Performance and Scalability Benchmark for 10,000 users: Siebel CRM Release 8.0 Industry Applications on HP BL460c Servers running Red Hat Enterprise Linux 4.0 and Oracle 10gR2 DB on HP BL680C

An Oracle White Paper
Released October 2008
INTRODUCTION
This white paper describes the performance and scalability capabilities of Oracle’s Siebel Customer Relationship Management (CRM) Applications Release 8.0. A scale out architecture was used for the application server tier (two application servers). The benchmark comprised 10,000 concurrent users running Siebel CRM Release 8.0 industry applications on HP BL460C and Oracle 10gR2 DB on HP BL680C Servers. The servers supporting the Siebel Gateway, Siebel Application Server and Siebel Web Server SWSE Plug-in ran the Red Hat Enterprise Linux 4.0 operating system, while the server supporting the Oracle 10gR2 DB ran the Red Hat Enterprise Linux 4.0 operating system.

Oracle’s Siebel Platform Sizing and Performance Program is a test suite certified by Oracle and executed independently by HP. HP completed the benchmark on Sep 30, 2008; Oracle certified it on October 28, 2008. Note that this benchmark data is intended for general information purposes and not as a substitute for implementation-specific sizing or benchmarks.

Results Summary: 10,000 Active Concurrent User Benchmark

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<td>Totals</td>
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<td>N/A</td>
<td>143,983</td>
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2 Siebel CRM Release 8.0 Industry Application Platform Sizing and Performance benchmarks are based on Siebel CRM Release 8.0 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.
OVERVIEW

Oracle’s Siebel Platform Sizing and Performance Program is designed to stress the Siebel CRM Release 8.0 architecture and to demonstrate that large customers can successfully deploy many thousands of concurrent users. Among the Siebel CRM Release 8.0 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 8.0 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**—The Siebel Connection Broker (SCBroker) is a server component that provides intraserver loadbalancing. SCBroker distributes server requests across multiple instances of Application Object Managers (AOMs) running on a Siebel Server.

- **Smart Database Connection Pooling and Multiplexing**—Allows customers to scale their databases without introducing expensive and complex transaction-processing monitors.

- **Server Request Broker**—Server Request Broker (SRBroker) processes synchronous server requests—requests that must be run immediately, and for which the calling process waits for completion.

- **Enterprise Application Integration**—Allows customers to integrate their existing systems with Siebel CRM applications.

- **eScript**—eScript is a scripting or programming language that application developers use to write simple scripts to extend Siebel applications. JavaScript, a popular scripting language used primarily on Web sites, is its core language.

This test simulated a large corporation with 10,000 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 service.
customer support, improve customer loyalty, and increase revenues through cross-selling and up-selling.

- **Siebel Partner Relationship Management**—Enables organizations to effectively and 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 sub processes to create a workflow process tailored to their unique business requirements.

- **Siebel Enterprise Application Integration (EAI) Integrate Third-Party Application and support of web services**—Allows customers to integrate their existing applications with Siebel CRM applications. Siebel 8.0 is planned to include pre-built Web Services that expose industry leading capabilities to various channels and applications, enabling customers to extend this functionality further across their enterprises, seamlessly exposing it real-time through standard Web portals and other Web Service-enabled environments that service a significantly broader range of customers and interaction models.

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**METHODOLOGY**

This benchmark was executed independently by HP under the Siebel CRM Release 8.0 Industry Applications Platform Sizing and Performance Program (PSPP) guidelines. Test cases are based on Siebel 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 10,000 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 service).

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 Siebel Web Services.

End users were simulated by use of Mercury LoadRunner version 8.1. The think time range between user operations was 10 to 30 seconds. The Siebel CRM Release 8.0 Scripting Engine was invoked to assign service requests and navigate the user to the appropriate views. Siebel CRM Release 8.0 Workflow Manager executed workflow steps based on inserted service requests. The Siebel CRM Release 8.0 EAI Web Services executed requests between different Web infrastructures.

**Database Setup**

Prior to benchmark execution, the database was approximately 131.20 GB. It was constructed based on Siebel customer experience and requirements and on the Siebel CRM Industry Application repository and data model—representing the most common data distribution and
volumes in high-transaction-rate implementations. The table below shows a sampling of record volumes for key business entities in the Siebel CRM Industry Application volume database.

<table>
<thead>
<tr>
<th>Business Entity</th>
<th>Number of Records</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounts</td>
<td>1,876,349</td>
</tr>
<tr>
<td>Activities</td>
<td>6,098,549</td>
</tr>
<tr>
<td>Addresses</td>
<td>3,821,180</td>
</tr>
<tr>
<td>Contacts</td>
<td>3,768,866</td>
</tr>
<tr>
<td>Employees</td>
<td>57,563</td>
</tr>
<tr>
<td>Opportunities</td>
<td>3,487,618</td>
</tr>
<tr>
<td>Orders</td>
<td>582,074</td>
</tr>
<tr>
<td>Products</td>
<td>288,618</td>
</tr>
<tr>
<td>Quote Items</td>
<td>2,168,768</td>
</tr>
<tr>
<td>Quotes</td>
<td>109,937</td>
</tr>
<tr>
<td>Service Requests</td>
<td>6,016,048</td>
</tr>
</tbody>
</table>

**Business Transactions**

Several complex business transactions were executed simultaneously for 4000 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—Incoming Call Creates Opportunity, Quote and Order**

- Create a new contact
- Create a new Opportunity for that contact
- Add two products to Opportunity
- Navigate to Opportunities - Quotes View
- Click "AutoQuote" button to generate quote
- Enter Quote Name, and Price List
- Drilldown on the quote name to go to Quote - Line Items View and specify discount
- Click "Reprice All" button
- Update opportunity
- Navigate to Quotes - Orders View
- Click on "AutoOrder" button to automatically generate order
- Navigate back to Opportunity

**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 the appropriate opportunity screen.
- New opportunity with detail is created and saved.
- Saving opportunity invokes scripting that brings user back to service request screen.
WebServices - Find, Submit a New Service Request and Update the Service Request

- There is no UI presentation layer, LR simulates J2EE web application to send web service request to Siebel server (EAIObjMgr_enu) to invoke Siebel business services.
- Siebel Web Services framework has an ability to generate WSDL files to describe the Web Services hosted by the Siebel application. Also, the Siebel Web Services framework can call external web services. This is accomplished by importing a WSDL document, described as an external Web Service, using the WSDL import wizard in Siebel Tools.
- Each Web Service exposes multiple methods. PSPP3 scenario covers methods like Query Service Request, Create Service Request and Update Service Request
- The Web Service authentication is done using session token.
- “ServerDetermine” session type is used and session token is maintained between each request to avoid "Login" for each request. To use “ServerDetermine” session type a login WS call (SessionAccessPing) should be made to retrieve session token before calling other web services. At the end of scenario, a logout (SessionAccessPing) should be called to make session token unavailable.

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

PSPP Components
- Siebel CRM Release 8.0 Industry Applications
- Red Hat Enterprise Linux 4.0
- Oracle 10gR2 Database Server v10.2.0.4.0

Database Server
- 1x4way HP BL680C Server
  - 4 x 2.4GHz Intel Xeon (E7450) Six-Core CPUs (24 CPU Cores)
  - 32GB RAM (installed)
  - Red Hat Enterprise Linux 4.0, 64-bit
  - Oracle 10gR2 Database Server v10.2.0.4.0

Gateway/Application Server 1
- 1x2way HP BL460C
  - 2 x 3.16GHz Intel Xeon (X5460) Quad-Core CPUs (8 CPU Cores)
  - 32GB RAM
  - Red Hat Enterprise Linux 4.0, 32-bit
  - Oracle 10gR2 Database Client v 10.2.0.1
  - Siebel CRM 8.0 SIA [20204] ENU
**Application Server 2**
- 1x2way HP BL460C
  - 2 x 3.16GHz Intel Xeon (X5460) Quad-Core CPUs (8 CPU Cores)
  - 32GB RAM
  - Red Hat Enterprise Linux 4.0, 32-bit
  - Oracle 10gR2 Database Client v 10.2.0.1
  - Siebel CRM 8.0 SIA [20204] ENU

**Web Server**
- 1x2way HP BL460C
  - 2 x 3.16GHz Intel Xeon (X5460) Quad-Core CPUs (8 CPU Cores)
  - 16 GB RAM
  - Red Hat Enterprise Linux 4.0, 32-bit
  - OHS (Oracle HTTPD Server) Version 10.1.3.0.0
  - Siebel CRM 8.0 SIA [20204] ENU

**HP LoadRunner Controller**
- 1x HP BL480C
  - 2 x 3.0GHz Intel Xeon Dual-Core CPUs
  - 24GB RAM
  - Microsoft Windows Server 2003 EE SP1
  - LoadRunner version 8.1

**HP LoadRunner Host 2**
- 1x HP BL460C
  - 2 x 2.66GHz Intel Xeon Quad-Core CPUs
  - 4GB RAM
  - Microsoft Windows Server 2003 EE SP1
  - LoadRunner version 8.1

**HP LoadRunner Host 3**
- 1x HP BL460C
  - 2 x 2.66GHz Intel Xeon Quad-Core CPUs
  - 4GB RAM
  - Microsoft Windows Server 2003 EE SP1
  - LoadRunner version 8.1
RESULTS

Response Times and Transaction Throughput

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Server Resource Utilization

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<th>Tier</th>
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<th>Functional Use</th>
<th>% CPU</th>
<th>Memory Utilization (GB)</th>
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</thead>
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<tr>
<td>Web</td>
<td>10,000</td>
<td>Web Server</td>
<td>24</td>
<td>9.75</td>
</tr>
<tr>
<td>Application 1</td>
<td>5,000</td>
<td>Gateway/Application Server 1</td>
<td>82.5</td>
<td>28.33</td>
</tr>
<tr>
<td>Application 2</td>
<td>5,000</td>
<td>ApplicationServer 2</td>
<td>82.3</td>
<td>28.49</td>
</tr>
<tr>
<td>Database</td>
<td>10,000</td>
<td>Database Server</td>
<td>9.1</td>
<td>19.00</td>
</tr>
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Network Utilization

For 10000 concurrent users, the network utilization measured was 73.22 MBps for the browser traffic, an average of 7.50 KBps per user.

CONCLUSION

The test system demonstrated that Oracle’s Siebel CRM Release 8.0 architecture and HP BL460C Servers form a very powerful and cost effective business solution.

- **Siebel on HP Blades** — This benchmark demonstrated the versatility and flexibility of HP Blades hardware. All tiers of the Siebel CRM Release 8.0 architecture ran on Red Hat Enterprise Linux, including the Oracle 10gR2 Database Server

- **Vertical scalability** — The Siebel CRM Release 8.0 Application Server showed excellent scalability on an HP BL460C server, with 5,000 users per server. Many users can be supported with minimal hardware.

- **Horizontal scalability** — The Siebel CRM Release 8.0 Application Server’s showed 100% horizontal scaling by adding a second HP BL460C Application Server. Load balancing was achieved utilizing the built in features of the Siebel Web Server extensions with the Oracle HTTPD server.

- **Low network utilization** — The Siebel CRM Release 8.0 Smart Web Architecture and Smart Network Architecture efficiently managed the network, consuming only 7.5 KBps per user

- **Efficient use of the database server** — Siebel CRM Release 8.0 Smart Database Connection Pooling and Multiplexing allowed the database to service 10,000 concurrent users and the supporting Siebel CRM Release 8.0 server application services with only 559 database connections. The HP BL680C server with 4 cpu’s ran at only 9.1% cpu utilization even under this heavy benchmark load. These servers take advantage of the new Intel Xeon E7450 six core processors with 12MB L3 Cache. Database storage was located on a highly available and efficient storage blade, the HP SB40C, using RAID 0+1.

3 Response times are measured 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.

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