

Performance and Scalability Benchmark: Siebel CRM Release 7 on HP-UX Servers and Oracle9i Database

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INTRODUCTION

This white paper describes the performance and scalability capabilities of Oracle's Siebel Customer Relationship Management (CRM) Applications Release 7. The benchmark comprised 32,000 concurrent users running Siebel CRM Release 7 on HP-UX servers and Oracle9i Database. This information should be used as an aid for system planning and sizing to support business requirements.

Results Summary: 32,000-Active-Concurrent-User Benchmark ^{1 2}

Workload	Number of Users	Avg Operation Response Time (sec)	Business Transactions Throughput/hour	Projected Daily Transactions (BTT/hour x 8)
Sales / Service Call Center	22,400	0.116	116,571	932,572
PRM	3,200	0.212	42,890	343,121
eSales	3,200	0.242	21,703	173,622
eService	3,200	0.228	41,148	329,182
Totals	32,000	N/A	222,312	1,778,496

Workload	Business Transactions Throughput/hour	Projected Transactions Per Day (BTT/hr x 8)
Assignment Manager	22,817	182,536
EAI - HTTP Adapter	770,905	6,167,240
EAI - MQ Series Adapter	540,845	4,326,760
Workflow Manager	60,244	481,952

¹ This benchmark data is intended for general information purposes and not for use as a substitute for implementation-specific sizing or benchmarks.

² 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 and/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.

Major Test Component	Version
Application	Siebel CRM Release 7.5.2.211
Database	Oracle9i Database Release 2 Enterprise Edition (v 9.2.0.2)
Operating System	HP-UX 11i+Dec 2002 quality patch, PHSS_26946, PHSS_26560, PHKL_28384
Hardware	HP rp8400, rp5470, Superdome

OVERVIEW

The Siebel CRM Release 7 Smart Web architecture introduces a revolutionary approach for deploying Web applications. It includes a Web-only solution with the interactivity customers have become accustomed to with client/server implementations. It does so by being highly scalable and very light on the network and Web servers, thereby allowing customers to leverage their existing network and Web-farm infrastructure.

The tests conducted in Oracle's Siebel Platform Sizing and Performance Program are designed to stress the Siebel CRM Release 7 architecture and to demonstrate that large customers can successfully deploy many thousands of concurrent users. The Siebel CRM Release 7 architecture features tested in this benchmark include

- **Smart Web Architecture**—Takes advantage of the latest 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.
- **Smart Database Connection Pooling and Multiplexing**—Allows customers to scale their databases without the introduction of expensive and complex transaction-processing monitors.
- **Server Request Broker**—Provides for component-level load balancing across multiple Siebel servers without the expensive and complex administration of transaction-processing monitors.
- **Enterprise Application Integration (EAI)**—Allows customers to integrate their existing systems with Siebel CRM applications. With a relatively modest

investment in equipment, customers can execute more than 10,490,000 integrated transactions during an eight-hour business day.

This test simulated a large corporation with 32,000 concurrent users across multiple functional requirements:

- **Siebel Call Center and Siebel Service**—Provides the most complete solution for enabling customer service and telesales representatives to provide superior customer support, generate customer loyalty, and increase revenues through cross-selling and up-selling.
- **Siebel Partner Relationship Management**—Enables organizations to more effectively and strategically manage relationships with channel and alliance partners, distributors, resellers, agents, brokers, and dealers.
- **Siebel Interactive Selling Suite**—Provides a comprehensive platform for business-to-business and business-to-consumer sales over the Web. Siebel eSales includes a complete set of out-of-the-box features to allow customers to quickly and easily find, and then order, the products and services that suit their needs.
- **Siebel eService**—Allows users to receive self-service and assisted service over the internet. Siebel eService provides customers with a secure, personalized experience for reviewing service issues, order status, and assets and resolving problems by using a full suite of problem-resolution tools.
- **Siebel Assignment Manager**—Offers a rules-based engine that assigns work—including sales opportunities, service requests, and activities—based on employee skills, availability, territory, and other user-defined factors.
- **Siebel Workflow**—Automates user interaction, business processing, and integration workflows through use of a business-process-management engine. It is designed for easy administration and rapid customization through its graphical drag-and-drop user interface. Administrators can add custom or predefined business services, branching, updates and inserts, and subprocesses to create a workflow process tailored to their unique business requirements.
- **Siebel Enterprise Application Integration (EAI)**—Allows customers to integrate their existing systems with Siebel CRM. Siebel EAI supports several adapters. The Siebel EAI HTTP and MQ Series adapters were used in this benchmark.

METHODOLOGY

This benchmark was executed independently by HP at the Enterprise Solutions Partners (ESP) Lab in Cupertino, California, under Oracle's Siebel Platform Sizing and Performance Program guidelines, with test cases based on Siebel customer requirements. These test cases reflect 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 the real-world requirements of a large organization of 32,000 concurrent users from the call center (sales and service representatives), partner organizations (Partner Relationship Management), customers (Web sales and Web service), and supporting application services such as work assignment (Siebel Assignment Manager) and business process management (Siebel Workflow). The application also simulated integration with legacy systems (Siebel EAI MQ Series Adapter) and Web systems (Siebel EAI HTTP Adapter) with more than 10,490,000 EAI transactions that can be executed between systems in a regular business day.

The end users were simulated by use of Mercury Interactive LoadRunner version 7.51, with a think time between user operations in the range of 5 to 55 seconds (an average of 30 seconds). The Siebel CRM Release 7 Assignment Manager processed assignment transactions for sales opportunities based on the positions and territories of employees. Siebel CRM Release 7 Workflow Manager executed workflow steps based on inserted service requests. The Siebel CRM Release 7 EAI MQ Series Adapter read from and placed transactions into IBM MQ Series queues. The Siebel CRM Release 7 EAI HTTP Adapter executed requests between different Web infrastructures.

Database Setup

Prior to benchmark execution, the database size was approximately 140GB. It was built to simulate customers with large transaction volumes and data distributions representing the most common customer data shapes. Below is a sampling of record volumes for key business entities of the standard Siebel volume database.

Business Entity	Number of Records
Accounts	2,309,277
Activities	8,924,305
Addresses	3,492,831
Contacts	3,366,764
Employees	21,000
Opportunities	3,448,952
Orders	438,100
Products	226,000
Quote Items	1,410,433
Quotes	253,614
Service Requests	5,602,538

Business Transactions

A total of 10 use cases of complex business transactions was executed simultaneously for 32,000 concurrent users. Between each user operation and the

next one, the think time was in the range of 5 to 55 seconds (an average of 30 seconds). The 10 use cases are listed below with a brief description of each.

Siebel Call Center

- Incoming call creates sales opportunity, quote, and order.
- Incoming call creates service request, customer profile, and activity plan.
- Service agent investigates and resolves service request.
- Simulation of users doing random searches on several objects, such as contact last name and account name.

Siebel Partner Relationship Management

- Partner queries on product and categories, reviews partner profile.
- Partner reviews, creates, or updates opportunity and activities.

Siebel Interactive Selling Suite

- User browses product catalog for several items.
- User browses product catalog, places item in shopping cart, reviews account profile.

Siebel eService

- User logs new service request, reviews open service requests.
- User searches for service centers, sends e-mail.

Siebel Enterprise Application Integration—Integrate Third-Party Application

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

The use cases for the different applications are typically considered heavy transactions. For example, the high-level description of the sequential steps for the “Incoming call sales creates opportunity, quote, and order” use case is as follows:

- Enable Siebel Search Center.
- Search for a nonexistent contact.
- After no records are found, navigate to the My Contacts page.
- Create a new contact, entering information into all of the fields in the list view.
- Navigate to the Contact’s Opportunity detail page.
- Create a new opportunity for the contact, including the opportunity name, description, projected revenue, and channel.

- Associate the opportunity with an account.
- Enter new products for the opportunity.
- Using the Siebel Auto Quote function, automatically generate a quote for the opportunity.
- Reprice the quote after changing the price list and the discount level.
- Communicate the net price from the quote to the customer.
- Update the opportunity when repricing is completed.
- Using Siebel Auto Order, generate an order for the quote.
- Summarize the quote and order with the customer.

TOPOLOGY

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

Web Server:

- 5x HP rp5470 servers
 - 4x 875MHz PA-8700+
 - 16GB RAM
- 5x HP rp5470 servers
 - 4x 750MHz PA-8700+
 - 16GB RAM
- 1x HP rp2470 servers
 - 2x 750MHz PA-8700+
 - 8GB RAM
- HP-Apache 2 version 2.0.39.05.03
- Siebel Web Server Plug-In version 7.5.2.211
- HP-UX version 11i

Gateway Server/LDAP:

- 1x HP rp5470 server
 - 4x 750MHz PA-8700+
 - 16GB RAM
- Resonate version 3.2.2e
- Siebel CRM Release 7.5.2.211 Gateway

- Sun ONE Directory Server version 6 for HP-UX
- HP-UX version 11i

Application Server:

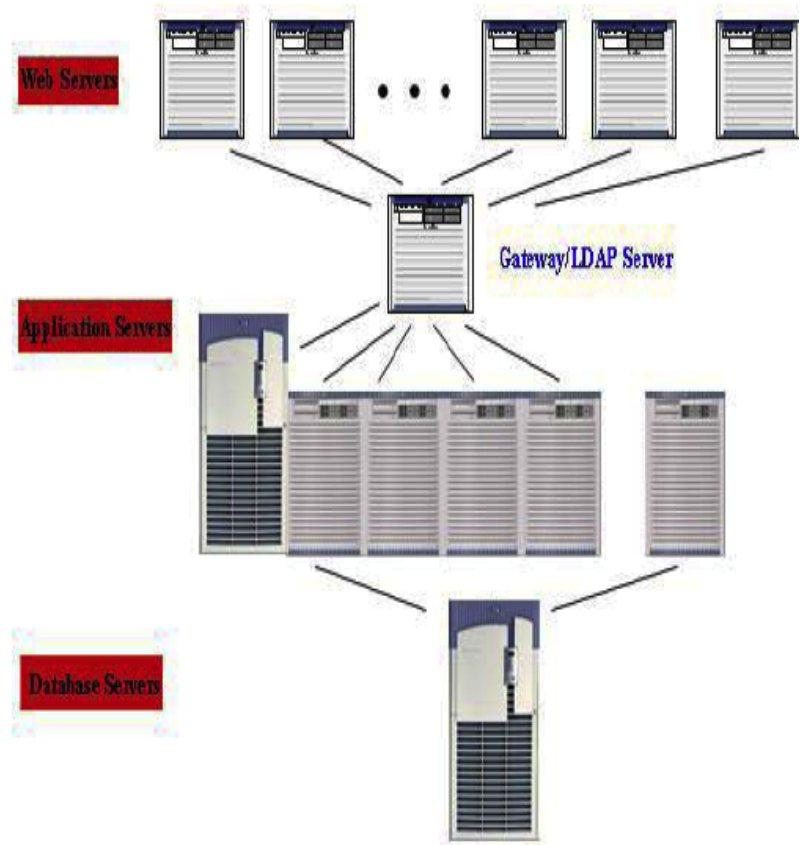
- 5x HP rp8400 server
 - 64GB RAM
- 1x HP 9000 Superdome 32-way
 - 128GB RAM
- Siebel CRM Release 7.5.2.211
- HP-UX version 11i
- 32x 875MHz PA-8700+

Database Server:

- 1xHP 9000 Superdome 16-way
 - 16x 875MHz PA-8700+
 - 64GB RAM
- Oracle9i Database Release 2 Enterprise Edition (v 9.2.0.2)
- HP-UX version 11i

LoadRunner Drivers:

- 17x HP NetServer lp1000r
 - 2x 1.13GHz Xeon
 - 4GB RAM
- Microsoft Windows 2000 SP2
- Mercury Interactive LoadRunner version 7.51 SP1



RESULTS

Response Times and Transaction Throughput ^{3 4 5}

Workload	Number of Users	Avg. Operation Response Time (sec)	Business Transactions Throughput/hour
Call Center – Sales and Service	22,400	0.116	116,571
Partner Relationship Management	3,200	0.212	42,890
Interactive Selling Suite	3,200	0.242	21,703
EService	3,200	0.228	41,148
Totals	32,000	N/A	222,312

Workload	Business Transactions Throughput/hour
Assignment Manager	22,817
EAI - HTTP Adapter	770,905
EAI - MQ Series Adapter	540,845
Workflow Manager	60,244

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.

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⁵ The Business Transaction Throughput provides a measure of efficiency for a full sequence or iteration of Siebel operations that constitute a business transaction, using the 10 types of transactions tested in the use cases.

Server Resource Utilization

Node	Functional Use	Average % CPU Utilization	Average Memory Utilization (MB)
7 x HP rp5470	Web Server – Application Requests – Call Center	34%	900
1 x HP rp5470	Web Server – Application Requests – ISS (eSales)	54%	400
1 x HP rp5470	Web Server – Application Requests - eService	67%	1600
1 x HP rp5470	Web Server – Application Requests - PRM	58%	870
1 x HP rp2470	Web Server– HTTP Adapter, WF	70%	70
1 x HP rp5470	Siebel Gateway Server / LDAP	19%	80
4 x HP rp8400	Siebel Application Server – End Users	82%	17550
1 x HP 9000 Superdome 32-way	Siebel Application Server – End Users	81%	34700
HP rp8400	Siebel Application Server – EAI MQ series, EAI HTTP Adapter, Workflow Manager, Assignment Manager	82%	2900
HP 9000 Superdome 16-way	Oracle9i Database Release 2 Enterprise Edition	62%	31000

Network Utilization

For 32,000 concurrent users, the network utilization measured was 18.2MB per second for the browser traffic, an average of 4.55Kbps per user. These measurements did not incorporate compression for Web-server-to-browser traffic.

CONCLUSION

The test system demonstrated that Oracle’s Siebel CRM Release 7 architecture on HP-UX servers and Oracle9i Database Release 2 Enterprise Edition easily scales to 32,000 concurrent users.

- **Vertical scalability**—The Siebel CRM Release 7 server showed excellent scalability within an application server.
- **Horizontal scalability** —The benchmark demonstrates scalability across multiple servers without degradation.

- **Low network utilization**—The Siebel CRM Release 7 Smart Web Architecture and Smart Network Architecture efficiently managed the network, consuming only 4.5K kilobits per second per user.
- **Efficient use of the database server**—Siebel CRM Release 7 Smart Database Connection Pooling and Multiplexing allowed the database to service 32,000 concurrent users and the supporting Siebel CRM Release 7 server application services with about 1,700 database connections.

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