



Demonstrating value: Optimized Solution for Oracle's Siebel CRM on IBM Power Systems

The benefits of running Oracle's Siebel CRM seamlessly with IBM industrial-strength PowerVM

IBM PowerVM for Siebel CRM

The combination of PowerVM® with Siebel CRM applications for Oracle and IBM clients provides a cornucopia of features for gaining the best utilization of Power Systems™ hardware and resources. The Active Memory™ Expansion (AME) and Active Memory Sharing (AMS) features build on top of the strong virtualization foundation of PowerVM, and are providing Oracle and IBM clients with newly reclaimed CPU and memory resources. The Optimized Solution discussed here, a joint IBM and Oracle effort, highlights how various IBM technologies work seamlessly with Siebel CRM. This same family of products has delivered a record-setting benchmark testing the performance and scalability of Siebel CRM¹.

Virtualization can help you make the most of your valuable hardware resources by sharing storage and network resources among the logical partitions (LPARs). Requiring only 3% CPU utilization and the creation of a virtual I/O server (VIOS), the overhead of virtualization is minimal. Leveraging PowerVM's LPAR capability, the IBM and Oracle teams have validated an Optimized Solution with a Siebel CRM workload running on IBM POWER7® processor-based Power Systems servers. The tests demonstrated Siebel CRM taking advantage of Active Memory Expansion and reducing memory usage by 30%. That same 30% of memory could then be used to support more users, or be given or loaned to another LPAR. Demonstrating additional value in the same test suite, the Siebel CRM workload showed a 25% benefit when using simultaneous multi-threading (SMT), demonstrating the value of running with SMT4, which is the default setting.

IBM PowerVM virtualization technology

PowerVM virtualization technology is a combination of hardware and software that supports and manages the virtual environments on POWER5™, POWER5+™, POWER6®, and POWER7 processor-based systems.

Available on IBM Power Systems servers, and IBM BladeCenter® servers as optional Editions, and supported by the AIX®, IBM i, and Linux® operating systems, this set of comprehensive systems technologies and services is designed to enable you to aggregate and manage resources using a consolidated, logical view. While many features are available with PowerVM, for the purposes of this paper we tested the features mentioned above to deliver proof points when used with Siebel CRM 8.1 on AIX 6.1².

PowerVM features include:

- Virtual Ethernet, used for all network traffic during the Siebel CRM load simulations.
- Shared Ethernet Adapter, used for Siebel Web and Siebel Gateway Server LPARs to reduce network resources.
- Disk storage virtualization, used for the Siebel CRM LPARs. Virtual SCSI provides the database and other Siebel application tiers with storage. Each Siebel CRM LPAR has its own disk resources attached to a SAN. No local storage is available.
- IBM Micro-Partitioning® technology using uncapped resources for impulsive Siebel CRM demands.
- Multiple shared-processor pools between Siebel Application and Web tiers.
- Active Memory Sharing between Siebel CRM LPARs.
- Active Memory Expansion reduces memory usage on the Siebel Application Server.
- Shared memory pools required for AMS where loaning of memory can save resources.

Optimized Solution test environment

The Oracle Siebel Platform Sizing and Performance Program (PSPP) benchmark kit consists of Siebel CRM Release 8.1.1.4 Industry Applications and Oracle Database 11g Release 2 software. The workload simulates deployments of a large enterprise using Siebel CRM. The kit comes with a well stocked 300GB database, custom scripts to drive a load and special business rules involving employees, partners, and customers using Call Center and communications components.

The mix of workload simulation and scripts used in this Optimize Solution testing are NOT comparable with other published Siebel CRM PSPP benchmarks. The kit framework was adjusted to simulate a vanilla Siebel CRM environment in order to emulate the look and feel of what a client might experience out-of-the-box. Any target number of users, for example 2000 users, are split among the five simulation scripts. The generated load used the same ratio of scripts for scalability and to ensure consistency for comparing the system loads across runs. The PSPP test kit publication discusses in detail the test scripts and contents of the test kit.

Power Systems 740 Express and 750 Express servers with POWER7 processor technology running AIX 6.1 were used for this Optimized Solution testing. The POWER7 processor includes many design features that contribute to the leadership performance of the Power 740 and Power 750 servers. High processor to memory and I/O subsystem bandwidths provide faster movement of data throughout the system.

Figure 1 shows the basic system hardware layout used for the Optimized Solution testing. The design of the layout focused on providing discrete additions of functionality and hardware, starting with a set of Power 740 servers with dedicated LPARs, and also using Power 750 servers with fully virtualized LPARs.

Oracle Application Test Suite (OATS) provides the web client simulation driver. Two IBM System x3850 X5 servers drove loads from 100 to 4000 users. OATS controllers delivered HTML requests to a web server,

which, depending on testing goals, was collocated with the database server or was stand-alone. IBM HTTP Server version 6.1 accepted the HTTP request and generated requests to the Siebel Application Server. The web server and the application server could be housed on either the Power 740 or Power 750 server, depending on whether the dedicated or virtualized environment was desired. In turn, the application server requested data from the database server. The dedicated environment had its own database server and disks distinct from the virtualized environment.

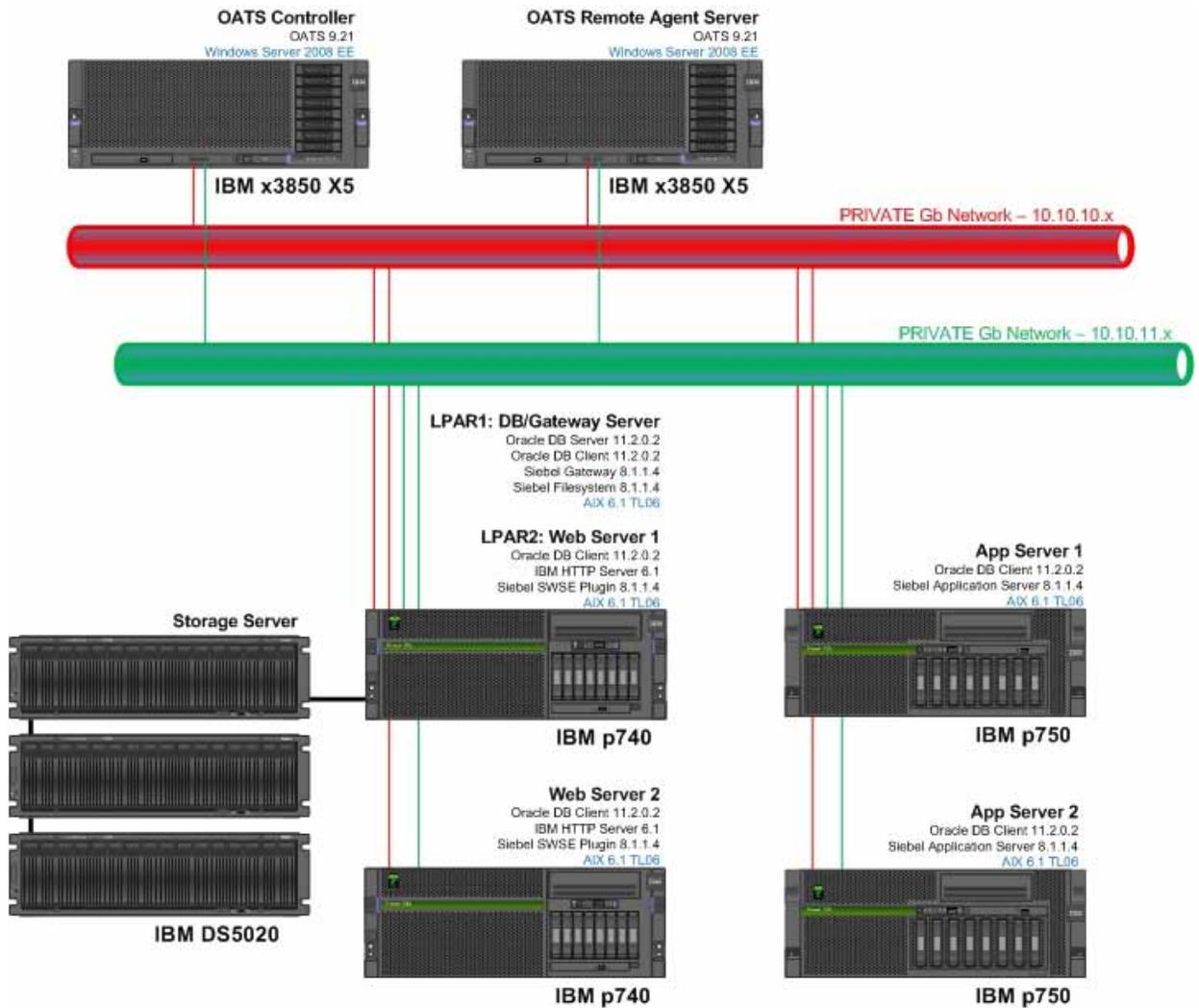


Figure 1: Optimized Solution test system hardware layout

The dedicated LPAR test environment, as shown in Figure 2, had two defined LPARs, one on each Power 740 server. The dedicated environment is well proven, with many data runs captured during a previous test project. Having the dedicated LPAR environment gave us the opportunity to mix dedicated LPAR testing with virtual LPAR environment testing.

The virtualized LPAR test environment in Figure 3 shows the Siebel CRM application tiers deployed in separate LPARs and the ability to migrate partitions to the second Power 750 server in the virtualized environment should the need arise.

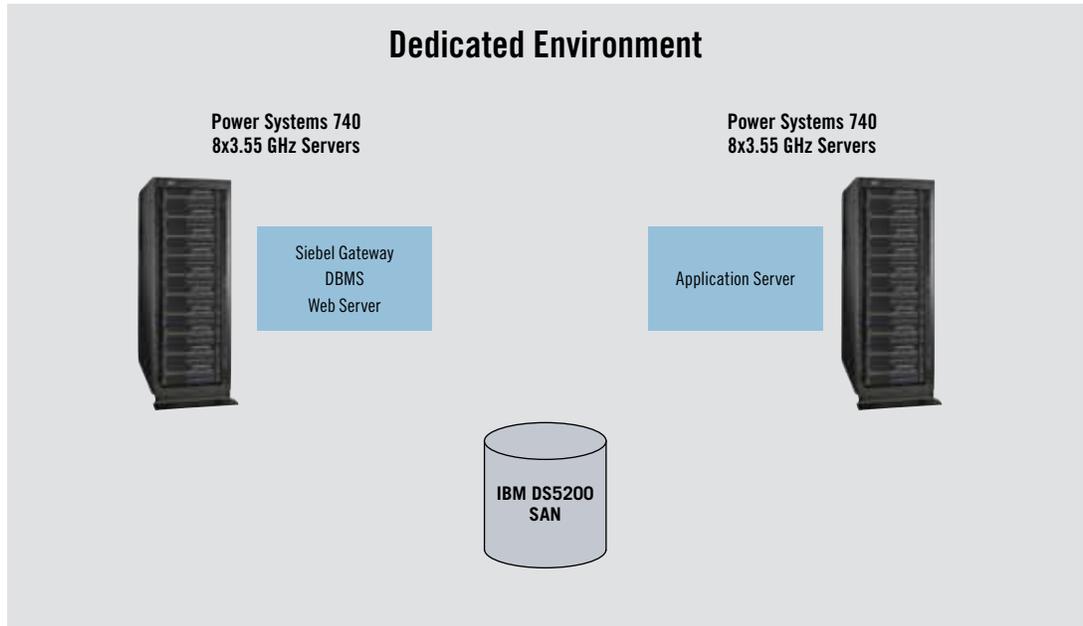


Figure 2. Dedicated Environment

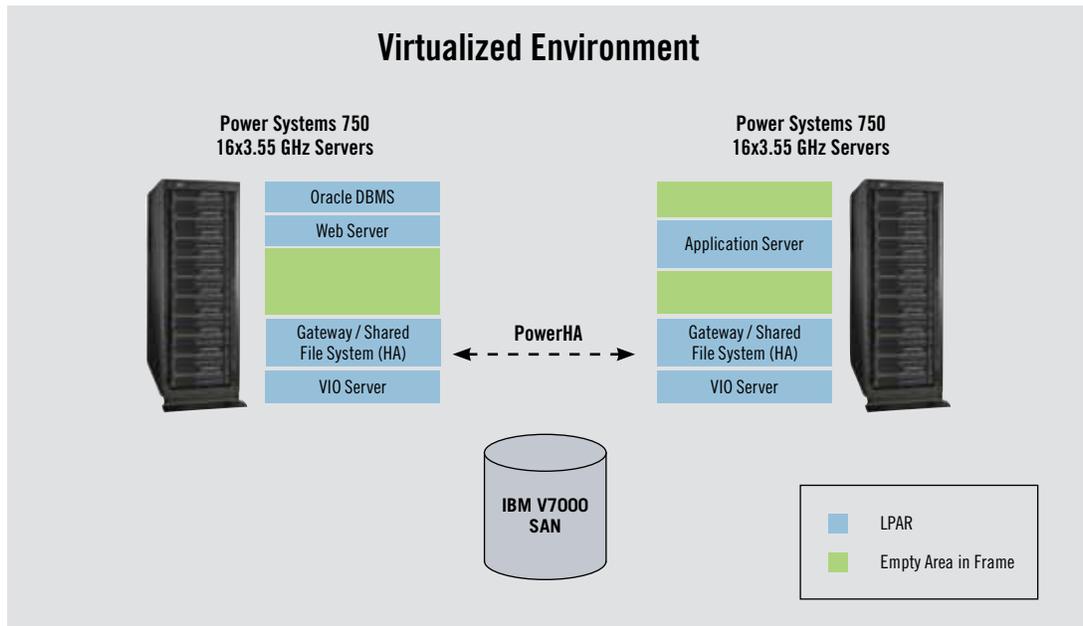


Figure 3. Virtualized Environment

Easy Tier function

The IBM Storwize® V7000 virtualized storage system includes IBM Easy Tier®, a function that responds to the presence of solid-state drives (SSDs) in a storage pool that also contains hard disk drives (HDDs). The system automatically and non-disruptively moves frequently accessed data from HDD MDisks to SSD MDisks, thus placing such data in a faster tier of storage. Easy Tier provides a unique ability to leverage SSDs and for our tests the Oracle Database workload experienced exceptional I/O performance.

Easy Tier eliminates manual intervention when assigning highly active data on volumes to faster responding storage. In this dynamically tiered environment, data movement is seamless to the host application regardless of the storage tier in which the data resides. Manual controls exist so that you can change the default behavior; for example turning off Easy Tier on storage pools that have both types of MDisks.

PowerHA

Figure 3 also shows the topology of the IBM PowerHA® configuration used to provide high availability (HA) for the Siebel Gateway Server and Siebel File System. IBM PowerHA SystemMirror for AIX monitors numerous soft and hard errors within the cluster from various event sources, including problems that are severe enough to immobilize the system (such as a process failure or exhaustion of system resources). With PowerHA 7.1, monitoring and event management have been moved into the kernel of the operating system (OS), which provides a robust foundation not prone to job scheduling issues or other events related to OS operations. Cluster awareness enables operating-system-based functions to operate harmoniously with PowerHA. PowerHA SystemMirror is integrated with cluster-aware AIX and exploits the operating system features by extending them across the cluster, enabling efficient centralized management.

What is the cost of virtualization?

From the recorded PSPP test runs, it can be seen that the CPU reported on the virtualized environment increased by 3%. This experiment was done by having the Database, Siebel Web server, and Siebel Gateway Server tiers reside on dedicated Power 740 servers while the application tier resided on a Power 750 server. No other LPARs were running on the virtualized servers.

Active Memory Expansion

Active Memory Expansion (AME) is the ability to define an area of memory for compressing infrequently used pages and reducing the memory requirements of the system as a whole. Two Siebel CRM tiers are likely candidates for AME, the database and the application tier.

Siebel Application Servers typically contain large memory footprints. It is not uncommon to see memory footprints above 64GB. With AME, the amount of memory required for the Siebel Application Server can be reduced, with minimal CPU increase. On the application server, our AME tests resulted in 31% memory savings with no increase to user response time and only 1% increase in CPU usage.

AME can also extend the usage of current memory, assuming available CPU for the additional users. The team did not test extending usage by increasing client loads, but it is assumed that if memory is saved, then that memory can be put to use for more users.

Active Memory Sharing

Active Memory Sharing (AMS) intelligently flows memory from one logical partition (LPAR) to another for increased utilization and flexibility of memory. The concept is very similar to that of the shared processor pool and micro-partitions. It allows you to oversubscribe memory on a POWER7 processor-based system and let the system (the POWER Hypervisor™) allocate memory where it is needed.

AMS is best utilized with complementary LPARs where sharing of memory is not contentious. An example of two complementary LPARs would be an LPAR that works at night (batch loads) while another LPAR works during the day (business ledger LPAR). The Siebel CRM PSPP kit does not provide an LPAR that is complementary to another LPAR within the Siebel CRM enterprise. However, for the sake of showing AMS within a live Siebel CRM environment, two Siebel application tiers within a shared memory pool were chosen for testing.

The candidates for sharing memory within the PSPP test environment are the database, Siebel Gateway Server, Application Server and the Web server. The database is generally thought of as a mission critical LPAR and thus, it is commonly configured with dedicated memory and processors. The Siebel Gateway Server tier is idle 99% of the time³, but has a memory footprint of only one gigabyte – too small to be a worthwhile target for the test. Through the process of elimination, the Siebel Application Server and the Web server are therefore the best candidates. AMS for the Siebel Application and Web server was thoroughly tested in the lab. It performed as expected, including with AME active on the application server.

Simultaneous multithreading

Simultaneous multithreading (SMT) is the ability of a single physical processor to simultaneously dispatch instructions from more than one hardware thread context. Because there are four hardware threads per physical processor on a POWER7 processor, additional instructions can run at the same time.

The AIX **smtctl** command controls the enabling and disabling of the processor simultaneous multithreading mode. By setting different values using the AIX **smtctl** command, the team configured the underlying system to test SMT4 (four threads), SMT2 (two threads) and SMT1 (one thread and disabled). Modifying the SMT value is dynamic and changes can be seen in real time with monitoring tools like the AIX **nmon** utility.

In most situations, it is best to leave the SMTCTL value to its default (four threads) for performance. Testing the different values of SMT with Siebel CRM confirmed that the default works best with this workload and yielded a 25% CPU performance benefit. Here are some points to remember about SMT values:

- Take caution, when dynamically modifying the SMTCTL value on a highly loaded system. In some testing, the system backed up and delayed client response times due to changing SMTCTL values.
- Wait for the SMT change to complete and stabilize prior to taking measurements. The time it takes to change from one SMT value to another is dependant on the load. The AIX **nmon** command is useful for providing real time CPU de-allocation or allocation.
- It is safer and easier to go from SMT1 upwards to SMT4 as additional CPU resources become available as you increase the available threads.

Oracle's Siebel CRM

Siebel Customer Relationship Management empowers users, increases the lifetime value of an organization's customers, while accelerating its ability to maximize revenues and protecting technology investments. Siebel CRM can:

- Boost user productivity through desktop integration with standard applications. Two-way synchronization between Siebel CRM and standard Microsoft applications such as Word, Excel, Outlook, and SharePoint allows users to accomplish more with lower training and support costs.
- Increase user adoption through a task-based interface. Siebel CRM has a dynamic user interface that guides users through key tasks in a step-by-step manner. By improving ease of use, standardizing business processes, and boosting data quality, Siebel CRM's task-based user interface boosts adoption rates as it lowers training costs.
- Improve organizational competitiveness with mobile solutions. Siebel CRM provides support for mobile devices—including laptops and BlackBerry devices—so users can be productive and drive competitive value even when they're away from the office.
- Enable user efficiency while protecting data integrity. Oracle Secure Enterprise Search provides your users with a familiar internet search interface while protecting sensitive data from unauthorized access.

The IBM and Oracle alliance

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For more information about IBM AIX version 7.1, visit:

ibm.com/systems/power/software/aix/v71

For more information about IBM System Storage offerings, visit:

ibm.com/storage

For more information about Oracle's Siebel CRM, visit:

www.oracle.com/us/products/applications/siebel/overview/index.html

¹ December 2011: <http://www.oracle.com/us/solutions/benchmark/apps-benchmark/siebel-81-pspp-power-740-750-1428419.pdf>

² Siebel CRM 8.1.1.8 or higher is available on IBM AIX 7

³ The Siebel Gateway Server tier is utilized during startup, shutdown, and during Siebel CRM configuration changes



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