Introduction

The future of healthcare will be almost entirely digital, driven by new and existing generations of consumers who are more mobile, technologically sophisticated and want more control over their own healthcare decisions. Healthcare providers, insurers and other system stakeholders will experience a range of pain points as they strive to overcome the inertia of traditional attitudes and navigate a digital landscape that is still in development. Putting patients first in a healthcare IT infrastructure devoted to providing greater value to the consumer is a sound strategy for competing in the new marketplace. But this value-based approach to healthcare places unprecedented pressure on IT departments across the industry to develop solutions that are more open and accessible to the providers and consumers of tomorrow.

This white paper addresses those pressures and offers workable strategies for creating an IT infrastructure that meets the evolving demands — and leverages the opportunities — presented by an increasingly mobile healthcare marketplace. It also puts forth a clear solution path for achieving these strategic objectives, covering:

- How and why the healthcare industry has reached its current digital status
- The regulatory, economic and other challenges the new digital landscape presents
- How to overcome these challenges with a value-based, patient-first approach
- What form a value-based IT architecture might take
- 4 strategies for enabling a value-based healthcare system
- How today’s mobile IT platforms and interoperability hold the key to future viability
- A solution path to enabling interoperability through Axway API Management
The Digital Anatomy of Healthcare

Today’s global healthcare system has taken on a new structure. Whether it’s viewed through a microscope, a heart monitor, an ultrasound or an iPad, its form would be entirely unrecognizable to the healthcare providers, administrators and beneficiaries of a mere generation ago.

Profound advancements in information technology have greatly impacted the healthcare industry to a point where it now functions within its own digital ecosystem. It has become a dynamic landscape in which vital data flows through an expanding network of hospitals, physicians, pharmacies, manufacturers, labs, regulatory agencies and, of course, patients.

To compete in this evolving environment, all stakeholders on the network must be equipped and prepared to exchange the right information, at the right time, from anywhere, using any device. For providers who have successfully embraced and implemented the new digital anatomy of healthcare, the advantages are well documented:

- More accurate and accessible electronic health records (EHR)
- Improved quality of care
- Faster claims processing
- Shorter billing and reimbursement cycles
- Compliance with regulatory agencies

But change is slow. Although electronic healthcare records have existed for more than 30 years, only 38% of office-based physicians had converted to e-records as of 2008, according to the Centers for Disease Control in Atlanta, GA. By 2013 that number had increased to about 78%, underscoring the industry’s measured pace of adopting new digital tools.¹

For most healthcare providers, even those who have been in the vanguard of digital implementation, there continue to be forces that act against the momentum of change.

Growing Pains

Healthcare providers, public and private health plans, and government agencies that have seen the digital writing on the wall and are looking to go all-in, are facing an array of persistent pain points:

**Regulation:** In today’s global healthcare system, providers must navigate a shifting and tightening landscape of regulatory burdens — including those mandated by the U.S. Affordable Care Act, which requires that participating organizations have a robust

digital capability. Additionally, the U.S. Office of the National Coordinator is pushing for digital interoperability as a core requirement in its next stages of guidelines. This means providers will become more proactive in demanding that IT developers use more open data integration technologies, such as Application Programming Interfaces (APIs), in order to connect data across medical locations.

**Legacy Systems and Security:** The healthcare industry as a whole cannot expect to build a gleaming digitally driven future while many providers still rely on a hodgepodge of disparate legacy systems. What’s more, like all other networked industries, the healthcare cyber-universe faces a tide of security threats that are becoming more and more sophisticated daily. During the summer of 2014, more than 5 million patients had their personal data compromised in health system privacy breaches.\(^2\)

**Economics:** A range of economic factors are taking their toll on healthcare costs. For example, in the face of a flurry of hospital mergers and acquisitions, and an increasing population, the number of hospital beds has consistently declined in the U.S. According to the American Hospital Association, total beds in community hospitals across the U.S. fell by 795,603 from 2012 to 2013.\(^3\) With the demand for accommodations rising, due in large part to an aging population, the healthcare payment system is incented to encourage higher patient turnover. This increases the chances of re-admission and raises the cost of healthcare.

But increasing the number of hospital beds doesn’t necessarily lower the cost of healthcare. In fact, some studies show that it leads to significantly higher costs. That’s because, where beds are plentiful, hospitals have been incentivized to fill them even if the patient could (and should) be treated in a lower-cost setting.\(^4\) Whether it’s this or other issues driving up healthcare costs, one way to overcome them is to put the control of healthcare decisions in the hands of consumers by giving them greater and timelier access to personal health information (PHI). A digital, value-based system will be key to making this happen.

Even though healthcare costs are trending up, healthcare profits are shrinking and are expected to get worse. Physician income, for example, has remained static over the past decade while expenses have steadily increased. A provider’s ability to raise fee-for-service revenue is under threat as well. U.S. Medicare and Medicaid programs are also holding back payment levels to the point where, over time, providers wind up on the losing end financially. And as the proportion of patients covered by government programs is growing, employers and insurers are pushing for greater accountability around healthcare dollars. Doctors and clinicians know that simply working harder, faster and longer won’t compensate for rising expenses. However, today’s digital technology can give them a fighting chance.

\(^2\) Community Health Systems Data Breach Notification, www.chs.net, August 18, 2014
**Market Forces:** Mobile devices, sophisticated customer segmentation and demands for greater transactional convenience and transparency have spawned corporate giants in publishing, entertainment, communications, travel and banking. Those slow to spot the trend are now battling to keep up. Money follows the innovators.

The same set of factors are now unfolding across the healthcare landscape, causing a similar shakeup within the healthcare sector and prompting providers to move toward the traditional economic principles that govern other industries. A reversion to proven market practices and attitudes — robust competition, results-based revenue, and the notion that the “customer is king” — will play a decisive role in the health and wellness space. And it will be enabled by the creative use of digital technology.

We’re already seeing this as retail titans such as CVS, Wal-Mart and Walgreens steadily carve larger and larger slices of the healthcare pie. These new arrivals to the healthcare scene have already transformed the retail world using digital technology and are now applying it to the healthcare model. It’s a model that is successfully challenging consumers’ traditional views on where to go for quick, convenient, accurate, customer-centric and less expensive healthcare covered by a growing range of insurers. This trend has the traditionalists concerned.

New entrants are expected to disrupt the traditional global healthcare market and draw billions from systems in developed and emerging countries.

In summary, the healthcare sector needs to fully leverage what the digital revolution has to offer; and they need to offer the kinds of digital services healthcare consumers are starting to expect. These new requirements are placing unprecedented pressure on the industry’s technology infrastructure. Success will require a 180° shift in how IT and business professionals in the healthcare industry view the consumer and the future of healthcare.

**Think Outcomes, Not Income**

Healthcare provider organizations are beginning to understand that their business model must evolve if they want to remain viable and competitive. Facing lower payment rates and potential loss of market share if they charge higher prices, they have no choice but to rethink how they approach the healthcare market — and they are.

Instead of attempting to fit the square peg of digital technology into the round hole of traditional healthcare practices, where all activity is concentrated inward on higher volume and profit margins, providers are starting to focus on looking outward to deliver greater value to the end users of their “products” — healthcare consumers. By flipping the healthcare equation on its head, providers believe they can leverage their technology infrastructure to improve patient outcomes and sustain or grow their market share. They call it “value-based healthcare.”

This tack toward consumerism makes sense, as evidenced by the migration of patients from traditional treatment venues and into patient care kiosks found in CVS and Wal-Mart. But what’s driving this consumerism is a system designed to give the consumer/patient what they want, when they want it, and at a comparatively lower price. These consumers use the “connectedness” of mobile technology and social media to empower individuals to make better healthcare choices. This new type of healthcare consumerism also enables people to become much more educated about, and take ownership of, their health records.

Bottom line: The consumer is now the common denominator for all stakeholders in the healthcare system. Providers that focus on building relationships and offering convenience by leveraging digital channels will reap the benefits of increased customer loyalty. Health plans are impacted as well — insurers who are slow to embrace a digital, “value-based” model will lose subscribers to those that recognize the growing tide of consumers migrating to a system that’s more open and accessible. This is the future of healthcare and insurers will have to keep up.

**It’s Happening Now**

The transformation to a value-based healthcare system is well underway. Although some organizations are still in the pilot stage, other providers, such as the Cleveland Clinic and Germany’s Schon Klinik, have initiated large-scale changes, resulting in striking improvements in outcomes and efficiency leading to growth in market share. Specifically, the Cleveland Clinic has established a continuum of care delivery model based on a tiered approach that provides patients with the appropriate level of care for each phase of their condition.
The tiered network helps drive efficiencies throughout the system by allowing the organization to "create multiple access points, which are essential to the new integrated, patient-centered model of healthcare. The Clinic has strived to improve the patient experience by using business intelligence tools to create same-day access in most cases. This has reduced wait times for new appointments from 14 to 7 days, adding 100,000 visits and increasing patient satisfaction scores as reflected by Hospital Care Assurance Program (HCAP) results."  

In order for IT departments across the healthcare spectrum to create a system capable of delivering similar results, they will need strategies that transcend traditional cost reduction models and offer technology-enabled treatment and payment methods that put patients first. Embracing a value-based approach to IT is step one.

**What Does a Value-Based IT Architecture Look Like?**

Historically, healthcare IT systems have been siloed by department, location, type of service and type of data (for instance, images). All too often, this siloed model creates IT systems that complicate, rather than support and simplify, integrated, multidisciplinary healthcare. The right kind of IT system is one that enables reliable data access, management and analysis, and features an updated service reimbursement system — effectively bringing a well-structured, value-based delivery system together.

Above all, the ideal IT architecture provides a unified format that enables consistent interoperability across devices, departments and types of data. This is the level of interoperability that will provide clinicians with the kind of timely access to observable data that drives the safe and efficient patient care that marks a value-centric system.

An interoperable value-enhancing healthcare IT platform needs to be:

- **Patient-Focused:** The system has to follow patients across services, sites and time for the full cycle of care.
- **Standardized:** Use of common data definitions throughout the system is imperative.
- **Inclusive:** The system must encompass all types of patient data. Physician notes, images, chemotherapy orders, lab test results and other data must be stored in a single place so that everyone participating in a patient’s care has a comprehensive view.
- **Sharable:** Medical records have to be accessible to all parties involved in care, including referring physicians, clinicians and the patients themselves.
- **Specific:** The platform should include templates and expert systems for each medical condition.
- **Secure:** Data security and compliance are paramount since they sustain consumer confidence. But security must be balanced with fast and convenient access to health data. In recent studies, 68% of participating individuals said they were concerned about the security of data stored in healthcare apps on their smartphones, with 76% expressing concern over the security of their medical data.  

6 Top Health Industry Issues of 2015, PwC, December 2014
Healthcare IT systems, which are currently shored up by proprietary walls, need to interact across the care spectrum. According to Premier, about 95% of healthcare providers say interoperability challenges limit their ability to transfer data from one medical center to another.

4 Strategies for Implementing a Value-Based Healthcare IT System

Defining an effective, value-enhanced IT architecture is one thing; implementing it is quite another. To do so successfully means pursuing 4 essential strategies:

1. **Maintain Centralized Identity Management**
   Centralized identity management provides a single connection point for stakeholders both inside and outside the healthcare provider system. For those connecting from outside, it enables providers and members to access self-service portals without having to manage their credentials directly, which also reduces the burden on IT. For those connecting from inside, it imparts a consistent user experience within a legacy environment, enables single sign-on, provides seamless integration with cloud services, and delivers a more secure level of integration than can be achieved by syncing LDAPs across domains.

2. **Establish a Single “Front Door”**
   In a field where patient data and privacy are paramount, a single front door strategy ensures gateways are in place to protect legacy applications. The gateway is especially effective for batch processors. It will check identity, detect intruders, standardize formats, enhance data sets and redact transmissions if necessary. It can also monitor door-to-door data exchange; for instance, clocking service management, capturing metadata, archiving messages and ensuring audit logs are captured.

3. **Standardize Data Structures**
   Standardizing data structures enables organizations to meet Medicare and Medicaid mandates and certain operating rules that require consistency (in error messages, for example), and standardizes formats for other data structures. It permits data set conversion for legacy systems and eliminates data inconsistencies that can drive up complexity and drive down process reliability.

4. **Optimize Provider and Member Management**
   Enhancing the member experience with easy-to-use services and support will increase consumer loyalty. Effective member management ensures the same information is available on any device and provides services such as 24-hour support. It also keeps the path clear for a steady progression of capabilities that enhance value to the consumer, such as the ability to find in-network providers, view EOBs (Explanation of Benefits), alert patients for prescription pickup on their mobile devices, deliver health and wellness advice, and more. Similarly, providers need to have access to the right patient information at the right time in order to offer truly comprehensive care and make smarter decisions.

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New, disruptive healthcare companies need strategies to engage with the traditional healthcare network and the emerging digital care environment, including a clear plan for adapting operating models and data standards to store, transmit and share data in accordance with legal, regulatory and societal obligations. Data strategies must put customers at the forefront and must account for the contextual nuances of healthcare. Capturing value beyond the episode of care also requires data gained outside the hospital or office. Consumers are adopting hardware and software solutions that not only facilitate this level of care management, but also enable providers to move to a single price model for the entire care episode.

**The Power of Mobile Health**

As mentioned previously, a value-based healthcare system is centered on the consumer, who is the common denominator across all constituents of the system: providers, employers, regulators, insurers, and emerging state-sponsored exchanges. In this respect, the onus falls on all involved — but especially healthcare plans and providers — to understand the way today’s (and tomorrow’s) consumer will behave, shop, connect and communicate. And that means that professionals on both the business and the IT side of the healthcare system need to be ready to embrace the power of mobile health.

Is your organization ready to introduce mobile health services to proactively engage the biggest consumers of healthcare? Opening backend IT systems via APIs is the most efficient way to achieve these goals and to reap the many benefits that follow. For example, making care more convenient, particularly for those with chronic conditions, is one of the most effective ways to lower hospital utilization, including inpatient bed days, length of stay, admissions, readmissions and emergency visits. And for many patients, there is nothing more convenient than using a mobile device to access health information and services.

Yet it’s important to remember that the benefits of exposing healthcare systems and data in this way need to be balanced with a healthcare institution’s requirements for ease of management, patient privacy, data security and regulatory compliance. The U.S. Federal Government, and most European nations, heavily regulates the exchange of personal health information (PHI). Healthcare providers need to comply with their own local and international standards and must also be able to prove their compliance via reporting and forensics should a suspected breach occur. Against this backdrop, taking advantage of the opportunities created by the web, mobile devices and APIs represents a significant challenge.

8 The Payment Reform Landscape: Bundled Payment, Suzanne Delbanco, www.healthaffairsblog.org, July 2, 2014
Value-Based Healthcare with Axway API Management

System interoperability and advanced data sharing are the first steps to developing an API-driven mobile healthcare system, and it’s a minimum requirement for a successful value-based transformation. Axway provides the technology foundation needed to enable enterprise class data sharing and true interoperability. For instance, Axway API Management makes it possible to expose information from an electronic health record system (EHR) — such as EPIC and other legacy systems — and enforce security controls for compliance. Axway API Management does this using APIs, providing the capability to orchestrate between web-services and other communication standards, such as JMS, to provide digital healthcare as a service. Additionally, these interfaces are mobile app friendly and provide seamless transformation of protocols for mobile apps.

Managing APIs and API-enabled systems empowers healthcare organizations to deploy new mobile applications while ensuring strict regulatory compliance. For example: Hospice workers can securely keep patient records with them on mobile devices for immediate access; home care workers can enter vital patient information directly into an app rather than creating handwritten notes that must be transcribed later; and doctors can gain authorized access to, say, patient MRI information from any location using any device.

Axway API Management supports delivery of true value-based healthcare by:

- Enabling patients to securely access PHI via web applications and mobile devices
- Delivering proactive, evidence-based reminders in home healthcare
- Reducing medication errors and readmissions
- Limiting redundant tests and treatments with interoperability between EHR systems
- Complying with HITECH Act Meaningful Use Stage 2, proposed Meaningful Use Stage 3, HIPAA and other regulations

Axway API Management also provides the capabilities IT professionals need to quickly transform existing IT services and business applications into a lightweight, flexible and secure API-oriented platform for mobile devices, machine-to-machine communications and the Internet of Things, so organizations can:

- Embrace new and better technology protocols
- Establish independence from HIS providers
- Support innovation within the IT organization
- Maintain the growing complexity of the API and data-file management infrastructure with minimal resources
Axway API Management for mobile back-end access and complex decision support capabilities enable payers and/or providers to:

- Deliver mobile and web self-service access to millions of members through a single, secure front door
- Use data from payer claims systems to provide a comprehensive health view of a patient to a provider
- Track medications compliance and consumption and share the information with caregivers
- Securely connect to medical devices that transmit patient information for preventive patient care and reducing re-admissions

**Conclusion**

Healthcare now operates in an increasingly digital environment; providers must be able to navigate and fully leverage these new capabilities in order to remain viable. Regulatory, economic and market forces are placing increasing pressure on the technology infrastructure of healthcare providers, who are experiencing rising costs, diminishing revenues and increased competition. To survive, many providers are rethinking their traditional inward looking, high-volume, profit-driven business model and embracing an outward-looking, value-based construct that puts the needs and outcomes of healthcare consumers first. Value-based healthcare relies heavily on continued patient engagement through mobile technology and the Internet of Things to reach individuals connected by smartphones, tablets and other mobile devices. These devices are driven by APIs, a technology that enables web-based and mobile applications to interact. By focusing on the patient side of the healthcare equation and empowering consumers through API-driven interoperability and mobile technology, providers have a way to level the playing field in the digital healthcare landscape.