



# Agilex Supports the Nationwide Health Information Network

## NEW OPEN-SOURCE SOLUTION BEING USED BY FEDERAL AGENCIES TO SECURELY SHARE HEALTH INFORMATION

### Overview

FHA released a contract to build CONNECT, and as part of the winning contract team, Agilex helped drive the development of CONNECT, the open-source gateway solution that over twenty federal agencies can use to securely exchange medical records and other data via the Nationwide Health Information Network (NHIN). Agilex provided capabilities in the areas of project management, software development, system integration, testing, documentation, product packaging and release management.

The CONNECT solution was built using service-oriented architecture (SOA) principles, making it adaptable and extensible enough to meet the needs of a very diverse user community while incorporating additional functionality as it is developed. This flexibility has also established it as a platform for defining and implementing new policies and procedures, such as those for protecting patient privacy.

Use of the Scrum methodology for Agile software development allowed the project to meet a highly compressed delivery timeline, with automated testing integrated into the process to offer mission-critical quality assurance. The CONNECT solution was subsequently recognized by the Office of the National Coordinator for Health Information Technology as the 'reference implementation' for accessing the NHIN.

### Office of the National Coordinator for Health Information Technology

The Office of the National Coordinator for Health Information Technology (ONC) serves on behalf of the Department of Health & Human Services (HHS) as the lead federal entity for the nationwide implementation and use of health information exchange. In this capacity, ONC is responsible for the development of the Nationwide Health Information Network (NHIN), a secure, nationwide and interoperable health information infrastructure connecting providers, consumers and other healthcare actors.

These efforts are being supported by the Federal Health Architecture (FHA), an e-Government, Line-of-Business initiative managed by ONC that will provide a shared, common interface to the NHIN - known as CONNECT - that over twenty-six government agencies can use to securely exchange health information. Agencies participating in the NHIN trial implementations using CONNECT included the Departments of Defense (DoD) and Veterans Affairs (VA), Social Security Administration (SSA), Indian Health Service, National Cancer Institute and Centers for Disease Control and Prevention.

## Challenge

Presidential Executive Order (PEO) 13335 called upon the United States to create an “interoperable health technology infrastructure” to improve the quality, efficiency, safety and effectiveness of the U.S. healthcare system. This April 2004 mandate also established widespread adoption of interoperable electronic health records within ten years as a primary objective.

While the PEO was fairly descriptive to what should be accomplished, the challenge confronting the newly-created Office of the National Coordinator for Health Information Technology was how to achieve these goals as this was an undertaking of unprecedented magnitude – essentially, a put a man on the moon program for healthcare.

The idea of utilizing a centralized database or master patient index for all electronic health records was quickly rejected as untenable. Alternatively, ONC proposed that the NHIN serve as a ‘network of networks’ that would link existing and emerging health information exchange (HIE) communities together as a super-network for the secure sharing of health information. In this context, the NHIN would rely upon a coordinated system for querying, vetting, accessing and retrieving health information from these databases simultaneously. In terms of its technical architecture, the NHIN would forgo the need for a dedicated network, developing specialized services, standards, specifications and policies to augment the existing Internet instead.

This was the hope anyway. However, significant questions remained as a healthcare system of this scope and complexity had never been deployed before. Rather, the network’s initial development would serve as a real-world pilot, where a number of decisions regarding how the NHIN would be implemented and operate would be addressed.

Another complication was the late addition of the federal government to these ‘trial implementations,’ which were initiated in September 2007 with nine regional consortiums agreeing to use the network to exchange health information within twelve months. Operating as part of the ONC-managed Federal Health Architecture, a number of federal agencies subsequently joined the ongoing trials. Left unresolved was how FDA proposed to interact with the NHIN while meeting the unique requirements of each participating agency.

Finally, ONC needed to look to the future while addressing the immediate need to make the network operational. For example, concerns existed about the extensibility of the architecture and the sustainability of the network. The trials would need to show that both were designed to be self-sustaining.

## How We Helped

### **SCRUM DELIVERED NEEDED FLEXIBILITY, FULL PROGRAM ACCOUNTABILITY AND BETTER SOFTWARE**

While the first nine contracts to participate in the NHIN trial implementations were issued in September 2007, the federal community committed to the trials later in the year, which meant that a corresponding contract for the federal sector wasn’t awarded until March 2008. Despite starting six months after the other NHIN participants, the FDA team would still need to meet the existing timeline, which meant that their solution needed to be ready for an initial demonstration of the network in just five months.

With this in mind, Agile utilized the Scrum methodology for Agile software development to help manage the program. Work is divided into short sprints – typically, two weeks in duration – with actual progress physically assessed at the conclusion of each period. Integrated quality control was another key feature as obstacles and programming errors were caught almost immediately through automated testing conducted each evening.

For this type of project, the benefits of Scrum were significant:

- Scrum offered a defined process for soliciting input and building consensus amongst diverse stakeholders
- It delivered greater accountability and transparency as progress could be independently and quantifiably assessed on an ongoing basis
- Scrum was more supportive of the necessary ‘trial & error’ inherent in developing an entirely new product due to its iterative nature
- It provided more accurate scoping and project planning estimates as it used actual past performance and relative sizing to forecast subsequent requirements

Through the use of Scrum, the project team was able to successfully meet each deadline despite their six-month delay in getting started and infinitely more complex computing environment.

### **SOA CHAMPIONED FOR ADAPTABILITY AND EXTENSIBILITY**

Another critical early decision was the choice to pursue a SOA-based approach for the CONNECT gateway. This approach would allow the team to capitalize on a number of services already developed for the project. Furthermore, SOA would provide each agency with additional latitude for customizing their implementation as many already had elements of the solution, such as a Master Patient Index (MPI) or policy engine, in place.

In the end, SOA proved critical to meeting the highly specialized requirements of each agency as this standards-based approach meant that required interfaces and adapters could be more quickly developed and deployed. It also delivered significant extensibility as additional features were simply layered upon the existing implementation as they were created.

## **POLICIES, STANDARDS AND SPECIFICATIONS CREATED TO PROTECT PATIENT PRIVACY**

What distinguishes the NHIN from the traditional Internet is a collection of specialized services, standards, specifications and policies, which are implemented by the gateway to govern the use and sharing of health information. To define these software requirements, the development team needed to translate a series of use cases into a solution architecture.

Of paramount concern was the need to protect and safeguard patient confidentiality. This led the team to create a rules-based authorization framework for authenticating requests in accordance with NHIN policies and procedures. In addition to complying with requirements like HIPAA, it also enabled the deployment of new approaches, such as a Data Use and Reciprocal Support Agreement (DURSA) that provides an overriding legal framework for the NHIN. The solution is also compliant with all applicable regulations for federal software, including FISMA and NIST 800-53.

## **STREAMLINING DEPLOYMENT ACROSS MULTIPLE HETEROGENEOUS ENVIRONMENTS**

Developing the solution itself and configuring it for each organization was just half the challenge. At the same time, the development team also needed to support both formal and informal testing. This necessitated maintaining multiple versions of the software simultaneously to accommodate external users at different levels of development. This flexibility was critical to the success of the initial test event in August 2008 as well as the more extensive use case demonstrations in December 2008.

## **CREATING AN OPEN SOURCE COMMUNITY**

The CONNECT gateway was developed as an open-source solution with the hope of encouraging widespread adoption within the federal government, at the state and local government level, and by private sector organizations. These efforts are being advanced through an online community – [www.ConnectOpenSource.org](http://www.ConnectOpenSource.org) – where users can download the software, access training and documentation, and share best practices.

## Solution

The CONNECT gateway is a turnkey solution configured to deliver out-of-the-box all of the functionality required to interface directly with the NHIN. As a standards-based solution, it delivers full interoperability via the Internet with all NHIN compliant systems. Key components include:

**CONNECT Gateway** – The gateway itself provides a standards-based interface to the NHIN as well as the core services required to interact with other providers. Underpinning the gateway is an enterprise service bus (ESB) messaging hub for managing system-to-system communications and the authentication framework for authorizing requests. Among the functions supported by the gateway are Subject Discovery, Document Query & Retrieval, Consent Management, Health Information Event Management, Auditing and Pseudonymization.

**The Enterprise Service Component (ESC)** – The ESC provides default implementations of many critical enterprise components required to support electronic health information exchange, including a Master Patient Index (MPI), Document Registry and Repository, Authorization Policy Engine, Consumer Preferences Manager, HIPAA-compliant Audit Log and others.

**Universal Client Framework** – The framework contains a set of applications that can be adapted to quickly create an edge system, and be used as a reference system, and/or can be used as a test and demonstration system for the gateway solution. This makes it possible to innovate on top of the existing CONNECT platform.

## Results

- The initial CONNECT gateway was delivered in just five months with an open source version made generally available in less than a year.
- The CONNECT gateway met all of the requirements of the demonstrated use cases, paving the way for the network's widespread deployment as a key component of the Obama Administration's healthcare reform agenda.
- CONNECT was used to define and implement policies and procedures for safeguarding patient privacy.
- The open-source software has been downloaded by numerous organizations with over one thousand developers registered to attend the inaugural user conference.
- By making it possible to verify health status in just minutes instead of weeks, SSA has reduced processing times for disability claims from 84 to 25 days.
- Federal agencies, states and private sector organizations are in the process of implementing the CONNECT gateway as their primary solution for securely sharing health information via the NHIN.

## About Agilex

Agilex is an employee-owned enterprise application, solution, and advisory firm. Our noteworthy business and technology professionals offer innovative thinking on leveraging advanced technologies. We make it possible for our clients to optimize systems and exploit data to realize the value of information. Headquartered in Chantilly, Virginia, Agilex has delivered significant results for an impressive list of clients throughout federal, state and local government, and within global 2000 corporations.

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Agilex Contributes to the Nationwide Health Information Network

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