



RTI Performance Benchark

Calculating RTI Overhead

Konakart E-commerce Server (Tomcat/JSP/Struts)

Table of Contents

- Test Overview 3
 - Application under Test:..... 4
 - Test Goals..... 5
 - Test Environment 5
 - Test Methodology 6
- Test Results 7
 - Response Time 7
 - Throughput 8
 - Transaction Throughput (kb/sec) 8
 - CPU Utilization, Disk Writes, Network I/O 8
- Summary..... 9

Test Overview

What: To calculate and publish the performance overhead of RTI— www.rtiperformance.com – using an uncontrived 3rd party, real-world example, with real production loads.

Why: Because the number one question we hear is - “what is the overhead of RTI?” Which is then quickly followed by the number two question - “can I run it in production?” The short answer is, the overhead is very small, around 1.5%, and of course you can run it in production; what is the value of a performance monitoring solution that can’t be run in production? In case you want to bypass the details, [click here](#) to skip straight to the test results.

How: We’ve chosen an industry standard e-commerce application - Konakart (<http://www.konakart.com>). We didn’t develop the application, it’s not contrived in any way, and we didn’t tune RTI for the tests. In fact, we outsourced the LoadRunner performance script development and test execution to a 3rd party, with simple instructions: install RTI, don’t touch anything, and report the results without modifying, tuning, configuring or otherwise tampering with any aspect of the product.

Application under Test:

The Konakart application uses Sun Java 1.6, Tomcat Servlet Container, and a MySQL Database. The application uses a standard JSP/Struts based web programming stack. The architecture of the application is shown in Fig 1

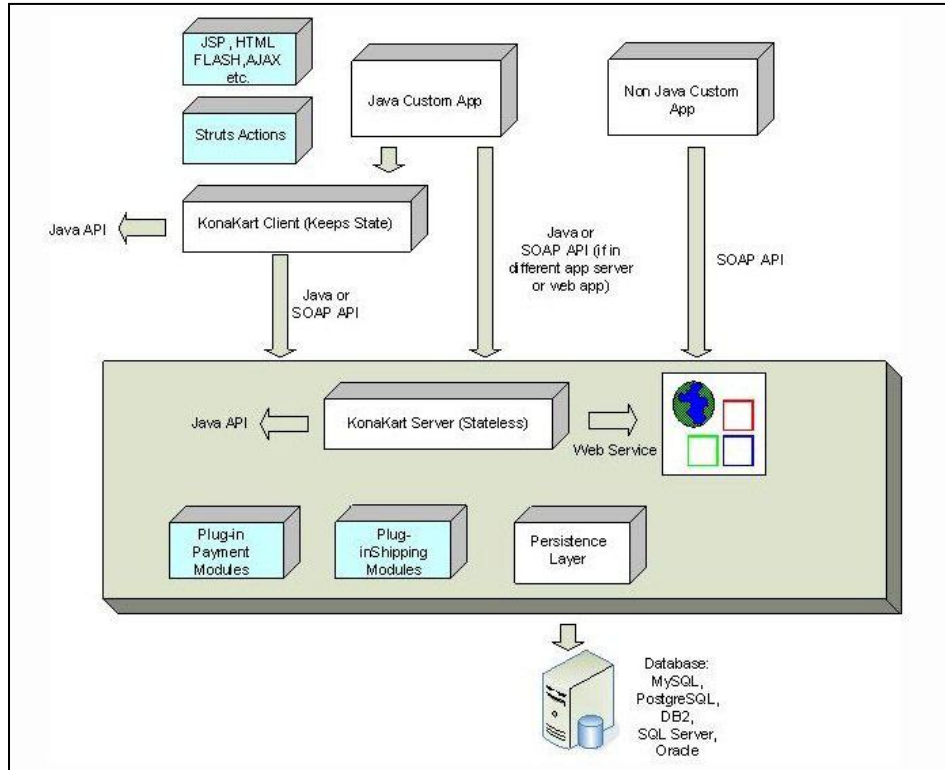


Fig.1 Konakart application architecture

Test Goals

The goals of the benchmark tests are to measure the following attributes of the RTI application

- **Response Time overhead**
- **Throughput overhead**
- **CPU, Network I/O and Disk I/O overhead**

Test Environment

Three machines were used to set up the test environment.

- Intel Xeon *Intel Xeon 2.8GHz CPU and 4 GB RAM* (Machine 1 and 2)
 - Machine 1: Tomcat Application Server (REDHAT Linux)
 - Machine 2: MySQL Database (UBUNTU linux)
- Windows XP, 3.0 GHz and 4 GB RAM
 - Machine 3: HP LoadRunner

Fig 2 below shows how LoadRunner works

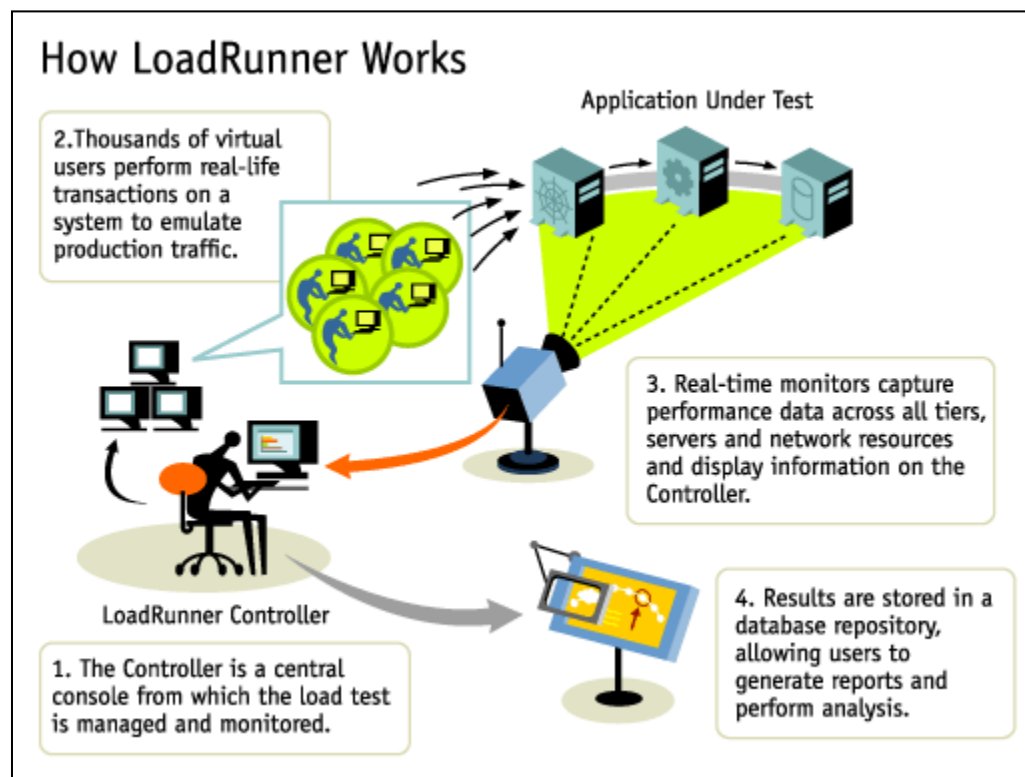


Fig. 2 LoadRunner set-up

Test Methodology

- The performance tests were done by using LoadRunner to generate load.
- LR script, that captured all the possible events/scenarios within the Konakart application, was created
- A load of 120 users (to simulate 120K requests per hour) was generated
- A ramp-up and ramp-down of 40 users per 20 seconds was set in the LR controller
- To measure the overhead of RTI, the tests were run for 4 hours 'with' and 'without RTI'

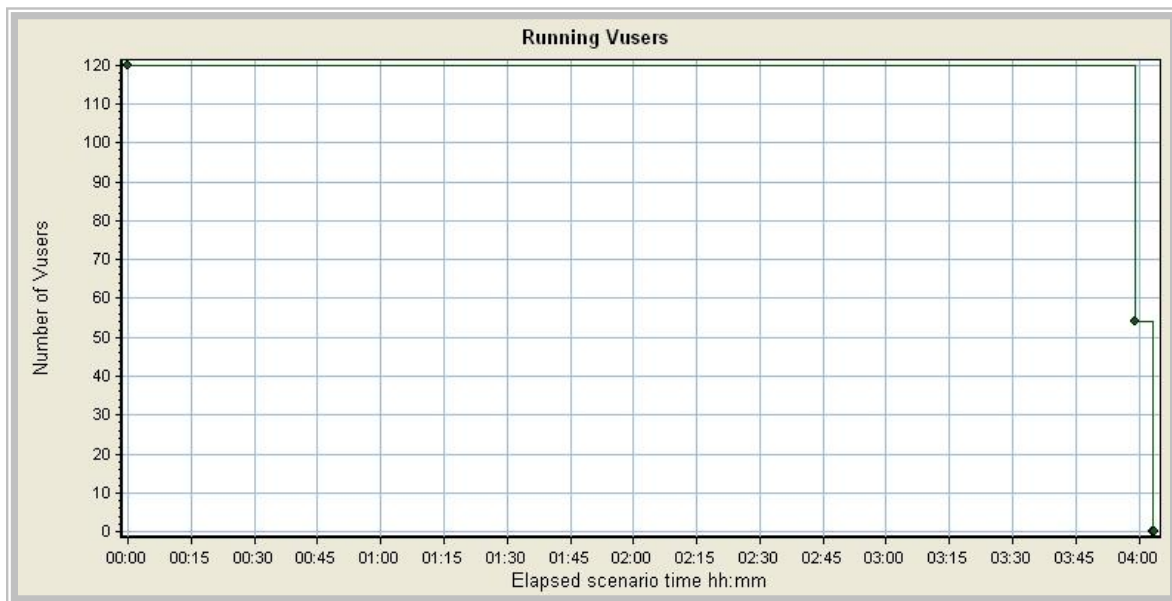


Fig 3. Number of V-users that executed V-user scripts, and their status, during each second of a load test

Test Results

Response Time

The Response Time test measures RTI's impact on application response time. On average, with RTI monitoring enabled, application response times increased by **1.24%** over a period of 4 hours.

Transaction Name	SLA Status	Minimum	Average	Maximum	Std. Deviation	90 Percent
Action_Transaction	🟢	472.297	535.324	539.484	5.773	536.688
AddToCartSubmit_do	🟢	0.172	0.232	1.469	0.078	0.297
EditCartSubmit_do	🟢	0.359	0.566	2.719	0.209	0.797
login_do	🟢	0	0.036	0.938	0.036	0.063
LoginSubmit_do	🟢	0.453	0.748	4.078	0.277	1.078
LogOut_do	🟢	0.016	0.073	1.031	0.053	0.125
QuickSearch_do	🟢	0.031	0.098	1.125	0.064	0.172
Selectcat_do	🟢	0.094	0.17	1.547	0.076	0.266
SelectProd_do	🟢	0.344	0.495	1.797	0.141	0.656
ShowCartItems_do	🟢	0.234	0.383	3.469	0.166	0.563
ShowRandomReviewDetails_do	🟢	0.047	0.114	3.094	0.083	0.203
ShowReviews_do	🟢	0.094	0.203	1.609	0.117	0.328
ShowSearchByManufacturerResults_do	🟢	0.063	0.136	3.125	0.09	0.234
vuser_end_Transaction	🟢	0	0	0	0	0
vuser_init_Transaction	🟢	0	0	0.016	0.002	0
Welcome_do	🟢	0.188	0.271	3.219	0.096	0.359

Fig. 4 - Response Time without RTI

Transaction Name	SLA Status	Minimum	Average	Maximum	Std. Deviation	90 Percent
Action_Transaction	🟢	533.125	537.034	551.891	2.821	539.953
AddToCartSubmit_do	🟢	0.031	0.132	1.234	0.107	0.297
EditCartSubmit_do	🟢	0.156	0.581	3.125	0.368	1.063
login_do	🟢	0	0.047	1.172	0.066	0.125
LoginSubmit_do	🟢	0.203	1.65	9.953	1.407	3.281
LogOut_do	🟢	0.016	0.082	1.063	0.097	0.203
QuickSearch_do	🟢	0.016	0.096	0.422	0.086	0.234
Selectcat_do	🟢	0.047	0.336	3.047	0.3	0.641
SelectProd_do	🟢	0.109	0.836	6.547	0.778	1.641
ShowCartItems_do	🟢	0.109	0.381	2.531	0.292	0.703
ShowRandomReviewDetails_do	🟢	0.016	0.1	0.75	0.091	0.25
ShowReviews_do	🟢	0.047	0.171	2.719	0.203	0.344
ShowSearchByManufacturerResults_do	🟢	0.031	0.117	2.891	0.113	0.297
vuser_end_Transaction	🟢	0	0	0	0	0
vuser_init_Transaction	🟢	0	0	0.001	0	0.001
Welcome_do	🟢	0.047	0.212	3.226	0.414	0.344

Fig. 5- Response Time with RTI Enabled

Measured overhead on response time (90% line) for a period of 4 hrs = 1.24%

Throughput

The throughput test measures the total data throughput over the 4 hour period first without, and then with RTI. With RTI, application throughput decreased by **0.25%** over the test period. The graph on the right appears to show increased performance with RTI, however this is an artifact of the LoadRunner reports and a difference in chart scaling.

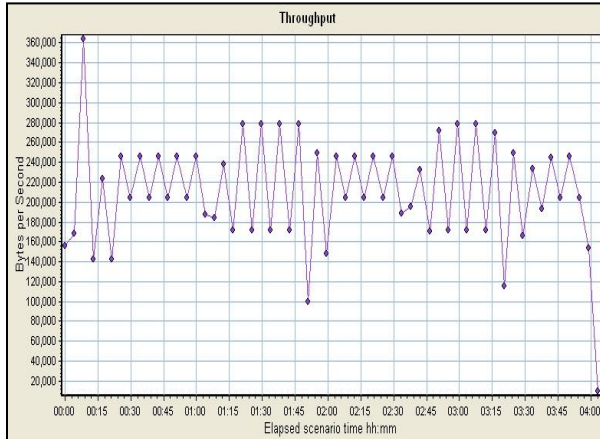


Fig. 6- Throughput without RTI

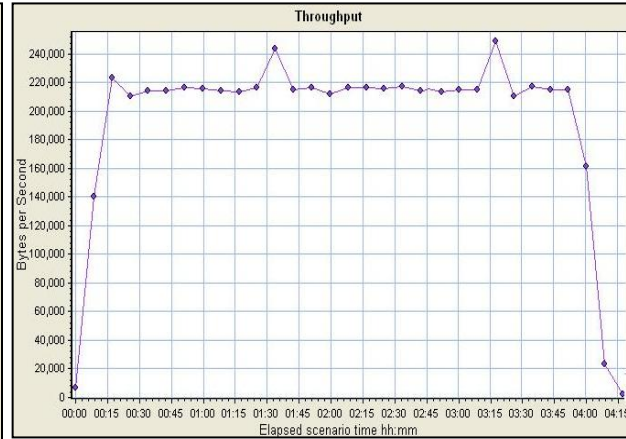


Fig. 7 -Throughput with RTI Enabled

Transaction Throughput (kb/sec)

Transaction Name	KB/sec
AddToCartSubmit_do	8.780453258
EditCartSubmit_do	29.56713881
login_do	7.558810198
LoginSubmit_do	9.533844193
LogOut_do	6.726628895
QuickSearch_do	7.658330793
Selectcat_do	47.94560907
SelectProd_do	36.53541076
ShowCartItems_do	16.30623229
ShowRandomReviewDetails_do	9.215014164
ShowReviews_do	17.07893768
ShowSearchByManufacturerResults_do	9.780736544
Welcome_do	12.55297745

Fig. 8- Throughput without RTI

Transaction Name	KB/sec
AddToCartSubmit_do	8.700453151
EditCartSubmit_do	29.51799713
login_do	7.502896734
LoginSubmit_do	9.508745322
LogOut_do	6.708194578
QuickSearch_do	7.613990293
Selectcat_do	47.89787659
SelectProd_do	36.50965242
ShowCartItems_do	16.28890852
ShowRandomReviewDetails_do	9.191905174
ShowReviews_do	17.01954377
ShowSearchByManufacturerResults_do	9.710098035
Welcome_do	12.50880346

Fig. 9 -Throughput with RTI Enabled

The average throughput without RTI was 219.24 Kb/sec and with RTI enabled was 218.679 Kb/sec for a period of 4 hours i.e. a decrease of 0.25%

CPU Utilization, Disk Writes, Network I/O

	CPU Utilization %	Disk writes Kb/s	Network In - Mb/Sec	Network Out - Mb/sec
Without RTI	18.74	47.39	1.2386	1.8345
With RTI	22.19	48.25	1.2531	1.8525

CPU, Network I/O & Disk I/O

Summary

Under a full load – 120 users executing 120k requests per hour - the overhead of RTI performance monitoring across the below application and system measurement points is minimal; approximately 1.48% overhead averaged across the measurements below.

Measurement	Overhead
Response Time Overhead	1.24 %
Throughput Decrease	0.25 %
CPU Utilization Increase	3.45 %
Network Reads Increase	1.17 %
Network Writes Increase	0.98 %
Disk Writes Increase	1.81 %
Total (average)	1.48%

With less than 1.5% overhead, an organization can gain valuable performance insight and management capabilities including:

- Visibility into their application throughput and performance
- Proactive performance alerting
- Transaction profiling and method-level diagnostic