CASE STUDY

Perfit Computer Benefits from Oracle Grid Technology in Providing High-Availability Hosted Services

Sponsored by: Oracle

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ABOUT THIS CASE STUDY

This study provides a short description of the use of Oracle's grid technology by Perfit Computer in support of its hosted services built on the **E**nterprise **M**anagement **DEC**ision **S**upport (EMDECS) application suite for the heavy-duty equipment and transportation industry. It discusses usage and experiences without the need for readers to have a deep technical knowledge of Oracle or grid computing. It is intended primarily for a readership of IT decision makers and technical architects, but will also be relevant to other readers actively considering the deployment of grid technologies.

IDC OPINION

Virtualization is becoming increasingly accepted as the means of delivering improved utilization of IT resources. Grid is the form of virtualization that addresses physical resources such as servers, enabling high availability through failover fault tolerance and scalability through the ability to add or remove resources without disrupting the service. Perfit Computer has deployed the Oracle Database 10g with Real Application Clusters (RAC) to provide improved quality of service for its hosted delivery of the EMDECS application suite for the heavy-duty equipment and transportation industry. This study shows that:

- Oracle's grid technology is sufficiently mature to provide cost-effective solutions for moderate-sized organizations as well as large IT departments.
- The high-availability and scalability claims for grid computing have been shown to deliver in practice the benefits that are claimed in theory and have been utilized by Perfit to deliver a high-availability, high-performance service to its expanding customer base.
- The industry experience demonstrated by the support services of Oracle and Dell show that grid computing has reached the level of maturity where it becomes practical for organizations with limited staff resources to deploy it successfully.
- The increased sophistication of the grid architecture need not result in additional administration costs when technologies such as the Oracle Enterprise Manager Grid Control are used to manage and administer the grid systems.

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- Grid technology permits a relatively small organization such as Perfit to compete on quality of service with much larger providers of hosted services and at an acceptable total cost.
- The ability to manage the environment remotely using small form-factor devices, like the Microsoft Window Mobile-powered Pocket PC wireless phone, is a great convenience and cost saver, particularly for smaller organizations that need to support a 24 x 7 environment.
- The grid solution has permitted Perfit to implement an architecture that avoids many of the operational hazards that were inherent in the earlier monolithic approach.

SITUATION OVERVIEW

Background to Perfit

As outlined in Table 1, Perfit Computer Systems Group Inc. is a Canadian developer of application software for the heavy-duty equipment and transportation industry. Its Enterprise Management DECision Support (EMDECS) application suite provides a fully integrated business solution to manage the operations and financial accounting areas of commercial heavy-duty equipment repair shops, rental and leasing companies, OEM dealerships, and transportation companies. As well as providing this as licensed software to be implemented at its customers' own sites, Perfit also provides a fully hosted solution to customers around the world. Current customers of the hosted service are located in Canada, the United States, Mexico, Netherlands, and Australia, with other geographically distributed customers to be added shortly. All of the access to the hosted service is Web based.

TABLE 1

Perfit Computer Systems Group Inc. — Basic Facts

Company Information	
Location	Mississauga, Ontario
Web address	www.perfitcomputer.com
Number of employees	Currently less than 50
Oracle relationship	Partner since 1996
Business	Provision of EMDECS application suite for the heavy-duty equipment and transportation industry as both a hosted service or as software implemented at a customer's site

Source: Perfit Computer Systems Group Inc., 2006

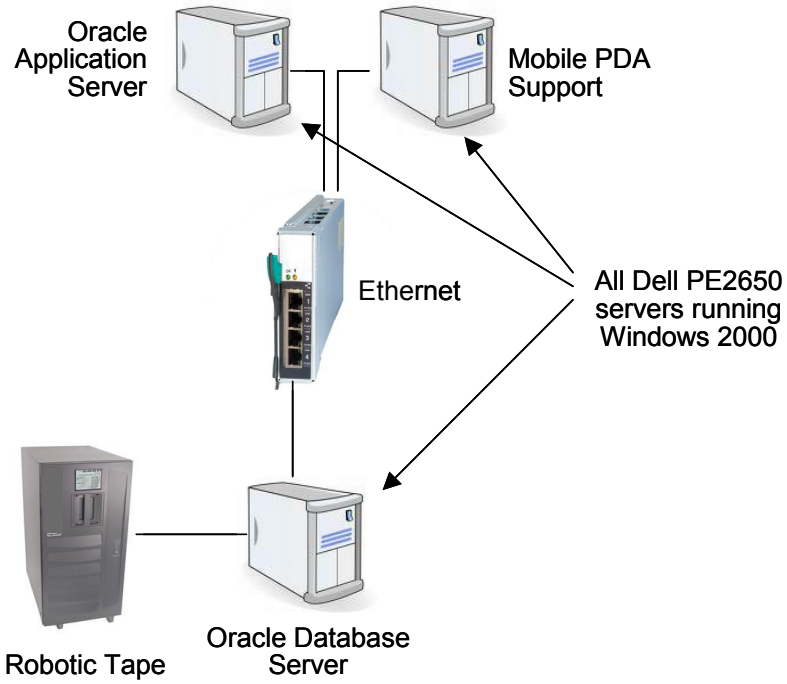
The success of the hosted service can be mapped by the growth in the number of users, from start-up to well over 1,000 users within the past few years. This continual increase in users has raised its own challenges for Perfit's group of technical staff.

Challenges of Growth

From the beginning, the EMDECS suite was based on an Oracle database and Oracle forms executing on an Oracle application server. In the original configuration (shown in Figure 1) the environment was based on three Dell PE2650 servers running Windows 2000. The database (Oracle Database 8i) and application server were each based on a dedicated machine, with the third server supporting the connection of PDAs providing support for barcode reading and other functionality through Oracle Database Lite 9i.

FIGURE 1

EMDECS Suite — Original Configuration



Source: Perfit Computer Systems Group Inc., 2006

Figure 1 shows that the physical infrastructure initially deployed had no provision for failover in the event of a problem occurring on any of the three servers. In fact this physical architecture gave rise to a number of problem scenarios:

- Difficulty in scheduling downtime for routine maintenance tasks, complicated by the distribution of Perfit's hosted customers across many time zones
- No redundant failover in the event of a hardware or software failure on any of the servers
- Performance degradation experienced while carrying out compute-intensive tasks such as periodic data conversion on behalf of customers
- Performance degradation caused by routine backups
- No simple scalability to accommodate the increasing number of clients

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Providing a Solution Through Grid Technology

Perfit considered a number of alternative solutions. The most obvious option of buying a single larger server, while addressing the initial capacity requirement, did not address the issues of continuous operation and would have forced Perfit into periodic large-step upgrades to accommodate client growth. The second option of buying two large servers to provide deliberate redundancy was also considered, but it would have partially solved the issue of system availability, not the issue of aggressive growth.

The third option was to implement a grid architecture using clusters of commodity servers. Because of Perfit's existing use of Oracle technology for both the database and application platforms, the consideration of Oracle's grid technology was a natural choice.

At the time this seemed to be a high-risk option since there was a perception in the industry that such grid technologies are still "bleeding-edge." Due to such technology concerns, Perfit's customers were not convinced that grid would be an appropriate solution and were worried that it could decrease system stability instead of providing for high availability. In particular, there was doubt that the Oracle Database 10g with RAC was sufficiently mature or that there was sufficient industry experience in deploying this type of solution.

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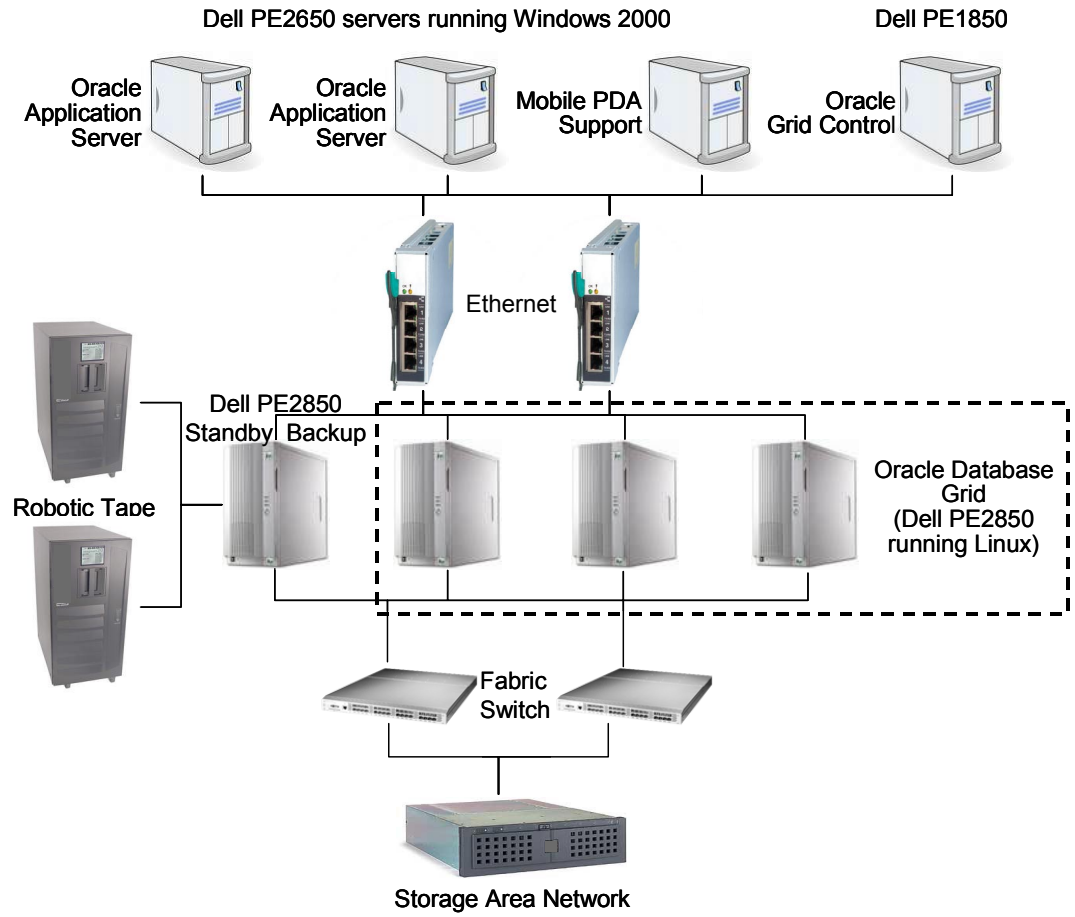
However, Perfit had the previous experience of earlier clustered implementations (using Oracle technology dating back to 1999) and recognized that Oracle has a substantial history of providing high-availability clustering technologies. Consequently, Perfit believed that Oracle's RAC technology should not be regarded as "bleeding-edge" and decided to deploy an Oracle grid solution. The company worked closely with its two strategic technology suppliers — Oracle and Dell — to define a grid architecture to support the EMDECS suite. The resulting architecture that is currently deployed at Perfit is shown as Figure 2.

Perfit recognized that Oracle has a substantial history of providing clustering technologies.

FIGURE 2

Perfit's Current Grid Architecture



Source: Perfit Computer Systems Group Inc., 2006

The physical architecture was designed with significant cooperation from both Dell and Oracle. The most complex decision was selecting the most appropriate hardware, in particular the chipset. Eventually the EM64T chipset in the Dell PE2850 was selected over the Itanium alternative, and this has proved to be a good choice for this implementation. Dell certified this environment for use with Oracle Database 10g with RAC.

The initial phase of the grid deployment, which is currently operational at Perfit, uses three Dell PE2850 servers to support the database. In fact, only two of these are required to be actively used within the grid at any one time. The third server provides additional capacity when required, and is brought online for system maintenance or should one of the servers fail. A separate standby/backup server controls the backup of the grid and is an active standby database. All pathways are redundant and designed to protect against hardware and communication failures. If required for scalability, additional servers can be added to the grid at any time.

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At this first phase, although Oracle Enterprise Manager Grid Control is being used to manage the database, it is not being fully utilized on the application servers. This is because the Web servers still execute on Oracle Application Server 9i. To include the application servers in the managed grid environment, Perfit is in the process of upgrading from Oracle Forms 6i to the current 10g release and to Oracle Application Server 10g in order to truly utilize the power of the grid.

The production implementation of the grid solution took place in May 2005. After the arrival of the hardware, the actual installation took 2–3 days to complete. Representatives from Dell arrived to configure the SAN and the simplicity of system setup from one bootable Dell installation CD and step-by-step manual made it effortless to get the Oracle Database 10g with RAC implemented.

The actual switch to the new live environment was contained within a loss of service to customers of just a little over four hours — the time needed to export the data and import it to the new environment. To run on Oracle RAC, no code rewriting was required to the EMDECS application suite, this being one of the most attractive features of Oracle RAC technology. This eliminated the potential destabilizing impact of change and shortcut the testing cycle.

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Experiences of Using the Oracle Grid Solution

Some initial system instability was due not to the Oracle software, but to a Linux kernel patch required for the hardware that was implemented. Despite this being outside of the direct responsibility of Oracle, Oracle Support was able to immediately determine the exact kernel patch required from Red Hat to resolve the symptoms observed. This unexpectedly high level of support gave considerable credibility to the quality of Oracle's support staff and their readiness to provide the level of assistance needed in deploying a grid solution. Not only does Oracle know the software, but in this case, they also know how to support the hardware and operating system.

After six weeks of continuous database availability with improved performance and no downtime, customers became reassured that the architecture was providing the improved quality of service required. Before the grid implementation, customers would assume that any slow down or loss of service was due to a problem with the hosted application service and would immediately contact Perfit technical support before checking their own site. However, since the grid implementation, the quality of service has improved to the point where customers now check their own Internet service providers first. This has helped to reduce the load of calls to technical support at Perfit.

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Continuity of service has been improved not just through problem avoidance, but also by the ability to perform routine maintenance in-flight. For example, rolling software upgrades can now be conducted on each server in turn as opposed to upgrading all servers simultaneously. No system downtime is now required for this type of maintenance.

It might be expected that the implementation of a grid solution would increase the administration workload. In fact, the opposite was found, primarily because of the vastly improved administration support provided by the Oracle Enterprise Manager Grid Control. This delivers an easy-to-use Web-based graphical presentation of live grid management information and replaces the need for administrators to reactively run scripts to troubleshoot system issues. It has made system management so convenient and accessible that system management can also be performed anywhere using Microsoft Window Mobile-powered Pocket PC wireless phones with VPN to access the grid control capabilities.

The inherent reliability of the grid gave Perfit the confidence to provide 24 x 7 support and take on additional staff in order to rotate the support. There would have been no need for Perfit to add staff in order to manage the grid had the support level stayed the same. New technical skills were easily learned because of the relatively low learning curve required to use the new Oracle Enterprise Manager. The system now notifies the small technical team by email with operational information based on established thresholds, enabling them to support each other more effectively. In fact, the technical staff of non-hosted grid customers of Perfit are now using the Oracle Enterprise Manager to manage their own systems rather than relying solely on Perfit for technical support.

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In terms of reliability, Perfit comments, "Server failures that would have shutdown the business have been avoided. The measurement is that the customers are more confident about system availability compared to the past."

The overall experience of Perfit Computer to date is summarized as:

- A very stable environment with no database downtime since the implementation of Oracle Database 10g with RAC
- A high level of confidence in Oracle's support services

- Greatly improved administration through the new features in Oracle Enterprise Manager Grid Control, with a relatively low learning curve and the capability to remotely manage the grid systems using wireless technology
- No increase in technical staff required to manage the grid
- Cost-effective scalability using commodity servers (with cost control further aided by membership of the Oracle PartnerNetwork [OPN], which provides significant licensing discounts to partners)
- Confidence that the systems can be seamlessly scaled as the number of users increases

FUTURE OUTLOOK

Already, the ability to demonstrate high availability and scalability has become an important factor in Perfit's ability to bid for contracts (both hosted and software-only). The success of the grid technology in supporting Perfit's hosted database has given both Perfit and its customers the confidence to go ahead with further phases of grid deployment.

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This increased confidence will drive the implementation of Oracle Application Server 10g Release 2 to extend the benefits of grid to the application environment as well as the database. This will require Perfit to convert its applications to Oracle Forms 10g. High availability is already provided for the application environment by having multiple application servers. The major benefit anticipated by Perfit will be the additional visibility into the processes on the application servers through Oracle Enterprise Manager Grid Control. This will also extend the remote management through Microsoft Windows Mobile-powered Pocket PC wireless phones to the application environment as well as the database.

Oracle Business Intelligence Discoverer will also be implemented in order to provide customers with the ability to create their own custom reports. This will extend the ability of customers to extract and report on their information stored within the EMDECS environment while reducing the number of requests for customized reports being placed on Perfit's development staff.

Oracle Secure Backup is currently being tested, and Perfit intends to use it to replace the current third-party backup product. Perfit believes that there are many benefits of going with an Oracle-based backup product. The principal benefit is expected to come from its integration with Oracle Enterprise Manager Grid Control, with other important factors being the low cost in comparison with other solutions and the quality of support behind the products from Oracle.

Perfit is considering the potential for deploying a second RAC cluster in a remote geography (possibly a different continent). This would exploit the capability to provide failover to a geographically remote grid for disaster-protection reasons.

CONCLUSION

Perfit Computer was faced with a situation that will be common to many user organizations as well as providers of hosted services. The need to provide high availability requires a fault-tolerant solution, while the need to adapt to new business opportunities will result in an increased number of clients, data, and transaction volumes that will necessitate rapid scaling of solutions. Monolithic computing cannot deliver these benefits in a cost-effective manner.

Perfit's experience of deploying grid technology to meet the requirements of both availability and scalability has demonstrated that this is a cost-effective and viable architecture that can deliver value even to moderately-sized IT organizations. Even though grid is still viewed as a leading-edge technology by many organizations, this case demonstrates that with the right level of assistance from technology partners, the implementation of grid can be a positive experience for IT departments and users alike. In particular, the assistance provided by Dell in designing the physical architecture and by Oracle's support staff in resolving issues even outside of the Oracle product set were vital to the successful outcome.

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The great improvement in administration capabilities now provided in Oracle Enterprise Manager has meant that the more sophisticated grid environment can be managed successfully and remotely without an escalation of the administration overheads.

Grid provides Perfit with the potential to change its physical infrastructure without having to redesign its applications or incur large step increases in costs. Essentially, it delivers a high-availability environment that can scale as fast as the business can grow. Perfit will also be able to add in-flight disaster recovery to geographically remote locations should this become a feature demanded by its hosted customers.

The bottom-line is the confidence in grid that Perfit is demonstrating through its forward-looking plans and its commitment to the Oracle products. According to Kenton Ho, Perfit's director of IT, "Perfit depends on the grid to grow our customer base exponentially. We know that we can easily add servers to meet increasing system demands."

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