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Performance Assessment

Oracle Insurance Insbridge Enterprise Rating

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EXECUTIVE OVERVIEW

Oracle Insurance Insbridge Enterprise Rating (Insbridge) is a stand-alone, Web-based rating, rules, and underwriting system for all lines of business. It allows business users to build, deploy, and manage complex rates and rules with a supremely accurate rating and underwriting engine in an easy-to-use environment. This document describes a set of performance-related tests conducted on the Insbridge systems – the SoftRater Rating Engine and the RateManager Authoring Environment – along with associated results. The goal of the test was to prove system scalability up to levels capable of supporting commercial insurance carriers at a high volume. The tests described were conducted in order to validate system scalability requirements and informative sizing metrics for use in production deployments. The tests further provided detailed data enabling Oracle to continue improving the Insbridge product.

RATEMANAGER TESTING

The Oracle Insurance Insbridge product includes the RateManager component, which is a Web-based application enabling business users to define the rules, rates and calculations to be used within the SoftRater rating engine. The goal of testing the RateManager application was to validate the stability of the application, and to provide data usable in sizing an environment for production purposes. The NeoLoad testing suite from Neotys was utilized for RateManager testing.

Test Environment

The environment used for RateManager testing was sized using one commodity server for the application tier, and a virtual machine for the database.

- Machine 1 (Web/App): 4 processor at 2.33GHz, 32GB RAM, Windows Server 2012 R2, IIS 8.5
- Machine 2 (DB): 4 processor at 2.66GHz, 32 GB RAM, Windows Server 2012 R2, SQL Server 2012

ENVIRONMENT	MACHINE 1	MACHINE 2
Test Usage	Application	Database
# CPU	4	4
Chip	Intel Hyper-Threading	Intel Hyper-Threading
Speed	2.53 GHz	2.66 GHz
Ram	32 GB	32 GB
OS	Windows 2012 R2	Windows 2012 R2
Software	IIS 8.5	SQL Server 2012

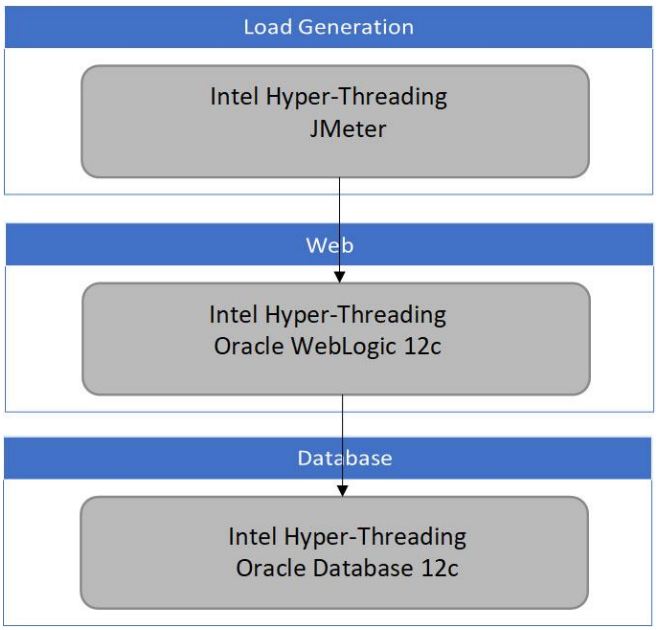


Figure 1. RateManager Machine Setup Example

Test Scenarios

During the test, 250 virtual users were allocated across several test cases as follows:

SCENARIO	NUMBER OF
Create New Calculated Variable	36
Create New Table Variable	35
Navigate Products & Program Listings	35
Navigate Program Element Listings	35
Login & Logout	35
Package/Deployment	37
Testing & Debugging	37

Tests were conducted across 60 minutes as well as 12 hours. Database size and rating logic complexity was consistent with a mid-tier insurance carrier.

Test Results

All tests were conducted successfully with no errors. Web and application server resource utilization peaked at 45 percent. Database processor utilization reached 90 percent at peak utilization.

Statistics are reported on a request-level basis, and rolled up to the page level. Request metrics define the average response time of each request from the browser to the application server. Page metrics bring together all of the response times for all requests conducted by a user on a single page view – this includes any AJAX style requests as well as any submission, and the initial loading of the page.

- Request Metrics: All response averages were below 0.6 second in all tests
- Page Metrics: All total response averages were below 1 second in all tests

SOFTRATER ENGINE TESTING

The SoftRater engine is deployed as a Web service. Rating requests are received, calculations executed and results returned. Testing was conducted using synchronous calls to the rating engine service. Tests were conducted across several environments in order to evaluate system scalability – that is, the product's ability to effectively utilize additional resources in order to support a higher volume of concurrent processing. The JMeter testing tool was utilized to deliver requests to the system, validate responses and measure response time.

Test Environments

Three environment configurations were utilized in testing the rating engine. Configurations are shown from smallest to largest. The first two configurations were achieved by separating the test environment into multiple zones.

All configurations utilized an operating system from Oracle, with Intel Hyper-Threading and quad processors of at least 2.53GHz. All configurations were deployed within standard testing servers.

All configurations utilized Oracle WebLogic 12c and an Oracle 12c database.

- Configuration 1: 4 processors, 32 GB RAM
- Configuration 2: 8 processors, 64 GB RAM
- Configuration 3: 16 processors, 128 GB RAM

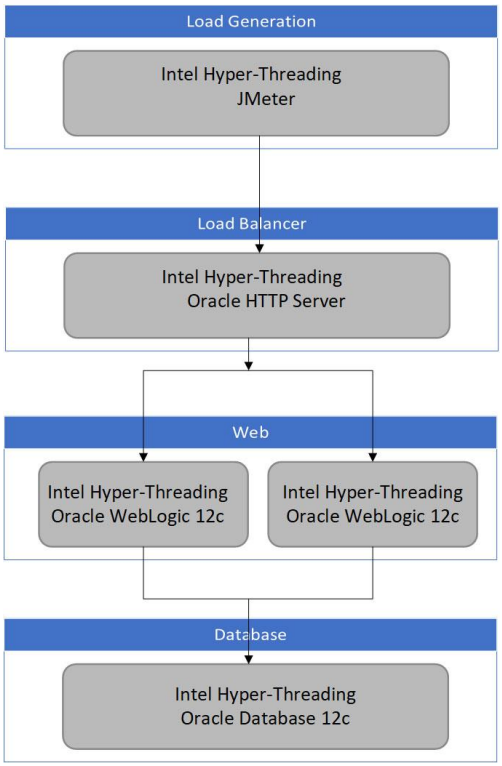


Figure 2. SoftRater Machine Setup Example.

Configurations 1 and 2 utilized virtualization. Configuration 3 did not use any virtualization technology. It is important to note that Configurations 1 and 2 were tested on the same server using two containers. Configuration 3 used two servers.

Database: Database utilization of the system processor was limited to 10 percent, simulating a shared-database environment.

Load Balancing: An HTTP server was deployed on the same server as the database, with load balancing via round-robin configuration.

Test Scenarios

For the test, 4 million unique service requests were generated. These test cases were as follows:

PRODUCT	TEST CASES
Personal Auto	1,000,000
Commercial Property	1,000,000
Medical Consumer	1,000,000

For additional products details, see appendix A. Database size and rating logic complexity was consistent with a mid-tier insurance carrier.

During each test, multiple JMeter instances were deployed with multiple threads organized into thread groups. Each thread group was allocated a particular set of test cases to execute, such that no test case would ever be executed by two threads at the same time and all test cases would be executed in sequence, maximizing the variety of load placed on the system at any given point in time. Once reaching the end of a sequence of messages, the thread group would then begin executing from the beginning and loop until halted manually.

Each test was executed for an hour. Ramp-up occurred during the first few minutes of processing. For each system configuration, four tests were executed – one test for each of the product categories – for a total of twelve independent tests.

Test Results

For each test, concurrent requests were ramped up to a point where application server resources were fully utilized (approximately 75 to 90 percent). Application server CPU was the limiting factor in all test scenarios, with the system scaling out to additional concurrent requests as processors were enabled.

The following table describes the number of concurrent requests processed by the system on a per-minute basis.

CONFIGURATION 1

PRODUCT	REQUESTS/MINUTE
Personal Auto	3,360
Commercial Property	4,980
Medical Consumer	14,040

CONFIGURATION 2

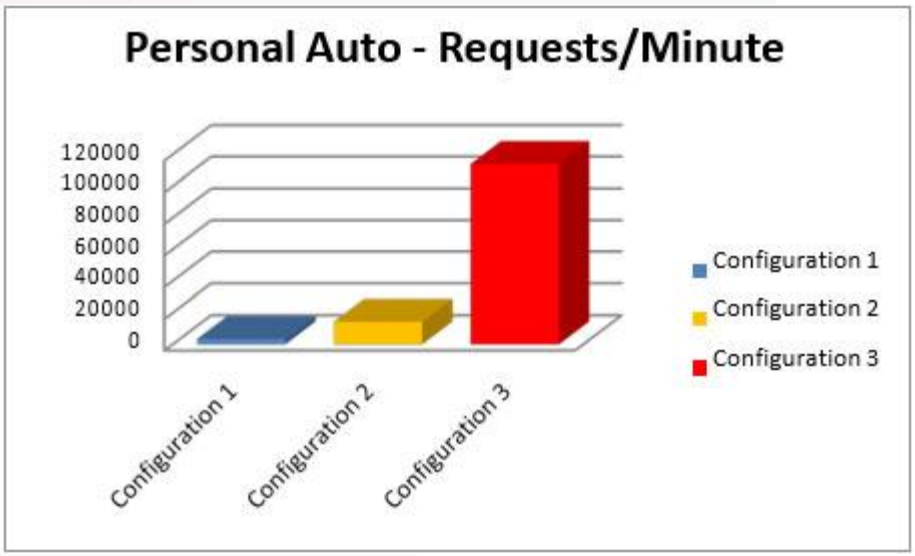
PRODUCT	REQUESTS/MINUTE
Personal Auto	14,220
Commercial Property	14,580
Medical Consumer	57,084

CONFIGURATION 3

PRODUCT	REQUESTS/MINUTE
Personal Auto	113,820
Commercial Property	99,186
Medical Consumer	515,340

Aggregate

The following graphic depicts the relative number of concurrent requests processed across configurations using Personal Auto as an example case.



The graphic illustrates the limiting factor in this test case, which was bandwidth. The addition of a separate dedicated server provided additional CPU as well as additional network bandwidth. Memory constraints were not a major factor in the test.

CONCLUSION

Oracle executed a set of load tests against both the RateManager Web application and SoftRater engine, components of the Oracle Insurance Insbridge Enterprise Rating product. All goals of the test were met. Oracle showed the RateManager application was able to serve 250 concurrent users performing a variety of operations on low cost, commodity hardware. Oracle also proved out system scalability of the SoftRater engine across a variety of typical product lines.

The throughput and scalability of Oracle Insurance Insbridge meets the needs of insurance companies today as well as the scalability necessary to enable future growth.

APPENDIX A

The final test database included 176 algorithms, 280 variables, and 197 tables over the three rating programs.

Personal Auto

HEURISTICS
Algorithms: 97
Underwriting Rules: 0
Variables: 203
Tables: 134
COVERAGES
Bodily Injury
Property Damage
Combined Single Limit Liability
Medical Payments
Personal Injury Protection
Uninsured Motorist Bodily Injury
Uninsured Motorist Property Damage
Uninsured Motorist Combined Single Limits Liability
Collision
Other than Collision (Comprehensive)
Replacement Cost
Auto Loan/Lease
Towing & Labor
Optional Limits Transportation Expense
Excess Sound Reproducing Equipment
Audio, Visual and Data Electronic Equipment
Tapes, Records, Discs and Other Media
TEST CASE PROFILES
of Drivers
High: 4
Mean: 2.10
Low: 1
of Vehicles
High: 9
Mean: 2.90

Low: 1
of Accidents/Violations Per Driver
High: 6
Mean: 2.38
Low: 0
of Coverages Per Vehicle
High: 14
Mean: 7.95
Low: 2

Commercial Property

HEURISTICS
Algorithms: 74
Underwriting Rules: 1
Variables: 64
Tables: 52
COVERAGES
Bodily Injury
Building
Contents (Personal Property)
Extra Expense
Personal Property of Others
Spoilage
Terrorism
TEST CASE PROFILES
of Locations
High: 5
Mean: 3.00
Low: 1
of Buildings Per Location
High: 5
Mean: 3.50
Low: 2
of Buildings Per Policy

High: 25
Mean: 10.50
Low: 2

Medical Consumer

HEURISTICS
Algorithms: 5
Underwriting Rules: 2
Variables: 13
Tables: 11
COVERAGES
Bodily Injury
Building
Contents (Personal Property)
Extra Expense
Personal Property of Others
Spoilage
Terrorism
TEST CASE PROFILES
of Members
High: 9
Mean: 4.60
Low: 1

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Integrated Cloud Applications & Platform Services

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