

Outsourcing Imaging Library: The Achilles Heal for PACS Vendors

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PURPOSE

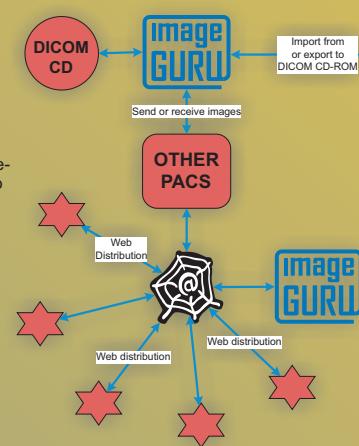
To present how developing a proprietary imaging library improved image quality, rendering and printing speeds, development turnaround time, and customer satisfaction of StorCOMM's PACS. We will also discuss the difficulties that we experienced in developing and maintaining this new component and present the lessons we learned.

METHODS

During the first seven years of StorCOMM's PACS development, we licensed an imaging library from a third party provider, just as most PACS companies do. We lived with the many drawbacks of working around someone else's design and capacity to fix bugs. Two years ago, we identified the imaging library as a core technology for a PACS company. Without an effective imaging library, a PACS is dependent on another company's innovations and susceptible to their downfalls as well.

The library that we originally licensed was a generic toolkit supporting the publishing industry with support for CAD and vector drawing, animation, TWAIN and character recognition, and special pre-printing image corrections. It also supported more than 100 graphic file formats and all major operating systems. In reality, we needed only the Windows operating system support and at most 10% of the 1,500 available algorithms, the remainder was just ballast for us. Furthermore it was extremely frustrating to work around the limitations of a third party software product and even more frustrating to be detached and unable to influence the direction of development of the third party toolkit.

With this new focus, we realized that living with a bolted-on imaging core is not an option for us. Over the next two years, StorCOMM developed a proprietary imaging library tailored to meet the needs of our healthcare providers.



RESULTS

StorCOMM's proprietary imaging library, code-named ImageGURU, contains exactly what our PACS needs and not a single line of code more. The benefits in developing our own imaging library are tremendous.

First, and probably most important for reading physicians, we achieved higher quality of images rendered to screen and printers. This was made possible by utilizing built-in logic that applies different types of interpolation while rendering images. The rules governing this interpolation can be altered through user preferences. Therefore, each type of output device gets an optimized bitmap.

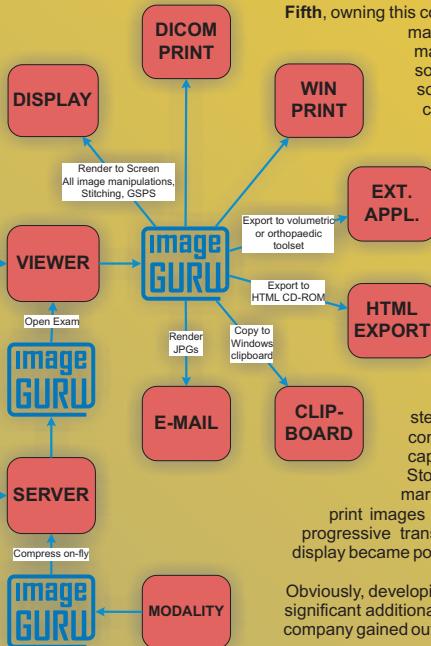
Second, the new, more efficient code runs much faster and consumes three times less memory while processing images than the third party imaging library patched with error condition checks. This in turn allows healthcare professionals to handle multi-thousand slice CT and MR studies without upgrading hardware. It also improves our software's overall responsiveness. When drawing images to the screen ImageGURU takes advantage of low-level functionality provided by video cards to decrease draw-time.

Third, ImageGURU provides support for sequential look-up tables as well as the latest DICOM GS/PS objects and progressive transmission. LUT processing has been improved by providing support for sequence tables at any level (modality, vol, presentation) without affecting the user's ability to adjust the image display via window/leveling and/or invert.

Fourth, shorter development turnaround time increased customer satisfaction. Our customers greatly appreciate StorCOMM's ability to react to real-life issues in an expedited

RESULTS (CONTINUED)

manner. Prior to the implementation of our new imaging library, it could easily take six months for a third party software manufacturer to fix a bug in their code. In addition, some fixes were provided in new library versions, requiring upgrades to the developmental environment and endless contractual discussions. With ImageGURU we can address critical problems within days on our own.



Fifth, owning this core technology also means less vulnerability to market consolidation and a greater level of marketing freedom. Royalties on each copy of software prevented us from marketing the software in new ways and adversely affected our capability to distribute a free DICOM viewer. Now, we can address new niche markets beyond our prior reach.

Last, but not least, the architecture of ImageGURU prepares StorCOMM for future industry challenges. The scientific community and the medical imaging industry continuously develop new recommendations and technologies. ImageGURU allows us to incorporate the latest standards and developments faster. For example, our imaging engine was built with a true 16 bit pipeline, allowing the processing and display of 16 bit medical images in a single step. It remains to be seen if the medical community will accept the higher price of a 16 bit capable display for the benefit provided, but StorCOMM is now ready to address this potential market need. This same applies to the ability to print images to 8 and 12 bit DICOM printers. In addition, progressive transmission and pixels-on-demand progressive display became possible with new library.

Obviously, developing and maintaining a new component requires significant additional resources, but it is clear that the benefits our company gained outweighed the drawbacks many times over.

CONCLUSIONS

Owning this cornerstone of underlying architecture permits StorCOMM to quickly address customer requests and incorporate new technologies faster. ImageGURU allows for the best possible image quality and gives a competitive edge integrating with high-end displays. This royalty free solution provides the freedom to better position our product in price sensitive markets.

