

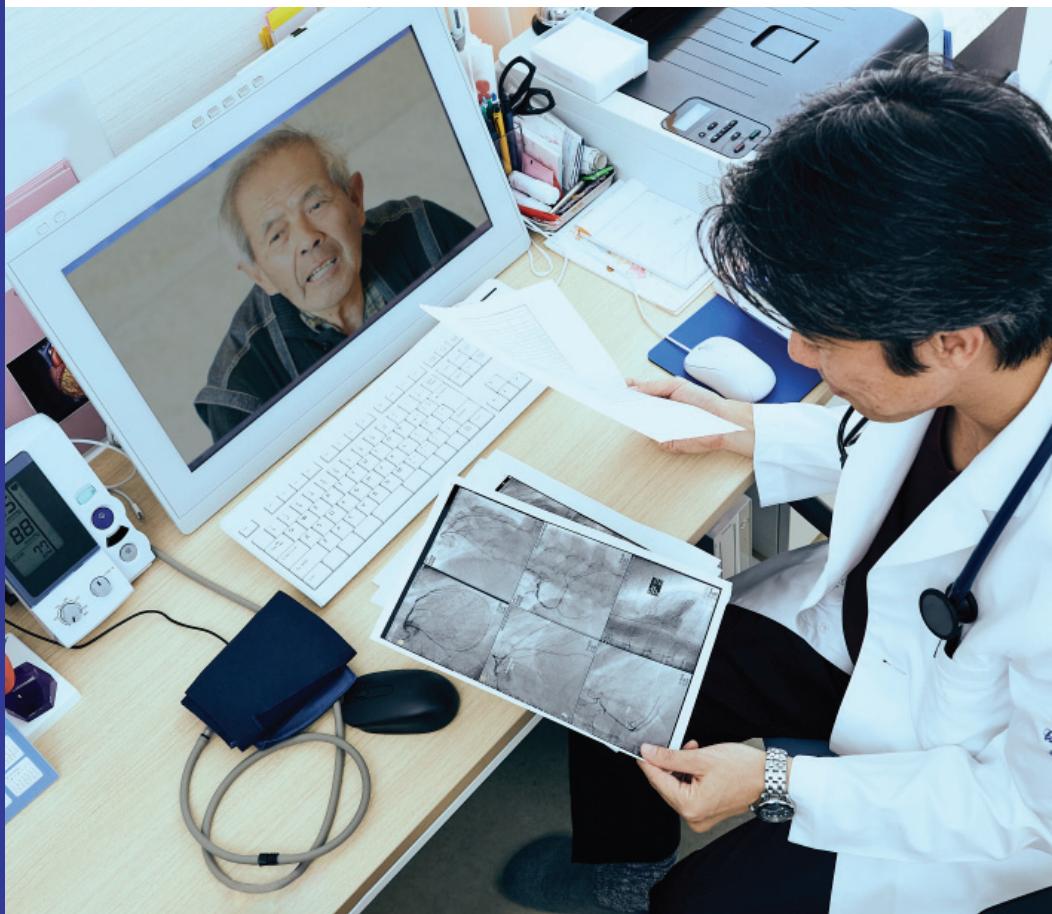


# ***Addressing Evolving Healthcare Needs in The New Normal: A Case for Digital Infrastructure***

In collaboration with:



# ***COVID-19 and its impact on digital health***



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Healthcare systems around the world face burgeoning demands with COVID-19 only compounding the issue. From facing influxes of patients to pausing elective procedures for months, this pandemic has sent healthcare systems into a tailspin to change nearly everything about how it operates and designs patient experiences; the catalyst for growth in the area of digital health acceleration.

In the Asia-Pacific region, many healthcare and life sciences organizations have leveraged technology through strategic partnerships to enhance the efficiency of their services delivering greater value for patients. Here's a look at some digital practices these countries have introduced:



Australia

- Forensic science provider NSW Pathology partnered with PixCell Medical (a medical diagnostic product developer) in December 2020 to deploy the latter's HemoScreen: a hematology analyzer for rapid, lab-accurate Complete Blood Count testing. HemoScreen enables true point-of-care testing in terms of operation, electronic result delivery through an internet of things (IoT) approach, ease of use, and transportability, while still providing core lab quality results.<sup>1</sup>



China

- Hainan UMP Internet Hospital (a telemedicine center) worked with Hong Kong-based, oncology-specific teleconsultation platform Aurora Tele-Oncology in August 2020 to bring cross-border oncology telemedicine services to cancer patients in Mainland China. Supported by a panel of Hong Kong oncology experts, the service offers cancer patients in China viable alternatives for treatment and follow-ups, especially if they are not comfortable visiting hospitals during a pandemic or have accessibility and mobility challenges.<sup>2</sup>



Hong Kong

- Gleneagles Hospital collaborated with telecommunications company HKT and insurer AIA Hong Kong to launch a telemedicine service in December 2020. Through HKT's telemedicine platform DrGo, users can book appointments and receive video consultations from Gleneagles doctors and medical staff, with prescribed medications deliverable within four hours of the appointment.<sup>3</sup>



Japan

- Chugai (a pharmaceutical company), together with digital therapeutics provider Biofourmis developed a digital solution in July 2020 for the objective assessment of pain associated with endometriosis. The solution includes a wearable, clinical-grade biosensor to capture physiological biomarkers and a patient-facing mobile app to monitor symptoms, supported by a gamification engine for patient engagement. The Artificial Intelligence (AI)-based technology provides continuous quantification of pain by applying analytics to physiological biomarkers.<sup>4</sup>



Singapore

- The National Cancer Centre Singapore, Singapore General Hospital and Duke-NUS Medical School partnered with Biobot Surgical (a medical robotics solutions provider) to develop the SwabBot™ in September 2020. The SwabBot™ is a robot that allows individuals to self-administer the COVID-19 swabbing process to address the challenges of manual swabbing. It reduces the risk of COVID-19 exposure for swabbers and the demand for a trained healthcare workforce. It also standardizes the consistency of the swabs taken while providing greater throughput of the swab tests.<sup>5</sup>

Despite the encouraging strides made in digital health, the right enablers may not have been put in place to maintain the current trajectory of mass digital acceleration. The pandemic is a watershed event, spurring organizations universally to review its existing infrastructure and capabilities to improve future preparedness. Instead of applying stopgap measures, organizations will have to identify their digital health priorities and adopt the appropriate strategies to address them.

<sup>1</sup> "NSW Pathology to deploy PixCell's HemoScreen devices for point-of-care testing," Healthcare IT News Australia, 2020.

<sup>2</sup> "Aurora Tele-Oncology partners with UMP Healthcare to launch oncology telemedicine services in Mainland China," Healthcare IT News, 2020.

<sup>3</sup> "AIA launches telemedicine platform with HKT, Gleneagles Hospital as fourth wave of Covid-19 grips Hong Kong," South China Morning Post, 2020.

<sup>4</sup> "Chugai and Biofourmis to develop digital pain assessment tool for patients with endometriosis," MobiHealthNews, 2020.

<sup>5</sup> "Clinicians in Singapore develop robot for faster COVID-19 nasal swabbing," Healthcare IT News, 2020.

# Digital health priorities in Asia-Pacific

According to the latest IBM X-Force report, cyberattacks on the healthcare industry doubled in 2020, with most of the attacks targeted at COVID-19 response efforts.<sup>6</sup> The pandemic has reshaped the definition of critical infrastructure, exposed systems and network vulnerabilities, which gave attackers the opportunity to act with malicious intent.

In the 2021 HIMSS Digital Health Trendbarometer report, 87% of all surveyed healthcare organizations in Asia-Pacific ranked IT security and data privacy as their top digital health priority in the next 12 months<sup>7</sup> (see Figure A).

## Which activities are a priority for your organization?

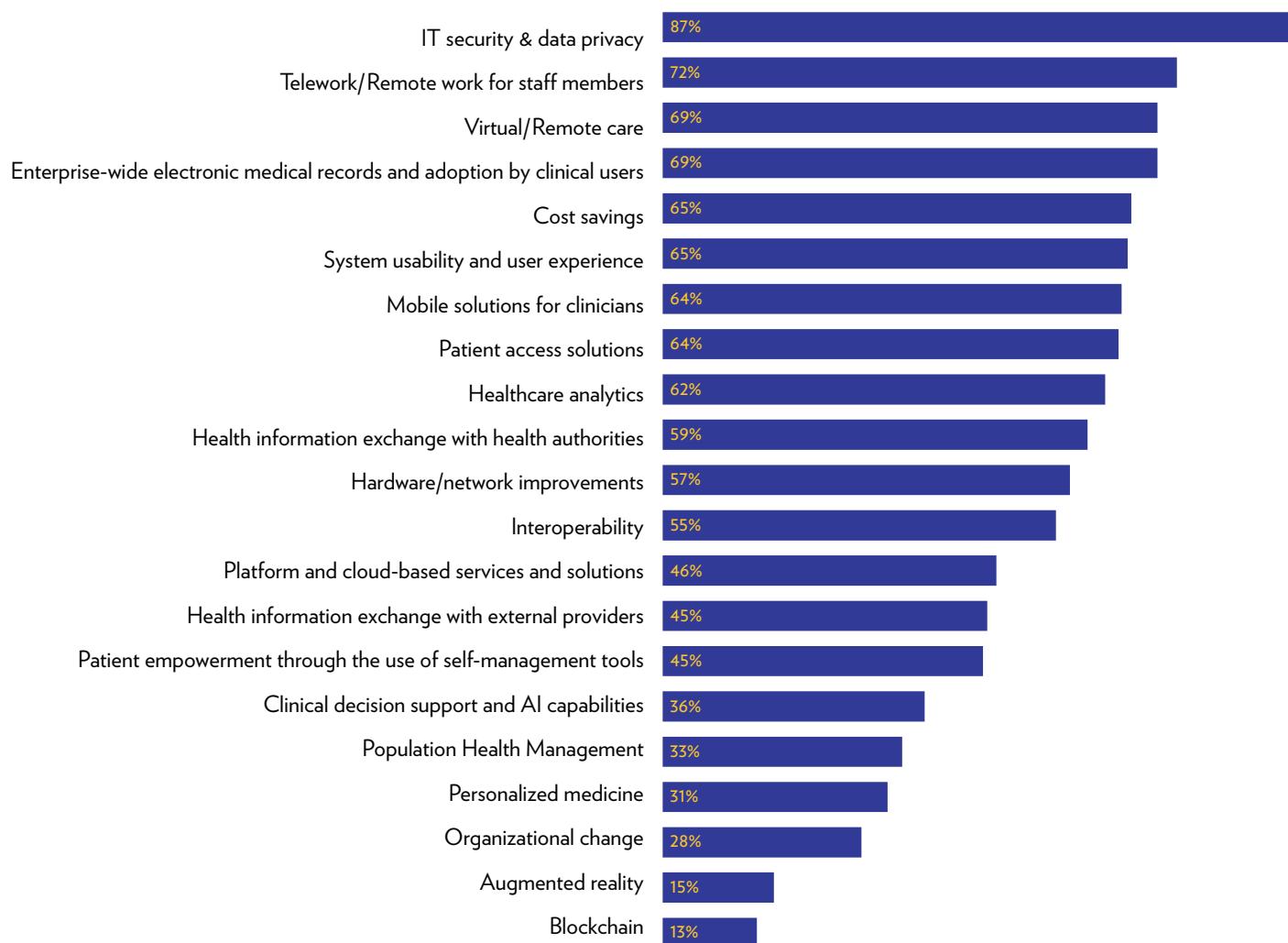


Figure A: Priorities listed in order of importance identified by survey respondents in the 2021 HIMSS Asia-Pacific Digital Health Trendbarometer report.

<sup>6</sup> 2021 X-Force Threat Intelligence Index, IBM, 2021.

<sup>7</sup> Asia-Pacific Digital Health Trendbarometer Report, HIMSS, 2021.

65% of organizations prioritized system usability and user experience. To achieve this, organizations need to identify the gaps and accelerate digital transformation.

The past year has pushed virtual care to the forefront with 69% of organizations prioritizing it. Virtual and remote patient monitoring can alleviate the pressure on healthcare resources. Wearables and health applications can be personalized to track health and wellness, consequently enhancing user experience.

This places increased urgency on the health information exchange (HIE) as interoperability across health systems and communities must enable safe and secure data flow from multiple and varied sources. Digital health is expected to grow from strength to strength, with 45% of healthcare organizations focusing on enhancing their HIE with external partners and 59% with health authorities.

To address these salient priorities, healthcare and life sciences organizations need to re-architect their legacy systems to remain agile and keep pace with innovative digital technologies. The strategy to build a robust digital infrastructure foundation is no longer an option but a prerequisite to adopt advanced technology and enhance IT and data security for the modern world.



# **Strategy: Building a robust digital infrastructure**

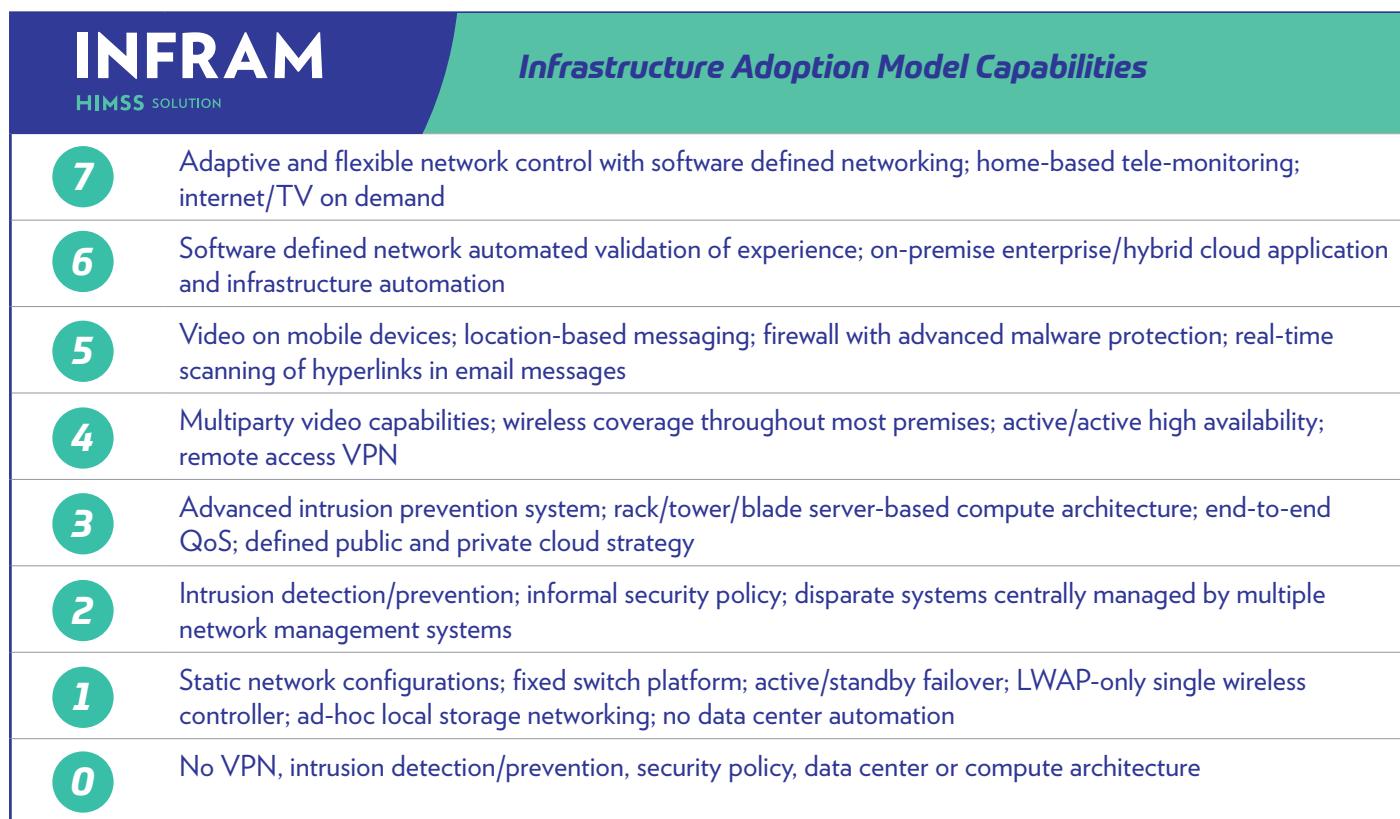


## **Identifying the gap in infrastructure**

Before embarking on a digital transformation journey, healthcare and life sciences organizations should first assess the gaps in their existing infrastructure. HIMSS recommends the Infrastructure Adoption Model (INFRAM) to aid healthcare and life sciences organization in identifying benchmarks for setting up their digital infrastructure and ensuring their systems are stable and manageable.

The eight-stage INFRAM model (see Figure B) helps decision-makers identify infrastructure gaps, develop a strategic roadmap and gain insights on the right areas for investment to meet international benchmarks and standards.

To achieve INFRAM Stage 7, a key strategy is to adopt a hybrid multicloud architecture through the interconnection of private and public cloud environments. Based on the *HIMSS Technology Outlook Survey: The Outlook for Cloud*<sup>8</sup>, healthcare and life sciences organizations are already deploying a significant share of their workload to cloud technology, with an estimated 39% hosted in the cloud today and a further 50% expected to move to the cloud within twelve months. In addition, 79% of survey respondents stated that moving to cloud is a strategic priority for their organization in 2020<sup>9</sup> — emphatic support of how cloud technology is the foundation for the entire modernization endeavour.



**Figure B: The eight stages of INFRAM advancement as organizations increase their information technology capabilities.**

<sup>8</sup> HIMSS Technology Outlook Survey: The Outlook for Cloud. June 2019.

<sup>9</sup> Out of the 204 respondents, 69% work for hospitals and acute-care facilities and 60% work for organizations with greater than 500 beds and/or 1,000-plus employees; 42% are clinicians/staff, 41%, middle management, and 17% senior management.



## Modernizing and securing critical infrastructure

Despite innovations in the industry, many have yet to upgrade their IT architecture, which supports critical information processing and medical devices. This poses a cybersecurity risk, as these systems lack regular maintenance, software updates and patches. In addition, legacy systems are unable to interoperate between data types or integrate with new applications, limiting the potential to grow, scale and innovate.

Whilst managing legacy systems, organizations need to ensure that the growing digital data generated by patients, devices, medical staff, insurers, suppliers and medical regulators are stored securely to adhere to strict regulatory mandates. These myriad operations and complex ecosystem of partners will require organizations to re-architect their infrastructure.

A hybrid multicloud architecture (see Figure C) provides computing elasticity through the public cloud, whilst maintaining secured data storage and the confidentiality of sensitive information through the private cloud. This empowers organizations to scale and address unpredictable workloads and innovate quickly, while maintaining data governance, security and privacy.

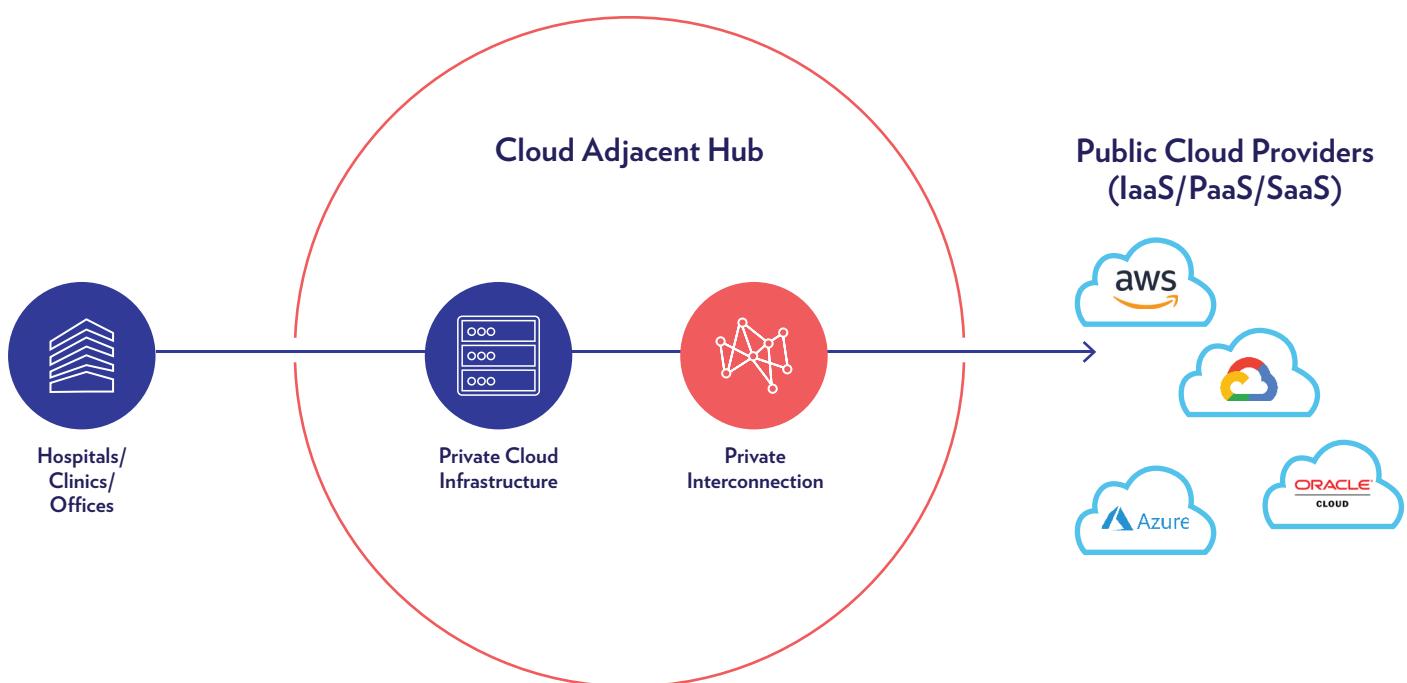


Figure C: An ideal hybrid multicloud architecture.

As organizations start adopting multiple cloud services, deploying a cloud adjacent hub is a necessary consideration for cost optimization and improved performance. Organizations need a secure interconnection with cloud providers to guard against security threats and achieve low-latency connections when processing data and integrating multicloud services.



## *Enhancing the user experience*

Data is increasing at an explosive rate, but the volume of data used for further advancements is marginal at best. Tapping into the potential of data is a process contingent on the quality of data exchanges, digital workflows and analytical advantages. However, many organizations lack the resources to secure and process data across multiple regions. Integrating a distributed infrastructure model can make interconnectivity, regulatory compliance, analytics and edge computing a possibility. This leaves room for technical advancements to accelerate growth and innovation.

Although the industry has not traditionally been associated with the latest technological advancements, healthcare and life sciences organizations stand to benefit from the cross-disciplinary functionalities of emerging technologies. The emergence of IoT, AI and edge computing has tremendous potential to transform digital healthcare services for better user experiences. Incorporating these advancements allows remote patient care and monitoring to be more immediate and helpful. Internet of medical things (IoMT)-based devices can enable medical professionals to monitor patient health remotely and communicate with them through video conferencing. Furthermore, intelligent wearable technology can capture real-time data directly to the patient record management system and alert medical professionals of any potential health problems. Such solutions would require the infrastructure to be deployed in an ecosystem-dense location to eliminate any latency issues during data transmission.

With a hybrid multicloud architecture, organizations can extend their digital infrastructure capabilities closer to edge locations where users, offices and devices are located.





## Patient data and healthcare records

Healthcare and life sciences organizations face challenges in storing data securely whilst providing information exchange within the medical fraternity. Electronic medical records (EMRs) are essential to capture records of patient activities like medical and treatment history, and patient charts under a single clinical practice. Many hospitals are investing heavily in EMRs to have data readily available at the point of care.

As diseases continue to be complex and a shift towards digital healthcare services is witnessed, complete medical history is needed to cater to the growing digital healthcare demands. Such factors have resulted in Electronic Health Records (EHRs) being adopted in recent years to provide a comprehensive healthcare information of the patient beyond the standard records. EHRs are built to have an extensive medical history of the patient that can be shared with other clinicians, specialists and personnel involved in patient care across healthcare organizations.

Data from EMRs and EHRs coupled with data generated from IoMT devices cause challenges for secured storage and interoperability. For a successful digital health infrastructure, end users must find it easy to navigate and access information conveniently. Edge solutions and cloud infrastructure can ensure reliable high-speed access to patient information to optimize workflow for critical treatment-based decisions at reduced time and costs.



## Patient experience

Improving the self-service capabilities of a digital health offering is crucial for better patient experience. For example, smart devices can guide users through an unfamiliar facility and are essential during a pandemic. Additionally, edge-based data centers can address the demand for content delivery with minimal latency.

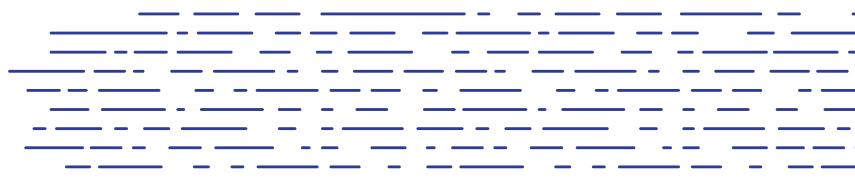
During emergencies, paramedics can provide vital data to doctors for immediate treatment upon arrival at a medical facility. The low-latency data processing ability enables accurate diagnosis and treatment. For example, paramedics can live stream the patient's heart rate and blood pressure in real-time to reduce diagnosis and treatment delays.

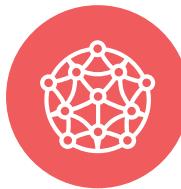


## Patient monitoring

Remote patient monitoring is a crucial addition to the development of digital health. Data from monitoring devices can be compiled for further analysis using analytical technologies and incorporating AI for faster information extraction. Edge-based solutions allow clinicians to receive notifications at fixed time intervals or when unusual patient activity arises. This creates resource efficiency and lowers the cost per patient, resulting in affordable healthcare.

Countries with a significantly distributed population (e.g., Australia) can improve the medical infrastructure, where patients with chronic diseases find it difficult to physically access a medical facility. Remote patient monitoring can also improve care for elderly patients who have a higher risk of suffering critical ailments or neurodegenerative disorders. The wearables can provide real-time visibility of the patients and monitor patients' physical activity patterns and behavior. Such data is highly sensitive, and processing it at the edge can ensure security in data transmission without placing strains on bandwidth.



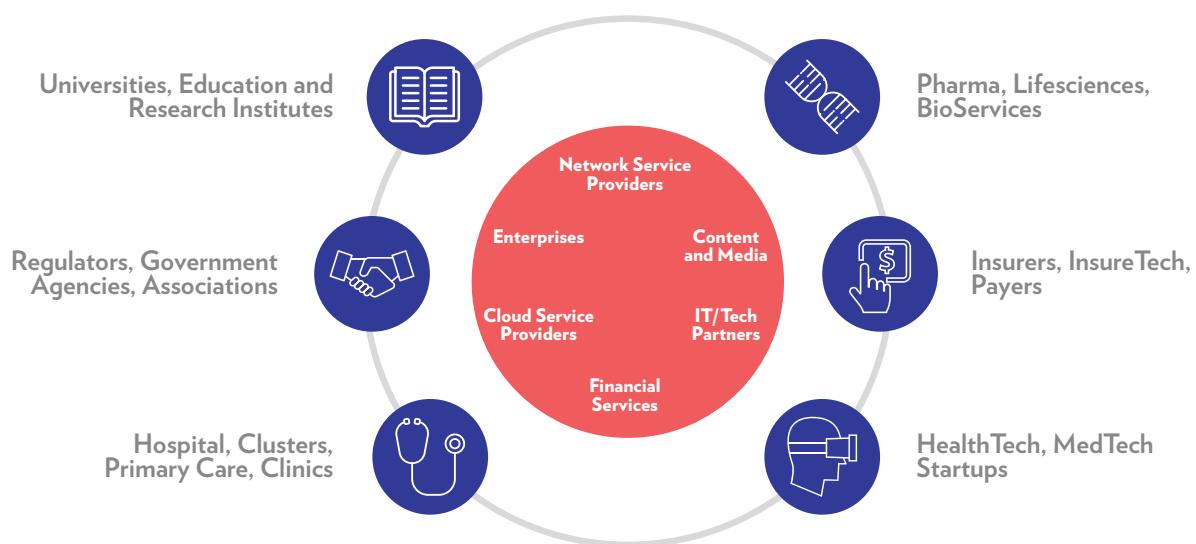


## Leveraging a rich ecosystem of partners

Technical adoption is becoming the backbone of the healthcare and life sciences industry. It has introduced a customer-centric approach by establishing a network to bridge the gap between key players in the ecosystem, namely clinicians, payers, patients, regulators and other healthcare players. The goal of a healthcare ecosystem is to enable healthcare data exchange, access to innovative services, on-demand interaction with clinicians and a personalized treatment path, all while ensuring seamless connectivity. From the organization's perspective, the goal is to provide improved healthcare and a conduit to uninterrupted communications with significant contributors like healthcare suppliers and regulators.

Interconnecting within the ecosystem enables platforms such as EMRs to function more efficiently. Healthcare organizations depend largely on EMRs for accessing patient data, and many of today's interoperable systems allow clinicians to see data that exists in external repositories. However, these separate external repositories depend largely on expensive MPLS connections for information exchange.

By deploying digital infrastructure in an ecosystem-dense location (see Figure D), organizations can establish private low-latency connections with business partners, service providers, and other ecosystem partners. This would equip healthcare organizations to build new digital services and collaborate to improve care delivery models for better patient outcomes. With interconnection, platforms can function more efficiently, with the benefits extending beyond clinical settings. Administrative functions like billing, insurance, and human resource can leverage Software as a Service (SaaS) applications to digitize their processes.



**Figure D: Visual representation of a dense healthcare and life sciences ecosystem.**

Healthcare and life sciences organizations can rely on an interconnected ecosystem for secure and private data exchanges, and low-latency connections with their business partners, service providers and other ecosystem participants. This would equip them with the ability to collaborate, build new innovative digital services, and deliver better user experiences and outcomes.

# **Moving forward in the new normal**



The new normal will be a future of persistent variables requiring healthcare and life sciences organizations to innovate quickly and keep up with the ever-evolving landscape. It is undeniable that the future of healthcare hinges on digital transformation. Forward-thinking digital leaders need to know how to navigate through these changes and build a robust digital infrastructure.

To achieve the full benefits, healthcare and life sciences organizations will first need to identify their digital gaps and build a strategic roadmap that addresses their business needs. Organizations should look to deploy a hybrid multicloud at the edge of an ecosystem-dense location to remain agile and scalable and achieve digital health priorities. By harnessing the capabilities of ecosystem partners through interconnection, organizations can ensure business continuity and enhanced user experience.

Equinix and Telstra are key partners which can help healthcare and life sciences organizations build the right foundational infrastructure (see Figure E) by:



Transforming your **Digital Core** with a hybrid multicloud architecture to improve security, reliability and cost optimization.



Extending across **Digital Edge** to increase reach, improve user experience, and build value closer to patients, employees and partners.



Enhancing capabilities through **Digital Exchange** to foster participation in digital ecosystems delivering innovation and collaboration.

# Digital transformation initiatives

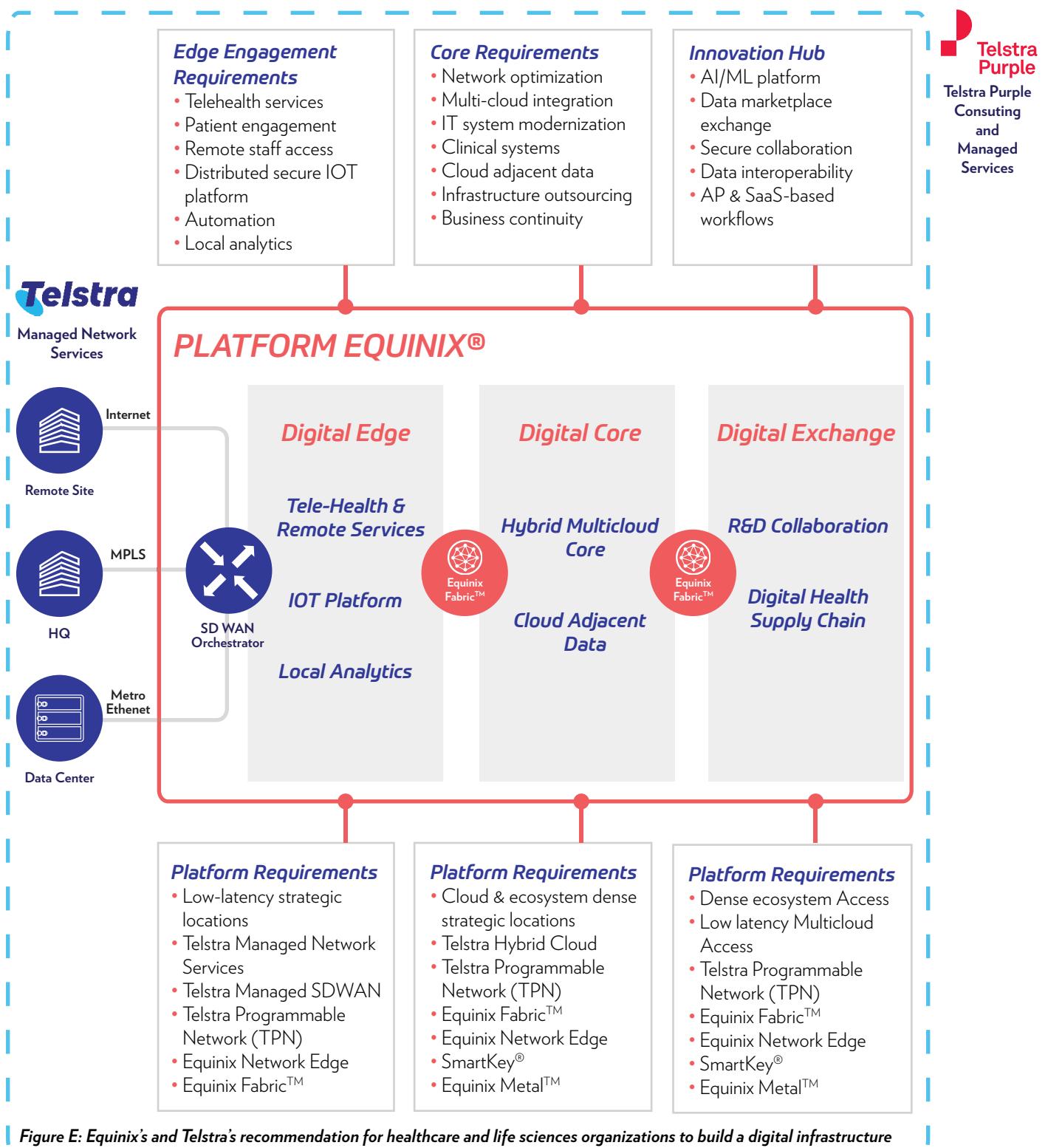


Figure E: Equinix's and Telstra's recommendation for healthcare and life sciences organizations to build a digital infrastructure

Equinix and Telstra bring powerful cloud ecosystems, network connectivity solutions and multi-cloud interconnection services to wherever in the world you need them. Visit [Equinix](#) and [Telstra](#) to find out more.

# **Telstra & Equinix - Enabling differentiated patient experience and digital health innovation**

The need for digitally-agile healthcare is more pressing today than ever before. From biotechnology and pharmaceutical innovation to diagnostic devices and teleconsultations, new technologies are creating an interconnected digital ecosystem to tackle our society's healthcare needs.



## ***Identifying the gap in infrastructure***

**Telstra Purple's** professional and consulting services deliver brilliantly connected future for digital healthcare. From network solutions to digital infrastructure transformation to digital experience design, Telstra Purple and Equinix can transform your business with leading-edge experience, expertise and technology to thrive now and into the future.

## ***Enhancing the user experience***

Telstra's SD-WAN and network core capabilities combined, creates a digital healthcare platform with the flexibility and control to innovate and provide differentiated services to patients. Telstra Calling for Microsoft Teams simplifies the telehealth and remote consultations with a single number, and both patients and healthcare teams enjoy clearer voice calling delivered over one of the leading networks in Asia Pacific.

Telstra has a suite of security solutions and services—from basic essential controls to locally managed security monitoring—that gives organizations the expertise, intelligence, and tools to secure businesses in a rapidly shifting digital landscape.

Telstra and Equinix enable healthcare organizations to navigate digital challenges and meet the needs of patients, medical teams and providers alike, while ensuring the security and confidentiality of patient data and strict data compliance and regulatory needs.

Telstra's decades of experience in providing global connectivity and enhancing IT capabilities through cloud, security, collaboration tools and Equinix's global platform with rich ecosystem of healthcare, cloud and technology partners enable healthcare and life sciences organizations to build and deploy compliant infrastructure where they need it, connect with the ecosystem of partners to build differentiated services and seize opportunity with agility, speed and confidence .

## ***Modernizing and securing critical infrastructure***

Transform your critical infrastructure into a patient intelligent core by establishing hybrid IT infrastructure that provides benefits of low-latency cloud access, distributed location for business continuity, and regional distribution. This can be achieved through Telstra and Equinix's colocation services and Telstra's Hybrid Cloud Services collectively with the power of Telstra Programmable Networks.

## ***Leveraging a rich ecosystem of partners***

Telstra and Equinix's colocation services and Telstra Global Connectivity enables organizations to master collaboration at scale with digital healthcare exchange across dense ecosystem of healthcare providers, payers, life sciences organizations and their suppliers in key global healthcare hubs around the world.

## About HIMSS

HIMSS is a global advisor and thought leader supporting the transformation of the health ecosystem through information and technology. As a mission-driven non-profit, HIMSS offers a unique depth and breadth of expertise in health innovation, public policy, workforce development, research and analytics to advise global leaders, stakeholders and influencers on best practices in health information and technology.

[www.himss.org](http://www.himss.org)



## About Equinix

Equinix is the world's digital infrastructure company™. Digital leaders harness our trusted platform to bring together and interconnect the foundational infrastructure that powers their success. We enable our customers to access all the right places, partners, and possibilities they need to accelerate advantage. With Equinix, they can scale with agility, speed up the launch of digital services, deliver world-class experiences and multiply their value.

[www.equinix.sg](http://www.equinix.sg)



## About Telstra

Telstra is a leading telecommunications and technology company with a proudly Australian heritage and a longstanding, growing international business.

Today, we operate in over 20 countries outside of Australia, providing services to thousands of business, government, carrier and OTT customers. Telstra Enterprise is a division of Telstra that provides data and IP networks and network application services, such as managed networks, unified communications, cloud, industry solutions and integrated services. Telstra Purple, our new professional and managed services business in Australia, Asia and the UK, brings together people and innovative solutions to define and deliver a clear vision of our customers' transformation journey, network foundation, and the protection they need to thrive.

Telstra's global network includes more than 26 cable systems spanning over 400,000 kilometres, with access to multiple cable landing stations and more than 2,000 points of presence around the world. Our subsea cable network is the largest in Asia Pacific, with access to the most lit capacity not just in Asia, but also from the region to Australia, USA and Europe.

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