Are you ready for FHIR?

Speed adoption of the new healthcare data exchange standard with FHIR Works on AWS and Cloudticity Oxygen™

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The Fast Healthcare Interoperability Resources (FHIR) standard addresses a critical challenge in the healthcare industry: the difficulty of exchanging healthcare information among providers, payers, patients, and other industry participants. In the past, healthcare data was too often trapped in disparate, proprietary systems. This forced organizations and patients to rely on slow, antiquated processes to access and share information. FHIR (pronounced "fire") is an open standard that enables legacy systems and new apps to more easily exchange data.

The FHIR standard builds on—and improves on—previous standards, including HL7v2 and CCDA (Consolidated Clinical Document Architecture). Unlike previous standards, FHIR uses RESTful web services and open internet standards, which should be familiar to most developers. FHIR offers the potential for greater interoperability with a broader range of devices and systems, such as many existing electronic health record (EHR) systems.

By developing new FHIR-compliant apps and building FHIR interfaces for EHR systems, organizations can produce important benefits for industry participants. Equipped with FHIR-based solutions:

- Clinicians can more efficiently share patient data such as scans, notes, and test results among teams to speed decision-making.
- Insurance companies can supplement claims data with clinical data to better assess risks, drive down costs, and improve outcomes.
- Patients can take greater control of their health care by accessing medical information through consumer-friendly apps running on smartphones, tablets, and wearables.

These benefits will be important enticements for healthcare industry organizations to adopt FHIR. But many do not have a choice. In 2020, the U.S. Centers for Medicare & Medicaid Services (CMS) finalized a mandate for the use of FHIR by a variety of CMS-regulated payers and providers beginning in mid-2021.

What is FHIR?

The FHIR specification—created by not-for-profit Health Level Seven International (HL7)—is designed to facilitate the exchange of electronic healthcare information. First drafted in 2011, FHIR draws from previous HL7 standards and uses a developer-friendly RESTful internet-based approach for accessing information.

To learn more about FHIR, visit:

FHIR Project

Why is FHIR required?

The CMS Interoperability and Patient Access final rule establishes several new policies meant to improve access to health information and facilitate greater interoperability among healthcare systems. For example, the rule requires CMS-regulated payers to implement and maintain a secure Patient Access application programming interface (API) so that patients can easily access information about claims through third-party apps. It also requires many types of plans and providers to make provider directory information publicly available through a Provider Directory API. And it requires CMS-regulated payers to share patient clinical data with other payers at the patient's request.

To support these and additional policies, CMS adopted technical standards defined in the Office of the National Coordinator (ONC) 21st Century Cures Act. These technical standards require the use of FHIR.

For more information, see "CMS Interoperability and Patient Access final rule" and "ONC's Cures Act Final Rule"

Unfortunately, adopting the FHIR standard can be challenging. Understanding the specification and then building a FHIR service that exchanges data in compliance with the standard requires substantial time and resources. IT teams then need to manage that service going forward.

For many organizations, using a cloud-based FHIR implementation will provide the fastest and most economical approach to adopting the standard. But to make the most of that cloud implementation, organizations should work with a partner that has deep experience launching and managing healthcare solutions in the cloud.

Identifying the key challenges of FHIR adoption

If your organization is a healthcare provider or payer affected by the CMS mandate, you must adopt FHIR or face regulatory fines. You need to move fast to meet mandated deadlines — but you should be aware of some potential hurdles before you make any decisions.

First, a commercial FHIR implementation might not be an option. FHIR is still a nascent standard, and there are relatively few commercial options available. Those options can also be expensive, especially if they are bolted onto existing EHR systems or other solutions.

Building your own in-house FHIR implementation might require your developers to sort through multiple commercial and open-source projects. Developers also must take the time to learn and understand the FHIR specification, which is long and complicated. For example, there are 145 defined resource types in the specification, all in varying levels of maturity within this evolving standard. Evaluating multiple commercial implementations and open-source projects, and modifying those implementations and projects — all while also learning the specification — can slow your organization's progress.

Finally, building an interface or app is just the first step. Your team will need the skills and resources to manage and scale your backend FHIR service in the future. That might involve managing and maintaining new infrastructure.

Building a FHIR-based service in the cloud

Using a FHIR cloud implementation can help you address some of the challenges of adopting FHIR and building a FHIR-based service. The right cloud implementation will enable you to accelerate provisioning of your environment, customize the environment, and scale up as necessary — all while controlling costs.

Faster infrastructure provisioning

Developing a FHIR-based service that enables easier access to health information requires infrastructure — including servers, storage systems, and databases. Acquiring, deploying, and configuring that infrastructure in your own data center can take months. In the cloud, provisioning infrastructure resources can take just minutes. You can significantly accelerate FHIR adoption using the cloud's virtual infrastructure.

Reduced infrastructure costs

A cloud-based FHIR implementation that uses modern cloud-native tools and frameworks minimizes the need for physical infrastructure. In particular, a "serverless" application model — which executes application functions only when required, rather than continuously running full applications—requires you to use and pay for far fewer compute resources than a more traditional application model.

Flexible resources and a variable-cost approach

To provision a physical server in your own data center, you have to buy the server. If the server is undersized, performance will suffer. On the other hand, if you have too much compute power or capacity to spare, you're wasting money. With the cloud, you can easily expand — or shrink — your environment as your data and processing volumes change. You only pay for what you use.

Innovative cloud-based services

When you choose a cloud FHIR implementation, you can tap into a wide variety of innovative services offered by the cloud provider. For example, you might decide to integrate a cloud-based data visualization service to create health dashboards for patients or to enable public health agencies to identify the location of virus outbreaks. You could integrate cloud-based machine learning (ML) models to help generate new insights for clinical or public health decision-making.

Data integration

The right cloud can help you simplify data integration with other, non-FHIR data sets. For example, healthcare providers might want to incorporate genomics data with clinical information to better identify genetic risks for patients, improve diagnostics, fine-tune prognoses, and select the most effective treatments. Those genomics data likely already reside in the cloud, so using a cloud-based FHIR implementation would enable you to integrate those data without excessive complexity.

Simplifying FHIR adoption with FHIR Works on AWS

FHIR Works on AWS is an open-source, cloud-based software toolkit that offers unique advantages for building FHIR-based services. Your organization can accelerate FHIR adoption while using innovative technologies to enhance the interface or app you are creating.

Streamlined deployment

FHIR Works on AWS employs a modern, serverless application model, which significantly simplifies deployment and reduces the need for physical servers. Using cloud-native services, your developers can provision code — plus the infrastructure required to run it — at the push of a button. The environment scales automatically as needed. There are few to no servers to provision or manage.

Explore FHIR Works on AWS

To learn more about this open-source FHIR project from AWS, visit:

https://aws.amazon.com/blogs/opensource/using-open-source-fhir-apis-with-fhir-works-on-aws/

FHIR Works on AWS also incorporates additional cloud-native tools to help you quickly set up your environment and deploy your service at tremendous scale. For example:

- **Amazon API Gateway** simplifies the developer process of building and managing APIs.
- **Amazon Elasticsearch Service** enables you to provide a rapid, personalized search experience that makes it easier to find information within fast-growing data volumes.
- **Amazon Cognito** allows you to implement authorization and authentication capabilities.
- **AWS Key Management Service (KMS)** simplifies the creation and management of cryptographic keys.
- **Amazon DynamoDB** lets you easily deploy a fully managed, high-performance, scalable NoSQL database.
- **Amazon Simple Storage Service (Amazon S3)** streamlines provisioning of scalable storage.

Customization

Because FHIR Works on AWS is an open-source project, it offers great flexibility for customization. You can contribute modifications to the source project, customize the default API that the toolkit provides, and tailor the architecture you use for the service you are building. For example, if you decide you want to use a database other than DynamoDB, you can do so without having to rewrite the entire software stack.

Access to innovative technologies

With AWS, you can integrate a variety of additional cloud-based services to enhance the FHIR service you are building. The Amazon SageMaker fully managed ML service, for example, enables developers and data scientists to rapidly build, train, and deploy ML models. Amazon also offers business analytics and data visualization tools, and it provides access to additional tools through the AWS Marketplace. Building on AWS lets you augment your service with unique capabilities more quickly and easily than if you were to build a FHIR implementation in your own data center.

Recognizing the requirements of cloud deployment and management

Despite the important advantages of the cloud-based FHIR Works on AWS, building on the cloud can still be daunting. FHIR Works on AWS simplifies FHIR adoption, but it does not completely eliminate important administrative work. What do you need to know before moving forward?

First, managing a cloud environment is not the same as managing a data center. Even routine tasks are different. For example, when you are using a serverless application model in the cloud, administrators cannot log into a physical server to troubleshoot problems. Learning effective management of a cloud-based environment can consume significant time and resources if your staff does not have deep cloud experience.

In addition, using FHIR Works on AWS to build your service does not automatically guarantee regulatory compliance. You need ways to simplify HIPAA compliance and even achieve HITRUST certification.

Addressing the requirements and challenges of using a cloud-based FHIR implementation is essential for realizing the full value of the cloud in reaching your higher-level goals. After all, you want to do more than manage a cloud environment. You want to use the cloud to enhance your existing software and develop new, innovative apps. And at an even higher level, you want to deliver new clinical insights, improve efficiency, and produce better healthcare outcomes.

Maximizing the value of FHIR Works on AWS with Cloudticity Oxygen

The Cloudticity Oxygen™ managed cloud solution helps maximize the value of FHIR Works on AWS so your organization can stay focused on innovation. Oxygen automates the delivery of managed services, managed security, and managed compliance. So offloading administrative tasks is just as easy as using a software-as-a-service (SaaS) platform. A team of cloud experts can help you optimize the cloud environment for your FHIR service and make sure everything stays up and running around the clock.

Why Cloudticity?

Cloudticity has deep expertise empowering healthcare organizations to create and scale the next generation of healthcare solutions. Since our founding in 2011, we have helped organizations deliver some of the healthcare industry's first solutions in the cloud. Our team can help your organization unlock the full potential of the cloud as you develop FHIR interfaces and FHIR-compliant apps.

Cloudticity Firsts for Healthcare in the Cloud

- First patient portal in the cloud
- First health information exchange in the cloud
- First and only FISMA high deployment on AWS GovCloud
- First Meaningful Use Stage 2 (MU2) compliance attestation for a large hospital system
- First AWS partner to earn the AWS Healthcare Competency

Importantly, unlike other providers of managed cloud services, we speak your language. Our focus on healthcare means that you don't need to translate your healthcare goals for us.

We also have a tight partnership with AWS, holding several partner designations and competencies.

- AWS Audited Managed Service Provider (MSP) Partner
- AWS Healthcare and DevOps Competencies
- AWS Public Sector Partner
- Advanced AWS Partner Network (APN) Consulting Partner
- Authorized AWS Channel Reseller
- AWS Authorized Government Reseller

Why Oxygen for FHIR?

Oxygen can help you meet critical IT and regulatory requirements.

Continuous compliance: Oxygen automates HIPAA compliance and HITRUST certification by implementing thousands of continuous compliance checks. It capitalizes on ML to identify and automatically remediate any drifts in your compliance posture.

Agility: Oxygen enables you to adapt to change rapidly, with minimal human intervention. A self-service model allows you to deploy infrastructure quickly while automated infrastructure operations help you increase the velocity of development.

Reliability: With Oxygen, you can implement a highly available architecture on AWS, work with your account team to eliminate single points of failure, continuously monitor and automatically fix problems, and depend on an always-available service desk to address any urgent issues.

Security: ML-based anomaly detection, incident management, managed intrusion detection and prevention, and a virtual Security Operations Center (vSOC) help safeguard sensitive healthcare data.

Performance: With real-time data monitoring plus autoscaling capabilities, Oxygen helps ensure that your FHIR service continues to run at optimum performance.

Cost optimization: The Cloudticity account team can help you make the most of the serverless application model, uncover hidden cloud costs, and identify other ways to control ongoing spending.

By managing your FHIR Works on AWS environment for you, Oxygen enables you to focus on higher-level goals.

You can devote more of your IT resources to developing the FHIR interfaces and new, innovative apps that will make it easier to exchange healthcare information. Those interfaces and apps can help enhance clinical decision-making, increase efficiency, reduce costs, empower patients with their own healthcare information, and ultimately improve outcomes.

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CASE STUDY

Accelerating the AWS cloud journey for MiHIN

Michigan Health Information Network Shared Services (MiHIN) is a nonprofit, public/private collaboration dedicated to improving the quality, efficiency, and safety of healthcare for Michigan residents.

Challenges

The organization needed to enhance agility for delivering new services and scale up its technology resources to better support the fast-growing volumes of patient information messages that pass through its network. At the same time, the organization's leadership team wanted to reduce costs, moving away from the fixed costs of a co-located data center to the variable-cost model of the cloud.

Solution

MiHIN decided to move to AWS for its scalability, security, and high availability. Using Cloudticity Oxygen, the organization was able to fully migrate to AWS within 90 days. Cloudticity continues to manage the organization's AWS services and assist with compliance issues.

Benefits

- **Flexible cost model:** MiHIN eliminated the fixed costs of the previous data center and shifted to a more flexible variable-cost model.
- **Compliance:** With help from Cloudticity, MiHIN achieved HITRUST certification.
- **Innovation:** Cloudticity helped MiHIN deepen its AWS expertise. MiHIN created an Advanced Cloud Services division to develop innovative services on AWS that will benefit millions of people.

Get started today

The FHIR standard has the potential to address the longstanding data exchange challenge in the healthcare industry while positively affecting the quality and efficiency of care. The CMS mandate leaves no doubt: the time for change is here.

FHIR Works on AWS can help you simplify adoption of the new standard as you build a FHIR-compliant service. By using the Oxygen managed cloud solution with FHIR Works on AWS, your organization can offload time-consuming, resource-sapping tasks and stay focused on delivering a full range of FHIR benefits for your organization and the industry.

For more information about how Cloudticity can help you get started with AWS FHIR Works, speak with a healthcare cloud expert today.

Learn more

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