

T E C H N O L O G Y

The New Alphabet Soup: Models of Application Integration

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In November 2004, the National Coordinator for Health Information Technology issued a Request for Information for the purpose of soliciting public comment on the development and adoption of a National Health Information Network.¹

Since then, the alphabet soup has thickened. What do terms like LHII, NHIN, EHR and RHIO mean to providers and hospitals? How do these institutions fit into the emerging national initiatives, and what role should they play in them?

In a previous column (JHIM, Summer 2005), I defined some barriers and enablers for regional health information organizations (RHIOs), explaining a framework for integration that focused on two necessary aspects—data integration and application integration. Data integration involves forming valid relationships between data sources. Application integration for data presentation involves making integrated data available by presenting a unified view of data to a user

through a computer application. This column will focus on four models for application integration. A more thorough discussion of these concepts can be found in a response to a request for information for the Office of the National Coordinator for Health Information Technology, submitted in January 2005.²

Model 1: User access through a RHIO-provided application. With this method (see Figure 1), users access data through a computer application that enables authorized queries and presentations of patient or population data. This method enables the RHIO to serve users' data needs without concern for interoperability with any other computer applications the user might be accessing.

For some users and organizations, this provides some additional trade-offs. Users can become confused about which application to use to access patient data when they have a local application or electronic medical records system and the RHIO application as well. Some organizations may not want to provide technical support for multiple applications and may

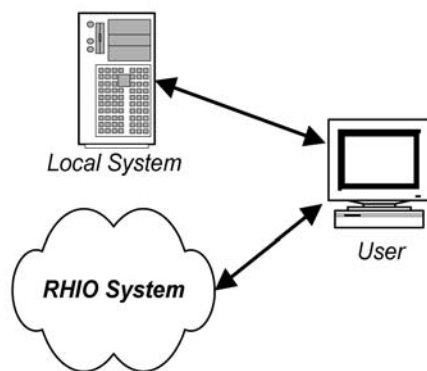


Figure 1. Application Integration Model 1: RHIO-provided Application

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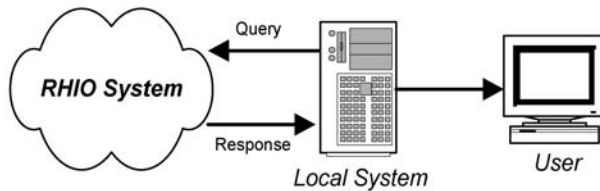


Figure 2. Application Integration Model 2: Data Exchange with Local Application

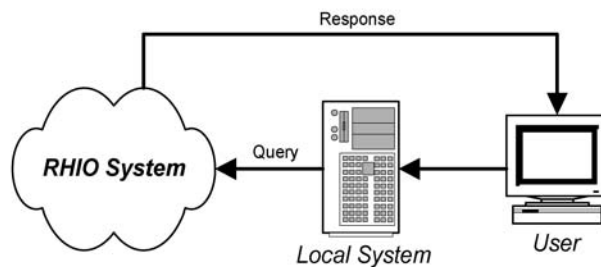


Figure 3. Application Integration Model 3: Direct User Access through a Local Application

discourage or even ban the use of an external RHIO application.

Model 2: Data exchange with user access through a local application. Using this method (see Figure 2), the user's local system queries the RHIO system for data, and presents the results of the query in the local system as if the data had originated there. This method enables users to use only their familiar institutional systems and avoid the potential confusion and support requirements of another application.

For this method to function successfully, both the RHIO and local system must be able to support automated query and response. The local system needs to be able to queue queries when the RHIO system is not available, and it must be able to recover when transactions fail or are delayed because of poor response

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times or network latency. Standards exist for this type of messaging, specifically those of Health Level Seven.

Model 3: Direct user access through a local application. Using this method (see Figure 3), the user accesses a patient's information in the

local system. When data is required from the RHIO, the user's local system logs into the RHIO application, using the credentials and patient identifiers already entered by the user. If the credentials are validated and the patient is found, the RHIO application is executed, and the user views the required record using that application.

Like Model 1, the user is restricted to viewing consolidated patient information through a new application provided by the RHIO system. But like Model 2, access to this new application is facilitated by the user's local system through the sharing (and passing) of user credentials and patient search parameters within

the context of the local application. Standards exist for this type of inter-application communication.³

Model 4: Data access via smart card. In this model (see Figure 4), data is stored on a smart card possessed by the patient, who brings it to any healthcare provider that needs access to health records. The provider uses a smart card reader to access the information on the card. Assuming the smart card is kept up-to-date and providers are able to both write data onto it and read data from it, the patient is ensured of possessing and controlling a complete medical record.

Where Do We Go from Here

By far, Model 2 represents the most desirable state for both users and IT organizations. The organization does not have to support a new applica-

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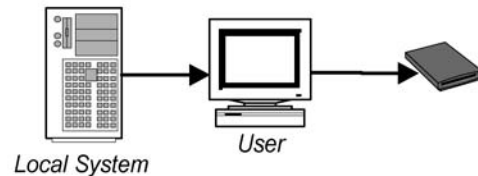


Figure 4. Application Integration Model 4: Data Access via Smart Card

tion, and users can see all their data in one place. However, achieving this level of application integration requires not only adherence to a fairly strict set of data sharing standards but also the likely modification of the local application to accommodate new data and ensure semantic interoperability, so that the meaning of the data sent from the RHIO is preserved in

the local application.

In the face of these challenges, organizations often step back to one of the other models as they simplify certain aspects of the implementation by compromising on the user's experience: Model 1 leaves the user with two or more applications through which to view data; Model 3 offers only slightly more conven-

ience by simplifying the process through which a user accesses the RHIO application.

As RHIOs continue to develop and EMRs continue to proliferate, only time will tell which models of application integration will prove most successful.

About the Author

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