Experience Specifying Interface and Integration Requirements in the PACS Request for Proposal

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INTERFACE AND INTEGRATION issues rank high among the obstacles in attaining desired functionality in a large scale PACS. If not planned for, these problems can significantly delay the implementation, create disillusionment among physicians and staff, and get the PACS project off to a difficult start. This paper reviews Integration Resources' experience specifying PACS interface and integration requirements in three recent RFP's, and the resulting responses from seven major PACS vendors.

METHODS

Three PACS RFP's developed by Integration Resources were used to assess the level of interface and integration commitment from various PACS vendors. The RFPs were distributed only to vendors offering full-PACS solutions, and in each case vendors were instructed to respond only if they were willing to take responsibility for the interfaces necessary to enable the connectivity and image/file sharing described in the functional requirements. It is important to note that the topic of discussion here is interface commitment on the part of the responding PACS vendor, not interface capability.

RFPs were written and distributed between April and October 1997 for (1) the largest healthcare provider network in the state of New Jersey, implementing PACS at three of its facilities, (2) a large medical center in Connecticut which includes two hospital campuses and an outpatient center, and (3) a large urban community hospital (650 beds) in New Jersey seeking to expand its radiological services to affiliated hospitals and clinics.

Assessment of the vendors' interface and integration commitments were based on: (1) their commitment to assume responsibility for interfacing the PACS with image acquisition modalities already existing in the radiology department(s) for purposes of transmission to diagnostic and clinical workstations, as well as storage/retrieval of images and access to study information, (2) their commitment to interface to Computed Radiography (CR) equipment provided as part of the PACS procurement, (3) their commitment to provide the interface between the PACS and the RIS/HIS for access to patient demographics and scheduling information, for the creation and management of patient folders, and to trigger events such as pre-fetching and autorouting (unidirectional interface), (4) their commitment to interface with Local Area and Wide Area Networks for bi-directional transmission of images between the central archive and workstations within the institution and in remote facilities, (5) their commitment to interface to printers and print networks, (6) their commitment to provide a teleradiology interface, and (7) their commitment to provide a web server.

RESULTS

Table 1 shows the vendor responses as indicated in their proposals. (Vendors have not been identi-

fied due to the confidentiality of the RFP process.) There were no interfaces for which all vendors responded positively when asked if they would assume responsibility for the interface. Only two interfaces, the interface to DICOM conformant modalities and the RIS/PACS interface, received predominantly positive responses, but even then there were exceptions. The majority of vendors accepting responsibility for interfacing to DICOM conformant modalities qualified that commitment as contingent upon validation and testing. One vendor, a major manufacturer of imaging equipment, indicated that they offer "turnkey" PACS solutions, but then quoted their basic system without assuming responsibility for any of the key interfaces. When asked for clarification, the vendor indicated that interface and integration services were optional, and that the costs for those services had not been included in their proposal. During the negotiation process which followed, the vendor submitted a revised proposal including responsibility for most of the critical interfaces, while increasing the cost of the system by more than 50%.

Most vendors were willing to assume responsibility for the RIS interface, provided the RIS was HL7 compliant. This interface commitment, however, was only to provide unidirectional functionality. In other words, vendors would commit to interfacing the systems so the RIS could provide the PACS with patient demographics, order and scheduling information and trigger events such as autorouting and pre-fetching of images. But they wouldn't commit to interfacing the systems so the PACS could send data back to the RIS to update the status of patients and/or studies. Direct connections between the host imaging modality's operator console and the RIS are not common, and most vendors propose to incorporate bar code readers to upload existing information into demographic fields. Host imaging modalities that support DICOM Worklist

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Table 1. Vendor Interface Commitment as Indicated in Response to PACS RFPs

	Vendor 1	Vendor 2	Vendor 3	Vendor 4	Vendor 5	Vendor 6	Vendor 7
DICOM Conformant Imaging Modalities	Yes	Yes	No	Yes	Yes	Yes	Yes
Imaging Modalities Requiring Upgrade to DICOM	No	Yes	No	Yes	Yes	Yes	No
DICOM Conformant CR	Yes	Yes	No	Yes	Yes	—	—
CR Requiring Upgrade to DICOM	No	Yes	No	Yes	Yes	Yes	Yes
PACS/RIS Interface	No	Yes	No	Yes	Yes	Yes	Yes
RIS Modality Interface	No	—	No	—	No	No	Yes
LAN and WAN Interfaces	Yes	—	No	No	Yes	—	Yes
Printer Network Interface	—	Yes	—	—	Yes	Yes	Yes
Teleradiology Interface	Yes	—	Yes	Yes	No	Yes	—
Web Server	—	Yes	—	No	Yes	—	No

Note: Dashes indicate information provided was insufficient to assess interface commitment.

Management will provide the best solution to this problem.¹

In general, the PACS vendors accepted responsibility for interfacing to a Computed Radiography (CR) system provided as part of the PACS proposal, whether it was DICOM conformant or required a third party DICOM upgrade. But again, there was an exception. One vendor said the CR interface was the OEM's responsibility. Most vendors were willing to assume responsibility for the printer interface, but only one vendor provided information on Look Up Tables (LUTs) whereby values and ranges of optical density were configured to match the capabilities of the printer and the preferences of the particular users.

DISCUSSION

There does not appear to be any flat rule that would indicate whether a vendor will or will not accept interface responsibility for a given device or information system. PACS vendors who offer "turnkey" systems or refer to themselves as systems integrators may accept full responsibility for interfaces, or may offer interfacing and systems integration as an option. It has been our experience that vendors are reluctant to commit to interfacing their systems with any image acquisition equipment or information system that they have not specifically interfaced with before.

The best way to determine whether a vendor will

accept interface responsibility is to include a description of each interface requirement in terms of desired functionality, and require the vendor to respond to the functional requirements on a line item basis. A matrix can be created which delineates desired functionality for each application entity² (image acquisition modality, image store, archive data base, workstation, and so on), and can later be used by the hospital's project manager to verify compliance with these requirements at the time of Acceptance Testing. The RFP should also include a listing of every equipment asset in the radiology department, indicating whether each device requires a direct DICOM interface, an upgrade to DICOM, or a frame grabber.

Interface and integration issues represent a major challenge in implementing hospital-wide and enterprise-wide PACS solutions. Few hospitals have the resources or the inclination to handle these issues internally and the majority of institutions will want to negotiate with the vendor for these services or arrange for a third party systems integrator. Hospital and radiology administrators should never assume that the vendor is taking responsibility for interface development, and should be wary of the term "turnkey."³ A statement that the vendor offers or can provide "turnkey" or systems integration services does not necessarily mean it has been included in the vendor's proposal.

REFERENCES

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