GRIDBYTE™
MULTI-DIMENSIONAL THINKING

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Title: Muiti-dimensional solutions in medical company
White Paper: GridByte-CS2007-05
Created by: Sam O. George/GRIDBYTE™
Release Date: 2007-APR-30
URL: http://www.gridbyte.com/Resources/Documents/GridByte-CS2007-05.pdf
Keywords: Business process optimization, medical company

Case Outline: The client, a medical imaging company, utilized off-shore consultants to review CAT-scans and give diagnostic reports. Every day, the imaging company transmitted hundreds of image files via email; **on average,** the file sizes were 15MB each. On one occassion, there were 800 (12GB) files clogging up their email system for several hours. The client resorted to email because ftp and other file-transfer/sharing methods had either not worked well for them or were insecure. The client also used email as a date-tracking system.

Initially, the client hired an IT consulting firm that partnered with GridByte™ to leverage advanced systems thinking in combination with compute system/network optimization skillsets. The client wanted to improve system (email and network infrastructure) speed and efficiency—possibly using multiple email servers concurrently.

Solution Brief: GridByte™ created a high performance fileserver with optimized network I/O that did not use email resources. We combined the file-sharing solution with a custom database implementation. We created enhanced network design with segmentation to isolate high bandwidth file-sharing traffic from other office communications. We created a VPN solution for off-shore remote access. We then implemented a different use-model that utilized the optimized systems correctly.

Solution Detail: Our client had a carefully scoped statement of work (SOW). However, our methodology at GridByte™ requires us to dig deeper—to understand the full mission of the business or business process. Our first action was to study the business process of the medical imaging company. It quickly became clear that their use of an email-based file-sharing methodology reflected a limited understanding of the breath of engineering IT possibilities. Moreover, we began to educate the client that the email optimization path in their SOW would only yield minimal success.

From the outset, our client-interface was reluctant to consider change to their use-model[1] due to concerns about the implications of yet another shift in direction. So, against this backdrop, we utilized GridByte™ resources to mirror all their data without affecting their day-to-day networks or business processes. We then created an optimized multi-component system that was literally 10 times faster than their original approach.

The imaging facility CAT scanner system had proprietary software for which we were not given access. So, we first created a database and implemented basic revision control software—mostly for check-in/check-out. Second, we mirrored client data into the database. Each image-sequence was given a generic object identifier to protect client privacy. The revision control methodology had two basic access modes; an administrator mode that could view patient names/records and a client mode with access based only on the anonymous object identifiers. Most importantly, the client-mode access was given to the company's off-shore partner. The system used information that had previously been ignored. Because of the

[1] **Use-model** is an encompassing term that describes how compute infrastructure resources are organized to serve the needs of the organization. It captures the underlying computation philosophy of the organization. It further describes how humans access compute resources. While a critical component of compute infrastructure implementation, many companies do not have cohesive strategies. The general paradigm in most businesses is ad-hoc use-models. Many ad-hoc use-models exist because of rapid innovations in software and hardware. In many projects that are undertaken by GridByte™ , ad-hoc use-models are responsible for significant productivity losses.

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time differentials between the U.S. and off-shore site, file-transfer could be load-balanced to have minimum impact **on** day-time work at the company.

Our live demo of the new solution showcased improvements that were an order of magnitude greater than the client's current system. After initial deployment, there was still resistance from the client because the new use-model was so different; it was not as simple as their email-based solution. However, the new solution was superior to the email approach in all areas of performance. We were faced with an interesting dilemma—a superior solution that intimidated the client. In general, GridByte™ does not make its business developing optimized GUI applications. We apply core programming skills to optimize all underlying compute server processes. With the help of the client's primary contractor, we successfully added some GUI interfaces to win full acceptance.

GUI aside, the core implementation utilized a database centric design. This database was implemented in a revision control system. Images captured by the CT scanner were immediately uploaded to the database and given unique object identifiers. The revision control system created a live mirror replication to the off-shore site 24 hours a day via load-balanced VPNs. File-sharing via mirroring was carefully load-balanced to minimize traffic during core U.S. business hours. When complete, the off-shore facility checked their reports directly into the database. The reports utilized links to images already in the database—thus the report files were small. In short, email was restored to non-production issues.

Conclusion: This is an example of how GridByte™ provided an innovative solution that went beyond the client's original vision to produce 10× performance improvement in file-sharing bandwidth utilization. By partnering with the client's contractor when the solution seemed intimidating, GridByte™ delivered a powerful solution that met the client's needs for both performance and useability.

Citation: Sam O. George, "Multi-dimensional solutions in medical company,"
http://www.gridbyte.com/Resources/Documents/GridByte-CS2007-05.pdf, GridByte™, 30 April 2007.