Benchmarking SAP Customer Relationship Management Software on Dell PowerEdge Servers

BY MORTEN LODERUP

Implementing appropriate hardware and software configurations is key to optimizing performance in complex data centers. This article describes results from the two-tier SAP® Interaction Center Benchmark for the mySAP™ Customer Relationship Management 2005 application on Dell™ PowerEdge™ servers.

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SAP customer relationship management software enables enterprises to help increase efficiency by providing rapid access to critical real-time information and tight integration with the components of a customer relationship cycle, including telephone, e-mail, and Internet systems; mobile clients and handhelds; and existing SAP software. It is built on the SAP NetWeaver® platform and the SAP enterprise service-oriented architecture (SOA), a business process–driven approach designed to enhance competitive advantage, dynamically adjust to change, and help ensure consistent productivity. Specific SAP customer relationship management software is available for marketing, sales, service, e-commerce, interaction center operations and management, and channel management.

To help demonstrate the hardware requirements and performance of SAP customer relationship management software, in September 2006 the Dell SAP Competence Center performed tests using the two-tier SAP Interaction Center Benchmark for the mySAP Customer Relationship Management (mySAP CRM) 2005 application. The tests showed that three variables can have a significant effect on mySAP CRM performance in a Dell hardware environment: the number of instances, the number of dialog work processes, and the sequential memory setting.

SAP Interaction Center Benchmark

To help enterprises understand the performance of a particular SAP application in representative hardware environments, SAP provides benchmarking and certification programs. After SAP receives a benchmark and certification from a hardware partner and the results are approved, SAP makes the results available on its Web site at www.sap.com/benchmark. Enterprises can use this data to help create an optimal environment in which a large number of users can access the hardware with low response times.

The SAP Interaction Center Benchmark for the mySAP CRM 2005 application (hereafter referred to as the IC Benchmark) focuses on typical interaction center activities based on SAP Interaction Center WebClient functions. It includes the following scenarios:

- Incoming call with display of contact history and creation of interaction record
- Contact with follow-up activity
- Search of contact history and display of historical record
- Inbound sale with creation of sales order
- Service call with creation of service ticket

Each user carries out one scenario during each test, with five user types running five different scenarios in parallel. The IC Benchmark was certified by SAP on October 4, 2006 (certification number 2006078). For additional details on the steps carried out in each scenario, visit www.sap.com/solutions/benchmark/ic.epx.

Test environment

The hardware used for the IC Benchmark included a Dell PowerEdge 6850 server with dual-core Intel® Xeon® 7040

Server	**Model**	Dell PowerEdge 6850
	Processors	Four dual-core Intel Xeon 7040 processors at 3.0 GHz, each with one 16 KB L1 cache and one 2 MB L2 cache per core
	Memory	32 GB
	OS	Microsoft Windows Server 2003 Enterprise x64 Edition
Client	**Model**	Dell PowerEdge 2500
	Processor	Intel Pentium III processor at 993 MHz
	Memory	4 GB
	OS	Microsoft Windows Server 2003 Enterprise Edition
Storage array	Dell/EMC CX600	
HBAs	Two QLogic QLE2460 HBAs	
Switches	Two Brocade SilkWorm 3800 Fibre Channel switches	
LUN RAID level	RAID-10	
Software	• mySAP CRM 2005 • Microsoft SQL Server 2005 • EMC PowerPath	

Figure 1. *Hardware and software used in the test environment*

processors and a Dell/EMC storage area network (SAN). The PowerEdge 6850 server ran the Microsoft® Windows Server® 2003 Enterprise x64 Edition OS along with mySAP CRM 2005 and Microsoft SQL Server™ 2005 software. A Dell PowerEdge 2500 server was used as the client system. Figure 1 summarizes the hardware and software used in the test environment.

The hardware test architecture (see Figure 2) used a two-tier configuration in which the database and applications ran on a central application server (the PowerEdge 6850) and the mySAP CRM front end ran on a client (the PowerEdge 2500). The client connected to the server through a Gigabit[1] Ethernet connection. The application server sent database requests to the SQL Server 2005 database residing on a RAID-10 logical unit (LUN) on the Dell/EMC CX600 storage array through redundant QLogic QLE2460 host bus adapters (HBAs) and two Brocade SilkWorm 3800 Fibre Channel switches. The switches were zoned so that only one initiator (HBA) and multiple targets (LUNs) existed in each zone. The storage array also connected to the same physical switch and the same logical zone. EMC® PowerPath® software on the application server provided optimized HBA load balancing and failover. The multiple paths between the storage array and each configured LUN helped ensure that the requesting application still had access to its data even following a component failure.

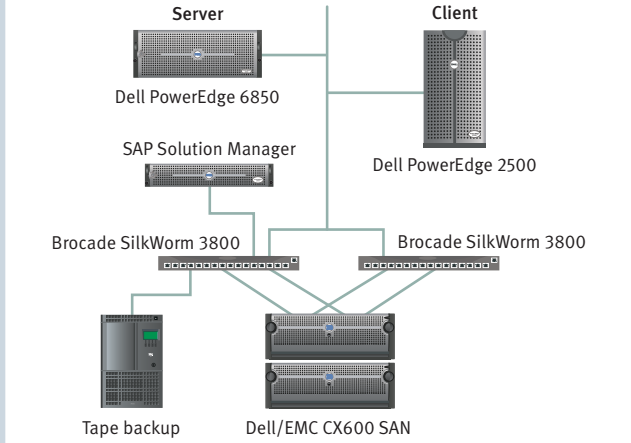

Figure 2. *Hardware architecture used in the test environment*

Test results

The IC Benchmark tests revealed several factors that can affect the response time and processor utilization when using the mySAP CRM application, most significantly the number of instances, the number of dialog work processes, and the sequential memory setting.

Number of instances

An instance consists of a runtime environment to process user requests. It could be equivalent to an application server (the physical host), but an application server could also have several instances running simultaneously. The runtime environment includes dialog work processes and a dispatcher, and may also have update, spool, and background work processes. Because each of these processes consumes server resources, setting an appropriate number of instances helps optimize both the server hardware resources and throughput.

To determine the optimal number of instances in the test environment, the test team ran the IC Benchmark with a user load of 300, 13 dialog work processes, sequential memory access disabled, and from one to four instances, and tracked response time and processor utilization for each configuration. As Figure 3 shows, with one instance, the response time was slow relative to tests with more instances, and the processor utilization was low. The response time decreased for both two and three instances, and then increased with the addition of a fourth instance. The processor utilization increased with each additional instance. The optimal number of instances in the test environment was three, which provided the fastest response time and good processor utilization.

Number of dialog work processes

Dialog work processes handle screen changes and interaction with the mySAP CRM graphical user interface (through the dispatcher). By default, two dialog work processes are assigned to each instance; the maximum number of dialog work processes is 99 per instance. Because running too

[1]This term does not connote an actual operating speed of 1 Gbps. For high-speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

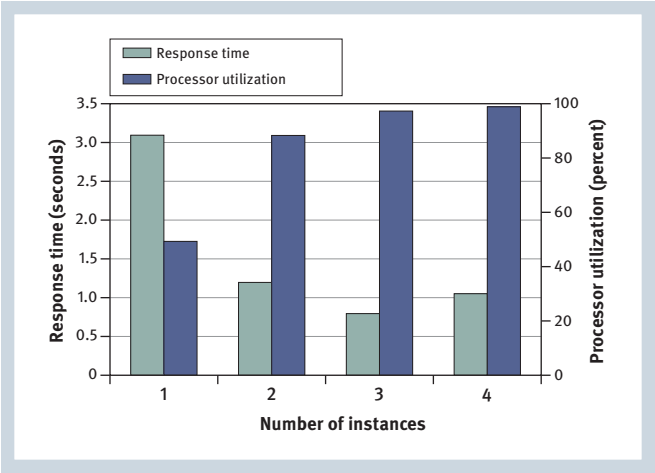

Figure 3. *Response time and processor utilization for different numbers of instances*

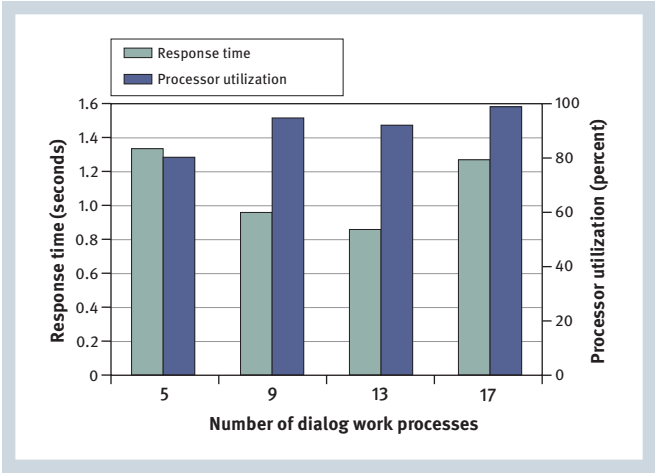

Figure 4. *Response time and processor utilization for different numbers of dialog work processes*

few processes does not make optimal use of available hardware, and running too many can interfere with the performance of critical applications, configuring the appropriate number is key to optimizing the environment.

To determine the optimal number of instances in the test environment, the test team ran the IC Benchmark with a user load of 300, three instances, sequential memory access disabled, and from 5 to 17 processes, and tracked response time and processor utilization for each configuration. As Figure 4 shows, the optimum number of processes for the test environment was 13, which provided the fastest response time and good processor utilization.

Sequential memory setting

Sequential memory access is set in the BIOS processor settings, and allows prefetching to bring data into memory or the cache before it is processed. It is typically enabled by default. When enabled, it optimizes the system for applications that require sequential memory access. If data is usually accessed in the same order, enabling it may be the best choice; however, if data is accessed randomly (for example, in an SAP database), disabling it may increase performance.

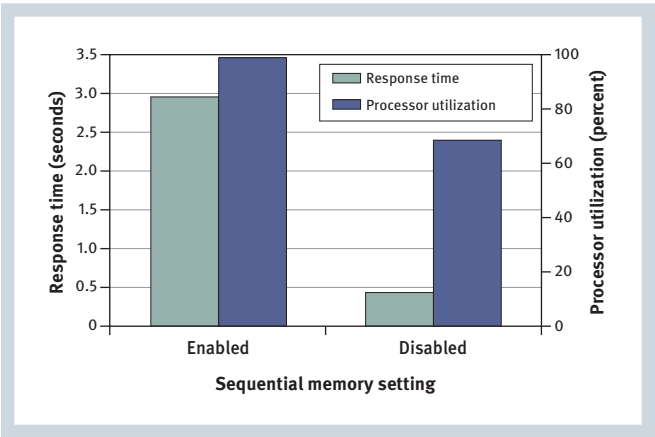

Figure 5. *Response time and processor utilization for enabled and disabled sequential memory access*

The test team ran the IC Benchmark with a user load of 250, three instances, 13 dialog work processes, and sequential memory access both enabled and disabled to determine which setting provided the best results for mySAP CRM 2005 in the test environment. As Figure 5 shows, disabling sequential memory access did increase performance by decreasing both response time and processor utilization.

Optimized customer relationship management

When implementing SAP software, enterprises should consider how both hardware and software configuration affect performance. The SAP Interaction Center Benchmark tests performed by the Dell SAP Competence Center showed that tuning certain parameters in mySAP CRM 2005–based systems—particularly the number of instances, the number of dialog work processes, and the sequential memory setting—can deliver significant performance increases, helping improve response times while maintaining an efficient level of processor utilization. Enterprises can take this data into account when deploying SAP customer relationship management software to help optimize performance and thereby increase their return on investment.

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