

Load Test Tools Evaluation

Abraham Jacob
jacobv@Softhome.net

Riyaj Shaik

Paul Tennis
paultennis@Softhome.net

March 5, 2002

© Copyright 2002



Note to Viewers

- ❖ The following presentation was put together as part of an evaluation of load test tools for a web based application project.
- ❖ Although there are many documents put out by the software vendors, we were surprised to find very few comprehensive independent surveys of load test tools.
- ❖ Information for this presentation was gleaned from many sources including user groups, software vendors, published articles, vendor demonstrations and actually using demonstration copies of several load test tools.
- ❖ Unless noted otherwise, the content of this presentation is our own. The opinions contained herein are our own and do not represent the opinion of a particular company or organization.
- ❖ We hope you find this presentation useful in your own evaluation of load test tools.
- ❖ Comments and feedback are welcome.



I. Introduction

❖ **Automation:**

- Use of test tools
- Can help test team to repeat test scenarios

❖ **Why automate?:**

- Some test scenarios like stress and load are difficult to simulate manually
- Improved accuracy, time savings, ability to repeat scenarios when changes are made

❖ **Expectations:**

- Doesn't eliminate the need for testers
- Requires time to develop scripts and scenarios



II. Types of Testing

- ❖ **Functional / Unit Testing**
- ❖ **Integration / System Testing**
- ❖ **Regression Testing**
- ❖ **Performance / Load Testing**
- ❖ **Acceptance / Installation Testing**
- ❖ **Documentation Testing**



III. Performance Testing

- ❖ Performance testing is a critical component of the entire testing process.
- ❖ Performance Testing determines the actual operational boundaries and will simulate the real world use of the application
- ❖ Performance Testing can be divided into:
 - Load Testing
 - Stress Testing
 - Scalability Testing

IV. Load Testing

- ❖ Load testing determines the system's behavior under various workloads.
- ❖ Objective is to determine how system's components react as the workloads are gradually increased.
- ❖ Usual outcome is the determination of system performance. For example:
 - Throughput
 - Response Time
 - CPU Load
 - Memory Usage



IV. Load Testing (cont.)

❖ **Load Testing**

- *The process of analyzing software applications and supporting infrastructure to determine acceptable performance, scalability, capacity and transaction handling capabilities by modeling real-world application usage conditions and executing them against the application and supporting infrastructure under test.*



V. Stress Testing

- ❖ Determines the breaking point or unacceptable performance point of a system to reveal the maximum service level it can achieve.



VI. Scalability Testing

- ❖ Scalability testing evaluates the effects of adding additional hardware and/or software to distribute “work” among system components.
- ❖ Tests can be performed in a variety of configurations, with such variables as network speed, number and type of servers/CPU's, memory, etc.
- ❖ Application of increasing workloads can determine overall flexibility and ability to scale for workload growth.



VII. Our Requirements

- ❖ Simulate 300 users using web application simultaneously
- ❖ Determine acceptable performance under simulated conditions
 - < 5 seconds to retrieve a page at 56K
- ❖ Determine the bottlenecks and limits of the application
 - Current architecture presents another layer of complexity
- ❖ Stress the application to see where it breaks



VIII. *Evaluation Considerations*

❖ Scripting

Scripts represent recorded user actions issued by a browser to a web application during a web session. They are created by passing HTTP/S traffic through a proxy server, then encoding the recorded data, which can be edited later for use in creating different scenarios.

– Key features

- ◆ Record and Playback
- ◆ Ability to recognize web page components
 - (tables, links, drop down menus, radio buttons)
- ◆ Data Functions
 - ability to use data from a text file to fill in forms
- ◆ Language



IX. Evaluation Considerations (cont.)

❖ Load Scenario Creation

Ability to define custom load scenarios, including number of virtual users, the scripts being executed, the speed of end-user connection and browser type, and the ramp-up profile. In some instances, scenarios can be modified "on the fly" to create "what if" scenarios.

– Key features

- ◆ Virtual user creation and support
- ◆ Weighting virtual users
- ◆ Adjust virtual user access speed
- ◆ Ability to combine scripts to create a scenario(s)



IX. Evaluation Considerations (cont.)

❖ Load Test Feedback

The ability of an application to monitor and display results of the load test sessions on a real-time basis.

– Key features

- ◆ Test error recovery
- ◆ Alert notification
- ◆ Feedback parameter coverage



IX. Evaluation Considerations (cont.)

❖ Reporting

Performance data can be accumulated at varying levels of granularity including profiles, scripts, individual pages, frames, and objects on pages. Reports may provide various graphs and data tables, and may also be able to export data to external programs, such as Excel, for further analysis.

– Key features

- ◆ Variety of reports
- ◆ Depth of reports - ability to drill down to a problem
- ◆ Ability to easily export test results



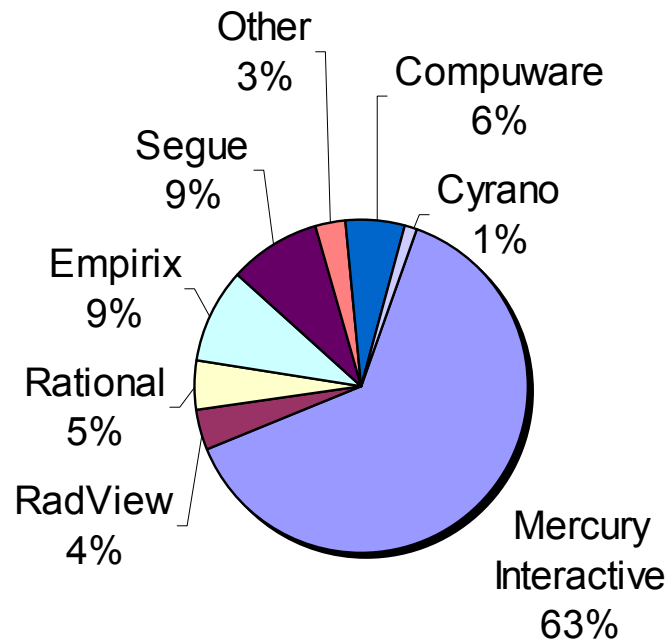
X. Load Testing Tools

Normalized
Cost Scale

- ❖ Microsoft's Web Application Stress Tool0
- ❖ Cyrano's OpenSTA1
- ❖ Quest Software's Benchmark Factory4
- ❖ Empirix's E-Test Suite 6.0.....6
- ❖ RadView's WebLoad 5.07
- ❖ Rational Software's Rational Robot7*
- ❖ Mercury Interactive's Astra LoadTest 5.48
- ❖ Compuware's QA Load 4.710
- ❖ Segue Software's SilkPerformer 5.010+

* Leased virtual users

XI. Load Test Tools Marketplace



Worldwide Load Testing Tool Market Share - Web Environments, 2000
Newport Group, Inc. *Annual Load Test Market Summary and Analysis*



Microsoft's

Web Application Stress Tool

<http://webtool.rte.microsoft.com/>

Rankings (1-5, 5 = Best)

- ❖ Scripting 1 Load Test Scenario Creation 1
- ❖ Load Test Feedback 2 Reporting 2

- ❖ Pros:
- ❖ Cons:
- ❖ Bottom Line:
 - **Evaluation stopped due to poor scripting and scenario creation abilities.**
- ❖ Pricing:
 - Free

The logo for Cyrano's OpenSTA is a blue diamond shape with a white border, containing the text 'Cyrano's OpenSTA' in a yellow, serif font. Below the diamond, the URL 'http://www.opensta.com' is written in a smaller, yellow, sans-serif font.

Cyrano's OpenSTA

<http://www.opensta.com>

Rankings (1-5, 5 = Best)

- ❖ Scripting 3 Load Test Scenario Creation 2
- ❖ Load Test Feedback 2 Reporting 2

- ❖ Pros: Price
- ❖ Cons: Unique scripting language but accessible with programming background. Poor reporting capability. Even though the tool is free, documentation and technical support are an additional cost.
- ❖ Bottom Line: A free test tool which performs basic load testing. Customizing scripts requires programming background.
- ❖ Pricing:
 - OpenSTA is free
 - OpenSTA user documentation \$100 (quote from web site)
 - OpenSTA support (10 incidents) is \$1500 (quote from web site)


Quest Software's Benchmark Factory

http://www.quest.com/benchmark_factory/

Rankings (1-5, 5 = Best)

- ❖ Scripting 4 Load Test Scenario Creation 4
- ❖ Load Test Feedback 3 Reporting 4

- ❖ Pros: Easy script creation and editing. Excellent results reporting and analysis; many options for virtual clients. Funnel Web tool helps create scripts from server log file.
- ❖ Cons: Limited feedback during tests, no ability to select virtual user access speed (but can throttle user speed). Tool not well established in marketplace.
- ❖ Bottom Line: Good performance testing tool, aimed at testing web databases rather than web applications
- ❖ Pricing:
 - \$13,200 for 300 virtual users, \$15,400 for 500 virtual users (quote)
 - \$552 for each additional group of 50 virtual users (quote)
 - \$731 for FunnelWeb tool (quote)



Empirix's E-Test Suite 6.0

<http://www.empirix.com/Empirix/Web+Test+Monitoring/testing+solutions/integrated+web+testing.html>

Rankings (1-5, 5 = Best)

- ❖ Scripting 5 Load Test Scenario Creation 3
- ❖ Load Test Feedback 3 Reporting 3

- ❖ Pros: Very good script creation, editing of scripts in Visual Basic available, but not necessary
- ❖ Cons: Difficult to get data from reports interface; limited feedback during load tests
- ❖ Bottom Line: Good tool for real time monitoring and load testing, easy setup
- ❖ Pricing: Company will price match RadView
 - \$28,000 for 500 virtual users (quote)



RadView's WebLoad 5.0

<http://www.radview.com/products/Webload.asp>

Rankings (1-5, 5 = Best)

- ❖ Scripting 3 Load Test Scenario Creation 4
- ❖ Load Test Feedback 5 Reporting 3

- ❖ Pros: Unique goal oriented testing features; good results feedback during tests. Several positive posting on QAForums web site from users about product support. Supports JavaScript for scripting language
- ❖ Cons: Limited analysis in reports; overly complex user interface, advanced JavaScript knowledge needed to edit scripts
- ❖ Bottom Line: Unique testing features and the ability to manage tests in progress make this product a suitable choice. Advanced JavaScript as a scripting language effects the learning curve making it a little steep. Reports could be more in-depth.
- ❖ Pricing:
 - \$28,314 for 300 virtual users (quote)
 - \$37,754 for 500 virtual users (quote)



Rational Software's Rational Robot

<http://www.rational.com>

- ❖ **Rankings (1-5, 5 = Best)**
- ❖ Scripting 4 Load Test Scenario Creation 4
- ❖ Load Test Feedback 3 Reporting 4

- ❖ Pros: Economical, good extensible language, good data creation facilities, good online community
- ❖ Cons: Weak tech support,
- ❖ Bottom Line: Very easy product to understand out of the box. Ability to record test scripts from the GUI and edit using SQA Basic (similar to Visual Basic)
- ❖ Pricing:
 - \$30,000 for 300 virtual users (quote)
 - \$36,000 for 500 virtual users (quote)
 - Option to lease virtual users for 30, 60 and 90 days
 - ◆ \$11,880 to lease 300 users for 90 days (quote)

Mercury Interactive's Astra LoadTest 5.4

<http://www-heva.mercuryinteractive.com>

Rankings (1-5, 5 = Best)

- ❖ Scripting 4 Load Test Scenario Creation 4
- ❖ Load Test Feedback 4 Reporting 3

- ❖ Pros: Real time test monitoring feature; flexible virtual client options, very popular tool, good support, good online community
- ❖ Cons: Script recorder has trouble with some pages; difficult to dig deeply into report data, cost, no Java support out of the box
- ❖ Bottom Line: Good tool for real time monitoring and load testing.
- ❖ Pricing:
 - \$18,000 for 100 virtual users (Estimate)
 - \$30,000 for 250 virtual users (Estimate)



Compuware's QA Load 4.7

<http://www.compuware.com/products/qacenter/qaload/>

Rankings (1-5, 5 = Best)

- ❖ Scripting 4 Load Test Scenario Creation 4
- ❖ Load Test Feedback 5 Reporting 4

- ❖ Pros: Real time test feedback, good reports and analysis, good integration with development products
- ❖ Cons: Developer oriented tool, Visual C++ required to compile test scripts, high price
- ❖ Bottom Line: Expensive but very strong all-around tool
- ❖ Pricing:
 - \$33,000 for 100 virtual users (Estimate)
 - \$99,000 for 1,000 virtual users (Estimate)



Segue Software's SilkPerformer 5.0

http://www.segue.com/html/s_solutions/s_performer/s_performer.htm

Rankings (1-5, 5 = Best)

- ❖ Scripting 4 Load Test Scenario Creation 4
- ❖ Load Test Feedback 4 Reporting 3

- ❖ Pros: Very intuitive and capable user interface; good script creation and editing, good development language, good online community
- ❖ Cons: Limited results feedback during tests; reports difficult to pull data from, expensive
- ❖ Bottom Line: Excellent user interface and generally good features make SilkPerformer a solid choice especially for testers not from the developer side
- ❖ Pricing:
 - \$50,000 for 100 virtual users which can be used multiple times (Estimate)
 - \$18,000 for 5,000 virtual users which can each be used only once (Estimate)



Web Performance Testing Scorecard

	<i>Normalized Cost</i>	<i>Company Name</i>	<i>Scripting</i>	<i>Load test scenario creation</i>	<i>Load test feedback</i>	<i>Reporting</i>	<i>Total</i>
0	Web Application Stress Tool	<i>Microsoft</i>	1	1	2	2	6
1	Open STA	<i>Cyrano</i>	3	2	2	2	9
4	Benchmark Factory	<i>Quest Software</i>	4	4	3	4	15
6	E-Test Suite	<i>Empirix</i>	5	3	3	3	14
7	WebLoad	<i>RadView</i>	3	4	5	3	15
7*	Rational Robot	<i>Rational</i>	4	4	3	4	15
8	Astra LoadTest	<i>Mercury</i>	4	4	4	3	15
10	QALoad	<i>Compuware</i>	4	4	5	4	17
10+	SilkPerformer	<i>Segue</i>	4	4	4	3	15

* Leased virtual users

XIII. Evaluation Considerations Checklist

- ❖ **Script Recording and Playback**
 - Similar to recording a Word or Access macro?
 - How easy is it to understand and edit the script?
 - Does tool recognize objects?
- ❖ **Web Testing**
 - Native support of HTML tables, frames, browser platforms, site maps, links?
- ❖ **Database Tests**
 - Support for SQL? ODBC?
 - Ability to supply input variables?
- ❖ **Data Functions**
 - Can data types be specified, generated automatically?
- ❖ **Object Mapping**
 - Support for standard controls methods, custom objects?

XII. Evaluation Considerations

Checklist (cont.)

- ❖ **Test/Error Recovery**
 - How does the tool recover from errors/error messages? Are errors captured?
- ❖ **Object Name Map**
 - Is there a central repository to store object identities?
 - Can object names be changed in a single place?
- ❖ **Object Identity Tool**
 - Provide details of object ID's and properties
- ❖ **Extensible Language**
 - Support for language extension
- ❖ **Environment Support**
 - Does tool support our release of Java, Oracle etc.?
- ❖ **Integration**
 - Does the tool work with Word, Excel?
- ❖ **Cost**
 - Initial cost, yearly licensing fees, tech support, virtual users

XII. Evaluation Considerations

Checklist (cont.)

- ❖ **Ease of Use**
 - Is training needed?
 - How easy is software to get running out of the box?
- ❖ **Technical Support**
 - How good is technical support?
 - Does the company charge for support calls?



XIII. Conclusions

- ❖ A number of test tools are available having similar features.
- ❖ Pricing is very fluid and determined by number of virtual users.
- ❖ If little to no funding available, OpenSTA provides some utility, but with significant drawbacks
 - It requires programming background to understand scripting language.
 - The low cost will be partially offset by the need to dedicate programming staff to script creation.
 - Feedback reporting is also deficient.
- ❖ Several “midrange” tools offer comparable functionality
 - Quest’s Benchmark Factory appears to be most cost effective “midrange” tool but has significant market risk.
 - Rational Robot may offer most competitive/functional solution if we are willing to “lease” virtual users for only 90 days.
- ❖ All tools require some training