

Rethinking the Network for Transformative Healthcare

Whitepaper | Healthcare



Introduction

If you are the IT leader of a healthcare organization thinking about deploying next-generation digital services, this paper is for you.

Imagine a scenario where your board and executive team just decided that your team needs to deliver a distinctive suite of telemonitoring capabilities across hundreds of locations, from skilled nursing facilities to rehab hospitals, scattered across a dozen states, within a year. It's a visionary idea with great potential to support better outcomes for patients, whether through better alerting or by providing a new data source for analytics, and doing it right is likely to be a critical element of your organization's long-term success. But it's not going to be easy, and you know that to support the vision, your organization will need new infrastructure capabilities.

As you evaluate your existing IT assets from compute and storage to networking and cloud, one of the first things you notice is that your networking infrastructure is probably insufficient to support this transformation. As matters stand today:

- A few of your hospitals seem to have unforeseen issues with downtime.
- Some sites have wildly fluctuating latency.
- Other locations lack the bandwidth they needed.
- The wireless networks inside your hospitals and clinics still have gaps in coverage that would underline capabilities like remote monitoring or mobile augmented reality.
- Your networking management is fragmented. Your team lacks the unified capability to monitor, manage, and maintain networking as a whole – from endpoints to cloud connections.



You know this new digital monitoring service will put new pressure on the network, and without better networking, the telemonitoring solution won't be reliable. It will impact patient care, frustrate clinical staff, and irritate executives. To make matters worse, the demands it puts on an overtaxed network run the risk of damaging the performance and availability of other mission-critical applications.

If this scenario has you nodding your head in recognition, you're not alone.

Up until now, healthcare has, compared with other sectors, lagged on digital initiatives.¹ However, it's becoming clear that the most progressive, forward-looking healthcare companies are exploring new digital services to improve patient care. 93% of healthcare organizations already have a digital transformation strategy or are in the process of creating one according to BDO's 2021 Healthcare Digital Transformation Survey.² Whether they're planning to adopt new telemonitoring services relying on new Internet of Medical Things (IoMT) sensors, building virtual reality infrastructure for continuing education, or simply expanding their analytics, all these digital initiatives put pressure on the network. Whether they already have issues or anticipate problems with performance, resilience, and cost as they add more digital services, more and more IT leaders at healthcare systems recognize that they lack essential networking capabilities that they will need to succeed.

And to make matters worse, they have no idea how to achieve the needed improvements within an environment that's often more budget-constrained than other industries.

Fortunately, Zayo has a track record of success for healthcare institutions and a distinctive set of technologies that can help. In this paper, we're going to explore the Zayo perspective on the digital future of healthcare. We will explore opportunities for healthcare, the technology challenges that block progress and value, discuss the network capabilities that can help, and wrap up with a short overview of Zayo's distinctive value proposition for healthcare.

¹ <https://www.mckinsey.com/industries/healthcare-systems-and-services/our-insights/digital-is-reshaping-us-health-insurance-winners-are-moving-fast>

² https://www.bdo.com/BDO/media/Report-PDFs/Digital%20Transformation/2021-Healthcare-Digital-Transformation-Survey_web.pdf



Opportunities and Possibilities

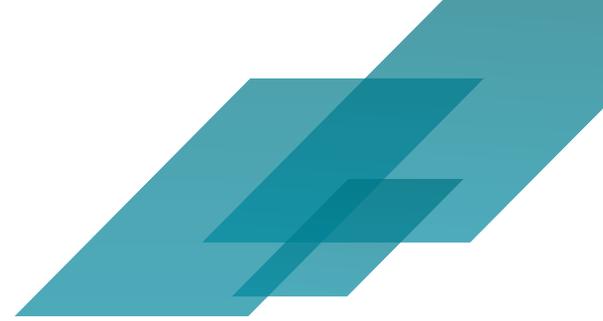
Why are healthcare organizations evaluating, planning, and implementing new digital services?

Essentially, they're pursuing two overriding priorities, though it's worth making the point that these feed into each other, overlap each other, and can't readily be separated. The priorities are:

- Improving patient experiences and clinical outcomes
- Making healthcare more efficient and cost-effective for both systems and patients

It's important to understand that all these possibilities and opportunities rest on a foundation of data – data capture, data movement, data access, and data analytics. And for the most part, healthcare organizations rely on electronic health record (EHR) and Practice Management Systems (PMS) platforms to gather data, utilize data, and analyze data. EHR and PMS have evolved from a place to keep patient records into a workflow engine for almost everything inside a healthcare organization. If you look at any EHR or PMS platform today, you'll see a rapidly changing set of capabilities that goes well past simple patient record capture, including:

- Automating coding
- Patient flow management
- Clinicals
- Telehealth
- Care management and utilization management
- Physician productivity
- Analytics



Building new digital services through EHR and PMS platforms unlocks massive potential for improving patient experiences and healthcare efficiency.

Patient Experiences and Outcomes. New digital services that directly improve patient experiences and outcomes are an obvious opportunity, and they're attracting massive investment.

Some of the simplest digital services include patient portals, which go a long way to improving outcomes and patient satisfaction, and are always behind enhanced, and enhancements can put new pressure on networks. Many providers rolled out telemedicine technologies for remote patient visits as well, reducing the risks of sick patients bringing COVID into care facilities. But not all providers have the network infrastructure to provide reliable, performant services, resulting in clinical staff and patient frustrations³.

Beyond the ubiquitous patient portal and video calls with physicians, leading-edge institutions are trying new digital services for ongoing monitoring that provides early awareness of emerging problems, including in-facility and remote telemonitoring using wearable technology. Those approaches demand highly performant, reliable wireless networking without coverage gaps.

Other behind-the-scenes digital services improve patient experiences and outcomes but aren't so obvious. Some of these include AI-powered diagnostics that already outperform doctors⁴, augmented reality for surgeons, and predictive analytics that rapidly identify patient deterioration⁵.

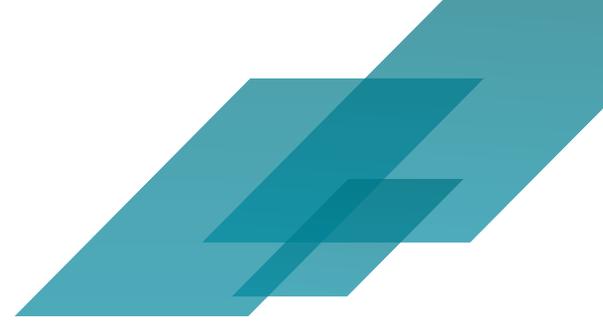
These digital services and many others have the potential to help millions of patients get better faster. And they all demand more from in-facility, cross-facility, metro-level, regional, and global network infrastructures.

At this point, it's worth mentioning that these efforts to improve patient experiences and outcomes also often make healthcare more efficient.

³ <https://mhealthintelligence.com/news/55-of-telehealth-providers-frustrated-with-overblown-patient-expectations>

⁴ <https://www.newyorker.com/magazine/2017/04/03/ai-versus-md>

⁵ <https://healthitanalytics.com/news/predictive-analytics-tool-accurately-detects-patient-deterioration>



Making healthcare more efficient and cost-effective. As everyone knows, the hard and soft costs of providing healthcare increase each year, and organizations are incentivized to control those costs through efficiency improvements. Efficiency improvements happen at many levels, but at the most basic level, they stem from changes in tools, processes, and procedures for both clinical and non-clinical staff.

New digital services are being tested and implemented to drive efficiency gains through enhanced staff effectiveness. These gains come from improvements in six critical areas:

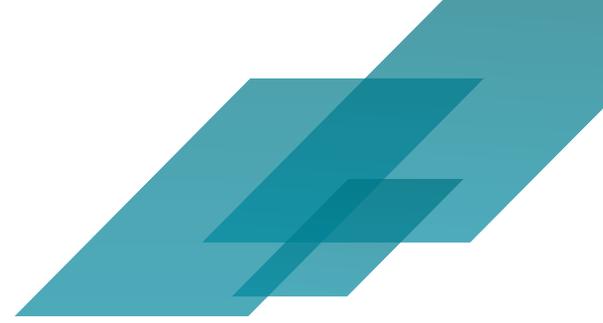
- 1.** Identifying overtreatment / ineffective treatment. In a PLOS One paper, surveyed physicians reported that 20.6% of treatments were unnecessary⁶. Any digital service that prevents unnecessary care has a direct impact on costs.
- 2.** Reducing clinical errors. More than 10% of hospital expenditure goes to address medical errors or infections that patients catch in hospitals⁷. Being able to identify emerging problems before they happen can drive down costs.
- 3.** Fixing care coordination. Fixing communication among care providers, different facilities, and at different stages of care can help solve the costs of improper diagnoses, harmful drug interactions, unnecessary rework, and more.
- 4.** Streamlining administration. There is no apparent link between higher administrative costs and better healthcare outcomes⁸, so there's strong demand for innovative digital services that streamline administration.
- 5.** Improving staff effectiveness. Digital services that reduce busywork and duplicate effort while improving clinical workflows and reducing manual processes can save thousands of dollars per employee and improve staff retention.
- 6.** Fighting fraud and abuse. Financial fraud and abuse cost the healthcare industry billions of dollars each year⁹, and digital services that flag and fight fraud make sense in a world where every dollar saved can be invested in growth or patient care.

⁶ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5587107/>

⁷ https://read.oecd-ilibrary.org/social-issues-migration-health/tackling-wasteful-spending-on-health_9789264266414-en#page5

⁸ <https://www.commonwealthfund.org/publications/journal-article/2014/sep/comparison-hospital-administrative-costs-eight-nations-us>

⁹ <https://www.ncsl.org/research/health/combating-health-care-fraud-and-abuse.aspx>



Exploring the Challenges and Capabilities

It's important to understand that new digital services rely on the ability to capture data, move data, analyze data, and make decisions using data. If your network stands in the way of any of these fundamental needs, service quality will suffer.

Let's take a look at a single digital service to see how network problems could impede the operational value of a new digital service.

So imagine, for a moment, that you're rolling out a new in-patient, video, and sensor-based telemonitoring capability throughout your healthcare system, from small rural nursing facilities to huge teaching hospitals with dozens of buildings on distributed campuses.

- It relies on wireless networking to capture data from each patient's room.
- Once data is captured over the wireless network, terabytes of data are transferred using wired connectivity to your SaaS-based EHR platform.
- The platform uses AI to analyze vitals and physical movement, generating alerts for nursing staff and doctors while automatically making notes in EHR records.
- At night, your EHR platform transfers a 2-3 terabyte subset of data to a cloud analytics service to support a research project conducted in collaboration with a medical school.

However, you rolled out the new digital service without fully evaluating network availability, performance, and resilience across every location. What would happen when you tried to take the new digital service live?

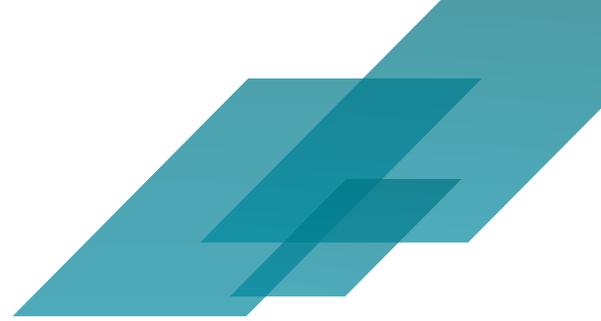


- At some locations, your wireless network is patchy with gaps in coverage, so it can't handle the new telemonitoring service in all patient rooms.
- Some locations would have enough bandwidth to support the new application, and others would not. Getting data to the EHR platform in real-time across all locations wouldn't be possible.
- Some locations would have 24x7 network uptime; others wouldn't, so outages would become a common problem
- Some locations would have more secure connectivity than others, so as you transfer the telemonitoring data, you might risk
 - compromising patient health information (PHI).
- Your mix of network partners limits your ability to control end-to-end service quality because you don't have a single monitoring and management system that spans the entire network, and your existing network management is highly manual.
- Your new solution puts so much pressure on the network. Other mission-critical services experience slowdowns or increased downtime.

These problems would destroy the value of your telemonitoring service while impacting the value of other essential services, potentially decreasing patient satisfaction, employee morale, and operational efficiency.

To cope with the new pressures of digital healthcare services, healthcare systems are putting their networks and network vendors under unprecedented scrutiny. Expectations for service quality are higher than ever, and risks to continued operational success simply can't be tolerated.

The solution isn't just a bigger pipe. Healthcare organizations need new capabilities to succeed.



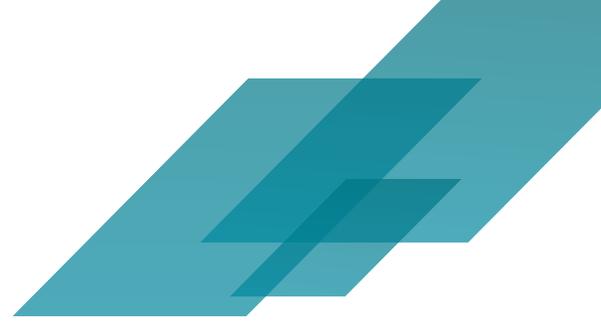
What are these capabilities?

First, there must be more than **sufficient wireless performance, coverage, and uptime** to support an explosion of data movement to and from sensors and devices, and end users. For example, many IT leaders are discovering that their old wireless infrastructure based on traditional WiFi can't cope with widespread Internet of Medical Things sensor deployment. Leaders are focusing on not just technical requirements but looking at wireless quality of service from the perspective of user experience:

- Is there enough wireless coverage to keep my patients happy? Does heavy patient and visitor wireless utilization cause slowdowns for other applications?
- Do my clinical staff run into gaps in coverage? Do my nurses, as they walk down a hallway, lose connections?
- Are there rooms/buildings/cities where wireless coverage gaps interfere with gathering sensor data?
- Is my wireless coverage future-proofed? Do we have sufficient bandwidth and spectrum to support emerging requirements?

Many healthcare organizations are exploring the possibilities of shifting from WiFi to private 5G connectivity, which offers superior coverage, bandwidth, throughput, and reliability.

Second, both within facilities, across facilities, and to data centers and the cloud, healthcare systems **MUST** provide **powerful wired networking**, as one tiny locus of poor performance or resilience can impede or destroy new digital experiences. Perhaps your last mile wired connectivity to a rural hospital isn't resilient enough to support a SaaS-based EHR platform. Perhaps a connection to your cloud has frequent but unpredictable spikes in latency, causing augmented reality staff training to time out. Perhaps you can't get data from every rehabilitation facility to a cloud-based analytics service promptly.



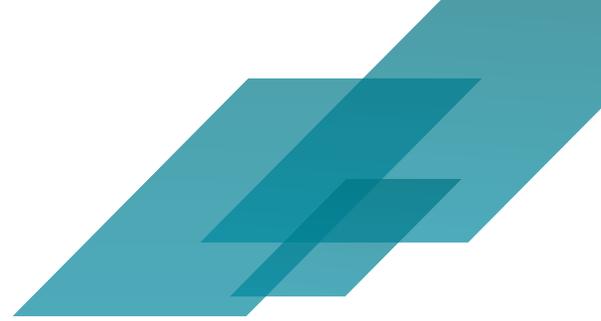
1. You need more than sufficient bandwidth.
2. For latency-sensitive applications, you need ways to deliver experiences locally and regionally without slowdowns or timeouts due to latency issues.
3. You need failover paths and redundancy, preferably automated.
4. You need to ensure a consistent quality of service across the network, regardless of the kinds of physical connectivity you have.

Healthcare organizations are searching for network providers who offer up-to-date last-mile fiber connectivity and superior metro-level links, as those capabilities make it easier to architect a performant, resilient network.

Third, your network platform has to **provide end-to-end insight and decision-making for a better quality of service**. It's not good enough to simply notice an application slowdown at a hospital. It's essential to be able to dig down and recognize that the issue is an interaction between a fiber cut and a slowdown with cloud connectivity, giving you the power to determine the best way forward as quickly as possible so that the network can be fixed, regardless of WHERE on the network the problem emerges.

You need some way to monitor, manage, and manipulate any aspect of your network with comprehensive visibility and control from endpoints to cloud.

Fourth, it's important to **incorporate automation**. Your network needs to be self-healing and self-optimizing, but ideally, it also needs to provide insights for improvement automatically. If twice a month network performance from your hospital in Cleveland slows down, based on end-to-end network performance data cross-correlation, your network platform should automatically identify the problem and attempt to fix it. If it can't be fixed automatically, a network function should automatically issue a trouble ticket so that your NetOps teams, or your vendor, can fix the problem.



That capability has to span your entire network to ensure a consistent quality of service while reducing the load on your teams.

Fifth, **efficiency matters**. Distributed healthcare facilities often rely on networking connections offered by local providers, resulting in a lack of consistency in capabilities and service quality. These inconsistencies often drive up costs and complexities. Ideally, a healthcare organization should have a single network provider that can offer the right connections at the right places for your requirements. They also need depth and breadth of capabilities to help address challenges. Being able to add on additional tools, like wavelengths or SD-WAN, to help you overcome issues is an essential part of delivering optimal experiences.

And finally, everything has to be **safe and secure**. Ideally, your network must provide a set of protections to defend your patients, your facilities, your corporate offices, your EHR providers, your cloud platforms, and any other device or user on the network from attack. PHI protections require this, but as you add more digital services, the risks of compromising PHI increase every time you move data across the network. Robust security integrations help you ensure that patient data won't be compromised.

These technology considerations are fundamental to successfully implementing digital services.

The reality is that some network vendors can measure up to these requirements, and others can't. As you assess your networks to determine whether they can support your plans for innovative digital services, you should grade them on their wireless networking, wired connectivity, insight, automation, efficiency, and security capabilities. You should also consider:



1. *Do your vendors have a track record of innovation?*

If your network vendors stand still, you can't innovate either, and there's no way you can have a future-ready network. The right network providers should have virtually unlimited future bandwidth opportunities, aggressive geographic growth, and always-enhanced intelligent architectures that give you more insight, command, and control over time. For example, do they offer managed SD-WAN services that let you outsource monitoring and management of network connectivity across all locations because some of your locations don't have IT staff?

2. *Do they intelligently augment and extend what you do through customer-defined solutions?*

One-size-fits-all never fits, and your requirements are certainly unique. Having a network provider who offers the same capabilities to everyone and isn't able to work with you on distinct requirements ends up impeding your ability to succeed, practically and financially. Do they have consultants with healthcare expertise?

3. *Do they give you the ability to adapt to change?*

As healthcare provider after provider discovered during COVID, having the right capabilities gives organizations the ability to shift and pivot rapidly when new pressures emerge. Remember when the pandemic began and some providers were caught flat-footed by the need to deliver remote telecare services? Having the right provider with the right underlying infrastructure capabilities gives your organization a better foundation for coping with change, delivering new leading-edge services, and offering new ways to provide value.

It's simply impossible to improve patient care and operational efficiency without the right network that empowers better data collection, data movement, and data-driven insights for decision-making. If your network is impeding your ability to roll out digital services, it's reducing or delaying value and interfering with your ability to compete. A better network unlocks new possibilities, and a limited network stands in the way.



Understanding the Zayo Difference

If this scenario and other possibilities for innovative digital services are on your radar, Zayo, as a leading network provider with deep experience in healthcare, is in a position to help you move forward.

Our scope and span of fiber networks offer a wealth of capabilities, options, and opportunities for any healthcare organization looking to deliver distinctive digital solutions to improve patient experiences, outcomes, and operational efficiency.

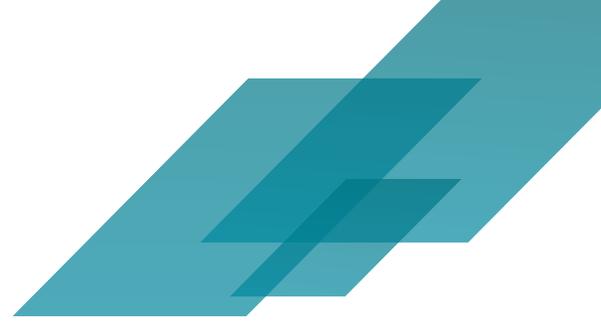
Zayo's global, low-latency, high-speed, secure fiber infrastructure provides best-in-class Internet, MPLS, and Cloud connectivity. Our network can be complemented by our ecosystem of fixed and wireless partners, or you can bring your network.

Organizations that choose Zayo discover:



1. A future-ready network where you need it.

Our expansive, deep, and diverse networks in North America and Europe include extensive metro connectivity, lit & dark fiber solutions, and expanding 400G & 800G-enabled routes that empower you to reliably leverage new technologies that demand low-latency, high-bandwidth, scalability, and control.



2. Edge connectivity and capabilities.

Instead of transferring endless amounts of data to a single cloud, Zayo gives healthcare organizations access to enhanced connectivity at the metro-level, allowing data aggregation and decision-making to be done locally and regionally. This capability offers ways to reduce latency and cloud transfer costs if needed.



3. An optimal mix of connectivity, from clinics to the cloud.

Zayo helps ensure that facility-level connectivity, through various connections, is resilient and offers the right performance. Metro-level, regional level, national and international level connectivity is robust and reliable. Connections to the cloud, through cloud on-ramps, offer the highest performance and the lowest latency.



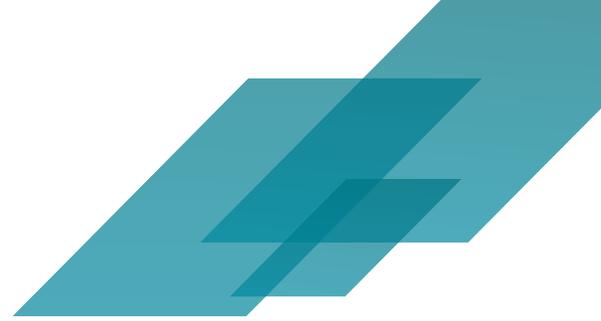
4. SD-WAN

Unlike other network providers, Zayo offers autonomous SD-WAN that spans every network element, from in-hospital 5G to cloud connectivity. Any NetOps team has a comprehensive view and automated alerting that identifies problems and speeds up resolution. Zayo can identify and resolve problems at remote locations through managed services, resulting in accelerated time to resolution for sites that lack on-premise IT expertise.



5. Private Wireless

Our 4G and 5G solutions give healthcare organizations a new way to solve coverage, connectivity, performance, and resilience problems. For the first time, IT teams have a powerful set of tools to ensure that digital services are well-supported, don't cause problems, and can provide superior customer experiences.



6. Connectivity solutions tailored to your needs.

Our solutions are designed to meet you where you want to be met. From last-mile or long-haul to the software-defined layer, we connect you from edge to edge, edge to cloud, cloud to edge, and everywhere in between with dark fiber, private data networks, wavelengths, Ethernet, dedicated internet access, and data center connectivity solutions.

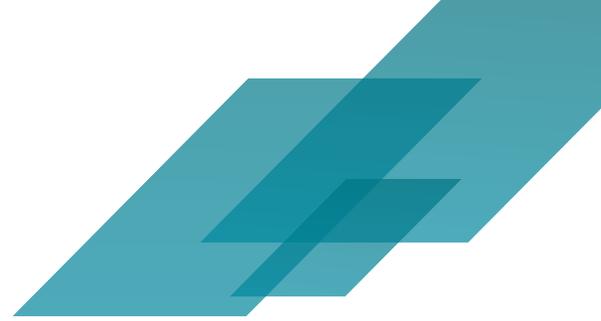


7. Trusted experts committed to your success.

Our team puts trust at the core of every relationship, combining an approach built on collaboration, agility, and creativity with decades of experience serving wireless and wireline carriers, media, tech, content, finance, healthcare, and other large enterprises.

At Zayo, we understand that businesses need more and that true WAN transformation goes from the LAN to the Cloud. We also know that implementing new networking technologies can be difficult and time-consuming, which is why we use automation and AI to deploy complex solutions at scale, and then holistically manage those solutions end-to-end.

Wrap all those services with our security capabilities (encryption, private networks, SASE) and software stack that visualizes the network every step of the way, and you have new protections for PHI that help you meet demanding compliance requirements for new digital services.



Transformative Benefits

But what are the benefits?

Benefits for Patients and Clinical Staff

- Faster application responsiveness for patients or healthcare professionals. Users don't have to worry about dropped connections or slowdowns. Our network provides a superior quality of service.

Benefits for IT Staff

- Network performance removes troubleshooting burdens and the need to re-architect networks regularly. Network automation removes manual intervention and delays in problem resolution. A higher quality of service lets IT teams architect and deploy game-changing services without the impediments of a limited, restrictive network.

Benefits for Business Strategy

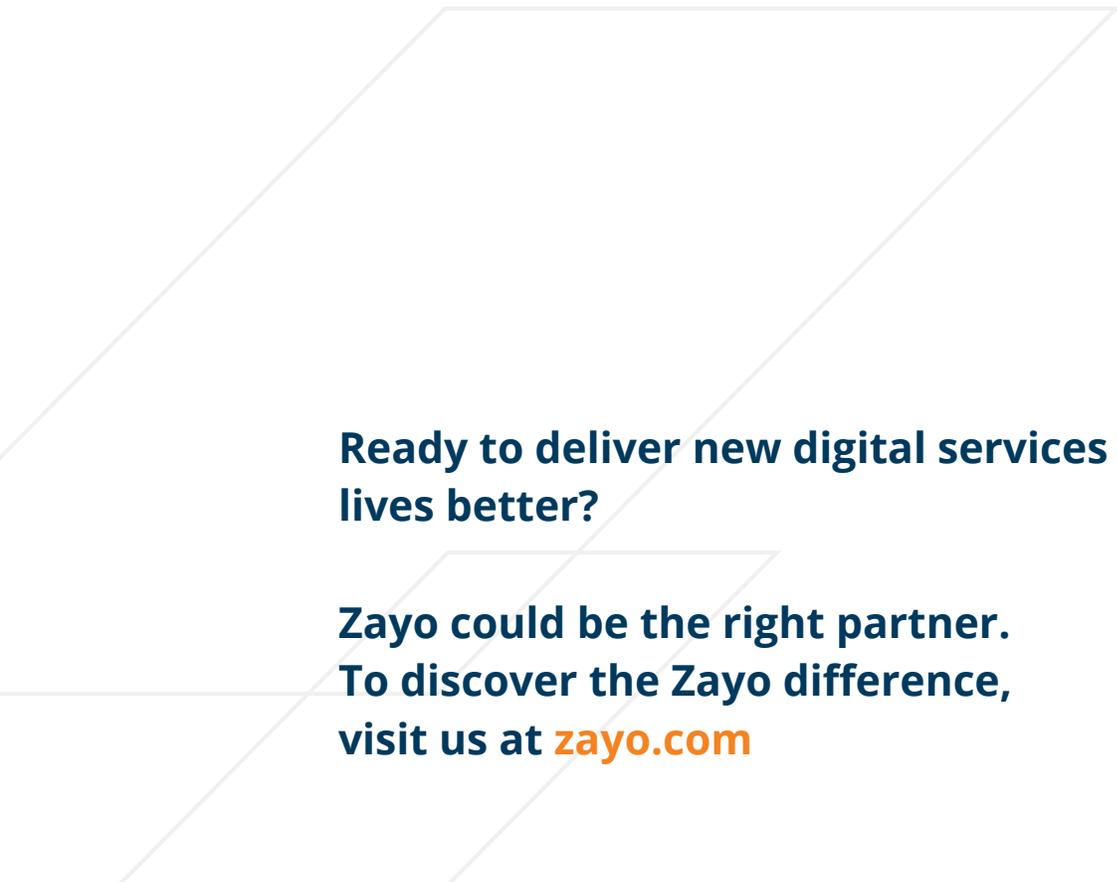
- The network supports new digital services that improve patient care and operational efficiency. Across the organization, leaders have new, valuable insights based on new ways to gather data. They can make more nuanced decisions about patient care and investment, which informs their strategy and execution.



In Conclusion

To wrap up, our customers know that we deliver a superior network experience for healthcare. We help some of the largest healthcare systems rethink their networks, solve intractable problems, support distinctive capabilities, and move forward faster, whether it's a new telemonitoring system, better training for clinical staff, or more powerful analytics powered by faster data transfers.

Regardless of your size, if you're aiming to deliver game-changing digital services and your network is holding you back, consider Zayo. With advanced end-to-end networking, comprehensive command and control, intelligent insights, automated enhancement, and powerful overlay services, we provide healthcare organizations with global reach, visibility, and security that spans every network element.



Ready to deliver new digital services that make lives better?

**Zayo could be the right partner.
To discover the Zayo difference,
visit us at zayo.com**

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