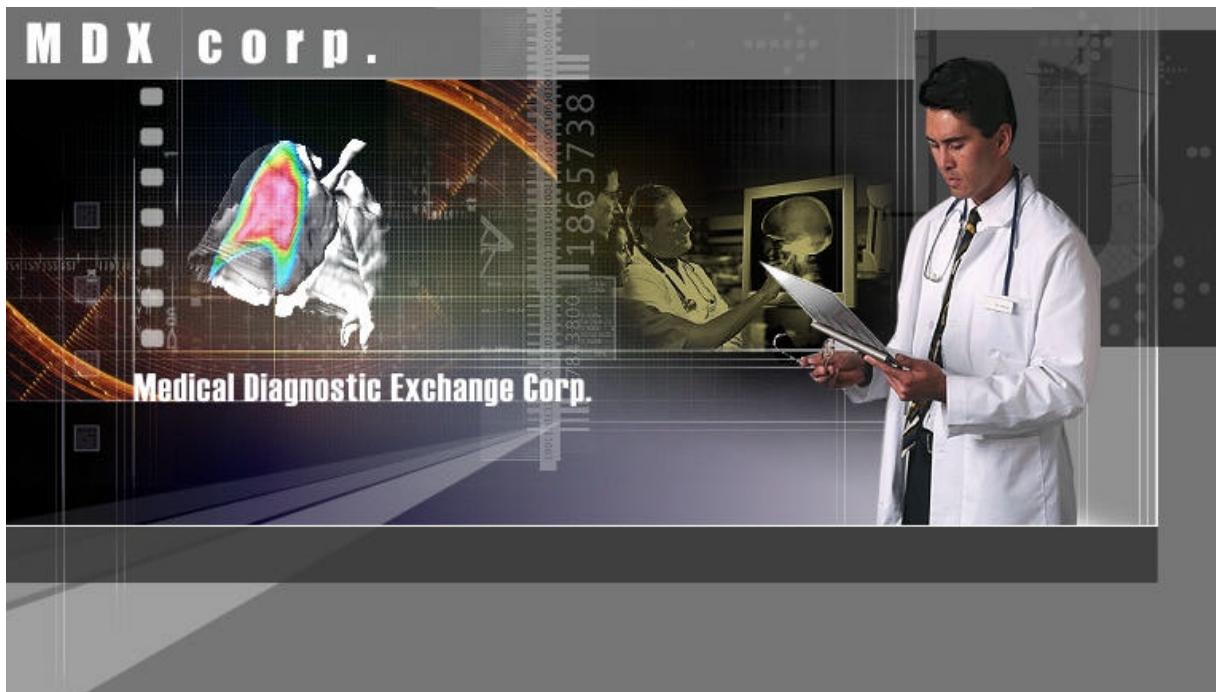


Medical Diagnostic Exchange Corp.

Cost-Effective Access to PACS Functions via Insight™

A simple alternative to investing in expensive PACS workstations. A next-generation system that goes beyond current web-based solutions.



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PACS Functions and the Insight™ System Architecture

The Insight™ system for image and data management provides an extremely cost-effective way to give clinical users access to needed PACS functions. This is possible because of the unique architecture of the system.

Client-server based

The Insight™ system is client/server-based: any application on the server generates screen images. When a new screen image is available, the image is compressed and transmitted securely to the user located at the client machine (see Figure 1). User events and interactions flow from the client to the server.

Full-featured and easy-to-use

The Insight™ software is also a full-featured and integrated PACS and RIS solution with a number of unique capabilities such as extreme ease-of-use and focused clinical applications.

Patent-pending technology

The patent-pending streaming technology of Insight™ ensures that the user observes no difference between running Insight™ remotely on the server and running the application on the local client. To the user, the computer network transmitting the images may simply be considered as a long monitor cable.

Replaces expensive radiological workstations

One advantage of the unique Insight™ technology is that large, expensive radiological workstations can be replaced with simple and inexpensive client stations such as thin-clients¹ or regular PCs. Such client devices, however, provide full diagnostic PACS functions for the clinical users, including searching and selecting of patients and data, loading of data regardless of study size and/or number of studies, presentation and analysis of image data (2D functions as well as advanced 3D functions such as MPR and reconstructions), and all ancillary PACS functions (printing, collaboration, tele-consultation, reporting, etc).

Standard web-based PACS applications running on PCs do not provide the required PACS functionality for a number of reasons: transmitting large amounts of image data to an access station is inefficient in terms of both time and bandwidth, and such access workstations must still be sufficiently powerful in order to perform all relevant analysis functions.

¹ A thin-client is a small, diskless computer that contains no operating system and boots in seconds and operates as a terminal to a server machine. Thin clients may have one or more screens, a keyboard, a pointing device, and a microphone (if necessary).

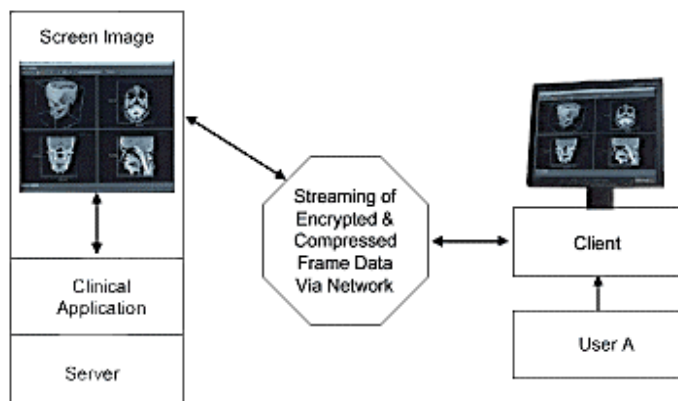


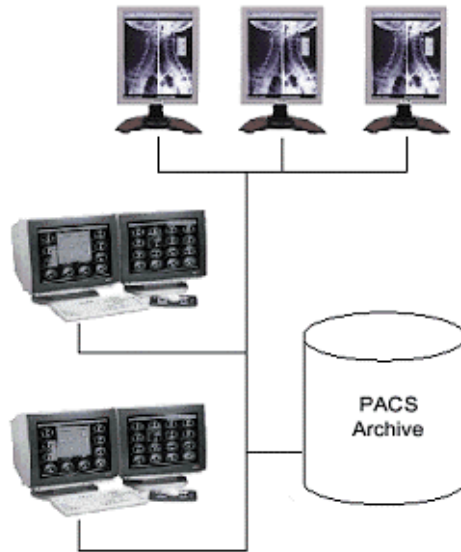
Figure 1. The client-server architecture of the Insight™ system ensures that patient data and images are never transferred from the server to any clients. Only the final screen images are streamed to the client station in response to user interactions.

1 A thin-client is a small, diskless computer that contains no operating system and boots in seconds and operates as a terminal to a server machine. Thin clients may have one or more screens, a keyboard, a pointing device, and a microphone (if necessary).

An Example of Cost-Effective Use of Insight™

As an example of cost-effective implementation of the Insight™ system, consider a moderate-sized hospital with an installed PACS system that includes a number of diagnostic workstations within the radiology department. Based on the success of the PACS system, a number of clinical departments and users are requesting PACS workstations with the same capabilities as those used by radiologists. Five workstations are required in all, one for the trauma department, two for surgical wards (with dual monitors), one for the ICU, and one for home use by a radiologist that is frequently on-call on weekends.

Figure 2 shows the desired configuration with five physical PACS diagnostic



workstations.

Now consider the configuration shown in Figure 3 with the Insight™ system providing distributed access to the data, PACS functions, and computational power of the central server machine. Each of the five access stations is functionally a complete PACS diagnostic workstation, but physically each station is an inexpensive and light client or simple PC (which includes a screen type that reflects radiological need - size, resolution, brightness, etc).

The resulting cost of investing in each of these two configurations can roughly be calculated as follows. For the first configuration (Figure 2), hardware costs are simply five times the price of a diagnostic workstation (estimated at 43.960 USD per unit, excluding 6.280 USD for a typical high-quality screen). For the Insight™ configuration, the cost is the same for the screens, but the client devices are 1.256 USD each, and the Insight™ server 2 is approximately 31.400 USD. The total investment is thus 81.650 USD for the Insight™ solution, versus 263.800 USD for the configuration consisting of dedicated workstations.

2 The Insight™ server in this configuration consists of an IBM Intel-Linux PC Cluster with three nodes: an Application/Cache Node and two Render Nodes. Note that the given hardware setup can support up to ten additional workstations/users.
PACS

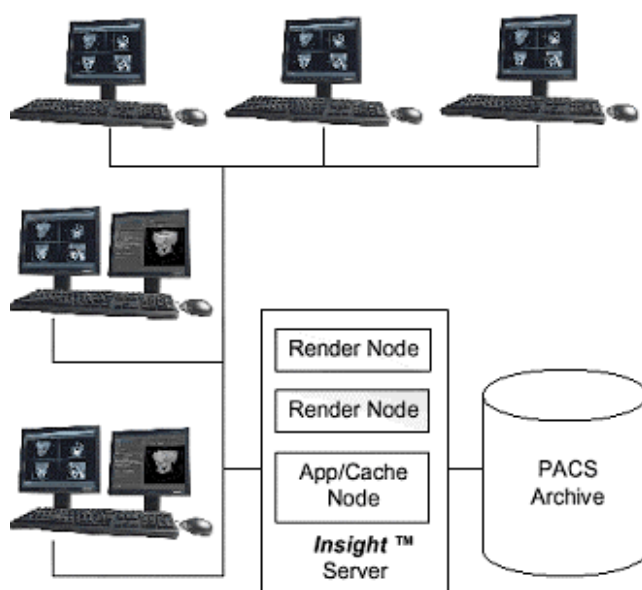


Figure 3. Expansion of a PACS system with the addition of an Insight™ server and five thin-client devices that function as diagnostic workstations.

This investment analysis assumes that software license costs and system support costs are the same for both configurations. However, one area where the Insight™ solution exhibits an additional advantage is regarding expansion of the system. If five more workstations/users need to be added, this is done by connecting five more thin-clients or PCs to the Insight™ server (no additional Render Nodes are required). Thus, the total investment for ten PACS workstations becomes 537.893 USD for dedicated equipment versus 134.473 USD for the Insight™ solution.

An Insight™ system with five Render Nodes has been operating at Aalborg University Hospital in Denmark over the last year. According to Dr. Henrik Gregersen of the Radiology Department, and the project leader, “it has been extremely simple to meet the growing PACS needs of our radiologists and clinicians – anytime an additional diagnostic or clinical workstation is required, we simply re-use an existing PC or install a thin-client. The return-on-investment is extremely rapid for each new seat.”

Conclusion

Contrary to traditional medical IT systems – where images are forwarded for viewing on local workstations – the architecture of the Insight™ system gives distributed access to the power of a central server machine and the data on the server. That is, by connecting to the Insight™ server, even over low bandwidth networks such as 0.5 Mb/s DSLs, the full power of a diagnostic PACS workstation is made available on a thin-client device or common PC. This means that the installation of costly PACS workstations can be replaced with a highly cost-effective configuration consisting of an Insight™ server and connected client access stations, with no compromise in terms of PACS functionality.