

Performance and Scalability Benchmark: Siebel CRM Release 7 on IBM eServer pSeries and IBM DB2 UDB

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INTRODUCTION

This white paper describes the performance and scalability capabilities of Oracle's Siebel Customer Relationship Management (CRM) Release 7. The benchmark comprised 30,000 concurrent users running Siebel CRM Release 7 on IBM eServer pSeries and IBM DB2 UDB. This information should be used as an aid for system planning and sizing to support business requirements.

Results Summary: 30,000-Concurrent-User Benchmark ^{1, 2}

Workload	Number of Users	Average Operation Response Time (sec)	Business Transactions Throughput/Hour	Projected Daily Transactions (BTT/Hour x 8)
Sales /Service Call Center	20,000	0.148	122,041	976,328
PRM	4,000	0.182	27,615	220,920
eSales	3,000	0.233	17,134	137,072
eService	3,000	0.196	40,455	323,640
Totals	30,000	N/A	207,245	1,657,960

Workload	Business Transactions Throughput/Hour	Projected Daily Transactions (BTT/Hour x 8)
Assignment Manager	48,771	390,168
EAI – HTTP Adapter	746,676	5,973,408
EAI – MQ Series Adapter	545,472	4,363,776
Workflow Manager	96,299	770,392

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 7.0.3 Application Suite
Database	IBM DB2 UDB v7.2
Operating System	AIX 4.3.3 ML9 and v5.1
Hardware	IBM eServer pSeries 660, 680, 690 Servers

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 were 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**—Allows customers to integrate their existing systems with Siebel CRM applications. With a relatively modest investment in equipment, customers can execute more than 10 million integrated transactions during an eight-hour business day.

This test simulated a large corporation with 30,000 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**—Allows organizations to more effectively and more 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 meet 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**—Allows customers to integrate their existing systems with Siebel CRM. Siebel Enterprise Application Integration supports several adapters. The Siebel Enterprise Application Integration HTTP and MQSeries adapters were used in this benchmark.

METHODOLOGY

This benchmark was executed independently by IBM under the Siebel Platform Sizing and Performance Program guidelines, with test cases based on Siebel applications' customer requirements. These test cases reflect some of the most critical and frequently used components. 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 30,000 concurrent users from the call center (sales and service representatives), partner organizations (running Siebel Partner Relationship Management), customers (Web

sales and Web services), 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 Enterprise Application Integration MQSeries Adapter) and Web systems (Siebel Enterprise Application Integration HTTP Adapter) with more than 10 million 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 7.5, 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 Enterprise Application Integration MQSeries Adapter read from, and placed transactions into, IBM MQSeries queues. The Siebel CRM Release 7 Enterprise Application Integration HTTP Adapter executed requests between different Web infrastructures.

Database Setup

Prior to benchmark execution, the database size was approximately 103GB. It was built to simulate customers with large transaction volumes and data distributions representing the most common customer data shapes. 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	1,897,161
Activities	8,744,305
Addresses	3,058,666
Contacts	3,366,764
Employees	21,000
Opportunities	3,237,794
Orders	355,297
Products	226,000
Quote Items	1,984,099
Quotes	253,614
Service Requests	5,581,538

Business Transactions

A total of 11 use cases of complex business transactions was executed simultaneously for 30,000 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). This section provides a high-level description of the 11 use cases tested.

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.

Siebel Partner Relationship Management

- Partner creates account, contact, service request, and partner profile.
- Partner creates opportunity and activities and assigns sales team.
- Partner searches for service requests and enters new action for service request.

Siebel Interactive Selling Suite

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

Siebel eService

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

Siebel Enterprise Application Integration—Integrate Third-Party Application

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

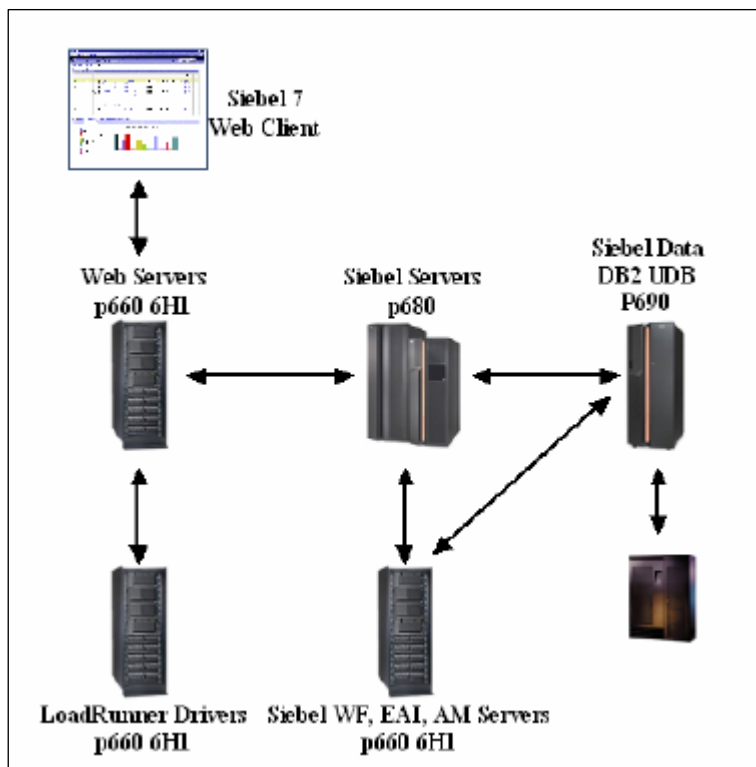
The use cases for the different applications are typically considered heavy transactions. For example, the high-level description of the sequential steps for the “Incoming call creates sales opportunity, quote, and order” use case is as follows:

- 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 all the fields in the list view.
- Navigate to the Contact’s Opportunity detail page.
- Create a new opportunity for the contact, including 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 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 servers:

- 4x IBM eServer pSeries Model 660, 6H1
 - 6x 64-bit RS64 IV 668MHz
 - 16GB RAM
 - IBM HTTP Server, Version 2.0.3
 - Siebel, Version 7.0.3 Web plug-in
 - AIX, Version 4.3.3 ML9

Gateway server/LDAP:

- 1x IBM eServer pSeries Model 660, 6H1
 - 6x 64-bit RS64 IV 668MHz
 - 16GB RAM
 - Siebel Gateway Server, Version 7.0.3
 - Resonate, Version 3.2
 - IBM SecureWay, Version 3.2.2

Application servers:

- 5x IBM eServer pSeries Model 680
 - 24x 64-bit RS64 IV 600MHz
 - 64GB RAM
 - Siebel, Version 7.0.3
 - AIX, Version 4.3.3 ML9
- 2x IBM eServer pSeries Model 660, 6H1
 - 6x 64-bit RS64 IV 668MHz
 - 16GB RAM
 - Siebel, Version 7.0.3
 - AIX, Version 4.3.3 ML9

Database server:

- IBM eServer pSeries Model 690
 - 32x Power4 1.3GHz
 - 128GB RAM
 - Enterprise Storage Server Model 2105-F20
 - DB2 UDB for AIX v7.2
 - Fixpak 5 with the following APARs: IY26865, IY28274, IY28611, IY30544
 - AIX, Version 5.1

LoadRunner drivers:

- 6x IBM eServer pSeries Model 660, 6H1
 - 6x 64-bit RS64 IV 668MHz
 - 16GB RAM
 - Mercury Interactive LR, Version 7.5
 - AIX, Version 4.3.3 ML9

RESULTS

Response Times and Transaction Throughput ^{3, 4, 5}

Workload	Number of Users	Average Operation Response Time (sec)	Business Transactions Throughput/Hour
Sales /Service Call Center	20,000	0.148	122,041
PRM	4,000	0.182	27,615
eSales	3,000	0.233	17,134
eService	3,000	0.196	40,455
Totals	30,000	N/A	207,245

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 11 types of transactions that were simulated in the benchmark.

Workload	Business Transactions Throughput/Hour
Assignment Manager	48,771
EAI – HTTP Adapter	746,676
EAI – MQ Series Adapter	545,472
Workflow Manager	96,299

Server Resource Utilization

Node	Functional Use	% CPU Utilization	Memory Utilization (MB)
IBM eServer pSeries Model 660, 6H1	Web Server – Application Requests	84	740
IBM eServer pSeries Model 660, 6H1	Web Server – Application Requests	83	739
IBM eServer pSeries Model 660, 6H1	Web Server – Application Requests	84	742
IBM eServer pSeries Model 660, 6H1	Web Server – HTTP Adapter	11	588
IBM eServer pSeries Model 660, 6H1	Siebel Gateway Server / LDAP	7	86
IBM eServer pSeries Model 680	Siebel Application Server – End Users	71	15,110
IBM eServer pSeries Model 680	Siebel Application Server – End Users	73	15,389
IBM eServer pSeries Model 680	Siebel Application Server – End Users	72	14,977
IBM eServer pSeries Model 680	Siebel Application Server – End Users	66	14,214
IBM eServer pSeries Model 680	Siebel Application Server – End Users	67	14,422
IBM eServer pSeries Model 660, 6H1	Siebel Application Server – EAI MQ Series Adapter	83	557
IBM eServer pSeries Model 660, 6H1	Siebel Application Server – EAI HTTP Adapter, Workflow Manager, Assignment Manager	84	528
IBM eServer pSeries Model 690	IBM DB2 UDB v7.2	23	18,074

Network Utilization

For 30,000 concurrent users, the network utilization measured was 23.5MB for the browser traffic, an average of 6.57 kilobits per second (Kbps) per user. These measurements did not incorporate compression for Web-server-to-browser traffic.

CONCLUSION

The test system demonstrated that Siebel CRM Release 7 architecture on IBM eServer pSeries servers and DB2 UDB easily scales to 30,000 concurrent users.

- **Vertical scalability**—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**—Siebel CRM Release 7 Smart Web Architecture and Smart Network Architecture efficiently managed the network, consuming only 6.57Kbps per user.
- **Efficient use of the database server**—Siebel CRM Release 7 Smart Database Connection Pooling and Multiplexing allowed the database to service 30,000 concurrent users and the supporting Siebel CRM Release 7 server application services with 1,818 database connections.

During the three-hour test, the database grew by about 7GB, demonstrating that the workload simulated by the system exceeded the requirements of some of the most demanding customers of Oracle's Siebel applications.



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Oracle Corporation
World Headquarters
500 Oracle Parkway
Redwood Shores, CA 94065
U.S.A.

Worldwide Inquiries:
Phone: +1.650.506.7000
Fax: +1.650.506.7200
oracle.com

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