Image-Enable the Enterprise

Best Practices for Implementing
an Enterprise Image-Viewing Platform

ResolutionMD®

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ENTERPRISE IMAGE SHARING:

## The key to modern, patient-centered, value-based, coordinated care

Images play a significant role in diagnosis and treatment for today's physicians. Improved imaging technology and greater image clarity has made radiology a critical tool for patient care.[1]

In a recent survey, 80 percent of referring providers said that correlating images to text helped to improve their understanding of radiology findings, showing that text-only reports from radiologists are not optimal for patient care.[2] Even within a hospital, physicians using EHRs that cannot access images must rely on text-only radiology reports.

While referring physicians always have access to the text of a radiology report, between 20 to 30 percent of the time they cannot view the images that go with it. Images go missing for many reasons. When CDs of images travel strapped to patients' chests, they can be lost or misplaced. Often, images taken at another clinic or hospital are simply not accessible, whether they are on a CD or being accessed via the web or another system. When images cannot be accessed, physicians must repeat imaging studies, wasting both money and time.

The ability to share images across healthcare enterprises not only makes clinical care more efficient, it also saves lives. Image sharing, for example, is at the core of telestroke, which saves lives by connecting patients to stroke neurologists over geographic distances. Remotely located stroke neurologists view patient images, deliver a diagnosis and order tPA when appropriate. tPA is a clot-busting drug that must be administered within three hours of a stroke's onset, making timing in diagnosis critical to patient survival and long-term health. Telestroke is so effective that its use grew 38 percent among hospitals between 2015 and 2016.[3]

The bottom line: Image sharing is critical to providing cost-effective, efficient, patient-centered, high-quality care.
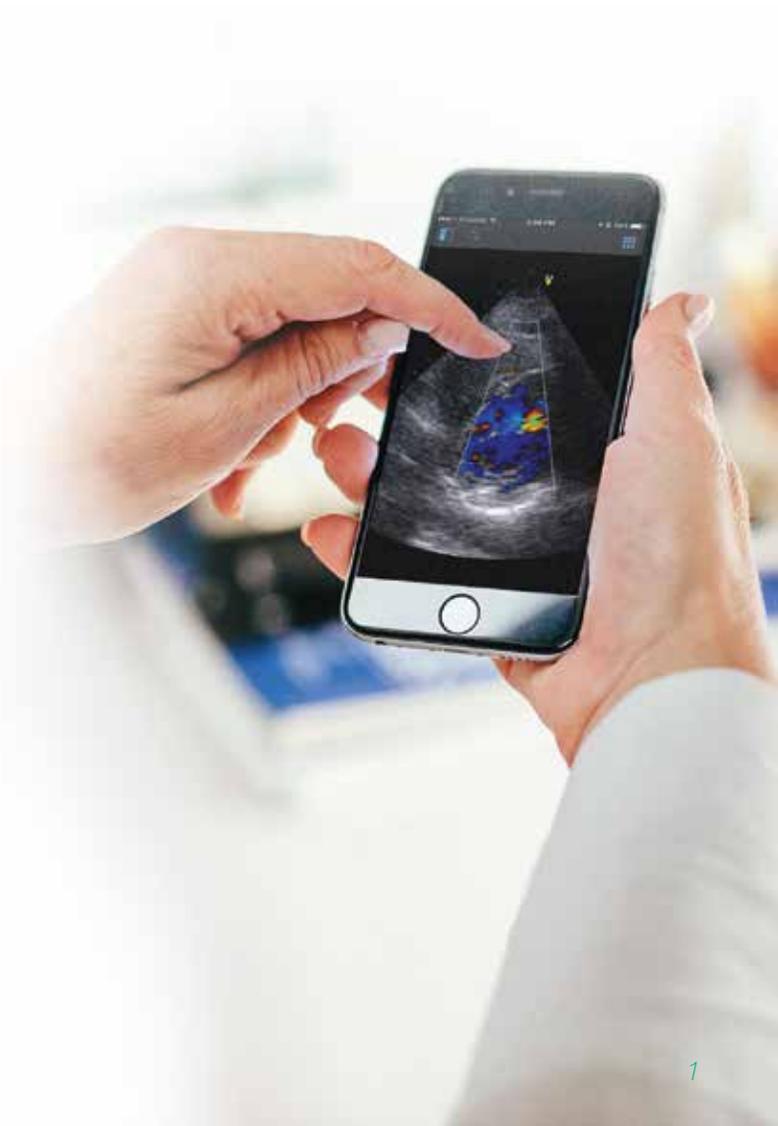
CHALLENGES OF IMAGE SHARING IN MODERN HEALTHCARE ENVIRONMENTS

Enterprise image sharing and viewing is no simple task in modern healthcare environments. Today's hospitals and clinics run on a mix of EHRs, PACS and VNAs across many locations, creating highly fragmented environments.

Challenges to efficient image sharing including the following:

PACS and VNA vendors often lack full support for standards, which impedes sharing of images between them.

Many PACS and VNAs have their own image-viewing applications that require physicians to log in to multiple systems when accessing patient images.

EHRs support access to text-based radiology reports but not to the images that go with them. Physicians typically work without access to the images or must use separate applications to view images.

Hospital mergers create hospital systems and clinics with geographically dispersed locations, adding a layer of complexity to sharing images between and among them.

Providers frequently need to access images from other hospitals, clinics or health systems outside of their own networks, which requires high-level security and the ability to interoperate with other health IT systems.

IMAGE EXCHANGE WORKFLOW WITH AND WITHOUT AN ENTERPRISE IMAGE-VIEWING PLATFORM

Image exchange flow without enterprise image-viewing platform

1 Patient with badly broken leg comes into ER and gets scan.

2 Scan read by radiologist and report shows patient needs surgery to repair break and damaged knee ligaments.

3 Imaging center burns a CD and brings it to patient.

4 Patient transferred via ambulance with CD of images for treatment by orthopedic surgeon at another hospital.

5 On-call orthopedic surgeon is contacted and goes to hospital to meet patient.

6 CD taken from patient to hospital imaging center and an attempt is made to upload images to PACS.

7 Disc is unreadable so a new order for images is placed and patient is sent again to imaging as orthopedic surgeon awaits them.

8 Surgeon is finally able to view images and read report from radiologist, determine necessary treatment and have patient prepped for OR.

Image exchange flow with enterprise image-viewing platform

1 Patient with badly broken leg comes into ER and gets scan.

2 Scan read by radiologist and report shows patient needs surgery to repair break and damaged knee ligaments.

3 On-call orthopedic surgeon at another hospital is notified about incoming patient. Surgeon views diagnostic quality images on tablet from home, determines treatment and calls in order to prep patient for OR upon arrival.

4 Patient is transferred via ambulance to hospital, arrives and is met by surgeon and sent immediately to OR.

MAYO CLINIC ADOPTS MOBILE ENTERPRISE IMAGE VIEWER

The challenge

Mayo's providers are geographically dispersed on campuses in Minnesota, Arizona and Florida. The clinic also works with many providers outside of the Mayo network. All these providers need simple, real-time access to patient images to collaborate and coordinate patient care.

The solution

To make images easily accessible to both internal practitioners and external referring physicians, the Mayo Clinic implemented ResolutionMD®. The enterprise image viewer provides mobile access to diagnostic quality images for both internal and external providers. Tight integration of ResolutionMD with Mayo's EHR allows clinicians to access patient images of any type from any source without leaving their EHR environment.

This shift to a single image viewer reflects a widespread need among hospitals and health systems for viewers that support seamless, efficient image access across the enterprise. In the May 2016 issue of The Journal of Digital Imaging, health IT leaders from Duke University and Mayo Clinic lay out the key elements of systematic patient image managment. One of these elements is the EHR Enterprise Viewer that provides "fast and efficient review and manipulation of image datasets on any desktop, laptop or mobile device."[5]

INTERMOUNTAIN HEALTH INCREASES EHR'S CLINICAL VALUE WITH INTEGRATED ENTERPRISE IMAGE VIEWER

The challenge

Today 8 of 10 physicians have an EHR, but much of how they use them has been focused on meeting federal requirements for meaningful use. For clinical use, physicians need EHRs to provide a full patient profile complete with images, medications, lab results and more. In early 2015, Intermountain Healthcare (IHC) recognized a need to get more clinical value from their EHR by providing physicians with integrated image access when working in the EHR. At the time, IHC was in midst of converting from a home-grown EHR to Cerner and needed an enterprise image-viewer that would work with both while it completed the transition.

The solution

To get the most value from both its old and new EHRs, IHC implemented ResolutionMD for its network of 26 hospitals. IHC has dubbed its Cerner implementation iCentra and when providers using iCentra want to access a patient image, the EHR defaults to ResolutionMD allowing providers to access any DICOM image without logging in again, re-selecting the patient and jumping through other access hoops. IHC has seen an increased use of the image-viewer, which demonstrates that this simple but powerful access solution is working for providers. Each time the image-viewer is implemented at an IHC hospital or clinic, there is an uptick in overall image access. "Our affiliated physician use has also increased quite a bit," notes Randy Tebbs, imaging systems manager at IHC.

> " We chose ResolutionMD because it is platform agnostic. It provides a lightweight tool for our physicians that enables them to access patient images from any PACS whether they're using HELP2 or iCentra. "

Randy Tebbs
Imaging Systems Manager
Intermountain Healthcare

PUBLISHED, PEER-REVIEWED RESEARCH SHOWS HOW MOBILE ENTERPRISE IMAGE VIEWER SPEEDS IMAGE ACCESS

A leading healthcare provider is seeing incredible benefits with the use of mobile solutions, which provides their radiologists on-call freedoms and dramatically reduces the amount of time it takes to access images after hours. Instead of having to physically get to a PACS workstation, launch the application and load the image, they are using a mobile solution to access studies in a fraction of the time it takes over traditional methods. Why waste time getting to a PACS workstation when access to the PACS is in your pocket?

The Mayo Clinic conducted a study that compared three image-viewing products' capabilities, including access time to images.

1 ResolutionMD

2 COMMERCIAL DESKTOP PACS

3 IN-HOUSE IMAGE VIEWING SYSTEM

WHO WAS INVOLVED IN THE STUDY

Radiologists Neurologists Oncologists Surgeons Physician assistants

WHAT THEY FOUND

17.5 MINS — LAUNCH THE SYSTEM · PERFORM THE SEARCH · LOAD THE FIRST IMAGE — IN-HOUSE IMAGE VIEWING SYSTEM

12.3 MINS — LAUNCH THE SYSTEM · PERFORM THE SEARCH · LOAD THE FIRST IMAGE — COMMERCIAL DESKTOP PACS

2.7 MINS — LOAD THE FIRST IMAGE — ResolutionMD

RESOLUTIONMD WAS UP TO 6X FASTER

DURING A STROKE THE BRAIN LOSES 2 MILLION NEURONS PER MINUTE

2.7 MINS
5.4 Million Neurons Are Lost

12.3 MINS
25 Million Neurons Are Lost

17.5 MINS
35 Million Neurons Are Lost
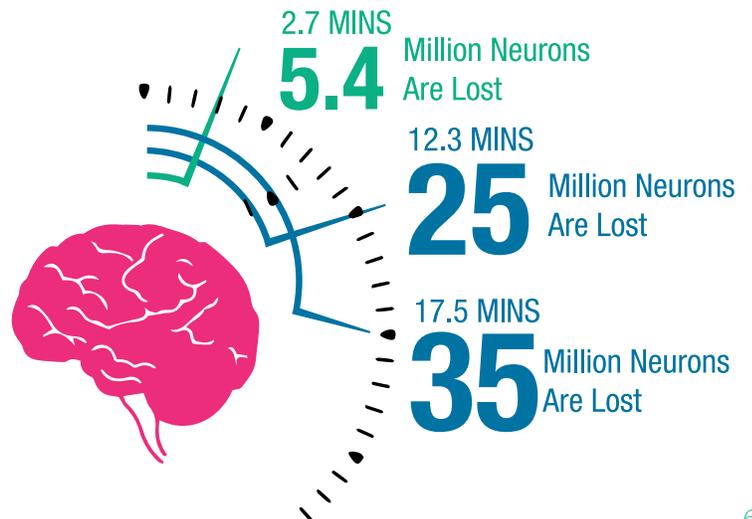
THE 8 ELEMENTS OF A SUCCESSFUL ENTERPRISE IMAGE-VIEWING PLATFORM IMPLEMENTATION

1   Stakeholder engagement

2   Viewer toolset support

3   FDA accreditation for viewing and diagnosis

4   Security and HIPAA compliance

5   Modern healthcare workflow support

6   Existing infrastructure support

7   Key elements of enterprise -image viewer implementation

8   User training and adoption

1. STAKEHOLDER ENGAGEMENT

Modern healthcare comprises a wide spectrum of imaging including radiography, echocardiography, fluoroscopy, endoscopy, ultrasound, MRI, CT and dermatological images taken with handheld cameras. These images are generated by departments, such as cardiology, dermatology, gastroenterology, ophthalmology and radiology, which typically operate in siloed, independent environments.

Providers of all types, from physicians to nurses to nurse practitioners, need access to these images on a daily basis. Access to these images is not only an important element of clinical care, it is also critical to fully realizing the benefits of EHRs.

Project Lead
The project lead is looking for quick wins to show short-term value. An enterprise viewing solution based upon ResolutionMD fits this approach perfectly, as it will have groups up and viewing very quickly

Network Administrator
The network administrator will love the simplicity of the installation and low-stress management of the product within their corporate network

PACS Administrator
PACS administrators will appreciate the cleanliness in connecting to the PACS through use of industry standards such as the DICOM protocol

Security Administrator
A security administrator will be more than impressed to learn that no patient data is downloaded to, nor retained on, an end-user mobile device

Key stakeholders for success

Emergency Room Physician
Giving physicians quicker access to images and simplified collaboration with their remote peers can play a big role in helping drive better outcomes

Radiologist
Delivering radiologists a diagnostic mobile solution that enhances their ability to perform their job while on the go, will have them smiling at the increased quality of life

Neurologist
To a stroke neurologist, time is the most precious of commodities and a product that enhances their ability to access stroke images quickly is an essential tool

Implementing an enterprise-wide image viewer requires the involvement of all who have a stake in image generation, management and oversight. For many providers, this level of cross-departmental coordination is a new experience. Guiding the implementation of an enterprise image viewer requires a governance body that includes representatives to address enterprise imaging technology, information, clinical use, and financial impacts. Specific governance models will vary depending on size, geographic distribution, current image storage and distribution technology, and the breadth of specialties practiced at the facility.

2. VIEWER TOOLSET SUPPORT

The primary goal of enterprise image viewers is to enable the sharing and viewing of images across the healthcare enterprise to enable quality, patient-centered care. Enterprise image viewers should enable a broad range of providers to view and manipulate images. Viewers with diagnostic capabilities offer deeper, advanced toolsets that enable providers to not only view images but to manipulate them using some of the same features offered on PACS workstations. Viewers with deeper toolsets will also provide the best basic viewing capabilities, serving the needs of all providers within a healthcare organization.

Specialty toolsets are typically only required by performing specialists. The following offers a guide to the basic toolsets needed for image viewing and diagnosis purposes:

Does the solution work with key modalities, including CT, MR, CR, DX, ES, KO, MG, NM, OP, OT, PT, SC, US, XA, IO, XC, RTIMAGE, OPT?

Does the technology have MPR and 3D viewing?

Does the technology offer quick access to side-by-side comparisons?

Can it view both DICOM and non-DICOM images?

3. FDA ACCREDITATION FOR VIEWING AND DIAGNOSIS

Mobile image-viewing software transforms a smartphone or tablet into a PACS, making the application subject to the same regulatory requirements as any Class II medical device. That's what the FDA states in its guidance:

"[A] mobile app that displays radiological images for diagnosis transforms the mobile platform into a class II Picture Archiving and Communications System (PACS)."

In patient care settings, ensuring that technology has FDA Class II medical device clearance is critical because providers have neither the time nor expertise to interrupt their workflow to determine whether the application on their smartphone can be safely used for diagnosis, notes Ryan Minarovich, a lawyer and consultant with the Tenzing Group which specializes in regulatory compliance for digital and mobile health products.

"The FDA's main goal is patient safety," explains Minarovich. "Today's physicians have so many tools and so much information at their fingertips that it's important to guard both doctors and patients from inappropriate use."

Resolution

Geometric distortion
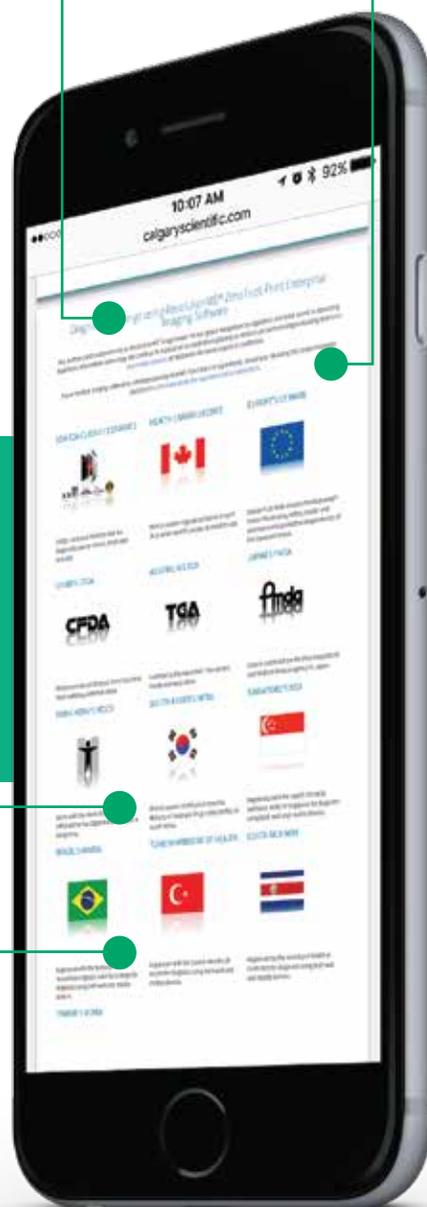
> " When doctors have the information they need at their fingertips, they react by diagnosing first and think about the rest later. That's the way they are programmed. "
>
> **Kyle Hall**
> Telehealth Coordinator
> Nebraska Medicine

Diffusion

Reflection

4. SECURITY AND HIPAA COMPLIANCE

Seventy percent of physicians rely on their mobile devices to manage patient data. At the same time, 68 percent of recent hacker break-ins can be traced back to stolen devices, many of them mobile. Health IT departments are between a rock and a hard place addressing these two directly conflicting trends. Many believe they must choose between either blocking physicians from using their mobile devices or increasing their risk by opening enterprise networks to patient data. There is a third alternative: Working with an enterprise image viewer that provides the modern security required to enable seamless enterprise image access and sharing from mobile devices.

Data Access Without Data Transfer

Systems that provide mobile access to patient information and then transfer and store that data on mobile devices are unsafe. When devices are lost or stolen, that information then becomes available to the thief. High-level mobile security includes the ability to share and view information without transferring it permanently to a mobile device. These applications also purge all patient information from mobile devices at the close of a session.

End-to-End Data Encryption

Mobile devices are capable of accessing patient information from virtually any location at any time, a capability that increases the potential amount of patient data traveling both inside and outside enterprise networks. Wherever and whenever it's transferred, data should be encrypted to protect it from eavesdropping hackers.

User Authentication Standards

User authentication ensures that any user trying to access patient data is who they say they are. Physicians working in enterprise environments often have multiple accounts - each with its own log-in procedure - to access health information systems. Multiple sign-ins are not only confusing for users but are also difficult for IT departments to manage.

Standards exist that allow IT departments to integrate authentication for multiple systems into a single secure sign-on. Support for these standards are critical to managing user authentication, allowing users to keep their password safe and secure, and implementing best practices such as periodic password updates. This combination of policy and technology keeps the wrong users from accessing patient records.

HIPAA Compliance

HIPAA, a set of health information security regulations, includes three components: rules for the protection and privacy of individually identifiable health information; security standards for electronic health information and notification requirements following breaches of unsecured protected health information. These rules ensure the confidentiality, availability and protection of patient health information, whether it's located in a doctor's EHR, a hospital server or a statewide health data registry.

5. MODERN HEALTHCARE WORKFLOW SUPPORT

Clinical workflow is rapidly evolving as the result of two trends: the pervasive implementation of EHRs and the rapid adoption of mobile devices by clinicians.

Since 2010, healthcare in the United States has undergone a massive transformation from a paper-based system to one in which 96 percent of hospitals and 78 percent of physicians have implemented some type of certified electronic health record (EHR).

Mobile devices are perfectly suited to the pervasive mobile workflow of clinical care. Smartphones and tablets provide untethered instant access to medical information and research, patient data and caregiver communications.

When EHRs and mobile devices are used together workflows become much more efficient and support better patient care. Providers can check vitals, lab results and other pertinent patient data without spending time going back and forth to a desktop system. To gain access to this efficiency, 63 percent of hospitals plan to deploy mobile communications platforms within the next year.

Image access from EHRs on mobile devices is a critical element of this developing workflow standard. Image viewers thus need to support both EHR integration and use on both smartphones and tablets.

EHR
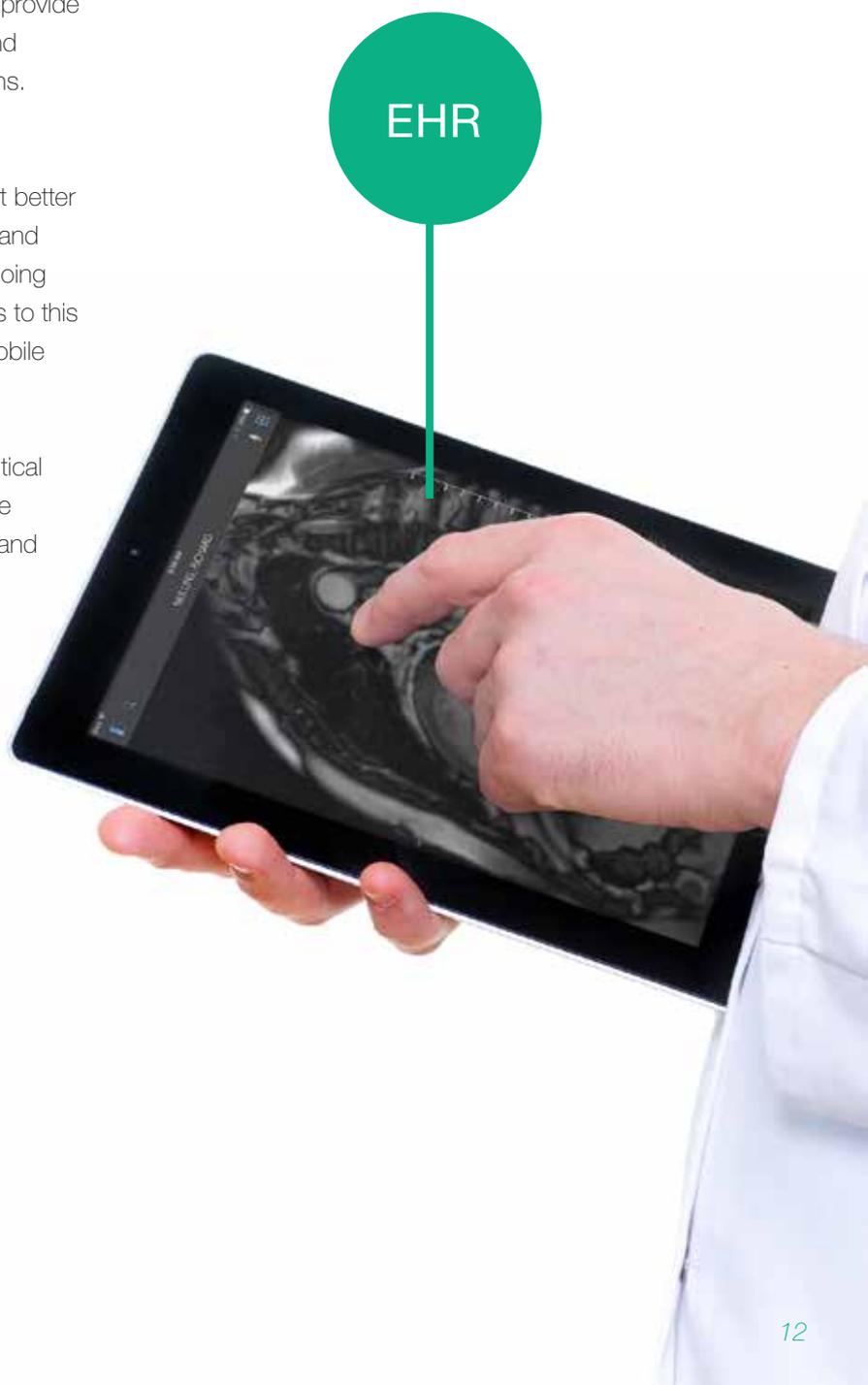
6. EXISTING INFRASTRUCTURE SUPPORT

Organizations are looking to implement seamless, enterprise-wide image access without adding additional layers of complexity to their health IT environment or requiring reengineering. ResolutionMD is a platform-agnostic tool that can be added to a health IT environment no matter what the level of complexity. It will connect with any PACS, VNA or EHR, making it possible to provide enterprise-wide image sharing and exchange without infrastructure changes.
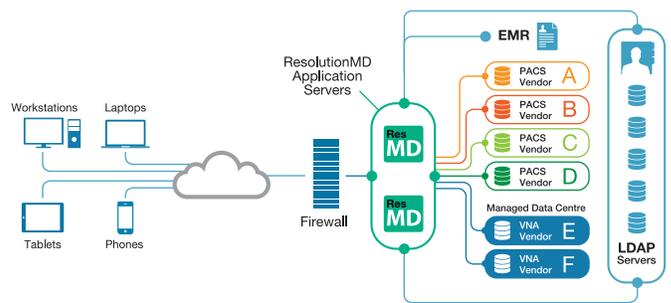
7. KEY ELEMENTS OF ENTERPRISE IMAGE VIEWER IMPLEMENTATION

A number of elements go into a successful enterprise image viewer implementation. A comprehensive site survey should be used to gather important details, including the following:

Identify your optimal server setup

- Determine server capacity based on use-cases and expected usage levels

- Verify optimum server configuration including load balancers and proximity to data sources

- Select desired server operating system based on support capability

Identify security requirements

- Decide how users will be authenticated - LDAP, secure LDAP or Active Directory

- Determine requirements for external access - VPN or SSL

Map out data access requirements

- Identify the systems you need to integrate with – EMR, RIS/HIS or others

- Consider different file types you need access to such as images, reports or videos

- Determine the archives you want to interface with such as PACS or VNA

Develop a mobile strategy

- Select the types of devices you will support and determine your BYOD policy

- Test Wi-Fi capacity to ensure bandwidth supports the new mobile devices on the network

Create a plan that allows time for proper system testing

- Construct a testing environment for system validation

- Document your rollout plan and approval process for bringing users on board

8. USER TRAINING AND ADOPTION

Once an enterprise image viewer has been thoroughly tested and accepted by the IT department and select user groups, it's time to focus on driving user adoption. Users of the system should be properly trained to understand how to integrate the image viewer's functionality into their daily workflows.

Training

The training curriculum should be tailored to specific job functions and delivered by appropriately qualified personnel. Clinical training should be conducted by experienced clinicians and technical training should be delivered by individuals with the proper technical certifications.

Effective training combines online training and experiential learning. Hands-on training is critical to ensure users truly understand how to effectively incorporate the technology into their clinical practice.

Adoption

A best practice is to identify people who will support user adoption after initial training. Typically these people are responsible for holding awareness events, lunch and learns and being available to answer questions. Key stakeholders can become adoption champions and help push the solution through to successful adoption. They are best suited to speak to the original project goals and understand the full potential of the solution.

ABOUT ResolutionMD®

The ResolutionMD platform enables doctors to securely view patient images and reports from a wide variety of computers and mobile devices, collaborate with other practitioners and diagnose from any location. Whether you are a single facility or a large healthcare systems with tens of thousands of users, ResolutionMD is the best choice for seamless image access across multiple departments. It is globally accredited and can be integrated into any EHR or distributed storage systems. ResolutionMD's federated approach is an important differentiator from other solutions as highly sensitive data is never moved to any device and not additional storage locations are created.

Find out how ResolutionMD can offer your organization uncompromised access to medical images.

ENDNOTES

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