IntelliSpace PACS archive and vendor neutral archive (VNA)

Considerations on choice of archives

**Introduction**

This whitepaper will provide additional information on considering a vendor neutral archive, or VNA, and what can be expected in the Philips IntelliSpace PACS approach to clinical enterprise archiving. This is a companion piece to the whitepaper released in 2011, “IntelliSpace PACS 4.4 and the VNA.”

**What is a VNA?**

In the previous whitepaper, it was determined that there is no single definition of a vendor neutral archive. A VNA can store any type of object beyond just DICOM images, including PDFs and JPEGs.

These systems can also use multiple digital media types such as magnetic disk, optical disk, and magnetic tape from nearly any manufacturer. In this sense, they are ‘vendor neutral’ to the storage vendor in addition to the data sources and data users.

**Isn’t IntelliSpace PACS iVault a VNA?**

While IntelliSpace PACS can accept DICOM images from and transfer DICOM images to third-party systems, in use, the system transforms the DICOM data to iSyntax, a proprietary file format. iSyntax is highly optimized for viewing by multiple simultaneous IntelliSpace PACS clients, even in low network bandwidth environments, for random access digital media.

In addition, most VNAs support all DICOM objects and services, our subset is smaller than a typical VNA. For these reasons, IntelliSpace PACS iVault is not typically considered a VNA.

**5 reasons to use a VNA**

1. **To support multiple DICOM-based departments**
   VNAs are often seen as a way to reduce silos of storage dedicated to individual PACS systems. For example, a customer may have a radiology PACS and a cardiology PACS and want to have a single archive for both systems.

2. **To support non-DICOM imaging**
   There may also be imaging from other sources, including departments outside of radiology, that are not DICOM compliant, such as ordinary cameras a dermatologist might use to provide images showing changes during the course of treatment. These images are often stored on a computer’s hard drive or removable media, and there may be no easy way, other than the file system name and date, to associate metadata describing the images to a particular patient. VNAs offer the ability to store JPEG and other non-DICOM formats natively.

3. **To support an archival strategy for non-imaging objects**
   There may also be documents such as examination reports or treatment plans that need to be archived.

4. **To support user mobility**
   VNAs are available with a web interface that enables remote access to medical images, allowing users to view their images from anywhere with an internet connection.

5. **To support decentralized PACS**
   VNAs allow PACS to be deployed in more remote environments, including CLIN, where high-speed broadband is limited. VNAs can provide a unified archive for remote medical imaging.
with the patient’s image data. These documents can be wrapped with DICOM-compliant metadata and stored as DICOM images or DICOM-encapsulated PDF documents. Alternatively, they can be stored using IHE Cross-Enterprise Document Sharing (XDS and XDS-I) profiles.

4. To facilitate cross-document sharing and exchange
As hospitals consolidate into Integrated Delivery Networks (IDNs) and Accountable Care Organizations (ACOs), there may be a need to aggregate data across multiple sites. VNAs can be one option, and this is similar in many respects to multiple PACS consolidation at a single site, but with the additional complexity of multi-site integration.

5. Coordinated care across large IDNs
Another consideration is that having a single common archive can allow the customer to change the PACS at a later date without having to do a painful migration of data from the old PACS to the new. The premise is that any PACS can read the DICOM data stored on the VNA, querying and retrieving it on demand.

In nearly all of the cases described above, IntelliSpace PACS can provide similar capabilities.

IntelliSpace PACS capabilities compared to VNAs
IntelliSpace PACS iVault has already been used to consolidate archival storage for IntelliSpace PACS and Xcelera. This same interface can be done with PACS from other vendors using standard DICOM services. With IntelliSpace PACS 4.4, the DICOM Storage Commitment Service Class Provider was implemented, helping the DICOM PACS Vault retain the files as an archive so they can be queried and retrieved at any time. Multiple PACS archiving can be supported with IntelliSpace PACS 4.4.

Several years ago, IntelliSpace PACS 4.4 implemented an IHE-compliant XDS interface to acquire, store, and return XDS-compliant documents and images. IntelliSpace PACS 4.4 then was able to convert standard visible light images from commercial cameras and wrap them in DICOM metadata for association with specific patients. Visible light study storage and XDS document storage can be supported with IntelliSpace PACS 4.4.

IntelliSpace PACS 4.4 introduced a capability in November 2011 that allows it to query across multiple PACS. Even with third-party PACS vendors, you can query the PACS and return the results in your timeline. Studies residing at remote sites can be requested on demand simply by selecting the thumbnail in the timeline. Additionally, studies from remote sites can be sent to a central site using the organization structures available in IntelliSpace PACS to consolidate studies in a single central archive while maintaining the logical origin of studies by individual site. Migration of studies from disparate PACS to a VNA must be done in order for the VNA to catalog and maintain the studies. The same would be true of migration of studies from disparate PACS to IntelliSpace PACS if the user requires a central archive. Similarly, if you want to replace a PACS that has been migrated to IntelliSpace PACS, you may do so. The new PACS can use DICOM and XDS protocols to query and retrieve studies from IntelliSpace PACS.

Questions to ask before choosing a VNA
Following is a list of important questions that should be considered before selecting a VNA.

• What are the workflow implications of using a VNA? Does the VNA provider understand clinical workflow versus data archiving? A VNA will not have the same workflow capabilities as the PACS system. Workflow is an inherent capability of IntelliSpace PACS and includes capabilities for image review and comparison, such as hanging protocols. VNAs typically allow for access to any study but favor archival storage management over workflow specialization.
• Will the VNA provider guarantee a Service Level Agreement for system uptime, disaster recovery from the VNA to the PACS in the event of a PACS failure, and image delivery times from the VNA to the requesting client/system?

• Do you want to maintain two separate systems – one for workflow and one for archiving? There are no standards for image deletion in DICOM. This means that if images are deleted from the PACS due to quality assurance issues, then you will have to manually delete them in the VNA as well. When deleting images from a VNA due to lifecycle management, should the VNA determine that the study should be deleted? Special messaging can be done between a PACS and a VNA to handle these types of occurrences, but then it is a custom integration and not ‘vendor neutral’.

• What happens if you choose to change VNA providers? A DICOM migration from one PACS to another can be time consuming and labor intensive. How much more labor intensive will a migration from one VNA to another VNA be with data other than radiology?

• What will the total cost of ownership (TCO) be with a PACS (or multiple PACS) and a VNA? Will you save on TCO with the additional direct costs (hardware, software, service, and support) from the VNA? What about the indirect costs such as maintaining data integrity across two systems?

• How will you handle disaster recovery should the PACS cache fail or if there is a catastrophic failure due to natural or manmade disaster of the VNA components? How will you mitigate disputes between the PACS provider and the VNA provider versus having one vendor (the PACS provider)?

**Conclusion**
The decision to add a VNA in a PACS environment requires careful planning focused on clear goals and objectives. IntelliSpace PACS iVault may meet your needs. Just as VNAs are evolving, so are the capabilities of IntelliSpace PACS.
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For an overview of DICOM, please see “DICOM Part 1: Introduction and Overview,” available from the DICOM website at: http://medical.nema.org/

The IntelliSpace PACS 4.4 requires a single medical record number per patient across all sites.