Apache JMeter

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Agenda

Simpler HTTP-Testplan

Erweiterungen

Testpläne parametrisieren

Fallstricke

Zusammenfassung

Fragen? Dann fragt ...

Einleitung

- Warum Lasttests?
- Warum JMeter?
  - Flexibel
  - Java, leicht erweiterbar
  - Apache 2.0 Lizenz
  - Nicht zu langsam

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Grundlagen Lasttests

- Latenz & Antwortzeit
- Durchsatz
- Standardabweichung (Jitter)
- I.d.R. misst man den Lastgenerator mit!

Grundlagen Lasttests

s. “Release It” - Chap. 8

Stellt JMeter auf englisch um (“Optionen”). Die deutsche Lokalisierung ist unerträglich.

JMeter Konzepte

- Testpläne
- Komponenten
- Scoping

JMeter Komponenten

- Thread Groups
- Sampler und Listener
- Logic Controller
- Assertions
- ...

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Thread Group

- Führt For-Schleife mit *n* Threads aus
- JMeter erzeugt Komponenten-Instanzen aus Testplan
- Jeder Thread tut etwas mit seinen Instanzen
  - z.B. HTTP-Request senden

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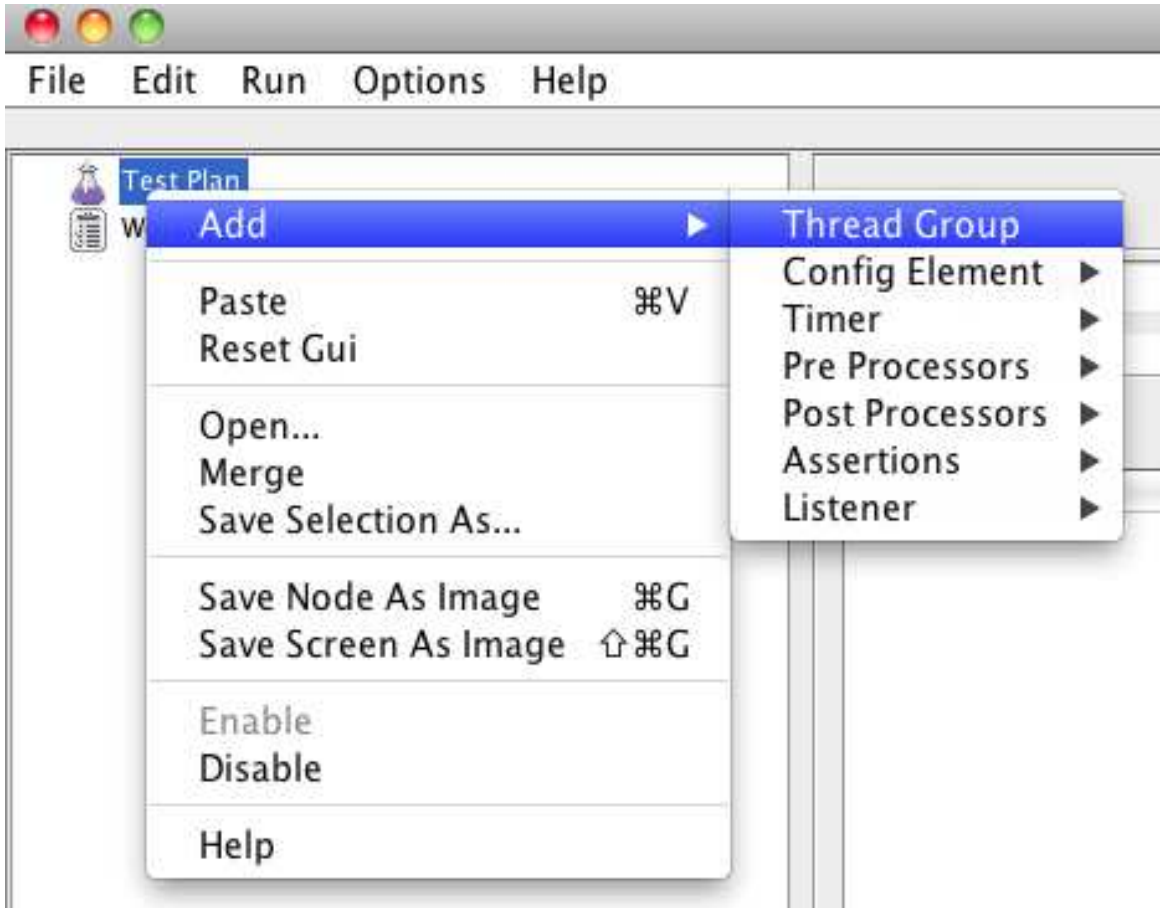
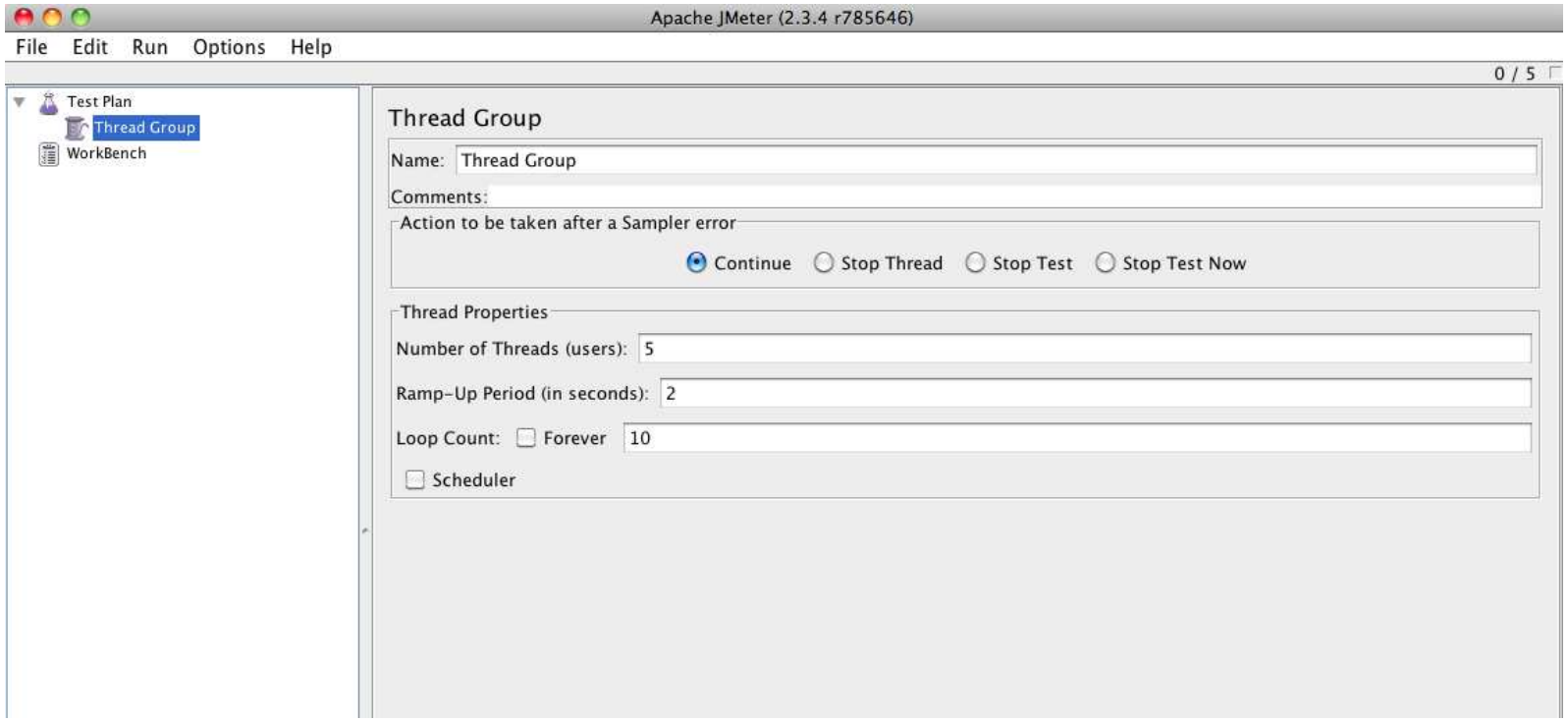
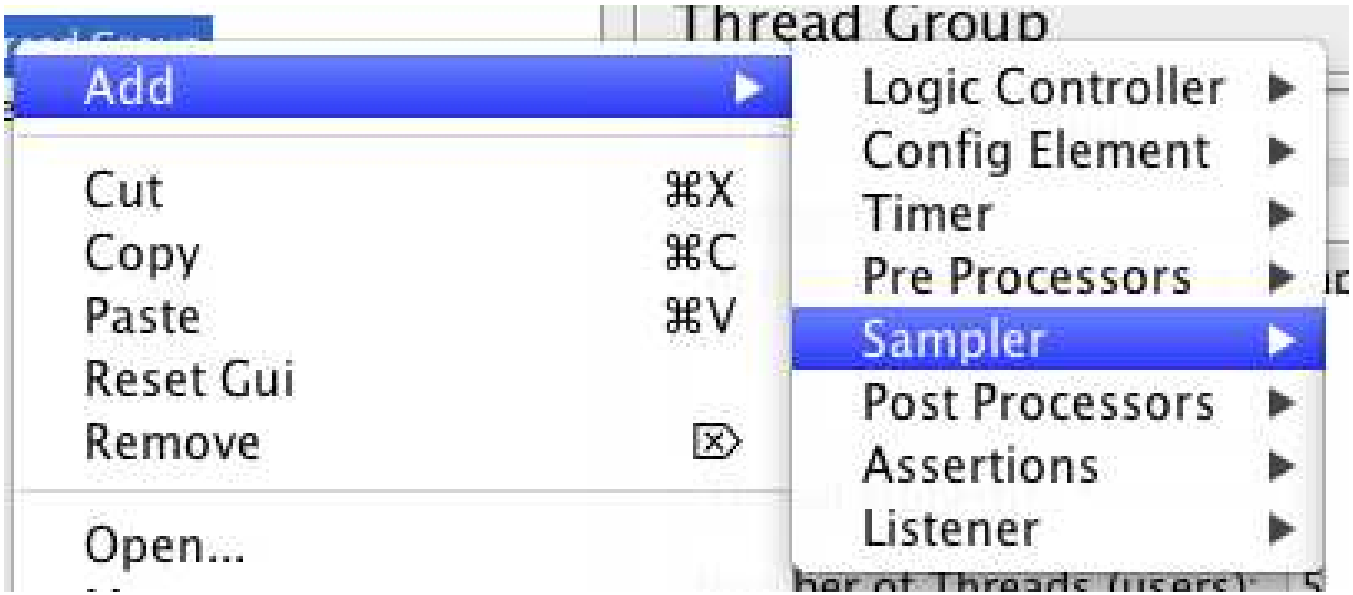
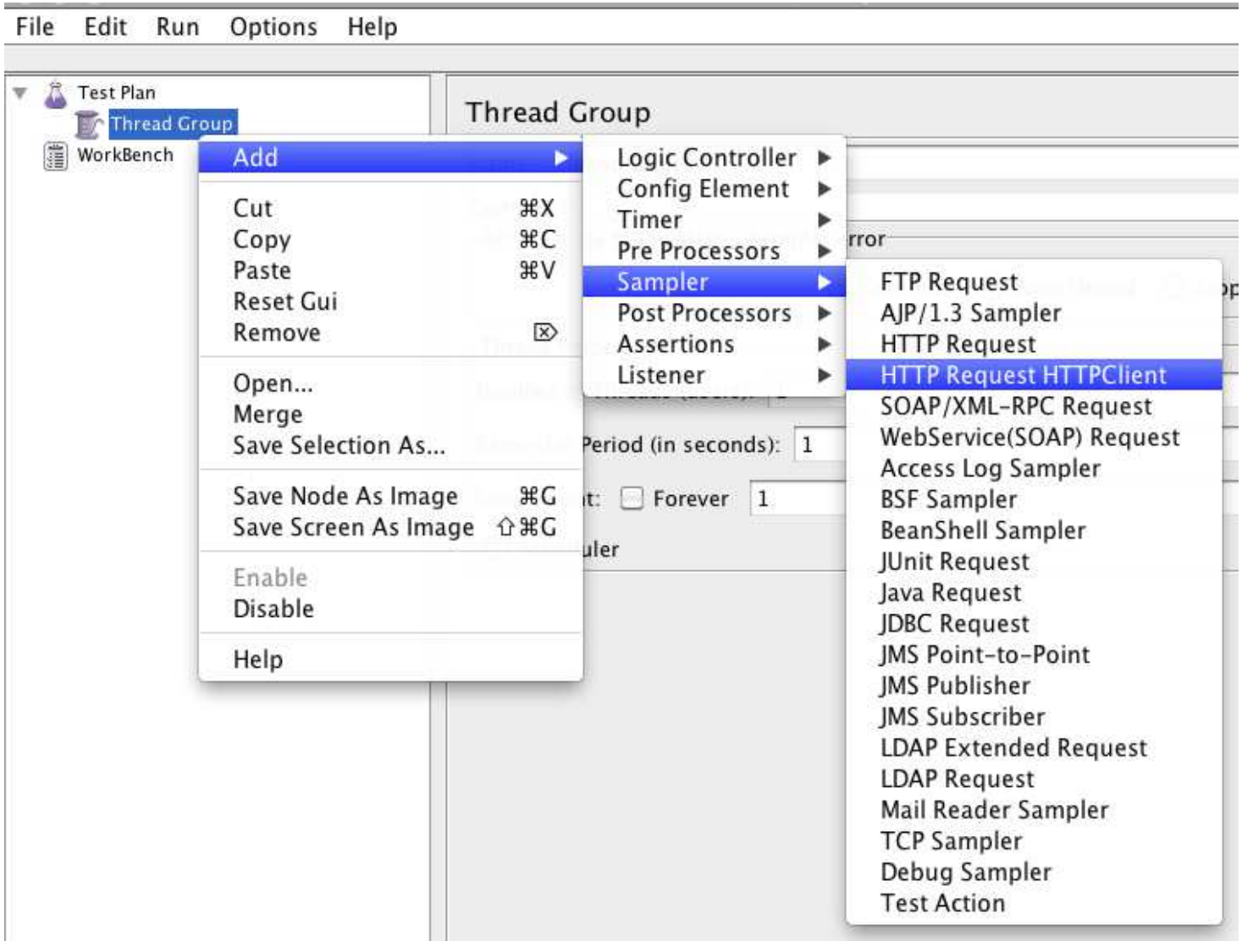

File
Edit
Run
Options
Help
Test Plan
Add
Paste ⌘V
Reset Gui
Open...
Merge
Save Selection As...
Save Node As Image ⌘G
Save Screen As Image ⇧⌘G
Enable
Disable
Help
Thread Group
Config Element
Timer
Pre Processors
Post Processors
Assertions
Listener

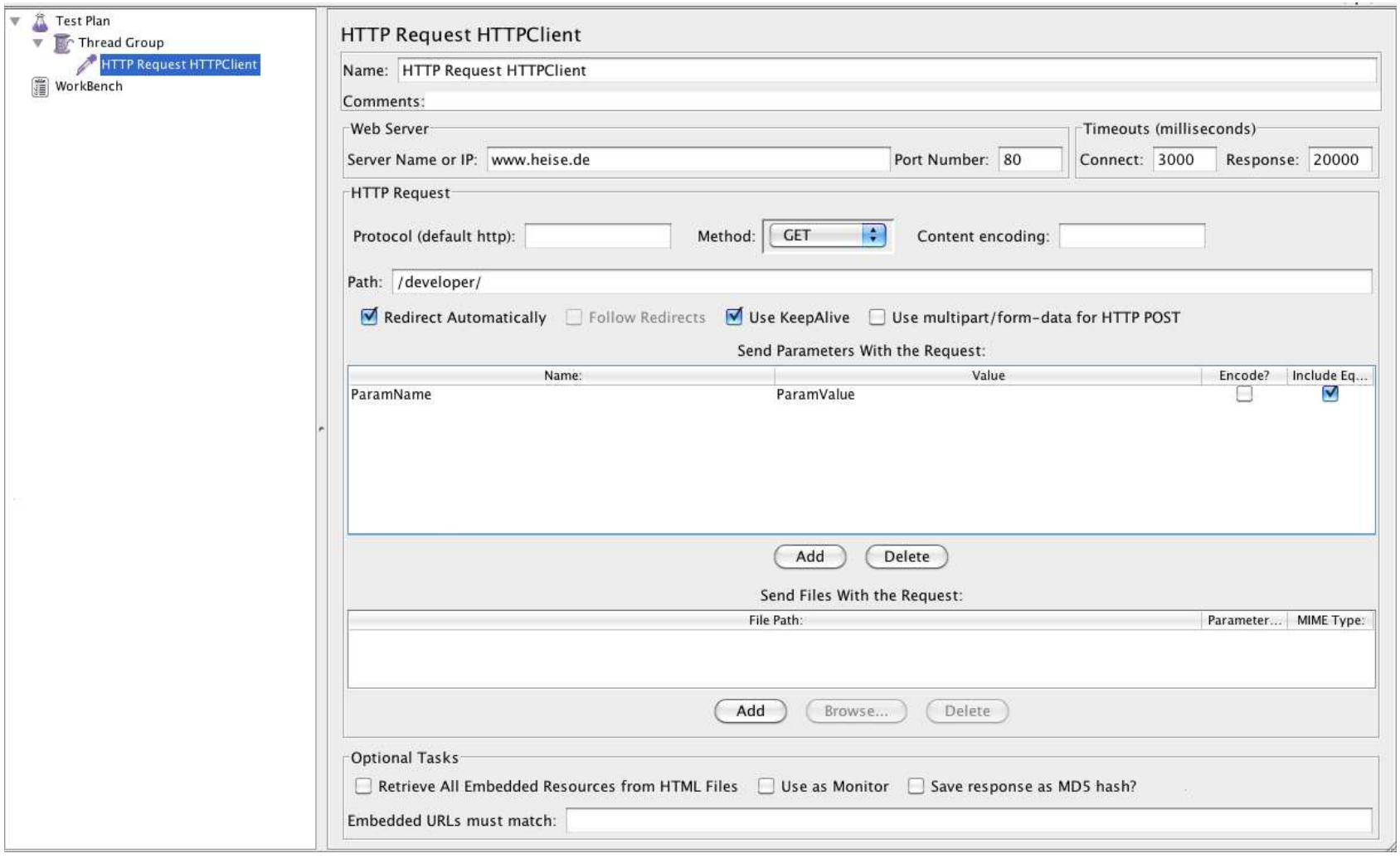

Apache JMeter (2.3.4 r785646)
File Edit Run Options Help
0 / 5
Test Plan
Thread Group
WorkBench
Thread Group
Name: Thread Group
Comments:
Action to be taken after a Sampler error
Continue Stop Thread Stop Test Stop Test Now
Thread Properties
Number of Threads (users): 5
Ramp-Up Period (in seconds): 2
Loop Count: Forever 10
Scheduler

Sampler

- “Meßpunkt”
- Erzeugt Sample Result
  - Success?, Request, Response, Headers, Timing, ...
- z.B. HTTP Request **HTTPClient**


Thread Group
Add
Cut ⌘X
Copy ⌘C
Paste ⌘V
Reset Gui
Remove
Open...
Logic Controller
Config Element
Timer
Pre Processors
Sampler
Post Processors
Assertions
Listener

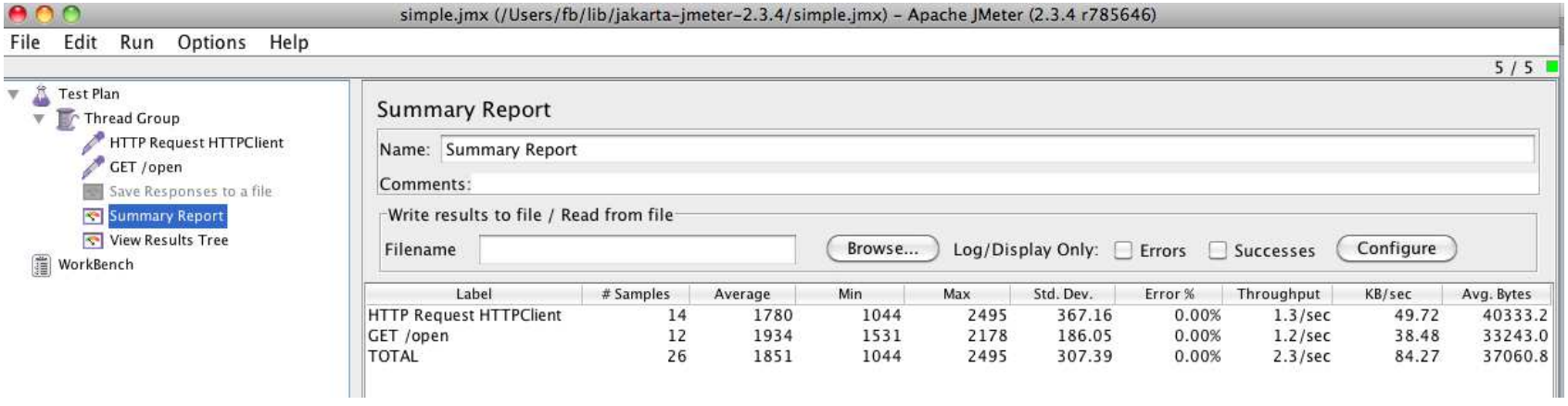

File Edit Run Options Help
Test Plan
Thread Group
WorkBench
Thread Group
Add
Cut ⌘X
Copy ⌘C
Paste ⌘V
Reset Gui
Remove
Open...
Merge
Save Selection As...
Save Node As Image ⌘G
Save Screen As Image ⇧⌘G
Enable
Disable
Help
Logic Controller
Config Element
Timer
Pre Processors
Sampler
Post Processors
Assertions
Listener
FTP Request
AJP/1.3 Sampler
HTTP Request
HTTP Request HTTPClient
SOAP/XML-RPC Request
WebService(SOAP) Request
Access Log Sampler
BSF Sampler
BeanShell Sampler
JUnit Request
Java Request
JDBC Request
JMS Point-to-Point
JMS Publisher
JMS Subscriber
LDAP Extended Request
LDAP Request
Mail Reader Sampler
TCP Sampler
Debug Sampler
Test Action
Period (in seconds): 1
Forever 1

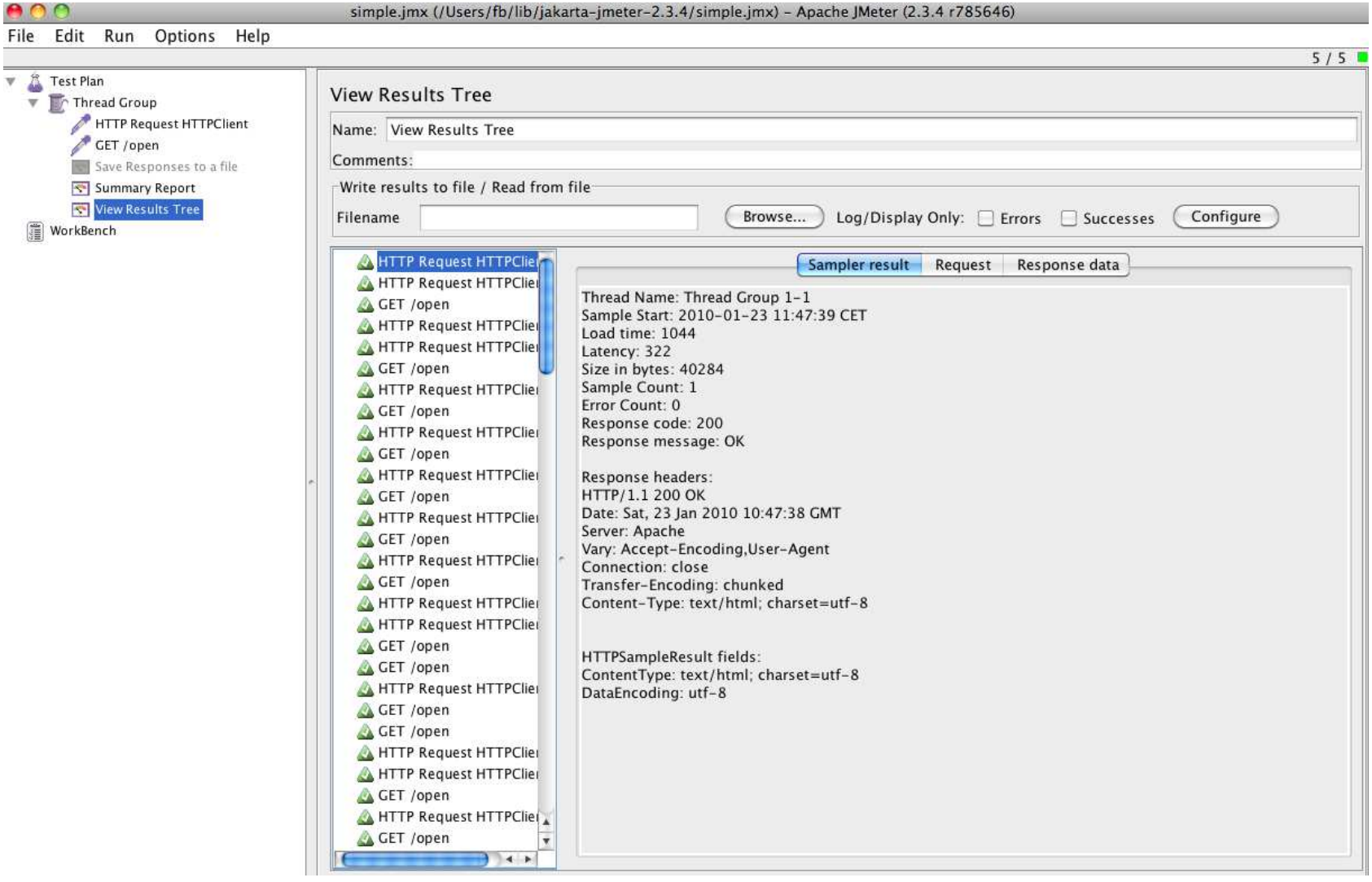


brands4friends

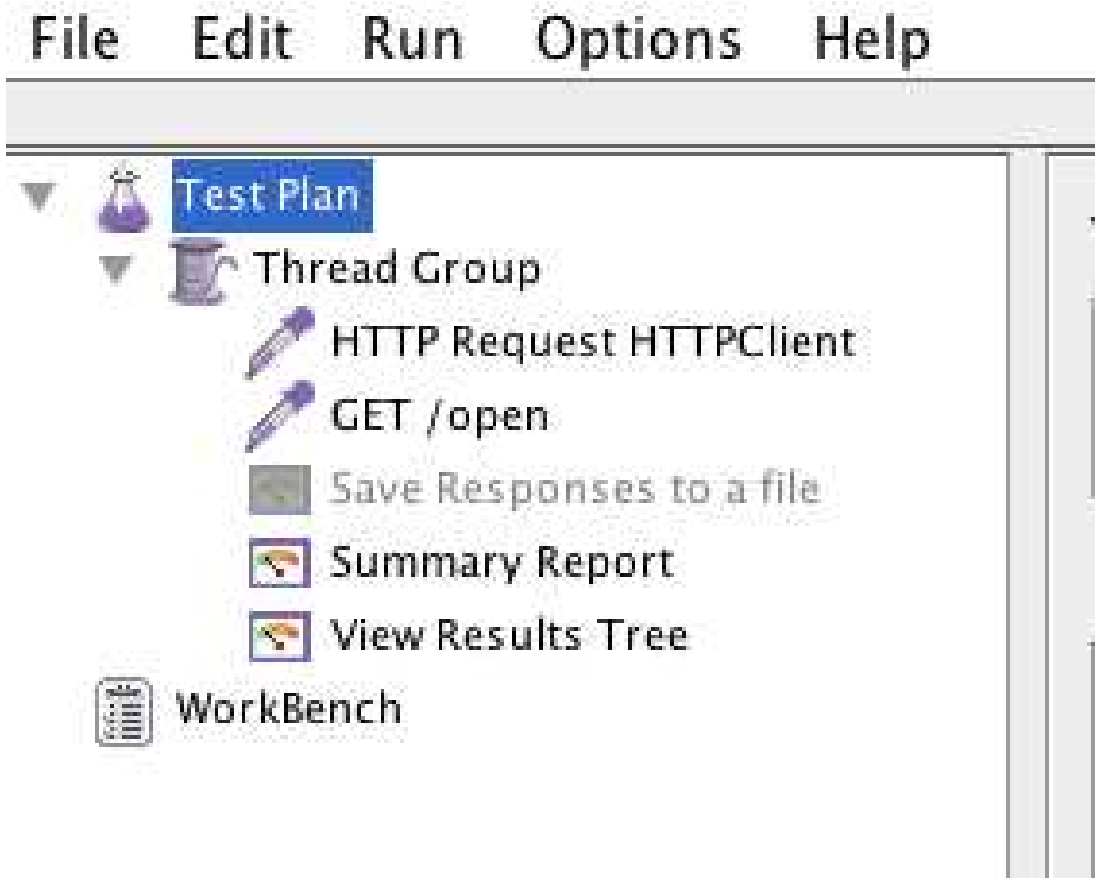
Listener

- Wertet ein Sample-Result aus
- “View Results Tree” und “Summary Report” sind meine Favoriten
- Simple Data Writer (CSV oder XML)


simple.jmx (/Users/fb/lib/jakarta-jmeter-2.3.4/simple.jmx) - Apache JMeter (2.3.4 r785646)
File Edit Run Options Help
5 / 5
Test Plan
Thread Group
HTTP Request HTTPClient
GET /open
Save Responses to a file
Summary Report
View Results Tree
WorkBench
Summary Report
Name: Summary Report
Comments:
Write results to file / Read from file
Filename
Browse...
Log/Display Only: Errors Successes
Configure
Label # Samples Average Min Max Std. Dev. Error % Throughput KB/sec Avg. Bytes
HTTP Request HTTPClient 14 1780 1044 2495 367.16 0.00% 1.3/sec 49.72 40333.2
GET /open 12 1934 1531 2178 186.05 0.00% 1.2/sec 38.48 33243.0
TOTAL 26 1851 1044 2495 307.39 0.00% 2.3/sec 84.27 37060.8


simple.jmx (/Users/fb/lib/jakarta-jmeter-2.3.4/simple.jmx) - Apache JMeter (2.3.4 r785646)
File Edit Run Options Help
5 / 5
Test Plan
Thread Group
HTTP Request HTTPClient
GET /open
Save Responses to a file
Summary Report
View Results Tree
WorkBench
View Results Tree
Name: View Results Tree
Comments:
Write results to file / Read from file
Filename
Browse...
Log/Display Only: Errors Successes
Configure
Sampler result
Request
Response data
Thread Name: Thread Group 1-1
Sample Start: 2010-01-23 11:47:39 CET
Load time: 1044
Latency: 322
Size in bytes: 40284
Sample Count: 1
Error Count: 0
Response code: 200
Response message: OK
Response headers:
HTTP/1.1 200 OK
Date: Sat, 23 Jan 2010 10:47:38 GMT
Server: Apache
Vary: Accept-Encoding,User-Agent
Connection: close
Transfer-Encoding: chunked
Content-Type: text/html; charset=utf-8
HTTPSampleResult fields:
ContentType: text/html; charset=utf-8
DataEncoding: utf-8

Simpler HTTP-Testplan



Simpler HTTP-Testplan

Erweiterungen

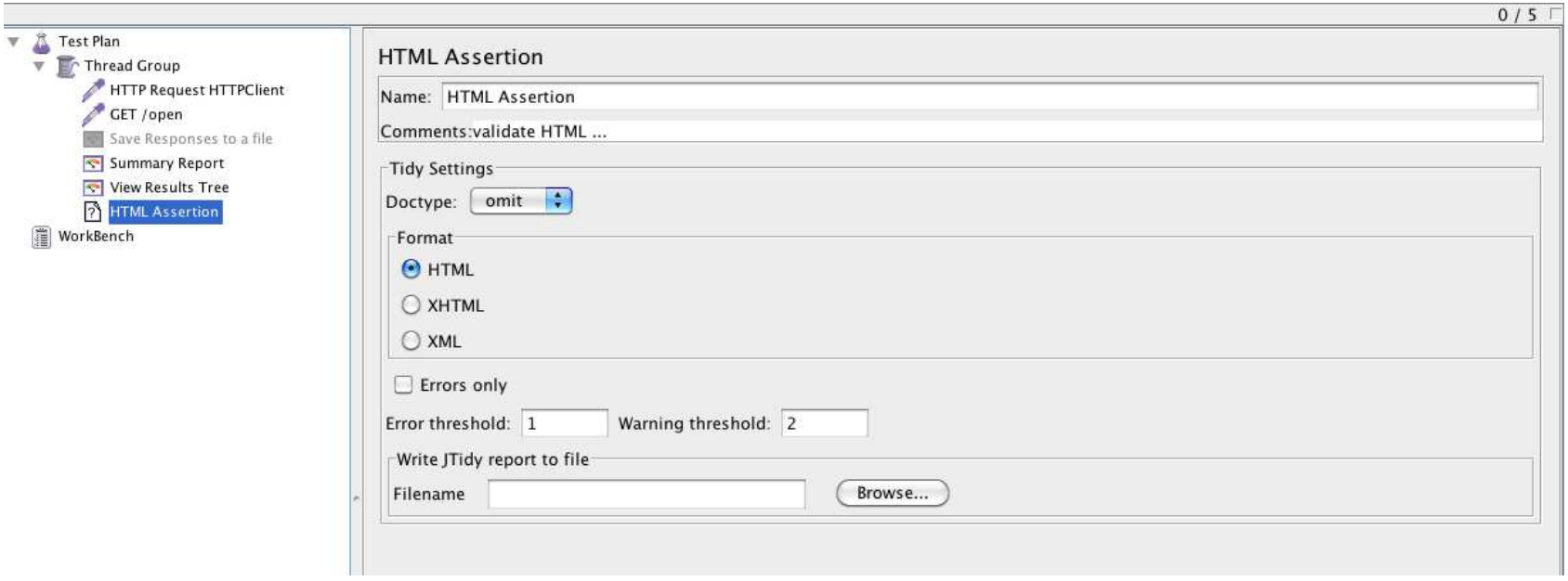
Testpläne parametrisieren

Fallstricke

Zusammenfassung

Assertions

- analog zu *assert*(...)
- Zusicherung wird verletzt → Sample fehlgeschlagen
- z.B.: Response Assertion, Duration Assertion

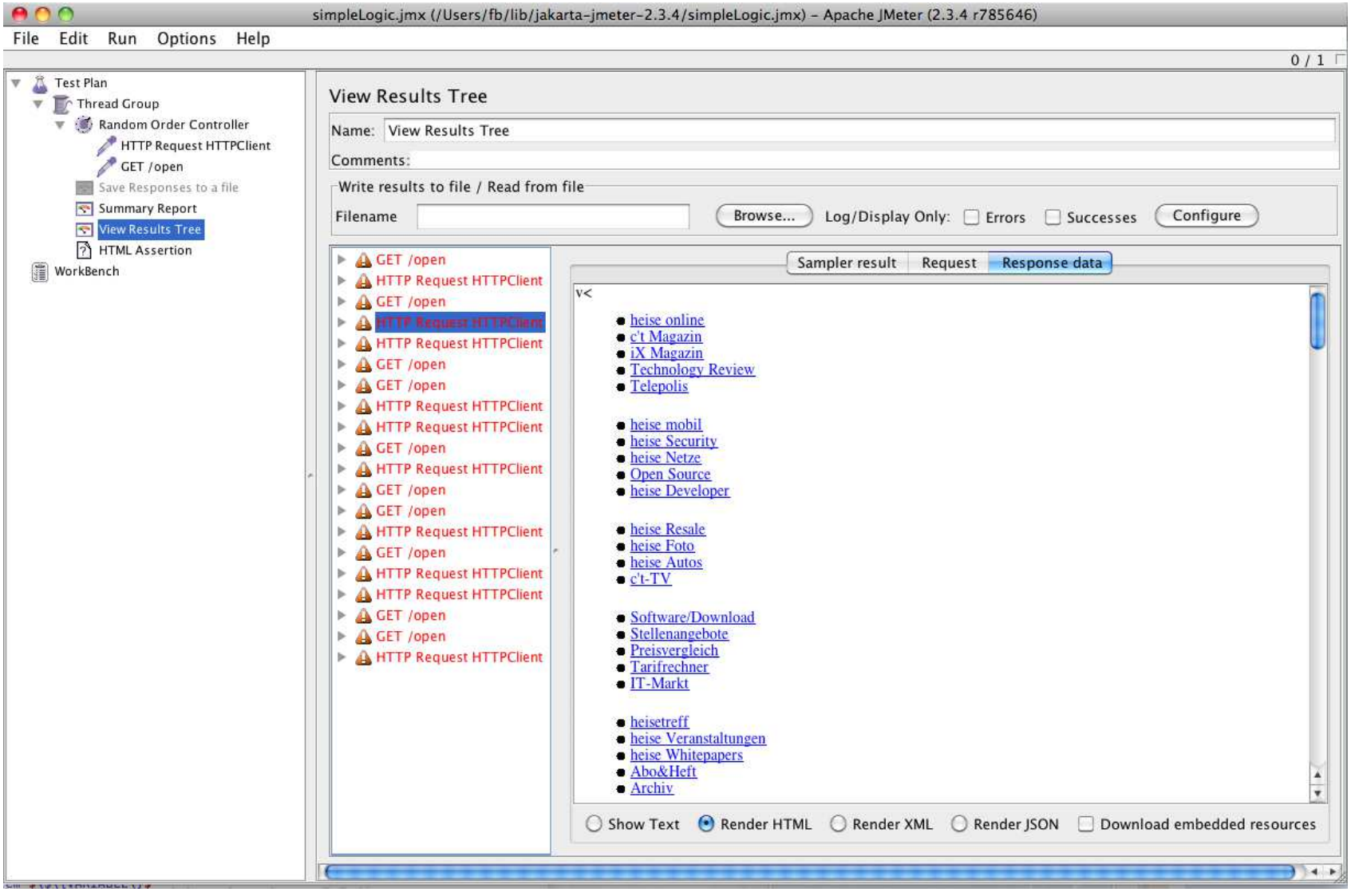

0 / 5
Test Plan
Thread Group
HTTP Request HTTPClient
GET /open
Save Responses to a file
Summary Report
View Results Tree
HTML Assertion
WorkBench
HTML Assertion
Name: HTML Assertion
Comments: validate HTML ...
Tidy Settings
Doctype: omit
Format
HTML
XHTML
XML
Errors only
Error threshold: 1
Warning threshold: 2
Write JTidy report to file
Filename
Browse...

View Results Tree
Name: View Results Tree
Comments:
Write results to file / Read from file
Filename
Browse...
Log/Display Only:
Errors
Successes
Configure
HTTP Request HTTPClient
HTTP Request HTTPClient
GET /open
HTML Assertion
HTTP Request HTTPClient
GET /open
GET /open
GET /open
HTTP Request HTTPClient
HTTP Request HTTPClient
GET /open
Assertion result
Assertion error: false
Assertion failure: true
Assertion failure message: Tidy Parser errors: 0 (allowed 1) Tidy Parser warnings: 20 (allowed 2)

Logic Controller

- Ändern den Kontroll-Fluß
- z.B. Loop Controller, Once Only Controller

simpleLogic.jmx (/Users/fb/lib/jakarta-jmeter-2.3.4/simpleLogic.jmx) - Apache JMeter (2.3.4 r785646)
File Edit Run Options Help
0 / 5
Test Plan
Thread Group
Random Order Controller
HTTP Request HTTPClient
GET /open
Save Responses to a file
Summary Report
View Results Tree
HTML Assertion
WorkBench
Random Order Controller
Name: Random Order Controller
Comments:



brands4friends

Fragen?

Simpler HTTP-Testplan

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Zusammenfassung

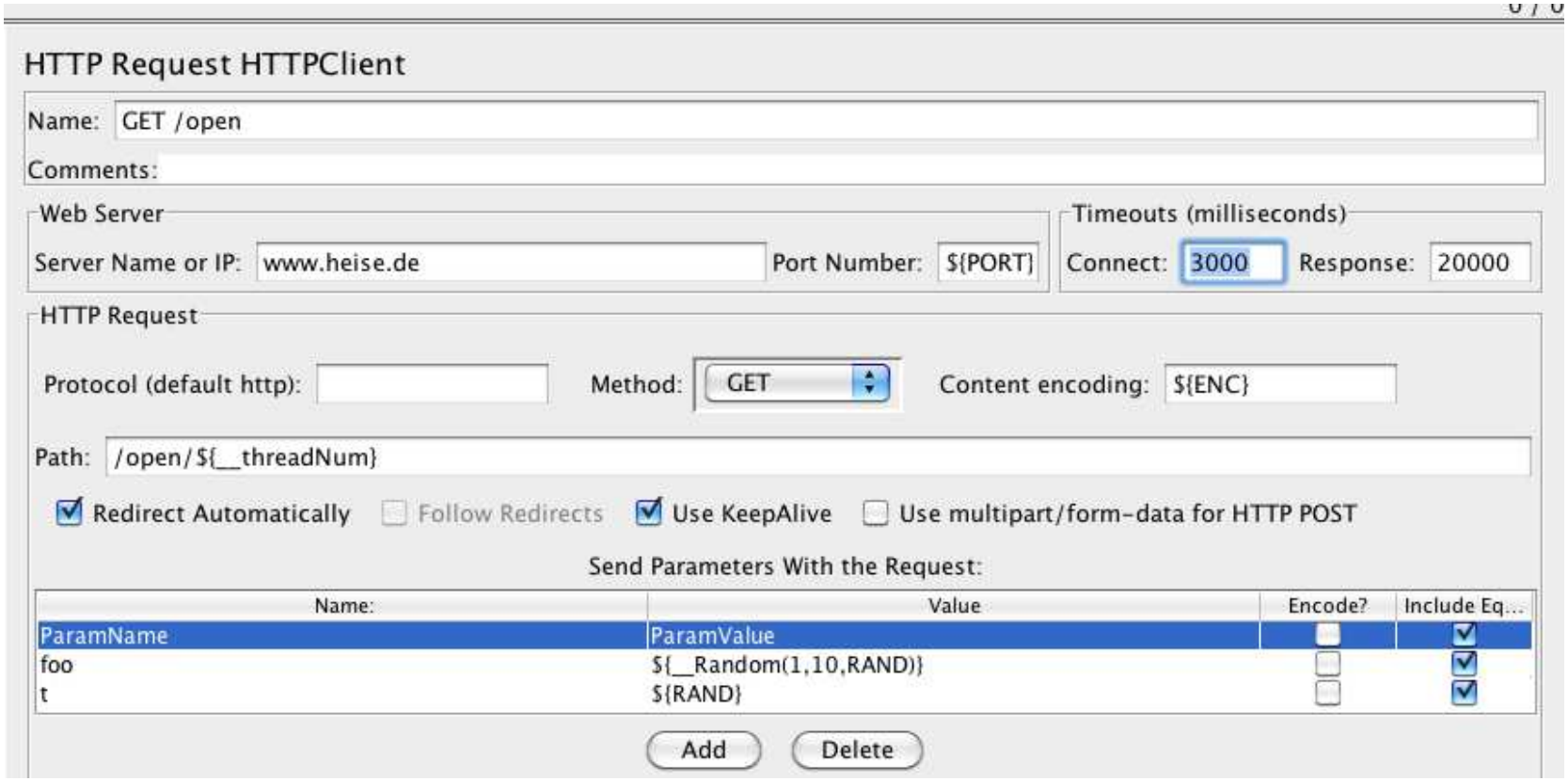
Variablen

- $\{VARIABLE\}$
- $\{UNDEF\} == UNDEF$
- JMeter trim()ed Leerzeichen (Version > 2.3.1)

Funktionen

- ${__functionName(var1,var2,var3)}
- ${__threadNum}
- ${__Random(1,63,LOTTERY)}
- ${__javaScript(expr,RETVAL)}
- Escape “,” as “\,”

Funktionen


HTTP Request HTTPClient
Name: GET /open
Comments:
Web Server
Server Name or IP: www.heise.de
Port Number: ${PORT}
Timeouts (milliseconds)
Connect: 3000
Response: 20000
HTTP Request
Protocol (default http):
Method: GET
Content encoding: ${ENC}
Path: /open/${__threadNum}
Redirect Automatically
Follow Redirects
Use KeepAlive
Use multipart/form-data for HTTP POST
Send Parameters With the Request:
Name:
Value
Encode?
Include Eq...
ParamName
ParamValue
foo
${__Random(1,10,RAND)}
t
${RAND}
Add
Delete

Simpler HTTP-Testplan

Erweiterungen

Testpläne parametrisieren

Fallstricke

Zusammenfassung

Fallstricke

- Synchrones I/O, $n \geq 1000$ Threads
- Einige Sampler machen ineffizentes I/O (z.B. DNS)
- HTTP Request HTTPClient vs. ~~HTTP Request~~
- Java GC (500ms Full GC $\rightarrow$ Test steht 0,5sec)

Fallstricke

- WhileController eval()ed eine JMeter-Funktion
- IfController eval()ed JavaScript
  - Jedes JavaScript-Statements muss mit “;” enden
- “Read the fine source (and fix it)”
- Parametrisierung von Testplänen ist etwas anstrengend

Fallstricke

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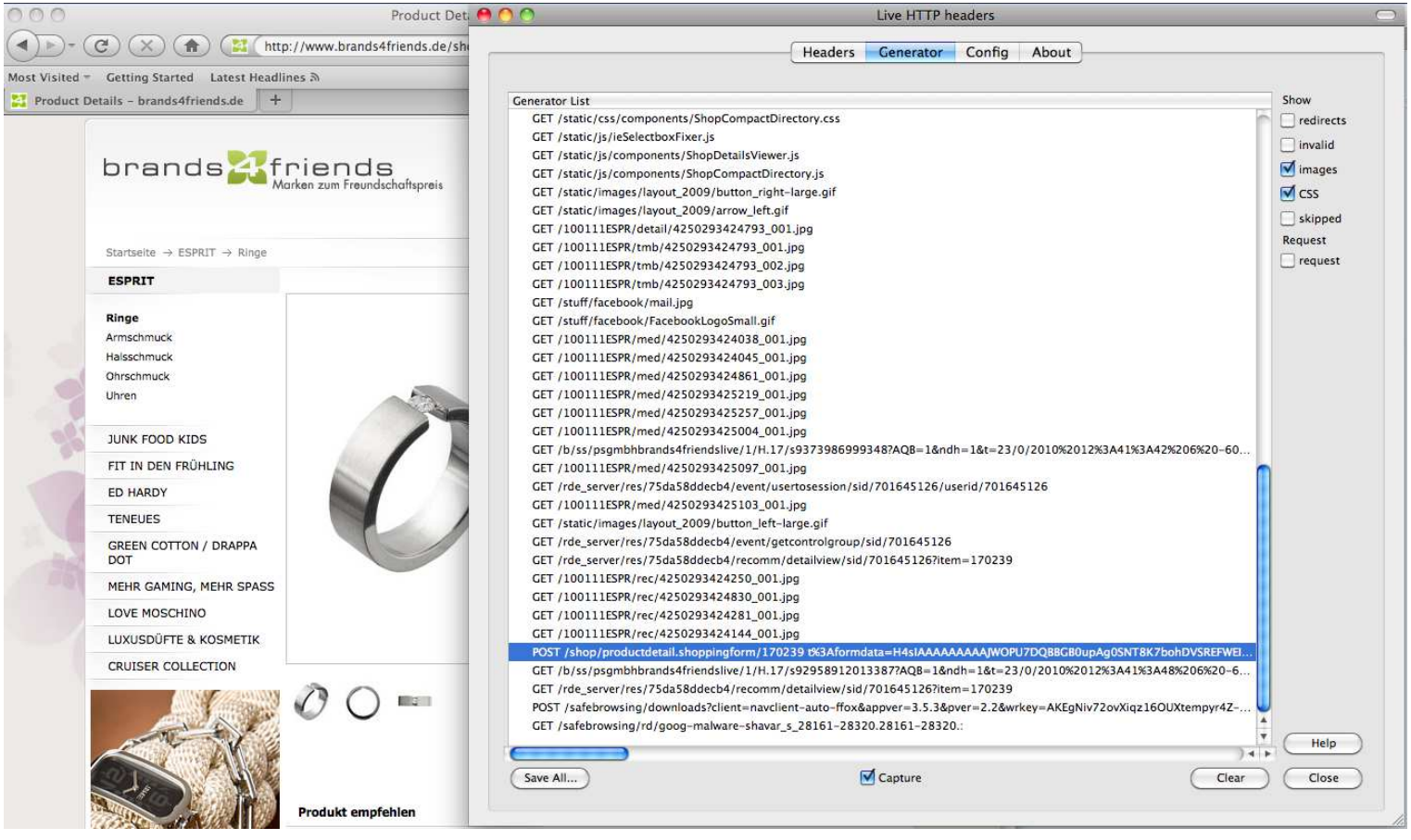
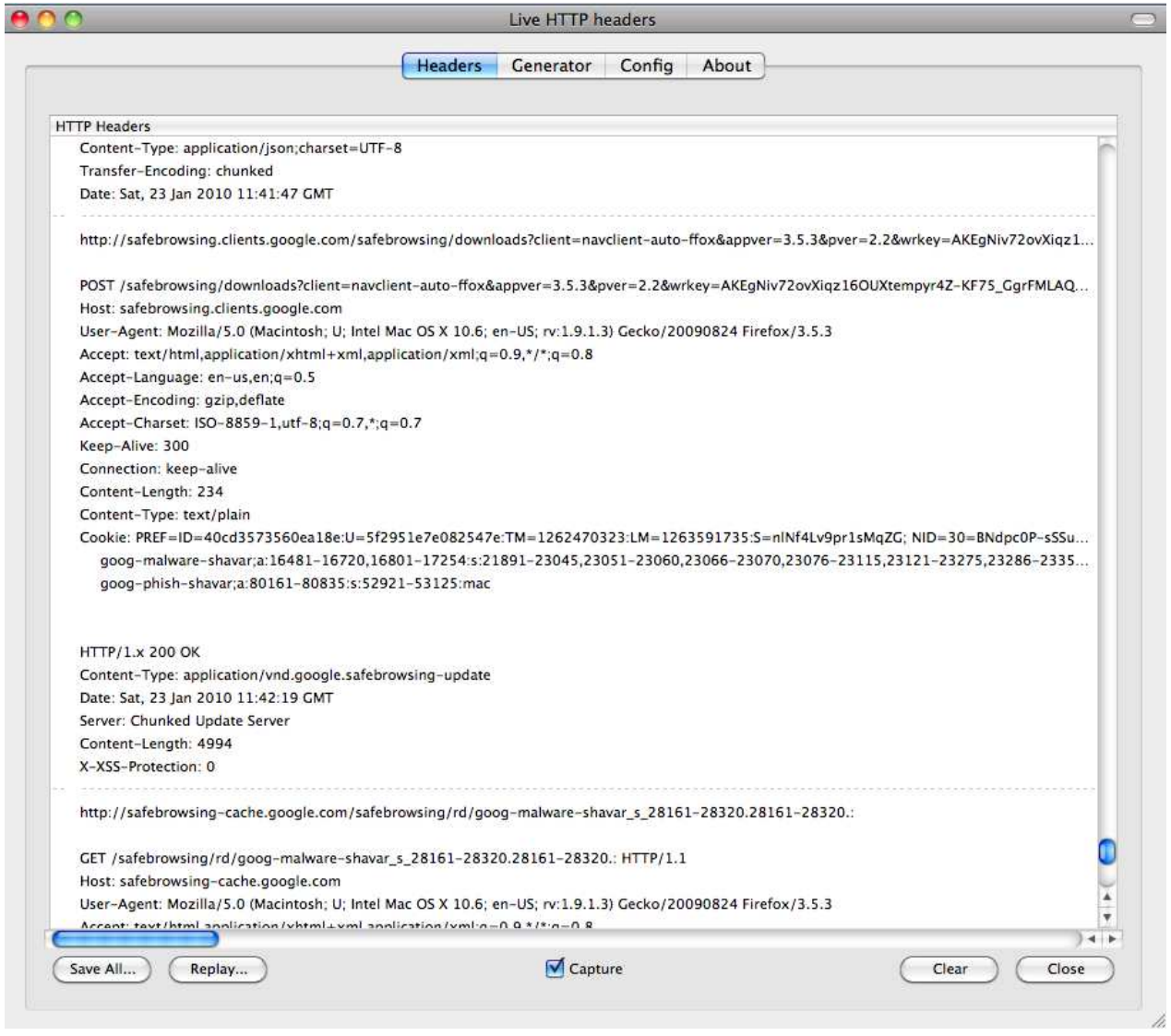
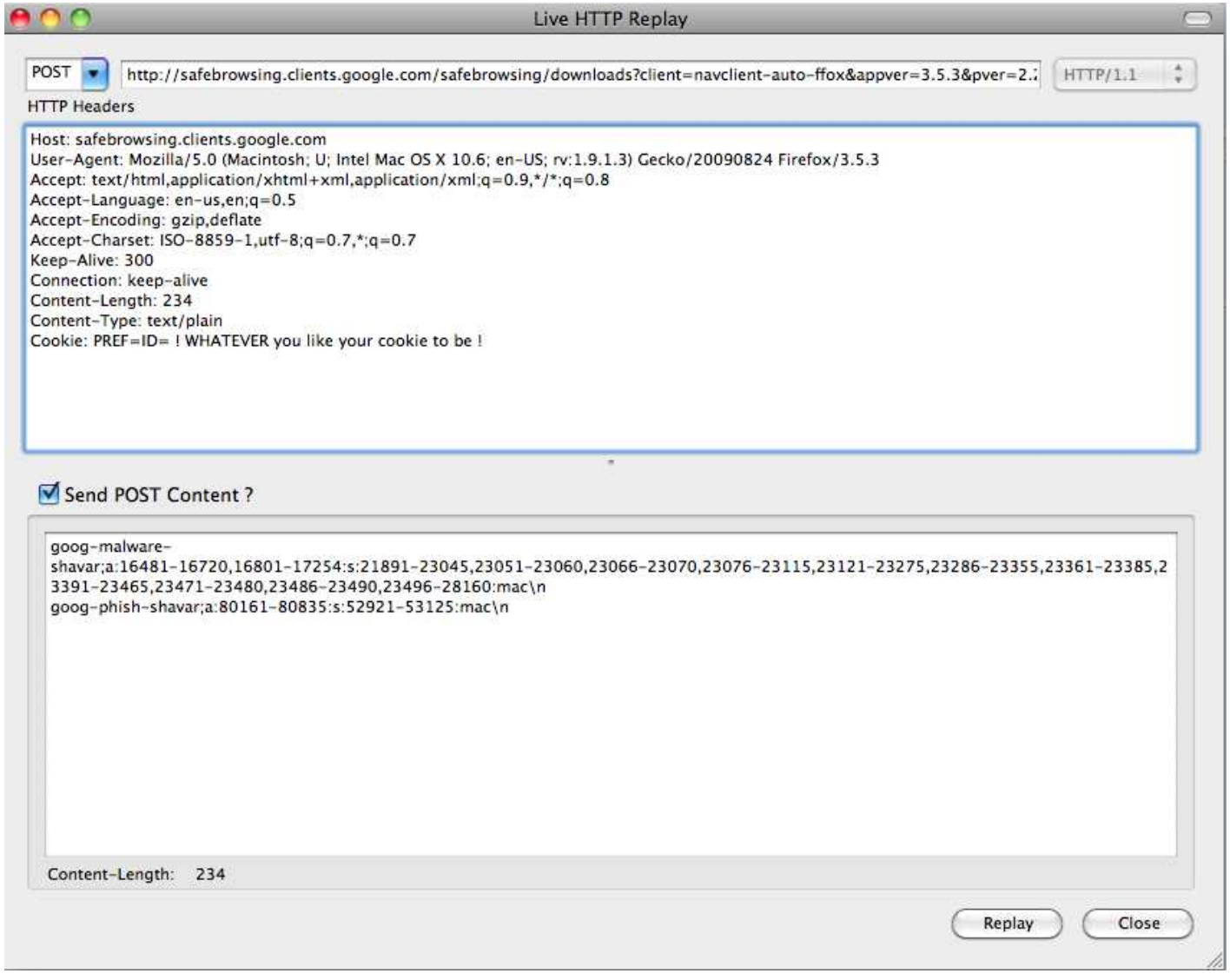
Fehlersuche

- View Result in Tree (evtl. mit “log errors only”)
- Test mit einen Thread und einen Loop-Count von eins laufen lassen
- JMeter-Log-Level in `bin/jmeter.properties` erhöhen
- “What’s this node?” Menü-Option gibt Klassennamen aus
- Live HTTP Headers und Firebug Firefox-Plugins

Live HTTP Headers




Live HTTP headers
Headers
Generator
Config
About
HTTP Headers
Content-Type: application/json;charset=UTF-8
Transfer-Encoding: chunked
Date: Sat, 23 Jan 2010 11:41:47 GMT
http://safebrowsing.clients.google.com/safebrowsing/downloads?client=navclient-auto-ffox&appver=3.5.3&pver=2.2&wrkey=AKEgNiv72ovXiqz1...
POST /safebrowsing/downloads?client=navclient-auto-ffox&appver=3.5.3&pver=2.2&wrkey=AKEgNiv72ovXiqz16OUXtempyr4Z-KF75_GgrFMLAQ...
Host: safebrowsing.clients.google.com
User-Agent: Mozilla/5.0 (Macintosh; U; Intel Mac OS X 10.6; en-US; rv:1.9.1.3) Gecko/20090824 Firefox/3.5.3
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-us,en;q=0.5
Accept-Encoding: gzip,deflate
Accept-Charset: ISO-8859-1,utf-8;q=0.7,*;q=0.7
Keep-Alive: 300
Connection: keep-alive
Content-Length: 234
Content-Type: text/plain
Cookie: PREF=ID=40cd3573560ea18e:U=5f2951e7e082547e:TM=1262470323:LM=1263591735:S=nlNf4Lv9pr1sMqZG; NID=30=BNdpc0P-sSSu...
goog-malware-shavar;a:16481-16720,16801-17254:s:21891-23045,23051-23060,23066-23070,23076-23115,23121-23275,23286-2335...
goog-phish-shavar;a:80161-80835:s:52921-53125:mac
HTTP/1.x 200 OK
Content-Type: application/vnd.google.safebrowsing-update
Date: Sat, 23 Jan 2010 11:42:19 GMT
Server: Chunked Update Server
Content-Length: 4994
X-XSS-Protection: 0
http://safebrowsing-cache.google.com/safebrowsing/rd/goog-malware-shavar_s_28161-28320.28161-28320.:
GET /safebrowsing/rd/goog-malware-shavar_s_28161-28320.28161-28320.: HTTP/1.1
Host: safebrowsing-cache.google.com
User-Agent: Mozilla/5.0 (Macintosh; U; Intel Mac OS X 10.6; en-US; rv:1.9.1.3) Gecko/20090824 Firefox/3.5.3
Save All...
Replay...
Capture
Clear
Close


Live HTTP Replay
POST
http://safebrowsing.clients.google.com/safebrowsing/downloads?client=navclient-auto-ffox&appver=3.5.3&pver=2.2
HTTP/1.1
HTTP Headers
Host: safebrowsing.clients.google.com
User-Agent: Mozilla/5.0 (Macintosh; U; Intel Mac OS X 10.6; en-US; rv:1.9.1.3) Gecko/20090824 Firefox/3.5.3
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-us,en;q=0.5
Accept-Encoding: gzip,deflate
Accept-Charset: ISO-8859-1,utf-8;q=0.7,*;q=0.7
Keep-Alive: 300
Connection: keep-alive
Content-Length: 234
Content-Type: text/plain
Cookie: PREF=ID= ! WHATEVER you like your cookie to be !
Send POST Content ?
goog-malware-
shavar;a:16481-16720,16801-17254:s:21891-23045,23051-23060,23066-23070,23076-23115,23121-23275,23286-23355,23361-23385,2
3391-23465,23471-23480,23486-23490,23496-28160:mac\n
goog-phish-shavar;a:80161-80835:s:52921-53125:mac\n
Content-Length: 234
Replay
Close

Simpler HTTP-Testplan

Erweiterungen

Testpläne parametrisieren

Fallstricke

Zusammenfassung

Zusammenfassung

- Konzepte
- Testpläne und Parametrisierung
- Fallstricke

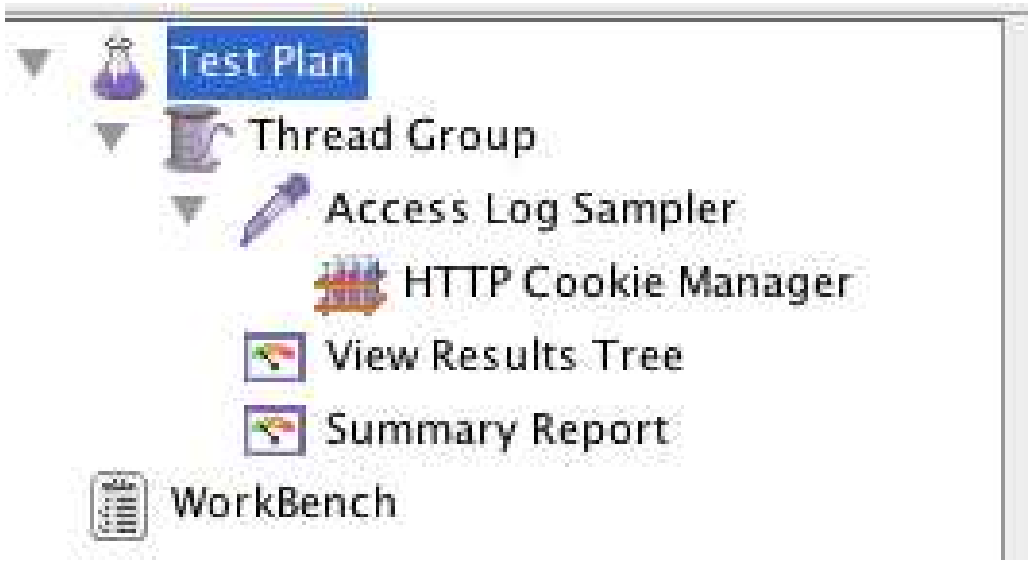
Dokumentation

- `http://jakarta.apache.org/jmeter/usermanual/`
- “Help! My boss wants me to load test our web app!”
  - `http://jakarta.apache.org/jmeter/usermanual/boss.html`
- Mailinglisten
  - `http://jakarta.apache.org/site/mail2.html#JMeter`
- `svn co http://svn.apache.org/repos/asf/jakarta/jmeter/`

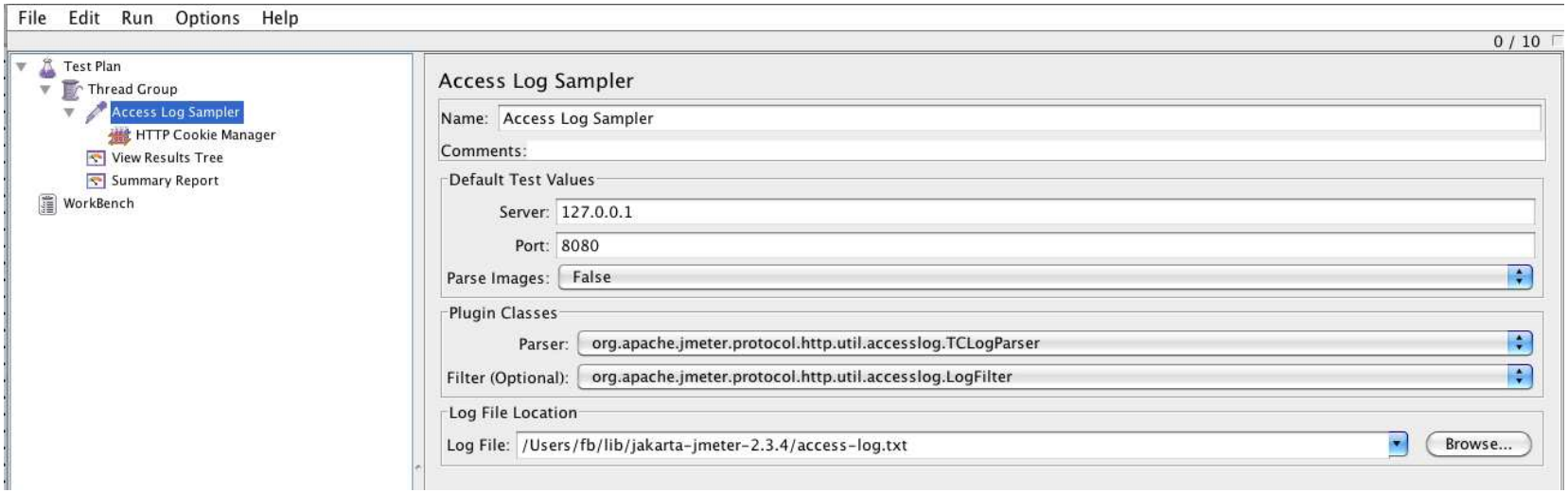
Danke!

Fragen? Anregungen? Kritik?

Access Log Testplan

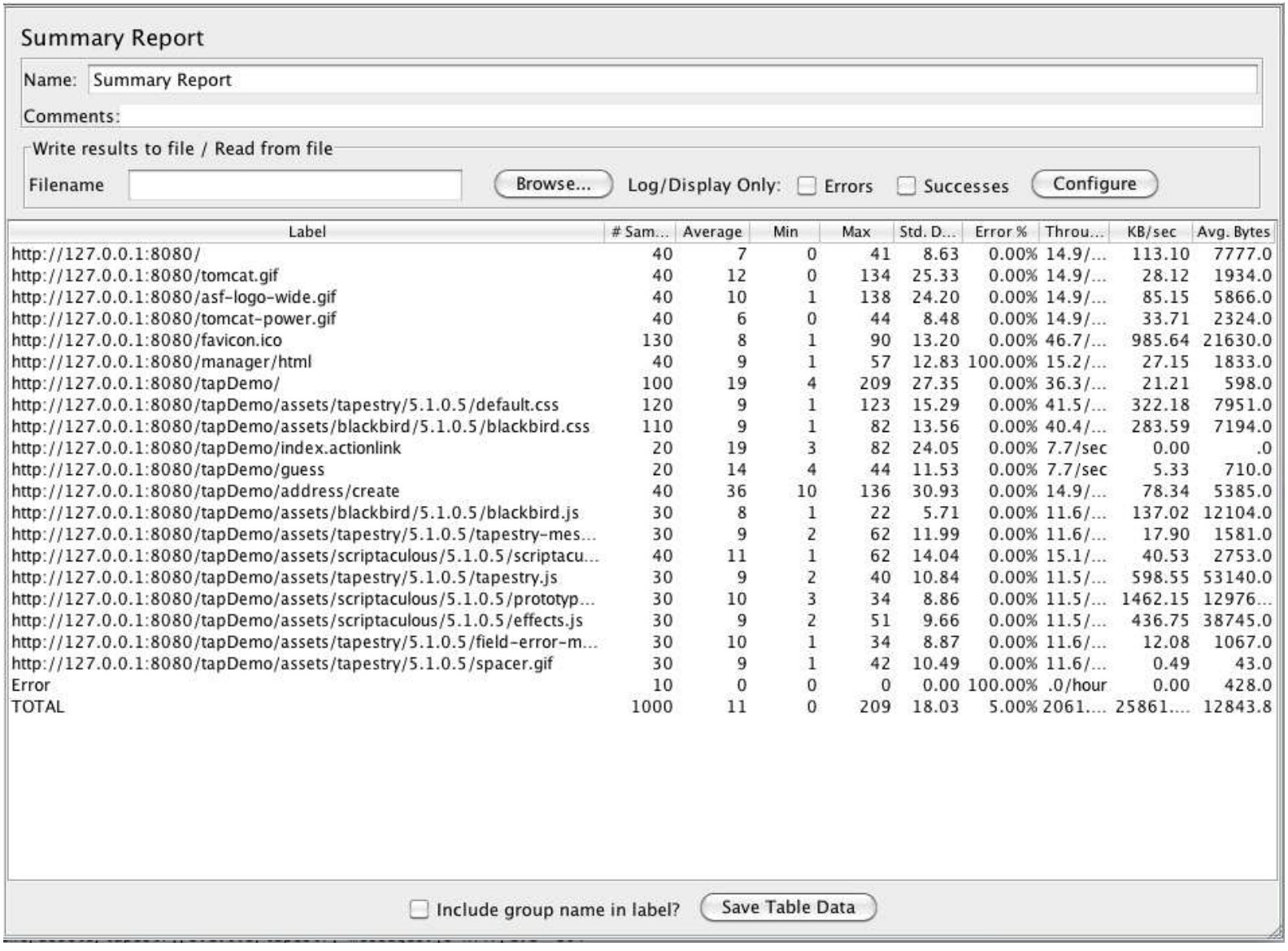


Access Log Sampler



Access Log Sampler

- Keine POST-Parameter
- Session Filter
- Cookie Manager sorgt für die richtigen^{TM} Cookies



Summary Report

Name: Summary Report

Comments:

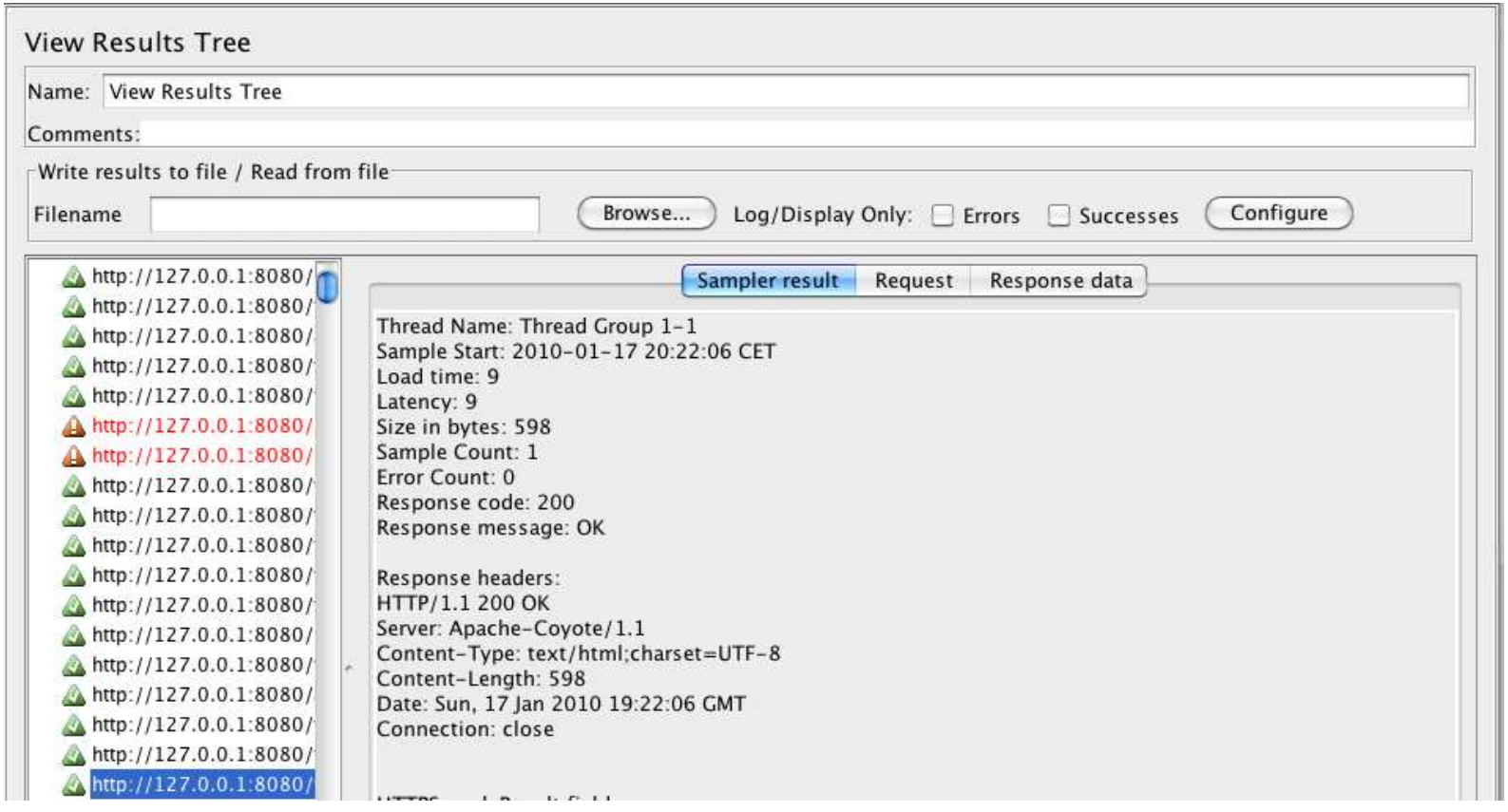
Write results to file / Read from file

Filename Browse... Log/Display Only: Errors Successes Configure

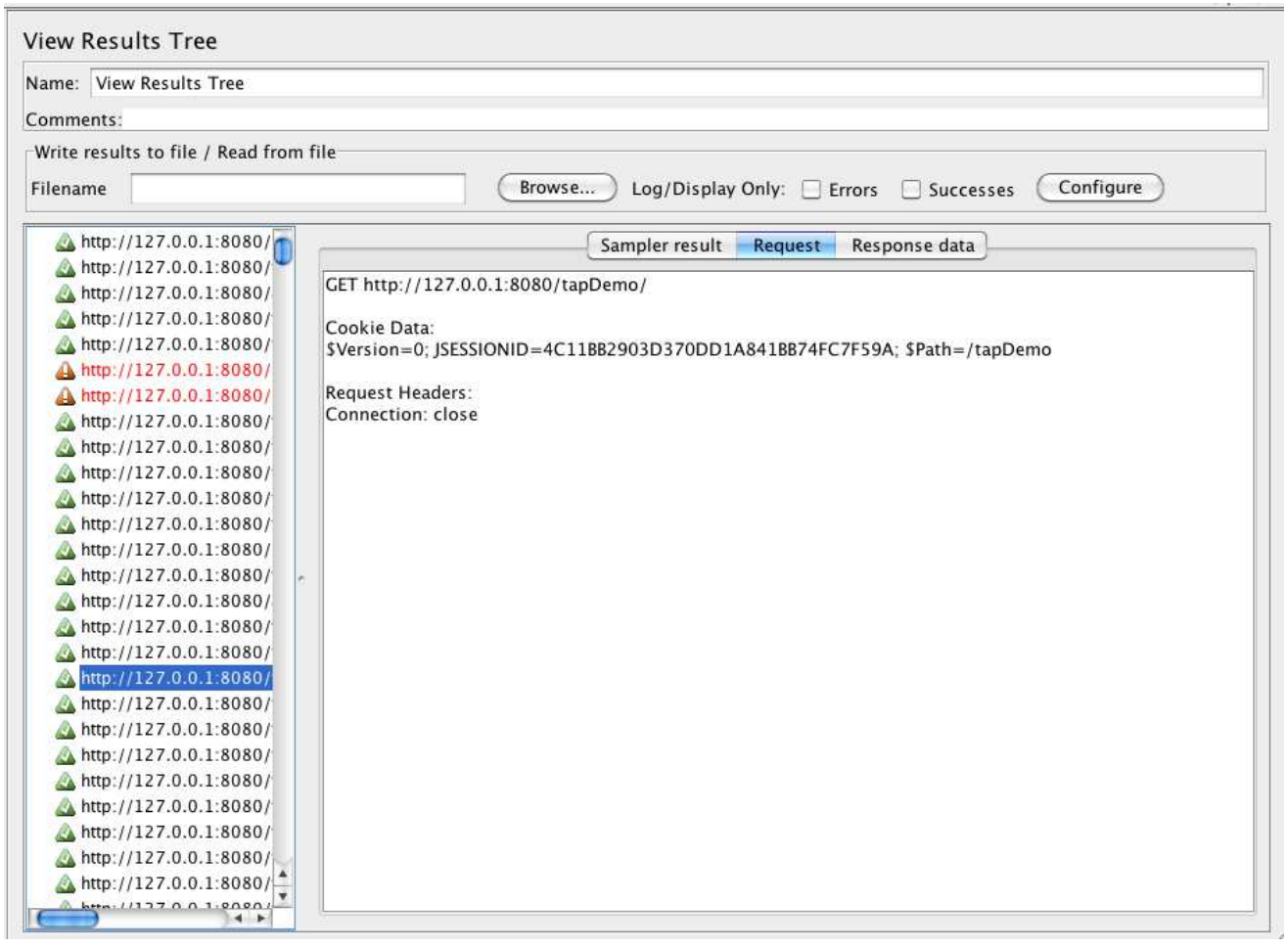
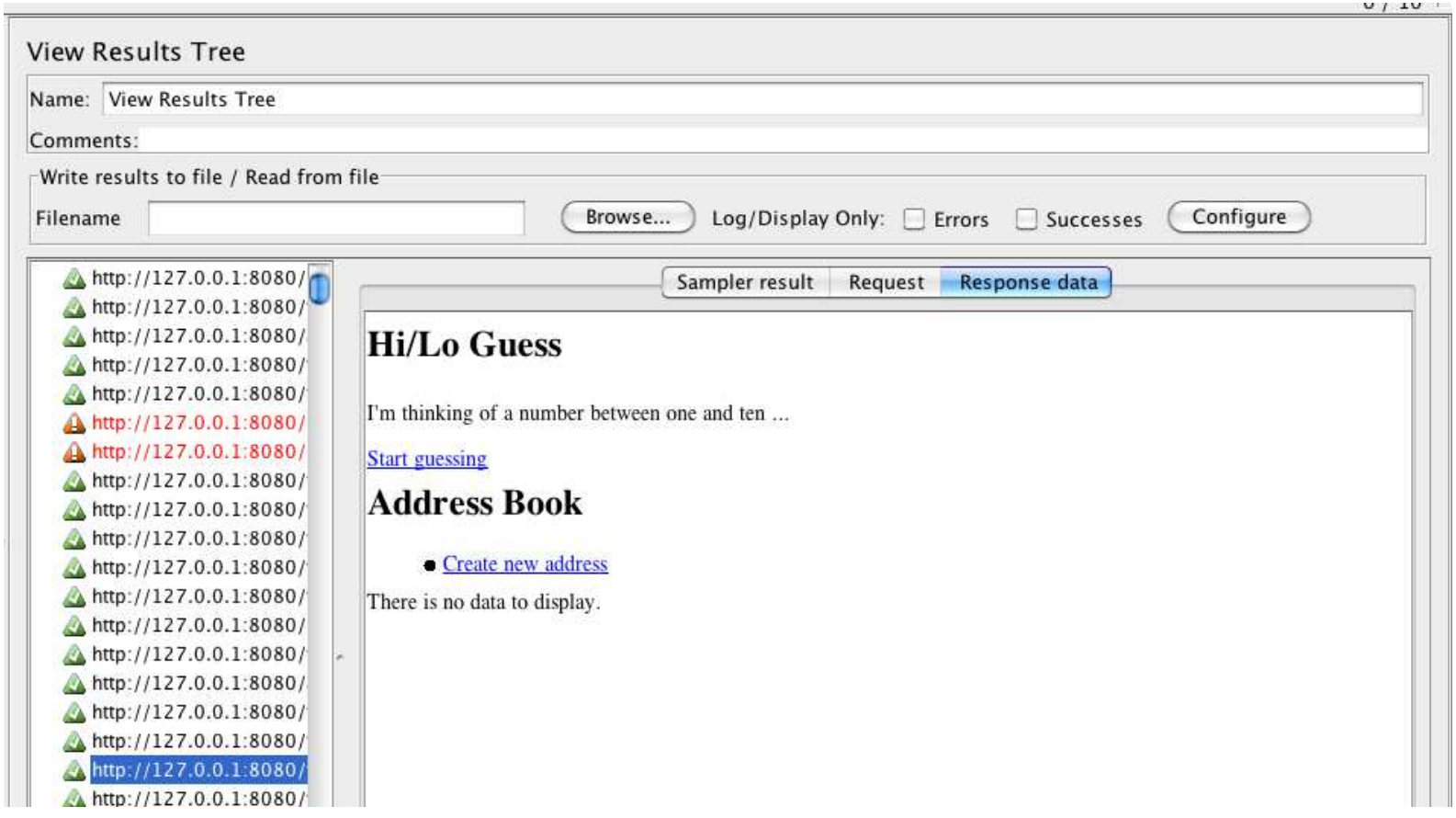
Label	# Sam...	Average	Min	Max	Std. D...	Error %	Throu...	KB/sec	Avg. Bytes
http://127.0.0.1:8080/	40	7	0	41	8.63	0.00%	14.9/...	113.10	7777.0
http://127.0.0.1:8080/tomcat.gif	40	12	0	134	25.33	0.00%	14.9/...	28.12	1934.0
http://127.0.0.1:8080/asf-logo-wide.gif	40	10	1	138	24.20	0.00%	14.9/...	85.15	5866.0
http://127.0.0.1:8080/tomcat-power.gif	40	6	0	44	8.48	0.00%	14.9/...	33.71	2324.0
http://127.0.0.1:8080/favicon.ico	130	8	1	90	13.20	0.00%	46.7/...	985.64	21630.0
http://127.0.0.1:8080/manager/html	40	9	1	57	12.83	100.00%	15.2/...	27.15	1833.0
http://127.0.0.1:8080/tapDemo/	100	19	4	209	27.35	0.00%	36.3/...	21.21	598.0
http://127.0.0.1:8080/tapDemo/assets/tapestry/5.1.0.5/default.css	120	9	1	123	15.29	0.00%	41.5/...	322.18	7951.0
http://127.0.0.1:8080/tapDemo/assets/blackbird/5.1.0.5/blackbird.css	110	9	1	82	13.56	0.00%	40.4/...	283.59	7194.0
http://127.0.0.1:8080/tapDemo/index.actionlink	20	19	3	82	24.05	0.00%	7.7/sec	0.00	.0
http://127.0.0.1:8080/tapDemo/guess	20	14	4	44	11.53	0.00%	7.7/sec	5.33	710.0
http://127.0.0.1:8080/tapDemo/address/create	40	36	10	136	30.93	0.00%	14.9/...	78.34	5385.0
http://127.0.0.1:8080/tapDemo/assets/blackbird/5.1.0.5/blackbird.js	30	8	1	22	5.71	0.00%	11.6/...	137.02	12104.0
http://127.0.0.1:8080/tapDemo/assets/tapestry/5.1.0.5/tapestry-mes...	30	9	2	62	11.99	0.00%	11.6/...	17.90	1581.0
http://127.0.0.1:8080/tapDemo/assets/scriptaculous/5.1.0.5/scriptacu...	40	11	1	62	14.04	0.00%	15.1/...	40.53	2753.0
http://127.0.0.1:8080/tapDemo/assets/tapestry/5.1.0.5/tapestry.js	30	9	2	40	10.84	0.00%	11.5/...	598.55	53140.0
http://127.0.0.1:8080/tapDemo/assets/scriptaculous/5.1.0.5/prototyp...	30	10	3	34	8.86	0.00%	11.5/...	1462.15	12976...
http://127.0.0.1:8080/tapDemo/assets/scriptaculous/5.1.0.5/effects.js	30	9	2	51	9.66	0.00%	11.5/...	436.75	38745.0
http://127.0.0.1:8080/tapDemo/assets/tapestry/5.1.0.5/field-error-m...	30	10	1	34	8.87	0.00%	11.6/...	12.08	1067.0
http://127.0.0.1:8080/tapDemo/assets/tapestry/5.1.0.5/spacer.gif	30	9	1	42	10.49	0.00%	11.6/...	0.49	43.0
Error	10	0	0	0	0.00	100.00%	.0/hour	0.00	428.0
TOTAL	1000	11	0	209	18.03	5.00%	2061....	25861....	12843.8

Include group name in label? Save Table Data

Sample Result



Sample Request



Sample Response