

# A Prescription for Database Efficiency

FusionStorm helps PDL BioPharma cure database server sprawl with Oracle Real Application Clusters.

Texas Instruments introduced silicon transistors in 1954, the same year in which human trials of Dr. Jonas Salk's polio vaccine were conducted. In the years since, technological advancements and drug discovery research have become unmistakably intertwined.

Few fields have been as favorably impacted by technology as the pharmaceutical industry. Where research once was performed in small laboratories by individuals using sheer brainpower and relatively simple tools, today's researchers leverage large-scale computing platforms and powerful databases to generate dramatic new breakthroughs.

Unfortunately, server sprawl has become a natural byproduct of this automation. The high-end databases required for the various computational and scientific applications used in pharmaceutical research have traditionally required dedicated servers. These servers are often dramatically underutilized, which introduces unnecessary cost and complexity into the data center.

Server sprawl recently became an acute problem for PDL BioPharma, a multinational biopharmaceutical company headquartered in Fremont, Calif. Historically a biotechnology research firm, PDL underwent a fundamental transformation in early 2005 when it acquired ESP Pharma and essentially became a commercial pharmaceutical company overnight. This created the need for new applications running on dedicated databases with their associated dedicated servers.

PDL enlisted FusionStorm to help the company consolidate its database environment in a way that would save money on hardware, simplify

management and still provide high availability. FusionStorm recommended a shared-disk platform featuring Oracle Real Application Clusters (RAC) running on a Linux operating system, and completed the entire implementation over a two-week period in November 2005.

## Going to RAC

"Database consolidation and improved efficiency were major considerations for us," said Steve Rogers, PDL's senior manager of IT operations. "Every time we wanted to roll out an application, whether it was Oracle AERS (Adverse Event Reporting System) or a clinical trial management system, we would have to deploy a dedicated server with its own local attached storage. By the time you'd get done, it was a \$50,000 solution – maybe even a \$200,000 solution. We were looking for a way to put more eggs in the same basket."

RAC technology has enabled PDL to eliminate this server sprawl. Where the company previously was running five separate instances of Oracle 9i database on five dedicated servers, it now has consolidated those databases on a three-server cluster.

"It's funny, every time we'd roll out a database we'd deploy a dedicated database server because that's the best practice from the vendor," said Rogers. "But by the time you're done, you look at the data and you have maybe 20 gig — yet, you've just deployed a four-processor box with half a terabyte of storage.

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## Strength in Numbers

The Oracle technology runs on a grid architecture, which harnesses multiple servers, network resources and databases to form a virtual supercomputer. In the past, this kind of reliability required very expensive, high-end servers. In a grid environment, however, organizations can utilize small to midsize servers that are combined together in a cluster to provide performance comparable to a very large system. Oracle uses the same clustering technology on all supported operating systems.

By enabling an application to run across multiple systems, or nodes, Oracle RAC creates what is known as a virtual service. If a node fails, other nodes take over so that there is no interruption in application availability. The clustering software also balances the application workload across nodes, improving performance. Adding processing power is as simple as adding another server to the cluster — there’s no need to shut down the cluster to add another server, and applications can begin using the additional capacity as soon as the new server is started.

In addition to the three-node RAC cluster for housing multiple production databases, FusionStorm created a second two-node RAC cluster for quality assurance and development purposes. Red Hat Linux Advanced Server 4, 64-bit, was used as the underlying operating system. Additionally, Oracle 10g Grid Control was put in place to help monitor and manage both the production and development environments.

FusionStorm previously laid the groundwork for the RAC implementation by installing a back-end EMC storage area network to create shared-disk access to all data — a prerequisite for Oracle RAC. RAC’s shared-disk architecture is an unusual approach to database clustering. Most competing database products partition data and only give each server access to its own disk subsystem. Oracle’s approach gives all servers access to the entire database, which is critical to the cluster’s failover capabilities. Various surveys indicate that the shared-access approach allows users to dramatically reduce failover time from up to 20 minutes to about 30 seconds.

“It was truly an end-to-end solution that included the entire storage environment — the hardware, the SAN switches and the configuration of the storage array — as well as the entire Oracle RAC implementation,” said Steve Soper, Enterprise Software Practice Manager for FusionStorm. “A lot of companies can do storage implementations, and a lot of companies can do Oracle RAC implementations, but there aren’t very many that can do both.

“There’s a huge value to the customer in being able to do both because you have one set of people managing the project, making hardware recommendations and implementing the solution. You’re working with one team rather than with multiple vendors, trying to get them to talk to each other. We make sure it’s done right, and we save the customer a huge amount of time and headaches on their end.”

## More to Come

PDL has been so pleased with the project that it is being expanded, with three more RAC clusters developed for both its main manufacturing facility in Minneapolis and headquarters in California. In addition, the company is migrating from Oracle 9i to Oracle 10g database, which was specifically engineered for grid computing.

“When we’re finished, we’ll have development and test environments in both California and Minnesota, and putting RACs in multiple data centers will provide us with some fault tolerance as well,” said Rogers. “The key thing is that we’ve been able to centralize a lot of IT resources. We have the ability to dynamically manage network resources, CPUs, memory and disk size. Because it is all on a SAN, we can also dynamically grow the storage and dynamically grow the number of nodes, or processors. That’s what really drove us to this solution, and so far it has been a good play.”

Rogers said FusionStorm deserves a great deal of credit for the success of the project.

“We didn’t have any experience with RAC at all, so we were able to leverage FusionStorm’s experience and knowledge to get us up and running,” he said. “They’ve just been phenomenal. What they say they can do, they do.

“We’ve had a very positive experience with FusionStorm’s professional services organization. A combination of account management as well as consistent quality of service has really kept us really happy.”