

Walk. Run. Fly.

Three phases for a smooth VNA implementation.

If you are looking to implement a vendor neutral archive (VNA), but are concerned about disrupting your clinical users, then consider this “Walk-Run-Fly” strategy. This incremental deployment methodology, pioneered by Larry Sitka, principal solution architect at Perceptive Software, will assure a successful implementation that your clinical users won’t even notice.

The volume and variety of patient information accumulated by healthcare organizations (HCOs), including medical images, video and other forms of unstructured clinical content, is growing rapidly. The need to effectively manage, access and share all of this content across a broader set of clinical and business users brings new hurdles and challenges with new revenue opportunities to health IT leaders. As physicians and patients increasingly demand timely, convenient and automated access to information from a variety of devices and settings, IT organizations must respond with solutions that transcend departmental boundaries in order to provide a single, common view of the patient digital record.

This three-phase process has proven to be effective for helping HCOs gradually harness the full power of a VNA for enterprise content management with the least possible disruption.

Over the past 15 years, the vendor neutral archive (VNA) has steadily moved to the forefront as an essential component of a modern enterprise content management strategy in healthcare. Successful deployment of a VNA is an IT strategy shift similar to your organization’s shift from film to picture archiving and communication system (PACS). One of the most common questions is, “How does the organization roll out and deploy a VNA without disrupting clinical users?” Perceptive Software advises customers to follow a “Walk-Run-Fly” deployment methodology. This three-phase process has proven to be effective for helping HCOs gradually harness the full power of a VNA for enterprise content management with the least possible disruption to business revenue being generated by clinicians and the physician base.

Phase 1: Walk

The **Walk phase** of VNA deployment is the critical first step toward IT vendor independence where the healthcare organization begins to take full control and ownership of its clinical content, much of which resides in departmental PACS. During this phase, VNA administrators learn how to effectively set up, deploy and manage the VNA platform. Deployment success can be measured by asking the clinical user base if they knew the VNA went live. If the answer is “yes,” something failed. A VNA should go live without clinical users ever noticing that it happened.

Prior to the advent of the VNA, the deployment process was typically handled by the PACS vendor. With a VNA, your organization should not need the support of the PACS vendor or the VNA vendor. With a truly independent VNA, not a PACS-defined VNA, your organization can control and take full ownership of the data. This process typically takes anywhere from three to six months. Following are key steps to a successful rollout of a VNA inside the Walk phase:

canonical data model

An application design pattern used to communicate between different data formats.

- 1. Install the base VNA product, redirecting all net new study data traffic to the VNA.** Create a study separation model inside the VNA, logically separating the information down to the storage level. Make sure the installed infrastructure will support an annual study run rate that is approximately five times the normal run rate. For example, if your study run rate is one million studies per year, then plan the infrastructure for at least five million studies in support of migration of data away from legacy PACS systems. Following the migration, this infrastructure will be repurposed or released from the VNA to IT for other purposes.

Note: Instead of increasing the core counts for SQL Server Enterprise, look to a leasing program provided by your VNA vendor to lease the additional cores supporting the migration. This is a monthly lease program and when the migration is complete, you can stop the monthly lease.

- 2. Transition each image source over one at a time for net new studies and for DICOM federation services.** This includes both PACS-attached and VNA-attached modalities. This process will teach your VNA administrators how to add modalities, PACS systems and workstations to the VNA. By placing the VNA between the modalities and the PACS, your organization can gain greater control of your data while abstracting the clinical sources. This process also enables administrators to define and refine the standardized or **canonical data model** supported by your organization through tag mapping.

Decide what the standard data model should look like for your VNA to ensure a successful deployment for your organization. Remember, you should have this level of control. Your VNA vendor should not dictate a data model for you. By leveraging a standard data model and creating a known state, you establish a common process to transform the information when required by a new application destination(s). This assures interoperability between disparate applications while preserving how the information arrives for storage in the VNA.

- 3. Create your migration plan.** Investigate the migration from each PACS/archive source. DICOM or media-based migration (most migrations are now media-based) are some of the more common methodologies for migration. Next, you must determine who is going to perform the migration—in-house or third-party resources. Perceptive Software recommends each site do at least one migration using in-house staff exclusively, without outside assistance, solely for the purpose of understanding how they work.

A true VNA should give your organization the migration tools to allow your team to own and manage the migration process over time. After all, a VNA by definition should be “the easiest product you could ever leave.” To be truly vendor neutral, a VNA must be vendor neutral even from itself. The VNA must come with embedded tools to move away from the VNA vendor without the vendor’s assistance. This tool should be free of charge to the customer and must not consist of complex scripts that require a software engineer’s level of understanding to support it.

- 4. Go for the low hanging fruit.** Begin with the “easier” sites, including radiology and cardiology sites that store DICOM data and have some form of definable workflow. This will prepare you to assimilate non-DICOM content into the VNA.
- 5. Connect and test all HL7 order, update, merge and delete messages.** If support is available, Imaging Object Change Management (IOCM) is a preferred approach to data synchronization and information lifecycle policy management. Synchronization with all PACS systems must occur in parallel and be synchronized the same way in the VNA or inconsistent results will cause major workflow problems.

Phase 2: Run

The **Run phase** of VNA deployment traditionally overlaps somewhat with the Walk phase, with the last 30% of the Walk phase also being the beginning of the Run phase. In the Run phase, an enterprise VNA will pass more study volumes through the system than it will see within the next five years of normal workflow. This phase primarily involves the time and effort of the VNA administrator. Following are key steps within the Run phase:

- 1. Execute the migration plan.** Make sure migration traffic is separable from the net new study volume inside the system infrastructure. Additionally, make sure the migration pace can be controlled, allowing it to be throttled up or down as needed. For the first pass of migration, the goal should be to have 85% of migrated studies pass through to storage for permanent residence without additional clean up. This is also the point where you can choose not to migrate some of the studies following a review. Frequently, study types such as “test” or “phantom,” including studies set for an information lifecycle management (ILM) policy expiration, can be excluded from the migration process.
- 2. Connect other DICOM sources.** Now is the time to investigate any other DICOM traffic that exists on its own. Endoscopy, ophthalmology, dermatology, wound care and other departments should now be identified, and if they provide a DICOM source, send the DICOM object to the VNA. Be very careful not to push a radiology and cardiology workflow on these other departments or the process will break. Instead, integrate solutions into the VNA that support a capture-and-send methodology.

The end result should be content in context, deliverable to any location, from any source and under a common view.

Phase 3: Fly

This leads to the final step in the deployment of a successful VNA, the **Fly phase**. Flying is fun but in reality has the potential to be more of a controlled crash. For obvious reasons, a crash must be avoided at all costs. During the Fly phase, all content is integrated under one view from one location. Perceptive Software has developed a unique integration approach, providing not just a traditional DICOM and non-DICOM VNA, but an image and object services bus for unifying content. Additionally, unified content alone offers no real advantage—it must be wrapped in context that is programmatically discoverable and linkable, not merely entered via a human interface. The end result should be content in context, deliverable to any location, from any source and under a common view. Key considerations for the Fly phase include:

- 1. Integration of non-DICOM content.** Non-DICOM content that is defined and discovered during the Run phase must be integrated into the content platform via any of these four methods. Multiple methods are likely to be required and supported in parallel:
 - a. XDS registry and repository services:** XDS is the future of content management. An IT strategy that includes XDS will eliminate the need for future migrations of clinical content. It will also ensure that content is viewable from any existing XDS consumer application.
 - b. DICOM wrapping:** Involves taking an object and wrapping it as a secondary capture or encapsulated document in DICOM. This makes the object viewable by any current viewer that supports secondary capture or encapsulated DICOM SOP classes.

- c. *CIFS/NFS*: Today these types of applications store a file to a CIFS/NFS share. The caveat to this is a requirement to also deposit a metadata file. This gives context to the object stored when the filename and path are not enough to decipher.
 - d. *Web services*: This method involves a direct custom web services integration into the application by the object bus. The web services integration, while proprietary, absorbs the information and manages it inside an XDS framework, also ensuring no migration is required to move the content to an XDS registry/repository.
2. **Implementation of a universal viewing application.** Flying in a flight simulator is an exhilarating experience and so should be the selection of a universal viewer as an extension of the VNA. The viewer must be at least a referential viewer capable of viewing both DICOM and non-DICOM inside one common framework. This technology is also referred to as an XDS consumer.
 3. **Implementation of a worklist/workflow application.** The movement to PACS 2.0/3.0 is in full swing, signified by the breakout of all traditional PACS requirements into isolated layers of software. The reference is no longer just to a radiology, cardiology or modality worklist, but to a “physician’s worklist” as many other departments are involved.
 4. **Transformation of IT from a capital model to a revenue-generating model.** One of the primary reasons for moving toward a services bus architecture is to increase flexibility and interoperability. Web service RESTful-based interfaces are making service oriented architectures (SOA) a reality. HCOs are now able to leverage and deploy the services bus to other organizations, including those outside the organization for profit.
 5. **Integration of all other silos onto the content bus.** Other silos, including document management, human resources, accounts payable, health information management (HIM) and clinical content sources can now be integrated into and managed in one common repository.

It’s time to take flight

Taking back control of clinical and business content from vendors is one of the most valuable benefits of a VNA. Careful deliberation must be undertaken by any healthcare organization to learn what first needs to be accomplished inside a successful VNA rollout. Following a tightly-controlled and incremental deployment strategy will assure not only a successful rollout, but also allow the organization to learn how to own, manage and leverage its data. Taking back control from vendors is possible with your VNA. As you move through the Walk-Run-Fly deployment methodology, realize that your VNA experience is ongoing. There will always be another department, facility or recently acquired enterprise to get on or off the content services bus. Get started today and let your productivity and efficiency take flight!

About the author

Larry Sitka is principal solution architect at Perceptive Software. He founded Acuo Technologies, now part of Perceptive, in 1999. Sitka’s duties and responsibilities have included lead software engineer, sales and marketing, channel development and support, and strategy development and delivery, which played significantly in Acuo’s success inside the U.S. Government and across large U.S. and Australian Healthcare IDNs. In addition, Sitka is an evangelist to the imaging industry, regularly authors articles and white papers and speaks frequently at industry events and conferences.

Prior to founding Acuo, Sitka served in senior engineering roles for Imation Corporation/3M Medical Imaging Division and AT&T Global Information Systems (NCR Networks Products Division). He has acquired several U.S. and European patents over the years, specifically focused on information management across the medical imaging and digital asset management space.