Performance and Scalability Benchmark: Siebel CRM Release 7.7 Industry Applications on Sun Microsystems UltraSPARC Servers and Oracle9*i* Database (64-Bit)

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INTRODUCTION

This white paper describes the performance and scalability capabilities of Oracle's Siebel Customer Relationship Management (CRM) Release 7.7. The benchmark comprised 12,500 concurrent users running Siebel CRM Release 7.7 industry applications on Sun Microsystems UltraSPARC T2000 and UltraSPARC III+ Servers and Oracle9*i* Database.

Oracle's Siebel Platform Sizing and Performance Program is a certified test suite executed independently by Sun. Sun completed the benchmark on November 5, 2005; it was certified on September 6, 2006. Note that this benchmark data is intended for general information purposes and not as a substitute for implementation-specific sizing or benchmarks.

Results Summary: 12,500-Concurrent-User Benchmark [1, 2]

Workload	Number of Users	Average Operation Response Time (sec)	Business Transactions Throughput/Hour	Projected Daily Transactions
Financial Services Call Center	10,000	0.25	90,566	724,528
Partner Relationship Management	2,500	0.61	63,532	508,256
EAI – HTTP Adapter	N/A	N/A	683,314	5,466,512
Totals	**12,500**		**837,412**	**6,699,296**

[1] Actual results may vary, based on a broad range of implementation-specific factors, such as transaction mix, hardware platform, network parameters, and database size. Oracle does not warrant or guarantee that customers will obtain the same or similar results, even if they use the same or similar equipment or software applications. Oracle does not warrant, endorse, or guarantee any performance of any products, any results desired or achieved, or any statements made within this document.

[2] Siebel CRM Release 7.7 Industry Application Platform Sizing and Performance benchmarks are based on Siebel CRM Release 7.7 customized industry applications and reflect a heavier scenario mix and more-aggressive think times than earlier versions. Results of this benchmark are not comparable with those of prior Siebel CRM Release 7 benchmarks.

Test Component	Software	Version	Hardware	OS
Database Server	Oracle	9.2.0.6 (64-bit)	Sun Fire E2900	Solaris 10 generic
Application Servers	Siebel	7.7.1	Sun Fire T2000	Solaris 10 generic
Application Servers	Siebel	7.7.1	Sun Fire V490 Sun Fire V890 Plus Sun Fire E2900	Solaris 9 generic
EAI App Server	Siebel	7.7.1	Sun Fire V440	Solaris 9 generic
Web Servers	Siebel JSWS	7.7.1 6.1 SP4	Sun Fire V240	Solaris 9 generic
Gateway/LDAP Server	Siebel JSDS	7.7.1 LDAP 4.1 SP9	Sun Fire V240	Solaris 9 generic

OVERVIEW

Siebel CRM Release 7.7 uses the enhanced Siebel CRM Release 7 Smart Web Architecture, which introduced a new approach to Web applications. This architecture improves scalability while making efficient use of network and Web server resources, allowing customers to use their existing network and Web server infrastructure.

Oracle's Siebel Platform Sizing and Performance Program is designed to stress the Siebel CRM Release 7.7 architecture and demonstrate the performance and scalability of the application in a business solution context. Among the Siebel CRM Release 7.7 architecture features exercised are the following:

- **Smart Web Architecture**—Takes advantage of the newest Web browser technology to deliver a highly interactive experience. The interaction model, which is similar to Windows-based applications, also improves productivity. Utilization rates on the Web server are low, allowing customers to retain existing Web server infrastructure.
- **Smart Network Architecture**—Allows Siebel CRM Release 7 customers to leverage their existing network infrastructure by compressing and caching user interface components, so that browser/Web server interaction occurs only when the application requests data. This allows customers to avoid expensive network upgrades that can be necessary with competing products.
- **Server Connection Broker**—Offers a preconfigured load-balancing option while also supporting a hardware-based solution. Resonate Central Dispatch may be used in Siebel CRM Release 7.7, but it is not required. In addition, the new Siebel Connection Broker component distributes tasks among multiple processes, improving intraprocess load-balancing characteristics.
- **Smart Database Connection Pooling and Multiplexing**—Allows customers to scale their databases without introducing expensive and complex transaction-processing monitors.

- **Server Request Broker**—Provides component-level load balancing across multiple Siebel servers, without the expense and complex administration of transaction-processing monitors.
- **Enterprise Application Integration (EAI)**—Allows customers to integrate their existing systems with Siebel CRM applications.

This test simulated a large corporation with 12,500 concurrent active users in multiple departments and addressed key business requirements:

- **Siebel Financial Services Call Center**—Provides the most complete solution for sales and service, allowing customer service and telesales representatives to provide superior customer support, improve customer loyalty, and increase revenues through cross-selling and up-selling.
- **Siebel Partner Relationship Management**—Enables organizations to more effectively and more strategically manage relationships with partners, distributors, resellers, agents, brokers, and dealers.
- **Siebel Workflow**—Automates user interaction, business processes, and integration through use of a business process management engine. It allows simple administration and customization through a graphical drag-and-drop user interface. Administrators can add custom or predefined business services and specify logical branching, updates, inserts, and subprocesses to create a workflow process tailored to their unique business requirements.
- **Siebel Enterprise Application Integration**—Allows customers to integrate their existing applications with Siebel CRM applications. Siebel Enterprise Application Integration supports several adapters. The Siebel Enterprise Application Integration HTTP Adapter was used in this benchmark.

METHODOLOGY

This benchmark was executed independently by Sun under the Siebel CRM Release 7.7 Industry Application Platform Sizing and Performance Program guidelines. Test cases are based on Siebel applications' customer requirements and exercise some of the most critical and frequently used components of the Siebel CRM application. The test cases must run in steady state for at least one hour, and certification is dependent on the achievement of certain key performance indicators.

The test simulated real-world requirements of a large organization, consisting of 12,500 concurrent active users in a call center organization. Test conditions simulated service representatives running Siebel Financial Services Call Center and partner organizations running Siebel Partner Relationship Management (Web sales and Web services).

Siebel Workflow and the Siebel Scripting Engine were used to incorporate business process management customizations.

The application also simulated integration with Web systems using the Siebel Enterprise Application Integration component and the Siebel HTTP Adapter. In

this case, an eight-hour business day included more than 5.4 million EAI transactions between systems.

End users were simulated by use of Mercury LoadRunner Release 7.8 SP1. The think-time range between user operations was 13 to 23 seconds. Siebel CRM Release 7.7 Scripting Engine was invoked to assign service requests and navigate users to the appropriate views. Siebel CRM Release 7.7 Workflow Manager executed workflow steps based on inserted service requests. Siebel CRM Release 7.7 Enterprise Application Integration HTTP Adapter executed requests between different Web infrastructures.

Database Setup

Prior to benchmark execution, the database size was approximately 230GB. It was constructed based on Siebel customer experience and requirements and was based on the Siebel CRM Industry Application repository and data model—representing the most common data distribution and volumes in high-transaction-rate implementations. The following table shows a sampling of record volumes for key business entities in the standard Siebel volume database.

Business Entity	Number of Records
Accounts	2,233,637
Activities	6,685,419
Addresses	3,475,662
Contacts	3,521,040
Employees	30,000
Opportunities	3,429,952
Orders	496,909
Products	230,102
Quote Items	1,984,252
Quotes	253,693
Service Requests	5,651,814

Business Transactions

Several complex business transactions were executed simultaneously for 12,500 concurrent users. Between each user operation and the next one, the think time averaged approximately 15 seconds. This section provides a high-level description of the use cases tested.

Siebel Financial Services Call Center—Create and Assign Service Requests

- Service agent searches for contact.
- Service agent checks entitlements.
- Service request is created.
- Service agent populates service request with appropriate detail.

- Service agent creates activity plan to resolve issue.
- Using Siebel Script, service request is automatically assigned to appropriate representative to address issue.

Siebel Partner Relationship Management—Sales and Service

- Partner creates new service request with appropriate detail.
- Service request is automatically assigned.
- Saving service request invokes scripting that brings user to appropriate opportunity screen.
- New opportunity with detail is created and saved.
- Saving opportunity invokes scripting that brings user back to service request screen.

Siebel Enterprise Application Integration—Integrate Third-Party Application

- EAI requests are made with a customized account-integration object. The requests consist of 80 percent selects, 10 percent updates, and 10 percent inserts.

The use cases are typically considered heavy transactions. For example, the high-level description of the sequential steps for the "Create and assign service requests" use case is as follows:

- Enable Siebel Search Center.
- Search for a contact.
- Review contact detail, and create a new service request.
- Add details to the service request.
- From the service request view, search for an account.
- Select an account, and associate it with the service request.
- Navigate to the Verify tab, and select entitlements.
- Verify entitlements, and continue service request investigation.
- Search for insurance group, and select the appropriate policy and product.
- Create a new contact, entering information into all the fields in the list view.
- Complete service request details, and save the service request.
- Select the activity plan option, and automatically generate an activity plan for the service request.
- Scripting will automatically assign the service request.
- Summarize the service request with the customer.

TOPOLOGY

This section describes the hardware topology of the systems used for the test, as well as the hardware and software combinations used.

Gateway/LDAP server:

- 1 x Sun Fire V240
  - 2 x 1.35GHz UltraSPARC IIIi
  - 8GB RAM
  - Solaris 9 Generic
  - Sun Java System Directory Server LDAP 4.1 SP9
  - Siebel Gateway Server 7.7.1

Web servers:

- 6 x Sun Fire V240
  - 2 x 1.5GHz UltraSPARC IIIi
  - 8GB RAM
  - Solaris 9 Generic
  - Sun Java System Web Server 6.1 SP4
  - Siebel 7.7.1 SWSE

EAI server:

- 1 x Sun Fire V440
  - 8 x 1.2GHz UltraSPARC IIIi
  - 16GB RAM
  - Solaris 9 Generic
  - Sun Java System Web Server 6.1 SP4
  - Siebel 7.7.1

Application servers:

- 1x Sun Fire V890 Plus
  - 8 x 1.5GHz UltraSPARC IV (+)
  - 32GB RAM
  - Solaris 9 Generic
  - Siebel 7.7.1
- 1 x Sun Fire E2900
  - 12 x 1.35GHz UltraSPARC IV
  - 48GB RAM
  - Solaris 9 Generic
  - Siebel 7.7.1
- 1 x Sun Fire T2000
  - 8 x 1.2GHz UltraSPARC T1
  - 32GB RAM
  - Solaris 10 Generic
  - Siebel 7.7.1
- 1 x Sun Fire V490
  - 4 x 1.35GHz UltraSPARC IV
  - 16GB RAM
  - Solaris 9 Generic
  - Siebel 7.7.1

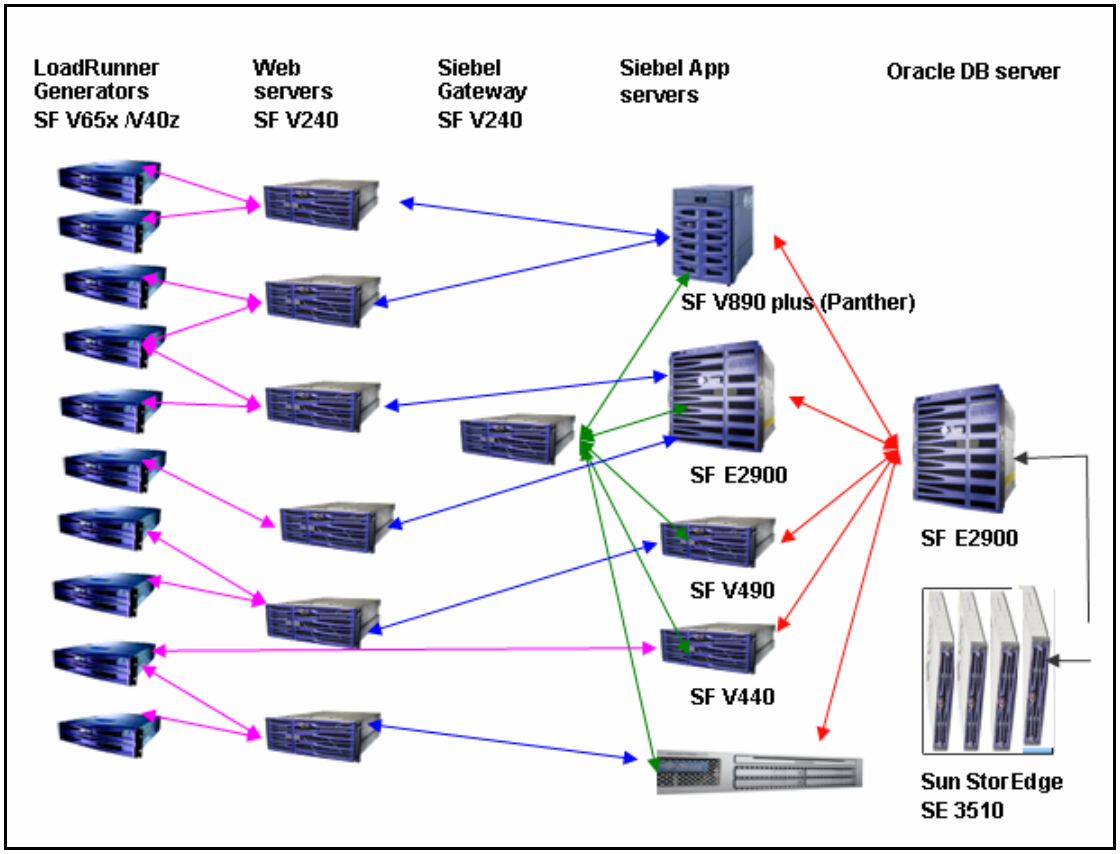
Database server:

- 1 x Sun Fire E2900

- 12 x 1.35GHz UltraSPARC IV
- 48GB RAM
- Solaris 10 Generic
- Oracle 9.2.0.6 (64-bit)
- Sun StorEdge FC 3510 Storage Array with 4 trays of 12@15k rpm 73GB disks

LoadRunner drivers:

- 10 x Sun Fire V65x
  - 4 x 3.02GHz Xeon
  - 3GB RAM
  - Windows XP SP1
  - Mercury LoadRunner 7.8 SP1



RESULTS

Response Time and Transaction Throughput [3, 4, 5]

Workload	Number of Users	Average Operation Response Time (sec)	Business Transactions Throughput/Hour	Projected Daily Transactions
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Server Resource Utilization

Node	Users	Functional Use	% CPU	Memory Utilization (GB)
1 x Sun Fire E2900	4,100	Application Server-Call Center Users – 3,280 Application Server-PRM Users – 820	72	24.5
1 x Sun Fire T2000	2,150	Application Server-Call Center Users – 1,720 Application Server-PRM Users - 430	84	12.8
1 x Sun Fire V890 Plus	4,500	Application Server-Call Center Users – 3,600 Application Server-PRM Users – 900	76	25.2
1 x Sun Fire V490	1,750	Application Server-Call Center Users – 1,400 Application Server-PRM Users – 350	83	10.6
6 x Sun Fire V240	12,500	Web Servers	68	1.9
1 x Sun Fire V440	N/A	Application Server – EAI	6	2.2
1 x Sun Fire V240	12,500	Gateway Server – LDAP Server	1	.5
1 x Sun Fire E2900	12,500	Database Server	58	28.6

Network Utilization

For 12,500 concurrent users, the network utilization measured was 32.7MB per second for the browser traffic, an average of 2.615 kilobits per second (Kbps) per user. These measurements incorporated compression for Web-server-to-browser traffic.

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[3] Response times are measured at the Web server instead of at the end user. The response times at the end user would depend on the network latency, the bandwidth between Web server and browser, and the time for browser rendering of content.
[4] A business transaction is a defined set of steps, activities, and application interactions used to complete a business process, such as "create and assign service requests." "Search for a contact" is an example of a step in a business transaction. For a detailed description of business transactions, see the "Business Transactions" section.
[5] Actual results may vary, based on a broad range of implementation-specific factors, such as transaction mix, hardware platform, network parameters, and database size. Oracle does not warrant or guarantee that customers will obtain the same or similar results, even if they use the same or similar equipment or software applications. Oracle does not warrant, endorse, or guarantee any performance of any products, any results desired or achieved, or any statements made within this document.

CONCLUSION

The test system demonstrated that Siebel CRM Release 7.7 architecture on Sun servers easily scales to 12,500 concurrent users.

- **Vertical scalability**—The Siebel CRM Release 7.7 server showed excellent scalability within an application server.
- **Horizontal scalability**—The benchmark demonstrated scalability across multiple servers without degradation.
- **Low network utilization**—The Siebel CRM Release 7.7 Smart Web Architecture and Smart Network Architecture efficiently managed the network, consuming only 2.615 Kbps per user.
- **Efficient use of the database server**—Siebel CRM Release 7.7 Smart Database Connection Pooling and Multiplexing allowed the database to service 12,500 concurrent users and the supporting Siebel Release 7.7 server application services. To optimize database server resources, a 10:1 ratio of users to database connections was used for Oracle's Siebel Smart Database Connection Pooling and Multiplexing.

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