Siebel CRM Oracle Customer Hub (Siebel UCM) on Oracle Engineered Systems
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Executive Overview

Today’s emerging Data Governance and Master Data Management (MDM) initiatives coming out of the executive suite of most corporations are evolving rapidly. They are turning what were once considered arcane, scattered and ad hoc back-room tasks into sophisticated high-tech showcases of increased cross-organizational collaboration, business intelligence, decisioning agility, and sales performance. It also opens the path to delivering on the emerging “Big Data” strategy.

A well executed MDM platform and its related functions are now being recognized as strategic asset for driving competitive differentiation, performance and value for any business. It represents a key driver towards establishing deeper relationships with existing customers – and developing new ones more quickly. There are tremendous investments going into MDM solutions, as a result. The return on the investment is usually obtained through improved productivity and operational efficiencies, resulting out of a consolidated/simplified IT framework and improved cross-channel customer engagement. Leveraging unified, enterprise-wide, single view of the customer and improved revenue through insight-driven cross-sell and up-sell.

HOWEVER, the unique performance characteristics required of a Customer Hub deployment to support large and growing volume of data, high-demand utilization, complex system reconciliation routines and processing tasks associated with customer data management represents a key challenge.

Oracle Customer Hub (also known as Siebel Universal Customer Master or Siebel UCM) is Oracle’s lead Customer Data Integration (CDI) solution. It is a part of Oracle's Master Data Management solution. Oracle Customer Hub enables enterprises to manage customer data over the complete customer lifecycle: capturing customer data, standardization and validation; identification and merging of duplicate records; enrichment of the customer profile; enforcement of compliance and risk policies; and the distribution of the “single source of truth” best version customer profile to operational systems.

Oracle Customer Hub running on Oracle Engineered system is the culmination of Oracle’s “Engineered to Work Together” strategy and delivers on the unique performance characteristics described above.

This white paper illustrates the strategic business and technical benefits, Corporate Data Governance teams will realize with Oracle Customer Hub solution running on an Oracle Engineered System. These benefits impact enterprise-wide business processes - Customer Service, Marketing, Loyalty, Sales, Finance etc. resulting into increased business agility and superior Customer Relationship Management – enterprise-wide single, unified view of the customer, higher quality customer service, improved marketing campaign effectiveness and ROI, enhanced lead management, efficient order processing, improved customer loyalty, and accurate customer and business insights.
Synergies provided by Oracle Engineered Systems are particularly advantageous for customers dealing with large transaction volumes, and using Oracle Customer Hub for servicing their data governance needs. The across-the-board improvement in performance, throughput and scalability achieved by deploying Oracle Customer Hub on Oracle Engineered Systems will help reduce data and infrastructure complexity, and deliver speed and scale to help businesses succeed in a data intensive, fast-changing, and competitively dynamic environment.
Introduction

Oracle Engineered Systems combine best-of-breed hardware and software components with game-changing technical innovations. Designed, engineered, and tested to work best together, Oracle Engineered Systems can power the cloud or streamline data center operations to make traditional deployments even more efficient. The components of Oracle Engineered Systems are preassembled for targeted functionality and then—as a complete system—optimized for extreme performance. By taking the guesswork out of these highly available, purpose-built solutions, Oracle delivers a solution that is integrated across every layer of the technology stack—a simplicity that translates into less risk and lower costs for your business. Only Oracle can innovate and optimize at every layer of the stack to simplify data center operations, drive down costs, and accelerate business innovation.

Oracle Exalogic

Oracle Exalogic is an Engineered System on which enterprises deploy Oracle business applications, Oracle Fusion Middleware, or third-party software products. Exalogic comes pre-built with compute nodes, memory, flash storage, and centralized storage; all connected using InfiniBand in a high redundancy architecture delivering five-nines availability, with fault tolerance and zero-down-time maintenance.

Exalogic dramatically improves performance of Oracle Applications, Fusion Middleware, and third-party applications without requiring code changes and reduces costs across the application lifecycle, from initial set-up to on-going maintenance, as compared to conventional hardware platforms. Oracle has made unique optimizations and enhancements in Exalogic firmware, Exalogic software, and in Oracle’s middleware and Oracle’s applications. These include on-chip network virtualization based on near zero latency InfiniBand fabric, high-performance Remote Direct Memory Access, workload management in Oracle Weblogic server, and optimizations in Oracle Coherence and Oracle Traffic Director. Exalogic includes support for a highly optimized version of the Oracle VM, which significantly outperforms comparable virtualization solutions and is an ideal consolidation platform for Oracle Applications. Templates to simplify install, deployment, and configuration of applications on Exalogic are available.

Oracle Exadata Database Machine

Oracle’s Exadata Database Machine is Oracle’s database platform delivering extreme performance for database applications including Online Transaction Processing, Data Warehousing, Reporting, Batch Processing, or Consolidation of mixed database workloads. Exadata is a pre-configured, pre-tuned, and pre-tested integrated system of servers, networking, and storage all optimized around the Oracle database. Because Exadata is an integrated system, it offers superior price-performance, availability, and supportability. Exadata frees users from the need to build, test, and maintain systems and allows them to focus on higher value business problems.

Exadata uses a scale out architecture for database servers and storage. This architecture maintains an optimal storage hierarchy from memory to flash to disk. Smart Scan query offload has been added to the storage cells to offload database processing. Exadata implements Smart Flash Cache as part of the storage hierarchy. Exadata software determines how and when to use the Flash storage for read and write as well as how best to incorporate Flash into the database as part of a coordinated data caching strategy. A high-bandwidth low-latency InfiniBand network running specialized database networking protocols connects all the components inside an Exadata Database.
Machine. In addition to a high performance architecture and design, Exadata offers the industry’s best data compression to provide a dramatic reduction in storage needs.

Oracle SPARC SuperCluster
Oracle’s SPARC SuperCluster is the world’s most efficient multi-purpose engineered system, delivering extreme efficiency, cost savings, and performance for consolidating mission critical applications and rapidly deploying cloud services. Oracle’s SPARC SuperCluster represents a complete, pre-engineered, and pre-tested high-performance enterprise infrastructure solution that is faster and easier to deploy than a collection of individual database and application servers. The system combines innovative Oracle technology—the computing power of Oracle’s SPARC servers, the performance and scalability of Oracle Solaris, the Sun ZFS Storage Appliance, the optimized database performance of Oracle Database accelerated by Oracle Exadata Storage Servers, and a high-bandwidth, low-latency InfiniBand network fabric—into a scalable, engineered system that is optimized and tuned for consolidating mission-critical enterprise applications.

Oracle’s SPARC SuperCluster provides both the capacity for growth, as well as the fine-grained server virtualization needed to isolate individual application components. With multiple layers of enterprise application infrastructure consolidated onto a high-performance, highly available SPARC SuperCluster system, deployment speed, application performance, and availability can all be optimized. Designed as a pre-configured, pre-tested, and ready-to-deploy SPARC SuperCluster engineered system, the solution provides a complete and optimized infrastructure solution for applications, built around robust compute, networking, storage, virtualization, and management resources. The result is a system that is orders of magnitude easier to manage, and up to five times faster to deploy than alternatives, all while occupying considerably less real estate requiring less power. Furthermore, the SPARC SuperCluster system provides full built-in redundancy resulting in a highly reliable infrastructure without single point of failure. An issue with one component will not impact other components of the system offering true isolation. Customers can consolidate multiple environments with minimum disruption, without fear of performance degradation, and the ability to achieve required service levels.
Oracle Customer Hub (Siebel Universal Customer Master or UCM)

Oracle Customer Hub is a source of clean customer data for the enterprise. The primary role of Oracle Customer Hub is to consolidate and govern unique, complete and accurate master Customer information across the enterprise and distributes this information as a single point of truth to all operational and analytical applications.

Oracle Customer Hub solution is organized around five key pillars:

- **Trusted Customer Data** is held in a central MDM schema. It includes:
  - Comprehensive customer data model, which not only masters customer profile used required in the front office but also those required by all the applications in the enterprise
  - Support for Complex hierarchies, roles and relationship within and across master entities
  - Child Data Entities such as addresses, related organizations, financial accounts, partner affiliations, campaigns, loyalty status, etc. Customers can extend child entities and add new entities as relevant for their business.
  - Industry specific data model

- **Consolidation** services manage the movement of master data into the central store.
  - List Import Workbench - for business users to business users to load data into the hub through metadata and template driven approach
  - Identification and Cross Referencing - to build the best version customer record and track it across multiple applications across the enterprise using one-to-may cross-referencing mechanisms
  - Source Data History - to systematically track the changes made to customer profile over time and roll back the system to a prior point in time.
- Rules based Survivorship - for users to analyze the quality of customer data to determine the best version customer record.

- **Cleansing** services deduplication, standardize and augment the master data. It includes:
  - Address validation
  - Enhanced Matching - allows matching on all types of names, address and identification data including child entities, using flexible search strategies and smart indexing. Also includes multi-language and multi mode capability.
  - Data Decay - supports decay detection, decay metrics calculation and decay prevention capabilities
  - Guided Merge and Un-merge
  - Enrichment - enrichment of customer profiles using out of the box integration with 3rd party content providers such as Acxiom and D & B.

- **Governance** services control access, retrieval, privacy, audit and change management rules. It includes:
  - Data Governance Manager - for data stewards to manage customer data throughout customer lifecycle
  - Advanced Hierarchy Management - enabled through integration with Hyperion’s Data Relationship Manager for data stewards to create and maintain hierarchies
  - Policy and Privacy Management
  - MDM Analytics - for data stewards to proactively assess the quality of customer data entering into Oracle Customer Hub

- **Sharing** services include integration, web services, event propagation, and global standards based synchronization.

With Oracle Customer Hub, organizations can drive:

1. **Business Growth** through increased cross-sell/up-sell, improved call center productivity, optimized marketing costs and Improved customer retention

2. **Operational Efficiencies** through reduced data management costs, improved marketing response rate and reduced sales cycle time

3. **Compliance** through systematic enforcement of privacy rules

4. **IT Agility** through simplified and extensible IT infrastructure that allows faster deployment of new systems and reduced cost of integration
Oracle Customer Hub Running on Oracle Engineered Systems

Oracle Customer Hub is used extensively across industries such as Telecommunication, High Tech, Manufacturing and Distribution, Public Sector, Financial Services, Retail and CG, Travel and Transportation etc. In some of these industries, especially for customers with global deployment, there is a need to manage large number of customer data (example customer master data consolidation for M&A, customer data management from several operational applications and self service applications) in any given day. Maintaining consistent, clean, and complete customer master data is essential for all transactional applications such as order management, sales, marketing and so on. During peak hours, there could be a several thousand customer master data updates such as profile preferences, address changes, and also the need for maintaining audit ability on customer data changes for regulatory and compliance requirements. Also, there could be several hundred thousand customer master data query from several integrated applications. Besides processing large number of customer master data management transactions, system should also support many sync transactions which can run into several hundred thousand. Yet, the expectation is that these transactions can be processed quickly often in sub seconds.

To meet such high demands, customers often have to invest significantly in hardware resources.

While this is just a short-list of imperatives facing corporations and governmental institutions today, clearly, there are several key themes that emerge: From a strategy perspective: speed and scale, resulting in savings; and from a capability perspective: data and information, resulting in better decisions. Clearly, the underlying challenge that needs to be addressed is data and infrastructure complexity for both business and IT, such that infrastructure investments align with business priorities around enterprise data management and deliver tangible benefits.

Engineered systems are specifically designed to deal with these storage challenges. For instance, Exadata Hybrid Columnar Compression technology will reduce the size of data storage by providing significant reductions in cost over time. Additional business benefits include less frequent archiving and longer access to historical data.

The primary objectives of the PSR benchmarking of Oracle Customer Hub on Oracle Engineered systems were to establish that it is able to:

1. Process and consolidate millions of customer records. In the retail, financial services, utilities, and communications verticals, typical customer data volumes can range from 100 million to 500 million records, just for one company.
2. Deliver sub-second response time for all read operations
3. Meet high throughput requirements

Represented in Figure 2, below, are a summary of the middleware components, the web servers, application servers, gateway servers/load balancers, data quality servers all residing on the Oracle Exalogic, and the underlying database residing on Oracle Exadata.
Gating Factors

Based on the vast domain expertise and best practices in the area of Master Data Management, combined with the in-depth understanding of the use of Oracle Customer Hub solution by some of the leading global companies, Oracle came up with the following set of characteristics that are deemed typical of any Oracle Customer Hub deployment and are gating factors that any company considering deployment of Customer Hub solution would put priority on:

1. **Integrated System**: Since any MDM system has many components including the Web Servers, Load Balancers, Application Servers, Data Quality Servers and some of them have their own dedicated database, the integrated system approach of having all the components installed on Exadata/Exalogic should reduce the IT operational cost significantly and reduce the complexity of the IT hardware landscape.

2. **High Scalability**: Because of the presence of multiple high performance compute nodes in the Exalogic rack, and use of parallelism, compression, disk striping, query offloading and massive flash cache in Exadata, the MDM deployment on Exalogic/Exadata will result in very high scalability.

3. **Prebuilt Components**: Exalogic has preloaded Web logic components that are optimized and enhanced. Since any MDM system has to be integrated to the operational systems via the middleware, integration to the operational systems will become quite easy.

4. **High Throughput**: WebLogic's networking, request handling and thread management mechanisms are enhanced in Exalogic which enable it to scale better on the high multi-core compute nodes that are connected to the fast InfiniBand fabric that ties all the compute nodes together. The net effect is that each server should be able to handle more client requests whilst also reducing the time taken to respond to each individual request.
5. **Reduced Response Time**: All the compute nodes within Exalogic, and Exadata and Exalogic, are all connected via the Infiniband I/O fabric and a native InfiniBand networking protocol called SDP is used to interact with the Oracle RAC database on Exadata. This should result in low latency for request-response times for calls between the application tier and the database. The performance gain should be most significant when large result-sets are transferred from the database. The desired net effect is applications are able to respond to client requests faster, leading to overall performance gain for enterprise MDM deployments.

**Test Steps**

The test was designed to mimic real-word data loads and transaction volumes. Outlined below are the steps that a typical MDM solution will require.

1. **Initial Batch Load** - The Initial Batch Load consolidates initial customer data from all the operational systems to Oracle Customer Hub. This is a one-time activity where:
   a. Data from operational systems is extracted and loaded into Siebel UCM (Enterprise Integration Manager) Tables via any SQL Loader tool such as ODI (Oracle Data Integrator).
   b. Data from EIM Tables is loaded to UCM SDH (Source Data History) Tables.
   c. UCM batch process is run in parallel workflow tasks to load the customer tables. The UCM batch process consolidates the data, de-duplicates the data and creates the golden customer records.
   d. BI/DW picks up the customer data from the customer MDM system via ODI.
   e. BI/DW picks up the transactional data from the operational systems via ODI.

2. **Daily Operational Loads** - After the initial load, daily operations are where Oracle Customer Hub is used as the customer repository. All operational systems search the Customer Hub before creating a record. In general terms, there are two basic types of transactional operations that transit as loads in the environment-
   a. User-based operational loads, and
   b. System-based operational loads.

   A. **Daily Operational Load: User** - For example, let's take the Call Center as one of the operational systems. Please note that similar activities would happen for all the operational systems.
   - Customer calls the Call Center for Enquiry/Order/Support.
   - Using the match/fetch web services exposed by the Hub, the golden customer record is matched and fetched from Oracle Customer Hub. Now the agent has complete information about customer rather than fragmented data.
   - If the customer is not found, a new customer record is created and synched to the Customer Hub. Usually the primary customer attributes are synched in real time.
   - Using the Insert/Upset Web Service, a new customer record is published to all the subscribing systems via publish/subscribe mechanism.
   - BI/DW picks up the customer data from the Oracle Customer Hub via ODI.
B. **Daily Operational Load: Systemic Processing** - Continuing with our daily operations example, there is generally the need to consolidate new/updated customer data from external/operational systems to Oracle Customer Hub. This requires sending all the new/updated customer data to the Oracle Customer Hub in a daily/weekly batch process. (Since this activity is not Performance intensive, this was kept out of scope of the current Performance benchmark; nevertheless, the typical steps involved are outlined below).

1. New/Updated customer data is extracted and loaded into Siebel UCM EIM (Enterprise Integration Manager) Tables via any messaging queue.
2. Data from EIM Tables is loaded to UCM SDH (Source Data History) Tables.
3. UCM batch process is run in parallel Workflow tasks to load the Customer tables. The UCM batch process consolidates the data, de-duplicates the data and creates the golden customer records.
4. New/Updated customer records are published to the subscribing systems.
5. BI/DW picks up the customer data from Oracle Customer Hub via ODI.

The test was done using a half rack Exadata machine and a half rack Exalogic machine. All the components of Siebel along with the Web Servers and Gateway Server were installed on Exalogic.
Exadata was used as the database – 400 million conditioned customer records were loaded to the system via the Siebel EIM Process, with close to 150 attributes for each customer record, (name, profile, cross-reference data, addresses, etc.).

Various real time transaction scenarios such as ‘Medium Complexity Read’, ‘Complex Read’, ‘Insert’ and ‘Update’ (refer to Figure 7 in the Appendix for descriptions) were tested and various performance metrics related to throughput, response times and CPU resource utilization were gathered.

Test Results

Results Summary:

- **Throughput** for Oracle Customer Hub on Exadata was 11X higher than customer requirements for complex read transactions, and 7X higher than customer requirements for medium complexity read transactions.

- **Scalability** performance for Oracle Customer Hub on Exadata for user loads scaled up by 3X for complex queries, translated into 2.3X higher throughput performance, with only a 20% increase in response times (see Figure 4 above).

- **Response** times for Oracle Customer Hub on Exadata were 10X faster for complex read transactions and 7X faster for medium complexity read transactions.

Clearly, the performance of a ½ rack Exadata machine produced impressive results against the initial hypotheses. A larger configuration would only yield faster response time and throughput figures. Furthermore, relative to other commercially available HW alternatives, Oracle Exadata and Exalogic machines operate at a lower total cost of ownership (TCO), require less space, and consume less energy.
Comparing results for the same tests done on traditional commodity hardware with the same processing power shows that Exadata/Exalogic delivered **4X better throughput and 8X better response times** indicating the effectiveness of the “engineered” hardware-software solution.

Customer Benefits of OCH and Engineered Systems Pairing

Oracle Customer Hub running on Oracle Engineered is proven to deliver massive PSR improvements and not only meets but exceeds the extreme performance demands of a large scale Oracle Customer Hub enterprise deployment. Here are some additional observations:

- **Faster Response Time:** With Exalogic and Exadata, Oracle Customer Hub deployments offer unprecedented response time, which translates to business value. Oracle Customer Hub running on Oracle Engineered Systems will significantly improve efficiency of knowledge workers and enable delivery of rich, insight-driven, cross-channel customer experience. Companies running Oracle Customer Hub on Oracle Engineered system will improve bottom-line with enhanced user efficiencies and topline with improved customer experience.

- **Higher Throughput:** The faster response time through Oracle Customer Hub for all related transaction means that it is possible to process more transactions through a core and support more users compared to the same on comparable hardware. Scaling for peak loads becomes easier, reducing the overall hardware footprint.

- **Reduction in DB server CPU cycling:** This leads to increased scalability and reliability, particularly when paired with an appropriate back up and disaster recovery process added into the schema.

- **Improved Consolidation:** Reduced number of instances by aggregating more business applications and databases. This may significantly reduce effort needed to administer & optimize databases.

- **Operational Efficiency:** Reduced call handling time, data administration and cleanse/match/enhance tasks that are core to proper data governance tasks in Oracle Customer Hub.

- **Reduced number of servers:** Leading to major cost savings.

Further, there are specific advantages that can be leveraged with an Exa-based Engineered System. Some of these include the following:
Engineering Advances That Enable OCH Performance Results

Below is a list of the technical features in Exadata and Exalogic that were key aspects of driving the performance improvements in the OCH stack. It is through these significant engineering advances that the results were achieved in our evaluation:

**Exadata**

**Exadata Smart Flash Cache**

Exadata Smart Flash Cache uses Flash memory to dramatically reduce the time to read and write database and log records. The intelligence in Smart Flash Cache transparently moves active database blocks from disk to flash in real time, thus ensuring that “hot” data is in Flash memory when the next access occurs. Blocks that should not be in Flash are similarly recognized, maximizing the amount of space in Flash for active data.

**Exadata Smart Scan**

Exadata Smart Scan speeds up data-intensive queries by leveraging the processing power of Exadata Storage Servers to scan and filter out results. By moving queries to storage instead of moving the data to the database servers, long-running reports and queries often complete 10x faster than on conventional systems.

**InfiniBand**

The use of InfiniBand as the networking fabric within Exadata ensures the lowest latency for messages and the highest bandwidth for data transfers. High-speed transactions as well as data-intensive queries and reports reap the benefits.

**Exadata Scale-Out Storage**

Exadata Scale-Out Storage enables the full performance of Exadata to be realized against large and growing databases, without fear of bottlenecks. As the database size grows and storage capacity is added to Exadata, storage performance and networking bandwidth scale in equal proportion.
I/O Resource Manager (IORM)

IORM allocates I/O bandwidth across different applications and databases, based on a prioritized allocation plan, to ensure that the most important applications get the performance they need when they need it.

Hybrid Columnar Compression (HCC)

Hybrid Columnar Compression dramatically reduces the storage space consumed by the database, while at the same time speeding up queries against the compressed data through reduced I/O. Compression often reduces the data storage by a factor of 10x or more, storing a petabyte scale database in 100TB of disk. Since compressed tables remain compressed in Flash memory as well as on disk, very large databases often fit entirely in Flash memory when compressed.

Exalogic

Exalogic Exabus

Applications running on Exalogic utilize Exabus, the underlying Infiniband fabric, which provides low latency and high throughput eliminating I/O bottlenecks in every application layer. Applications components are typically deployed in more than one server and Exabus provides low latency for I/O across nodes on same Exalogic rack. Access to ZFS storage device over Exabus greatly reduces latency for log file writes and other file access operations. For applications running on Exalogic and accessing database tier on Exadata, Exabus delivers faster I/O, reduces CPU usage on both the mid-tier and DB-tier and provides higher connection pooling efficiency.

Oracle VM for Exalogic

Exalogic Oracle VM can be used to sub-divide a physical compute node into multiple virtual machines to increase application deployment efficiency while maintaining application performance. Oracle VM has been engineered for tight integration with Exalogic Exabus I/O backplane using a technique called Single Root I/O Virtualization (SR-IOV) ensuring Oracle VM significantly outperforms comparable hypervisors from other leading vendors. The benefit of this approach is unmatched application performance. In an Exalogic configuration, the impact of virtualization on application throughput and latency is negligible.
Conclusion

The business context for IT as it relates to data management in supporting daily business operations has changed drastically over the last couple of decades. Managers are faced with significant complexity and challenges, which when addressed correctly, can lead to significant savings through speed and scale. The notion of aligning business priorities with IT decisions and actions holds merit, regardless of whether the business manager is trying to operationalize strategy or whether an IT stakeholder is trying to automate processes supporting the strategy.

Given the inherent infrastructure complexity (multiple systems, multiple standards, a history of custom development projects, fragmented data sources, etc.) further compounded by business imperatives (need for high speed/throughput, response times, optimum HW utilization at lower TCO, etc.) render high performance computing and data management a necessity. IT and business managers, both, recognize the importance of accessing large volumes of data quickly, across systems – all the while leveraging data management best practices, IT prowess, and fast/scalable HW – each of which is a critical success factor in achieving business goals.

The Oracle test of Oracle Customer Hub on Exadata shows the ability of the combination to deliver high performance computing capabilities in order to deliver speed, scale, and savings.
Appendix

ACRONYMS AND DESCRIPTIONS OF TERMS USED IN THIS DOCUMENT.

- AIA • Application Integration Architecture
- BI/DW • Business Intelligence / Data Warehouse
- CRM • Customer Relationship Management
- EIM • Enterprise Integration Manager
- ERP • Enterprise Resource Planning
- Exadata • Oracle Exadata Database Machine provides an optimal solution for all database workloads, ranging from scan-intensive data warehouse applications to highly concurrent OLTP applications. The Database Machine delivers extreme performance in a highly-available, highly-secure environment and is also well-suited for consolidating multiple databases onto a single grid. The Database Machine is delivered as a complete pre-optimized and pre-configured package of software, servers, and storage.
- Exalogic • Oracle Exalogic is an engineered system that is highly optimized and pre-configured to run multi-tier application workloads. Most Oracle Applications are based on a multi-tier architecture and can therefore benefit from Exalogic.
- MDM • Master Data Management
- OLTP • On Line Transaction Processing
- RAC • Real Application Clusters
- RTD • Real-Time Decisions
- SDP • Sockets Direct Protocol
- SDH • Source Data History
- SOA • Service Oriented Architecture
- SQL • Structured Query Language
- TCO • Total Cost of Ownership
- UCM • Universal Customer Master

MDM on Exadata - Topology of the Test Environment

![Test Topology Diagram]

Figure 6: Test Topology
MDM ON EXADATA - PERFORMANCE TEST RESULTS

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Definition</th>
<th>Required Throughput (Transactions per second)</th>
<th>Observed Throughput (Transactions per second)</th>
<th>Required Response time in milliseconds</th>
<th>Observed Response time in milliseconds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium Read</td>
<td>Get Customer details along with the Addresses, Financial Accounts and Assets with the Customer Id from the Operational System. (Retrieve up to 25 attributes)</td>
<td>1500</td>
<td>10,450</td>
<td>200</td>
<td>29</td>
</tr>
<tr>
<td>Complex Read</td>
<td>Get Customer details along with the Addresses, Financial Accounts and Assets with the Customer Id from the Operational System. (Retrieve up to 150 attributes)</td>
<td>500</td>
<td>5657</td>
<td>500</td>
<td>49</td>
</tr>
<tr>
<td>Update</td>
<td>Update Customer details along with the Addresses, Financial Accounts and Assets with 25 to 40 attributes.</td>
<td>30</td>
<td>50</td>
<td>500</td>
<td>200</td>
</tr>
<tr>
<td>Insert</td>
<td>Create Customer details along with the Addresses, Financial Accounts and Assets with 25 to 40 attributes.</td>
<td>30</td>
<td>50</td>
<td>500</td>
<td>200</td>
</tr>
</tbody>
</table>

Figure 7: Test Scenario Description with Required and Observed KPI's

The above provided results clearly show the significant speed advantages of Exadata well beyond the throughput and response-time requirements.

THE FOLLOWING ARE THE RESULTS OF MEDIUM QUERY AND COMPLEX QUERY WITH INCREASING NUMBER OF USERS.

<table>
<thead>
<tr>
<th>Operation</th>
<th># of Users</th>
<th>Throughput (tps)</th>
<th>Response Time (m sec)</th>
<th>Web CPU</th>
<th>App CPU</th>
<th>DB CPU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium Query</td>
<td>100</td>
<td>4450</td>
<td>25</td>
<td>8%</td>
<td>25%</td>
<td>8%</td>
</tr>
<tr>
<td>Medium Query</td>
<td>200</td>
<td>8200</td>
<td>27</td>
<td>15%</td>
<td>355%</td>
<td>13%</td>
</tr>
<tr>
<td>Medium Query</td>
<td>300</td>
<td>10,450</td>
<td>29</td>
<td>22%</td>
<td>60%</td>
<td>16%</td>
</tr>
<tr>
<td>Complex Query</td>
<td>100</td>
<td>2397</td>
<td>40</td>
<td>6.5%</td>
<td>30%</td>
<td>10%</td>
</tr>
<tr>
<td>Complex Query</td>
<td>200</td>
<td>4696</td>
<td>41</td>
<td>13%</td>
<td>52%</td>
<td>18%</td>
</tr>
<tr>
<td>Complex Query</td>
<td>300</td>
<td>5657</td>
<td>49</td>
<td>15%</td>
<td>74%</td>
<td>21%</td>
</tr>
</tbody>
</table>

Figure 8: MDM on Exadata. Test results for Medium and Complex Query

Here the test shows the linear scalability of the application with step increases in number of users. As the number of users increase, we can see the throughput increasing linearly.
Oracle Customer Hub (Siebel UCM) on Oracle Engineered Systems

Author: Shyam Shah and Bill Miller

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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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