SPECjEnterprise®2010

Link: https://www.spec.org/jEnterprise2010/

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Preface:

SPEC is an organization that develops standardized benchmarks to evaluate the performance of computer systems. This standardization allows for consistent and comparable performance measurements across different systems. SPEC benchmarks cover a variety of domains, including CPU performance, graphics, and enterprise applications.

SPECjEnterprise2010 is a Java Enterprise Edition (Java EE) benchmark meant to measure a Java EE based enterprise system. A Java EE based enterprise system typically constitutes hardware systems, enterprise software stack based on the Java EE 5 specification, database systems, Java Virtual Machine, operating system and the network.

Introduction:

 SPECjEnterprise2010 is a **full-system** benchmark. It assesses(evaluates) the entire system including all components and layers beyond the Java EE server to characterize performance for the complete application stack. For example the supporting infrastructure that are tested beyond the Java EE server are JVM, Database, CPU, disk and servers

It is an end-to-end benchmark that evaluates the entire process or workflow of an application from the UI to the backend services. In other words here it covers the complete lifecycle of the enterprise app from the user interactions till the backend processing.

It was adopted at 2010 and it expands SPECjAppServer2004 which was based on Java EE 1.3 while our Bench marks is based on Java EE 5. The main difference between them is the word load scenario .The SPECjAppServer2004 simulates an order processing scenario, involving tasks like database updates, order processing, and user interactions. While SPECjEnterprise2010 Reflects a more modern and comprehensive e-commerce application scenario. In addition to order processing, it likely includes features such as inventory management, customer interactions, and potentially more complex business processes.

We need this bench mark for evaluation and comparison between differs vendors, Organizations often need to choose an appropriate Java EE application server for their enterprise applications. The benchmark provides a standardized way to compare the performance of different vendors' application servers and platforms. Since this bench mark is a full-system bench mark we use it to test the system as a whole not just testing one component of it

Benchmark Methodology:

The SPECjEnterprise2010 application is based on a scenario that incorporates CRM(Customer relationship management) , manufacturing and supply chain management as its business case.

Measurement:

Performance is measured by a metric called EjOPS (jEnterprise Operations Per Second).It is derived by adding the operations per second in the dealer domain to the work orders per second in the manufacturing domain.

Business and Application Environment:

The workload is modeled after an automobile manufacturer whose main customers are automobile dealers. Those customers use a Web based UI to browse the products catalog, purchase and sell automobiles, and track dealership inventory.

Orders above a certain size result in special large orders, So that they are requested directly from the manufacturer. These interactions are encapsulated in the **Orders Domain** as show in the Diagram Above

In the diagram there us between domains JMS which stands for Java Message Service. It is a Java-based messaging API for creating, sending, receiving, and processing messages between distributed systems or components.
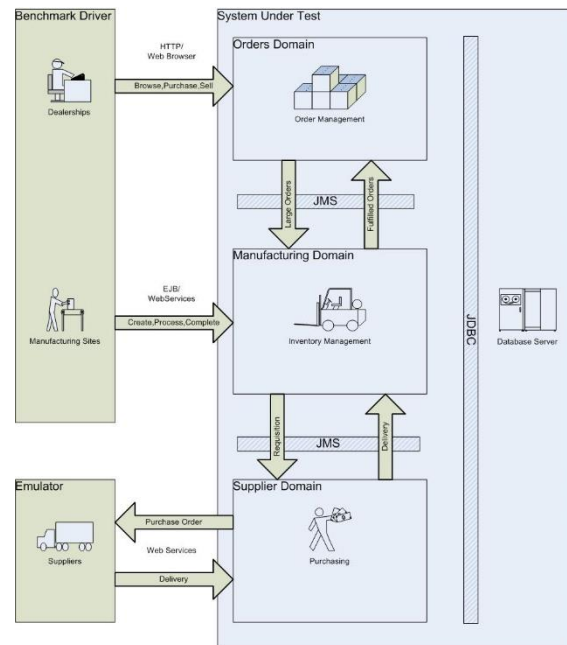
Application Under Test Design

1. Orders Domain Model: It is a web-based UI so that customers can keep track of their accounts, dealership inventory, sell automobiles ,manage their shopping cart and buy automobiles.

2.Manufactiring Domain Model: It Models the production activity across different manufacturing plants in different locations. There are two types of production lines, the planned lines and Large-Order lines. The planned lines run on schedule and produce a pre-defined number of widgets. In contrast, the Large-Order lines runs only when a large order is received from a customer(i.e. dealer).Manufacturing begins when a Work-Order enters the system. Each Work-Order is for a specific quantity of a particular type of widget and is manufactured at one of possibly many locations. The planned line Work-Orders are typically created as a result of a forecasting application. The Large-Order line Work-Orders are generated as a result of customer orders. When a Work Order is created at a location, the Bill of Materials (BOM) for the corresponding type of widget is retrieved and the required parts are taken out of the inventory of the location. As the widgets move through the assembly line, the Work-Order status is updated to reflect progress. Once a Work Order is complete, it is marked as complete and inventory updated.

When the parts quantity or availability has been significantly reduced or exhausted in the inventory, the suppliers need to be located and purchase orders need to be sent out. So the Supplier Domain is being contacted

Example MessageSenderSession is a stateless session bean is used to by other stateless session beans in the manufacturing domain to create and send messages to other domains. It sends a JMS message to the **Supplier domain for a new requisition** and to the **Order domain to notify it of a fulfilled order.**

3.Supplier Domain Model: It Models the interactions with suppliers. It Decides which Supplier to be chosen based on the parts in the order, the lead time specified by the supplier and the price determined by the supplier. When parts are received from the supplier, the Supplier Domain sends a message to the Manufacturing Domain to update inventory.

4. Database Model: We have 3 separate databases, one for each domain. This is more likely related to the real-world scenario that the enterprise adopt the new component model first while leaving their data. In other words, the benchmark doesn't require creating a new consolidated database for these 3 ones Instead, it allows for the existence of these three individual databases, each with its own set of tables.

Results:

Found 50 results (out of 50 records).

SPECjEnterprise2010

Tester	System Title	# cores	# chips	# cores per chip	# appserver nodes	EjOPS	Test Date	Published	Disclosure
Oracle Corporation	Oracle Weblogic Server Standard Edition Release 12.1.1 on Oracle SPARC T5-8	128	8	16	1	57422	Mar-2013	Mar-2013	HTML Text
Oracle Corporation	Oracle WebLogic Server Standard Edition Release 10.3.5 on SPARC T4-4	32	4	8	4	40105	Aug-2011	Sep-2011	HTML Text
Oracle Corporation	Oracle Weblogic Server Standard Edition Release 12.1.2 and Oracle Database 12c on Oracle SPARC T5-8 using Oracle VM Server for SPARC	128	8	16	1	36571	Sep-2013	Sep-2013	HTML Text
Oracle Corporation	Oracle WebLogic Server Standard Edition Release 12.2.1.2 on SPARC T8-1	32	1	32	1	34260	Sep-2017	Sep-2017	HTML Text
Oracle Corporation	Oracle WebLogic Server Standard Edition Release 12.2.1.2 on SPARC T8-1 with Encryption	32	1	32	1	32623	Sep-2017	Sep-2017	HTML Text
Oracle Corporation	Oracle WebLogic Server Standard Edition Release 12.1.1 and Oracle Database 11gR2 on Oracle SPARC T5-8 using Solaris Zones	128	8	16	1	27844	Apr-2013	May-2013	HTML Text
Oracle Corporation	Oracle WebLogic Server Standard Edition Release 12.2.1 on Oracle Server X6-2	44	2	22	1	27803	Jun-2016	Jul-2016	HTML Text
Oracle Corporation	Oracle Weblogic Server Standard Edition Release 12.1.1 on Oracle Sun Fire X4800 M2	80	8	10	1	27150	Feb-2012	Mar-2012	HTML Text
Oracle Corporation	Oracle Weblogic Server Standard Edition Release 12.1.1 on Sun Server X2-8	80	8	10	1	27150	Feb-2012	Jul-2012	HTML Text
Cisco Systems, Inc.	Oracle Weblogic Server Standard Edition Release 10.3.5 on Cisco UCS B440 M2 Blade Server	40	4	10	2	26119	Sep-2011	Sep-2011	HTML Text
Oracle Corporation	Oracle WebLogic Server Standard Edition Release 12.1.3 on SPARC T7-1	32	1	32	1	25819	Oct-2015	Oct-2015	HTML Text
Oracle Corporation	Oracle WebLogic Server Standard Edition Release 12.1.3 on SPARC T7-1	32	1	32	1	25093	Oct-2015	Oct-2015	HTML Text
IBM Corporation	WebSphere Application Server V8.5.5.2 and DB2 10.5 on IBM Power S824	24	4	6	1	22543	Mar-2014	Apr-2014	HTML Text
Oracle	Oracle WebLogic Server Standard Edition Release 12.1.3 on Oracle Server X5-2	36	2	18	1	21504	Mar	Apr-2015	HTML Text

Sample Results:

Although different work loads are applied we need just to compare them to have like sense of what is SjOPS from the numbers we can see

		Oracle WebLogic Server Standard Edition Release 12.1.1 on Oracle SPARC T5-8	Oracle WebLogic Server Standard Edition Release 10.3.5 on SPARC T4-4
Hardware		Oracle SPARC T5-8 1 JEE Server Node 1 DB Server Node 128 cores for both JEE and DB	Oracle SPARC T4-4 4 JEE Server Node 2 DB Server Node 128 cores for JEE and 64 cores for DB
	Purchase	Average:0.207 Max:13.974	Average:0.075 Max:19.180
	Manage	Average:0.128 Max:16.957	Average: 0.056 Max: 15.468
	Browse	Average:0.256 Max:9.765	Average: 0.083 Max: 15.505
	CreateVehicle EJB	Average:0.129 Max:3.324	Average: 0.339 Max: 39.570
	CreateVehicle WS	Average:0.127 Max:2.694	Average: 0.322 Max: 38.805
EpJos		57,424.78 EjOPS	40,167.13 EjOPS

Hardware definitions:

- Oracle SPARC T5-8: It is a specific hardware system manufactured by Oracle, belonging to the SPARC T5 series. It includes processors, memory, storage, and other components integrated into a single server unit.
- Oracle SPARC T4-4: Another specific hardware system by Oracle belonging to the SPARC T4 series. It has a different architecture and capabilities compared to the SPARC T5-8
- JEE Server Node: It is the logical instance of the Java EE application server. It's where the Java EE applications, like Oracle WebLogic Server, are deployed and run.
- DB Server Node: It is the logical instance of a database server. It's where the database management system (DBMS) runs and manages the data

Insights form the Results above:

- Generally, Oracle WebLogic Server 10.3.5 on SPARC T4-4 shows lower average response times across all transaction types compared to Oracle WebLogic Server Standard Edition Release 12.1.1 on Oracle SPARC T5-8. This depends on several factors including Hardware differences where SPARC T4-4 has a different processor architecture compared to SPARC T5-8 .The T5 series generally offers better performance than the T4 series. In addition, The T5-8 setup has 128 cores for both JEE and DB, while the T4-4 setup has 128 cores for JEE but only 64 cores for DB.

- On the other hands T5 has better EjOPS than T4 which is our metric that this bench mark focus on. This points make us sense the EjOPS metric which is the no of operations per sec.
- . Generally, a higher EJOPS indicates better overall throughput or the ability to handle a larger workload. but this doesn't necessarily mean better response times.
- Now using EjOPS We can compare systems in the real life scenario it depends on the application when we need to care about the time of each transscation we look at the reposne time. When we need overall throughput and like how well the system will perform under high load we look at EjOPS.