INTEROPERABILITY ON FHIR

The growth of the FHIR (Fast Healthcare Interoperability Resources) standard and its current and future impact on healthcare interoperability.
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The healthcare industry has been desperately trying to achieve IT system interoperability for the better part of a decade. Interoperability has received attention at the highest levels — from hospital board strategies to government-driven initiatives to vendor and agency consortiums. While significant strides have been made during this time, the end goal of an IT infrastructure that seamlessly integrates to easily and securely exchange electronic patient information remains elusive. Ask any expert and they’ll tell you the secret to realizing this vision lies in the development of and universal adherence to agreed-upon, open technology standards.

Standards are not new to healthcare. In fact, some of our most foundational digital workflows are built on standards that go back 25 years or more. DICOM (Digital Imaging and Communications in Medicine) is one such example. This international standard is used to transmit, store, retrieve, print, process and display certain types of medical imaging information. However, in recent years the emergence of new standards specifically geared toward enhancing healthcare interoperability has accelerated. HL7 (Health Level Seven) standards for electronic health information exchange, integration, sharing and retrieval as well as the IHE (Integrating the Healthcare Enterprise) XDS (Cross Document Sharing) profile for registering and distributing electronic patient documents and records across healthcare enterprises are two such examples in a long list.

While there’s clearly no shortage of healthcare technology standards, interoperability struggles remain. Inherent limitations in each standard combined with inconsistent adoption, application and enforcement is to blame. The newest healthcare interoperability standard to hit the scene, FHIR (Fast Healthcare Interoperability Resources) hopes to change this narrative. The question is how is FHIR different? Where does it excel where other standards fall short? And what impact will it ultimately have on bringing healthcare interoperability to fruition?

WHAT IS FHIR?
FHIR was introduced nearly five years ago by HL7 as a draft standard that leveraged existing web-based standard concepts with an emphasis toward supporting clinical data exchange. It empowers organizations to leverage agreed upon and consistent data elements and formats (known as resources) to build an API (application programming interface) to power data exchange across systems.

According to the HL7 website, the philosophy behind FHIR is to build a base set of resources that, either by themselves or when combined, satisfy a majority of common clinical use cases. FHIR resources aim to define the information contents and structure for the core information set that is shared by most implementations. This information can be metadata or text or be bundled together to create clinical documents similar to C-CDA (Consolidated Clinical Document Architecture).

Each of the resources has a unique identifying tag that acts similarly to the URL of a web page. Users can access these tags on any browser-based device to obtain the designated information regardless of what EMR system is at the center of a provider’s infrastructure.

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HOW IS FHIR DIFFERENT?
The vast majority of other healthcare-focused standards have focused primarily on exchanging structured data and documents. FHIR, on the other hand, incorporates resources that are directed at exchanging unstructured information as well. This is a significant differentiator because it broadens the types of information that can be shared and systems that can be integrated.
Another notable difference between FHIR and other standards is the object model. For example, HL7 version 2 is a socket-protocol-based standard and version 3 is SOAP (Simple Access Object Protocol)-based. Both of these object models are often difficult to understand and implement, and adoption of these standards has suffered as a result. FHIR leverages a much simpler object model based on REST (Representational State Transfer) APIs — an architectural style specifically designed for web services development.

The REST APIs leveraged in FHIR are less cumbersome and more agile and intuitive than the socket-protocol and SOAP models of its HL7 predecessors, making solutions easier to implement, extend and scale. This is particularly true for programmers with a strong web and mobile background.

In fact, one of the frequent critiques against standards like XDS and other IHE profiles are there rigidity. In other words, these profiles are often difficult to vary, customize or extend. While FHIR can also be profiled, it’s web-based architecture makes the resources easy to extend and tweak.

One other critical FHIR differentiator is the fact that the vast majority of EMR vendors are embracing it. EMR systems have been established as the core clinical information sources in most hospitals and health systems and their adoption of FHIR is evidence of its promise as a standard.

Software vendors (including Hyland Healthcare) are increasingly adopting FHIR to create apps that extend the capabilities of EMRs, enhancing these platforms with data that enhances clinical decision making and improves outcomes. These apps support a wide variety of tasks — from predicting congestive heart failure and tracking diabetes care to facilitating medication management, medical image research and coordination of care.
THE NORMATIVE RELEASE
While FHIR has been around for nearly five years, the standard took a huge step toward longevity in January of 2019, when it was announced that FHIR Release 4 (R4) passed the normative ballot submitted to the American National Standards Institute (a national accrediting body). A significant portion of R4’s elements have received normative designation including the resources that determine how to use terminologies, how to build APIs and data formats that define how to recognize patients. A “normative” designation means all future changes to FHIR will be backward compatible. Therefore, applications that implement the normative sections of R4 can stay conformant with the standard without needing to reinvent products or services. This was an issue with previous releases of FHIR. The standard was constantly changing, and staying compliant often required significant code revisions.

HOW WILL FHIR EVOLVE?
While R4 is clearly a watershed moment for FHIR, it’s only the beginning. HL7 has already noted that FHIR Release 5 will build on R4 to expand normative content, enhance publishing implementation guidelines and improve support for apps that use multiple versions of FHIR. HL7 is committed to establishing FHIR as a platform from which interoperability can emerge, promising to provide reusable data across the continuum of care. Furthermore, the organization contents that the FHIR standard will never have a final version. Instead, much like a smartphone, FHIR will continue to evolve and improve.

HOW HYLAND HEALTHCARE LEVERAGES FHIR
Hyland Healthcare is at the leading edge when it comes to leveraging FHIR in its content services and enterprise imaging technology solutions. For example, we successfully tested several FHIR R4 integration profiles — including Mobile access to Health Documents (MHD) — at the 2020 Integrating the Healthcare Enterprise (IHE) North American Connectathon in Cleveland.

One of our earliest applications of FHIR came with the development of our Epic Web BLOB Pass Through solution. This solution allows patient content to be archived in OnBase, Hyland’s enterprise information platform, instead of the Epic BLOB (Binary Large Object). This strategy helps alleviate Web BLOB administration challenges and allows users to leverage valuable workflow capabilities. In this instance, FHIR is not only used to route content to OnBase, but also ensure documents can be retrieved and accessed directly from Epic. The end result is a seamless integration where documents appear to be stored and managed in Epic even though they reside in OnBase.

R4 will ensure a longer-lasting, more stable platform and greater interoperability. It allows vendors and health IT users to create and implement FHIR-based applications more consistently and uniformly, without worries of obsolescence due to a change in the standard. A wider range of healthcare organizations will be willing to adopt FHIR as a result.
From an enterprise imaging perspective, Hyland Healthcare has worked to layer patient mobile FHIR resources on top of existing IHE profile actors such as Patient Identifier Cross-Reference (PIX) Manager and XDS. NilRead, Hyland Healthcare’s enterprise and diagnostic viewer, also leverages FHIR to locate patient images based on metadata and link these images to requesting applications such as EMR systems. Finally, Acuo, Hyland Healthcare’s independent Vendor Neutral Archive (VNA), uses FHIR to support image consolidation and deidentification efforts to feed Artificial Intelligence (AI) and machine learning algorithms.

Going forward, Hyland Healthcare will start with FHIR as a default when it comes to evaluating and developing new health IT solutions. The standard will also serve as the backbone for bridging our content services solutions to our enterprise imaging solutions, providing seamless integration between the two suites.

Evidence of this is already being demonstrated through the development of what we’re tentatively calling the Hyland Healthcare “FHIR Engine.” The FHIR Engine is a server containing basic resources for viewing documents and images and searching patients. It is being built in such a manner that not only Hyland can add resources to it, but our customers and partners can as well. The FHIR Engine will be a standalone component that won’t be specific to OnBase, but can be leveraged from any of the repositories that exist in Hyland including OnBase, OneContent, Perceptive Content, Acuo and more.

**WHAT DOES FHIR MEAN FOR PROVIDERS AND PATIENTS?**

While it may seem overly technical to many, providers and patients have several reasons to be excited about FHIR. First, the ease with which FHIR allows content and information to be connected to and accessed from core clinical applications means providers will gain visibility into a wealth of new actionable information about their patients. This actionable information will help streamline processes and workflows while aiding clinicians in making more informed and accurate diagnoses and treatment decisions.

For example, Hyland Healthcare is currently working in conjunction with a drug interactions company to develop a FHIR-based interface that will automatically generate a document specific to each patient that outlines potential medication interactions, side effects and more based on the information contained in their medication lists. This type of actionable information can provide crucial clinical decision support and help prevent potential adverse drug interactions.

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FHIR may also be the key to the patient merge conundrum. Patients who see multiple providers in different health systems may no longer have to worry about having separate differing medical records at each of these facilities. Similarly, they may no longer need to manage multiple patient portals from providers that use different EMRs. One single health record that integrates data from different systems and formats may finally be possible with the help of FHIR.

Perhaps the most promising aspect of FHIR is its potential to make the healthcare user experience much more similar to the web-based environments we enjoy in other industries.

While the possibilities of FHIR are considerable, the standard is not a magic bullet for health IT interoperability. For example, FHIR is not immune to the legacy system challenges that often plague interoperability efforts based on other standards. Furthermore, FHIR may not be the best or most logical standard to use for every integration. FHIR must be strategically leveraged in conjunction with other standards — including XDS, HL7 and DICOMweb just to name a few — in order to truly establish an interoperable healthcare technology infrastructure.

Learn more at HylandHealthcare.com