

Building a Multi-Site Allergy Repository and Checking Service: Architectural and Organizational Challenges

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Summary. At Partners HealthCare System in Boston, MA, a project is underway to create a common repository for the storage of patient allergy information, along with services necessary to update, retrieve, identify, and perform intervention checking against that data. Prior to this project, allergy data has been fully encased within separate application databases, each of which does its own checking for potential interactions with drugs being given to a patient. Development of this type is giving way to a service-oriented architecture (SOA)^[1], where allergy data will be visible, editable, and actionable across the enterprise, regardless of its original location. As we embraced the advantages of SOA, we found that merging data from different systems into an integrated whole and providing common services for them requires much coordination and presents complex challenges in analysis, design, construction, testing, and implementation.

Project Description

Partners is an integrated delivery network that includes Massachusetts General and Brigham and Women's Hospitals, as well as multiple other healthcare sites. At the center of this project is the creation and maintenance of Partners' Enterprise Allergy Repository, or PEAR. The clinical applications that are participating (our consumers) represent a diverse mix of environments, business needs, network accesses, scripting languages, databases, client/server processes, and existing data models. Legacy allergy data from each consumer database is being converted and merged to create PEAR. Each consumer will be able to update PEAR, and will use a common service to perform drug-allergy interaction checking. Through identifiers stored within it, PEAR links to First Data Bank's National Drug Data File, Partners' internal Master Drug Dictionary, and our Enterprise Master Person Index. Communication between each consumer and PEAR requires the ability to send a message to our system and receive a response back. To accommodate this across multiple platforms, we provide all services via both our local scripting language and XML.

Technical challenges fall into several areas: identifying patients, allergens, and drugs; normalizing all existing allergy records into a common format while ensuring that no data are lost, and writing services that can be accessed by all consumers regardless of their technology.

Coordination challenges include: gaining consensus^[2], providing a realistic level of customization, and prioritizing the project among equally high profile projects underway at Partners.

Current Status. Implementation of the project is scheduled for late spring 2004, when all consumers will begin accessing PEAR and using its services on the same day.

Observations

Decision-making. The decision-making process at Partners is of a distributed nature, the result of which has been that when a decision needs to be made that affects all of the participants it is often not clear where the authority to make the decision resides. In order to succeed, we have needed the active backing and involvement of IT and clinical leadership in addition to the business owners of each consumer application.

Data Conversion. Converting all legacy data from multiple, widely varying data stores and merging it into a single repository has consumed many more hours than we anticipated. In order to normalize the data, we needed to follow an iterative process of conversion, merge, examination of data, creation of additional rules, application of those rules to each conversion routine, and repeating the process again.

Conclusion. We are creating a common repository of patient allergy data that has the ability to trigger warnings to any clinician in our system when she or he writes an order for a medication to which a patient is allergic. That it would be so difficult to achieve was not obvious to us at the outset of this project. Through this product we hope to demonstrate quantitatively our ability to move a significant step forward in improving patient care.

References

- [1] The Stencil Group. Application Architecture: A Critical Foundation For Service-Oriented Development and Web Services. September 2002.
- [2] Kuperman G, Marston E, Paterno M., et al. Creating an Enterprise-wide Allergy Repository At Partners HealthCare System. Proc. AMIA Fall Conference 2003: 376-380.

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