# The Inevitable Healthcare IT Shift to Cloud

Five9™

Introduction

The future of healthcare is at our doorstep, and cloud plays an important part in that future. With cloud, we have collaborative technology for a great digital transformation. Now, we face the difficult task of putting together the right pieces.

For the purpose of this e-book, we will evaluate the healthcare market and discuss current healthcare IT cloud challenges and opportunities. We will examine ideas from a variety of sources, thought leaders and analysts. Then, we will provide suggestions and guidance for cloud deployments, vendor selection and strategic integrations.
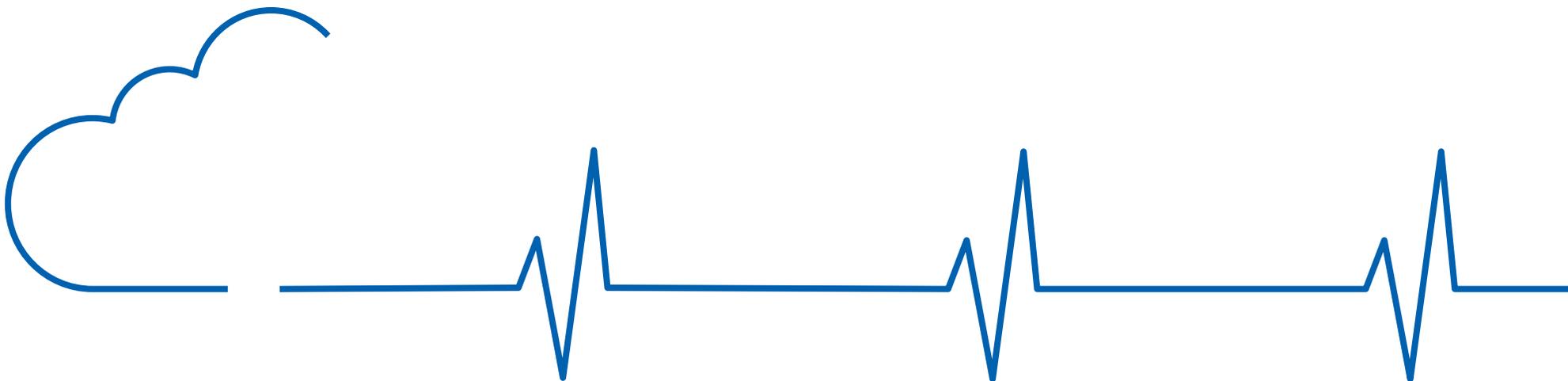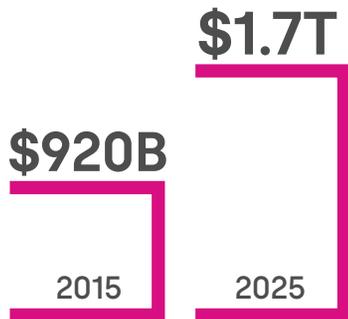
Chapter 1

The Current State of Healthcare

U.S. Federal Government Estimates:

86% Growth in federal portion of national health care spending.

$1.7T

$920B

2015   2025

Growth in federal portion of national health care spending.

Healthcare has long-term value that no other industry can rival. Factor that in with a growing population of the elderly and omnipresent demands for better outpatient care, and it's easy to see why the market continues to chart upward growth.

The U.S. federal government estimates that the federal portion of national health care spending will grow 86%, from $920 billion in 2015 to $1.7 trillion by 2025. Deltek's Federal Health Information Technology Market forecasts the demand for vendor-furnished Health IT products and services by the U.S. federal government will increase from $6.0 billion in FY 2016 to $6.4 billion in 2021.[1]

Accordingly, Markets and Markets expects the global healthcare cloud computing market to reach $9.48 Billion by 2020 from $3.73 Billion in 2015 at a CAGR of 20.5% during the forecast period.[2]

Here is what we know:
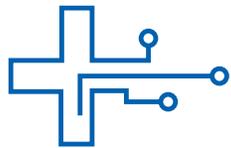
Healthcare industries want a digital transformation.

Consumers along with political and regulatory powers are applying pressure.

Cloud deployments offer the most expeditious paths to digital transformation.

How Does this Translate?

Government is taking serious interest in healthcare IT and healthcare reform. To that avail, they've ascribed a hefty price tag on new systems and processes. With shifting federal investments, there is a ripple effect that proliferates into all areas of the business – cloud technology included.

On the home front, public and private markets aren't exactly waiting for government funds to pan out. They know they need dramatic updates to compete with rising healthcare demands and are ready to make a change. According to a Harvey Nash/KPMG CIO survey, more than half of surveyed CIOs in the industry said they would be seeing IT budget increases in 2017.[3] But few have consensus on where to spend.

Chapter 2

What Is Driving Digital Transformation in Healthcare?

Healthcare doesn't have the analytical muscle it craves. And that's a problem felt by all areas of the business. The extreme governance of healthcare, which originally served to protect patients and establish secure business practices, has inhibited technological growth and advancement. The industry still has several operational silos that prevent interoperable data. To dissolve those silos, CIOs and related healthcare IT professionals must look to infrastructure, platform and software upgrades.

Possibly the most viable and economical path for IT professionals is to deploy and unite cloud-based enterprise service bus (ESB) software with electronic healthcare record (EHR) connectors. Cloud-based IT infrastructure enables collaboration and computational synergy between hospitals, pharmacies, insurance companies, research facilities and other healthcare organizations. If IT can create an information-centric care delivery model, it can spur collaborative support and effectively modernize healthcare.

Consumerism of Health

Consumers are a major driving force behind healthcare modernization. They want more value from their healthcare providers, and they are pushing politicians to revise the current market paradigm.

Health care has long held to a fee-for-service model (FFS) that ascribes flat rates for treatment regardless of outcome. In other words, healthcare companies profit by amassing as many tests and treatments as possible regardless of the benefit to the patient. This has created a vicious cycle between insurance providers and healthcare organizations driving up costs at the expense of patients.

Today, consumers are pushing for a value-based model in which providers establish fees based on clinical outcomes. In this system, healthcare providers would need to establish more measured prescriptions to achieve the best results for the lowest patient cost. This proposed concept requires an optimization of resources not currently achievable with legacy on-premises infrastructure.

What Our Experts Say:

"No other time in the history have consumers ever been more empowered. Consumers now view their relationship with their insurance company and hospitals in the nearly exact same way as they view every other modern day, digitally engaged, direct-to-consumer company such as Amazon, Apple, or Google. They expect greater choice, immediate service, mobile applications, and complete transparency into every aspect of the product or service they are purchasing. This wave of the empowered consumers is finally reaching the healthcare industry, and the industry is being asked to answer the call. Those who can, will prosper. Those who cannot will become irrelevant. Especially in the context of the next coming Bear Market."

Arthur Hankus, Pill Pack

What Our Experts Say:

"The ongoing trends in healthcare from today's consumers require an expanding array of choice. Consumers at all levels in the healthcare continuum are looking to exert their increasing influence and actively participate in what services they receive, from whom, and where. Consider the array of prescription medications advertised on television and the idea that a decade ago that a patient would have ANY voice in what pill they received. This trend has actively extended itself into the MCO marketplace with customers "shopping" their business to find the best service and pricing where those choices are made available…and those choices are increasingly being made available. This level of competitiveness is further pushing the healthcare marketplace to raise its "retail" approach which I find healthy for the system. The next level in this evolution will be when they can influence price at a greater rate. We already see the effects of this in medical services like Lasik surgery where competition continues to drive prices down while retaining quality. In a healthcare system that needs to become far more cost efficient, it is likely that it is the end user patient that can be the most powerful driver in reigning in this marketplace at the cost level, rewarding quality service with their business, and placing pressure upon providers who seek to perpetuate the older, less empowering models. I welcome this evolution. "

Ralph Choate Gerontologist National Director of Customer Service PCG Public Partnerships, LLC.

Health Tech

Virtual care is on the rise. Patients are tired of sitting in emergency rooms and urgent care centers for hours on end. They want more flexibility, and healthcare providers need something to divert traffic from their already taxed, on-demand ER and health centers. Consequently, several digital solutions have emerged to disrupt the traditional care model.

On the consumer side, more patients are leaning on self-diagnosis and online consultative websites like WebMD to determine the severity of their symptoms and administer at-home care when viable (e.g. ice for a sprain). When the prognosis is more severe, patients are more measured with their doctor/provider selection. Digital solutions allow them to compare healthcare with increased competency. Websites like Zocdoc help patients search for providers based on symptoms, procedure, doctor name, location or insurance coverage. Often, patients are leapfrogging general practitioners for specialists that are more qualified to treat their specific ailment.

On-demand healthcare has also taken other digital forms like virtual ICUs, telehealth and other e-patient platforms. Companies like Teladoc are leveraging telephone and videoconferencing technology to provide on-demand remote medical care via mobile devices, the internet, video and phone.

What Our Experts Say:

"**Teladoc recognizes the growing need for virtual care and provides a new kind of quality healthcare experience, one with better convenience, outcomes and value by leveraging our technology platform in delivery of non-emergent care to the patient. Through our web site, mobile app, or contact center, a member/patient can arrange a telephonic or video virtual office visit with a board certified licensed physician within 60 minutes.**"

Gary Britton, Teledoc, Vice President of Operations Calvaruso LCMC Health

"**To make interoperability successful we need to look outside of healthcare to identity how it works. Telephony is one truly interoperable function. It does not matter which carrier you have or the type of phone you have. If you dial the correct number, you will be able to communicate to another party. In healthcare, the two main issues preventing successful interoperability are lack of definition of how the call should be connected in addition to how the call should be answered. Both must be addressed to achieve a truly interoperable environment in healthcare.**"

Stacy Calvaruso LCMC Health
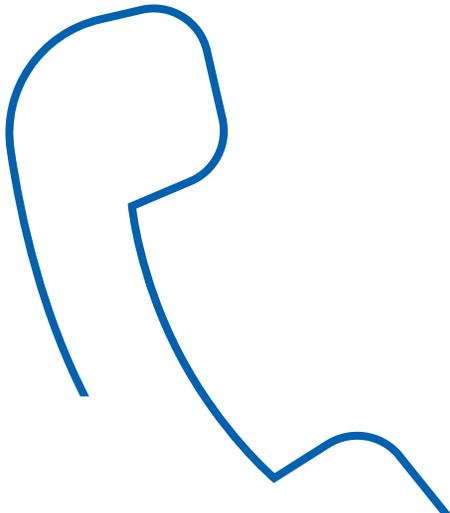
Preventative Healthcare

Consumer behaviors are shaping the healthcare industry into a more decentralized system. Patients have more power to self-evaluate and select care best suited to their needs. This digital progression has also sparked consumer interest in preventative care.

Outside of the virtual care providers, patients are relying on internet-of-things (IoT) enabled tools, wearable devices and mobile applications to monitor their vitals and prescribe action. Consumers are more engaged in their pre- and post-care regiments and are actively forming communities based on health. Patients don't just want a fix-me system, they want to anticipate trouble and counter it with tactical preventative healthcare.

Physicians also see value in greater preventative healthcare, but disparate systems limit their capabilities. On-premises systems wall up data in their respective departments. As a result, macro analysis and cross-operational conclusions are near impossible.

For healthcare companies that embrace digital change, there is much to learn in population health management. With analysis of larger datasets and the introduction of AI, companies can expand their capabilities. Advance analytics and deep learning can help healthcare entities more accurately track diseases and map population risks. They can anticipate complications within remote populations and mobilize for faster quarantines. This also enables companies to anticipate resource consumption and present more economical business models for scaling medicine production or healthcare staffing.

Healthcare Regulation and Security

No surprise – the most controversial influence of healthcare cloud digitization involves regulation and security. Recent security scares have sparked regulatory scrutiny and refocused healthcare enterprises on compliance strategies. It's a treacherous technological impasse. Healthcare companies need complex and integrated tools with high processing and analytical capabilities. But they also need air sealed integrations that adhere to encroaching regulations.

Here are just a few of the regulatory powers at play:

Health Insurance Portability and Accountability Act (HIPAA)

Some of the most notable security regulations have focused on HIPAA. Through HIPAA, government organizations dictate data privacy and security provisions for safeguarding medical information. Companies that transmit protected health information (PHI) must enforce physical, network and process security measures.

HIPAA breaks out into two rules, the Privacy Rule and the Security Rule. The HIPAA Privacy Rule dictates how companies save, access and share medical and personal information. The HIPAA Security Rule dictates national security standards to protect health data created, received, maintained or transmitted electronically.

According to the U.S. Department of Health and Human Services, HIPAA compliant hosting providers must maintain physical and technical securities. There are specific rules for transferring, removing, disposing and re-using electronic media and electronic protected health information (ePHI).

Similar provisions were passed overseas as part of the EU General Data Protection Regulation (GDPR).

Health Information for Economic and Clinical Health (HITECH).

In 2009, U.S. government passed HITECH to support the enforcement of HIPAA requirements by raising the penalties of health organizations that violate HIPAA Privacy and Security Rules. Most officials regarded HITECH as a response to the increased use, storage and transmittal of ePHI. The combination of the aforementioned regulations has challenged cloud providers o architect impenetrable solutions. This has significantly delayed the adoption of cloud, but it has not completely deterred the on premises exodus. Companies still require system interoperability and are looking for hosted infrastructure and platforms (hybrid and full cloud) that provide appropriate governance. Because of the market demand, some cloud systems have recently undergone their own governance transformation for security that surpasses most legacy solutions.

Affordable Care Act (ACA)

Although regulatory powers have restricted information usage, they are simultaneously encouraging market competition. The ACA, while subject to scrutiny and an uncertain future, has shifted the healthcare market into a customer-first model. By encouraging competition among health insurers and providers, the ACA has made healthcare B2C. As a result, the ACA has forced healthcare providers to find a bridge between siloed systems and digital engagement strategies to maintain patient satisfaction. Though not its original intent, the ACA has made a latent impact on cloud migration. Growing competition means a greater need for health data, data interpreters and cross-functional engagement tools.

## Medicare Access and CHIP Reauthorization Act (MACRA)

Established in 2015, MACRA brings massive changes to the healthcare market effective January 1, 2019. Under the proposed system, clinicians will move from a traditional FFS model to a more qualitative care model. This reflects an ultimate shift of accountability to clinicians and providers. Consequently, industry stakeholders must consider new ways to dilute risk, expedite healthcare services and expand their resources for more diverse healthcare options.

What Our Experts Say:

"**With a concentrated effort from many public and private organizations to 'fix healthcare', it is clear that the future of interoperability success is being closely watched and scrutinized. The governmental regulatory agencies view the efforts of modernizing healthcare through IT initiatives as a way to cure the financial woes of healthcare as a whole. There is no denying that interoperability will reduce errors, increase efficiency, and create a higher level of a patient quality of care "**
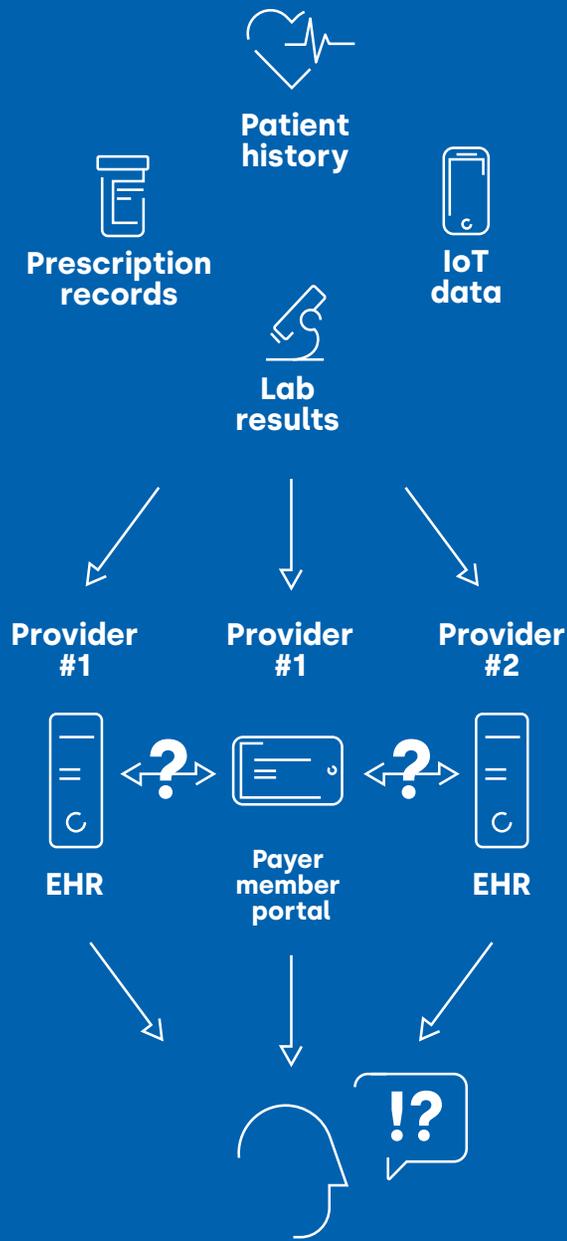
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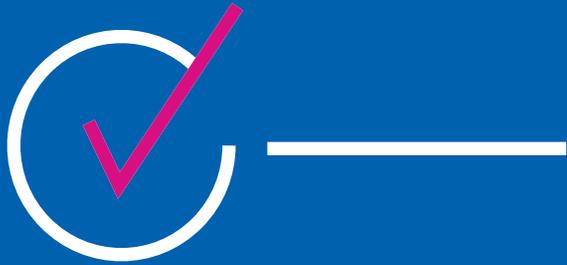
Why Cloud Makes Sense for Healthcare

The Electronic Healthcare Record (EHR) Dilemma

When hospitals and healthcare companies made the move from paper records to EHRs, they digitized their records in segments, which is partially why we see so many disparate legacy systems today. Healthcare companies stored and secured records in different phases leading to multiple non-collaborative systems that have disjointed governance. Nowadays, many healthcare systems still log patient history in one place, prescription records in another, lab results in another, company operations in another, etc.

EHRs alone revolutionized the industry by enabling practitioners to quickly search for patient files and log visits. However, because of the incremental transition from manuscript to digital records, there is an operational gap that causes redundancies, inefficiency and sometimes confusion for clinicians and patients. The gap exists because healthcare providers have created multiple systems that cannot inform each other.

A distorted belief that information is somehow more secure in these fragmented systems perpetuates the gap and stifles innovation. In truth, these systems are overly rigid, which prevents them from quick patch updates, agile responses to attacks and regulatory upheaval. Multiple systems mean multiple entrances for attackers to exploit. With multiple redundant data streams, healthcare companies increase the likelihood that data will be misplaced or mishandled.

Patient history

Prescription records

IoT data

Lab results

Provider #1

Provider #1

Provider #2

EHR

Payer member portal

EHR

Enterprise Health Clouds as a Bridge

How do you fix a tangled web of valuable patient information and unify it without disrupting operations? How do you maintain security and compliance while porting carefully governed files into a unified vision? Analysts believe enterprise health clouds may be your best answer.

Forrester defines enterprise health clouds as, "Solutions that ingest data from disparate sources, create a 360-degree view of a patient and healthcare consumer, include tools to jumpstart application development, and provide governance and security to manage PHI." [4]
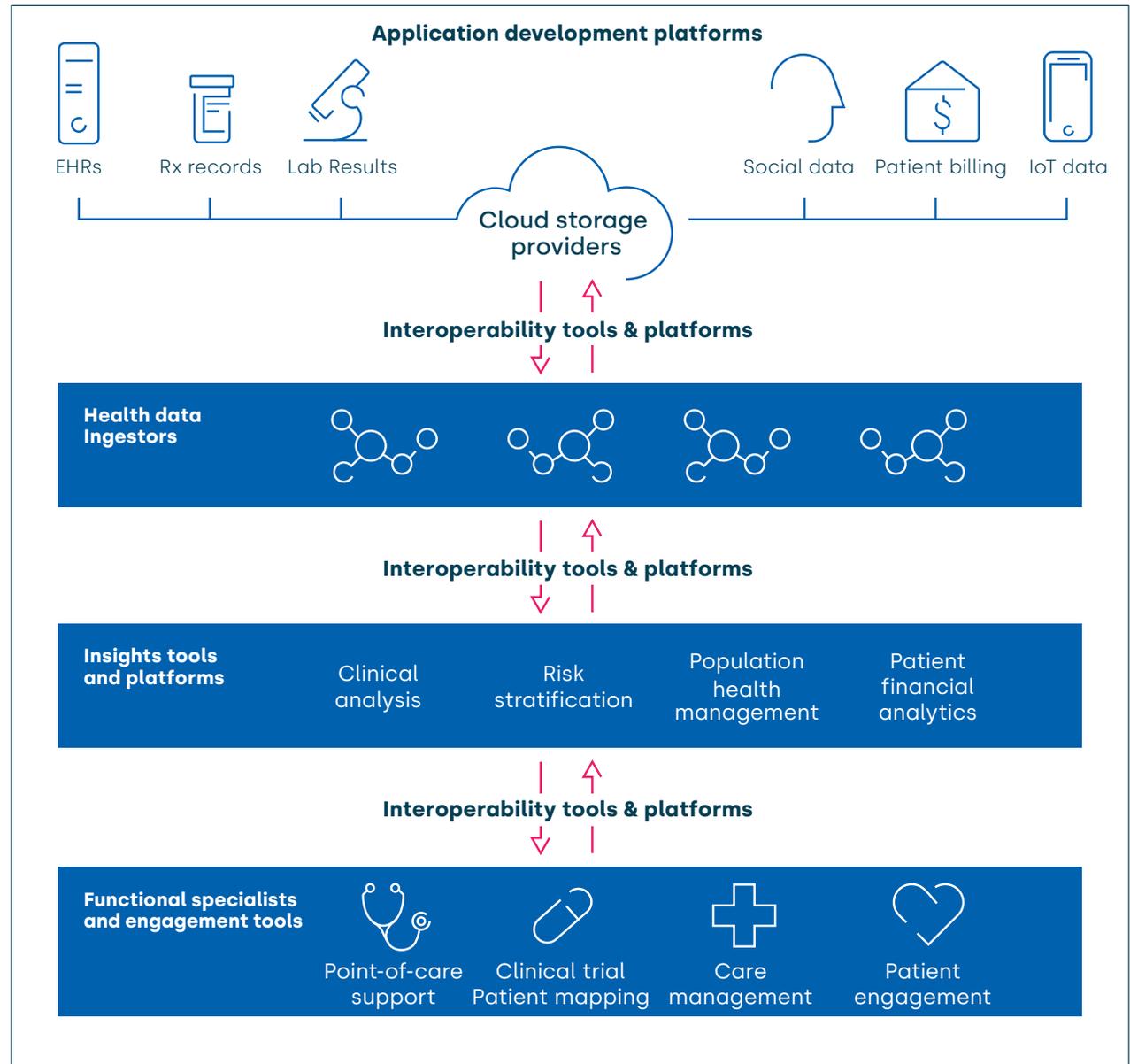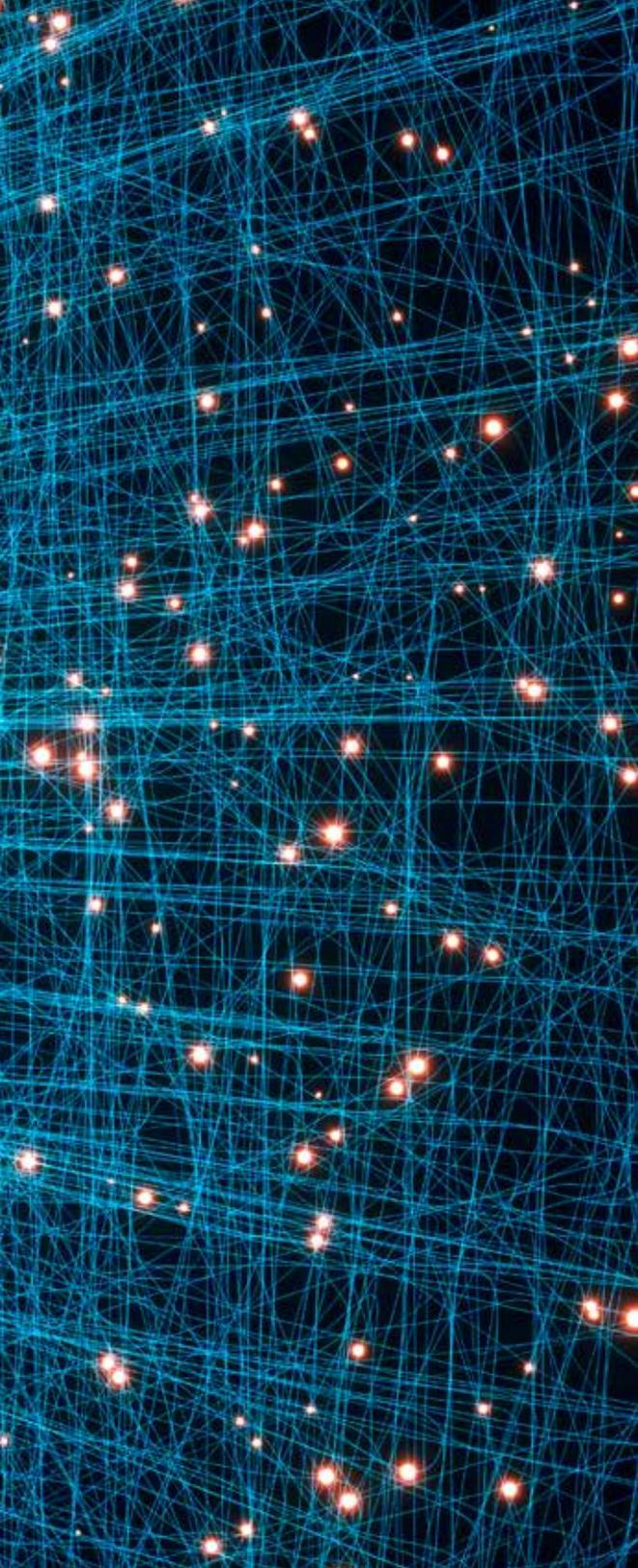
What an enterprise health cloud does:

1. Extract information from EHR providers and other data sources.

2. Unify information and establish common data definitions.

3 Surround data in a protective layer of governance.

4. Establish policies and rules to create clean, comprehensive data sets.

5. Enables patient insights and advanced analytics.

6. Provides integration points for developers to deploy additional tools and applications.

Governance

Data encryption   Role-based access controls   Sign-on authentication

Application development platforms

EHRs   Rx records   Lab Results

Social data   Patient billing   IoT data

Cloud storage providers

Interoperability tools & platforms

Health data Ingestors

Interoperability tools & platforms

Insights tools and platforms	Clinical analysis	Risk stratification	Population health management	Patient financial analytics

Interoperability tools & platforms

Functional specialists and engagement tools	Point-of-care support	Clinical trial Patient mapping	Care management	Patient engagement

Envisioning the Future of Healthcare

The marriage of previously disparate systems in an enterprise health cloud opens up an ocean of possibility for the future of healthcare. The move to an interoperable system means greater efficiency. But more than that, it means usable data. Instead of siloed patient repositories, EHRs could inform a platform. That platform could feed information to different applications that automate administrative processes and analyze data.

Cloud offers a steroid for the analytical muscle the industry lacks. Imagine what preventative health could look like if healthcare providers could use AI and unified data to simultaneously diagnose and track disease across multiple geographies. What magic that could occur with a patients' smart watch helping populate their vitals in a carefully monitored medical system? Picture an AI running through an entire patient history in seconds and diagnosing days ahead of any symptoms.

A cloud platform provides a stable base. From there, companies can add business intelligence and operation tools. They can deploy cloud-based contact centers, workforce management systems and website management applications.

Chapter 4

Cloud Deployments, Vendor Selection & Strategic Integrations

Do you plan on challenging your companies on-premises preference?

The benefit of cloud-based operations is too great to discount. For those that do not embrace cloud there is an obvious competitive threat in terms of scale, reach and cost.

There is a high demand for healthcare CIOs to maintain strategic positions within their companies. But strategic vision is easy to obfuscate without a sound IT plan and supporting technology.

"Although 80 percent of healthcare CIOs indicate that there is a growing strategic role for IT in their organizations, compared with 67 percent from all industries, only half of those surveyed said they have a clear digital business vision and strategy, while the survey found that 39 percent of respondents were currently working on a digital business strategy. "

Health Data Management5

Consider Cloud Solutions for Your Strategic Digital Transformation

There are a variety of vendors that offer healthcare-specific cloud solutions. These solutions can aid CIOs and healthcare IT with a range of functions. Companies like PHEMI, Salesforce Health Cloud, Microsoft, Oracle, IBM Watson Health, athenahealth, Philips Health Suite, Infor, SAS, CareCloud, Kinvey, and Epic all provide cloud health care systems to bridge data and create interoperability.

When building your cloud environment, look for the following features:

Health Data Ingestion

Health data ingestion is critical to the digital transformation. With the right solutions, you can integrate health data from disparate sources and convert everything into a more actionable format.

Look for cloud providers that can help consolidate your systems and support cloud migration. Consider services that are easy to augment and that can create interoperable app ecosystems.

Cloud Storage

Medical data will soon far exceed the storage capabilities of on-premises systems. Health care organizations can't just terminate existing data. They need cloud storage to match the growing demand.

When selecting a cloud storage provider, make sure you can store information in compliance with HIPAA. Look at the size of information you'd like to port and anticipate growth. Select a provider that can facilitate your needs for the foreseeable future.

Additional Technical Considerations:

Selecting vendors that maintain high levels of privacy and security. Make sure they have necessary adherence for government regulation and compliance (HIPAA & GDPR). Most reputable providers will have certifications you can request. Also, be sure to audit the service reliability. Critical systems should maintain considerable redundancy and have disaster recovery support.

Platform Customization

A platform exists as a repository for all the information you need to access. A great platform can delineate different data sets and interpret fields for better research and engagement.

Look for platforms that are customizable. Some platforms may incorporate their own AI or analytics. Use a platform that is also third-party application agnostic. You'll want to add features as you continue to innovate and enhance your system. Your platform should be a strong base for APIs to connect.

Analytics

Nearly 80 percent of hospital executives indicated that predictive analytics could help them significantly boost care, yet only 31 percent have been using analytics for more than a year, according to a Health Catalyst survey.5

Machine learning, automated administration and general business operation drill-downs are fast becoming the norm. Select a cloud provider that can help guide your data interpretation. Consider solutions that will boost visibility in operations, build efficiency and impact the bottom-line. Then, move to more abstract analytics for greater innovation.

Engagement

Cloud solutions aren't exclusively backend. Look for strategic integrations that can bolster engagement. Consider cloud contact centers that can expedite data collection and facilitate stronger patient interactions. Add healthcare-specific solutions and point-of-care aid for physicians. Weave additional applications into your cloud platform to automate administrative function and support business goals.

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About Five9

Five9 is the leading provider of cloud contact center solutions, bringing the power of the cloud to more than 2,000 customers worldwide and facilitating more than five billion call minutes annually. Five9 helps contact centers increase productivity, boost revenue, and create customer loyalty and trust.

For more information visit **www.five9.com** or call **1-800-553-8159**.

4000 Executive Parkway, Suite 400
San Ramon, CA 94583
925.201.2000

www.five9.com