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The Universal Image Viewer

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Key Points

• A universal image viewer enables viewing of images across departments and enterprises, thus enhancing patient care.

• A universal viewer may replace or coexist with a PACS viewer, and may be integrated with a vendor-neutral archive or electronic health record system.

• Universal viewers offer a number of advanced functionalities, including viewing of DICOM and non-DICOM images and more, server-side image processing, streaming technology and scalability.

• There may be a trade-off between having a zero-footprint solution and availability of advanced features. Few solutions require absolutely no software on the viewing device.

In today's rapidly evolving healthcare environment, the need for cross-department and cross-enterprise information sharing is greater than ever before. This is particularly true for diagnostic images. A universal medical image viewer meets this need by enabling viewing of any medical image, imaging report and related patient data anytime and anywhere outside of a PACS environment. At last, digital image access is no longer confined to the department that created the data. However, all universal viewers are not created equal. This article examines the attributes of a universal viewer, viewing use cases, and the features and functionalities available in the technology today.

The nature of image viewing is changing. The concept of dedicated technology residing on a single workstation and tied to a particular departmental solution is rapidly becoming history. As the need— and legislative mandate—to share images across departments, multisite enterprises and entire communities expands, a more flexible vendor-neutral viewing system that provides anywhere, anytime image access is rapidly becoming an expectation.

What is a universal image viewer? To some extent this depends on who you ask and what universe they inhabit. Essentially, a universal viewer is a single platform supporting the visualisation of medical images in any format— both DICOM and non-DICOM— and imaging reports that can run on any off-the-shelf computer or universal device in any location to support the workflow of any physician, as the enterprise requires. In other words, it makes images available wherever, whenever and to whomever needed. The solution eliminates the need for users to log into a specialised radiology PACS or other departmental system to view imaging data, as well as the patchwork of specialised solutions often used to provide image access beyond the department that created the imaging data. Such a viewing solution may replace or coexist with a traditional PACS viewer, and may be integrated with a vendor-neutral archive (VNA) or electronic health record system (EHR).

Not surprisingly, the requirements of a universal viewer for a small hospital are often relatively modest compared to the needs of a large, multi-site institution operating in an expansive imaging environment with digital radiology, cardiology, laboratory, ophthalmology and wound care files, a broad network of consulting clinical specialists and referrers covering a large geographic area. To satisfy all their needs and make the most of their budget, hospitals must truly understand their full image distribution requirements before they begin a search for a solution.

Attributes of a Universal Viewer

Today, hospitals can easily find a high-quality image viewing system that is feature-rich, easy-to-use, versatile, secure, and affordable. Some systems actually deliver performance similar to a standard standalone PACS viewer— with all the bells and whistles. But not all viewers are created equal. So a hospital must understand its needs, survey the marketplace and make its choice carefully.

Best of Breed Solution

The best universal viewing solutions provide a range of advanced functionalities that will enable versatile image communication now and as a hospital's needs expand in the future. These include:

• Zero-footprint browser-based technology to view all standard and less common DICOM files for every imaging modality.

• Viewing of all standard and non-standard DICOM images from other medical specialties, such as cardiology and pathology.

• Display of additional image formats, such as jpeg, tiff, avi, mpeg, often used for laboratory, ophthalmology and other images.

• Viewing textual reports.

• Support for the Integrating the Healthcare Enterprise Cross-Enterprise Document Sharing (IHE XDS) profile.

• Server-side image processing.

• Support of a full range of hardware and platforms, including PC and MAC, as well as Android, BlackBerry, iOS, and Windows.

• Support for all standard Web browsers, including legacy technology.

• Streaming technology to make the most of available bandwidth.

• Application Programming Interface (API) for easy integration in other clinical systems.

• Scalability to accommodate a large user base.
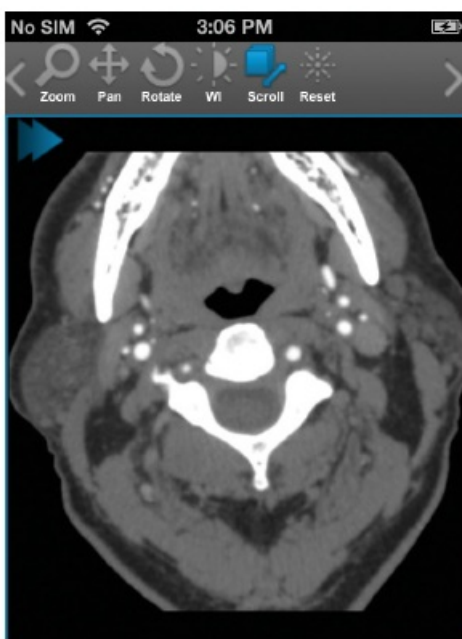
Universal Viewing Use Cases

• A universal viewer enables radiologists and clinicians to access patient images and reports when needed, realising Cross-enterpr ise image sharing for collaboration and second opinions.

• Cross-enterpr ise image sharing for trauma transfers and other emergency cases, enabling decision-making on a case before the patient is transferred.

• Referring physician image access, typically through a physician web portal.

• Image viewing across a health information exchange (HIE).

Not every viewer is the best selection for every one of these use cases, and technology choices must be predicated on every site's needs. Hospitals should be sure to identify a system robust enough to meet all their demands today, with an eye towards future needs. Users can also make the most of their budgets by making wise choices and not paying for features they will never need.
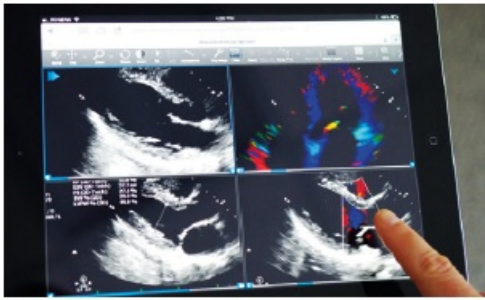
Benefits of a Universal Viewer

By providing immediate access to all physicians who need images, a universal viewer can significantly enhance patient care by speeding up diagnosis and increasing treatment efficiency and precision. These viewers also provide convenience and efficiency to all staff involved in using or facilitating access to images, streamlining hospital processes and procedures. They play a large role in enhancing communication with referring physicians.

Technology Overview

Most universal viewers are browser-based, employing some form of thin-client or zero-footprint technology that downloads from a central server or off-site cloud environment, which is part of the system. This enables use on a wide range of devices in multiple locations with minimal or no updates on these devices. Images to be accessed can be either cached on a universal viewer server or streamed to the server directly from archiving systems like a PACS or a VNA. Users then access the server through a web browser and interact with the application and imaging data remotely— the computing power lies on the server hardware, not the local device. The best viewers do not download images to the device, minimising security concerns. When viewing an image, an authorised user will log into the appl ication with secure authentication protocols, find the desired image and continue from there. The device's connection, whether wired or wireless, is also an important ingredient in the mix. Secure and fast connections are a must for high performance.

Although web-based viewers may use a browser for image display, they can still employ proprietary technology, limiting the usefulness of the images. At times, vendors are less than literal with their descriptions— so buyer beware.

Thin Client vs. Zero-Footprint

The early wave of universal viewers was based exclusively on thin-client technology, with most of the viewing applications running from a server. A plug-in or download of various sizes on the viewing hardware was required. Today, many universal viewers continue as thin client applications. During the past few years, some vendors have progressed to a flavour of zero-footprint technology that still requires installing Adobe Flash software on the device. Few solutions require absolutely no software on the viewing device.

From an IT perspective, thin-client technology can create a complex and difficult to maintain IT environment. IT departments need to support the portions of the viewing solution running on remote devices in what is often an uncontrolled operating environment— an iPhone or tablet, which may be treated casually. Therefore, a zero-footprint solution offers tangible advantages over thin-client technology. But on the downside, it can demand a compromise on advanced features. The issue, in part, is the ability of the user interface on a local device to control an application running on a remote server quickly and efficiently to manipulate images as desired. Some vendors have invested significant ef for ts in making the most of wireless bandwidth to enhance performance and to integrate the most sophisticated viewing functionalities into their systems. Therefore, these viewers deliver the best of both worlds.

Conclusion

A universal medical image viewer is becoming a necessity in today's healthcare environment with its emphasis on information sharing and abundance of multiple mobile devices used in healthcare. A wide range of universal viewers are available with significantly different capabilities, from simply providing access to non-diagnostic access to images beyond a PACS to highly sophisticated support for diagnostic quality viewing with a full range of image manipulation tools and the ability to transmit data files in real time. A medical facility should carefully assess its imaging needs beyond the radiology department and the enterprise to determine what features and functionalities it needs in a universal viewer today and in the foreseeable future. It should also carefully examine the capabilities of a full spectrum of such viewers to find the technology that meets its specific needs.

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