Calibration of Performance Test tooling

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Proven Quality

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Introduction

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What triggered the investigation

Historical *International Prototype Metre* bar, made of an alloy of platinum and iridium, that was the standard from 1889 to 1960

Q: *Do performance test tools emulate the exact same behavior a real user would show when accessing the application ?*

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Research Definition

Scope:

- 4 commonly used test tools, installed with default settings
- 1 virtual user to execute the test
- 1 Browser
- 1 OS
- Mix of commercial and Open Source tools

Goal:

- Identify differences.
- Adjust settings.

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First Findings

- Tooling doesn't execute javascript like a browser does
- Different behavior at network level, number of tcp sessions
- Different behavior in requests methods and number of requests.

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Test Plan & Scenario

1. Execute the testscenario manually, this is the Reference.
2. Record the scenario with the testtool.
3. Run the scenario with the testtool.

Scenario:

- Add the dvd “Speed” on the front page to the cart
- Search for a dvd with the word: “Mary”
- Add dvd “There’s something about Mary” to the cart
- Checkout
- Create a new account
- Complete the checkout & shipping
- Return to the frontpage and logout

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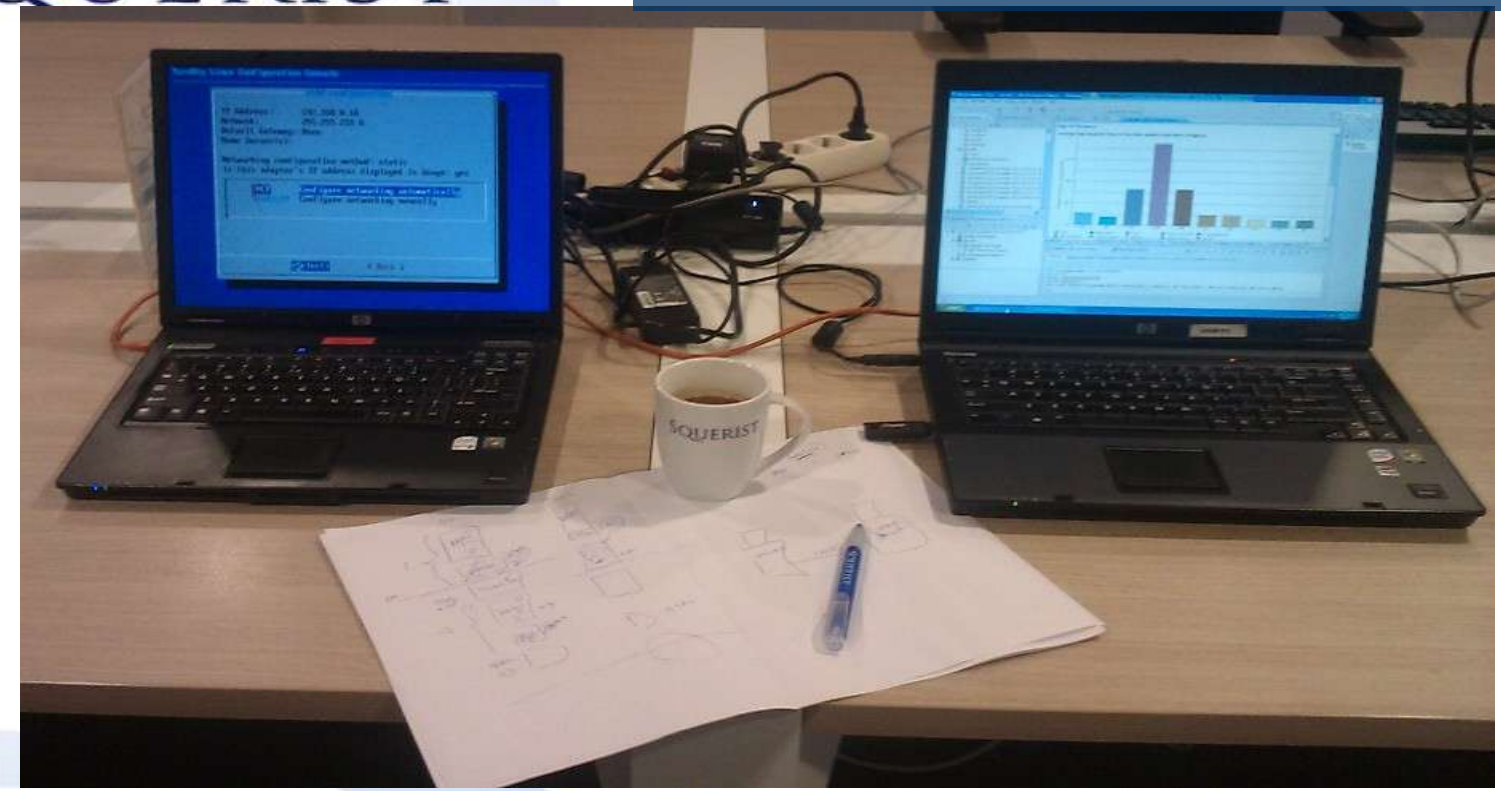
Test Environment Setup



Server: Bootable Linux CD

Turnkey Linux & OsCommerce

http://www.turnkeylinux.org/oscommerce

VMWare XP images:

- Tool A
- Tool B
- Tool C
- Tool D
- Clean image

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Results of the test

	Manual	Tool A	Tool B	Tool C	Tool D
Startpage	0,815	1,715	0,669	0,912	0,875
Select DVD Speed	0,942	0,99	0,473	0,946	0,313
Add to cart		0,197	2,071	3,21	0,14
Search "Mary"	5,98		4,689	1,22	5,984
Add to cart	1,367	6,92	2,092	3,538	0,094
Check Out	0,421	1,715	0,25	0,897	0,078
New Customer	0,408		0,637	0,896	
Account created	0,389	0,795	0,6	0,798	1,297
Continue	0,498				0,156
Shipping	0,374	0,13	0,417	0,883	0,312
Payment	0,431		0,358	0,787	0,141
Confirm Order	0,488	1,92	0,64	0,909	0,266
Startpage	0,418		0,383	0,808	0,188
Log Off	0,542	0,72	0,444	0,829	3,547
	13,073	15,102	13,723	16,633	13,391

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Calibration

- Create the reference by analysing user behaviour with the application
- Analyse tool behaviour with the application
- Calibrate tool
- Validate calibration by rerunning the test.

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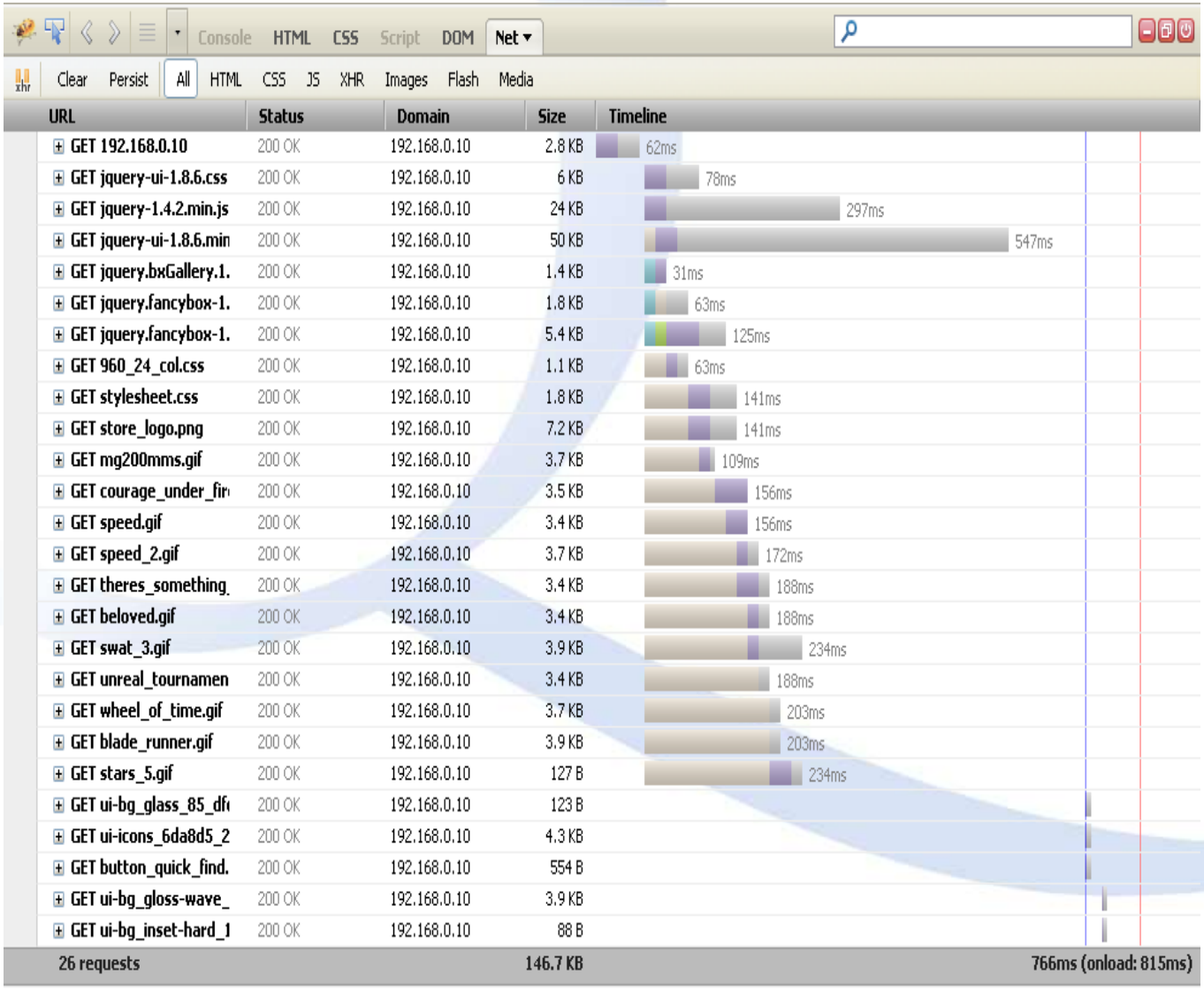
Reference with FireBug



	Manual	
	Network	Onload
Startpage	766ms	815ms

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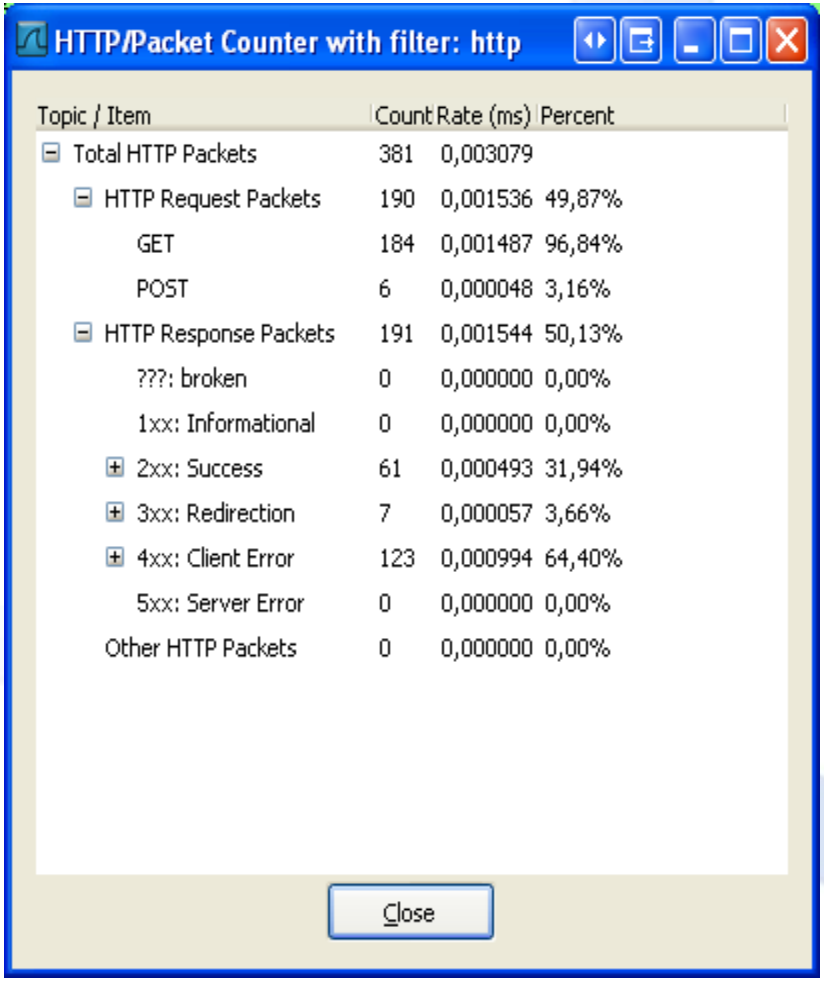
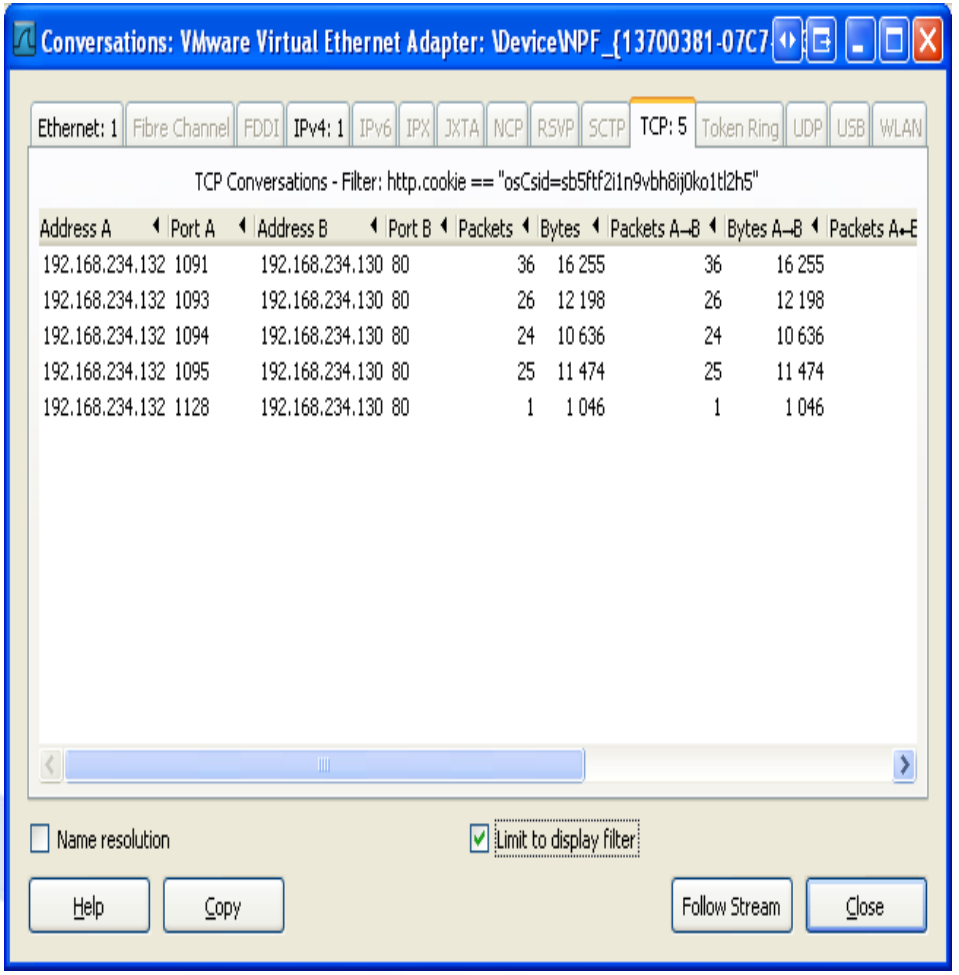
Reference with WireShark





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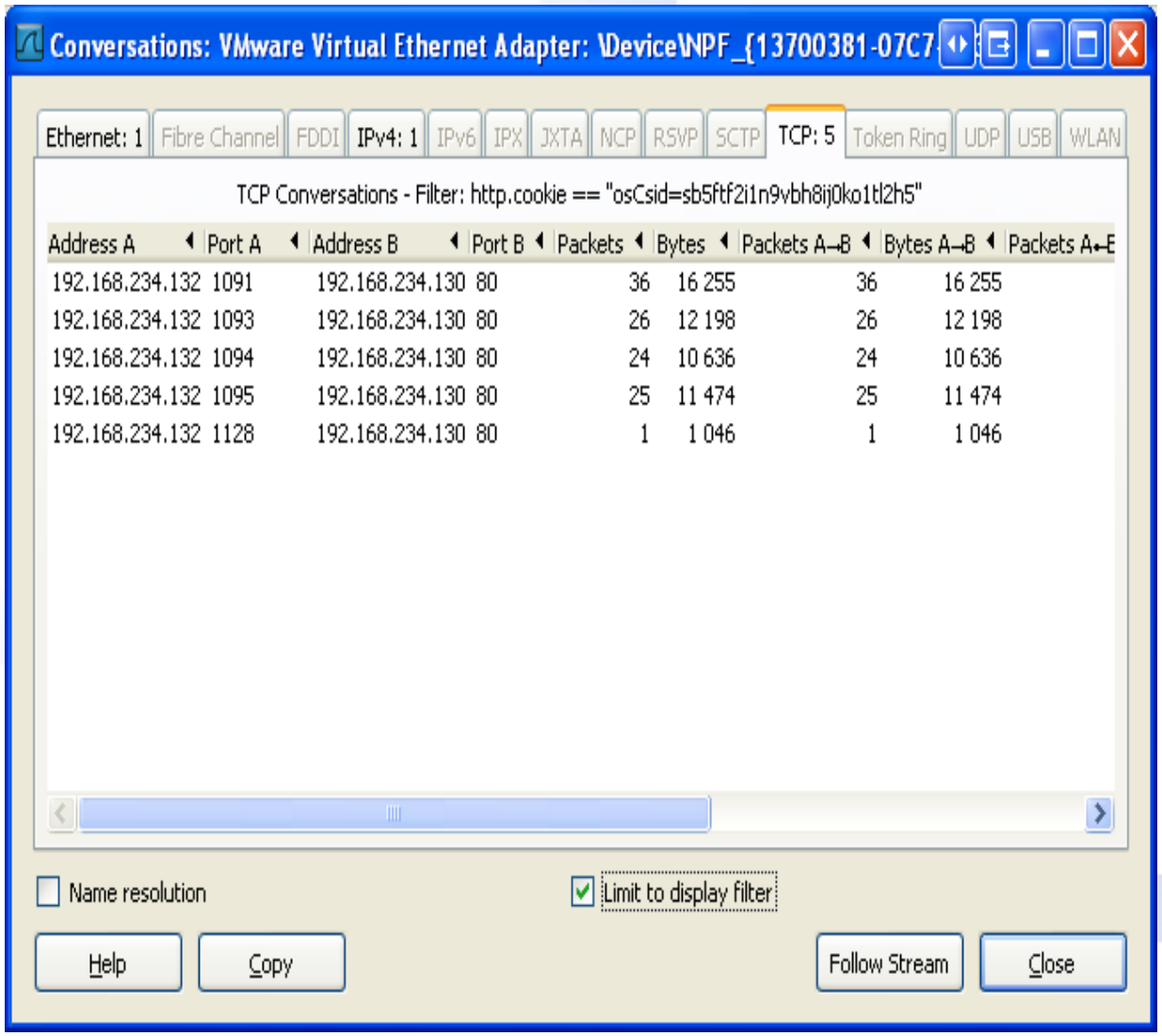
Reference TCP Sessions



Reference 5 sessions

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Tool behaviour and Solutions

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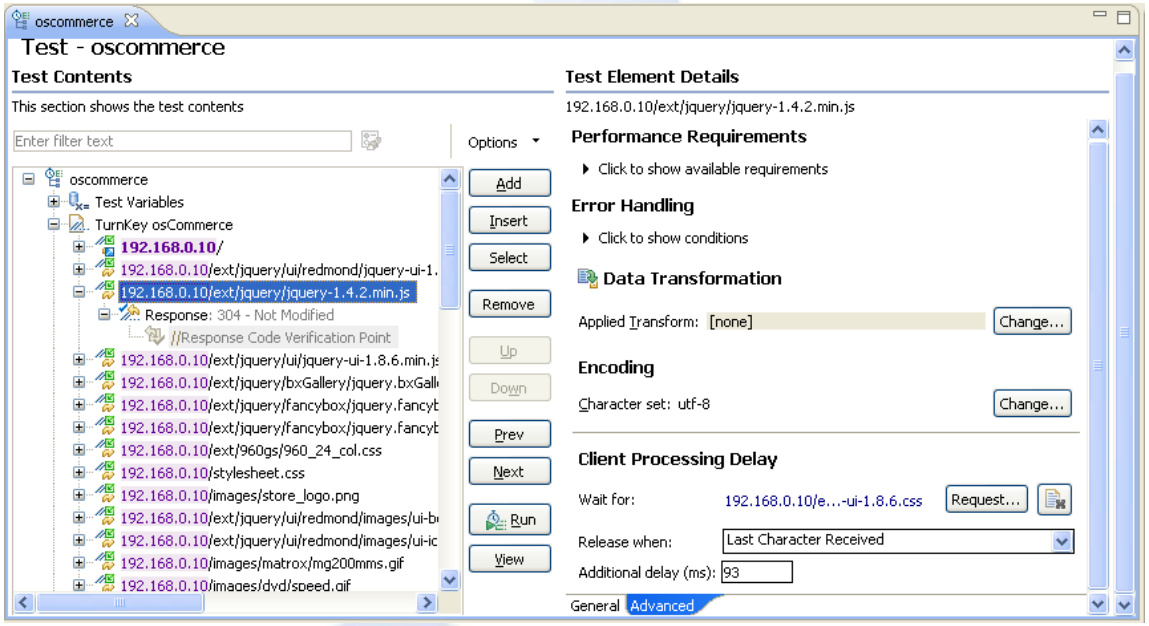
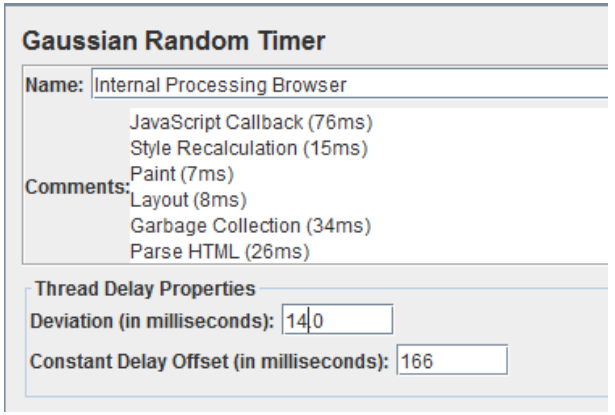
Compensate Browser processing





Problem identified: *Tooling doesn't do processing like a browser. (javascript, rendering)*

Solution: *Compensate in the tool for clientside processing and during a loadtest execute the scenario manually to capture the user experience.*

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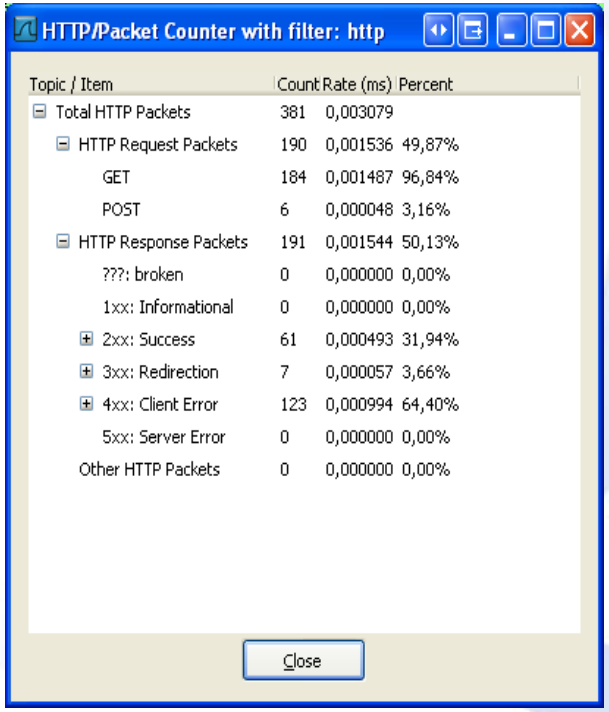
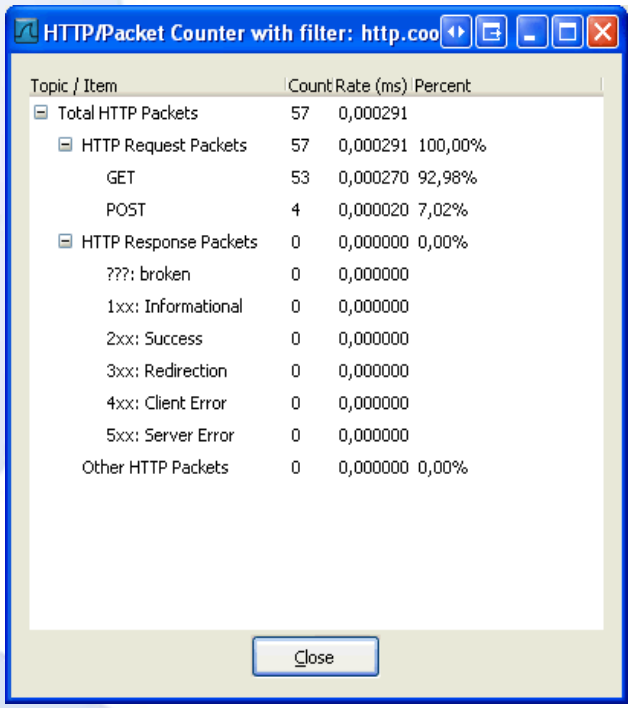
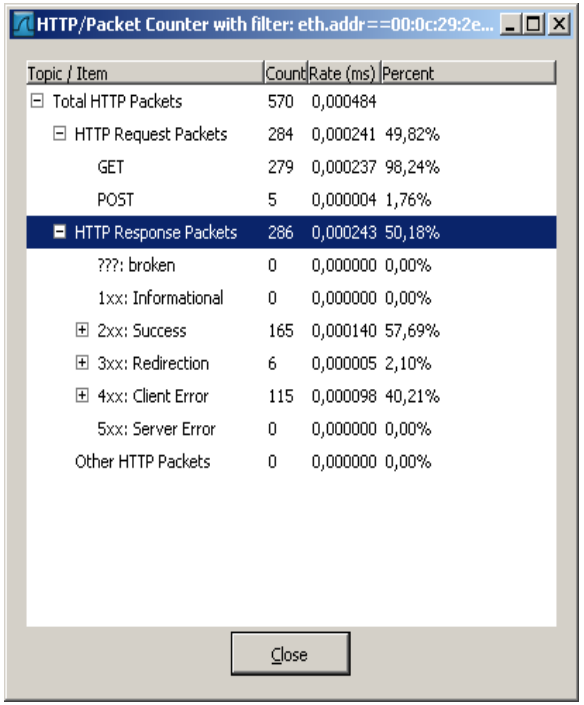
Post en Get Requests







Reference

Tool A

Tool B

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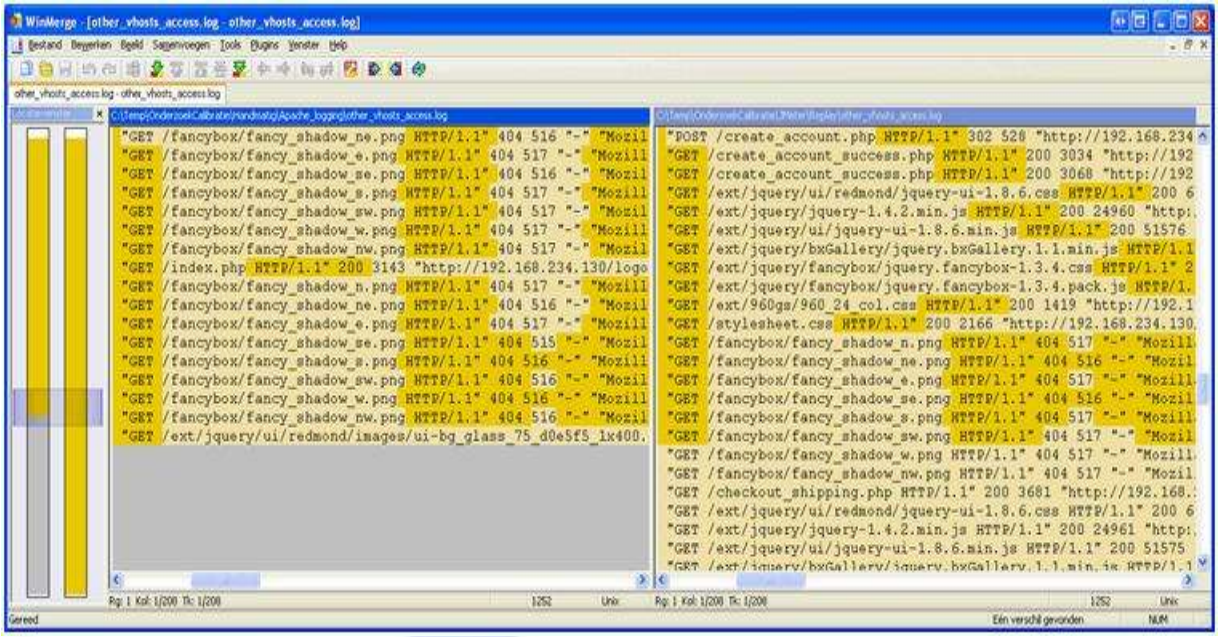
Adjust get & post request setting

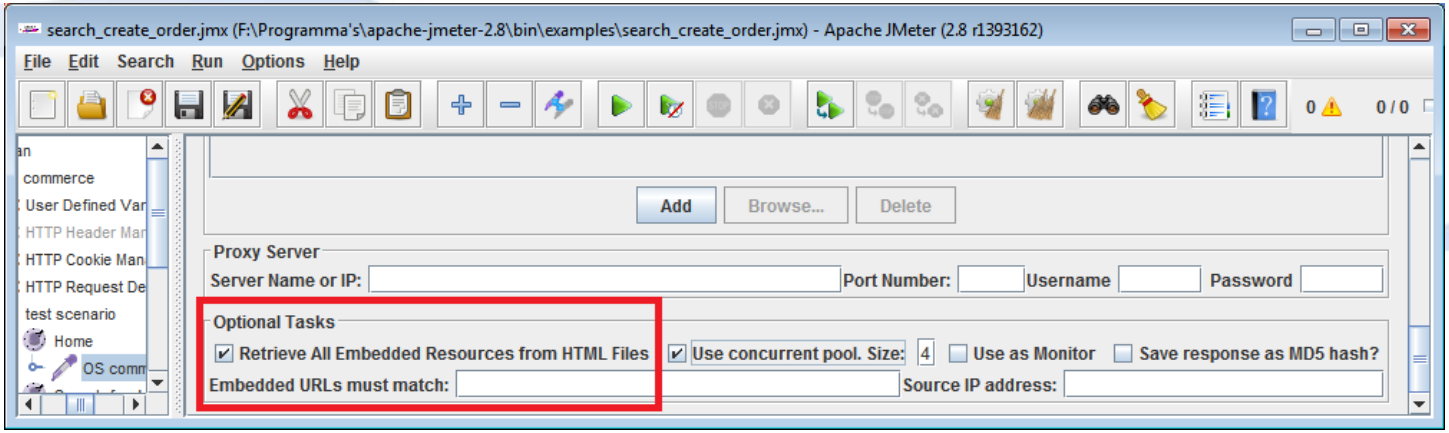


Problem identified:

Different number of Requests, GET and POST

Possible Solution:

Adjust settings on how to Retrieve resources



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Adjust for Caching

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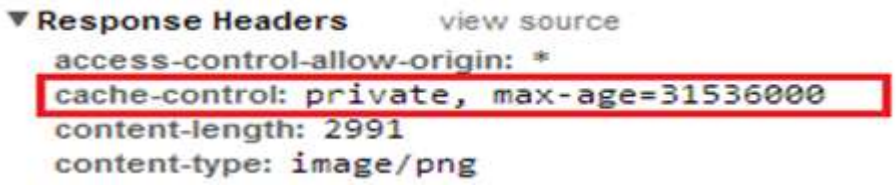
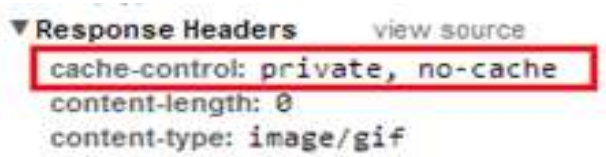
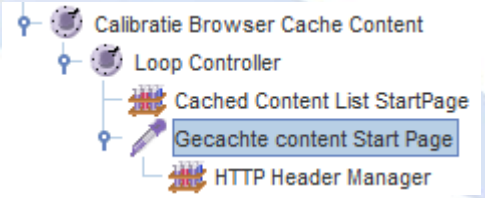
Problem identified: *Some content is cached within the browser.*
Solution: *Retrieve cached content once for every VU.*



With Browser caching



Without browser caching



Cached_Content_StartPage.csv

Compensation in J-meter for cached content using an “Only once Loop Controller”

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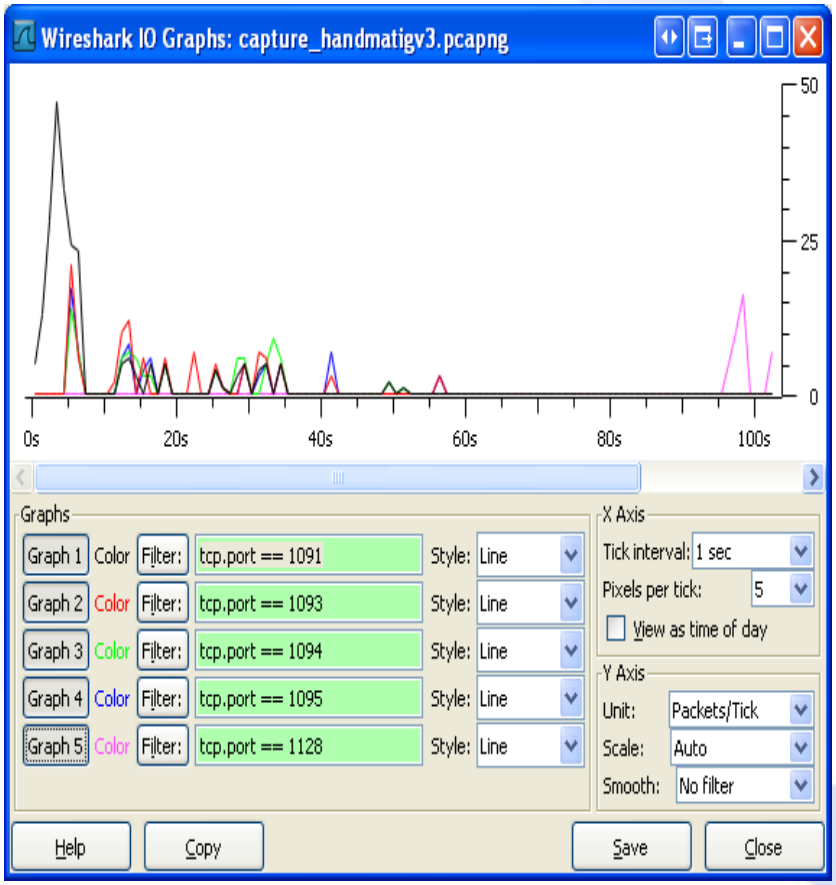
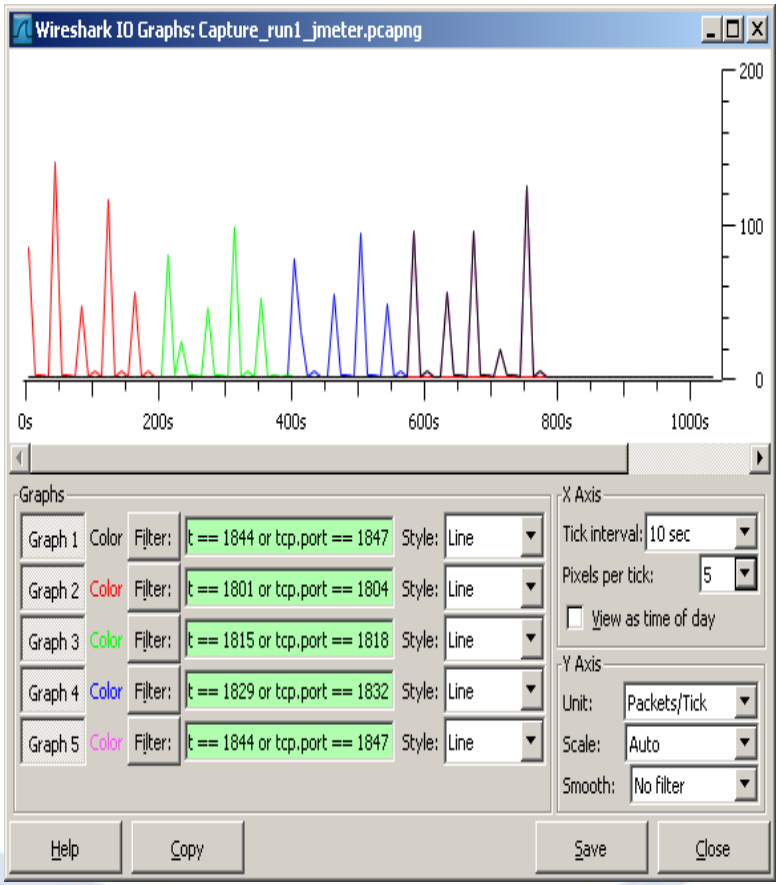
Network behavior



Reference



Tools

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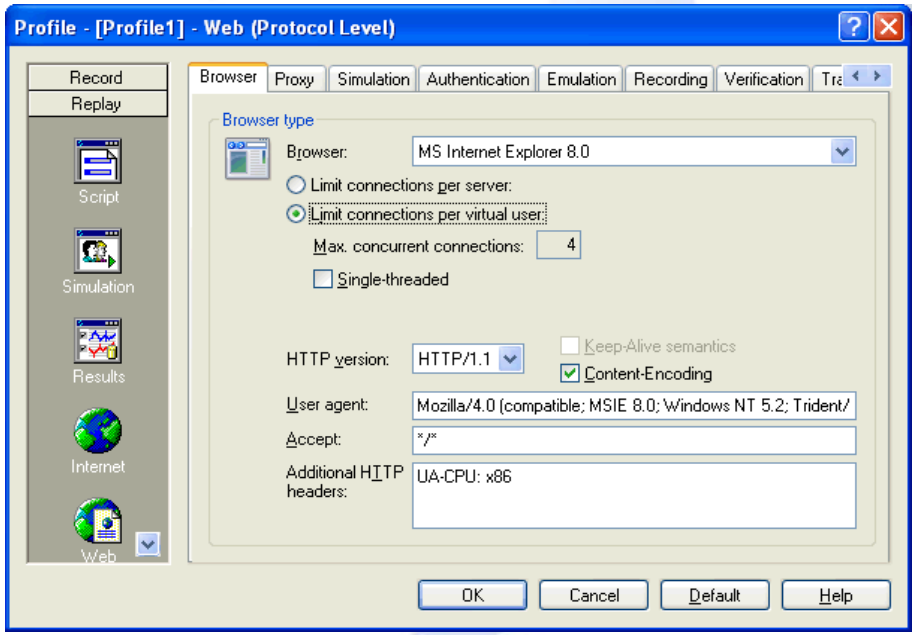
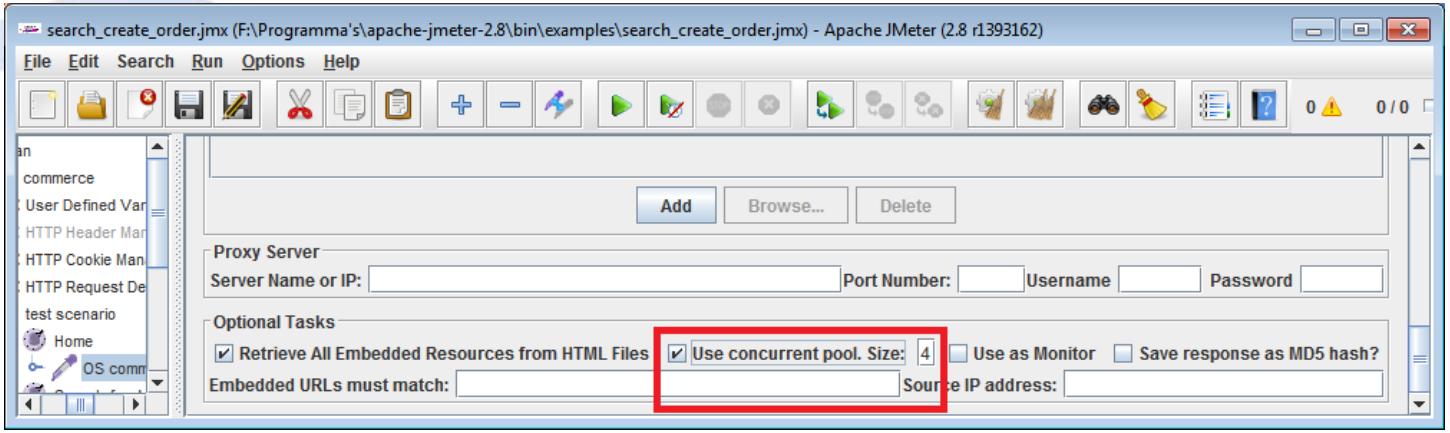
Adjust settings for connections



Problem identified: *Different behavior at network level caused by different number of connections used*

Possible Solution:
Adjust settings for number of connections per virtual user



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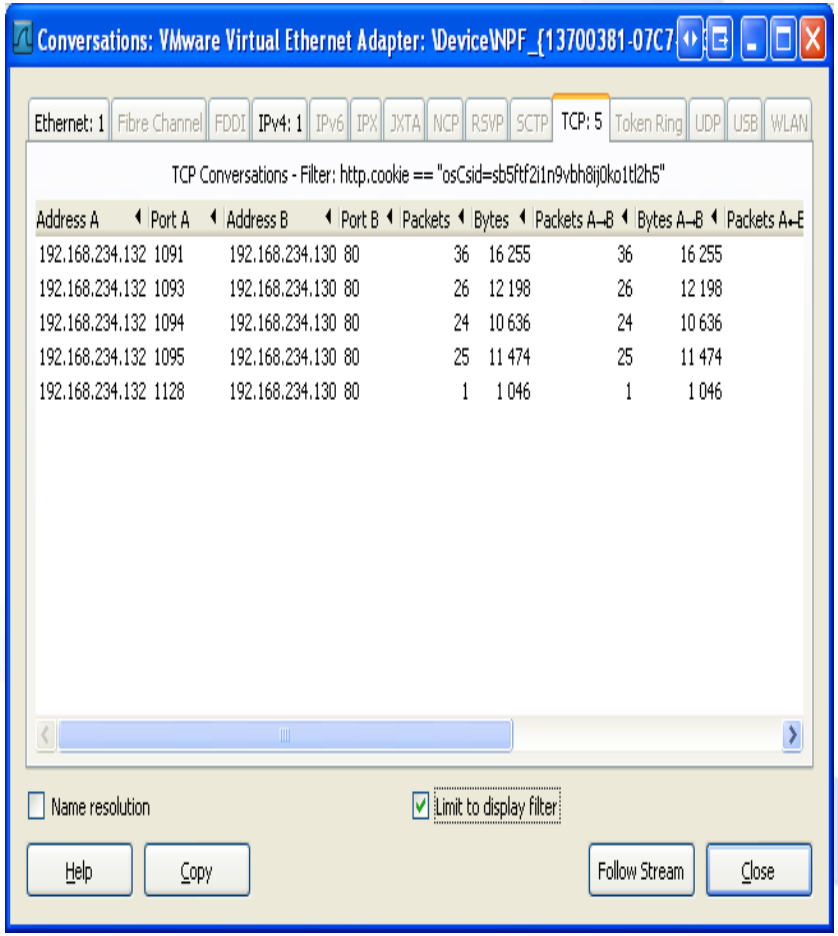
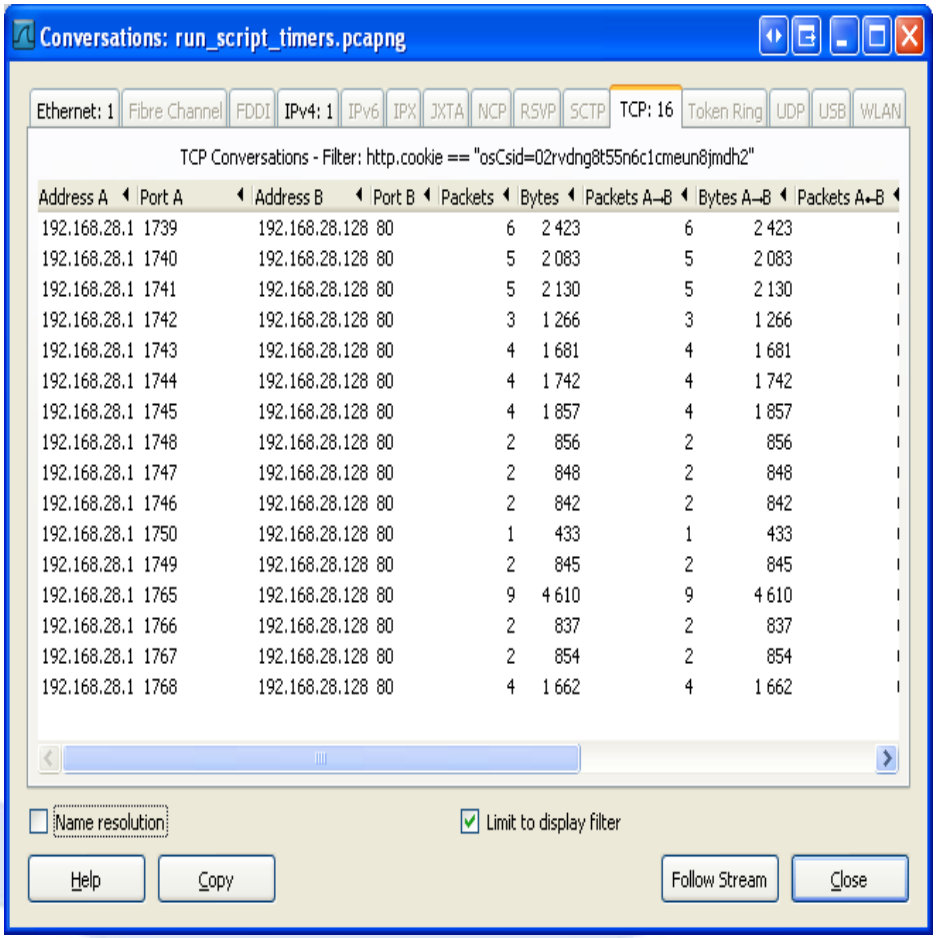
TCP Sessions





Reference 5 sessions

Tools 8 ~ 32 sessions

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Results after Calibration

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Conclusion

The behavior and reported results from Performance Testtools need to be:

VALIDATED & CALIBRATED

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How do we do this?

At Squerist part of our intake and tool selection process for performance testing is the calibration and validation of the tools we are going to use.

We monitor developments in the market on tooling, network and application level and conduct our own research.

Next steps

Are we finished? NO!!!

We want to research the influence of:

-Different browsers
-Different OS.
-Different amounts of VU
On performance and user experience

Why?

Because we are testers and our customers deserve accurate results!!!