

# Federating a healthcare enterprise

## Addressing workflow challenges in a multi-enterprise environment

Digital imaging continues to grow as a routine component of healthcare services today. A key benefit of this is the ability to have a patient's diagnostic-quality images, with potential for advanced manipulation, move among facilities along with the patient. IntelliSpace PACS Federation allows users to view other IntelliSpace PACS archives, or gain access to a disparate PACS, to present reports and images to the clinician with a view of a patient's imaging history. This white paper covers some of the advances offered by Philips to address the challenges encountered on the way to achieving full federation of healthcare systems.

### **An interoperable system that shares all data**

Currently, a very common healthcare scenario is one in which a patient visits multiple independent hospitals or imaging centers. With this approach, a patient's historical imaging studies are most often not stored together. In many cases, the information system and PACS for these disparate facilities will not be common. It is very valuable to the clinician to be able to view images and reports regardless of where and when they were created. A "federation" or "federated system" makes this possible through creation of independent information systems or PACS that share data and behave as a single system.

### **Additional functionality required**

The standards employed by information systems and PACS, HL7 and DICOM, do not provide enough functionality on their own to provide the levels of communication required for the disparate systems to behave as a single system. To address this challenge, members of the Radiological Society of North America (RSNA) have teamed with members of the Healthcare Information and Management Systems Society (HIMSS) to launch the initiative known as "Integrating the Healthcare Enterprise" (IHE).

One of the primary outputs of IHE is the introduction of profiles and actors that combine the HL7 and DICOM communication standards to provide the desired communication. A profile is a set of transactions that when properly executed result in the sharing of desired information in the appropriate context. An actor is one of the systems playing a specific role in the execution of the defined transactions. The IHE profiles that lend themselves to a federated system are primarily XDS, PDQ, and PIX.

### **XDS profile**

The cross-enterprise document sharing (XDS) profile is the creation of a cross-domain registry and repository. This allows users to enter patient demographics into a single holding area or registry. The registry is optimized to hold the patient information and allow for efficient queries of the repository to find out where the patient has been and which locations hold exams for the patient.

The second part of the XDS profile is the repository. The repository is a holding area for exams. In the case of small data elements, this could be a centralized storage location. Frequently, for radiology and cardiology imaging exams that are large in nature, a PACS can serve the role of a repository, and the registry will be cognizant of the existence of the PACS for providing access to imaging exams. When patient records are created in independent facilities and stored as part of a common registry, each independent facility needs a method to query the registry based on the patient identifier it recognizes, and to have the registry return a comprehensive list of data for the patient.

## PDQ and PIX profiles

Two capabilities that allow for the appropriate query and result return are the patient data query (PDQ) profile and the patient identifier cross referencing (PIX) profile. The PDQ profile allows a user to submit a few elements of the patient demographics, such as name, date of birth, and sex, as part of the query. Based on a qualified match of these items, the registry returns a list of patient data that are a likely match for the patient in question.

The PIX profile relies on yet another system component, which assumes that there is some type of patient identifier manager. When a user creates a patient ID in the local facility, the user “lists” the identifier with the manager. The manager keeps a table of all identifiers for the patient. In doing so, a user in a facility can query the PIX manager based on the patient ID of which it is aware. The PIX manager will then provide all other known patient identifiers so the registry can be queried for all patient identifiers regarding the patient in question, and the data returned will be inclusive across the federated systems. An electronic master patient identifier (EMPI) fills the role of a PIX manager and may be used as part of the PIX profile.

However, even these systems need to be deployed and then populated before they are useful. What is a site to do until these systems are in place? Can multiple facilities still federate before they have systems to fill these IHE profiles?

## Utility with or without IHE

Philips realizes that the current need for federated facilities might be outpacing the deployment of IHE elements. With the introduction of the federated capabilities within the IntelliSpace PACS 4.4 release, Philips has built in components that allow federation, even in the absence of the IHE components.

For assurance, the IntelliSpace PACS Federation capabilities will fill the role of XDS document provider and document consumer. In the absence of an XDS registry, the federation capabilities will be able to work directly with other PACS using the DICOM Q/R function to get a list of prior exams and also make those exams available to the user.

When operating with other Philips IntelliSpace PACS, the federation capabilities will optimize study movement by leveraging iSyntax\* properties. It will also make the reports stored in remote Philips iVault PACS storage solutions visible to the user.

## Commonality of terms

Another issue created by allowing disparate systems to share data is the need for commonality of terms used. To compensate for this lack of commonality, a canonical dictionary is required so that terms can have a consistent meaning across the federation. The IntelliSpace PACS 4.4 release features such a dictionary.

## Allowing federation now

The IntelliSpace PACS 4.4 release will provide the first generation of federated capabilities in Philips PACS, and will allow hospitals and imaging centers to combine their individual data to create a comprehensive medical experience for the patient. When facilities join the federation, the result for a user will be a patient timeline that shows local studies in addition to studies created on other Philips iVaults or non-Philips PACS. Depending on system configuration, the user will have access to images and reports for these images.

Facilities can deploy the federated PACS capabilities in an IHE environment, an IHE-free environment, and a mixed environment that has some devices that are IHE-compliant and some that are not. In this way, sites can begin to deploy a federated solution now. As facilities expand IHE capabilities, they can begin to increase the efficiency of the federation by leveraging IHE components.

Consult with your local IntelliSpace technical team to understand what features are available to you today based on your individual environment.

\*Based on mathematical representations of images called wavelets, Philips patented iSyntax technology allows just-in-time delivery of image data for rapid access. Diagnostic-quality images are delivered over existing hospital networks, making large infrastructure upgrades unnecessary.

Please visit [www.philips.com/IntelliSpacePACS](http://www.philips.com/IntelliSpacePACS)



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