ColdFusion Performance Testing and Tuning

By Charlie Arehart
CTO/Founder Syste*M*anage
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Session Overview

- Introduction to Load Testing Web Applications
- Creating a Real-World ColdFusion Test
- Identifying Common Performance Bottlenecks and Tuning Opportunities
  - CF, Database, Admin, Architecture, and more
- Load Testing Best Practices
- Resources for Learning More
- Questions & Answers

Audience

- Who should be interested in Load Testing?
  - Know you need to test
  - Know you ought to test
  - Don't think you need to bother testing
  - Have never even considered testing
- In other words, all web application developers
  - You may have reasons to have dismissed it
  - Many common challenges have been overcome

Why Should I Care?

- Even if your application doesn't expect high load
  - Do you know how it will perform under light load?
  - Do you know how some programming change you've made will perform under current production load?
  - Have you wondered what the impact would be of some change in programming or configuration?

The Cold Facts

- Most developers are familiar with the "concept" of load testing, but very few actually do it!
- Most common reasons for not testing are Time, Complexity & Cost (can be very expen$ive)
- Most sites run into performance problems with only a few users (you don't have to be ToysRUs)
- Most performance problems are discovered too late in the game to properly address the issues

What does it mean for your site to perform or scale well?

- Delivers page views to users in 3-8 seconds or less (varying industry standards)
- Performs consistently throughout a visitor's session
- Response times scale linearly as user load increases as opposed to exponentially

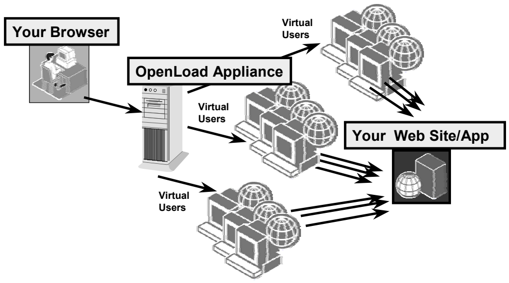
What is a Load Test?

- Simulates multiple users to measure, define, validate and maintain optimal application performance, scalability and reliability
- Serves as a compass for understanding the limits of any Web-enabled application and, subsequently, for managing its performance and growth

Virtual User Simulation

- You don’t need to gather users together to do a test!
- Load testing tools can create “virtual users”

OpenLOAD™



Load Testing over the LAN vs. the Internet

LAN Testing:

- Eliminates network variability due to the Internet
- Saturates system rather than the network

Internet Testing:

- Uncovers hidden delays due to Internet “weather”
- Exercises your pipe, routers, firewalls and load balancers in addition to the system under test
- Ensures Service Providers are meeting SLAs

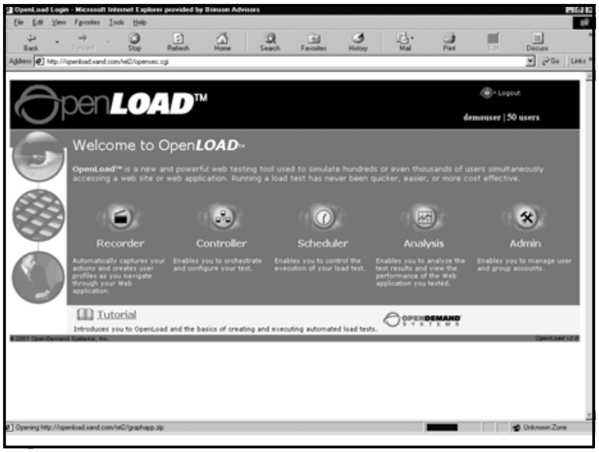
Creating a Real-World Example in ColdFusion

Customer Case Study:

- Set up a User Profile
- Configure a Load Test Scenario
- Schedule a Load Test
- Analyze Test Results

Step 1: Recorder

- Setup a “User Profile”
  - This describes how a user might browse through your site
  - Literally, like turning on a VCR, you’ll record your steps through the site
    - Record/stop/pause/resume
    - No scripting required!


OpenLoad Login - Microsoft Internet Explorer provided by Brinson Advisors
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss
Address
Go Links
OpenLOAD™
Logout
demouser | 50 users
Opening http://openload.xand.com/hel2/graphapp.zip
Unknown Zone

http://openload.xand.com/hel2/opensec.cgi

Welcome to OpenLOAD™

OpenLoad™ is a new and powerful web testing tool used to simulate hundreds or even thousands of users simultaneously accessing a web site or web application. Running a load test has never been quicker, easier, or more cost effective.

Recorder	Controller	Scheduler	Analysis	Admin
Automatically captures your actions and creates user profiles as you navigate through your Web application.	Enables you to orchestrate and configure your test.	Enables you to control the execution of your load test.	Enables you to analyze the test results and view the performance of the Web application you tested.	Enables you to manage user and group accounts.

Tutorial

Introduces you to OpenLoad and the basics of creating and executing automated load tests.

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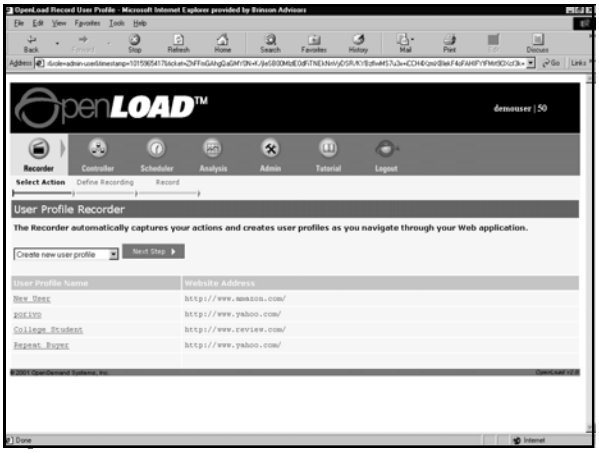
OpenLoad Record User Profile - Microsoft Internet Explorer provided by Brinson Advisors
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Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss
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Go Links
OpenLOAD™
demouser | 50
Recorder
Controller
Scheduler
Analysis
Admin
Tutorial
Logout
Select Action
Define Recording
Record
Next Step
Done
Internet

User Profile Recorder

The Recorder automatically captures your actions and creates user profiles as you navigate through your Web application.

Create new user profile

User Profile Name	Website Address
New User	http://www.amazon.com/
porivo	http://www.yahoo.com/
College Student	http://www.review.com/
Repeat Buyer	http://www.yahoo.com/

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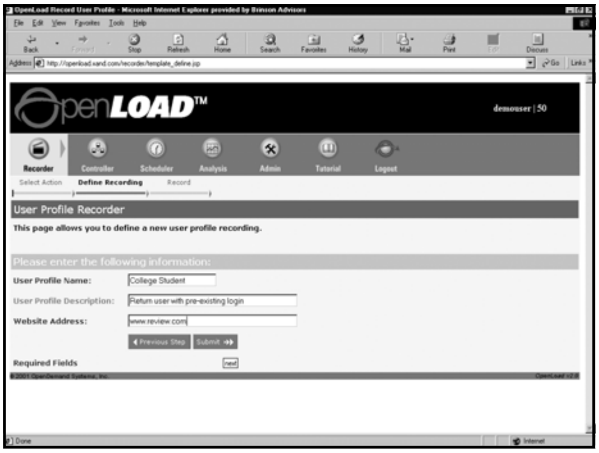
OpenLoad Record User Profile - Microsoft Internet Explorer provided by Brinson Advisors
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss
Address
Go Links
OpenLOAD™
demouser | 50
Recorder
Controller
Scheduler
Analysis
Admin
Tutorial
Logout
Select Action
Define Recording
Record
Previous Step
Submit
next
Done
Internet

http://openload.xand.com/recorder/template_define.jsp

User Profile Recorder

This page allows you to define a new user profile recording.

Please enter the following information:

User Profile Name: College Student

User Profile Description: Return user with pre-existing login

Website Address: www.review.com

Required Fields

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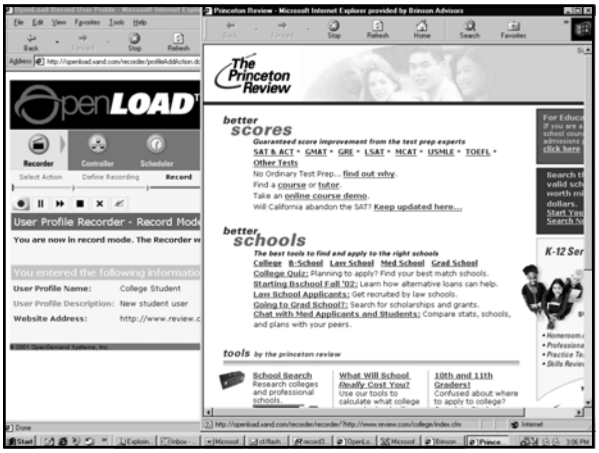
OpenLoad Record User Profile - Microsoft Internet Explo
File Edit View Favorites Tools Help
Back Forward Stop Refresh
Address
OpenLOAD
Recorder
Controller
Scheduler
Select Action
Define Recording
Record
Princeton Review - Microsoft Internet Explorer provided by Brinson Advisors
Back Forward Stop Refresh Home Search Favorites
The Princeton Review
For Educa
If you are a school coun admissions
click here
Search th valid sch worth mi dollars.
Start You Search N
K-12 Ser
Homeroom.
Professiona
Practice Te
Skills Revie
Done
Start
Explorin
Inbox -
Microsof
cl/flash
record3
OpenLo
Microsof
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Prince
3:06 PM
Internet

http://openload.xand.com/recorder/profileAddAction.dc

User Profile Recorder - Record Mode

You are now in record mode. The Recorder w

You entered the following informatio

User Profile Name: College Student

User Profile Description: New student user

Website Address: http://www.review.c

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The best tools to find and apply to the right schools

College B-School Law School Med School Grad School

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Starting Bschool Fall '02: Learn how alternative loans can help.

Law School Applicants: Get recruited by law schools.

Going to Grad School?: Search for scholarships and grants.

Chat with Med Applicants and Students: Compare stats, schools, and plans with your peers.

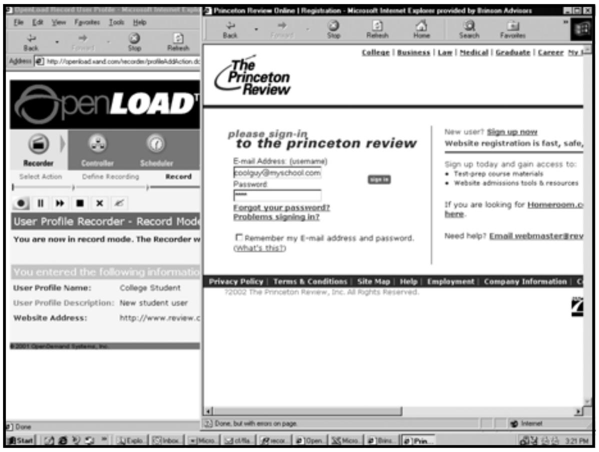
tools by the princeton review

School Search Research colleges and professional schools.

What Will School Really Cost You? Use our tools to calculate what college

10th and 11th Graders! Confused about where to apply to college?

http://openload.xand.com/recorder/recorder/?http://www.review.com/college/index.cfm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File Edit View Favorites Tools Help
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Back Forward Stop Refresh Home Search Favorites
The Princeton Review
College | Business | Law | Medical | Graduate | Career | My
sign in
Privacy Policy | Terms & Conditions | Site Map | Help | Employment | Company Information | C
Done
Done, but with errors on page.
Internet
Start
Explo
Inbox
Micro
cl/fla
recor
Open
Micro
Brins
Prin
3:21 PM

http://openload.xand.com/recorder/profileAddAction.dc

User Profile Recorder - Record Mode

You are now in record mode. The Recorder w

You entered the following informatio

User Profile Name: College Student

User Profile Description: New student user

Website Address: http://www.review.c

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please sign-in to the princeton review

E-mail Address: (username) coolguy@myschool.com

Password: ****

Forgot your password?

Problems signing in?

☐ Remember my E-mail address and password. (What's this?)

New user? Sign up now

Website registration is fast, safe,

Sign up today and gain access to:

- Test-prep course materials
- Website admissions tools & resources

If you are looking for Homeroom.c here.

Need help? Email webmaster@rev

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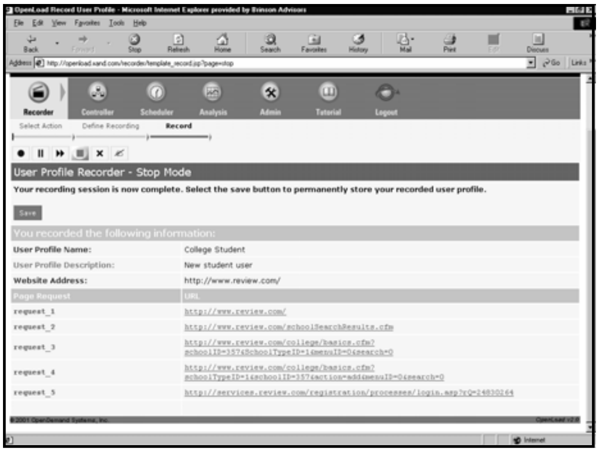
OpenLoad Record User Profile - Microsoft Internet Explorer provided by Brinson Advisors
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss
Address
Go Links
Recorder
Controller
Scheduler
Analysis
Admin
Tutorial
Logout
Select Action
Define Recording
Record
Save
Internet

http://openload.xand.com/recorder/template_record.jsp?page=stop

User Profile Recorder - Stop Mode

Your recording session is now complete. Select the save button to permanently store your recorded user profile.

You recorded the following information:

User Profile Name:	College Student
User Profile Description:	New student user
Website Address:	http://www.review.com/

Page Request	URL
request_1	http://www.review.com/
request_2	http://www.review.com/schoolSearchResults.cfm
request_3	http://www.review.com/college/basics.cfm?schoolID=357&SchoolTypeID=1&menuID=0&search=0
request_4	http://www.review.com/college/basics.cfm?schoolTypeID=1&schoolID=357&action=add&menuID=0&search=0
request_5	http://services.review.com/registration/processes/login.asp?rQ=24830264

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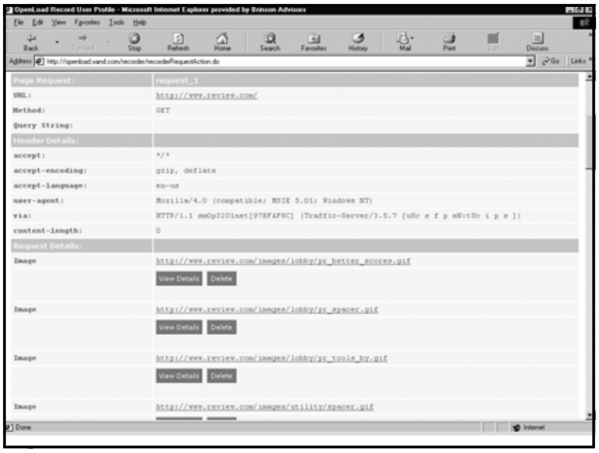

File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss
Go Links
View Details
Delete
Done
Internet

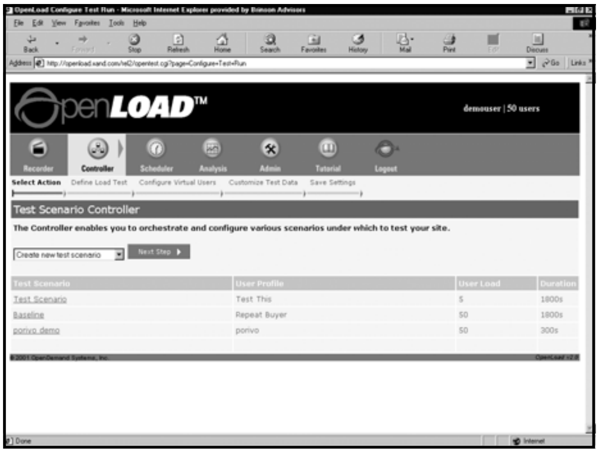
OpenLoad Record User Profile - Microsoft Internet Explorer provided by Brinson Advisors

Address: http://openload.xand.com/recorder/recorderRequestAction.do

Page Request:	request_1
URL:	http://www.review.com/
Method:	GET
Query String:	
Header Details:	
accept:	*/*
accept-encoding:	gzip, deflate
accept-language:	en-us
user-agent:	Mozilla/4.0 (compatible; MSIE 5.01; Windows NT)
via:	HTTP/1.1 mm0p3201net[97BFAF8C] (Traffic-Server/3.5.7 [uSc s f p eN:tUc i p s])
content-length:	0
Request Details:	
Image	http://www.review.com/images/lobby/pr_better_scores.gif
Image	http://www.review.com/images/lobby/pr_spacer.gif
Image	http://www.review.com/images/lobby/pr_tools_by.gif
Image	http://www.review.com/images/utility/spacer.gif

Step 2: Controller

- Configure a Load Test "Scenario"
  - This describes the characteristics of the virtual users you want to simulate
    - Number of users/duration of test
    - Browser type/connection speed to simulate
    - Varying form input data
    - And more



OpenLoad Configure Test Run - Microsoft Internet Explorer provided by Brinson Advisors

Address: http://openload.xand.com/rel2/opentest.cgi?page=Configure+Test+Run

Test Scenario Controller

The Controller enables you to orchestrate and configure various scenarios under which to test your site.

Create new test scenario

Test Scenario	User Profile	User Load	Duration
Test Scenario	Test This	5	1800s
Baseline	Repeat Buyer	50	1800s
porivo demo	porivo	50	300s

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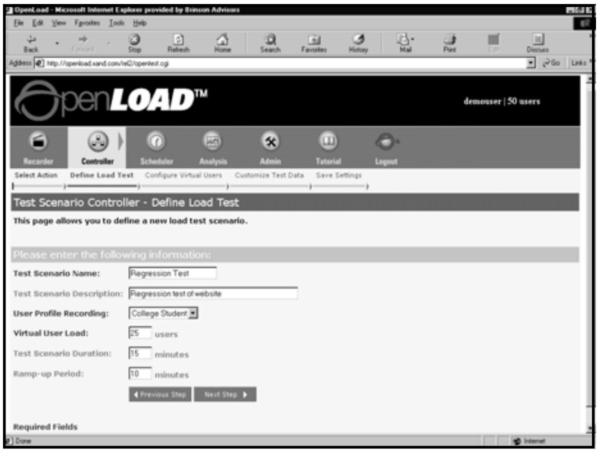


OpenLoad - Microsoft Internet Explorer provided by Brinson Advisors

Address: http://openload.xand.com/rel2/opentest.cgi

Test Scenario Controller - Define Load Test

This page allows you to define a new load test scenario.

Please enter the following information:

Test Scenario Name: Regression Test

Test Scenario Description: Regression test of website

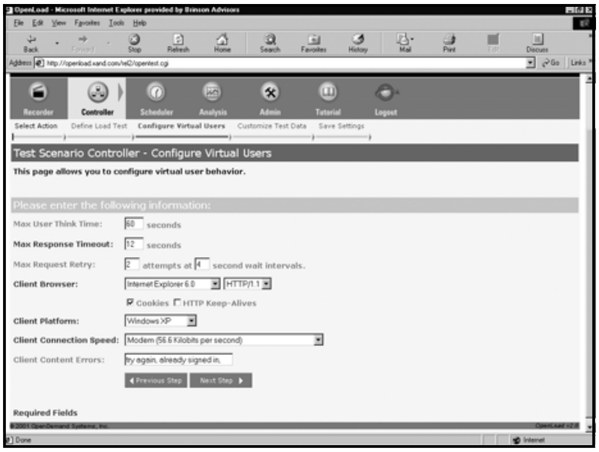
User Profile Recording: College Student

Virtual User Load: 25 users

Test Scenario Duration: 15 minutes

Ramp-up Period: 10 minutes

Required Fields



OpenLoad - Microsoft Internet Explorer provided by Brinson Advisors

Address: http://openload.xand.com/rel2/opentest.cgi

Test Scenario Controller - Configure Virtual Users

This page allows you to configure virtual user behavior.

Please enter the following information:

Max User Think Time: 60 seconds

Max Response Timeout: 12 seconds

Max Request Retry: 2 attempts at 4 second wait intervals.

Client Browser: Internet Explorer 6.0 HTTP/1.1

☑ Cookies ☐ HTTP Keep-Alives

Client Platform: Windows XP

Client Connection Speed: Modem (56.6 Kilobits per second)

Client Content Errors: try again, already signed in.

Required Fields

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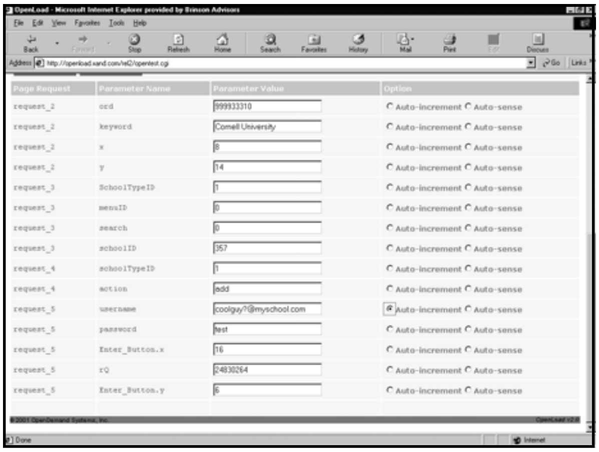
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss
Go Links
Done
Internet

OpenLoad - Microsoft Internet Explorer provided by Brinson Advisors

Address: http://openload.xand.com/rel2/opentest.cgi

Page Request	Parameter Name	Parameter Value	Option
request_2	ord	999933310	○ Auto-increment ○ Auto-sense
request_2	keyword	Cornell University	○ Auto-increment ○ Auto-sense
request_2	x	8	○ Auto-increment ○ Auto-sense
request_2	y	14	○ Auto-increment ○ Auto-sense
request_3	SchoolTypeID	1	○ Auto-increment ○ Auto-sense
request_3	menuID	0	○ Auto-increment ○ Auto-sense
request_3	search	0	○ Auto-increment ○ Auto-sense
request_3	schoolID	357	○ Auto-increment ○ Auto-sense
request_4	schoolTypeID	1	○ Auto-increment ○ Auto-sense
request_4	action	add	○ Auto-increment ○ Auto-sense
request_5	username	coolguy7@myschool.com	● Auto-increment ○ Auto-sense
request_5	password	test	○ Auto-increment ○ Auto-sense
request_5	Enter_Button.x	16	○ Auto-increment ○ Auto-sense
request_5	rQ	24830264	○ Auto-increment ○ Auto-sense
request_5	Enter_Button.y	6	○ Auto-increment ○ Auto-sense

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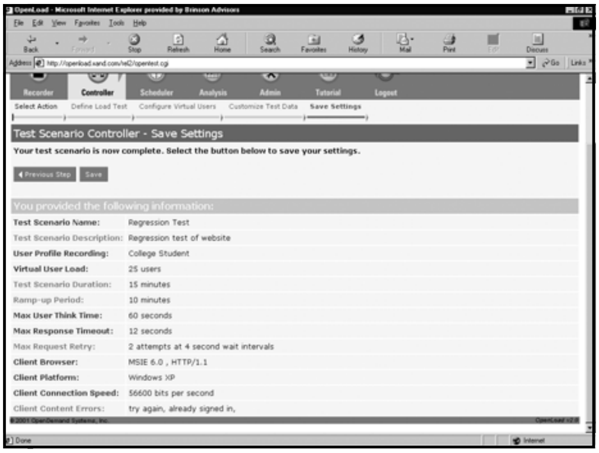

OpenLoad - Microsoft Internet Explorer provided by Brinson Advisors
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss
Address http://openload.xand.com/rel2/opentest.cgi
Go Links
Recorder Controller Scheduler Analysis Admin Tutorial Logout
Select Action Define Load Test Configure Virtual Users Customize Test Data Save Settings

Test Scenario Controller - Save Settings

Your test scenario is now complete. Select the button below to save your settings.

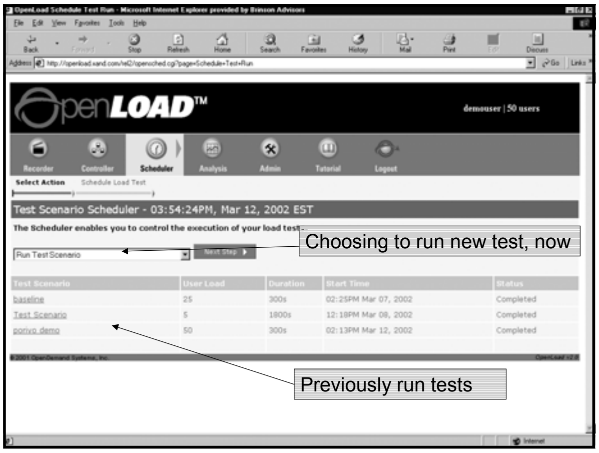
◀ Previous Step | Save

You provided the following information:

Test Scenario Name:	Regression Test
Test Scenario Description:	Regression test of website
User Profile Recording:	College Student
Virtual User Load:	25 users
Test Scenario Duration:	15 minutes
Ramp-up Period:	10 minutes
Max User Think Time:	60 seconds
Max Response Timeout:	12 seconds
Max Request Retry:	2 attempts at 4 second wait intervals
Client Browser:	MSIE 6.0 , HTTP/1.1
Client Platform:	Windows XP
Client Connection Speed:	56600 bits per second
Client Content Errors:	try again, already signed in,

Step 3: Scheduler

- Schedule a Load Test
  - Run a test immediately
  - Schedule one for a future time
  - And more


OpenLoad Schedule Test Run - Microsoft Internet Explorer provided by Brinson Advisors
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss
Address http://openload.xand.com/rel2/opensched.cgi?page=Schedule+Test+Run
OpenLOAD™
demouser | 50 users
Recorder Controller Scheduler Analysis Admin Tutorial Logout
Select Action Schedule Load Test

Test Scenario Scheduler - 03:54:24PM, Mar 12, 2002 EST

The Scheduler enables you to control the execution of your load test.

Run Test Scenario | Next Step ▶

Choosing to run new test, now

Test Scenario	User Load	Duration	Start Time	Status
baseline	25	300s	02:25PM Mar 07, 2002	Completed
Test Scenario	5	1800s	12:18PM Mar 08, 2002	Completed
porivo demo	50	300s	02:13PM Mar 12, 2002	Completed

Previously run tests

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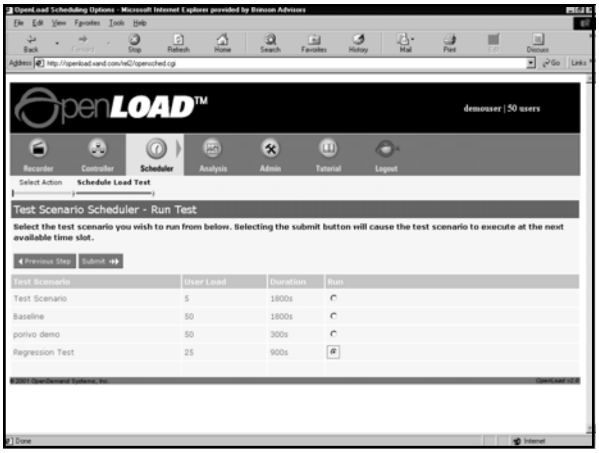
OpenLoad Scheduling Options - Microsoft Internet Explorer provided by Brinson Advisors
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss
Address http://openload.xand.com/rel2/opensched.cgi
OpenLOAD™
demouser | 50 users
Recorder Controller Scheduler Analysis Admin Tutorial Logout
Select Action Schedule Load Test

Test Scenario Scheduler - Run Test

Select the test scenario you wish to run from below. Selecting the submit button will cause the test scenario to execute at the next available time slot.

◀ Previous Step | Submit ▶▶

Test Scenario	User Load	Duration	Run
Test Scenario	5	1800s	○
Baseline	50	1800s	○
porivo demo	50	300s	○
Regression Test	25	900s	●

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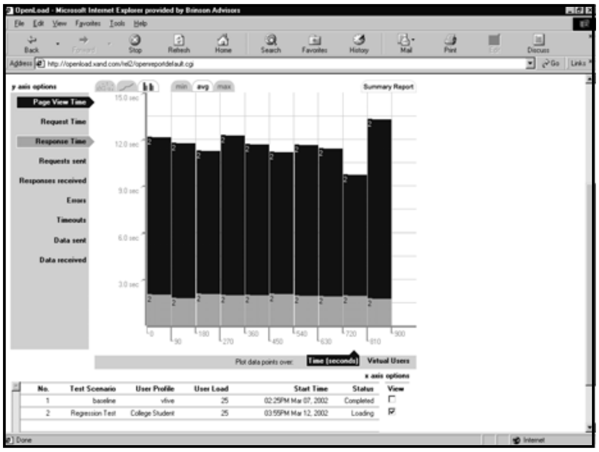
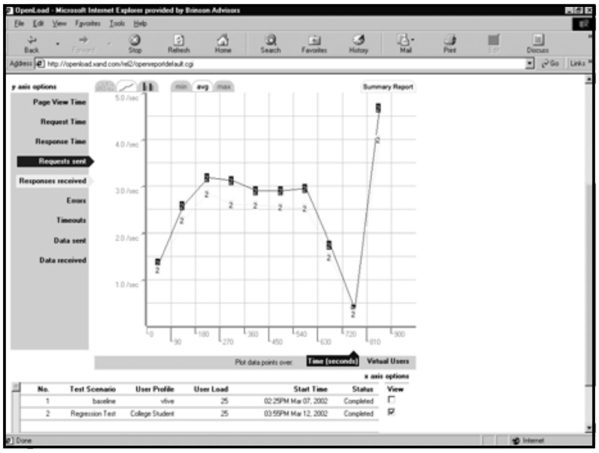
Done
Internet

Step 4: Analysis

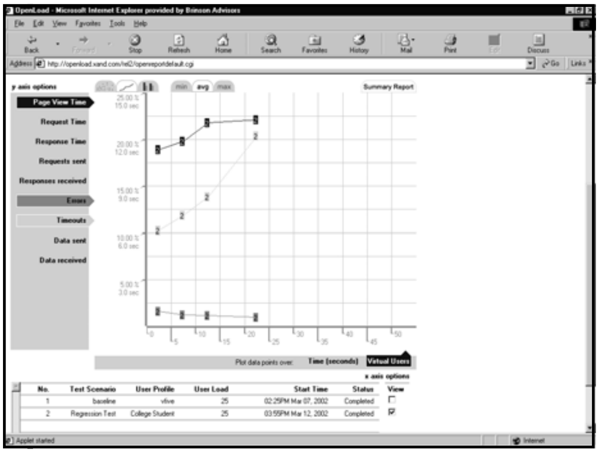
- Analyze Test Results
  - View the performance of your web app
  - Provides multiple graphs for review
  - Each graph offers variations of how/what data is presented
    - Can graph multiple types of data at once
    - Can even graph multiple test runs at once



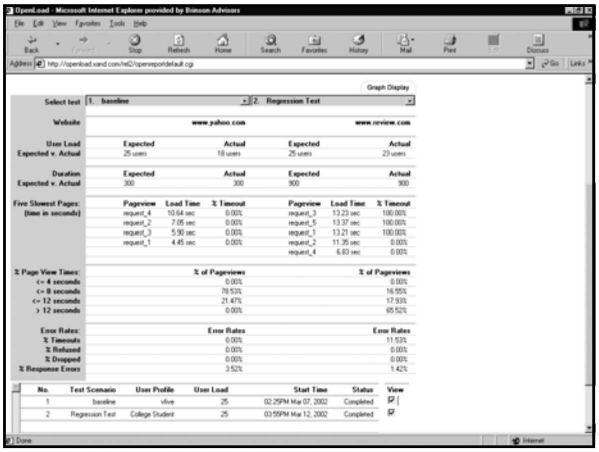
No.	Test Scenario	User Profile	User Load	Start Time	Status	View
1	baseline	vfive	25	02:25PM Mar 07, 2002	Completed	□
2	Regression Test	College Student	25	03:55PM Mar 12, 2002	Loading	☑



No.	Test Scenario	User Profile	User Load	Start Time	Status	View
1	baseline	vfive	25	02:25PM Mar 07, 2002	Completed	□
2	Regression Test	College Student	25	03:55PM Mar 12, 2002	Completed	☑



No.	Test Scenario	User Profile	User Load	Start Time	Status	View
1	baseline	vfive	25	02:25PM Mar 07, 2002	Completed	□
2	Regression Test	College Student	25	03:55PM Mar 12, 2002	Completed	☑


OpenLoad - Microsoft Internet Explorer provided by Brinson Advisors
File Edit View Favorites Tools Help
Back
Forward
Stop
Refresh
Home
Search
Favorites
History
Mail
Print
Edit
Discuss
Address http://openload.xand.com/rel2/openreportdefault.cgi
Go
Links
Graph Display
Done
Internet

Select test	1. baseline			2. Regression Test		
Website			www.yahoo.com			www.review.com
User Load Expected v. Actual	Expected		Actual	Expected		Actual
	25 users		18 users	25 users		23 users
Duration Expected v. Actual	Expected		Actual	Expected		Actual
	300		300	900		900
Five Slowest Pages: (time in seconds)	Pageview	Load Time	% Timeout	Pageview	Load Time	% Timeout
	request_4	10.64 sec	0.00%	request_3	13.23 sec	100.00%
	request_2	7.05 sec	0.00%	request_5	13.37 sec	100.00%
	request_3	5.90 sec	0.00%	request_1	13.21 sec	100.00%
	request_1	4.45 sec	0.00%	request_2	11.35 sec	0.00%
				request_4	6.83 sec	0.00%
% Page View Times:			% of Pageviews			% of Pageviews
<= 4 seconds			0.00%			0.00%
<= 8 seconds			78.53%			16.55%
<= 12 seconds			21.47%			17.93%
> 12 seconds			0.00%			65.52%
Error Rates:			Error Rates			Error Rates
% Timeouts			0.00%			11.53%
% Refused			0.00%			0.00%
% Dropped			0.00%			0.00%
% Response Errors			3.52%			1.42%

No.	Test Scenario	User Profile	User Load	Start Time	Status	View
1	baseline	vfive	25	02:25PM Mar 07, 2002	Completed	☑
2	Regression Test	College Student	25	03:55PM Mar 12, 2002	Completed	☑

Additional OpenLoad Features

- Supports Cookies and sessions
- Supports SSL processing

Planned Enhancements:

- Monitoring and reporting performance stats
- Providing ongoing monitoring
- Much more

Key Benefit for CF Developers

- Easy to use
- No software installation required
- Puts testing into developers hands
  - No longer the province of “the test team”
- Allows you to perform testing throughout application life-cycle
  - Load test from development to deployment

Why Load Test from Development to Deployment?

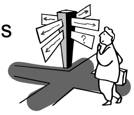
- Identifies problems early on before they become costly to resolve
- Reduces development cycles
- Produces better quality, more scalable code
- Prevents revenue and credibility loss due to poor Web site performance
- Increases customer satisfaction and retention
- Enables intelligent planning for future expansion

Maybe High "Load" Isn't a Problem You Foresee

- Can load testing still be useful for you?
- Can certainly look to common performance tuning opportunities as sources of bottlenecks in high or even low load situations

Common Tuning Opps

- Determine impact of various opportunities:
  - CF coding changes
  - Database design/config/coding changes
  - CF version upgrade
  - CF Admin configuration changes
  - Web server configuration changes
  - System architecture changes
  - HTML coding changes



Common Tuning Opps: "Classic" CF Coding Issues

- Certain classic CF tuning questions may not be that important compared to many others we will discuss
  - Using CFOUTPUT around each var or not
  - Cost of pound signs over-use
  - Prefixing all variables
  - Using CFSCRIPT where possible
  - Cost of Evaluate() vs IIF() functions

Common Tuning Opps: Other CF Coding Issues

- Consider benefits of caching pages (or parts of page) that are rather static: CFCACHE, CFSAVECONTENT
  - Be careful about using .cfm just to include static navbar
    - Consider page caching instead:
- Consider impact of locking (and not locking) all persistent variable use. Big debate. Load test to know.
- Be careful with setting timeouts for CFLOCK, CFHTTP, CFQUERY too high

Common Tuning Opps: More CF Coding Issues

- Alternatives for reading text files: CFFILE vs CFHTTP vs ODBC text drivers vs Merant text drivers vs Java custom tag
- Don't enable clientmanagement="yes" if not using client variables
  - Writes client vars about every visit to registry (or DB)
- Consider cost of CFINCLUDE vs CF_ custom tag vs CFMODULE vs CFX vs CFOBJECT vs UDF vs CFMX's CFCs and CFFUNCTION options
- Be careful of recursion in UDFs, custom tags

Common Tuning Opps: DB Design/Config

- Database processing is usually largest contributor to poor performance
  - Starts with choice of right DBMS for the job
  - Proceeds to good database design
  - Proper use of indexing can have big perf impact
  - Use DBMS options to test/tune your SQL and DB design
- Also configuration of datasources
  - Consider cost/benefit of "maintain db connection"
  - Tune "Limit simultaneous access to db to x"
  - Consider ODBC vs OLEDB vs Merant vs Native driver
- Tune Admin's "limit cached db connection inactive time to x minutes" (global setting)

Common Tuning Opps: DB Coding

- Biggest goal is to avoid unnecessary DB I/O
- Also, don't do in CF what can be done better in DBMS/SQL
  - Avoid SELECT *; use count(*) vs recordcount
  - Use aggregate functions, inner <u>and outer</u> joins; unions
  - Consider subqueries (in SELECT and WHERE)
  - See Ben Forta's "Teach Yourself SQL in 10 Minutes"
- Use CFOUTPUT GROUP where appropriate
  - See CFML docs for more info

Common Tuning Opps: DB Coding (cont.)

- Use DB caching where appropriate
  - CACHEDWITHIN and CACHEDAFTER on CFQUERY
  - Caching to persistent scopes (session/application/server)
  - CF5's query of queries capability
- Consider stored procedures for faster execution
  - Consider CFQUERY call of SP vs CFSTOREDPROC
- Consider impact of CFTRANSACTION IsolationLevel

Common Tuning Opps: CF Version Upgrade

- Upgrade to CF5
  - Up to 5x faster than CF4.5
  - Reduced memory footprint
  - Better memory management
    - Fewer leaks, better release of unused resources
- CFMX has just come out
  - Remains to be seen what performance impact will be

Common Tuning Opps: CF Admin Config

- Tune "limit simultaneous requests"
- Tune template cache size, consider "Trusted Cache"
- Tune "maximum cached queries"
- Weigh impact of "auto read locking", "full checking" of session, app, and server scope variables
  - Single-threading of sessions
- Disable "Debugging>Enable PerfMon/Enable StackTrace" options if not using them
- Consider turning on "strict attribute validation"
- Consider impact of Client vars stored in ODBC DB

Common Tuning Opps: Web Config

- Web server limitations (IIS on Win2k Pro supports only 10 users by default, for instance)
- See Macromedia KB article 20075
  - About tuning the IIS "Application Protection" setting
- Don't use SSL pages where they're not needed
  - Ok for credit card/privacy info request processing
    - But don't put whole site or section under SSL if not needed

Common Tuning Opps: System Architecture

- Consider benefits of scaling hardware/software
  - Vertical scaling: adding memory, CPU power, multiple CPUs per box
  - Horizontal scaling: S/W vs H/W load clustering, round robin DNS
- Consider tiered server configuration
  - Separating database server from web/cf server
  - Possibly creating separate image server
  - Possibly sharing a single file/template server for multiple clustered CF servers

Common Tuning Opps: HTML Coding

- Over design of Web pages (graphics: too many, large)
- Pre-load images before they are needed
- Validate on the client whenever possible (JavaScript or ActionScript)
- Observe design & coding best practices

Performance Opportunity: Monitoring

- Things you can monitor in CF
  - Log slow pages (remember 8-second rule)
  - Enable Debugging (to check processing time in code)
- Things you can monitor with O/S tools (PerfMon)
  - Memory contention issues (paging)
  - Heavy disk I/O (high service times)
  - Excessive queue lengths (more than one) & wait times (more than a few milliseconds)
- Other possible monitors
  - Network latency (packet collisions & lost)
- Later releases of OpenLoad will show such monitoring

Improving Apparent Response Time

- Consider suppressing whitespace
  - At admin level, with “Supress WhiteSpace” option
  - In code, with CFSETTING, CFSILENT, and CFPROCESSINGDIRECTIVE tags
- Use CFFLUSH
  - Can cause part of page to display to user before entire page is completed
- Leverage browser caching where appropriate (CFHEADER)
- Consider gzipping output from CF templates
  - Can set at web server level, can also program
    - May be even easier to do in CFMX with Filters

More Tuning Opportunities

- These have been just a few of the more common tuning opportunities
  - Not all will make sense for all sites/apps
- There are still more
  - Many of which may not be obvious but may be valuable
- Planning to create a benchmark site
  - To be published showing impact of various changes
    - Using a standard application suite
- Still need to test/tune these things for yourself

Leverage Knowledge of Others

- Perform design and code walkthroughs
- Keep up on, apply industry best practices, coding stds
- Participate in user groups
- Read the CF Dev Journal magazine
- Join email mailing lists

Resources for Learning More

- Macromedia Resources
  - ColdFusion 5 Performance Brief
    - http://www.macromedia.com/software/coldfusion/productinfo/performance_brief/cf5_perf_brief.pdf
  - CF 4.5.1 Performance Tuning Brief
    - http://www.macromedia.com/v1/DocumentCenter/partners/ColdFusion_4.5.1_NT_Performance_Guide.pdf
  - Administering ColdFusion Server, Chap 6
    - “Creating Scalable and Highly Available Web Sites”
  - Macromedia Knowledge Base/TechNotes
    - 922 (somewhat dated), 566, 8627 (detailed tuning ideas), 12970 (general load testing guidelines)
    - http://www.macromedia.com/v1/support/knowledgebase/searchform.cfm

Resources for Learning More

- *Optimizing ColdFusion*, Chris Cortes, from Osborne/MCGraw-Hill
- *Certified ColdFusion Developer Study Guide*, Ben Forta
  - Chapters 36, 37 and others
- My Jan 2002 CFDJ article on Admin Performance Settings
- Microsoft Duwamish App Perf Site
  - http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnduwon/html/d5perfover.asp
- Macromedia KB 11773 points to several resources
  - many outside of Macromedia

Load Testing Do’s

- Do test early and do test often
- Do establish what is and is not acceptable performance for your application
- Do test from the user’s perspective - it’s the only one that counts
- Do baseline and compare your findings
- Do monitor your system while you test
- Do test whenever there’s a change in your site’s content, code or infrastructure

Load Testing Don’ts

- Don’t wait until the last minute to test
- Don’t depend on your customers to do your testing for you
- Don’t test under unrealistic conditions
- Don’t forget that increases in site signups, accumulation of history, table sizes, disk usage and network traffic will degrade your application’s performance over time
- Don’t be so quick to throw hardware at the problems you turn up - it doesn’t always help

Test your app for FREE

- Register at http://www.opendemand.com/cf/
- Test for FREE. Choose either:
  - up to 25 virtual users for one hour
  - or up to 5 virtual users for a currently unlimited time period
- Obtain online copy of this presentation
- Try-out performance tuning tips
  - Test again and compare results to your baseline

Q&A

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