The post-COVID public sector

5 ways to come back stronger with automation and hybrid cloud infrastructure

> "Some form of remote work arrangements are here to stay. There is no indication that work arrangements will go back to pre-pandemic days. Whether one works remotely or not will likely depend on the work being performed."[1]
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> **Sheri Greenberg**
> Contributing author, COVID-19 and its impact series: The future of work in local governments post pandemic

Executive summary

COVID-19 compounded existing challenges for governments, colleges and universities, and teaching hospitals. These organizations were already struggling to meet rising expectations with aging infrastructure and more complex IT. With the pandemic came new hurdles, like telework and a massive surge in online services. In one week in March 2020, unemployment claims jumped from 250,000 to about 3 million—a more than 11-fold increase.[2] Legacy applications and processes floundered as state residents constantly hit the refresh button for the latest news, epidemiologists analyzed massive data sets, and the entire workforce crowded onto online meeting platforms.

At Red Hat, we were inspired to see organizations across the U.S. innovate to serve their citizens and overcome pandemic obstacles in creative ways—despite constrained budgets and furloughed workers. Using automation, the City and County of Denver enabled a remote workforce literally over the weekend. The World Health Organization (WHO) introduced an online learning platform that uses machine learning to recommend COVID-19 content for healthcare providers. The State of Michigan's Department of Technology, Management, and Budget (DTMB) reduced its application delivery times. Some organizations used funding from the American Rescue Plan Act to accelerate their digital journeys.

In this piece, learn how Red Hat® customers are using automation and modern application architectures to improve the user experience, lower costs, and gain the agility to adapt to what's next. Get ideas for how to come back stronger, including:

▸ Do more with less, with automation.

▸ Enable a remote workforce with automation.

▸ Modernize aging infrastructure with hybrid cloud.

▸ Process data where it is generated—at the network's edge.

▸ Accelerate the journey to the cloud and edge computing with Red Hat technologies and services.

1 Greenberg, Sheri. "*The future of work in local governments post pandemic,*" IBM Center for the Business of Government, April 13, 2021.

2 Pressgrove, Jed. "*Have State Unemployment Insurance Systems Recovered from COVID-19?*" Government Technology, February 25, 2021.

1. Do more with less, with automation

Organizations with public cloud workloads are able to scale servers and storage on demand, which helped them respond to COVID-19. Automation enables cloud technology to scale for the unexpected. If a task is repetitive, software can do it faster, more accurately, and more consistently than humans.

Here are tips for using automation for more efficiency and better service levels:

Start small. Attempts to automate a big, complex process with many sub-processes often fail. For quick wins, automate small tasks — the more, the better. Freeing staff from many small manual tasks frees up time to focus on larger projects. Along the way, you will also gain confidence using the automation platform and create a collection of automated processes to use as building blocks for more complex automation projects.

Find out what other organizations have automated. Visit online automation marketplaces, such as Ansible® Galaxy, to see what automation projects are popular and how they are done. Determine what it would take to adapt existing projects for your needs and IT environment.

Treat automation code like application code. Some automation solutions, like Red Hat Ansible Automation Platform, use a language that is easier to write, understand, and troubleshoot than development code. Code that is easy to understand is more valuable because more people can adapt it. But keep in mind that even the most intuitive automation language is still susceptible to human error. To mitigate risk, apply processes used in modern software development, such as automation workflow reviews and version control. Critical processes need more rigorous controls.

Think creatively. Automation is useful for more than provisioning and configuring servers. Consider automating your switch, router, firewall, and security appliance configuration. Or automate your response to cyber attacks from bad actors attempting to exploit the pandemic-related rise in online transactions.

2. Enable a remote workforce with automation

Many organizations expect some employees to continue working from home after pandemic restrictions are eased. Helping a remote workforce stay productive and engaged requires giving them the services and tools they need to do their jobs well and stay connected with coworkers.

Elements of a remote worker solution range from VPNs and centralized routing to remote workstations and learning platforms. Automation accelerates the provisioning of servers, storage, and network and security devices. For example, Microsoft, a Red Hat partner, uses Red Hat Ansible Automation Platform across its corporate network to automate provisioning and updates for network devices. Cisco uses Ansible Automation Platform to automate Multiprotocol Label Switching (MPLS) VPN configuration, track the status of configuration changes, check syntax, and more. The World Health Organization (WHO) collaborated with Red Hat Open Innovation Labs to build a scalable, flexible learning platform to help health workers understand, prevent, and treat COVID-19. After healthcare workers enter their skills, experience level, and topics of interest, a machine learning algorithm recommends content. Read more about the project.

"Working with Red Hat Open Innovation Labs provided a more flexible and responsive approach for creating solutions using open source technologies. We were able to build a DevOps platform that can not only deliver relevant, timely COVID-related information and knowledge to health workers globally, but one that can also scale and adapt to their future needs."[3]

Bernardo Mariano
Chief Information Officer and Director, Digital Health, The World Health Organization

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3 Red Hat press release. *"World Health Organization embraces open source technologies to assist healthcare workers."* Nov. 16, 2020.

Red Hat in action: City and County of Denver

The City and County of Denver adopted Microsoft Teams as its business collaboration platform before the pandemic. When the 15,000-person agency abruptly went home to work in March 2020, demand skyrocketed, with exponentially more calls, chats, and users. Users submitted a flood of requests for new Microsoft Teams on ServiceNow. Manually fulfilling those requests was not feasible, and delays would come at a cost to productivity.

To expedite creation of new Microsoft Teams, the City and County of Denver used Red Hat Ansible Automation Platform to automate provisioning, deployment, and configuration management. The value of automating Microsoft Teams creation and other automation projects includes:[4]

▸ Supporting a 514% increase in Microsoft Teams use from March 2020 to February 2021.

▸ Accelerating the provisioning of teams from 20 minutes to less than 1 minute by integrating Ansible Automation Platform with ServiceNow.

▸ Saving 372 work hours over the creation of more than 1,300 teams.

▸ Automating updates to ServiceNow knowledge base articles.

▸ Creating virtual emergency operations centers for pandemic response, snowstorms, etc., in just 15 minutes.

Read the case study.

3. Modernize aging infrastructure with hybrid cloud infrastructure

Many public sector organizations are saddled with aging infrastructure. Legacy operating systems and monolithic applications are costly to maintain, complex to manage, difficult to scale, and burdened with technical debt. Aging infrastructure also makes it more difficult to adapt to whatever changes the post-pandemic world may hold in store. For example, many governments and universities are planning new applications for virtual interactions, surveillance of now-empty spaces, or asset location tracking.

Hybrid cloud infrastructure gives you the agility to adapt to the unpredictable. *Hybrid* refers to the fact that applications can be deployed in multiple environments—for example, public clouds, private clouds, or bare metal or virtual servers. As needs change, applications can be moved freely to different platforms because all of their dependencies are packaged up with the code.

> "We can't predict the future, but we know we will face challenges related to hiring and resource availability. Being able to automate processes will be fundamental to supporting new, digital ways of working to solve these challenges."[4]
>
> **Sean Greer**
> Director of IT Service Delivery,
> City and County of Denver

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4 *Red Hat case study. "City and County of Denver supports remote work with Red Hat Ansible Automation Platform." April 29, 2021.*

What is hybrid cloud infrastructure? It has three characteristics:

▶ A modern operating system, like Red Hat Enterprise Linux® that will make sure your infrastructure performs and remains stable — no matter your use case and workload.

▶ Container-based deployments. Holding not only the application and dependencies it needs to run, containers can be deployed in any environment (any cloud or on-premise server) and freely moved. Reasons to move an application include taking advantage of a different cloud provider's tools — like artificial intelligence (AI) and machine learning (ML) — or favorable pricing.

▶ Microservices architecture for new applications. Microservices are the tiniest components of an application. By using microservices, developers can build quality software — faster. That is because microservices are easier to build, test, deploy, and update than monolithic applications. Different developers can work on a project concurrently, delivering new or improving existing services more quickly.

The following are tips for migrating to a hybrid cloud infrastructure:

Use microservices for new application development. If you have legacy applications that change frequently, consider refactoring them to a microservices architecture.

Have a plan for scaling if a service grows faster than anticipated. Case in point: the 1,100% rise in state unemployment insurance claims from one week to the next in March 2020. Do not assume that you need more app instances or servers. It is sometimes possible to scale by tuning middleware or the operating system.

Use a continuous monitoring tool. Tracking traffic and utilization statistics help you spot performance and stability issues before they become problems.

Commit to full stack security. Avoiding security breaches helps prevent downtime that can have an outsized impact on the most vulnerable city residents.

4. Connect people and things at the network edge

Governments and healthcare organizations looking to increase operational efficiency in the post-pandemic world are embracing edge computing. City governments, for example, are deploying Internet of Things (IoT) sensors that transmit data to edge servers, where artificial intelligence and machine learning applications swiftly identify and remediate problems. Examples include traffic flow monitoring and transportation management, timely pothole repair and garbage pickup, identification of suspicious packages, and automated responses to emergencies like chemical spills or gas plumes.

Teaching hospitals are using edge servers for healthcare analytics on medical images and bedside sensor data. Processing huge volumes of data locally rather than moving it over the wide area network (WAN) to the cloud accelerates the identification of problems that require timely intervention and enable analytics, even in locations where WAN bandwidth is limited, such as rural clinics.

"Containerizing our applications helped us establish a vendor-agnostic view of our infrastructure and gives us the freedom to move into cloud environments in the future, where appropriate."[5]

Jack Harris
Chief Technology Officer,
Michigan Department of Technology,
Management, and Budget (DTMB)

Read the case study.

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5 *Red Hat case study. "State IT department builds digital services with Red Hat OpenShift." Nov. 23, 2020.*

With edge computing, instead of sending data to the cloud—which requires a fast, high-capacity WAN—you bring processing to where data is generated (such as a clinic, hospital, city parking garage, or transportation center.). Processing takes place on compact edge hardware, often equipped with graphics processing units (GPUs) optimized for AI/ML. The edge device ingests data from diverse sources. These can include sensors, internet protocol (IP) cameras, electronic health record (EHR) systems, and imaging systems. AI/ML applications running on the edge device rapidly identify situations requiring immediate action—either sending an alert or initiating an action according to rules.

To consolidate data from multiple locations—for example, for population studies, ML model training, or archiving—write rules specifying which data should be sent to the cloud.

5. Accelerate your journey to the cloud and edge with Red Hat

The first step to preparing for an unpredictable, post-pandemic future is identifying opportunities for innovation. The next step, which is more difficult, is putting in place the culture, processes, and technology to make those ideas a reality.

Red Hat helps to simplify the journey to modern IT by providing technologies, professional services, and expertise gained from working with leading public sector organizations over many years.

Accelerate your journey to the cloud

Use Red Hat Modernization and Migration Solutions to shift from a proprietary environment to open source technology, gaining flexibility and often cutting costs. Offerings include:

▸ Red Hat Services Solution: Infrastructure Migration to accelerate adoption of technologies like Linux containers, hyperconverged platforms, automation, and multicloud management.

▸ Red Hat Modernization and Migration Solutions to optimize your existing environments and ready your applications for the hybrid cloud.

▸ Red Hat Services Journey: Container Adoption, to build a hybrid cloud infrastructure and adopt the needed organizational and process changes.

Introduce edge computing

Red Hat's edge computing technologies focus on making operations simpler through automated provisioning, management, and orchestration. Because edge computing sites often have limited or no IT staffing, ideally they are managed using the same tools and processes as the centralized infrastructure. They should also be able to operate when the network connection is unavailable. Solution elements include:

Operating system: Red Hat Enterprise Linux provides the tools, applications, frameworks, and libraries for building and running applications and containers.

Containerized workloads: Red Hat OpenShift® is used for building, deploying, and managing container-based applications across any infrastructure, cloud, or edge locations.

Virtual machine and high-performance computing workloads. Red Hat OpenStack® Platform supports the most challenging virtual machine workloads, like network functions virtualization (NFV) and high-performance computing.

Storage. Red Hat OpenShift Data Foundation provides persistent storage for Red Hat OpenShift, in the cloud, datacenter, or edge environments. Red Hat Ceph® Storage provides self-healing and massively scalable block, file, and object storage for modern workloads.

Messaging and communication. Red Hat Application Services and developer tools provide cloud-native capabilities to develop fast, lightweight, scalable edge applications. Red Hat AMQ supports different communication patterns needed for edge computing use cases. For data transport, aggregation, and edge application services, use Red Hat Runtimes and Red Hat Integration.

Management. Tools include Red Hat Advanced Cluster Management for Kubernetes. Red Hat Ansible Automation Platform combines the universal automation language with cloud services and certified content for efficiently automating, deploying, and operating edge infrastructure, including the network.

Conclusion

COVID-19 underscores the fact that governments, higher education, and healthcare organizations have to be prepared to change service delivery with little notice. Many organizations already had plans in place before the pandemic to improve processes, modernize applications, or start migrating to the cloud. The pandemic has given these projects new urgency.

Fortunately, modern, open source technologies make change easier. For example, automation platforms help the public sector do more with less by shifting time-consuming, manual tasks from humans to software. Hybrid cloud infrastructure, in turn, enables rapid deployment of applications on any platform—and faster changes.

Whatever your business needs and current IT environment, Red Hat has the technologies, services, and training to help you adapt more quickly to change

Learn more

Explore public sector solutions from Red Hat: redhat.com/gov

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 integrate new and existing IT applications, develop cloud-native applications, standardize on our industry-leading operating system, and automate, secure, and manage complex environments. Award-winning support, training, and consulting services make Red Hat a trusted adviser to the Fortune 500. As a strategic partner to cloud providers, system integrators, application vendors, customers, and open source communities, Red Hat can help organizations prepare for the digital future.

facebook.com/redhatinc
@RedHat
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North America
1 888 REDHAT1
www.redhat.com

Europe, Middle East, and Africa
00800 7334 2835
europe@redhat.com

Asia Pacific
+65 6490 4200
apac@redhat.com

Latin America
+54 11 4329 7300
info-latam@redhat.com

redhat.com
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