

White paper

# **API 101:** **An introduction to** **APIs and how they are** **transforming health IT**

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## Introduction

Application programming interfaces (APIs) make it easy for two applications to connect, collaborate, and exchange data. Using an API, a software application can request information from, share information with, or command another application to do something.

Because APIs usually work behind the scenes to integrate different systems, this kind of integration is referred to as “seamless,” meaning the user doesn’t realize they are accessing information from more than one application, as they are only interacting with one.

APIs create a secure channel for communication and data transfer. The only access to the information being shared is via the two software applications that are communicating using authentication and authorization protocols, making APIs a secure method of communication.

APIs have evolved since the dawn of computing in the 1960s and today, power the modern digital economy. APIs have led to radical transformations in retail, finance, and many other industries. Virtually every major software-based service – from Google to Twitter to Facebook – uses APIs to create a seamless experience for users while their applications connect and collaborate across platforms.

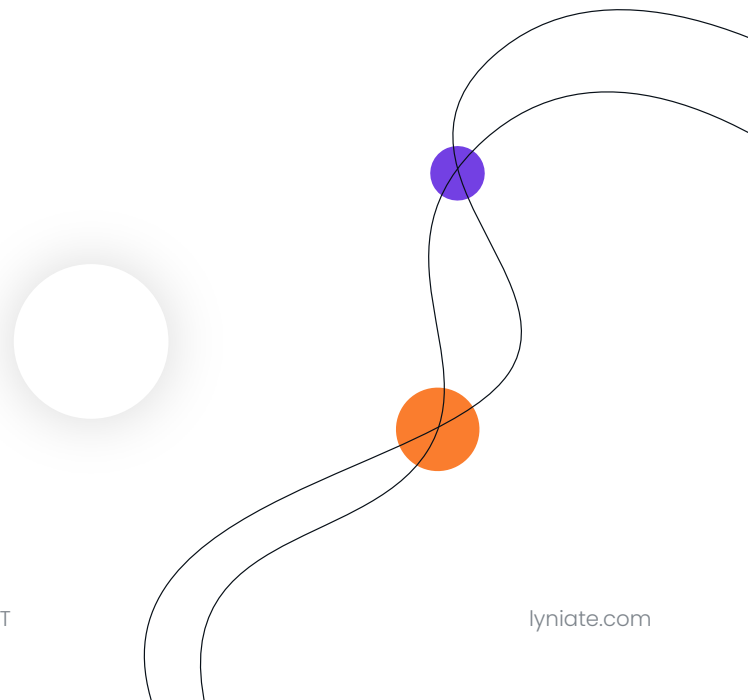
APIs can help most organizations realize the value of data and information access faster than ever before.

API technology has transformed the digital economy and are now poised to do the same in health IT by solving one of the most critical challenges we face today: interoperability. Barriers to interoperability include silos of information created by cumbersome, outdated systems; laggard standards adoption; and the time, resources, and money required for integration.

### What do you need to know before diving in?

In this white paper, you will learn:

- What APIs are and how they work
- How APIs can solve for interoperability barriers in health IT
- The advantages of using APIs compared to traditional integration methods
- The potential API technology brings to health IT



## What are APIs and how do they work?

APIs allow software applications to connect, communicate, and collaborate through web services. Through an API, one software application can request information from or share information with another, or it can command another application to do something.

For example, if you order a product from Amazon, you may want to track the shipment to know when it will arrive. In many cases, Amazon relies on shipping services like the U.S. Postal Service (USPS) for delivery. You could track your package using the tracking number provided by USPS on the USPS website or mobile app. However, in order to provide a seamless experience for their customers, Amazon uses an API to ask USPS for shipping updates so you can track your package without having to actually leave Amazon's website or mobile app. Amazon isn't duplicating the data or storing the shipping information in their databases – they don't have to. The API call between Amazon's application and USPS provides real-time shipping information for your package.

APIs are a combination of two technologies. Web services harness the power of internet communication protocols to provide a secure channel to connect two applications and transmit data. Standards like JSON and XML provide data-interchange formats, or objects. These objects are easy for humans to read and write and for machines to generate and parse.

Using an API to communicate, the applications use a standard format that lets them connect and share. Neither application knows or cares about the internal workings or data structures of the other application. The format used by APIs to communicate is flexible and extensible – it's easy to update or change. This flexibility is an advantage since it provides a path for future improvement while preserving the past for compatibility.

Through an API, one software app can request info from or share info with another, or it can command another app to do something.

### APIs Use Objects To Collaborate

- Hides complexity
- Flexible and extensible
- Easily read by humans and machines

How's the weather been?

Ben



Stormy! Rain, lightning, rough surf and high winds from the east.

Mary



**Application Ben "asks"**

`Get /Service/TheWeather/now`

**Application Mary "replies"**

```
{ "weatherCondition": "stormy", "rain": "yes", "lightning": "yes", "surfConditions": "rough", "windSpeed": "25", "windDirection": "east" }
```

## Barriers to interoperability in health IT

Interoperability is the ability for applications, systems and devices to connect, exchange, and use data in the health IT ecosystem to optimize healthcare. Interoperability is a crucial component in providing efficient and effective care for the benefit of individual patients and populations.

The drive toward value-based care has made interoperability and data even more critical in health IT. Providers, payers, and others need increasing amounts of data to improve administrative performance, reveal the costs of care delivery, and manage payments under the terms of multiple risk-based contracts. Data can also be used to analyze and understand the actuarial risks of patient populations.

With increased access to healthcare data, the patient and clinician experience can be and is being transformed. APIs allow for enhanced patient engagement through patient portals, aggregation of health data, and facilitation of telehealth. Getting data in the right place at the right time improves care coordination and clinical outcomes by equipping the care team with optimal clinical decision support.

Despite recent advances, interoperability remains one of the biggest challenges in health IT. There are several reasons for this: inherent limits of legacy integration technology, lack of true standards, and systems deployed as separate silos of information. Typically, the integration and adaptation of these systems is costly, both in terms of money and resources, and often falls short of providing all the data needed.

Legacy integration systems that are widely used in healthcare today are also difficult to adapt to new uses, which creates data silos, impedes innovation, and limits coordination across departments or health systems. Often, the result is applications that don't work well together and are frustrating for administrators, clinicians, and patients.

EHRs use proprietary vendor software and often don't communicate enough with one another, creating challenges for data sharing. To integrate third-party applications with EHRs, developers must either rely on existing data feeds (which may or may not meet their needs) or build integration connections from scratch, which takes time, money, and resources.

Further complicating this situation is a lack of enforceable standards, which means developers often must code to each EHR instance, or accept limitations of existing feeds or adapters, which slows down innovation and adoption while driving costs even higher.

Fortunately, it's now possible to avoid costly IT integrations and migrations. APIs can enable data integration between different EHRs and applications within hours (not weeks or months), allowing health IT innovators to develop, adopt, and leverage solutions more easily.

The emergence of standard APIs like the Fast Healthcare Interoperability Resource (FHIR) are also moving health IT closer to a "plug-and-play" approach to interoperability.

## Under the hood: the move toward SOA

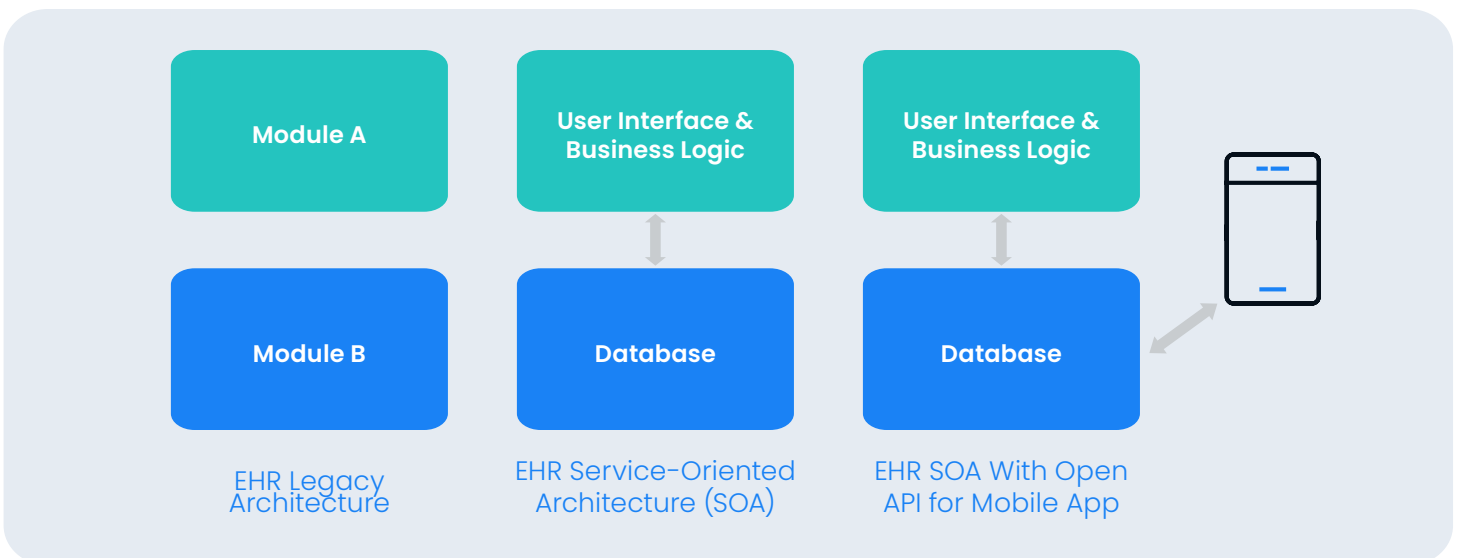
In recent years, there has been a significant shift in application design toward a services-oriented architecture (SOA). Previously, monolithic applications were designed as a set of self-contained modules with little or no interaction.

SOA reimagines these modules as services that can communicate and collaborate.

This shift toward SOA is also occurring with health IT. EHRs, in particular, are shifting toward SOA, which makes them more flexible.

APIs will accelerate this move. APIs can be used to extend core services and exchange data between EHRs and other applications. Making these APIs “open” or publicly available, will further transform EHRs into platforms for innovation and lay the foundation for a flourishing, diverse healthcare app ecosystem.

APIs can be used to extend core services and exchange data between EHRs and other apps.



## FHIR APIs

Health Level Seven International (HL7) has guided the development of FHIR, a standard set of specifications for web-based resources. HL7 FHIR is an ever-expanding set of capabilities developed via consensus and real-world validation that is simplifying the use of APIs in health IT.

HL7 FHIR defines resources as exchangeable content. These resources must have a common definition and a unique identifier, making it easier for data to be accessed by other applications or devices. Resources are used as building blocks, so developers can create applications with fast access to accurate data – no matter what EHR or application they are using.

Recently, the Office of the National Coordinator for Health Information Technology (ONC) released a set of rules mandating the use of API technology that complies with FHIR specifications. This is an important step forward and will ensure foundational compatibility and basic interoperability.

It's important to note that FHIR is evolving and currently offers a somewhat limited dataset and lacks key functionality like population-focused APIs. Also, as we have seen with other healthcare "standards," vendors may implement them differently, moving FHIR away from a true plug-and-play standard. There are also concerns when it comes to balancing the needs for a standard approach with the desire to support cutting-edge applications and innovation. It's important to avoid FHIR inadvertently becoming an innovation bottleneck.

A "best of both worlds" approach that combines standards like HL7 FHIR and supports the development of custom APIs will drive health IT forward by balancing cutting-edge development with the spread and adoption of emergent common standards. Experimentation at the leading-edge will also help identify and define new FHIR resources in response to market demand.

APIs create a secure channel to quickly transfer data in real-time, without the need to store any data locally. Since APIs do not need to store data, this reduces security risks while enabling third-party applications to benefit from the same real-time access as native applications like EHRs. APIs can also be designed with a unified data model (UDM) that is EHR-agnostic, which makes them highly portable and scalable. UDMs make it possible for third-party developers to use the API without worrying about having unique EHR-specific coding.

Regardless of the approach, APIs offer third-party vendors and health systems an elegant way to adopt custom APIs and standards like FHIR. APIs may look the same as other middleware integration productions, but they can leverage the native application infrastructure without requiring expensive development.

[A "best of both worlds" approach that combines standards like HL7 FHIR and supports the development of custom APIs will drive health IT forward.](#)

## Security

APIs are a RESTful solution, meaning they are a pass-through for the data. Data does not need to be replicated in duplicate databases but lives in a single source of truth – such as the EHR – and is accessed when needed in real-time.

Contrast this with traditional integration methods like HL7 or exchanging “flat files” of patient records between organizations or applications – a method that leaves no record of who viewed the patient record information or where else that information may have been sent or stored.

By only exposing data via APIs, potential vulnerabilities become limited to a small set of endpoints. This approach gives the IT group greater control of who gets access to data with a standard path to authentication. Access to data can be restricted as needed, with robust audit logs to track and report data requests and access.

## Benefits of APIs

Today, it takes time and IT resources to build custom interfaces to every EHR instance. However, with a universal API, developers can install once and are ready to deploy across multiple EHRs. Since APIs can be portable, they reduce development costs. APIs eliminate the cost of custom interface development and maintenance and may also reduce EHR vendor interface fees. APIs can be deployed and used within hours, and users can rapidly begin to see value.

[Access to data can be restricted as needed, with robust audit logs to track and report data requests and access.](#)

## Conclusion

Health IT is now poised to make a meaningful and cost-effective leap forward by leveraging the technology that has transformed the modern digital economy – APIs.

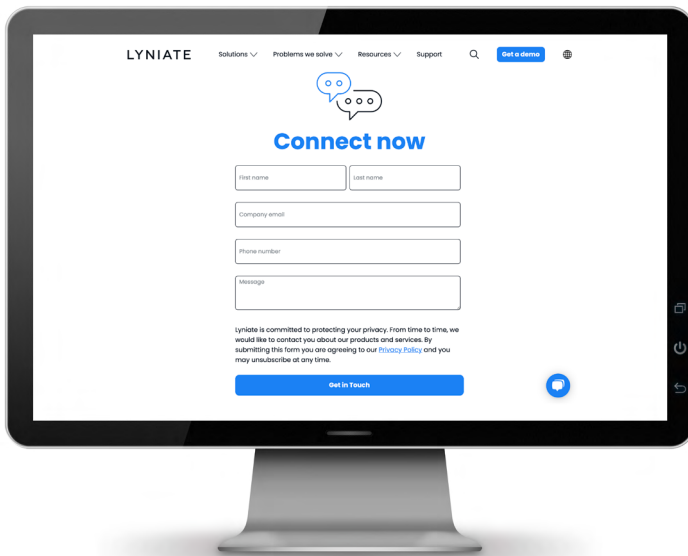
The importance of this approach should not be underestimated. API technology unleashes innovation, making data flow freely and allowing applications to build upon and cross-leverage functionality. This can dramatically reduce the time from idea to impact on the real world.

Given the scope and scale of the challenge of reinventing healthcare, this is precisely the technical innovation we need. APIs enable easy-to-use, convenient apps, engaging clinicians and other end-users instead of frustrating them. By eliminating head turning, copy and pasting, and toggling between screens, APIs create a seamless workflow to provide a better user experience and more effective outcomes for patients.

In the emerging world of value-based care, APIs will be an even more critical part of a health IT strategy that allows organizations to thrive. When app users are given the right tools, health care organizations win, and so do the users and the patients they serve.

[In the emerging world of value-based care, APIs will be an even more critical part of a health IT strategy that allows organizations to thrive.](#)





## Your next step:

[Get your integration project started!](#)

Talk to our experts today to discuss your integration challenges. Schedule a conversation to learn more about Lyniate Rapid, a healthcare-specific API gateway and manager. With Rapid, you can create, publish, maintain, and monitor APIs at scale, including the ONC and CMS mandated FHIR standard structured APIs.

[For more information, visit \[Lyniate.com\]\(https://lyniate.com\).](#)

## About Lyniate

Lyniate partners with healthcare organizations around the globe delivering flexible interoperability solutions that connect people through increased access to data. As a trusted partner, Lyniate powers the applications and workflows that improve clinical, operational, and financial outcomes today while helping healthcare teams to understand, prepare for, and influence changes on the horizon. Lyniate is committed to empowering people with the best interoperability solutions for healthcare, from specialty clinics to large networks, from payers to vendors, and everything in between.