

# The future of hospitals

## Caring for data and saving lives

How data, legacy technologies and budgetary pressures are impacting the future viability of hospital performance

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Hospitals need to scale their storage as they need it, instantaneously, inexpensively and without disruption. We have to move on from the limitations of vendor-specific hardware lock-in and free hospital data to enable improved, more accurate services at reduced costs.

# Introduction:

## Accidents waiting to happen?

**B**y 2050, it is estimated there will be over two billion people over the age of 60, according to the [World Health Organization \(WHA\)](#). For hospitals, regional health authorities and governments, this represents an unprecedented logistical and funding challenge. Finding and allocating resources to cope with increasing healthcare demands will test even the most innovative of managers.

There are also socio economic and political issues to consider. What will be the impact of Brexit for example? How will it affect supplies, reciprocal funding arrangements and staffing? Will increased migration impact demands on local hospitals? According to [The World Migration Report 2018](#), there will be 405 million international migrants by 2050. Coupled with the [ageing population](#), what does this mean in terms of overall healthcare provision?

Fundamentally it means change. No hospital can continue on current spending and service provision and expect to survive the immediate future. That's a fact the industry has been aware for some time. In 2013, a [Lancet article](#) identified the need for change, saying, "what is emerging is a new paradigm: better value through population and personalised medicine." While we have yet to really experience personalisation to any great extent, the will to make it happen is certainly there and increasingly the technical means to make it work. ➡

The proliferation of internet of things devices and sensors is already helping to connect previously isolated machines and departments. A report by Allied Market Research predicts that the [IoT healthcare market will reach \\$136.8 billion](#) worldwide by 2021. There is a wave of connected devices coming, targeting everything from health alerts to chronic disease management. Deloitte [claims](#) that by 2022, Europe will spend approximately \$44 billion on connected, digital devices for healthcare. As Bernard Marr [suggests](#) in his Forbes column, “IoMT (internet of medical things) isn’t intended to replace healthcare providers but to provide them with the data gathered from devices for better diagnoses and treatment plans as well as to reduce inefficiencies and waste in the healthcare system.”

“While the data being derived from sensors and devices is multiplying exponentially, hospitals are being hamstrung by legacy technologies that are not designed to cope”

It’s an intelligence revolution but there are still stumbling blocks. As Kelly Patrick from IHS Markit [says](#), technology is improving patient monitoring accuracy and enabling patient mobility, but has yet to provide cost benefits and reduce complexity. While the data being derived from sensors and devices is multiplying exponentially, hospitals are being hamstrung by legacy technologies that are not designed to cope. The volumes and breadth of data being generated are demanding a more holistic approach to infrastructure and data care.

What this means for hospitals is that in the rush to adopt the latest technologies in the hope of finding efficiencies, they run the risk of exposing themselves to the dangers of on-site complexity. Legacy datacentres mix with multiple cloud providers creating data bottlenecks and rising costs. While this is not what hospitals set-out to achieve, this is often the result.

While talk of artificial intelligence and smart city integration may be premature, technology can help hospitals solve some pressing issues today, while preparing the ground for increased automation. 

## Next: The challenges

As part of digital transformations, hospitals have to take this into account. Do it once and do it right rather than rip and replace many times. It's easier said than done but if hospitals are to really meet the challenges of the next 30 years, they have to lay the foundations now, to build scalable, affordable infrastructures that can utilise data fully to enable the next generation of healthcare services.

In this paper we will look at the present and immediate future, the challenges hospitals face and the potential solutions to help hospitals not just cope with today but also plan for tomorrow. ■



One of the biggest problems hospitals face is data bottlenecks, which leads to slow application performance and response times. Any hospital that wants to take advantage of AI and automation has to get its data infrastructure right, otherwise analytics will be a waste of time.

# The challenges

**H**ospitals are complicated. They are like hotels, university research departments, engineering companies and logistics businesses all rolled into one. They employ thousands of people and are one of the principle buyers of goods and services in most EU nations.

In recent years, technology has been fundamental to their operations but this has been both a blessing and a curse. Technology has helped to streamline processes, improve record keeping and financial management but technology goes out of date quickly. Attempts to upgrade systems over the years have been hit and miss, either patchwork processes of deployment or large-scale rip and replace projects. Expensive errors have occurred. For example, in the UK, estimated losses for an [abandoned NHS IT project](#) in 2013 were around £10bn.

Cost pressures and the merging of application and data silos remain a constant challenge.

## Legacy headaches

Understandably, hospitals want the latest capabilities to improve service provision but at the same time find operational efficiencies. It has led to considerable investment in technology over the years but maintaining that investment has proved difficult. ➡

Upgrade paths can be costly but also practically challenging. Unsurprisingly, most hospitals have skipped technology leaps. Today that has translated into a mixed bag of legacy systems tasked with managing modern day data requirements.

As well as being costly to support, legacy technologies compromise speed and efficiency and increasingly a cybersecurity risk, as [HealthTech Insider reported](#) last year. It means that hospitals are not well positioned to take advantage of the latest advancements in automation, from machine learning through to hybrid cloud efficiencies.

## Data tsunami and personalisation

Hospitals generate huge amounts of data. According to [PwC](#), data is generated from physician notes, medical records, medical images, pharmaceutical R&D, conversations about health in social media, and information from wearables and other monitoring devices. Used efficiently this data can drive incredible value but how?

Complexity in managing a multitude of varied data sources could undermine attempts to find efficiencies through digital transformation. While hospitals may understand the need to transform, actually transforming efficiently and enabling future-proofing data flow and analytic capabilities is difficult and potentially damaging.

Data flow is fundamental to meeting the demands for patient-centric care. Joining the data dots across silos is key to enabling personalisation, especially with an increased, older and independent population. According to [EU statistics on income and living conditions](#), some 14.1 percent of households in the EU-28 in 2016 were composed of a single person aged 65 years and over.

The challenge for hospitals is how to manage this tsunami of data in such a way as to make personalisation possible, while driving down costs and improving overall service provision? 

“While hospitals may understand the need to transform, actually transforming efficiently and enabling future-proofing data flow and analytic capabilities is difficult and potentially damaging.”

## Continuity

Data continuity is going to be critical to hospital life. Ensuring digital systems and connected devices are up and running 24x7 will become even more crucial as more devices and people are connected via IoT networks.

Whether it's technical glitches, such as the ones that hit [two hospitals in the Netherlands in 2017](#), or cyber-attacks, such as the [attack on German hospitals in 2016](#), what is clear is that hospitals need continuity strategies.

As well as prevention, methods and tools for curing a problem, recovering data and minimising downtime have to be considered. Multiple clouds providers, on premise datacentres, complex networks and a multitude of data sources can all add complexity to continuity strategies.

## Embracing the future

How can hospitals future-proof systems? As we have already suggested, the rapid advancement of technology puts hospitals at the mercy of change. Keeping pace with new devices and connectivity standards, as well as the latest data analytics tools will be difficult, especially on tight budgets.

How can hospitals build infrastructures and data management processes that can take advantage of the expected growth in connected medical devices and the future potential of advanced analytics such as Artificial Intelligence (AI)? Future-proofing essential infrastructure, such as data storage, is a difficult challenge, one where most organisations can come unstuck. ■

**Next:**  
Hospital  
technology  
challenge  
checklist



### Hospital technology challenge checklist:

- Are you running a lot of old hardware from different vendors?
- Is your data trapped in departmental silos?
- Are you having to wait too long for applications and tools to work?
- Is the cost of transformation inhibitive?
- Are you being forced into vendor-specific upgrades?
- Could your systems cope with the continuity challenge of disruption and cyber-attack?
- Do you have a plan to build for today and tomorrow to enable personalisation and advanced analytics?

**Next:**  
From volume  
to value

# From volume to value

## — how data can build the future hospital

**D**igital transformation can either empower or undermine. Hospitals need to reduce complexity and costs and improve communication without impacting care. How can hospitals improve infrastructures to cope with increasing data volumes? How can hospitals deliver efficient services avoiding the complexity traps of modern data infrastructures? How can they build modern dynamic systems to take advantage of data intelligence and provide a platform for tomorrow's more advanced, automated analytics?

Hospitals have to think outside of the box, literally. To overcome the technology and infrastructure challenges, hospitals have to think differently, approach problems from different angles and build scalable, robust infrastructures not tied to specific, time-limited hardware. Here we have outlined some key considerations for meeting the many challenges today's hospitals face.

### **Consolidate and manage healthcare IT data from disparate systems**

Accessing a variety of data sources from different systems and data silos, such as radiographs, medical records, patient appointments, staffing and so on, demands interoperability and centralisation. ➡

“If hospitals and staff are to use data to its full potential, they need access to a broad range of data that can be overlaid and analysed.”

Hospitals need a single point of control of all storage devices, for example, to ensure infrastructure-wide control, regardless of hardware vendor. This should ensure consistent data flow from all departments and devices, enabling hospital-wide analytics and intelligence. There should also be a plan for scalability of data, managing data performance and cost savings through software and not hardware defined storage systems.

## Support internal and external data sources

A [Deloitte survey](#) in the US last year claimed that physicians were not getting access to complete data sets, undermining their ability to fulfil efficiency targets. According to the research, they had access to performance and productivity data but not cost data. If hospitals and staff are to use data to its full potential, they need access to a broad range of data that can be overlaid and analysed. Support for worldwide knowledge databases for rare diseases and faster diagnostics (for leveraging anonymised data, for example) will add considerable weight to overall analytics and decision making. [The Integrating the Healthcare Enterprise \(IHE\)](#) body has guidelines on how to support simpler communication between all healthcare organisations.

## Hospitals need to ensure system continuity

A multi-layered approach to storage and data protection will enable the continuity, availability and recovery of all hospital systems. This includes mirroring, replication for disaster recovery and the ability to accurately fall back to a point in time when the system was working efficiently.

In case of system error, disruption or cyber-attack, hospitals need to ensure they can continue to operate without disruption, or at the very least minimal disruption to healthcare services. . This is about system speed, accuracy and the ability to manage multi-layered protection easily, regardless of hardware and locations. 

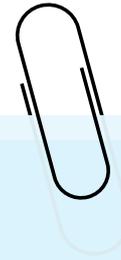
## Build for today and tomorrow

The rapid advancement of new technologies as well as Moore's Law have done it for hardware. It's almost impossible to keep up with the development of CPUs and new technology inventions, which means that datacentres are out of date as soon as they are built. Today it is increasingly important for any organisation to think beyond hardware, to be hardware agnostic, while phasing out legacy systems. In data terms, this means it is essential to focus on the provision and management of data regardless of the underlying hardware and ensure a smooth migration.

Hospitals need simplicity in scalability and integration, not to be pushed down expensive, rip and replace avenues that demand long term commitment to one brand, hardware type or proprietary solution. Data needs to flow quickly and efficiently, ensuring ultra-fast application response times and real-time data availability for life-critical healthcare applications.

Building a quick, open, robust and scalable platform today will ensure hospitals can take advantage of the latest automation and analytics tools as they become available. ■

**Next:**  
Getting to the  
core of  
hospital data



## Getting to the core of hospital data

1. Data migration can be a pain. Hospitals need painless migration to ensure no disruption and no unforeseen costs. Storage performance is fundamental to modern, data-centric hospital infrastructures, so opening up data silos and guaranteeing easy migration is key.
2. DataCore's software-defined storage platform offers hospitals the ability to ultimately eliminate disruptions and achieve zero downtime, with zero RPO and zero RTO. The platform is scalable. Hospitals buy it once and use it forever, regardless of hardware changes.
3. DataCore simplifies the adoption of new technology and eliminates the manual work required while ensuring all SLAs during the migration process. The platform enables hospitals to tackle bottlenecks and improvement response times, resulting in significant performance improvements for existing systems, and maximising throughput for newer ones.

**Next:**  
Conclusion

# Conclusion

The future is here — data will drive transformation

Providing a variety of data sources to hospital staff should enable better decision-making and identify areas of potential waste and improvement. Unless hospitals have a complete picture of resources delivered via data, regardless of location, department or source, decisions will be based on assumptions rather than accurate intelligence. So, how do hospitals improve internal data management and processing without disruption and massive cost?

Hospitals have to consider software defined storage (SDS), a system that enables the more efficient management of data and storage regardless of the underlying hardware.

Its independent nature means that it can more easily facilitate SLAs, governance, security and data protection across an organisation. It enables the centralised management of datacentres, increased automation and analytics. It improves data and performance visibility and future proofing against hardware upgrades and vendor lock-in.

For hospitals, given the on-going budgetary challenges and limited internal resources, SDS can help re-define data and enable the next generation of medical services, without forcing the organisation down expensive cul-de-sacs. ➡

“The storage and management of data throughput is fundamental to the modern and future hospital.”

New technologies for hospitals are coming thick and fast. Blockchain solutions for patient records and drug management, robotic process automation (RPA) to improve automated communication across systems and machines, and AI to improve speed and accuracy of diagnosis and patient treatments; all are promising to transform hospitals and provide tools for more efficiency in management and care.

However, we have seen transformations before, leaps in technology that have dazzled and amazed but have not always fulfilled the overall promise.

There are some fundamental differences today in infrastructure technologies. Hyperconverged infrastructures and virtualisation are enabling organisations to realise greater efficiencies in IT management. Sensors are enabling organisational visibility, even of previously ‘dumb’ machines, across IoT networks, generating valuable data. The key for hospitals is what glues this all together.

The storage and management of data throughput is fundamental to the modern and future hospital. Without fast, reliable data provision, investments in sensors and analytics tools are meaningless. While understanding the costs, performance issues and potential complexities of data is key to making informed decisions and enabling hospital efficiencies, understanding the role storage can play in helping or hindering progress is essential.

In fact, you could go as far as to say, the future of caring for data and saving lives is in removing the reliance on hardware. If every time hospitals need to leap forward in technology they have to be put through an upgrade and migration mill, it will be like taking one step back to take two steps forward. Hospitals need greater simplicity, intelligence and automation in data management and above all independence of traditional upgrade paths, not just for their sakes but for all our sakes. ■

**Next:**  
Find out more



Over 1,000 hospitals and health systems rely on DataCore software-defined storage to simplify management, reduce costs, and provide high-performance storage systems with zero downtime.

To find out more about Healthcare Data Storage Solutions view our [website](#) or [download our solution brief](#). Alternatively you can [request a live demo](#) or fully-functional free trial.



### About DataCore Software

DataCore is the authority on real-time data. We pioneered software-defined storage and are bringing that technology to optimise workload response time and resource utilisation. We empower IT organisations to achieve always available, highperformance, and highly efficient data. DataCore's value has been proved in over 10,000 deployments across traditional, hyperconverged, cloud, and hybrid environments. [www.datacore.com](http://www.datacore.com)



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