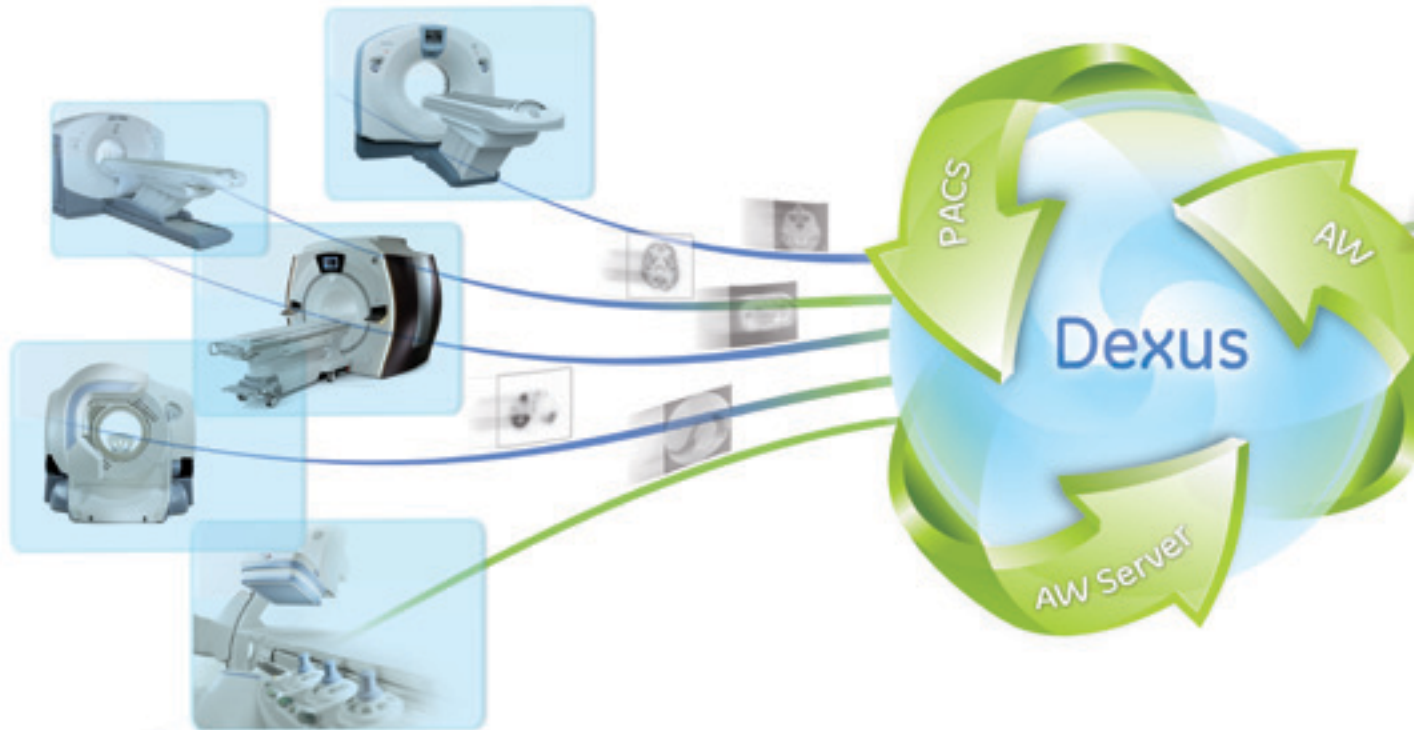# Integration and Information the Cornerstone of Radiology

By William P. Shuman, MD, FACR, Director of Radiology,
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Radiology embraced the digital revolution more than 20 years ago. In most hospitals today, radiologists perform their diagnoses in virtually an all-digital environment. Alternate care sites—clinics and physician offices—are quickly following in the same direction, if they are not already there. However, as imaging and information technology advanced at varying levels over the past two decades, radiology departments have become a multi-system environment. As a result, radiologists utilize an array of systems—many from different manufacturers—to read and report the patient diagnosis. These systems include, but are not limited to, PACS, RIS, HIS, Speech Recognition, and advanced image processing.

As technology changes, so too does our expectation of the technology. We expect it to positively impact patient care by enabling us to see the body more clearly with advanced imaging or post-processing techniques, and enhance our workflow for physician accuracy and efficiency (particularly important in emergency cases).

Yet, this multi-system electronic environment may present a barrier to workflow and efficiency. Advanced processing workstations were historically separate workstations. Native to these systems are 3D and other advanced image post-processing software. Radiologists had to pause in their analysis, physically move to the image processing workstation, perform the image analysis, and then push the data back to the PACS. In this scenario, efficiency and seamless connectivity of patient information was lost.

Recent integration of advanced processing capabilities to the PACS diminished the need to utilize a stand-alone workstation. This was often accomplished by providing

access to an advanced application server via the desktop. While this configuration worked, it still presented significant workflow challenges.

With multiple systems already open on the workstation—HIS, RIS, PACS—the radiologist was required to navigate and locate/manage the desktop mindshare. Perhaps more important is speed and functionality. At the University of Washington, we use most of our advanced processing capabilities (as do other sites) with CT colonography, cardiac, spectral dual energy, and vascular imaging. Having a dedicated advanced image processing workstation (i.e., AW Workstation) just 20 feet away from the PACS workstation made it tempting to go over and work on it. However, this defeated the purpose of a single desktop. As radiologists are well aware, interruptions to the diagnostic process, including moving to a dedicated processing workstation, diminish efficiency and productivity.

While increases in network and processing speed helped address these issues, a fully integrated program that allowed us to seamlessly access PACS, RIS, advanced image processing, and other applications at the same time, on the same workstation,
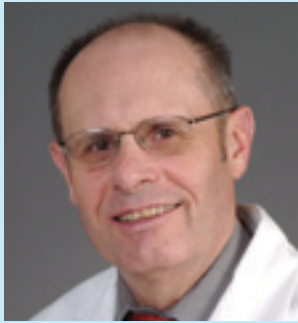
was highly desired. At our facility, we recently implemented a new solution that integrates GE's new AW Server to our RIS-driven workflow with impressive workflow efficiency results.

Dexus workflow

An integral part of Dexus is the AW Server integration to PACS and RIS for a single imaging workflow. It also leverages a central PACS database to enable access to a broad array of advanced 3D visualization and processing tools typically found on the AW.

This environment provides a substantial improvement in the speed of image post-processing on the PACS. System usability is also enhanced due to transparent image sharing between AW and PACS.

By using a thin-client architecture, AW Server enhances the value of remote access to patient information. This is especially important for our multi-site healthcare system, where we now have the ability to scan a patient at any location and provide the same level of interpretation and analysis regardless of where the radiologists are situated.

> "Remember, as radiologists, we are integrators of information, and the more our tools complete these tasks for us, the more efficient we can be in our diagnoses and consultations."
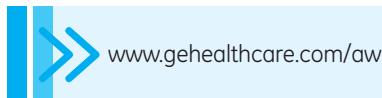>
> *Dr. William P. Shuman*

Speed has historically been an issue with advanced post-processing in the PACS. It is important that speed be independent of location—it is the same whether the images are being sent from a facility in another city or state, or three doors down the hall. By addressing the speed issue, we anticipate the AW Server will further impact our ability to perform more advanced analysis from virtually any location, including at-home night reads when on-call. As radiology subspecialties continue to grow in demand, speed will become even more important in the near future.

Clinical collaboration among and between specialties will also be further enhanced. Utilization of advanced applications in our diagnostic workflow will increase in our daily routine and in training residents and fellows. When access was cumbersome and required an interruption in workflow, there was a natural reluctance on the part of the radiologist to use 3D image analysis. Frankly, their productivity would decrease as they fell further behind on their workload. Now with Dexus, we can perform 3D analysis directly on the PACS on more patient cases due to the increase in speed of access and performance, which impacts the quality of patient care. In our facility, we estimate that in approximately 10% to 15% of high-tech imaging, 3D analysis will improve or change the diagnosis.

Finally, training is a critical component and should not be overlooked. In my opinion, the best scenario is an intuitive system and software that doesn't require significant training. The test of any training program is the extent to which staff can fully utilize the software while maintaining efficiency—two weeks after the training session is complete.

Our radiologists expect the new environment will offer the referring physician, patient, and hospital (our employer) a better balance between accuracy, quality, and productivity. The way information from different systems and software is integrated does matter. We've learned that one software environment with a single database is critical for access to advanced imaging functionality and the entire diagnostic and image evaluation process.

Remember, as radiologists, we are integrators of information, and the more our tools complete these tasks for us, the more efficient we can be in our diagnoses and consultations. ■

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William P. Shuman, MD, is Director of Radiology at UWMC and Vice Chairman and Professor for the Department of Radiology. Dr. Shuman received his medical degree from State University of New York Syracuse and completed a residency in radiology at the University of Vermont. Dr. Shuman is one of the leaders in creating cardiac CT at UW. Outside of UW, Dr. Shuman has served as Associate Editor for two leading academic peer reviewed journals in radiology, is currently on the Appropriateness Committee of the American College of Radiology, and is the President of the Society of Body CT/MR.

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