

Software Testing

Load & Performance Testing

Beat Fluri



University of
Zurich^{UZH}



Non-functional Requirements

ISO/IEC 9126

Reliability, Usability, Efficiency, Changeability, Portability

Implicit, important factor whether a software is used or not

I have to wait all the time

I do not get used to the complex navigation

ISO 9126 criteria are hard to verify. Efficiency is, probably, the only one to measure accurately

Response time and resource consumption

Testing Efficiency

Performance testing

Which component have a long response time?

For instance, certain DB query may take noticeably longer than others

Load testing

How does the system work under heavy load?

How long does it take to complete a request if specific number of persons interact with the system

Stress testing

How does the system react if it is overloaded?

Specifying Efficiency - Response Time

Normally, non-functional requirements are specified in terms of boundaries

The system should complete request in under 2 seconds if it is under normal load
98% of all request should be completed in under 3 seconds.

Define what “normal load” means

Between 09:00am and 05:00pm 500 users will work with the system

Is this information enough?

Define what “heavy load” means and what is the expected average time the system will encounters heavy load

Peak times at the end of the month with 750 users doing...

Load Testing Infrastructure

Do we have the same hardware for the production and the testing environment?

The similar the better

What is better, having a slower or faster environment for testing than for production?

Do I exactly know how the average user interacts with the system?

Number of users

Frequent vs. infrequent actions

breaks between interactions

Load Testing Infrastructure

What do I have to consider when selecting specific sets of actions?

Diversity of request: Equal request may be cached (DB)

Also use write request

Include breaks into the test execution to better simulate user interaction

How do I generate load?

Load generator not on the same machine as the system under test

Keep an eye on the resources (CPU, memory, HD)

How do I interpret the test result?

Persist test plan and results for comparison

Use some statistics

Repeat the test run to get a better average result

Approach

1. System under test is running
2. Specify the test case to execute under test
3. Implement test case in load test tool (e.g., JMeter)
May use test case recording in with proxy in JMeter
4. Add listener to record the response times and report the results
5. Let the system run
Keep it running for a certain time
6. Check the load on the system under test
7. Analyse data

Demo

