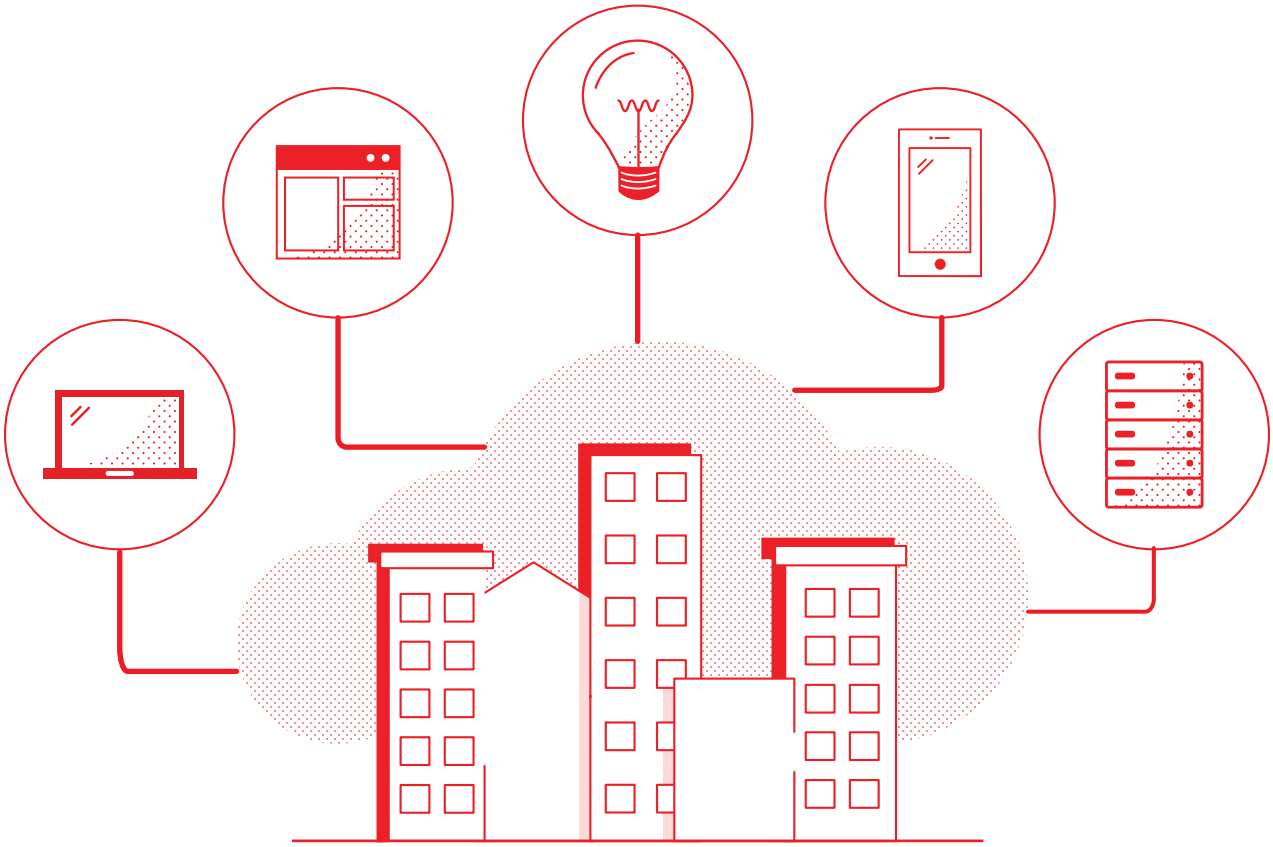
Become a digital service provider

Transform your business from network core to edge with a broad ecosystem of certified solutions and partners



Red Hat

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Ready to start your transformation?

Adapt to ongoing change

Change is inevitable

Telecommunications service providers face an evolving landscape of technologies, partners, and customer needs. To remain successful, many service providers are modernizing and transforming their network infrastructure, business operations, and customer experiences.

Even so, no single vendor can deliver a modern core-to-edge network solution—partnerships are essential. A partner-based approach to network design can provide:

- Complete, interoperable solutions based on certified components.
- Increased choice of technologies and services.
- Greater network scalability and flexibility.
- Innovation and practices that have been proven across industries.

Technology decisions have a lasting impact across your organization. Choosing the right underlying platforms can help you adapt to change faster and more easily.

"The next generation of mobile networks won't be defined by inflexible, proprietary solutions—it will be founded in open cloud-native technologies."

Jim Whitehurst
President of IBM, formerly President and CEO of Red Hat

Start with an agile, open foundation

Open source communities develop many of the technologies needed to modernize your infrastructure, operations, and experiences. They also promote interoperability, collaboration, and innovation across technologies and industries. In fact, 97% of IT leaders in the telecommunications industry say that enterprise open source is important to their organization.[1]

Standardizing on a production-grade open source platform gives you the flexibility and efficiency you need to quickly introduce new services and forms of revenue. With a consistent foundation, you can deploy solutions from multiple vendors to create the right infrastructure for your organization at all times.

Open source technologies define the future of telecommunications

Open source communities guide innovation in key technology areas for modern networks:

5G networking

Edge computing

Network and IT automation

IT and cloud security

Container architecture

Artificial intelligence and machine learning

1 *Red Hat, "The state of enterprise open source in telecommunications," February 2020.*

Modernize through open partnership

Build on platforms for the future

Red Hat offers platforms based on innovations that began in open source communities. Among these offerings, **Red Hat® Enterprise Linux®**, **Red Hat OpenStack® Platform**, **Red Hat OpenShift®**, and **Red Hat Ansible® Automation Platform** provide an open, programmable, cloud-native software foundation for modern networks. Integration throughout the Red Hat portfolio lets you deploy a consistent, adaptable, and scalable infrastructure from core to edge with less work. Standardized tools and operations increase efficiency across your organization. Interoperability and flexibility allow you to take advantage of emerging technologies and modern development and operations approaches.

Red Hat platforms also provide a stable, yet innovative, base for deploying partner products, solutions, and services from a large, certified ecosystem.

Gain choice and stability with a robust partner ecosystem

Red Hat's open business model focuses on collaboration and partnership. The Red Hat network ecosystem brings together industry-leading partners and trusted open source communities to create innovative, validated, integrated solutions for the telecommunications industry.

Red Hat curates the most useful, reliable, and future-ready partner applications, products, and services to create a robust ecosystem. Each partner offering is tested and validated to perform on Red Hat platforms across use cases. Detailed certification policies ensure compatibility and stable operation. Red Hat also works closely with ecosystem partners to certify their latest releases on an ongoing basis. As a result, you can always choose your preferred network applications, platforms, and integrated technologies and services, with confidence that they will work together reliably.

"As a leader in building open, innovative telecommunications infrastructure, we see a tremendous advantage to running standardized software at the telco edge, helping to enable a range of new workloads via dynamically scalable services."

Jim Whitehurst
President of IBM, formerly President and CEO of Red Hat

Create a modern, dynamic network foundation

Red Hat provides a complete cloud-native, software-defined foundation for 5G networks and edge computing. Key products include:

- **Red Hat** Enterprise Linux
- **Red Hat** OpenStack Platform
- **Red Hat** OpenShift Container Platform
- **Red Hat** Ansible Automation Platform

Deploy modern network infrastructure, operations, and experiences

Red Hat's platforms and ecosystem connect agility with stability, speed with security, and choice with unity to simplify the transition to modern network infrastructure, business operations, and customer experiences.

Step 1: Identify your ideal state

Red Hat and partner technologies can be combined in many ways to address your transformation goals. Assess your organization's requirements and identify the infrastructure features and capabilities you need to achieve your ideal state. Possible goals include deploying a 5G network, adopting modern service development, and automating operations across your organization.

Step 2: Choose your products and platforms

With a broad ecosystem for telecommunications service providers, Red Hat unites vendors, applications, components, and technologies to help you build the right infrastructure for your business. Confidently choose the components your organization needs, knowing they will work together reliably.

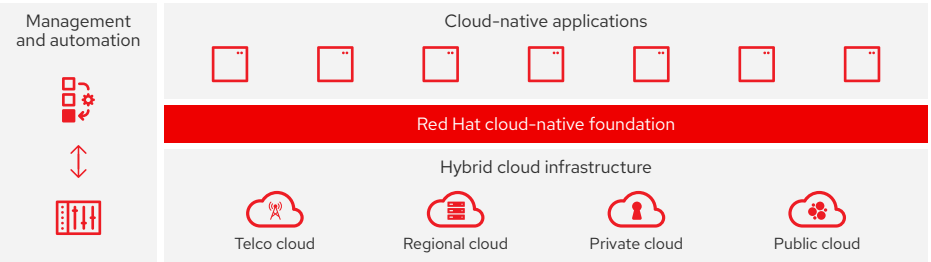
Step 3: Customize and adapt your network environment

Red Hat's ecosystem lets you build an adaptable foundation that unifies your network and IT infrastructure. Deploy the applications and workloads your customers demand today and evolve your environment over time.

Step 4: Focus on your own success

Red Hat delivers flexible solutions to advance your business. We have partnerships with established vendors and new market entrants to help you build a modern infrastructure that adapts on your terms and schedule.

The following sections discuss three fundamental transformation areas and how Red Hat's platforms and network ecosystem addresses each.



Modern networks are built on partnership

Red Hat collaborates with industry-leading companies to advance the underlying technologies on which modern networks are based.

Intel builds agile, cloud-ready network architectures based on high-performance, industry-standard platforms and open, software-defined infrastructure.

NVIDIA creates scalable 5G and edge solutions using open, cloud-native, software-defined, graphics processing unit (GPU) accelerated, and artificial intelligence (AI) technologies.

Nokia offers a comprehensive portfolio of network equipment, software, and services that help you digitally transform your networks to address capacity needs, reduce complexity, and create innovative new services.

Transform your network

Deploy cloud-based, software-defined network infrastructure from core to edge

Demand for services and bandwidth continues to grow as customers access new services and applications. In fact, mobile data use is growing at nearly 100% per year.[2] To meet increased demand, you must expand your network infrastructure. However, aging and rigid infrastructure can make it difficult and costly to scale quickly in line with demand. As a result, your costs to deliver services may increase faster than your profits from those same services.

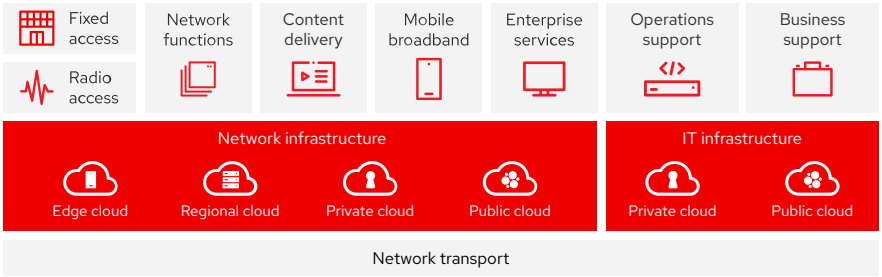
To remain competitive and maintain favorable revenue margins, you need to transform your network infrastructure and operations to increase efficiency, flexibility, and scalability while supporting rapid service development and controlling overall costs.

Start your network transformation

Network transformation takes place across your entire infrastructure:

- **Network functions virtualization (NFV) in your network core**
  Virtualize your network core onto flexible, multi-purpose, cloud-based infrastructure. Consider deploying network functions in containers for increased portability, scalability, and security.
- **Cloud-native radio access networks (RAN) at your network edge**
  Virtualize your RAN to decouple baseband functions from the underlying hardware and create a cloud-based software fabric that spans both Long-Term Evolution (LTE) and 5G networks.

Red Hat works with leading NFV and cloud-native RAN partners to help you transform your network infrastructure more easily.



Benefits of network transformation

Transforming your network from core to edge can help you significantly lower costs, gain flexibility, and scale more easily.

Compared to purpose-built solutions, virtualized network infrastructures offer:

68%
lower capital expenses (CapEx).[3]

67%
lower operational expenses (OpEx).[3]

67%
lower total cost of ownership (TCO).[3]

Compared to conventional distributed RANs, centralized virtual RAN architectures offer:

25%
higher productivity.[3]

66%
faster time to market and revenue.[3]

44%
lower TCO.[3]

2 *GSMA, "The Mobile Economy 2019," 2019.*

3 *ACG Research, "Economic Advantages of Virtualizing the RAN in Mobile Operators' Infrastructures," September 2019.*

Ecosystem partner highlights

Network functions virtualization partners

Affirmed Networks, **acquired by Microsoft** in April 2020, delivers fully virtualized, cloud-native mobile core solutions with leading performance and scale for rapid service creation and delivery. Together, Affirmed Networks and Red Hat offer a virtualized evolved packet core (vEPC) solution for NFV environments. This proven solution combines the Affirmed Mobile Content Cloud with Red Hat's NFV software foundation based on Red Hat OpenStack Platform. Testing shows that the solution delivers the flexibility and scalability of NFV and establishes a new performance benchmark for mobile core platforms.

Read the **Red Hat and Affirmed Networks NFV performance benchmark for mobile packet core overview** to learn more.

"Working together with our partner, Red Hat, we have helped Turkcell complete its *Unified Telco Cloud* platform, [...] a carrier-grade infrastructure framework for building hybrid clouds and delivering new services."[4]

Harsha Kalkoti
Senior Product Manager, Affirmed Networks

Cisco uses a cloud-to-client approach to unify multivendor solutions into a streamlined open network architecture that is simple, resilient, and ready-to-automate. Through a long-standing partnership, Cisco and Red Hat deliver a comprehensive set of open, security-focused solutions that help you digitally transform your business, modernize your datacenter, and deploy hybrid cloud environments. These integrated, validated offerings empower your IT teams to deliver positive business outcomes with speed and scale while creating a foundation for efficiency and competitive gain.

Learn more about Cisco and Red Hat's partnership at **redhat.com/en/partners/cisco**.

4 *Affirmed Networks, "***Affirmed & Red Hat Power Turkcell's Network Transformation: Deployment Represents one of the Largest Virtualized Networks in EMEA Region***,"February 6, 2019.*

Ecosystem partner highlights

Network functions virtualization partners

Juniper Networks simplifies networking with products, solutions, and services that connect the world. The company works with Red Hat to streamline adoption of distributed, scalable cloud environments with open, security-focused solutions based on Red Hat OpenStack Platform, Red Hat Ceph® Storage, Red Hat Enterprise Linux, and Juniper Contrail Networking and Contrail Cloud offerings. Intended for telecommunications and enterprise organizations, these solutions help you design, implement, and operate more agile and automated network infrastructures.

Learn how Juniper Networks and Red Hat deliver distributed, scalable solutions at **red.ht/rh-juniper-clouds**.

"Open source is key, but it is important to pick the right players both for technologies and go-to-market. Red Hat and Juniper collaborate together to catalyze the innovations in upstream communities and deliver leading solutions to our mutual customers."

Tore Smedman
Senior Director of Strategic Alliances, Juniper Networks

Mavenir is a leading innovator of 5G core technologies that help network operators evolve mobile service delivery. Red Hat and Mavenir work together to transform networks with modern, containerized applications and environments. Mavenir's cloud-native, service-based 5G core platform, running on Red Hat's software foundation, provides a flexible path for moving to 5G while making the most of existing evolved packet core (EPC) and 4G LTE investments.

Learn more about Mavenir's 5G solutions at **mavenir.com/solutions/evolve-5g**.

Ecosystem partner highlights

Cloud-native radio access network partners

ALTIOSTAR

Leading Network Transformation

Altiostar provides a 4G and 5G virtualized RAN (vRAN) software solution that supports open interfaces and disaggregates the hardware from the software to build a cloud-based, software-defined network. Red Hat and Altiostar offer an open vRAN solution to help you modernize your network, decrease capital and operational costs, and take advantage of revenue opportunities from increasing mobile traffic. The Red Hat and Altiostar solution delivers full RAN functionality using NFV infrastructure from Red Hat and open RAN technology from Altiostar. Using this solution, you can deliver more customer value, reduce network costs, and prepare for future growth and uncertainty.

Read the **Modernize with a virtualized radio access network from Red Hat and Altiostar brief** to learn more.

"Operators need to evolve their radio access networks to be part of a software-based cloud network that can adapt to the myriad requirements and applications of 5G."

Shabbir Bagasrawala
Head of Product Go-To-Market, Altiostar

Parallel Wireless

Parallel Wireless offers a unique, unified 5G, 4G, 3G, and 2G **OpenRAN** architecture for cost-effective wireless coverage and capacity. This open, cloud-native solution covers five key network domains—RAN, edge, core, orchestration, and analytics—to help you modernize your network, reduce deployment cost and complexity, increase operational efficiency, access new revenue streams, and deploy multivendor 5G networks. Parallel Wireless and Red Hat collaborate to bring this solution to rural, suburban, and urban areas rapidly and affordably.

Learn more about Parallel Wireless and Red Hat interoperability at **access.redhat.com/ecosystem/software/4485181**.

Transform your business operations

Connect and automate business and operations systems across your organizations

The market for digital telecommunications services continues to grow. Digital service delivery requires you to become more flexible, agile, and efficient. However, legacy operations and business support systems (OSS and BSS) typically use large, monolithic applications that are difficult to modify, scale, and update quickly and cost-effectively, impeding your ability to effectively deliver these services.

To stay competitive in a fast-changing digital services market, you must rapidly develop, introduce, and iteratively evolve services.

Start your operational transformation

Modernizing your OSS and BSS can help you increase flexibility, speed, and innovation to become a digital service provider. OSS and BSS modernization occurs in three main areas: automation, integration, and application delivery.

- **Automate**
  Automate your business processes to enhance efficiency, eliminate errors, increase consistency, and improve customer experiences, all while reducing costs.
- **Integrate**
  Connect diverse, distributed applications, data sources, and development teams to remove bottlenecks, optimize resource and component reuse, and promote collaboration.
- **Deliver**
  Adopt modern application development and delivery approaches – based on containerized microservices and DevOps models – to create cloud-native applications, improve productivity, and scale elastically.

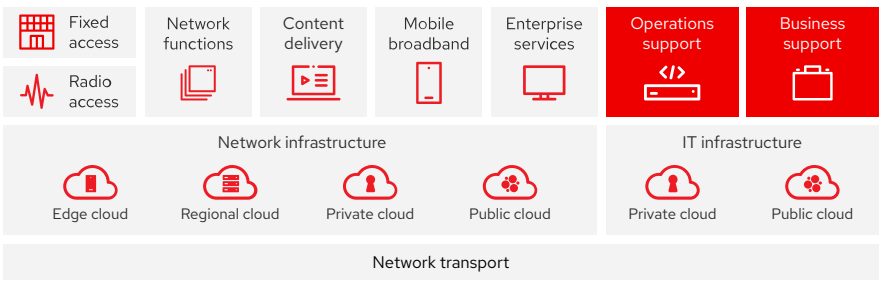
Red Hat works with key OSS and BSS vendors to help you modernize your operations and deliver high-value digital services.

Key use cases for operational transformation

Modernizing your OSS and BSS with flexible open source solutions can help you become a digital service provider. Operational transformation can occur in many areas of your business:

- Modernize your OSS and BSS integration architecture for speed and agility.
- Automate configuration management to stay compliant.
- Deploy automated fault monitoring and remediation to reduce costs.
- Synchronize like systems in real time to streamline efforts.
- Automate to streamline business processes.

Learn more



Ecosystem partner highlights

Operations and business support system partners

MYCOM OSI is an independent software vendor (ISV) that provides assurance, automation, and analytics solutions for service providers and enterprises. The company's Assurance Cloud and Experience Assurance and Analytics (EAA) solutions help you deliver digital experiences and improve service quality across hybrid networks. Based on these technologies, MYCOM OSI and Red Hat offer a virtual central office solution with cloud-native assurance for all components, including hardware resources, cloud platforms, NFV infrastructure, virtual network functions (VNFs), and service chains.

Read the **Improve user experience with cloud-native service assurance brief** to learn more.

Netcracker Technology, a wholly owned subsidiary of NEC Corporation, offers business-critical digital transformation solutions for service providers. These software solutions and professional services empower large-scale digital transformations and unlock cloud, virtualization, and mobile ecosystem opportunities. Using Netcracker technology, Linux containers, and Kubernetes orchestration, Red Hat and Netcracker deliver a real-time business and operations environment that supports automation and innovation to speed your service delivery, ease your service updates, and increase your sales performance.

Read the **Build a cloud-native service environment with Red Hat and Netcracker brief** to learn more.

Nokia offers an extensive suite of software and services that help service providers reinvent their businesses and transition to 5G. Ranging from cloud-native RAN to cloud-native charging, Nokia's software empowers you to deliver digital services. Together, Nokia and Red Hat deliver digital service solutions based on Red Hat OpenShift and have successfully deployed Nokia's 5G cloud-native charging for a tier-1 operator in North America.

Learn more about Nokia network solutions at **nokia.com/networks**.

Transform your customer experiences

Deliver rich, integrated offerings quickly and speed development of new services

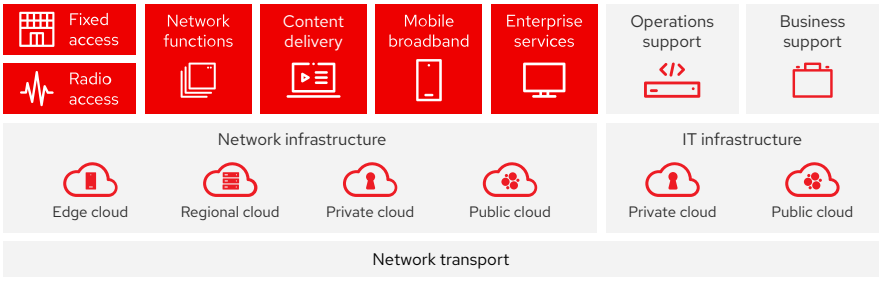
Advancing technology has made richer and more valuable customer experiences possible. As users become accustomed to connected, contextual experiences in their everyday life, they demand the same experiences from all of their service providers. And if customers have poor experiences, they are likely to consider competitors' offerings.

To compete effectively, you must continually provide valuable, personalized digital experiences and content to your users.

Achieve customer experience transformation

Connecting business systems—including marketing, sales, and customer care operations—lets you build the rich, layered services your customers demand. Adopt microservices architectures, DevOps methodologies, and continuous integration and continuous delivery (CI/CD) pipelines to speed development and deployment of new, high-quality offerings. Add flexible automation across all disciplines to further accelerate tasks while increasing security and compliance.

Red Hat partners with experts in telecommunications experiences to help you rapidly develop and deliver innovative, differentiating services to your customers.



Key drivers for improving customer experience

Transforming your network infrastructure and business operations can support improved customer experiences and greater revenues.

66%
of service providers and technology suppliers say stronger customer relationships are a very important driver for transformation.[5]

36%
of global IT leaders are implementing network automation to improve customer satisfaction.[6]

26%
of telecommunications CEOs are relying on improving customer engagement to ensure their organization is ready for the future.[7]

24%
of mobile network operators say better customer experience is the top benefit of 5G.[8]

5 *TM Forum, "**Digital Transformation Tracker 4: The culture wars of transformation**," February 2020.*

6 *Cisco, "**Cisco Annual Internet Report (2018–2023)**," March 2020.*

7 *KPMG, "**Telecom CEO Outlook 2019: Redefining resilience**," August 2019.*

8 *Telecoms.com Intelligence, "**Annual Industry Survey 2019**," December 2019.*

Ecosystem partner highlights

Integrated services partners

Amdocs is a leading provider of software and services for communications and media organizations of all sizes. The company uses an open source application platform to accelerate dynamic, digital transformation in telecommunications. By rebuilding key OSS and BSS applications as microservices running on Red Hat OpenShift Container Platform, Amdocs can deliver new features and services to market faster, as well as transform its entire development culture to focus on open, efficient work. These benefits extend to Amdocs' customers, allowing them to innovate more effectively in their own businesses.

Read the **Amdocs creates dynamic development with Red Hat OpenShift case study** to learn more.

IBM, Red Hat's parent company, is a leading cloud platform and cognitive solutions company. IBM solutions help you reinvent your business to offer more personalized customer experiences, accelerate network automation, and create new revenue streams. Based on deep open source values and experience, Red Hat and IBM support your transition to modern, cloud-native infrastructure with innovative platforms, flexible automation, intuitive management tools, and leading services offerings.

Learn more about IBM solutions for media and entertainment at **ibm.com/industries/telecom-media-entertainment**.

Seamlessly integrate your network environment

Network infrastructure contain technologies, products, and components from many vendors and open source communities. Incompatibilities between components can lead to increased downtime, reduced performance, and lower customer satisfaction. Interoperability, connectivity, and integration across your environment are critical for delivering reliable, high-quality services to your customers.

To maximize uptime, performance, and customer satisfaction, you need reliable, unified network infrastructure, operations, and services. Integration across all aspects of your network should be a key part of your transformation journey.

Choose your network integration path

Red Hat works with many integration partners to deliver the services and solutions you need. Purchase and deploy complete, integrated, and co-engineered solutions within your environment, or engage an integration partner to plan and build a custom infrastructure for you. The choice is yours.

Red Hat collaborates with leading systems integrators to help you transform your network infrastructure, operations, and services rapidly and effectively.

Take advantage of integration expertise

Red Hat works with integration experts to create and deploy solutions that support your business. These partners can help you transform and connect infrastructure, support systems, and services into a unified, interoperable environment.

Key integration points include:

- Network infrastructure
- IT infrastructure
- Business and operations support systems
- Fixed access services
- Radio access services
- Network functions
- Content delivery services
- Mobile broadband services
- Enterprise services

Ecosystem partner highlights

Systems integration partners

Accenture provides a broad range of strategy, consulting, technology, and operations services with digital capabilities. Together, Accenture and Red Hat help you implement open source solutions for complete, large-scale projects to improve performance and create sustainable value.

Learn about **Accenture services for telecommunications**.

DXC Technology offers complete IT services to help you innovate. DXC partners with Red Hat to deliver open source solutions at scale, connecting and integrating data, devices, and applications across your organization to modernize and transform your business.

Learn about the **DXC Technology and Red Hat partnership**.

IBM integrates leading technology with advanced research and development labs to help you become a digital service provider. IBM and Red Hat solutions let you modernize applications, connect data, deploy across clouds, manage compliance, and protect your business.

Learn about **IBM solutions for telecommunications**.

NTT DATA focuses on long-term commitment and combines global reach with local knowledge to deliver consulting services. NTT Data is a Red Hat Certified Cloud and Service Provider (CCSP) partner, delivering cloud-based Red Hat products on demand.

Learn about **NTT DATA digital solutions**.

Tech Mahindra offers services for building integrated customer experiences to service providers, equipment manufacturers, and software vendors. Using Red Hat and IBM technologies, Tech Mahindra helps you transform your operations and accelerate your hybrid cloud strategy.

Learn about **Tech Mahindra telecommunications services**.

World Wide Technology (WWT) provides digital strategy, innovative technology, and supply chain solutions for large organizations. WWT collaborates with Red Hat and our partner ecosystem to create virtual central office (VCO) solutions based on open, software-defined platforms.

Learn about the **WWT and Red Hat partnership**.

Red Hat open partner ecosystem for telecommunications

The choice is yours

Modernize your network infrastructure, business operations, and customer experiences with innovative, interoperable, and adaptable solutions from the most robust partner ecosystem for telecommunications. Whatever your needs, we can help you successfully prepare for a changing future.

A10 accenture affirmed ALTIOSTAR Leading Network Transformation ALTRAN Part of Capgemini amdocs

ARISTA Atos cisco DELL Technologies DXC.technology ERICSSON

f5 HCL Hewlett Packard Enterprise IBM Infoblox intel

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NVIDIA Parallel WIRELESS QCT ribbon communications SevOne TATA CONSULTANCY SERVICES

Tech Mahindra TRILIO turnium vasona networks World Wide Technology ZTE

Learn more

Ready to start your transformation?

Partnership is essential for success in the fast-changing telecommunications industry. Through collaboration with industry leaders and innovators, Red Hat provides the reliable, standards-based software foundation and certified partner ecosystem you need to become a digital service provider.

Learn more about Red Hat and partner solutions: **redhat.com/telco**

Want to partner with Red Hat?

Red Hat collaborates with partners in many ways. Learn how we can advance business together at connect.redhat.com.

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