

Generic Performance Measurement in CI: The GeoMap Case Study

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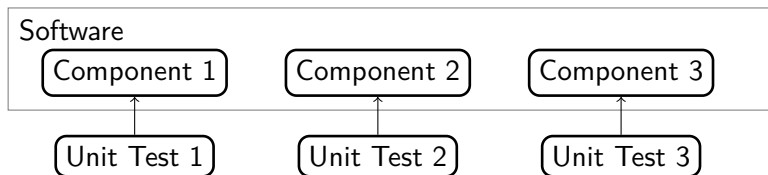
⁴Software Engineering Group, Christian-Albrechts-Universität zu Kiel

9. 11. 2022

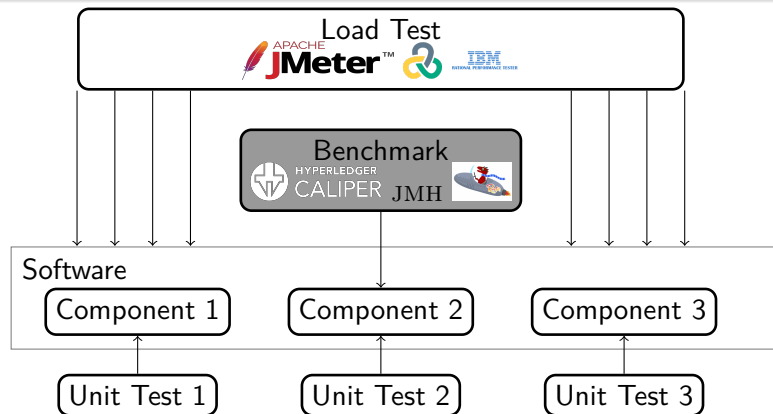
- 1 CI Performance Measurement using Peass
- 2 Measurement in GeoMap: Approach
- 3 Measurement in GeoMap: Results
- 4 Summary & Future Work

CI Performance Measurement using Peass

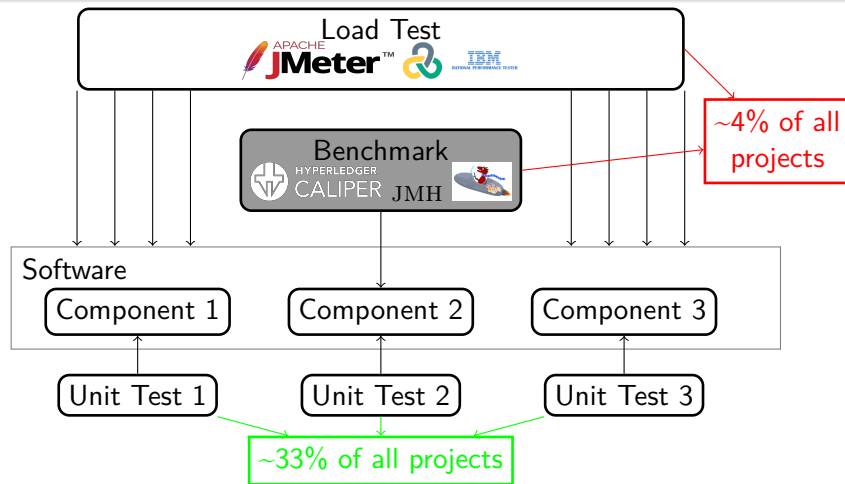
Why Unit Test Measurement?



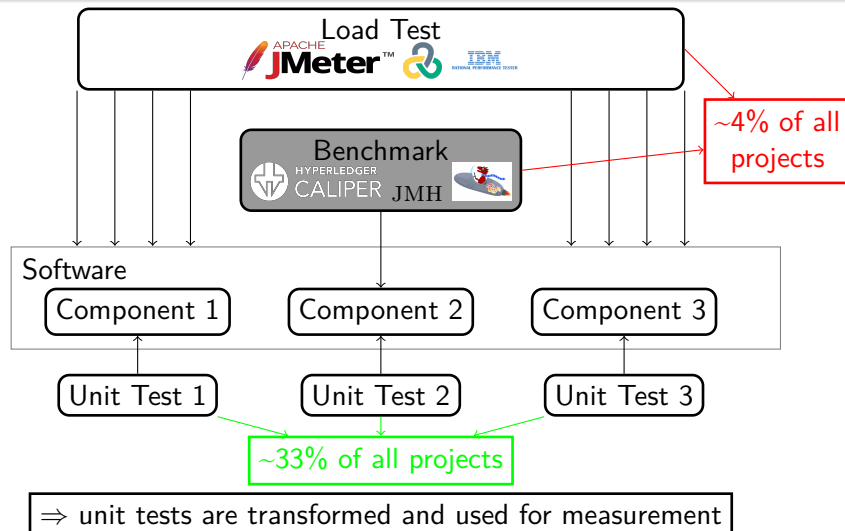
Why Unit Test Measurement?



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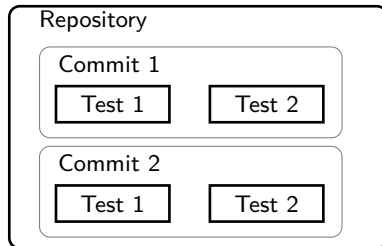


Peass

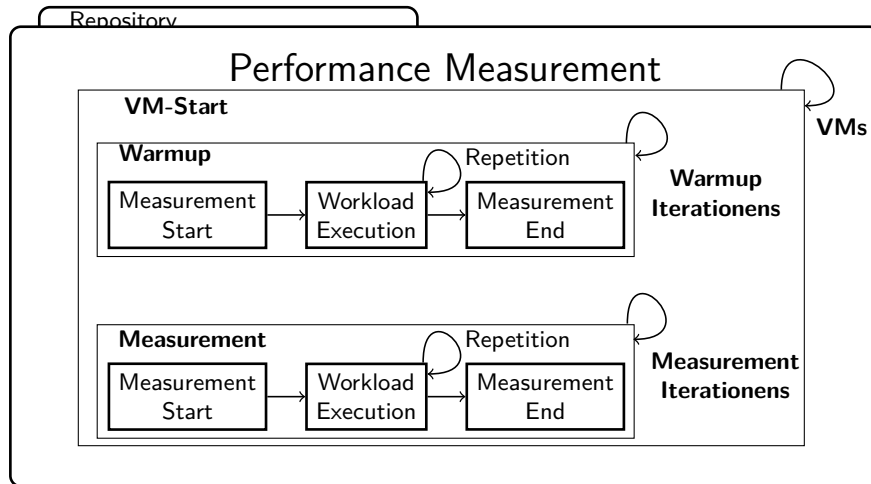


- **P**erformance **a**nalysis of **s**oftware **s**ystems
- CLI-Tool: <https://github.com/DaGeRe/peass>
- Jenkins-Plugin: <https://github.com/jenkinsci/peass-ci-plugin>

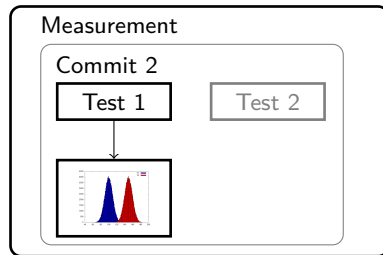
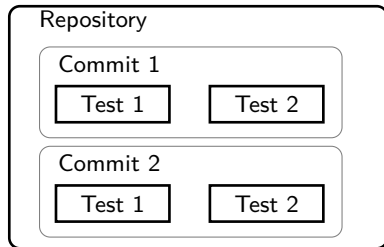
Process of Peass



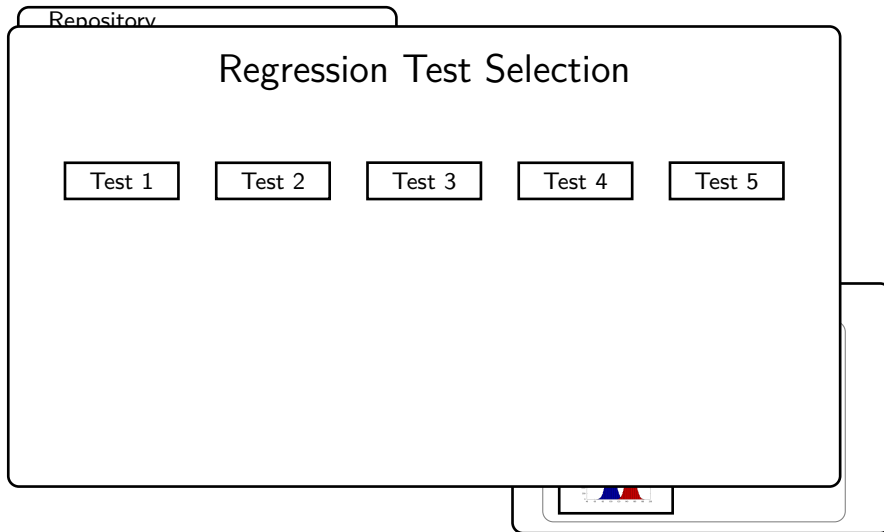
Process of Peass



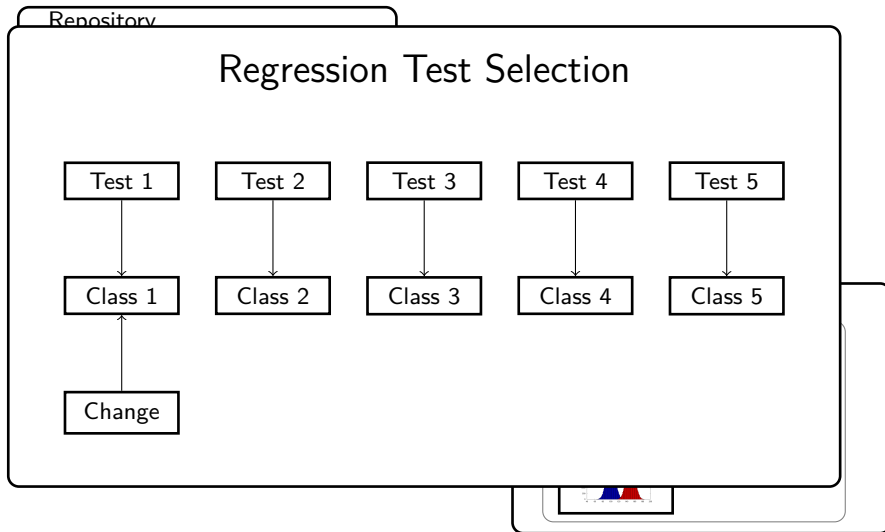
Process of Peass



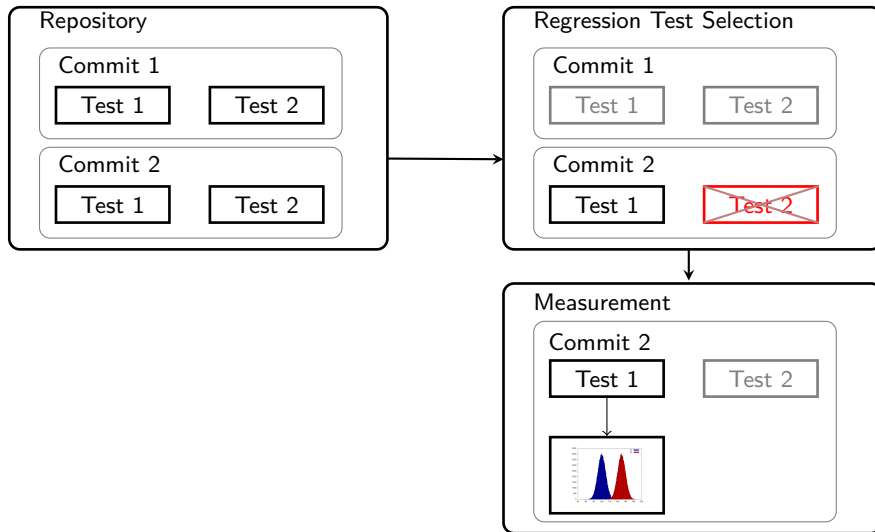
Process of Peass



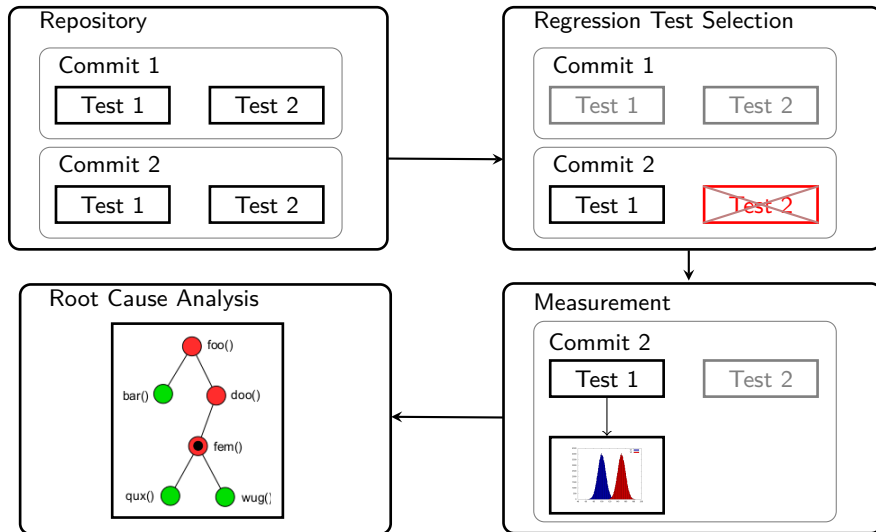
Process of Peass



Process of Peass



Process of Peass



Measurement in GeoMap: Approach

Die größte Online-Plattform für **Immobilien.Markt.Daten.**
im DACH-Raum

- transparente und nachvollziehbare Daten
- Unternehmensflatrate, Bestes Preis-/ Leistungsverhältnis
- Individualisierbarkeit
- Eigenes Research-Team, eigene Datenqualifizierung
- Unabhängiger und vollständiger Blick auf den Markt
- GeoMap-Services (diverse Exporte, API, Partnerschnittstelle)



Standortanalysen

Erstellen Sie per Klick eine Standortanalyse für Ihre individuelle Standortauswahl und exportieren Sie diese als PDF-Datei.

1 Kurzübersicht

	Leipzig	Stadtbezirk Mitte	Ortsteil Zentrum-Ost
Einwohnerzahl	596.517 (2018)	65.140 (2018)	4.931 (2018)
Arbeitslosenquote	4,8 % (2018)	3,2 % (2018)	3,2 % (2018)
Ø - Einkommen	1.384 €/Monat (2018)		1.708 €/Monat (2018)

(Quelle: Stadt Leipzig, Amt für Statistik und Wahlen)

Entwicklung Kaufpreise Wohnen



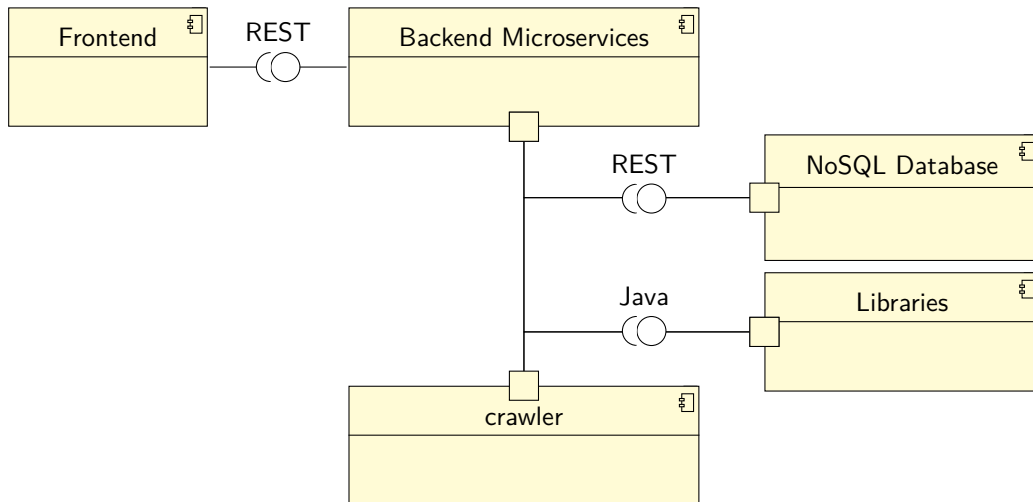
Entwicklung Mietpreise Wohnen



Entwicklung Kaufpreise Büros/Praxen

-4.000

Architecture GeoMap



Performance Engineering in GeoMap - Steps

- Continuous performance measurement in CI using Peass
- Systematic code review
- Load test implementation and comparison to unit test results (afterwards)

Performance Engineering in GeoMap - Steps

- **Continuous performance measurement in CI using Peass**
- Systematic code review
- **Load test implementation and comparison to unit test results (afterwards)**

Performance Measurement in GeoMap

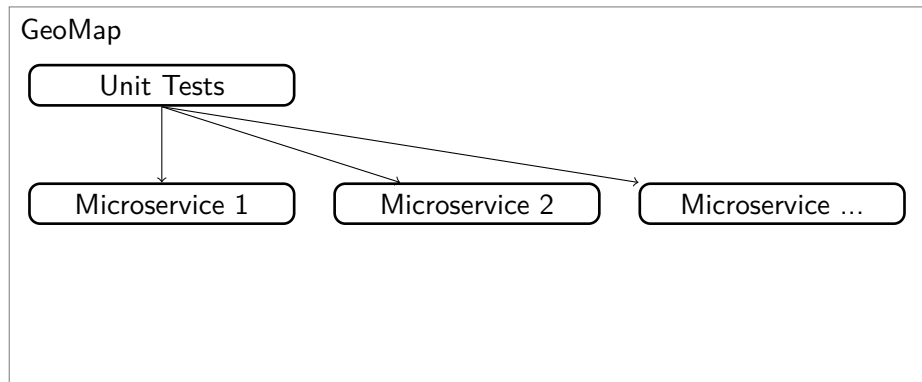
GeoMap

Microservice 1

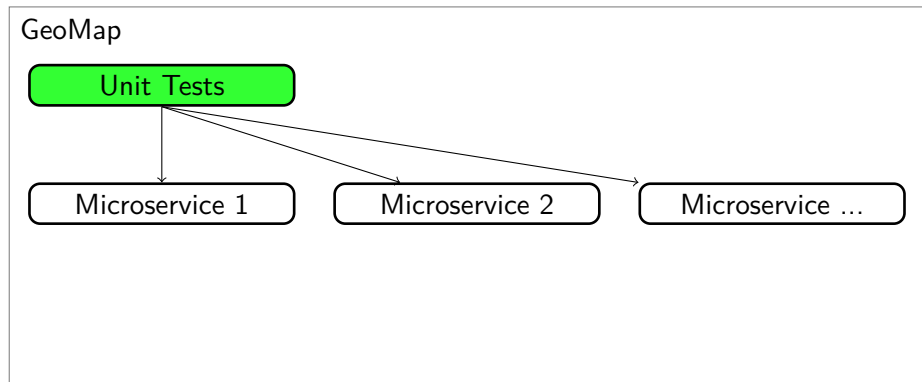
Microservice 2

Microservice ...

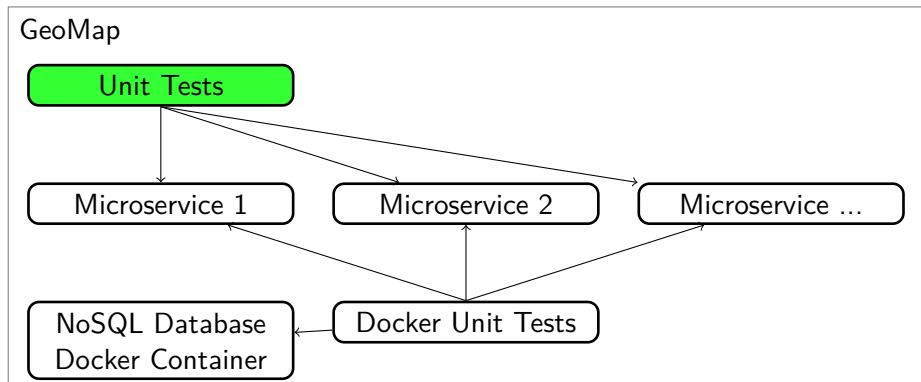
Performance Measurement in GeoMap



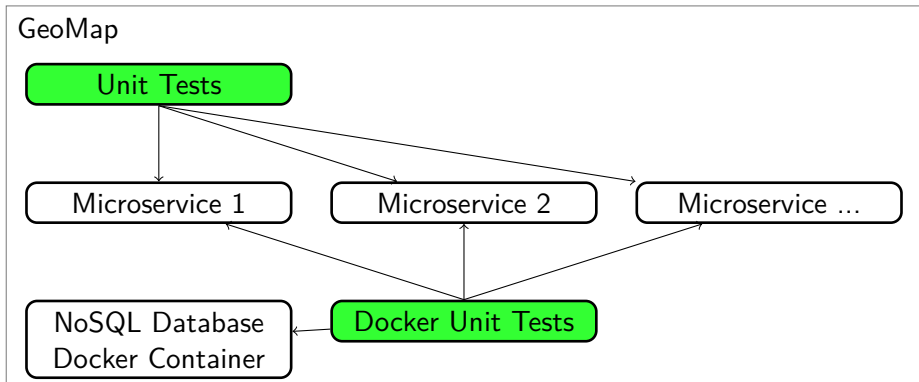
Performance Measurement in GeoMap



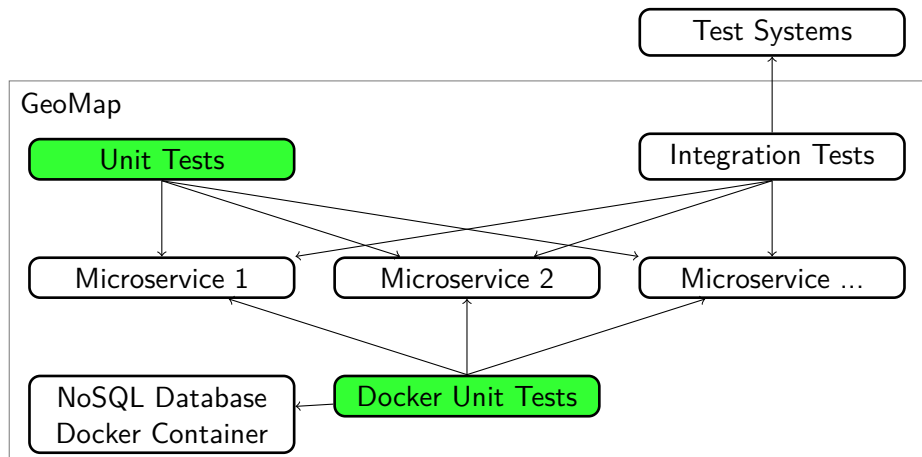
Performance Measurement in GeoMap



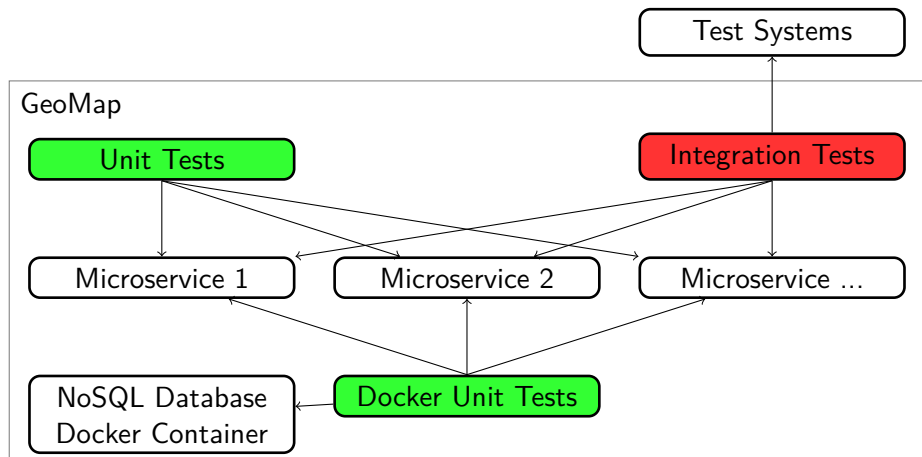
Performance Measurement in GeoMap



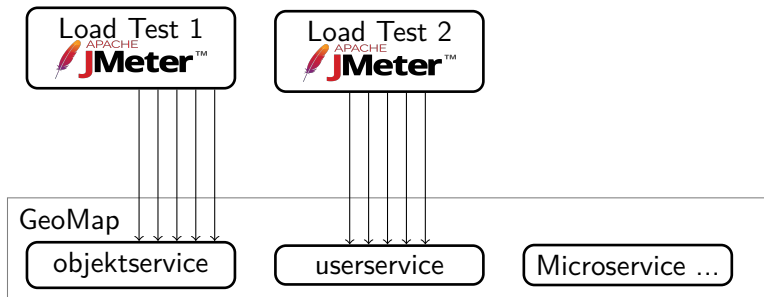
Performance Measurement in GeoMap



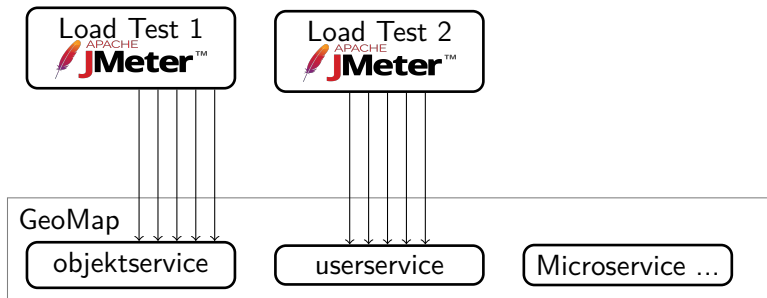
Performance Measurement in GeoMap



Load Test Structure



Load Test Structure



⇒ Measurement of most important use cases by load tests;
afterwards comparison with Peass-CI results

Measurement in GeoMap: Results

Überblick

 **Jenkins**

Suchen    

Dashboard > geomap-overview > #73 > Peass Measurement Overview

↑ Back to Project

 Status

 Changes

 Console Output

 Edit Build Information

 Delete build '#73'

 **Peass Measurement Overview**

 Replay

 Pipeline Steps

 Workspaces

 Previous Build

Peass Overview Results

geomap-commons geomap-datamodel geomap-tools-elasticsearch geomap-backend-nodocker geomap-backend-docker

geomap-commons

Show Statistic Download Classifications

Hide None

Hide Unclassifyable

Hide Classified

Änderung	Testfall	Änderung gemessen?
Commit: 67a12024998c4e045d505526cb04b25aca5b2543		
immo.geomap.common.util: Anonymisiert	none	
Commit: f5038102ee252242b498487fce891002e9eda388		
immo.geomap.common.util.TestBasic: Anonymisiert	immo.geomap.common.util.TestBasic: Anonymisiert	24,105 % Choose Classification function Übernehmen
immo.geomap.common.util: Anonymisiert	none	
Commit: 3f22073679a3b788a17d28d2a438f69607979566		
immo.geomap.common.util.BasicHttpDownloader	immo.geomap.common.util.TestBasic: Anonymisiert	-1.234,815 % Choose Classification TODO Übernehmen
immo.geomap.common.util.TestBasic: Anonymisiert		
Commit: f8d1afcb1e9008e4f3c0854e85fc25da595b2030		
immo.geomap.common.(org.locationtech.jts.geog): Anonymisiert	none	

Überblick

The screenshot shows the Jenkins web interface for the 'Peass Measurement Overview' of a build named '#73'. The left sidebar contains navigation links: Back to Project, Status, Changes, Console Output, Edit Build Information, Delete build '#73', Peass Measurement Overview (selected), Replay, Pipeline Steps, Workspaces, and Previous Build. The main content area is titled 'Peass Overview Results' and shows a table of measurement results. A large white box with the text 'Live Demo' is overlaid on the table. To the right of the table, there are buttons for 'Show Statistic', 'Download Classifications', 'Hide None', 'Hide Unclassifiable', and 'Hide Classified'. Below the table, there is a section for 'Testfall' and 'Änderung gemessen?' with a table of results. The table has columns for 'Testfall', 'Änderung gemessen?', and 'Anonymisiert'. The results show two rows: one with 'none' and '24,105 %' (green bar) and another with 'none' and '-1,234,815 %' (red bar). Both rows have a 'Choose Classification' dropdown menu and an 'Übernehmen' button. The commit hash 'f8d1afcb1e9008e4f3c0854e85fc25da595b2030' is displayed at the bottom of the table.

Jenkins

Dashboard > geomap-overview > #73 > Peass Measurement Overview

Peass Overview Results

geomap-commons geomap-dat
geomap-commons

immo.geomap.common.util.
immo.geomap.common.util.T
immo.geomap.common.util.
immo.geomap.common.util.B
immo.geomap.common.util.T

Commit: f8d1afcb1e9008e4f3c0854e85fc25da595b2030

immo.geomap.common.
(org.locationtech.jts.geoi

Testfall Änderung gemessen?

none

24,105 %

Anonymisiert

Choose Classification

function

Übernehmen

none

-1,234,815 %

Anonymisiert

Choose Classification

TODO

Übernehmen

none

Load Test Results

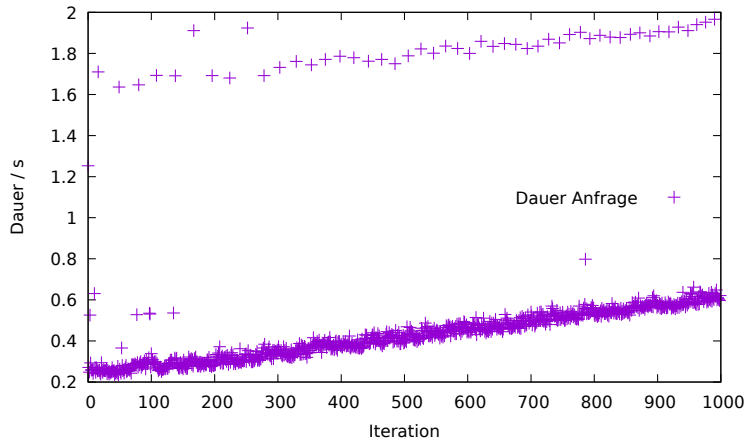


Abbildung: Durations Request I

Load Test Results

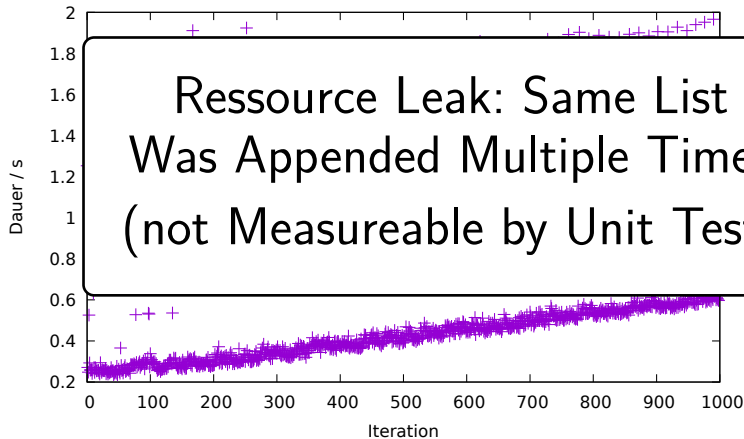


Abbildung: Durations Request I

Correlations Unit Test Results - Load Test Results

change	Unit Test			Load Test		
	mean difference	mean standard deviation	effect size	mean difference	mean standard deviation	effect size
1	4,43	0,065	67,71	129,55	6,21	20,87
2	213,9	7,21	29,64	424,7	101,5	4,18
3	557,3	21,9	25,5	1308,96	33,44	39,14
4	59,41	2,74	21,7	Not covered		
5	3,18	0,85	3,74	1,74	0,28	6,262

Tabelle: Effect Size of Performance Changes

Correlations Unit Test Results - Load Test Results

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Tabelle: Effect Size of Performance Changes

⇒ **changes of relevant use cases are measureable by unit tests** (in GeoMap)

Summary & Future Work

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- Summary
 - Peass(-CI) detects performance changes between commits
 - Detected 21 performance changes and implemented 4 improvements
 - **Changes of relevant use cases are measurable by unit tests** in GeoMap
 - Ressource leak detection is hardly possible by unit tests
- Future work
 - further case studies
 - relation of application performance and unit test performance
 - ML-aided root cause detection: learning typical changes and deriving change root causes