PERFORMANCE TESTING TOOLS

- (Standalone) Tool
  - Performance Testen (Load, Stress,...)
  - Apache Projekt
  - Frei verfügbar
  - Integration in andere Umgebungen (Maven,...)
  - Breites Spektrum an Funktionalität verfügbar (Web-Tests, DB-Tests, FTP-Tests,...)

Resources

- JMeter
  - http://jmeter.apache.org/usermanual/get-started.html
- JMeter Plugins
  - https://jmeter-plugins.org
- BlazeMeter
  - https://www.blazemeter.com

INSTALLATION

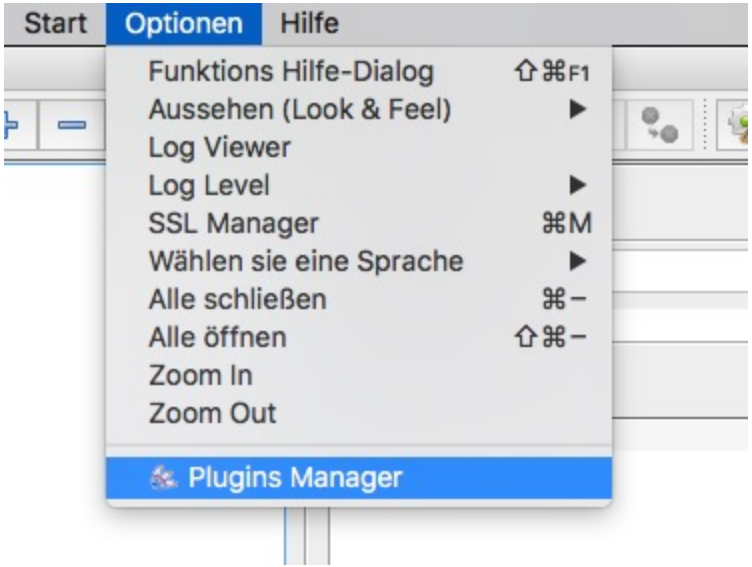
Installation

- JMeter (JDK necessary)
  - http://jmeter.apache.org/download_jmeter.cgi

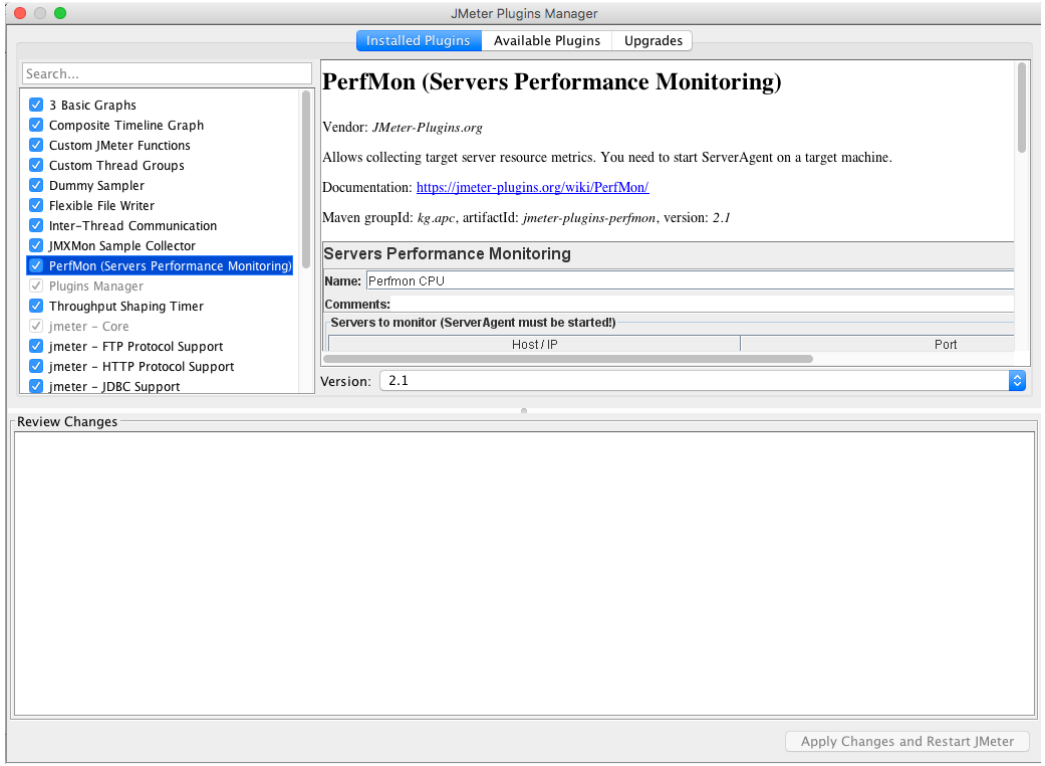
- JMeter Plugins Manager
  - https://jmeter-plugins.org/downloads/all/

→Copy to ext/lib → restart JMeter

Installation

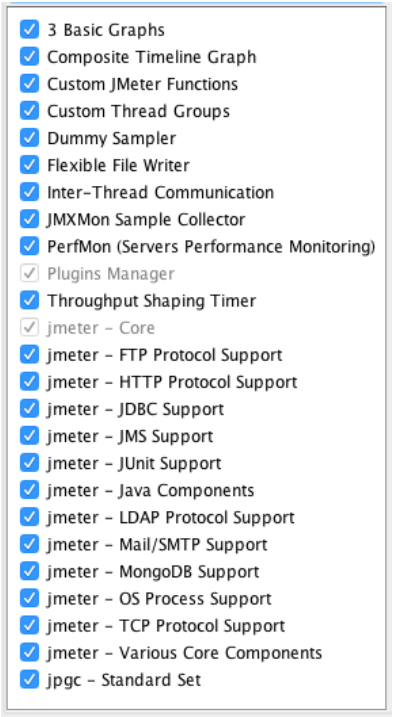


Installation



Installation

- Plugins
  - „jpgc – Standard Set“
  - „3 Basic Graphs“
  - „PerfMon“



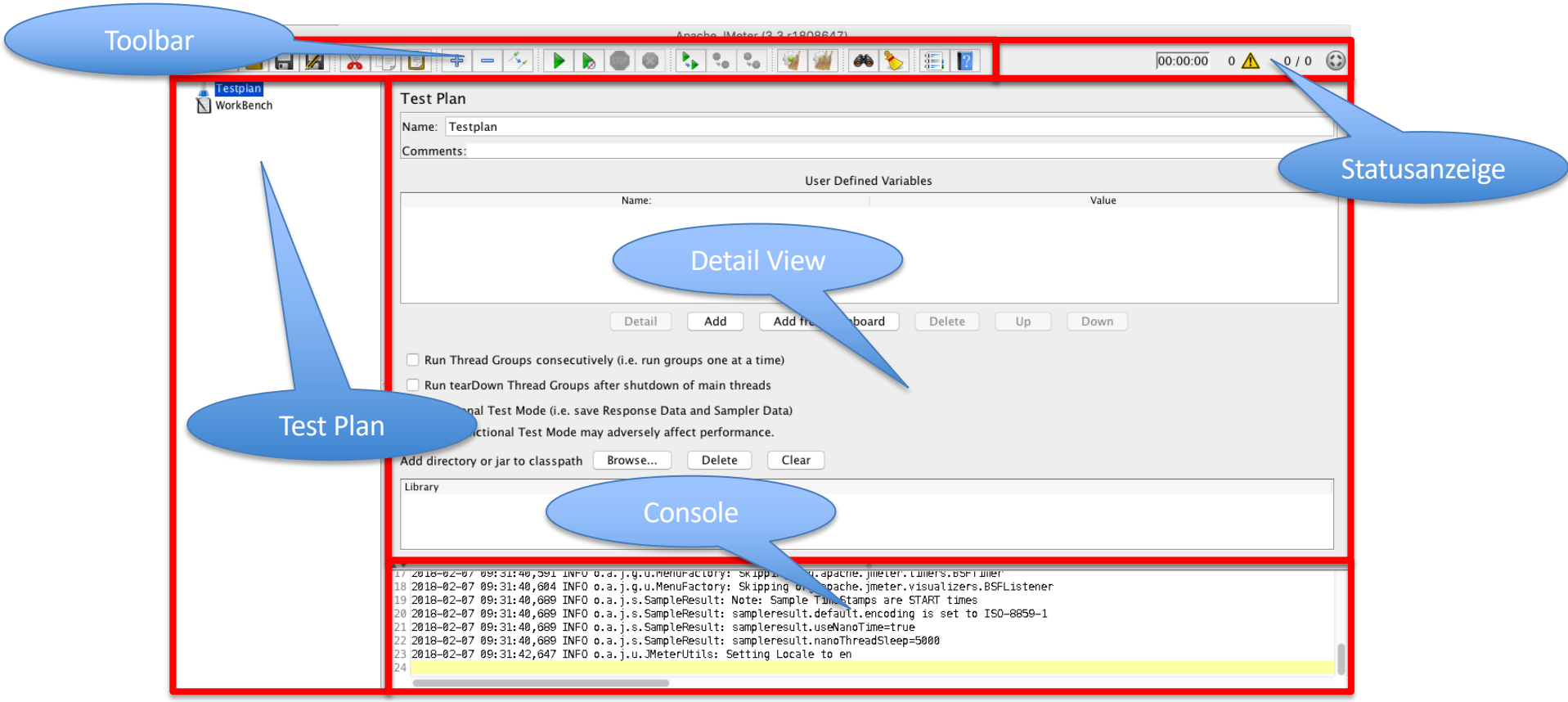
Start

- Testcreation/Testdebugging via GUI
  - jmeter.sh or jmeter.bat

- Testrun
  - Console!

```
ramirez-mon:bin chris$ ./jmeter.sh
================================================================================
Don't use GUI mode for load testing, only for Test creation and Test debugging !
For load testing, use NON GUI Mode:
   jmeter -n -t [jmx file] -l [results file] -e -o [Path to output folder]
& adapt Java Heap to your test requirements:
   Modify HEAP="-Xms512m -Xmx512m" in the JMeter batch file
================================================================================
```

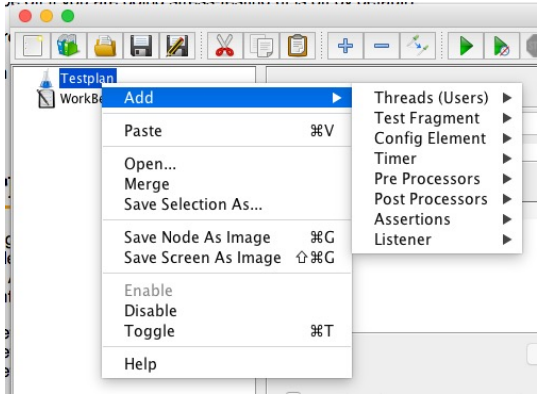
TOOL - GUI

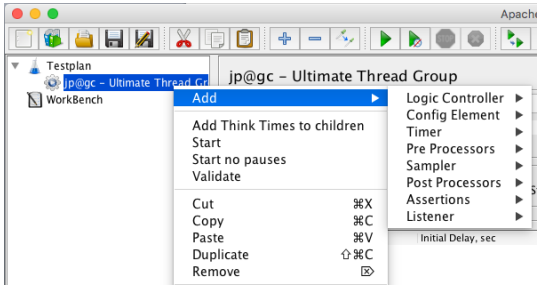

Toolbar
Statusanzeige
Detail View
Test Plan
Console
Testplan
WorkBench
Test Plan
Name: Testplan
Comments:
User Defined Variables
Name:
Value
Detail
Add
Delete
Up
Down
Run Thread Groups consecutively (i.e. run groups one at a time)
Run tearDown Thread Groups after shutdown of main threads
Add directory or jar to classpath
Browse...
Delete
Clear
Library
00:00:00
0
0 / 0
2018-02-07 09:31:40,604 INFO o.a.j.g.u.MenuFactory: Skipping
2018-02-07 09:31:40,689 INFO o.a.j.s.SampleResult: Note: Sample TimeStamps are START times
2018-02-07 09:31:40,689 INFO o.a.j.s.SampleResult: sampleresult.default.encoding is set to ISO-8859-1
2018-02-07 09:31:40,689 INFO o.a.j.s.SampleResult: sampleresult.useNanoTime=true
2018-02-07 09:31:40,689 INFO o.a.j.s.SampleResult: sampleresult.nanoThreadSleep=5000
2018-02-07 09:31:42,647 INFO o.a.j.u.JMeterUtils: Setting Locale to en

JMeter Tests

- Test consist of different elements
  - Threads
  - Configurations
  - Samplers/Logic
  - Listeners
  - Assertions

- Grouping is possible (z.B. Sampler)



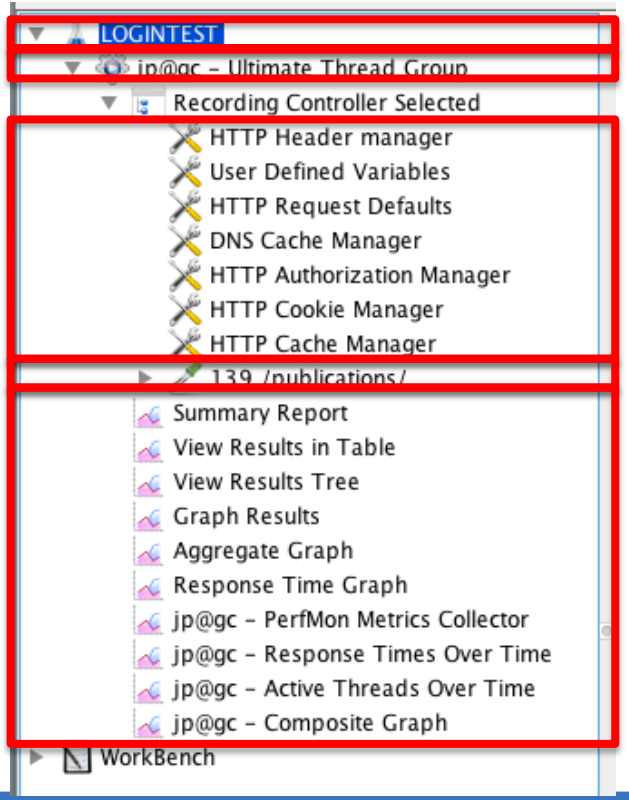


JMeter Tests

- Execution Order
  - Configuration elements
  - Pre-Processors
  - Timers
  - Sampler (in order)
  - Post-Processors (unless SampleResult is **null**)
  - Assertions (unless SampleResult is **null**)
  - Listeners (unless SampleResult is **null**)

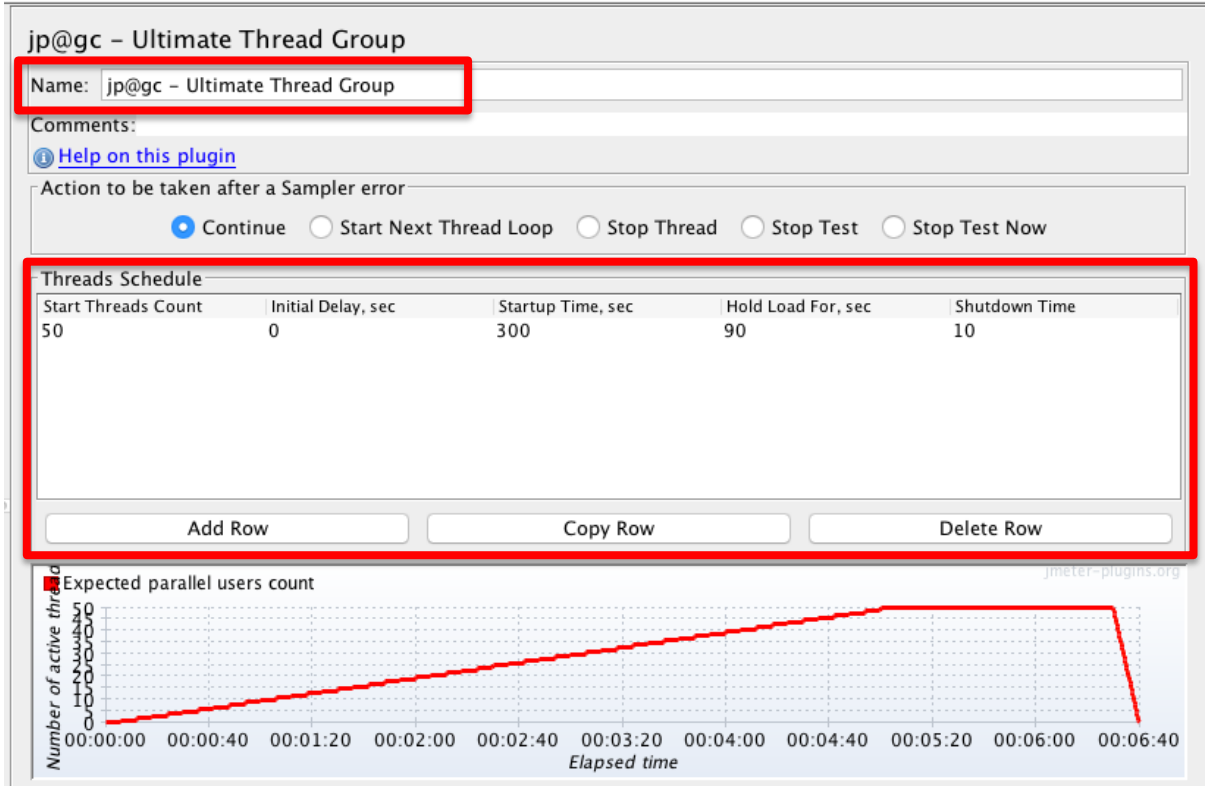
JMeter Test Plan

- Typical Test Plan
  - Root
  - User
  - Configuration
  - Actions
  - Results/Reports

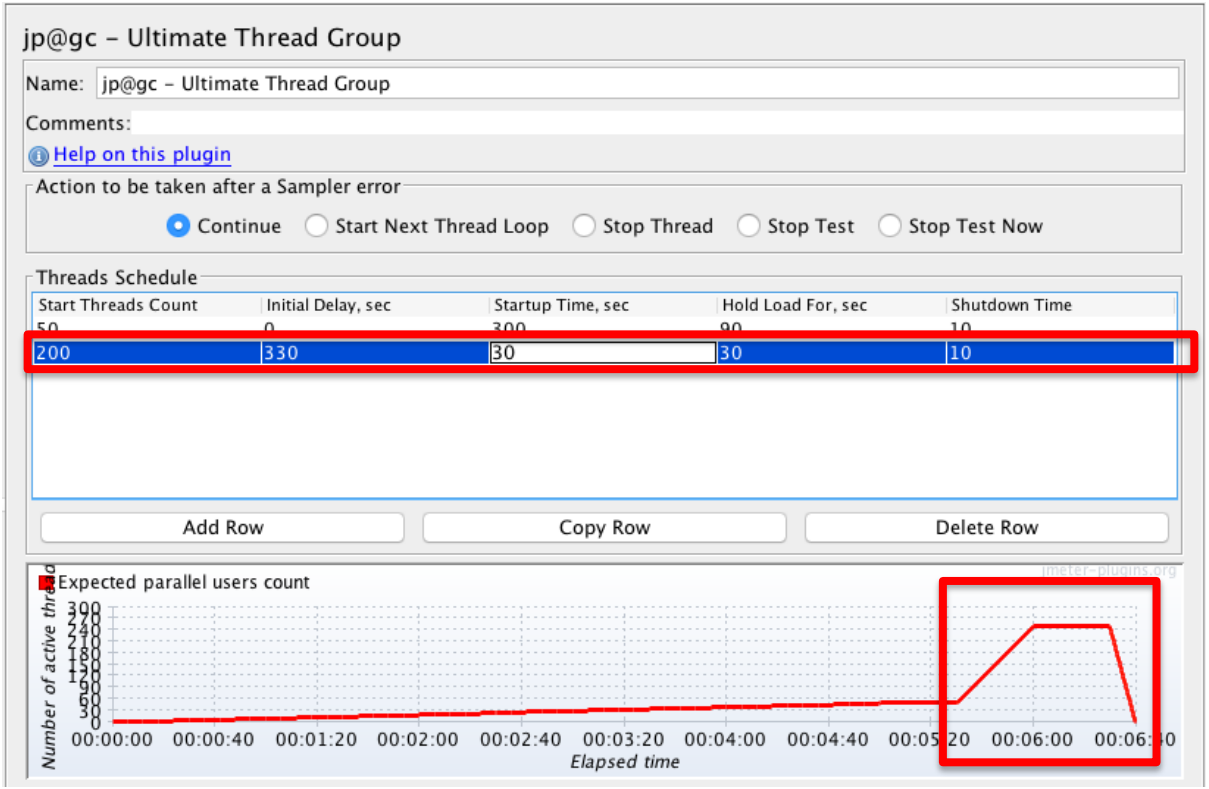


USERS/THREADS

JMeter Test Plan – Users



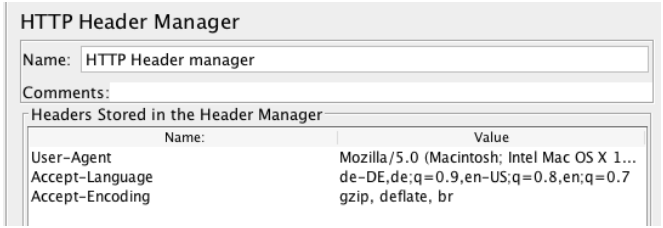
JMeter Test Plan – Users



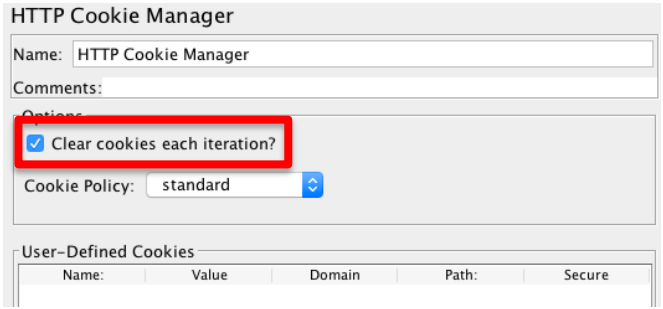
CONFIGURATION

JMeter Tests – Configuration

- HTTP Header Manager
  - User-Agent, Accept-Language, Accept-Encoding,...

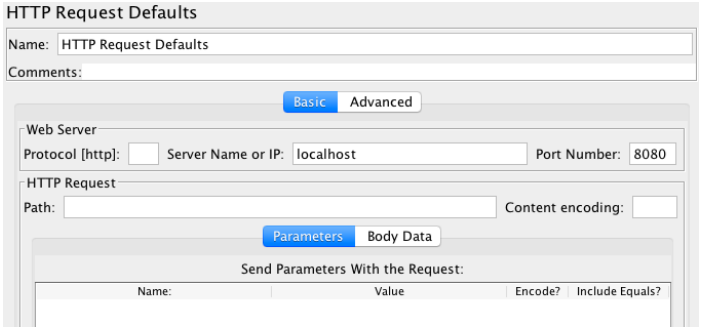


- HTTP Cookie Manager
  - Own Cookies oder Cookies of the page

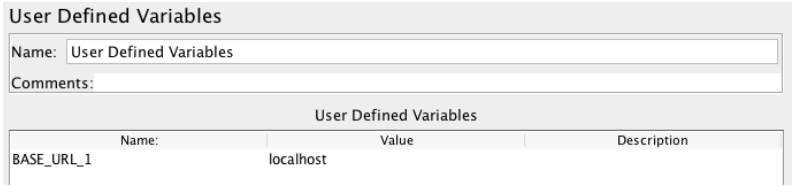


JMeter Tests – Configuration

- HTTP request defaults
  - Server, IP, Port, Path,...



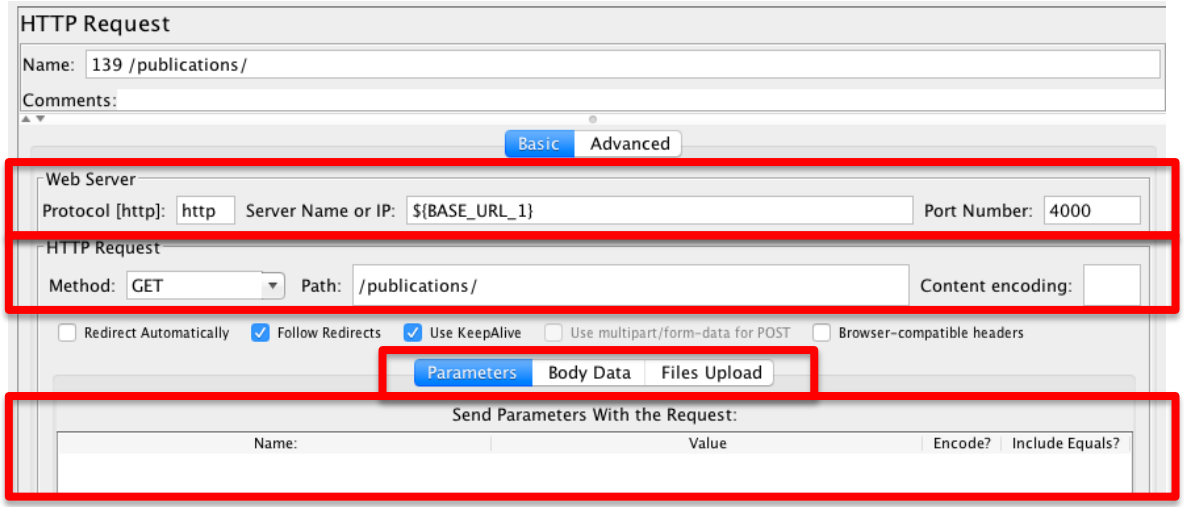
- User defined variables
  - Placeholder



ACTIONS (LOGIC/SAMPLER)

JMeter Tests – Actions

- HTTP Request
  - GET request to an address



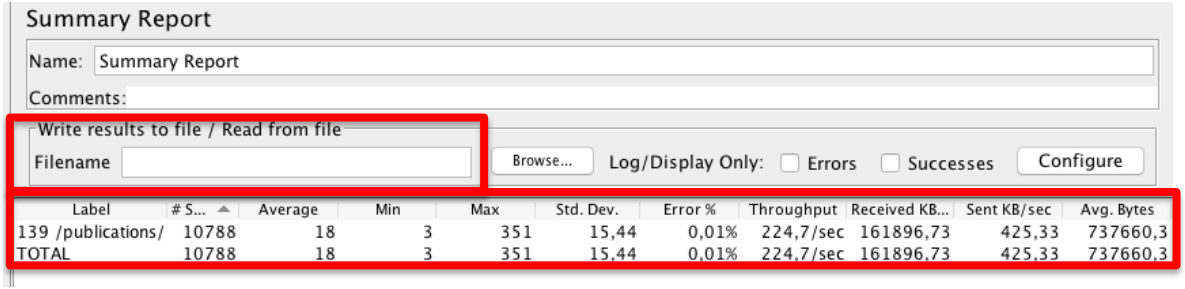
JMeter Tests – Actions

- Some other actions
  - DB
  - FTP
  - JMS
  - SMTP
  - JUnit!
  - Selenium
  - ...

RESULTS AND REPORTS

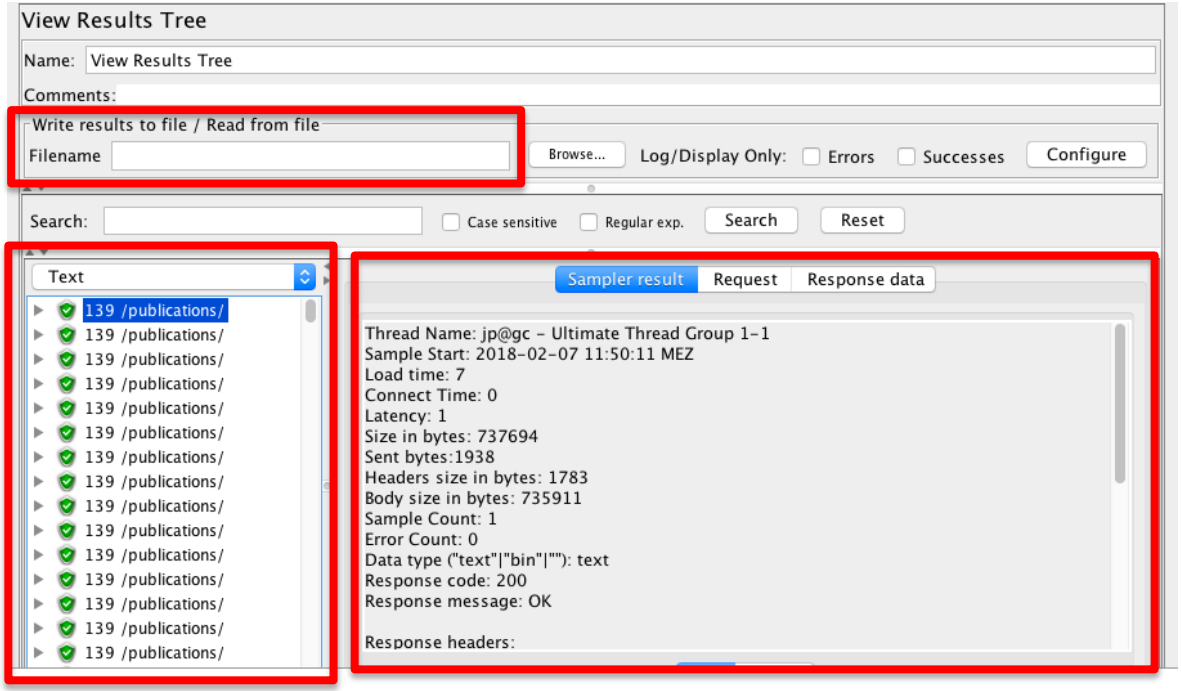
JMeter Tests – Results

- Summary Report

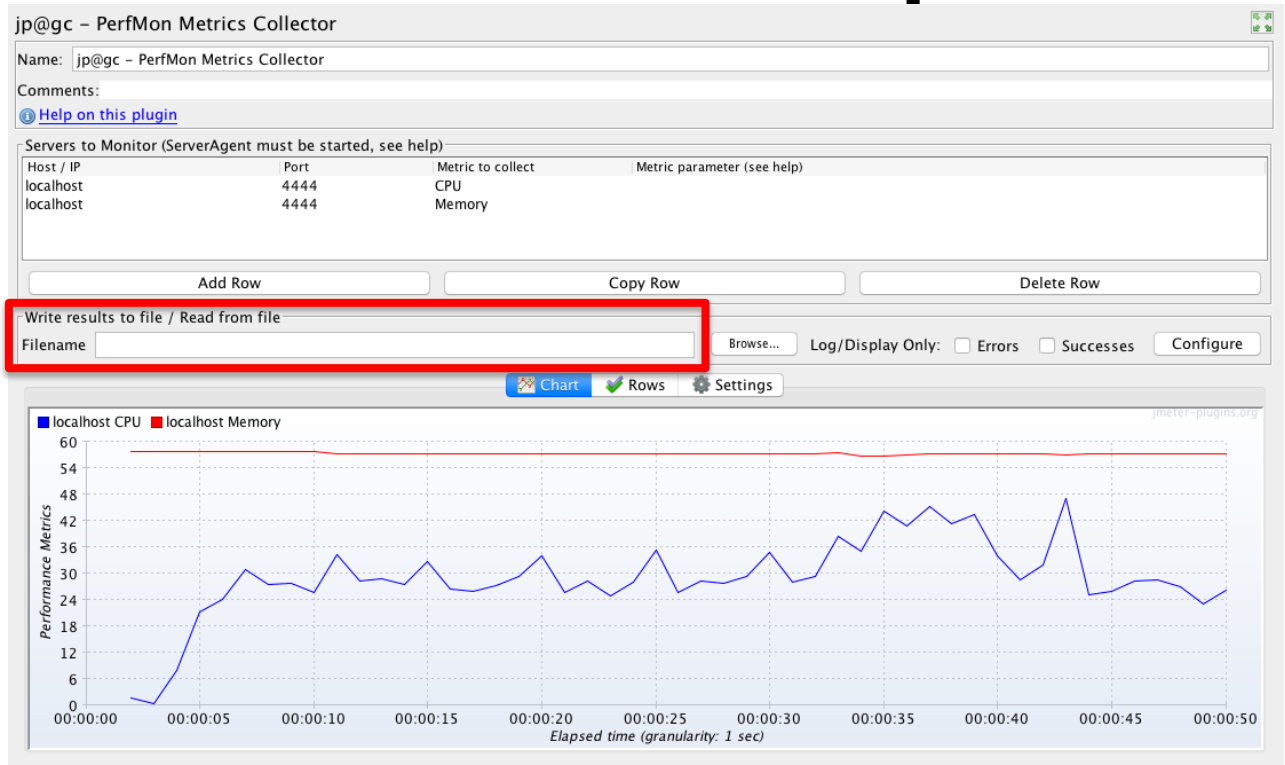


JMeter Tests – Results

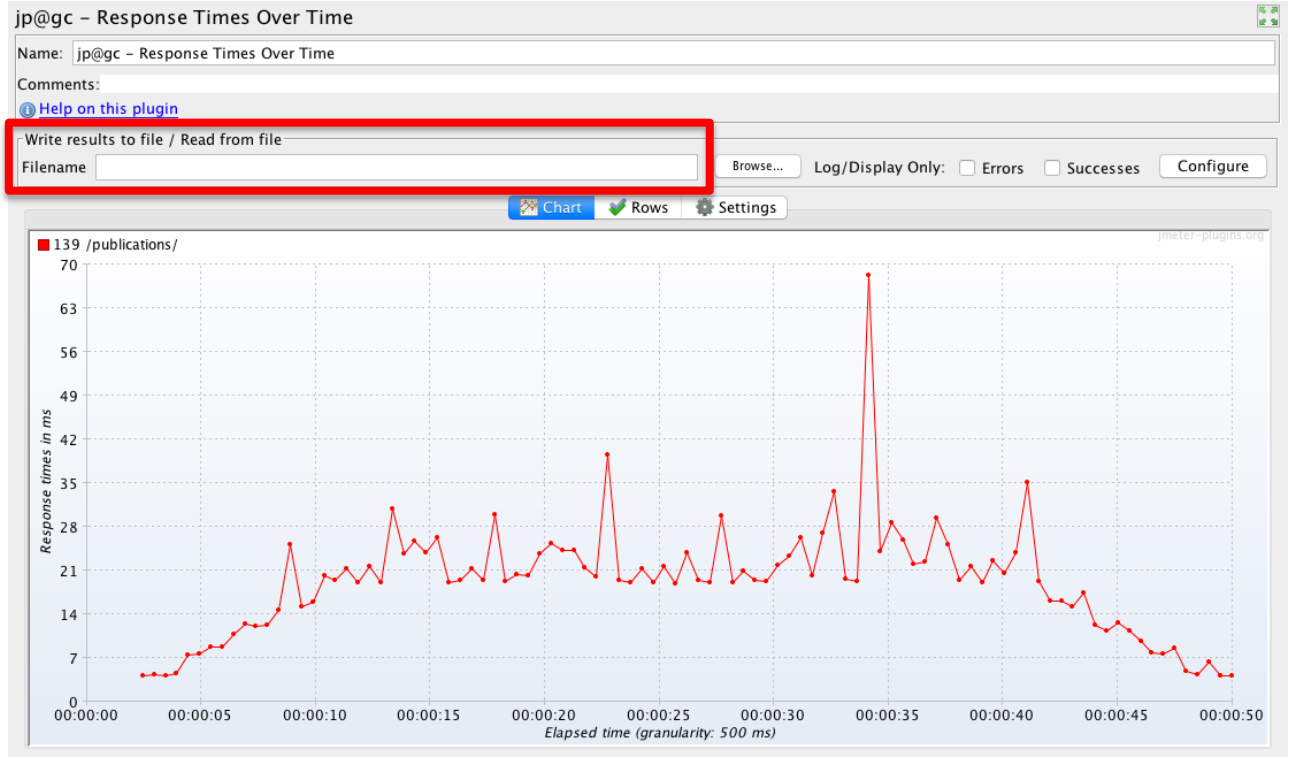
- Results in Table/Tree



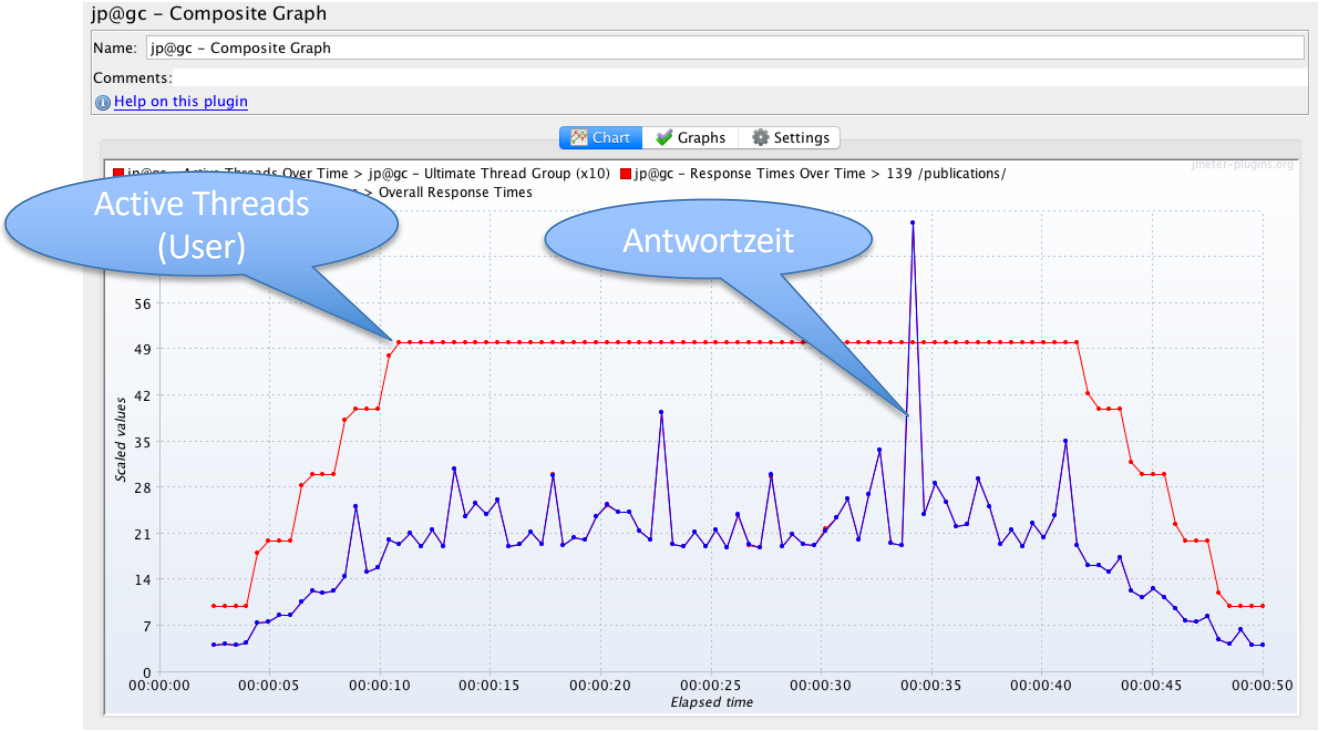
JMeter Tests – Reports



JMeter Tests – Reports



JMeter Tests – Reports

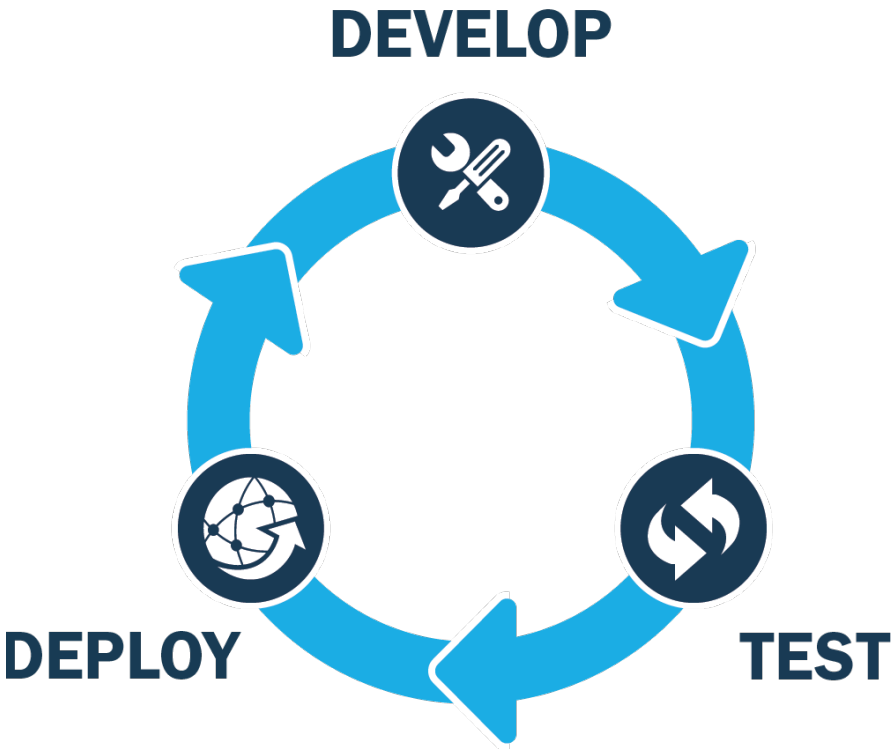


JMeter „Best Practice“

- Record tests
  - Built-in recorder (proxy)
  - BlazeMeter (browser plugin)

- Combination with other tools
  - Selenium (via JUnit tests or Selenium WebDriver plugin)

Advanced Usage – Continuous Integration

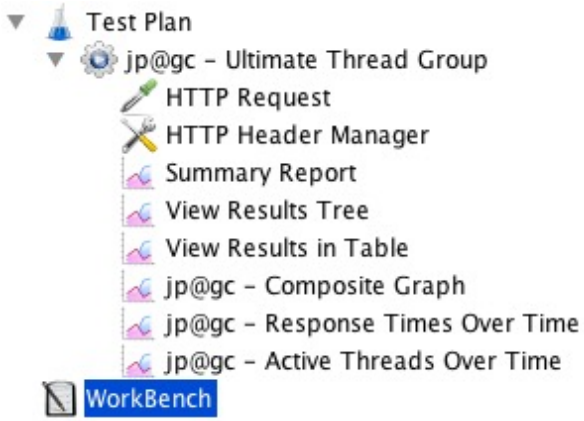


Advanced Usage – Continuous Integration

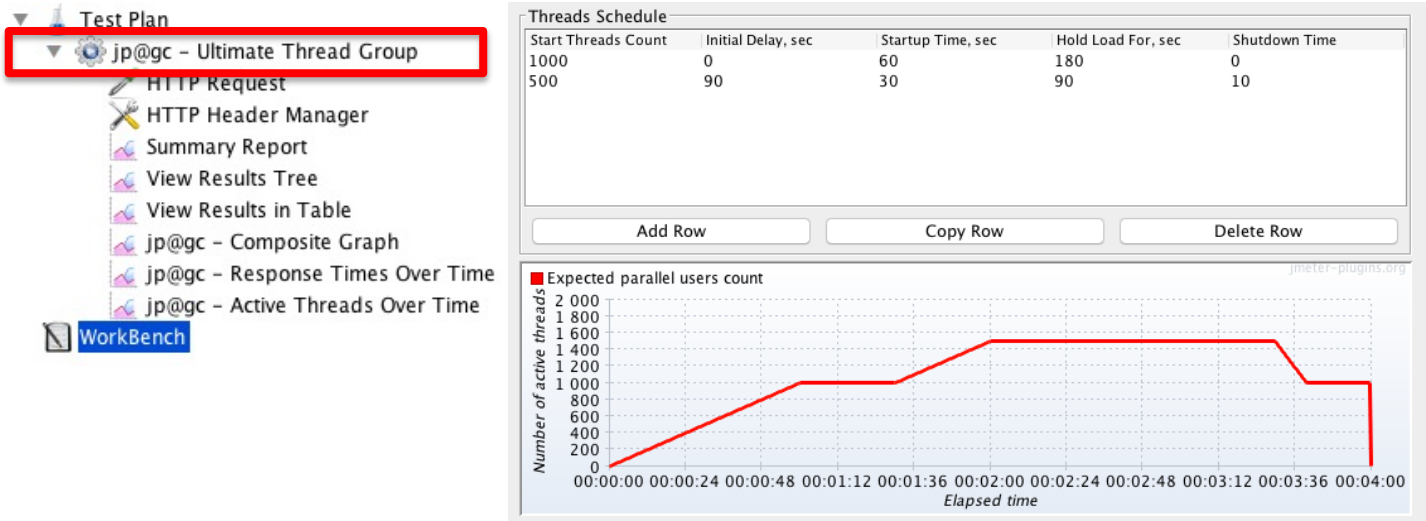
- JMeter with Apache Maven
  - Maven as build tool
  - JMeter as performance testing tool
- Uses the plugin mechanismus of Maven
  - JMeter out-of-the-box functionality is no problem
  - Extensions (plugins) not trivial (dependencies)
- Convention over Configuration
  - JMeter tests in src/test/jmeter

TESTPLAN

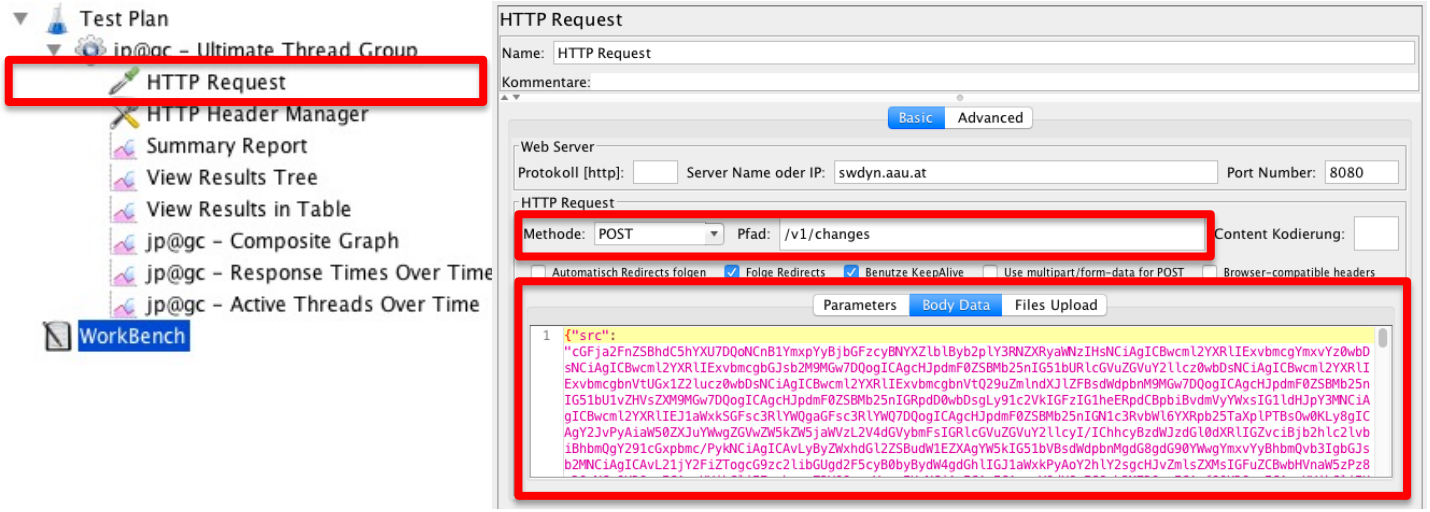
Advanced Usage – Continuous Integration



Advanced Usage – Continuous Integration

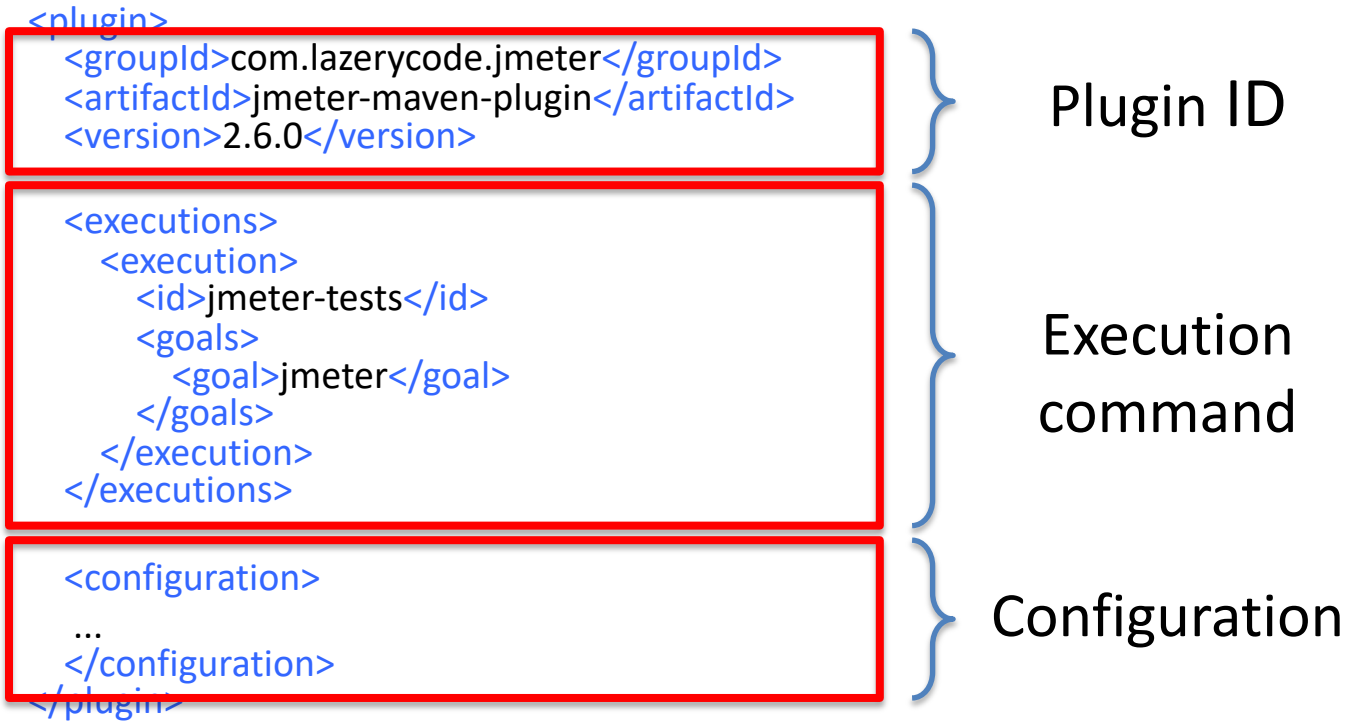


Advanced Usage – Continuous Integration



Advanced Usage – Continuous Integration

Advanced Usage – Continuous Integration



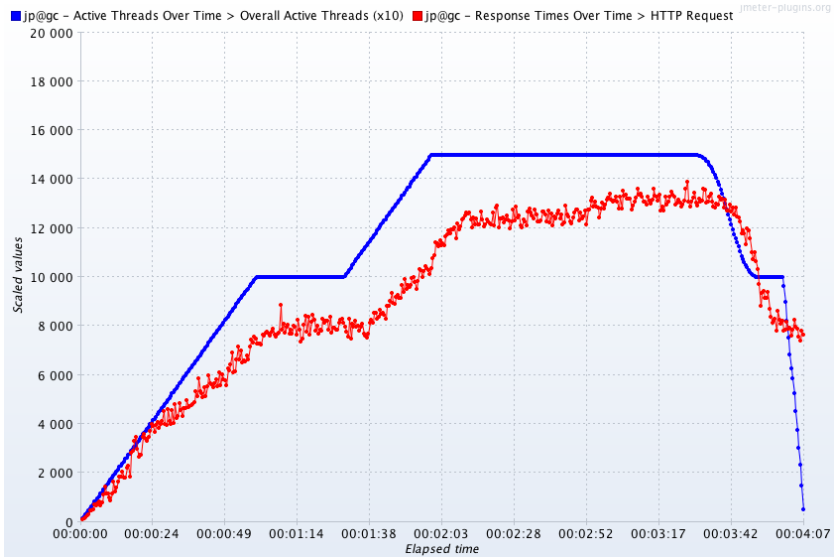
Advanced Usage – Continuous Integration

```
<plugin>
  ...
  <configuration>
  <jmeterVersion>3.3</jmeterVersion>
    <jmeterExtensions>
      <artifact>kg.apc:jmeter-plugins-casutg:2.5</artifact>
      <artifact>kg.apc:jmeter-plugins-dummy:0.2</artifact>
      <artifact>kg.apc:jmeter-plugins-ffw:2.0</artifact>
      <artifact>kg.apc:jmeter-plugins-fifo:0.2</artifact>
      <artifact>kg.apc:jmeter-plugins-functions:2.0</artifact>
      <artifact>kg.apc:jmeter-plugins-graphs-basic:2.0</artifact>
      <artifact>kg.apc:jmeter-plugins-graphs-composite:2.0</artifact>
      <artifact>kg.apc:jmeter-plugins-cmn-jmeter:0.5</artifact>
      <artifact>kg.apc:jmeter-plugins-jmxmon:0.2</artifact>
      <artifact>kg.apc:jmeter-plugins-manager:0.19</artifact>
      <!--<artifact>kg.apc:jmeter-plugins-perfmon:2.1</artifact>-->
      <artifact>kg.apc:jmeter-plugins-tst:2.1</artifact>
    </jmeterExtensions>
  <downloadExtensionDependencies>false</downloadExtensionDependencies>
  </configuration>
</plugin>
```

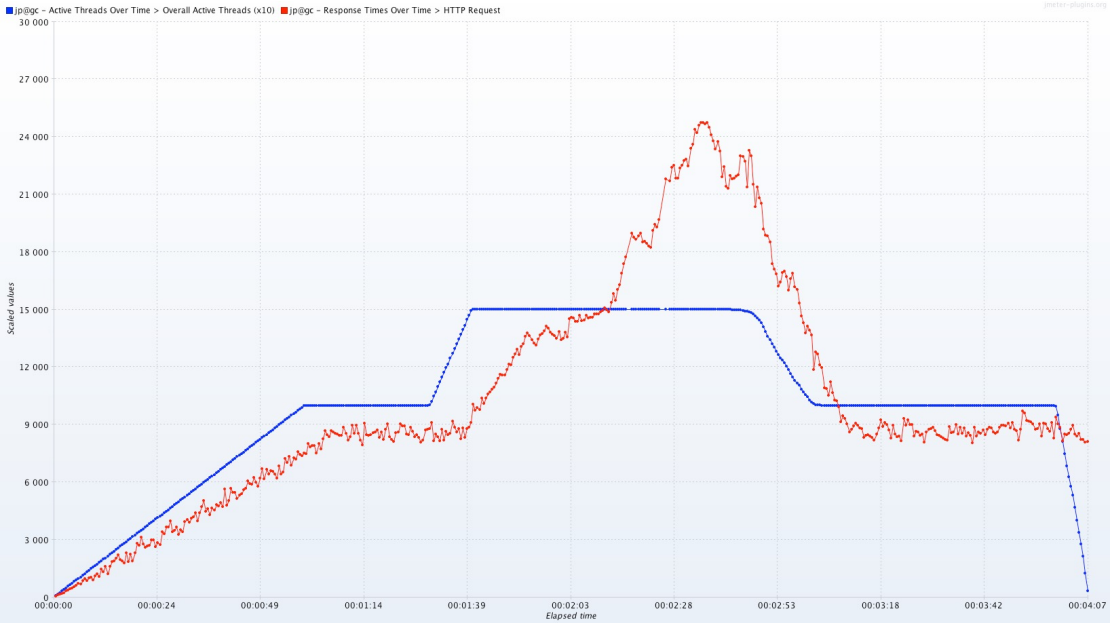
DEMO (REST SERVICE)

REST Service

Label	Anz. d...	Durc...	Min	Max	Std. Dev.	% Feh...	Durchsatz	KB/sek	Sent KB/...
HTTP Request	29218	9307	29	20189	3695,23	0,00%	118,5/sec	87,70	1484,43
Gesamt	29218	9307	29	20189	3695,23	0,00%	118,5/sec	87,70	1484,43



REST Service



Outlook?

- Other Samplers/Actions
  - Java Tests
  - Selenium
  - ...
- Distributed performance testing
  - Many „physical“ Clients
- Assertions