it takes to deploy services.
- Improve safety and service delivery for citizens.
- Plan future infrastructure developments.

Chapter 8

Healthcare:

Extending better care anywhere

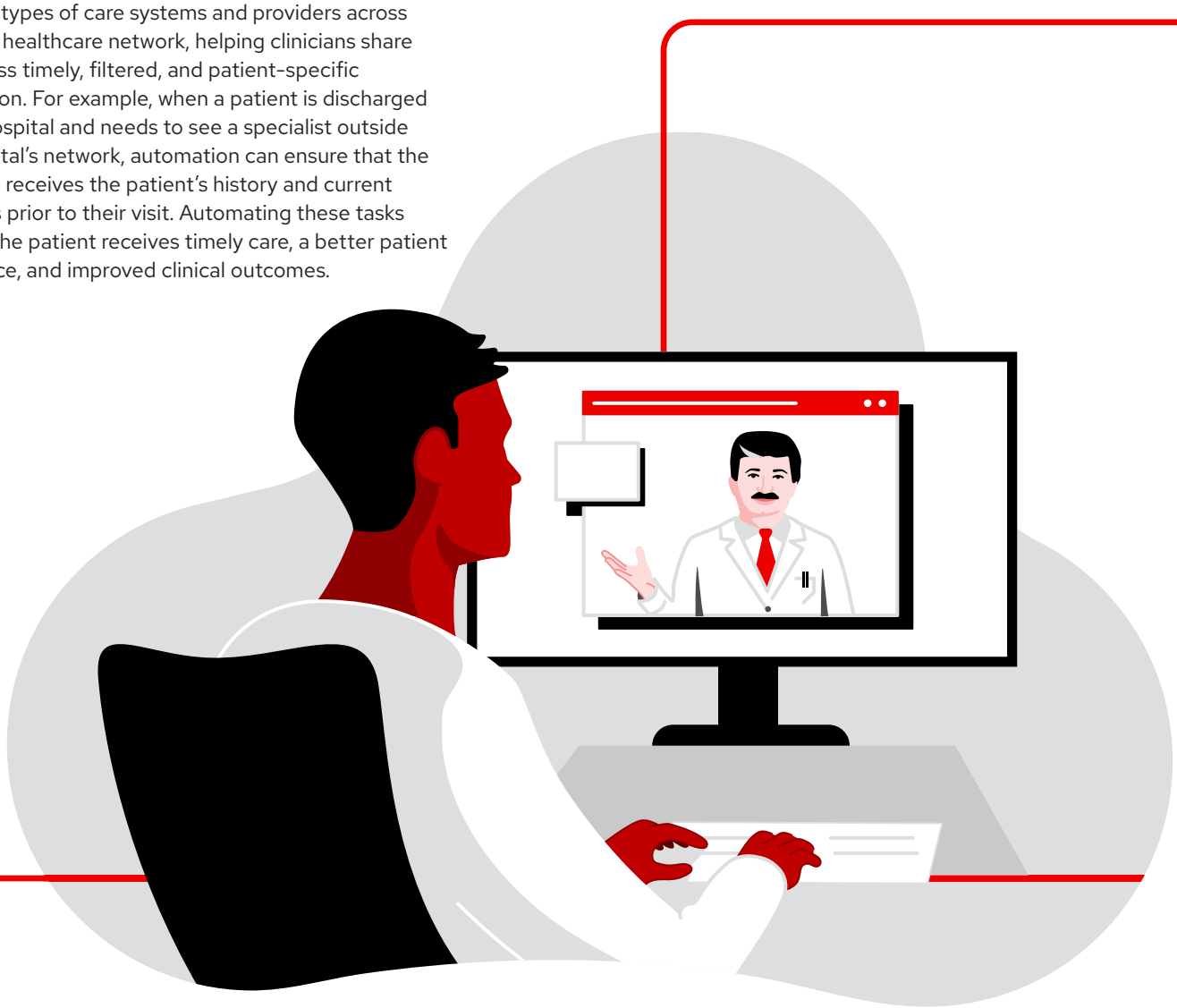
Uniting a dispersed healthcare network

Providing better care and enhanced services for patients is an ongoing pursuit in healthcare. As clinicians and paying organizations work to improve healthcare there is also a focus on ensuring they are prepared for the changes happening around the world. Twenty years ago, care started to move away from hospitals toward remote care treatment options such as outpatient centers, clinics, and freestanding emergency rooms. The role of technology across such a dispersed network should aim to support clinicians as their needs evolve.

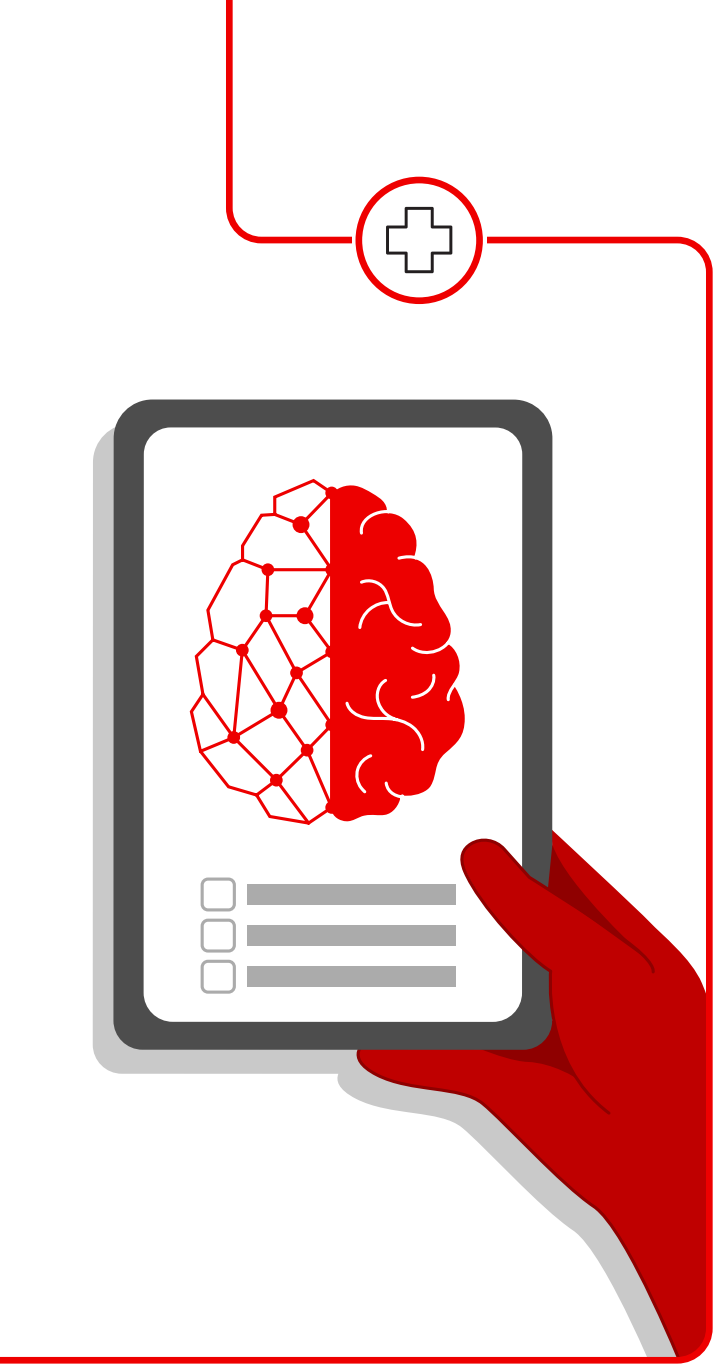
One key aspect to addressing these needs is connecting different types of care systems and providers across a diverse healthcare network, helping clinicians share and access timely, filtered, and patient-specific information. For example, when a patient is discharged from a hospital and needs to see a specialist outside the hospital's network, automation can ensure that the specialist receives the patient's history and current diagnosis prior to their visit. Automating these tasks ensures the patient receives timely care, a better patient experience, and improved clinical outcomes.

As part of the Surviving Sepsis Campaign, HCA Healthcare has saved approximately

8,000 lives from sepsis using Red Hat Ansible Automation Platform.[3]



[3] Red Hat success story. "HCA Healthcare develops predictive analytics using Red Hat software," May 5, 2019.



Automating critical care decisions in real time

Beyond just supporting clinical systems, automation needs to be used to improve clinical decision-making in real time. This need is being accelerated by several factors, including more complex treatments being provided for patients in remote office settings and even in an at-home setting. Decision-making involving medical transportation services, trauma services, and home-based care can also be improved and personalized based on patient data generated from wearables and a variety of other medical devices.

Using automation, edge computing, and analytics, clinicians can convert data into new insights to help improve patient outcomes while delivering financial and operational value.

Traditionally, a sepsis diagnosis required a manual chart review, potentially delaying diagnosis of a condition that becomes 4%-7% more deadly every hour. Automation at the edge is already improving patient experiences and healthcare outcomes, including saving lives. Clinicians, data scientists, and IT professionals have collaborated on solutions that automate the collection and analysis of clinical data such as patient location, vital signs, and laboratory results.

When the data indicates potential sepsis, automation at the edge coordinates workflow between the patient's nurses and the sepsis team, who may be in different locations or outside the hospital's network, helping them to initiate the appropriate care. This capability helps doctors detect sepsis indicators up to 20 hours earlier, saving thousands of lives.

A healthcare network of the future

Automating edge computing devices in healthcare can help clinicians to:

- Monitor patients remotely and improve patient and clinician engagement sooner in the disease process.
- Assist in improving the delivery of care in locations where expertise is not available.
- Use ML to improve the speed and accuracy of diagnoses and treatments provided to patients.
- Track and deploy vaccines and other medication as needed.

Chapter 9

Learn more:

Get started with automation at the edge

Automation at the edge is about adapting in real time by connecting devices, applications, and data to discover, decide, and take action.

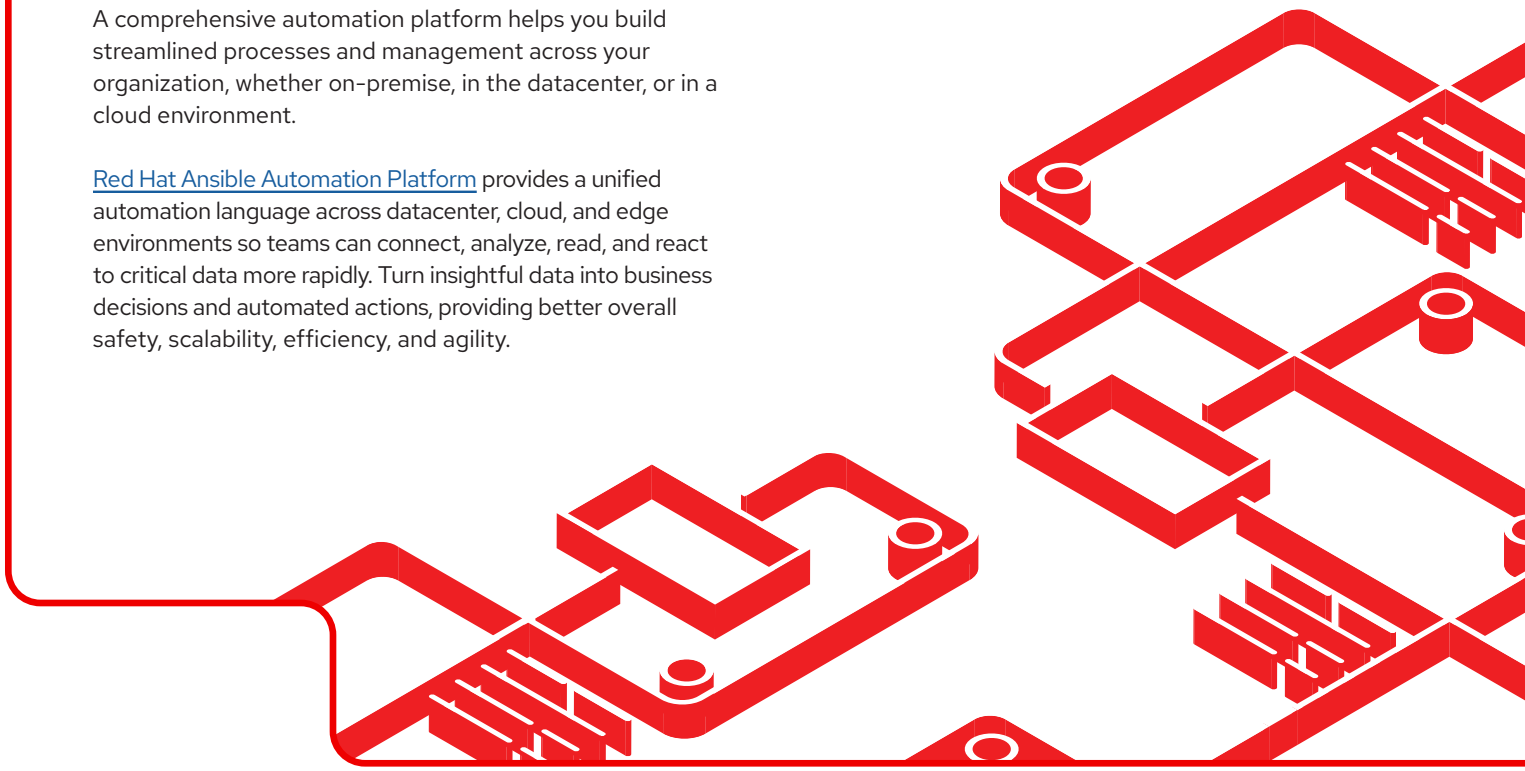
From improving safety at industrial sites to faster diagnoses in healthcare to better customer experiences in telco, business happens at the edge.

A comprehensive automation platform helps you build streamlined processes and management across your organization, whether on-premise, in the datacenter, or in a cloud environment.

Red Hat Ansible Automation Platform provides a unified automation language across datacenter, cloud, and edge environments so teams can connect, analyze, read, and react to critical data more rapidly. Turn insightful data into business decisions and automated actions, providing better overall safety, scalability, efficiency, and agility.

Read more about automation at the edge

Discover Red Hat Edge



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