101 VNA QUESTIONS

YOU NEED TO ASK BEFORE IMPLEMENTING A VENDOR NEUTRAL ARCHITECTURE

CHAPTER 1

Implementation Information

Make certain that you understand how and who will be providing the support that you need to implement the solution.

- How many engineering teams are involved in the development and maintenance of your VNA solution?
- Where will the engineering teams be located?
- Will you be outsourcing custom engineering projects to other companies?

CHAPTER 2

Vendor Information

If you are implementing a solution with the help of an outside resource, there are several fundamental questions that you need to ask before choosing a vendor to provide you with a VNA solution.

- How long has the vendor been providing VNA solutions?
- How many installed VNA customers does the vendor have?

CHAPTER 3

Software Architecture

Before implementation can begin, you must first understand the current software architecture that may already be in place.

- What is the primary programming language used in developing your VNA solution?
- What programming language was used to develop the resource intensive compression logic component within your VNA solution?
- Is your compression library a third-party generated solution?
- Does your VNA solution require any separately licensed third-party software or libraries?

CHAPTER 4

Deployment

Deployment is made much easier and less costly in terms of the resources needed when a thorough understanding of the solution is gained before implementation begins.

- What operating systems will need to be certified for use with your VNA solution?
- What database systems will need to be certified for use with your VNA solution?
- Will your VNA solution require a specific hardware brand or model?
- Will your VNA architecture need to support redundant servers and redundant storage systems?
- Will your VNA solution require a load-balancing switch to be utilized?

CHAPTER 4 *CONTINUED*

Deployment

- Will your VNA solution need to run within a VMWare virtualized environment?
- Will you VNA solution need to support enterprise Active Directory integration for user authentication?
- Will your VNA solution utilize vendor-, product-native storage API's like Dell DX, Caringo CASstor, EMC Centera, or HP MAS?
- Will your VNA solution need to guarantee a high degree of assurance that business continuance is achieved in the face of component failure in the system?
- Will your VNA solution need to be capable of adding storage without disruption of services?

CHAPTER 4 *CONTINUED*

Deployment

- Will your VNA solution need to automatically notify system administrators of hardware or software malfunction?
- Within what time frame would you like to complete deployment (start to finish)?
- Will the VNA solution software licensing scheme that you choose impose a physical or logical limitation on the number of users or devices that be connected to the system concurrently?

CHAPTER 5

Security

There are a number of very important security, compliance and access questions that need to addressed prior to the implementation of a VNA.

- Will the system need to be set-up with a capability to restrict user access to patient data by group membership?
- Will the system need to be set-up with a capability to restrict user access to various features based on roles?
- Will the system need to audit user access to patient data for HIPAA compliance?
- Will you need to provide a capability whereby all 7 years of data and images are on-line at all times, using spinning disk storage?

CHAPTER 5 *CONTINUED*

Security

- What security measures will your VNA solution need to utilize?
- What type of access will be required to support your VNA solution?
- Will you need to implement an anti-virus solution on each machine? Can you use the enterprise anti-virus software currently used by the entire organization?
- Will you VNA solution need to utilize LDAP to provide the benefit of being able to leverage an existing Directory Server to obtain user authentication and authorization information?

CHAPTER 6

DICOM Content

If you are planning to store and receive DICOM objects in your VNA, there are a number of questions that need to addressed prior to the implementation of the VNA.

- Will your VNA solution need to receive and store DICOM objects?
- If yes, do you have a current DICOM Conformance Statement?
- Do you have your own DICOM development toolkit, or will you need to rely on third-party development?
- Will your VNA solution need to support the following DICOM commands: C-STORE (SCP), C-FIND (SCP), C-MOVE (SCP), Storage commitment push model (SCP)?

CHAPTER 6 *CONTINUED*

DICOM Content

- Will your VNA solution need to support the validation of inbound DICOM objects to confirm conformance to the DICOM standard? How will non-conforming objects be treated? How will exceptions be logged?
- Will your VNA solution need to support DICOM study close policies configurable at the device/connection level?
- If yes, will the DICOM study close policies based on: the closing of the DICOM association, a timer, the receipt of a subsequent DICOM Storage Commitment request?
- Will additional DICOM devices need to configured into your VNA solution as necessary?

CHAPTER 6 *CONTINUED*

DICOM Content

- Will your VNA solution need to provide configurable options for performing lossless and lossy image compression of DICOM objects? If yes, what lossless and lossy DICOM object compression options will be supported?
- Will your VNA solution need to provide for the automated internal validation of the DICOM object study metadata with a received HL7 order metadata?
- Will your VNA solution provide the ability to coerce all changes to DICOM-related fields maintained in the database into the DICOM header upon export?
- Will your VNA solution provide a configurable option of keeping the original DICOM object stored unmodified and available for medical-legal purposes?

CHAPTER 6 *CONTINUED*

DICOM Content

- Will your VNA solution need to provide the ability to perform transformation on incoming DICOM header data prior to population of its databases?
- Will your VNA solution need to provide the functionality to span DICOM query SCP (C-FIND) requests to one or more other archives? Will it provide a combined unified response to the originally requested DICOM device?
- Will your VNA solution need to provide the functionality for forwarding DICOM retrieve (C-MOVE) requests to another DICOM archive?
- Will your VNA solution need to support storage of multiple local patient ID's for a single patient in its database?

CHAPTER 6 *CONTINUED*

DICOM Content

- Will your VNA solution need to provide the functionality of translating a DICOM object's originating facility patient ID into the requesting facility patient ID automatically upon DICOM query and retrieve?
- Will your VNA solution need to have a user interface which allows for performing a DICOM "push" of DICOM objects to one or more DICOM targets?
- Will your VNA solution need to provide for a mechanism for outbound auto-routing of received DICOM objects based on source organization, source device, or storage policy?

CHAPTER 6 *CONTINUED*

DICOM Content

- Will your VNA solution need to provide the functionality of translating a DICOM object's originating facility patient ID into the requesting facility patient ID automatically upon DICOM query and retrieve?
- Will your VNA solution need to support configurable business policies for storing received DICOM objects? If so, which storage options will need to be configurable: Number of copies of a DICOM object to store? Type and ratio of image compression to use? Object retention period?
- Will your VNA solution need to provide the ability to view DICOM association metrics (DICOM commands, performance, object counts, etc.)?

CHAPTER 7

Non-DICOM Content

If you are planning to store and receive Non-DICOM objects in your VNA, there are a number of questions that need to addressed prior to the implementation of the VNA.

- Will your VNA solution need to import, store and manage non-DICOM clinical objects?
- Will your VNA solution need to import, store and manage non-DICOM objects in their native (as received) format?
- What object types will your VNA solution need to import, store and manage: JPG, TIFF, PDF, MPEG, AVI, DOC, TXT, other?

CHAPTER 7 *CONTINUED*

Non-DICOM Content

- Will your VNA solution need to convert non-DICOM objects to another format when storing?
- Will non-DICOM objects need to be provided back to consumers in their native (as received) format?
- What are the methods that your VNA solution will support the import of non-DICOM objects?
- Will your VNA solution need to import, store and manage non-DICOM objects that have a study context? If yes, will your VNA solution associate those non-DICOM objects with a DICOM study?

CHAPTER 7 *CONTINUED*

Non-DICOM Content

- Will your VNA solution need to import, store and manage non-DICOM objects that have no study context (patient context only)?
- How will patient and study metadata be obtained by your VNA solution for imported non-DICOM objects?
- Will your VNA solution need to provide a method to classify non-DICOM objects upon import?
- If yes, can users search for non-DICOM objects by classification criteria?

CHAPTER 7 *CONTINUED*

Non-DICOM Content

- What methods will your VNA solution utilize to support the export of non-DICOM objects?
- Will non-DICOM object storage and management be part of your DICOM applications or provided by a third-party application?
- Will your VNA solution need to make visible light entities? If so, how? How will they be captured/indexed?
- Will your VNA solution need to order less image capture/retrieval? If so, how?

CHAPTER 8

Integration (HL7 & Web Services)

Another VNA implementation consideration is determining whether you will need to integrate HL7 and web services.

- Will your VNA solution need to support HL7 interface to RIS/HIS and other information systems?
- If yes, what version of HL7 will need to be supported? What HL7 messages will need to be supported?
- Will your VNA solution need to include native HL7 support or will you require a broker application? If a broker application is required, will this be separately licensed?

CHAPTER 8 *CONTINUED*

Integration (HL7 & Web Services)

- Will there be a separate cost for each HL7 interface desired?
- Will the proposed VNA solution need to provide the capability to convert received HL7 text reports to DICOM Structured Report data objects?
- Will your VNA solution need to support Web Service API's? If yes, what Web Service messages will need to be supported?
- Will your VNA solution need to support interfaces to an eMPI solution? If yes, will it need to utilize the IHE PIX Profile?

CHAPTER 9

Industry Standards (IHE)

Another VNA implementation consideration is determining how the solution will be developed with respect to data management standards.

- Will your VNA solution need to be 100% standards based with respect to data management? (e.g. Supports IHE Integration Profiles, Stores data internally in DICOM Part 10 file formats, storage layouts and database schema readily decode-able) If so, which Standards? If no, can you identify any discrepancies and purpose?
- Will your VNA solution need to support IHE? If so, which profiles and actors will be supported?
- Will your VNA solution need to participate in the IHE?

CHAPTER 10

ILM

Another VNA implementation consideration is determining how the solution will be developed with respect to ILM policies.

- Does your VNA solution provide for separate ILM policies per data object source?
- Does your VNA solution provide for separate ILM policies per organizational node?
- Does your VNA solution utilize stored object metadata in the ILM retention and purge policies?
- Is your VNA solution capable of treating pediatric and mammography data differently from other data?
- How does your VNA solution manage data when moving from one storage technology to another?

CHAPTER 10 *CONTINUED*

ILM

- Does your VNA solution allow for different storage management and retention policies based on clinical metadata?
- If you are proposing the use of any proprietary file formats or proprietary compression schemes, what is the rationale for this use of proprietary file formats or proprietary compression schemes?
- Does your VNA solution provide for separate ILM policies per organizational node?
- Does your VNA solution provide for separate ILM policies per data object source?
- Will your VNA solution utilize stored object metadata in the ILM retention and purge policies?

CHAPTER 10 *CONTINUED*

ILM

- How will your VNA solution be able to treat pediatric and mammography data differently from other data?
- How will your VNA solution manage data when moving from one storage technology to another?
- How will your VNA solution allow for different storage management and retention policies based on clinical metadata?
- If you are proposing the use of any proprietary file formats or proprietary compression schemes, what is the rationale for this use of proprietary file formats or proprietary compression schemes?

CHAPTER 10 *CONTINUED*

ILM

- Will your VNA solution provide for the built-in organization of stored data object which mirrors the enterprise imaging business units of the institution?
- Will your VNA solution provide a mechanism for organizing exceptions based on metadata validation of incoming data objects that will require manual reconciliation?
- Will your VNA solution provide source device/organization based quality assurance rules for inbound content?
- Will your VNA solution provide for EMPI integration with multiple local patient identifiers and automatic patient identifier coercion?

CHAPTER 11

Workflow

An optimal VNA solution is constructed with consideration given to the possibility of part of the system being down for short or long periods of time.

- If a departmental PACS is down for some reason, can your VNA solution infrastructure be used as the PACS for that department temporarily?
- Does it have the ability to update the primary PACS when it becomes functional again?

CHAPTER 12

Web Distribution of Content

Understanding how you wish to distribute content via the web is another important consideration that needs to be determined for implementation of a VNA.

- Will images need to be made available from a secure web site, “https” with a secure user name and password?
- Will images need to be made available using a VPN to connect to the LAN and then connect to web server?
- Will you need unlimited web viewer licenses for referring physicians?
- Will you need to be capable of restricting user access to patient data by group membership?
- Will you need to include compression technology to decrease download time?
- Will you need to provide HIPAA-compliant encrypted transmission solutions?

CHAPTER 12 *CONTINUED*

Web Distribution of Content

- Will you need to offer an optional hosted web distribution server?
- Will you need to make images available in both DICOM full function and JPEG partial function to accommodate any type of computer or Internet connection?
- Will you need to make available old study comparisons on the web server?
- Will you need to make available advanced functions such as ROI, cross localize, and advanced hanging protocols on web-based viewers?
- Will your solution allow users to choose their preferred viewer for non-DICOM objects at the client level? For example, large JPEG images to be displayed by an external JPEG viewer with specific tools instead of standard DICOM viewer.

CHAPTER 13

Enterprise Visualization

Finally, when developing a VNA, consideration needs to be given to enterprise visualization requirements.

- How will your VNA solution need to support ease of viewing large image sets over restricted bandwidth connections?
- How will your VNA solution need to support Enterprise Viewer integration to the EMR?
- Which DICOM SOP object types will your VNA solution need to support?
- How large will the code footprint for your VNA solution viewer software need to be?

CHAPTER 13 *CONTINUED*

Enterprise Visualization

- Which specific type, version dependencies and size of any libraries will your VNA solution viewer be dependent upon (Java, .NET, Flash, etc.)?
- How will your VNA solution Viewer be installed/maintained/upgraded?
- Will your VNA solution Viewer be dependent on an image cache that is separate from the archive? If so, how will the cache be synchronized with the archive after a QC update?
- Will your VNA solution Viewer support Grayscale Softcopy Presentation States and DICOM Key Object Notes? If so, which?

CHAPTER 13 *CONTINUED*

Enterprise Visualization

- Will your VNA solution Viewer need to support server side rendering and image streaming technology?
- Will your VNA solution Viewer need to deal with low-bandwidth and high latency connected users?
- Will administrative privileges be required to install your VNA solution Viewer at the client?
- Will your VNA solution Viewer require lossy compression to function over lower bandwidth connections? If yes, how/where will these images be stored? If no, what are the ramifications?

CHAPTER 13 *CONTINUED*

Enterprise Visualization

- Will your VNA solution Viewer need to present a system wide work list containing all known images for a given patient regardless of where the viewer is used from?
- Will your VNA solution need to support DICOM WADO?
- What basic 2D, advanced 2D and 3D tools will need to be made available to clinicians, specialists and remote diagnosticians using your VNA solution Viewer?

101 VNA QUESTIONS

You need to ask before implementing a vendor neutral architecture!

For more information about developing a Vendor Neutral Architecture, please visit: www.teramedica.com.

For more information on the VNA Institute of Technology or to enroll for CPHIMS (CE) Continuing Education Hours, visit www.vnait.org.