Digital transformation
for the healthcare industry

Microsoft

Healthcare is undergoing a digital renaissance. Propelled by patient demands, increased competition, high operational costs, and compliance imperatives, healthcare organizations are rapidly adopting new technologies to transform the "sick care" model of care delivery into "well care." The huge explosion of healthcare data is a boon to digital leaders, who are using analytics and predictive models to plan treatment for individual patients and entire populations. Meanwhile, virtual technologies and the consumerization of healthcare have made it possible for providers to push beyond the four walls of doctors' offices and hospitals to monitor and care for patients as they go about their daily lives.

Consumers expect the same experience from healthcare providers that they get from other B2C companies. They demand transparency around practitioners, treatments, and fees; seek to collaborate with caregivers on personalized care; and want self-service tools and wearables that support wellness and disease management and enable them to access and manage their own data.

The healthcare customer experience is riddled with pain points, from initial scheduling and treatment planning and navigation to reimbursement and skyrocketing costs. By streamlining processes, adopting the best digital tools, and empowering patients, healthcare providers and payers can enhance patient care and outcomes, while reducing costs.

Increasing business value with the Internet of Things

With the pervasive adoption of electronic health records (EHRs), formerly paper-bound patient data has become more available to caregivers. Healthcare organizations can integrate confidential patient data with other sources such as fitness and health monitoring devices, sensors, and implants to create rich, constantly evolving profiles; use predictive models to create personalized treatment plans; and employ business intelligence (BI) tools to analyze and visualize population needs. Given that self-reported data is inherently unreliable—because patients forget, omit, or falsify key information—medical device data will bring greater accuracy to patient diagnoses, medical caregiving, and ongoing monitoring.

Connected devices and applications will fuel an explosion in medical data. By 2020, medical data will double every 73 days; each person will create more than 1 million gigabytes of personal health data;[1] and 646 million IoT devices will be used by providers, payers, and consumers.[2]

With predictive analytics, real-time monitoring and treatment, and genome sequencing, the era of precision medicine is within reach. In the United States, digital healthcare will deliver $305 billion in savings in the near future, with $200 billion of that due to better management of chronic diseases.[3]

Increasing IT stability and security
Mobile Doctors 24-7 is a physician and wellness call center based in Dubai that is staffed by Western-trained specialists. The company was struggling with IT issues, diverting key resources to IT and telecommunications needs to maintain stable systems. Mobile Doctors 24-7 wanted to deploy a cloud platform, but was concerned about security and reliability.

Mobile Doctors 24-7 positioned its IT services on Azure, by launching SaaS, OSaaS, and IaaS, because of the platform's scalability, security, user-friendly interfaces, and speed in setting up a server with either Linux or Windows. As a result, Mobile Doctors 24-7 has been able to achieve 99.9 percent availability of all its services, including Office 365. Data and services are protected with SSL-TSL 128-bit encryption, and the services are compliant with ISO 127001 and HIPAA. Automatic updates keep the services up-to-date, while the easy scalability of Azure means the platform will grow with the business. Of equal importance, the company has cut its operational costs by 50 percent.

"Seventy percent of non-life-threatening conditions can be diagnosed by speaking to a doctor over the phone. With Office 365, we can now focus exclusively on meeting patient needs."

– Raouf Khali, Founder and CEO, Mobile Doctors 24-7

Optimize clinical and operational effectiveness

Patients with chronic illnesses represent 86 percent of US healthcare costs.[4] Identifying conditions before they become intractable is key. Healthcare providers and payers can perform analytics on healthcare data to identify trends and patterns and propagate best practices for individual patients and populations. They can also use automated tools and systems hosted on the trusted cloud to streamline operations and reduce costs.

Microsoft Dynamics CRM Online and the Azure cloud platform bring disparate data sources together, while Cortana Intelligence Suite helps translate raw data into actionable intelligence. Machine learning helps organizations get smarter when dealing with vast amounts of data, essential in the era of IoT.

With proactive, personalized healthcare, healthcare systems can improve treatment effectiveness and drive overall throughput. They also can do more effective population planning. Identifying healthcare trends, such as medical conditions in aging patients or growth or outbreaks of diseases, allows healthcare providers to plan to meet these groups' needs. Identifying high-risk behaviors, disease indicators, or noncompliance with treatment regimens for individual patients can allow caregivers to intervene before conditions become chronic or fatal.

Connecting everything— medications, devices, and equipment—also enables hospitals to maximize their investments: tracking and securing devices should they be lost or stolen, protecting drugs from diversion or theft and ensuring they are administered properly; gaining an accurate, real-time picture of patient health and equipment performance; and performing preventive maintenance to gain full usage of costly equipment.

Ensuring edge-to-edge security: Healthcare organizations are held to a high standard. They must protect patient health information (PHI) and other data, services, and facilities against physical and cyber attacks, at a time when connections, users, and devices are proliferating. An unintended consequence of digital transformation is the increase in cybercrime and new, more complex security challenges. Cybersecurity is a board-level conversation and top-of-mind for all business leaders. In every aspect of their operations, CXOs must embrace "secure by design" as a business priority. IoT solutions built on the Microsoft platform boast industry-leading, edge-to-edge security and cloud-based threat detection.

Device manufacturers can build smart devices on Windows 10, the most trusted platform ever, with tools to ensure device and data integrity and protection, authenticate users, and provide lockdown capabilities in the event of threats.

Healthcare organizations benefit by using devices that are secure by design; connected to trusted cloud services; and enhanced by robust identity and access management services, automatic updates, and other services such as remote monitoring and predictive analytics. Healthcare IT decision makers know that every platform they deploy should have its own unique security provisions and meet key legal and compliance requirements and international standards, as Microsoft does with all of its services.

Healthcare data is treated differently in various countries around the world. In the United States, providers and payers must comply with HIPAA and HITECH regulations as they use and manage PHI. Other countries have similar regulations. The industry is struggling with competing imperatives to protect patient confidentiality and open up large healthcare data sets for medical research, self-care, and population planning.

More than 25,000 US health organizations use the Microsoft Cloud, knowing that Microsoft meets the industry's high standards for health data security, privacy, and compliance. Healthcare organizations trust Microsoft and its partners to offer industry-compliant cloud and managed services that meet regulations in all relevant jurisdictions.

Managing patient healthcare in real time
Dartmouth-Hitchcock, a New Hampshire–based healthcare system, sought to change the way people interact with the healthcare system by building a highly coordinated, intensely personalized solution that encompasses physical, mental, and emotional health.

The organization implemented ImagineCare, a cloud-based system that empowers nurses and coaches to track and respond to an individual's health status in real time.

Patients receive personalized treatment plans that improve their health and quality of life. Dartmouth-Hitchcock's ability to see a 360-degree view of patient health has made its health management practices more effective. As a result, the organization has saved millions of dollars in readmission costs and unnecessary ER and doctor visits.

"The system is really transforming how we can deliver health and wellness to the population. Despite all of the technology involved, ImagineCare does not lose that human touch, which is so important."

– Nathan Larson, Director of Remote Medical Sensing, Dartmouth-Hitchcock Medical

Transform the care continuum: Patients arrive at hospitals when they are at their sickest, making hospitalization the most expensive way to treat patients. Connected devices and remote care management solutions based on cloud platforms can help caregivers monitor patient vital signs for potential warning signs, track medication compliance, and alert care teams to the need for immediate or follow-up treatment. They also increase patient compliance in following treatment plans, reducing the need for costly hospital readmissions. This last mile of patient treatment can be the most important for patients, providers, and payers alike.

wit-gele kruis

Empowering home-visit nurses
Wit-Gele Kruis, a home nursing and support organization based in Belgium, sought to empower its nurses to securely share increasing amounts of patient information with other medical and support stakeholders on an open, flexible platform.

Wit-Gele Kruis deployed Windows tablets connected to Active Directory, which empowered nurses to capture service notes and collaborate with their peers on developing personalized health plans.

As a result, Wit-Gele Kruis has provided staff with instant access to information on more than 300,000 patients. The 2,500 connected devices have increased nurse mobility and effectiveness and reduced service costs.

"We can easily communicate with other interested parties, such as doctors and home-care help. We can use the built-in camera to take photos of injuries and forward them straight to a doctor or upload them to the patient's file."

– Marie-Jeanne Vandormael, Quality Manager, Inspection Service, Wit-Gele Kruis, Limberg

Accelerating healthcare transformation
with Microsoft and the Internet of Things

IMPROVE THE PATIENT EXPERIENCE:
Provide staff with mobile devices and access to patient and contextual data, so that they can provide a personalized, face-to-face care experience. Make patient data accessible from a unified point, so that all caregivers have the same holistic view of the patient's journey and can optimize each care interaction from wherever their work takes them.

ENABLE integration of a range of touch points, including online self-service platforms, medical and fitness wearables, and CRM, EHR, and back-end systems to create a consistent patient experience.

PROTECT high-value equipment and pharmaceuticals from shrinkage, theft, or loss with RFID tags and readers.

ENGAGE PATIENTS:
Provide patients with wearables, such as smart heart rate monitors or glucose monitors, so they can monitor their conditions. Connected devices alert users and staff if a medical event occurs.

SUPPORT workforces with productivity tools, collaboration platforms, and mobile apps that enable faster decision making and seamless operations.

OPTIMIZE CLINICAL AND OPERATIONAL EFFECTIVENESS:
Connect on-site staff with remote specialists via video to increase diagnosis effectiveness. Use data to enhance patient outcomes and identify health trends and risks, while also analyzing internal processes to streamline operations and reduce costs.

TRANSFORM THE CARE CONTINUUM:
Integrate data from various sources to drive analytics, enabling continuous improvement of healthcare processes and surfacing new opportunities for product and service innovation.

IMPROVE the speed and quality of population and individual treatment planning with user-friendly tools, integrated data, advanced analytics, cloud services, and machine learning.

ENABLE a unified care experience for better outcomes with seamless connectivity and integration across internal and third-party platforms, while protecting patient data and privacy.

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Engage patients: Digitally savvy consumers are accustomed to researching goods and services online, using online reviews, personalized recommendations, and transparent pricing to make their decisions. They want the same experience from healthcare providers and insurers that they get from retail and entertainment companies.
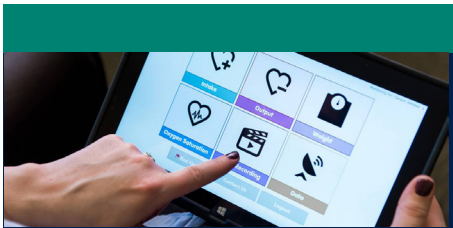
Consumers expect to collaborate with their caregivers rather than passively receiving treatment plans. They demand to understand the pros and cons of different approaches and their costs, including prescription drug fees. They want tools that provide rich data and services and help them monitor their progress, from wearables to self-service portals. They also seek easier access to caregivers for virtual diagnoses, ongoing consultation, or remote monitoring.

Globally, there is a push to standardize and consolidate healthcare data access. Patients themselves may lobby for centralized data repositories, so that they can gain greater control over their healthcare data, to make it easier to change doctors; return informed care across networks when traveling; manage services and costs; and integrate clinician, self-reported, and IoT data.

Healthcare organizations need to streamline business processes and develop a single, 360-degree view of their customers. That will mean integrating disparate EHR systems and facilitating secure information exchange across healthcare partners, not just departments. Creating a single data repository on cloud platforms, such as Microsoft Azure, can help healthcare providers and payers achieve these goals. They also can eliminate common pain points around scheduling, staffing, and record keeping, with easy-to-access and integrated, cloud-based tools.

Consumers also want to take charge of their health. Healthcare providers can provide patients with self-service portals, digital apps, and wearables to monitor their health data and illnesses. New York Presbyterian Hospital provides patients with a myNYP portal to share medical information, learn about their care team, call a nurse, or send a message with the tap of a tile.

These digital tools can also help increase compliance with medical regimens, from increasing exercise to ensuring accurate dosage and timing of medication. Since daily behaviors contribute to conditions that cause 40 percent of early deaths,[5] involving patients in their care and giving them real-time input on their conditions and behaviors could lead to hundreds of billions in annual savings globally. It also can prevent costly hospital readmissions, which may lead to financial penalties. Device manufacturers can build clinical-grade devices on the Windows IoT platform that provide both staff and users with new visibility into patient and population health.

Empowering patients to improve living skills
The Mississippi Department of Mental Health (DMH) wanted to enhance the lives of state residents who have mental illness and intellectual and developmental disabilities. The agency sought to accomplish this goal by creating a system of services and support to improve this at-risk population's daily living skills and build independence.

The DMH deployed CARETILES, a mobile cloud-based application from CoCENTRIX, which takes advantage of the Microsoft Azure cloud platform to communicate care plans to patients on any mobile device. The app, which is built on the Microsoft Dynamics CRM platform, provides a graphic interface that enables users to communicate complex concepts more easily. For example, patients can use the app to interact with classroom teachers or order in restaurants.

"The ultimate payoff is that we can now more easily make a difference in the lives of individuals with developmental disabilities who may not have anyone else who understands them."

– James Dunaway, CIO, Mississippi Department of Mental Health

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Engage your patients to improve experiences and outcomes

Dr. Girish Shirali, a pediatric cardiologist at Children's Mercy hospital in Kansas City, developed Cardiac High Acuity Monitoring Program (CHAMP), an application that brings doctors home, virtually, with babies born with heart disease.

In the two years that hypoplastic left heart syndrome (HLHS) patients at Children's Mercy have experienced their treatment supported by CHAMP, not a single child has been lost. It's not only saving lives, but reducing the stress of concerned parents and reducing costs. Today, CHAMP is scaling beyond the walls of Children's Mercy, dramatically reducing mortality in other pediatric facilities across the country.

Parents enter data into hospital-issued **TABLET**

↓

Parents select areas for **CONCERN**

↓

Device **SENDS DATA** to 24x7 home monitoring team

↓

Monitoring team contacts parents about **REMINDERS** or **ALERTS**

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Intense market, regulatory, and consumer pressures force continual industry change

Healthcare providers and payers are facing enormous challenges as they serve consumers in a highly regulated and intensely competitive marketplace. Here are some of the issues healthcare systems face.

Industry uncertainty
In the United States, healthcare providers and payers have made significant investments to implement Affordable Care Act provisions, as well as sustained multibillion-dollar losses. In 2017, the industry should gain clarity about the presidential administration's path forward, but for now participants are playing a waiting game.

Empowered consumers
Constantly connected consumers want to participate more in healthcare choice making, control costs, and monitor their own conditions with digital tools. They also expect a seamless experience across all channels.

Thinning margins
Globally, the industry is moving toward value-based pricing, although its future in the United States is uncertain. Price-conscious consumers are pushing healthcare providers to become more transparent about services and how they are billed to enable easier comparison shopping, while governments want providers to tie fees to outcomes.

Chronic diseases
Healthcare providers face a double-edged sword. Earlier diagnoses, drug advances, and innovative treatments are keeping sicker patients alive longer in both developed and emerging markets. The result? Higher costs for payers and consumers, especially at the end of life. Chronic diseases account for 6 of 10 deaths globally each year.[6]

Runaway drug prices
Pharmaceutical companies are hiking prices for drugs for chronic diseases and common illnesses alike, forcing difficult decisions for providers, payers, and consumers. If subsidies aren't available, patients may choose to do without, increasing the risk of high-cost ER visits or hospitalizations.

Emerging technologies
Providers and payers are adopting digital tools and moving business processes and data to cloud platforms. Many are choosing hybrid cloud platforms to protect PHI while gaining the flexibility, scalability, and cost advantages of the public cloud for less sensitive business operations.

Big data sets
The ability to open up large medical data sets for research and planning holds much promise, yet there are important questions around patient privacy and regulatory compliance yet to be resolved.

Empower care teams

Healthcare organizations are focused on driving patient outcomes. Facilitating collaborative care across teams, locations, and partners is key. Healthcare organizations can provide teams with mobile tools, such as Microsoft Surface tablets, to capture patient data face-to-face and receive a steady stream of updates. Streamlined processes enable caregivers to spend more time with patients, rather than gathering information.

Care teams can use video conferencing on Skype for Business to confer with each other and diagnose patients, increasing their productivity and ensuring quality of care for all, including high-risk patients, while reducing patient emergencies.

In healthcare, time is money. Healthcare organizations need to equip staff with streamlined workflow, including easy, seamless access to patient data and imagery. They can provide staff with online portals, powered by Microsoft Azure, that provide all the information and resources they need to make care decisions from wherever their work takes them. Meanwhile, productivity solutions such as Office 365 and Microsoft Dynamics CRM Online speed daily work processes and enhance patient relationships.

Using remote monitoring to enhance patient care
Kaiser Permanente, one of the nation's largest not-for-profit health plans, is constantly exploring ways to enhance patient care and convenience. The organization also strives to increase clinician effectiveness by enabling secure, remote access to patient data. The organization worked with Cognizant to implement a remote patient monitoring system based on Microsoft Azure IoT. The solution securely connects to smartphones and devices like glucose meters in patient homes and integrates the data with a program prescribed by a Kaiser Permanente clinician.

With near-real-time, remote monitoring of vital signs and automated alerts, Kaiser Permanente has enhanced care and safety for its patients. Healthcare staff, including nurses, dieticians, and other workers, benefit with better insights into patient data and streamlined workflow. The organization also expects to reduce outpatient visits for routine checks and reporting of vital signs.

"There's far less expense in having the patient record their vitals remotely from home, instead of coming to the clinic. And because it's easier for the patients, they're more willing to participate."

– Mehul Shah, Associate Director of Product Engineering, Cognizant Technology Solutions

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Why Microsoft

Microsoft has a strong track record of helping healthcare organizations realize the business value of digital transformation. That's because our holistic platform and advanced technologies, open and flexible approach, enterprise-grade solutions, and partner ecosystem build on companies' existing technology investments and deliver results quickly and cost-effectively. Working with Microsoft brings a distinct set of business advantages that no other provider offers. Across the different healthcare sectors, Microsoft solutions help organizations achieve the insight, innovation, and efficiencies that promote competitive advantage and ensure quality, cost-effective care.

A trusted, flexible, and open-cloud platform
Today, the Microsoft cloud infrastructure supports more than 1 billion customers in more than 140 countries. With this unique experience and scale, Microsoft cloud services can achieve higher levels of security, privacy, and compliance than most customers can on their own. Azure has received more compliance certifications than any other cloud provider, including major global, national, regional, and industry standards and regulations.

Windows 10 accelerates time to value
Windows 10 provides one universal app platform, one security model, one management approach, one unified experience that scales across all devices—from the smallest sensor, to the largest, most powerful devices. This one core operating system enables a common developer platform, enhanced security, management, store, and more, across the broadest range of devices. Windows 10 devices offer seamless integration with current devices and infrastructure. Use Azure IoT Suite to connect devices and things, get started quickly with preconfigured solutions, and use untapped data to transform the business.

Global
The extensive, global Microsoft datacenter footprint covers more regions than any other provider, to better meet data sovereignty requirements. We're investing in one of the world's largest technology partner ecosystems with 640,000+ partners in 170 countries.

Edge-to-edge security
Device manufacturers building smart devices, retailers selling devices, and enterprises using Azure must all protect each and every endpoint and ensure that their cloud services are built with the highest security. Healthcare providers and payers know that protecting PHI and other confidential data is essential to maintaining the public trust. Device manufacturers use Windows 10, the most trusted Windows ever, to build smart devices. Windows 10 takes intelligence to the edge, with Secure Boot and Trusted Boot, to help ensure device integrity; integrated Windows Defender, to help keep devices safe from malware and other threats; BitLocker and Trusted Platform Module (TPM) support, to help keep user and device data safe; Credential Guard and Windows Hello, to ensure user authentication across all devices using the latest technology; and Device Lockdown, to enhance device security in event of theft or diversion.

Enterprises benefit by deploying Windows devices that are secure by design, provisioned to connect to the trusted cloud, and provide automatic updates. Azure Active Directory (Azure AD), a world-class identity management solution, provides enterprises with self-service tools that empower employees to access cloud services, but maintain robust controls and provide ongoing security monitoring and alerts. More information about the Microsoft commitment to transparency, privacy, compliance, and security can be obtained at the *Microsoft Trust Center*.

On customer terms
Azure is the only platform that supports a fully hybrid architecture, giving customers complete flexibility and control of data and applications delivered between public and private clouds. The Microsoft Cloud works with any operating system, database, middleware, and application framework, enabling companies to build on their current technology. Windows 10 empowers the digital transformation of IoT devices and smart things enabling edge intelligence for a multitude of ever-evolving needs, whether gathering data, monitoring security, or enabling productivity on-the-go.

Comprehensive, enterprise-ready solutions
Microsoft solutions span the full spectrum of business needs—data access, high-performance computing, advanced analytics, visualization, and business process automation. Windows 10 offers unprecedented universal application capability across devices, including innovative devices like Surface, Surface Hub, and HoloLens. Individual and enterprise productivity is increased by ensuring that the right information is provided to the right people at the right time for actionable insights and decisions. This is accomplished through a holistic suite of collaboration, knowledge management, work process, mobility, business insights, and advanced analytics capabilities.

Advanced technologies designed for ease of use
By offering technologies such as Power BI, Cortana Analytics, and Azure IoT Suite, Microsoft helps enterprises apply advanced technologies to business challenges once deemed too costly or complex to solve. For example, Microsoft Industrial IoT capabilities enable organizations to ingest data from any source or format, apply machine learning models and data visualization, and integrate those results into collaboration and work-process solutions. This drives informed actions, as individuals take advantage of tailored, actionable insights to make better business decisions and deliver better business outcomes.

Largest ecosystem of industry-leading partners
Microsoft has a broad ecosystem of prominent systems integrators and independent software vendors. This ecosystem uses existing technology investments and offers the flexibility to select the best solutions for each business. Our partners design and deploy innovative, industry-focused solutions built on a Microsoft foundation, coupling best-in-class technology with deep industry expertise. No other technology provider offers a comparable end-to-end portfolio as well as an open and flexible approach. Together, it's this unique perspective that helps Microsoft drive digital transformation across all aspects of an organization and change the way a company optimizes operations, empowers employees, transforms products and services, and engages with customers.

For more information, visit **InnovateOnWindows10IoT.com**

Windows 10 provides customers with a flexible platform of integrated products and services, while our comprehensive partner ecosystem helps lead companies through a journey of digital transformation to create innovative products and services, improve customer engagement, and execute with excellence.

Why Windows 10?

One Windows—offering a universal Windows platform for developing, deploying, and managing all company devices and apps.

Security-enhanced—providing enterprise-grade security with granular UX control and advanced lock-down to help secure identities, data, and devices.

Connected—ensuring interoperability across devices, easy incorporation of sensors and peripherals, and seamless connectivity to Microsoft Azure.

Healthcare organizations use compliant cloud services, devices that are secure by design, and end-to-end encryption to protect vital data from security breaches, theft, or misuse, and ensure compliance with global regulations.

As one of only a handful of firms with hyper-scale cloud infrastructure, Microsoft is in a unique position to help customers tap into digital transformation and invest in technologies that will create more operational efficiencies and better engagements with customers, suppliers, and partners.

For more information on how Microsoft is empowering businesses to harness IoT across their enterprise, visit: **www.InnovateOnWindows10IoT.com**

Digital transformation starts now.

Get started today. Work with Microsoft or one of our global partners to see how to transform business by harnessing IoT, big data, collaboration, and mobile solutions.

- Get more information on Microsoft and the healthcare sector:
  https://enterprise.microsoft.com/en-us/industries/health/

- Find a Microsoft partner: *https://partner.microsoft.com/en-us/solutions/health*

- Read about customer success stories in the health industry:
  https://enterprise.microsoft.com/en-us/industries/health/?post_type=customer-stories

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