Partners HealthCare Center for Personalized Genetic Medicine

Advanced integration and development
Flexible business process management
More than just HL7 interfacing

Partners HealthCare uses InterSystems Ensemble® to create a breakthrough in personalized medicine

In 2009, Partners HealthCare Center for Personalized Genetic Medicine (PCPGM), in Boston, tested a man from Utah for genetic markers of an inheritable heart condition – hypertrophic cardiomyopathy. Partners then used a new clinical genomics networking system it developed, based on the advanced integration technology of InterSystems Ensemble, to transfer the test results to the man's electronic medical record at Intermountain Healthcare in Salt Lake City, Utah. This first-ever successful electronic transfer of genetic test results marked the opening of a new era in personalized medicine. Had they been printed, the 13 pages of results would have been difficult to access, share, and interpret for most physicians.

Digging into the DNA

Personalized medicine is based on the concept that genomic testing can provide information about a person for tailoring medical care to individual needs. The identification of an individual's DNA base pairs that vary from normal – variants – is the first step in personalized medicine. Variants then need to be correlated with known effects before being communicated to the physician. Adding this information to a patient's electronic medical record (EMR) can, for example, help guide selection of drugs to minimize side effects, or help build a strategy for a more successful treatment outcome.

Putting DNA into the EMR

The trick is getting complex genetics data into the EMR, and putting meaningful information in front of the physician. The lack of systems for processing and communicating this data, and software to help physicians make effective use of it, has hindered progress. The breakthrough of the PCPGM/Intermountain transfer was made possible by PCPGM's development of VariantWire, the clinical genomics networking system based on InterSystems Ensemble. The project also included close work with the HL7 Clinical Genomics Workgroup on genetic variation messaging standards, and development of software for identification of variants and their role in health and disease.

A powerful development environment for connected applications

"What I really like about Ensemble is its ease of use and reusability," says Steve Woodworth, team leader at Partners Healthcare and a lead developer on the Ensemble-based framework for VariantWire. "From a Partners perspective, reusability of our previous work is the key thing." For example, as part of a previous project, Partners created a framework composed of Ensemble business processes and data transformations for connecting external physician EMRs with Partners' internal systems, and bi-directional data sharing. Using this framework it now takes Partners HealthCare only a half hour to connect a new physician practice EMR into its system. This same framework concept and some of the same code were used for developing VariantWire.

> ***"I tell people [Ensemble is] HL7 right out of the box, but we're using it more and more for non-HL7 tasks. It's fast. It's powerful. You can do a lot with a minimal amount of effort."***
>
> *Steve Woodworth, team leader at Partners Healthcare.*

Ensemble integrates the development team

The VariantWire architecture enables different components to "plug and play" into the framework. "We created the framework using Ensemble business processes to handle the overall processing and flow of information," says Woodworth. "We built it in a very generic way and it's class driven. So we can just go in and change parameters in a table to determine which components are called and adapt VariantWire easily for input from a new lab or output to a new EMR. It didn't take a lot of code in Ensemble to get a really powerful solution."

VariantWire makes heavy use of Ensemble's XML tools and Java gateway to incorporate solution components, such as results validators and gene variation interpretation systems, written by the genetics developers. "The great thing about Ensemble is that it has enabled Partners to leverage everyone's expertise in this project, without everyone having to learn a new technology," explains Woodworth. "The genetics developers are Java and XML people. That's what they wanted to use. Once they saw how Ensemble could incorporate their work in Java, and how well it uses XML and XSLT, they really wanted to use those capabilities."

Making it easier to make breakthrough applications

Genetic testing involves many different labs and tests, but it is "infeasible to think that every lab is going to be connected to every provider, so it's kind of a scenario that calls out for a hub architecture like VariantWire," notes Sandy Aronson, Executive Director of Information Technology at PCPGM. Over time, PCPGM hopes to connect a number of labs to VariantWire to expand the infrastructure base needed to support broader use of genetics in preventive care and patient treatment decisions. The goal is to enable any lab that connects to VariantWire to connect to all other institutions in the network through just this single, secure interface.

Partners HealthCare has been a longtime user of Ensemble, initially for HL7 messaging. Now, notes Woodworth, "I tell people it's HL7 right out of the box, but we're using it more and more for non-HL7 tasks. It's fast. It's powerful. You can do a lot with a minimal amount of effort. We can handle a lot of requests for projects, and use of Ensemble at Partners keeps on growing. People say 'Wow, you're doing all of that?' And I can be humble and say it's really not a lot of work."

InterSystems Corporation

World Headquarters

One Memorial Drive

Cambridge, MA 02142-1356

Tel: +1.617.621.0600

Fax: +1.617.494.1631

InterSystems.com

InterSystems ENSEMBLE®