

Don't look back in anger

Was ich als Architekt aus der Versionshistorie eines Softwaresystems lernen kann

Dr. Elmar Jürgens
Dr. Dennis Pagano

Forschung

- 13 Promotionen in Software Engineering
- Promotionsprogramm, Enger Universitätskontakt



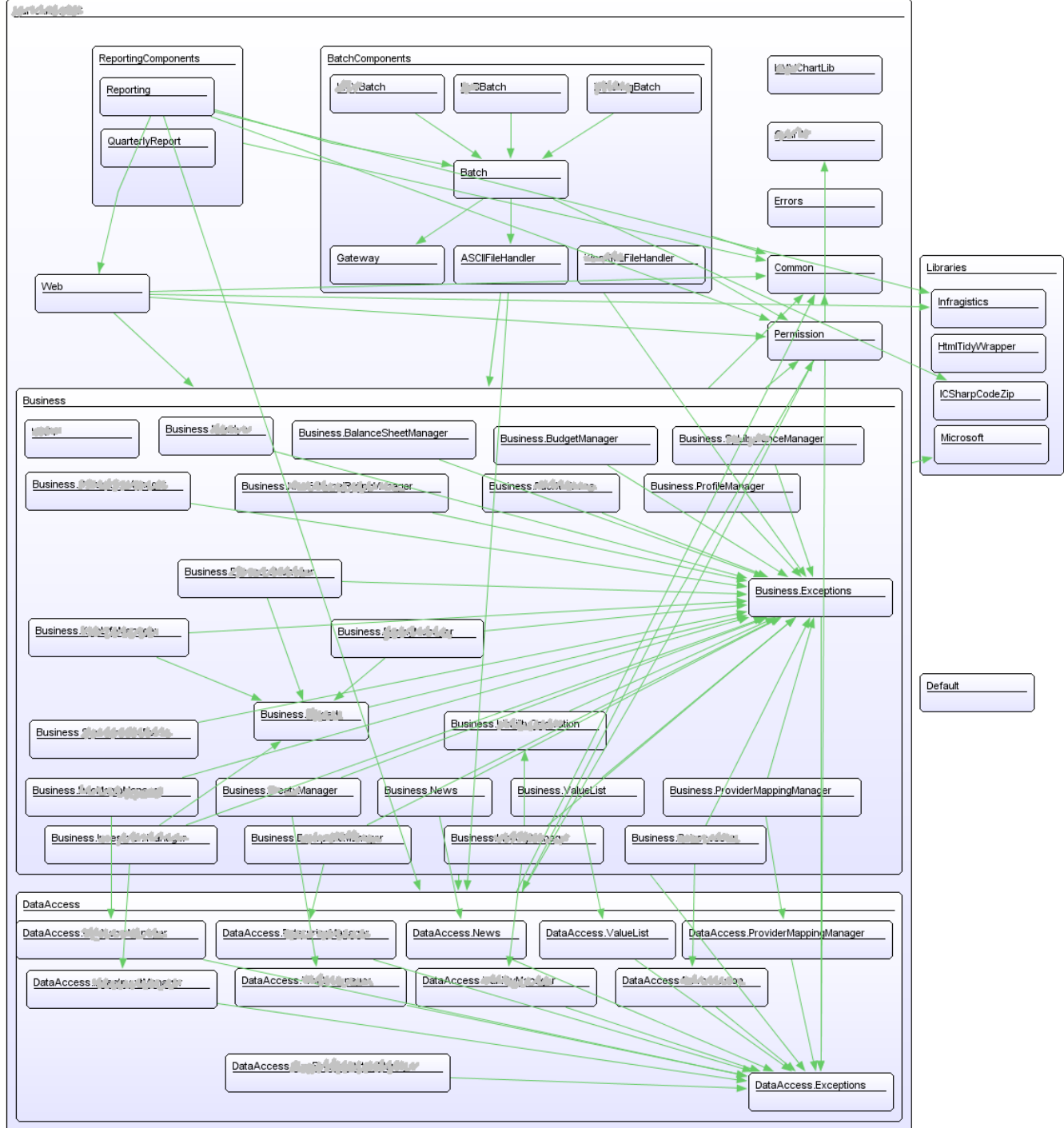
Praxis

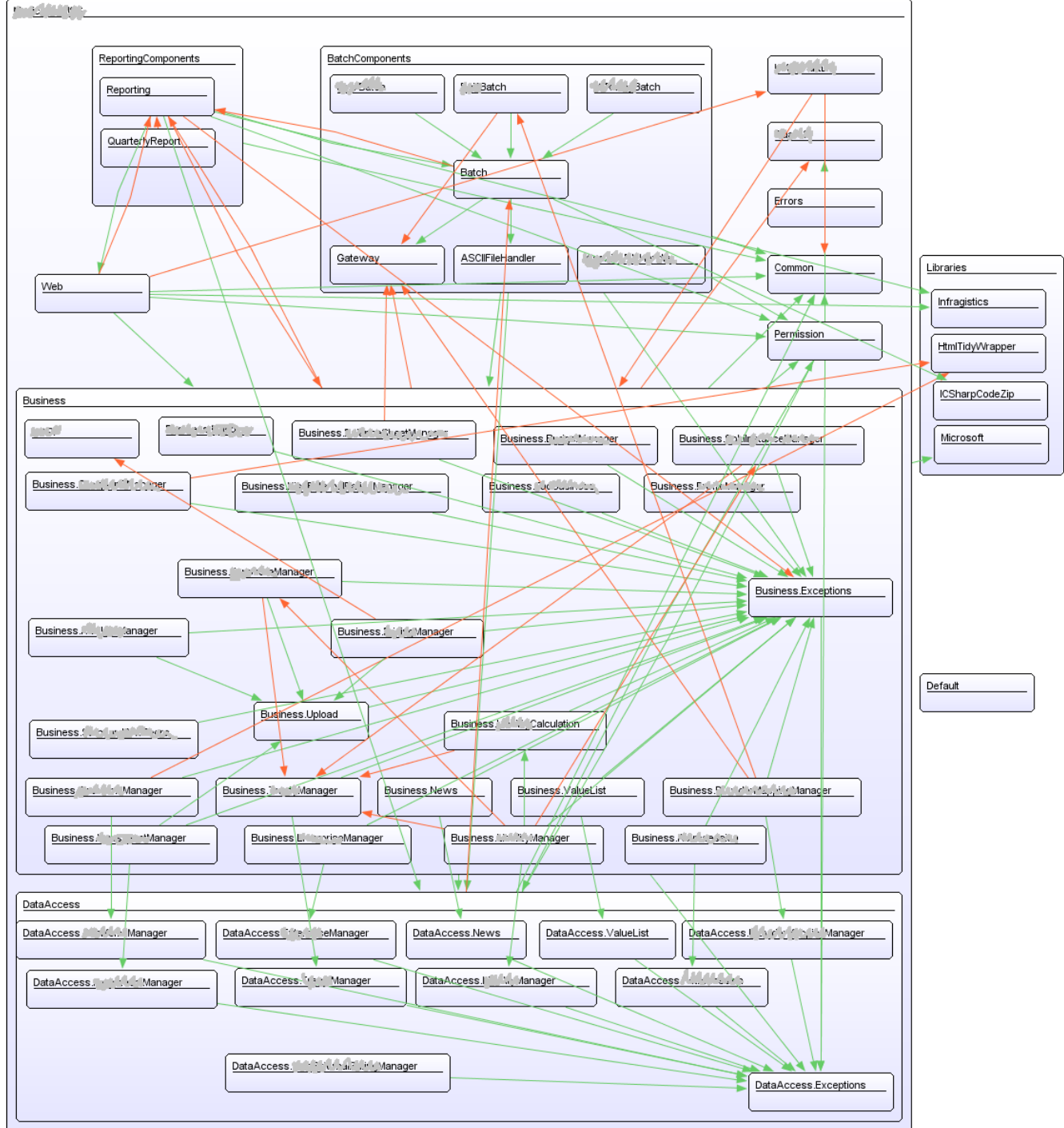
- Software Audits
- Quality Control und Test Control

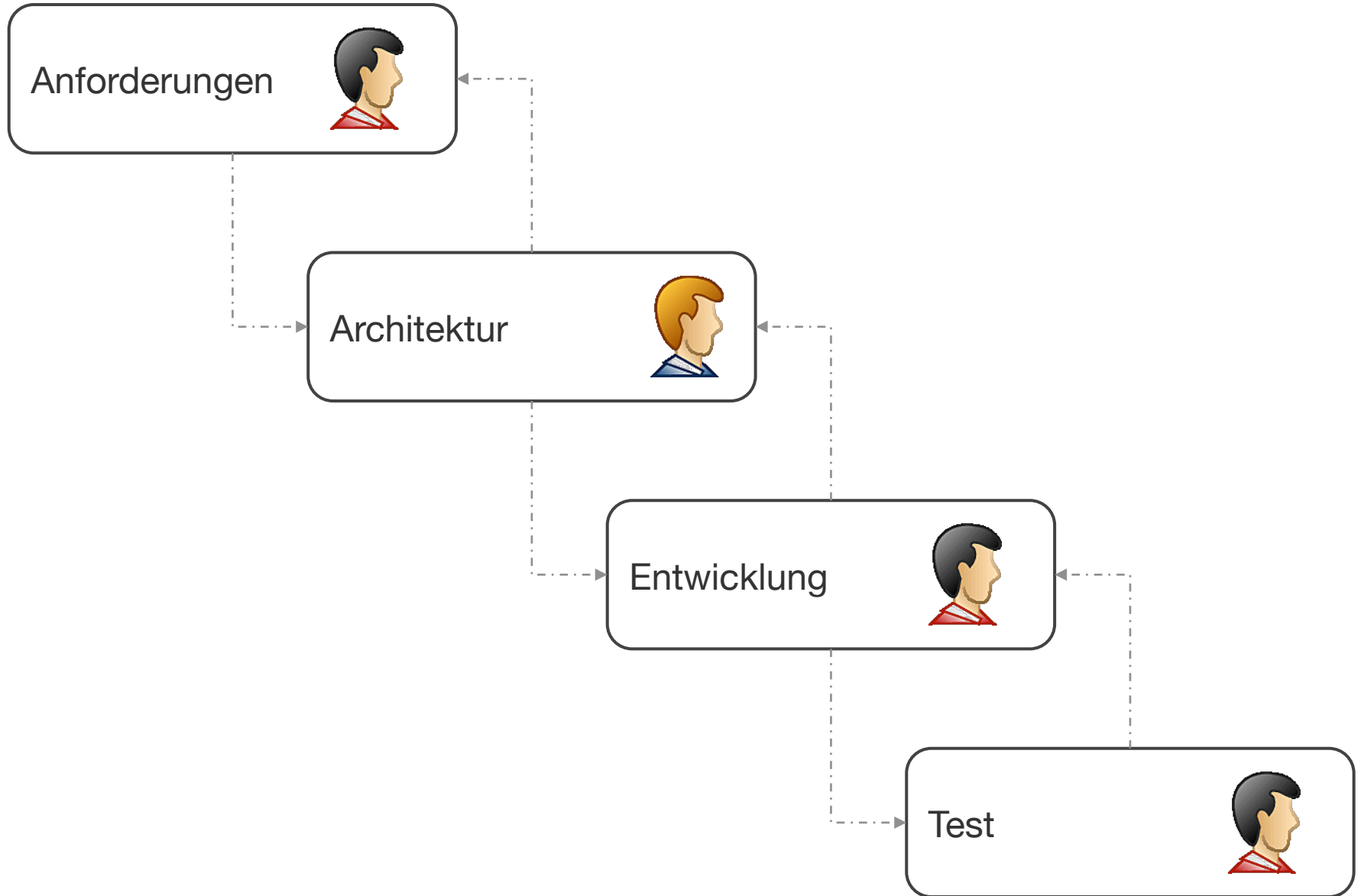


Analysewerkzeug

www.teamscale.com









Ausfall beim Nasdaq-Index

Herzstillstand an der Wall Street



Wenig ging mehr am Times Square: Drei Stunden lang klemmte der Handel an der New Yorker Tech-Börse Nasdaq. Schuld war offenbar ein Softwarefehler. Die Panne war nicht die erste ihrer Art in letzter Zeit - sie zeigt die Anfälligkeit der elektronischen Märkte. Von Marc Pitzke, New York-Miniatur [Forum]

US-Technologiebörse: Nasdaq unterbricht Handel für drei Stunden



Anforderungen



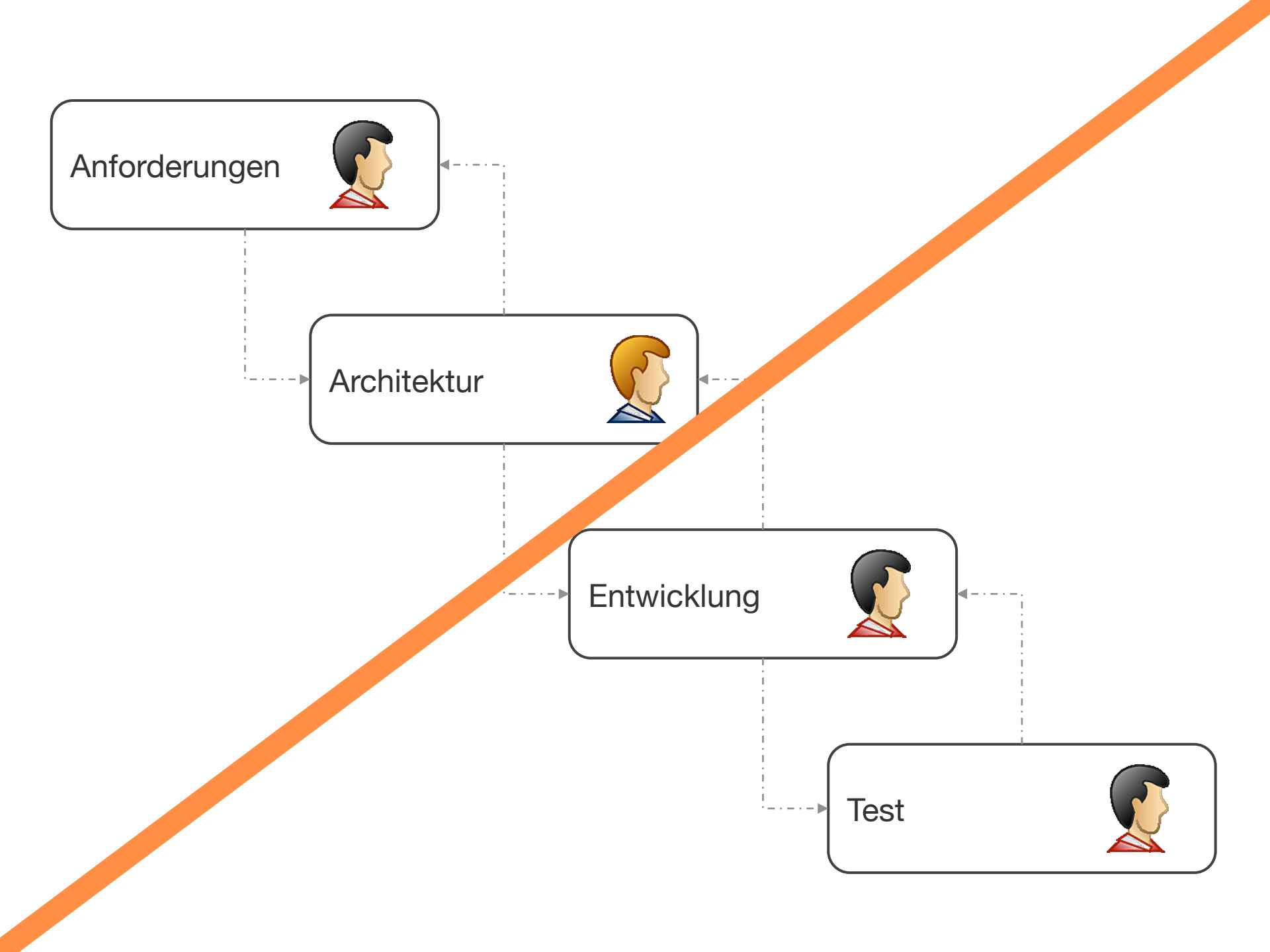
Architektur



Entwicklung



Test





Architekt



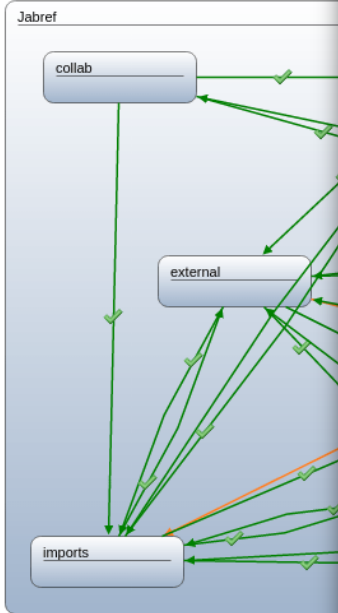

```
/* Process the input string received prior to the
newline. */
do
{
    /* Pass the string to FreeRTOS+CLI. */
    xMoreDataToFollow = FreeRTOS_CLIProcessCommandLine(
        xSocket, cOutputString, xMoreDataToFollow);

    /* Send the output generated by the command's
    implementation. */
    sendto( xSocket, cOutputString, strlen(cOutputString), 0,
        NULL, 0);

} while( xMoreDataToFollow != pdFALSE );

/* All the strings generated by the command have
been sent. Clear the input string for the next
command. */
```

Filter: 



gui → export

Dependencies: 1

Dependency source

net.sf.jabref.gui.MergeEntriesDialog



Added db2 database mapping after reading forum post

by [Daniel Lewis](#) in revision [91687a1146419dd23ceaed299185512696643dc1](#) (git)

Files: 11 changed

Findings: 4 12 1

Jul 17 2014 10:53



Dashboard

Activity

Findings

Tasks

Code

Architecture

Delta

Projects

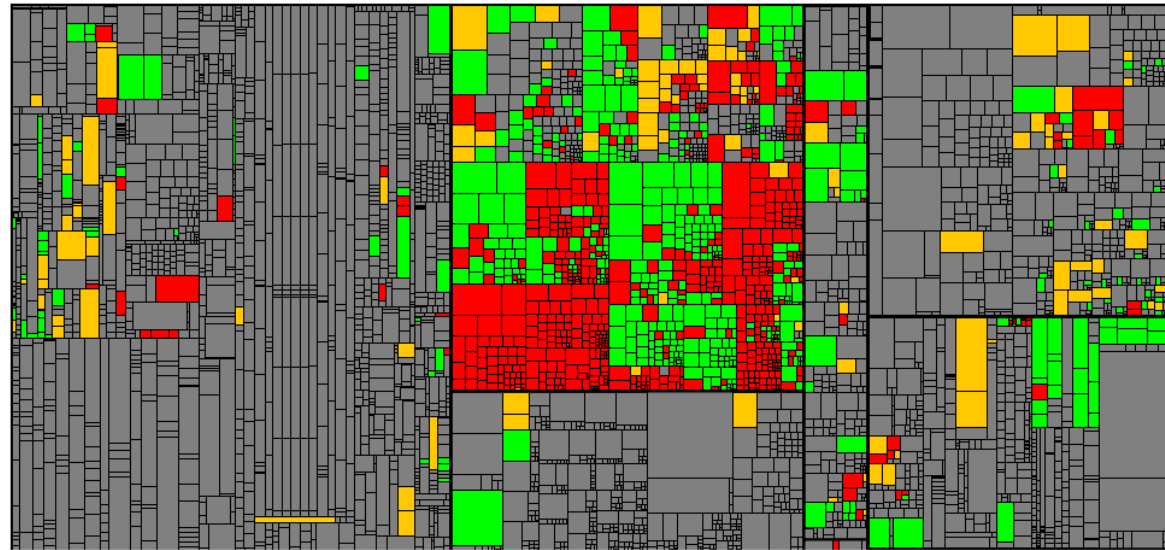
System

Admin

Jul 17 2014 10:30

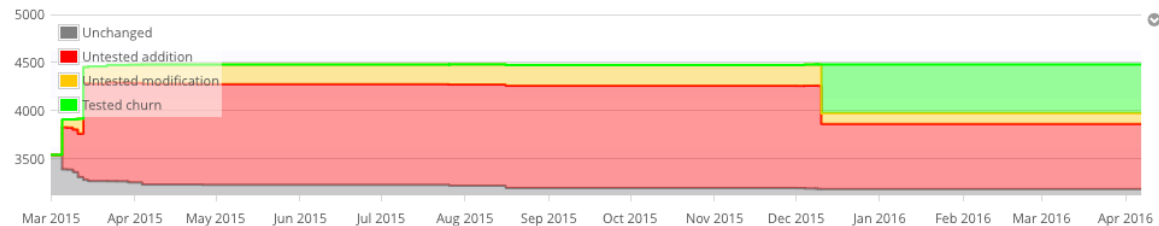
Test Gap Treemap for pinta

Test Gap: 61%



Jul 17 2014 08:46

Test Gap Trend Chart for pinta

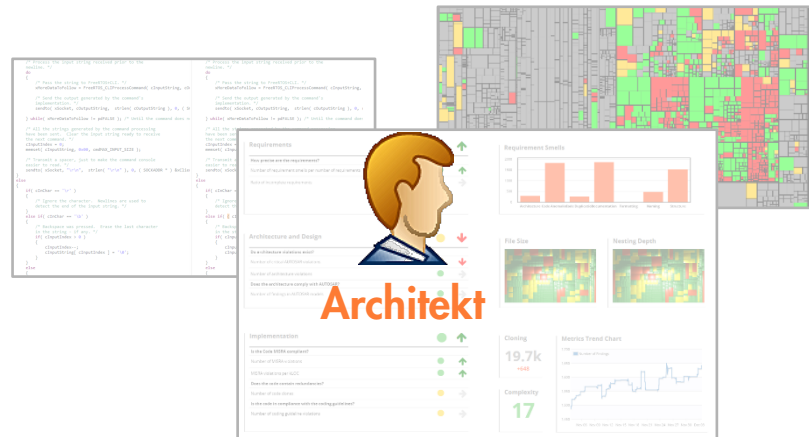


Core Metrics for team

net.sf.jabref.export.LatexFieldFormatter



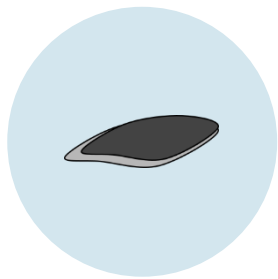
Warum schon
wieder **dieser**
Fehler?



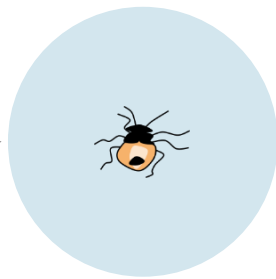
Entwicklung



Test



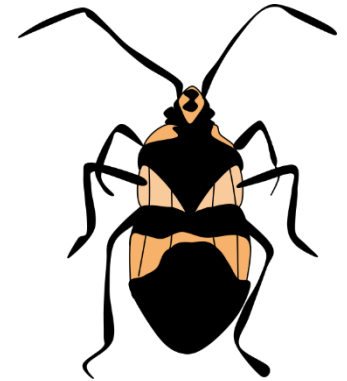
Team-Wechsel



Code-Ownership



Inkonsistenter Klon



Bug

Historien-Analyse



conqat.org

Entwickler

Haupt-Committer

feilikas
stemplinger
plachot
sahinagic
bader
malinskyi
ribeiro
svejda
hodaie
amann
kanis
junker
steidl
streitel
beller
hauptmab

Sporadische Committer

Block-Arbeit

„Abwandern“

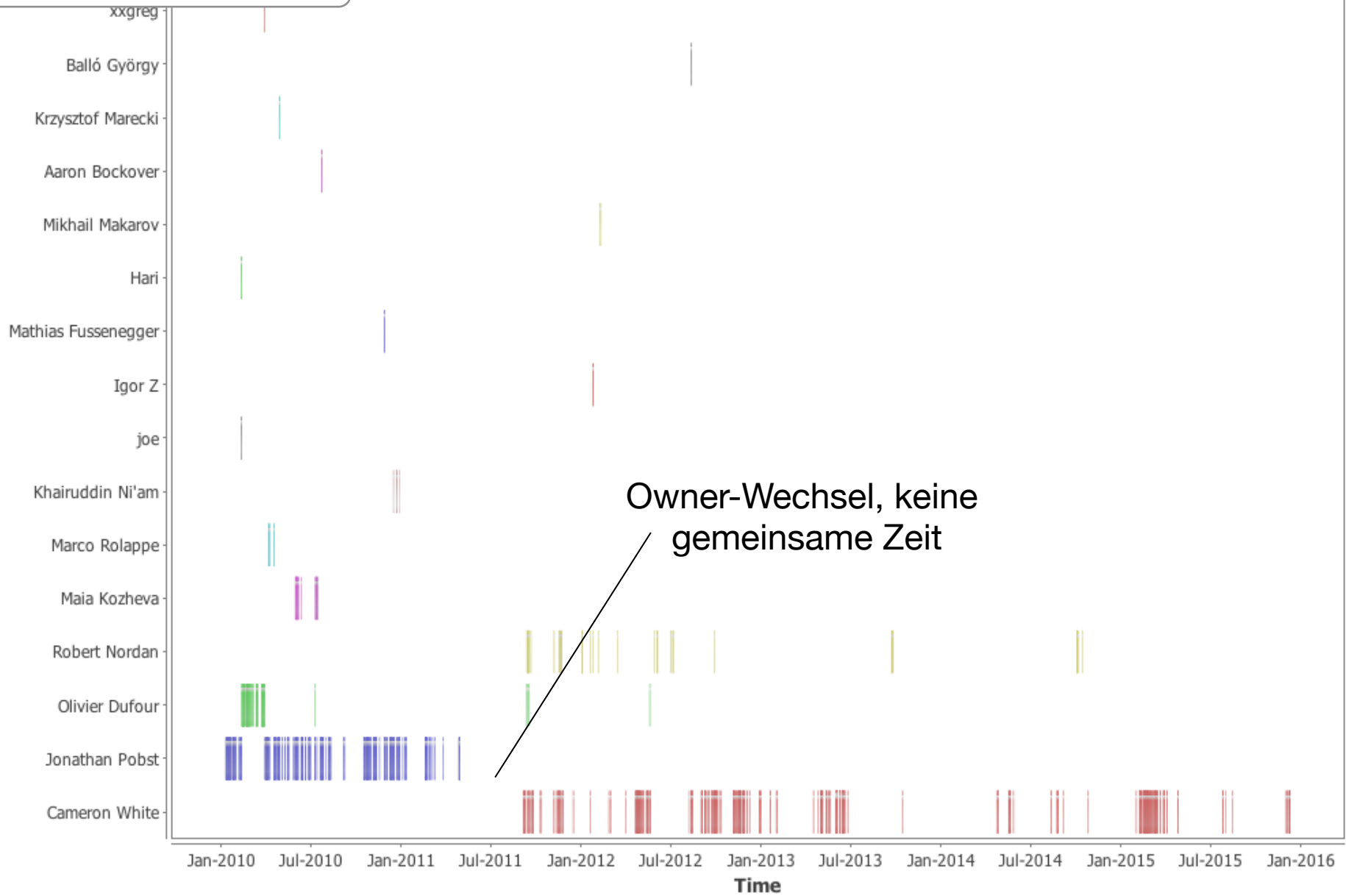
heineman
poehlman
juergens

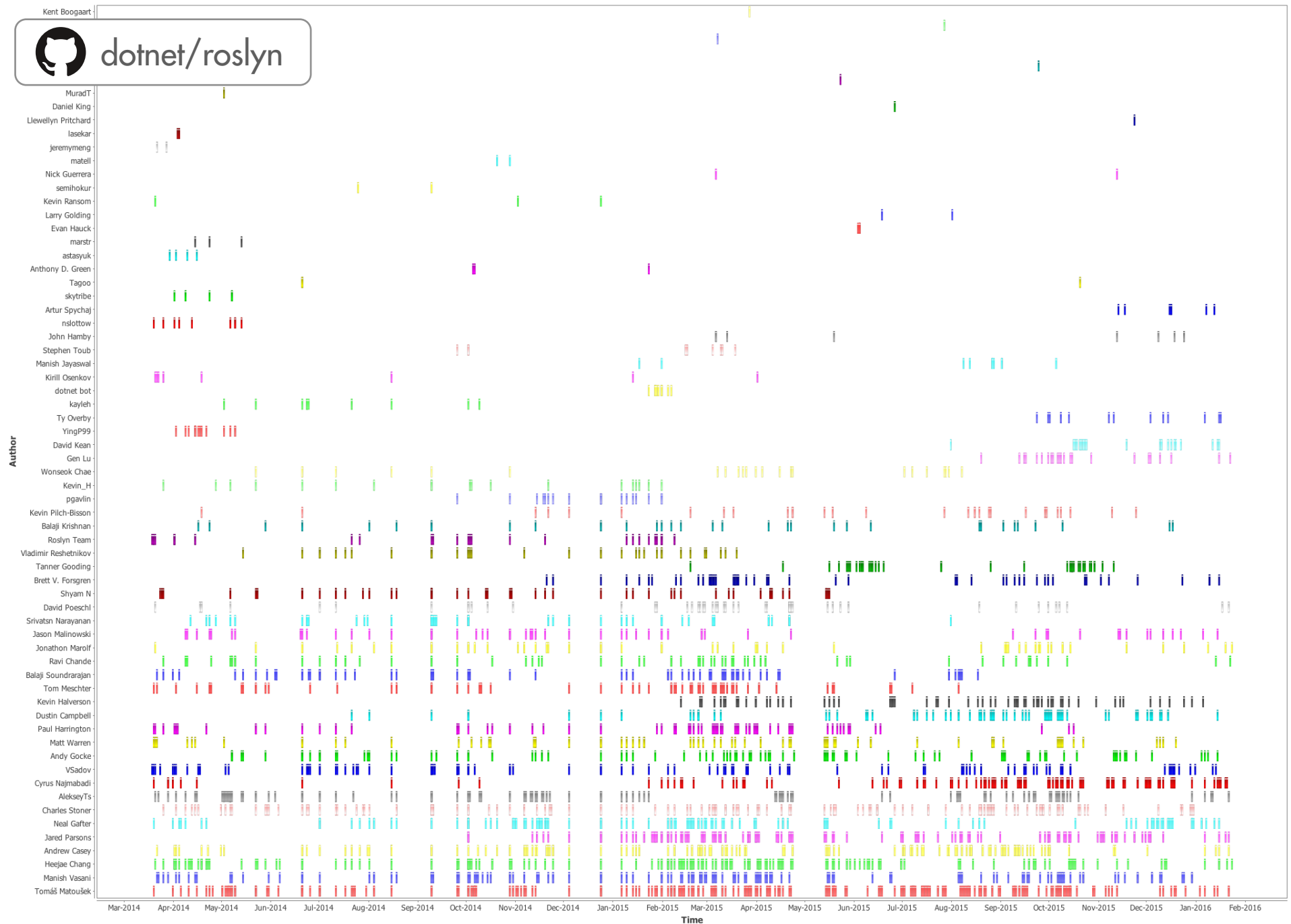
Jun-2011 Jul-2011 Aug-2011 Sep-2011 Okt-2011 Nov-2011 Dez-2011 Jan-2012 Feb-2012 Mrz-2012 Apr-2012 Mai-2012 Jun-2012 Jul-2012

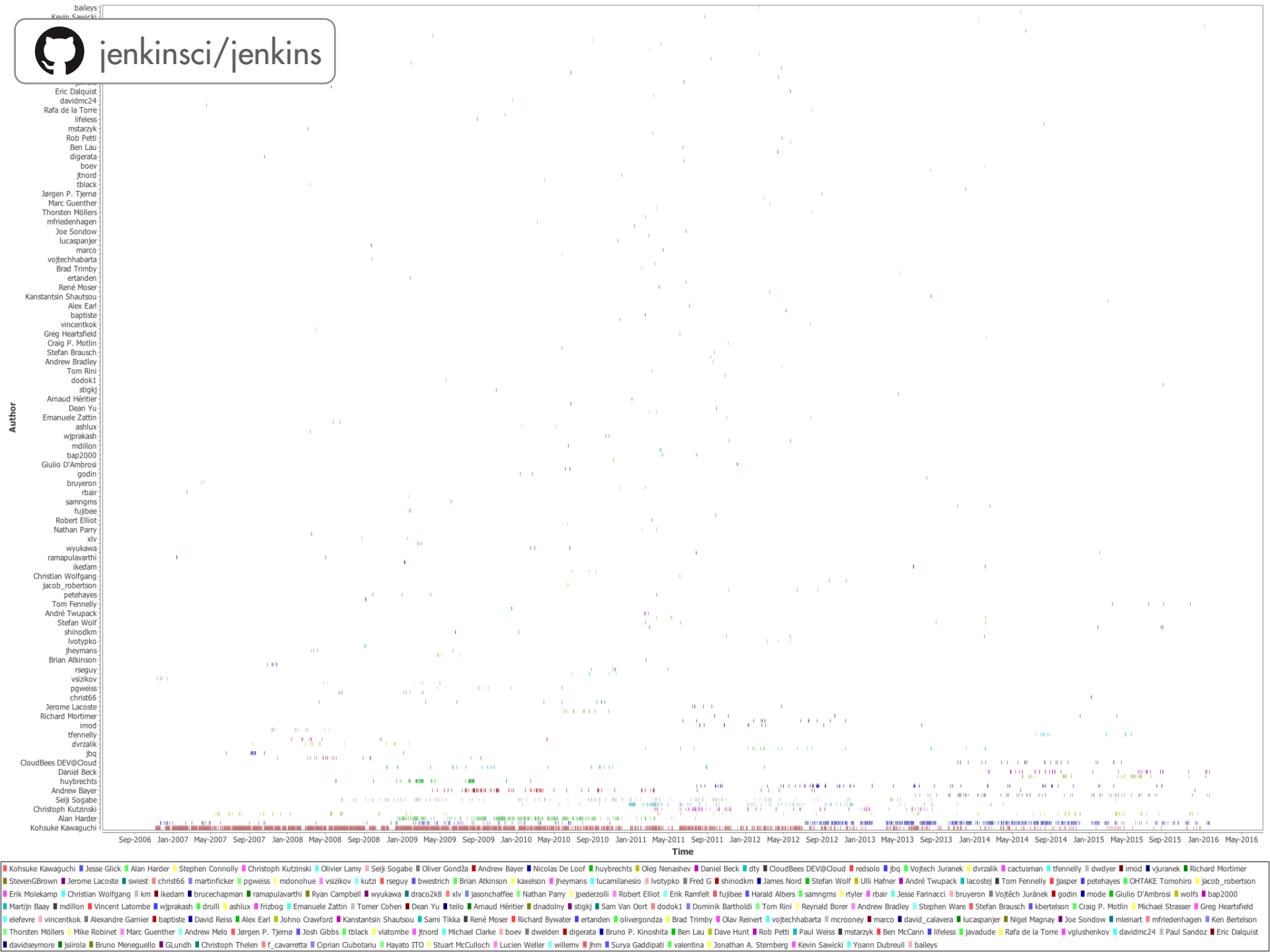
Zeit



Author

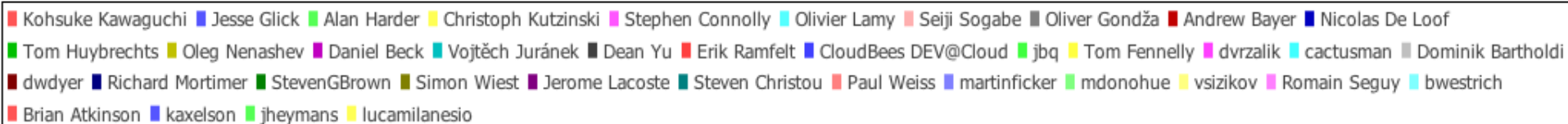
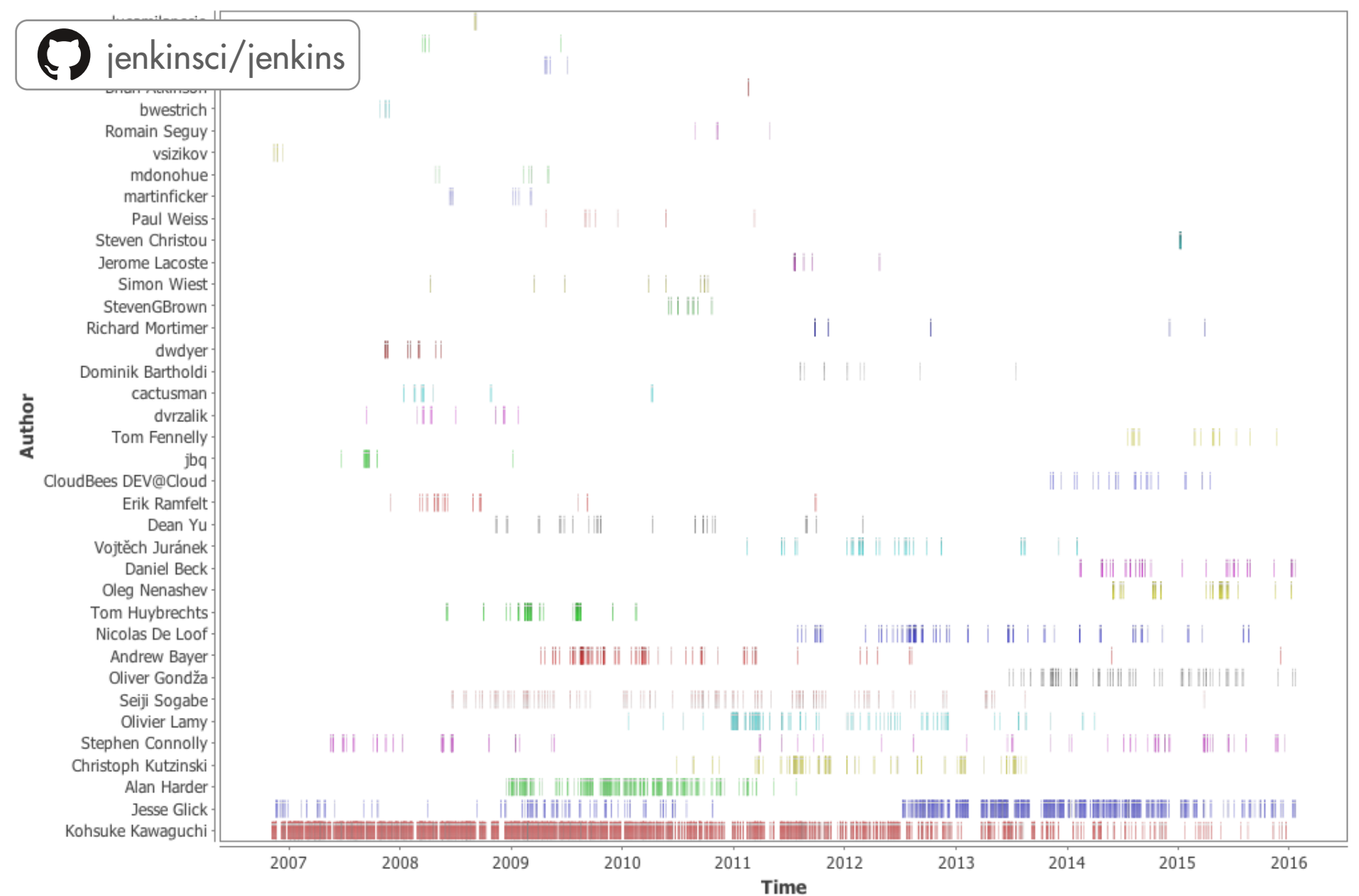








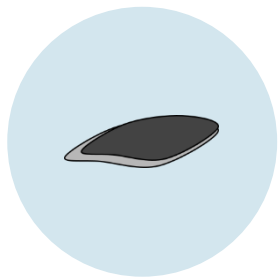
jenkinsci/jenkins





Kundenprojekt





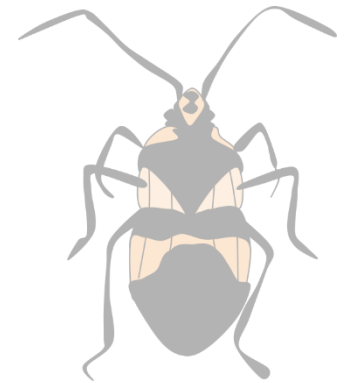
Team-Wechsel



Code-Ownership

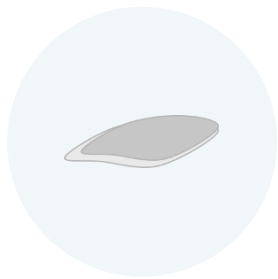


Inkonsistenter Klon

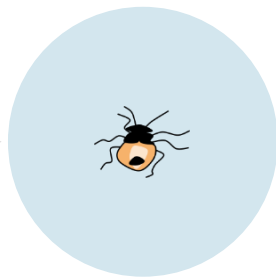


Bug

Historien-Analyse



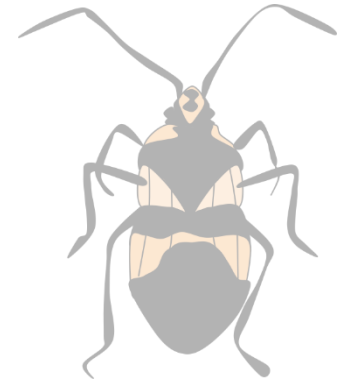
Team-Wechsel



Code-Ownership



Inkonsistenter Klon

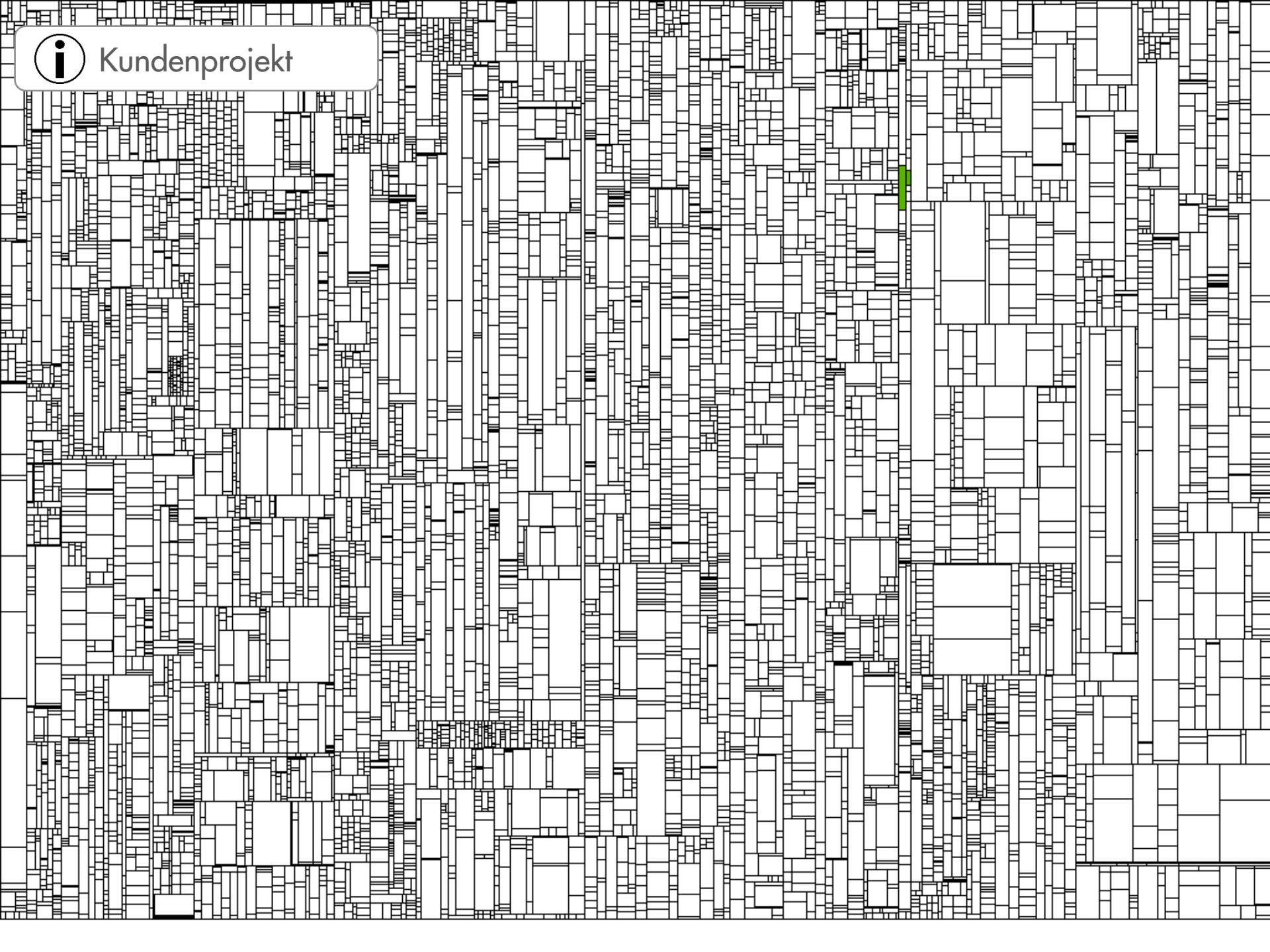


Bug

Historien-Analyse



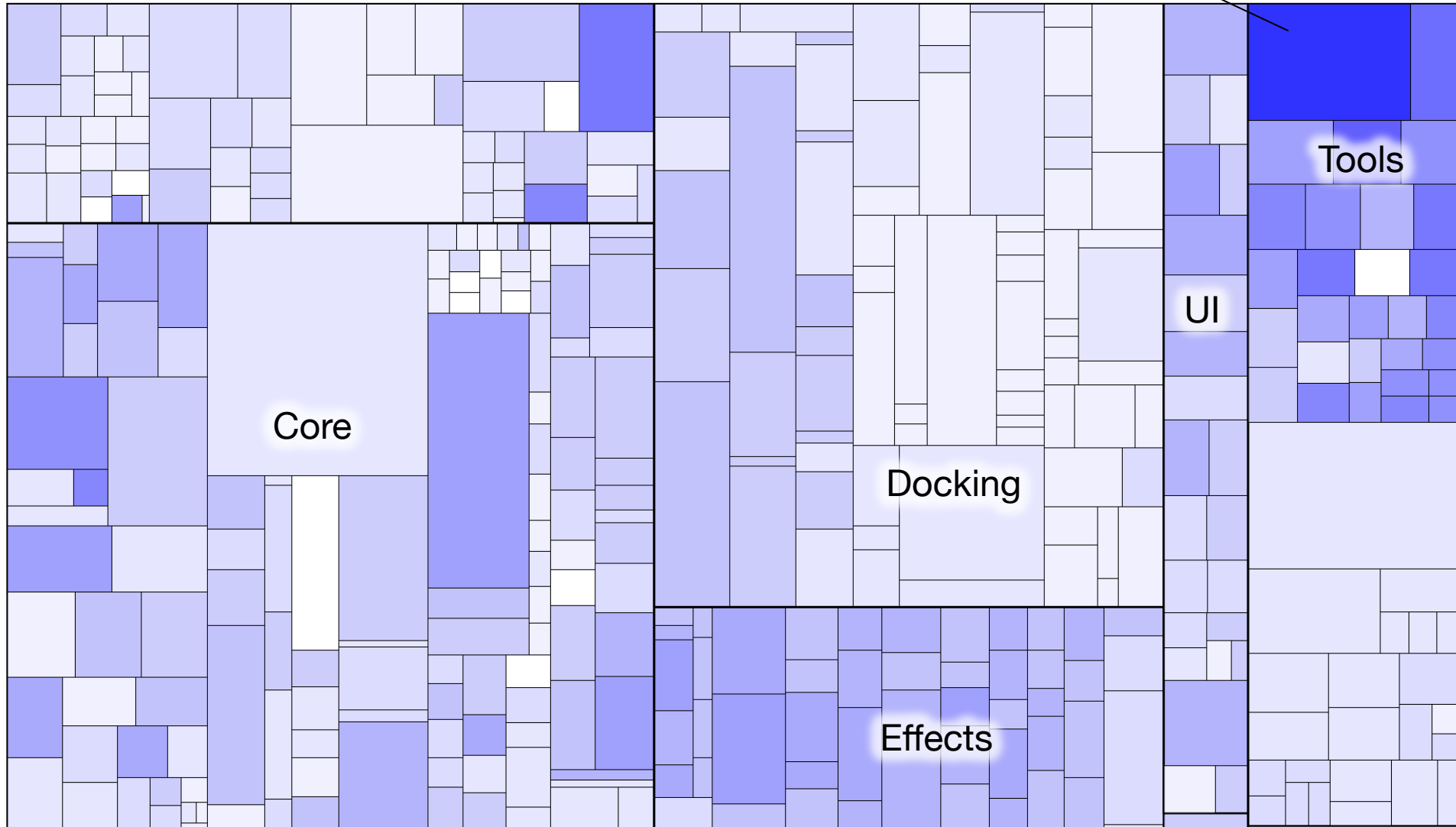
Kundenprojekt





TextTool.cs (17 Entwickler)

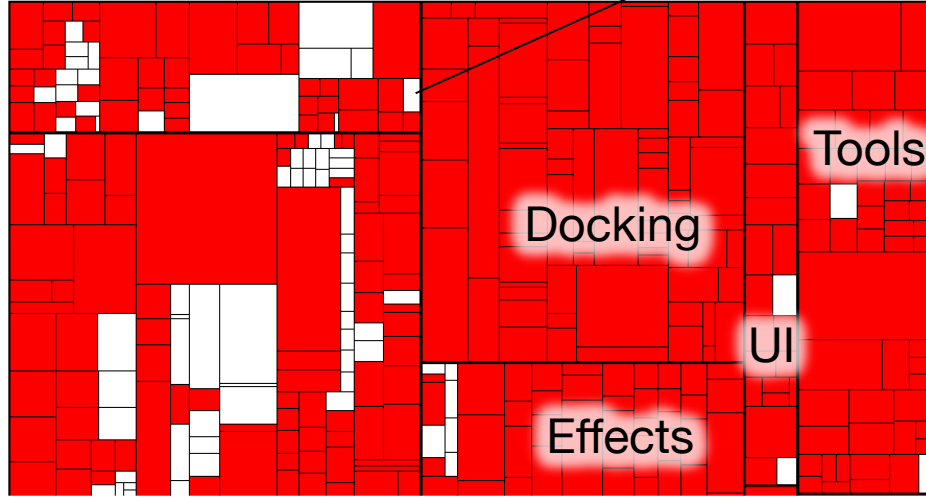
Ownership Distribution for [pinta](#)





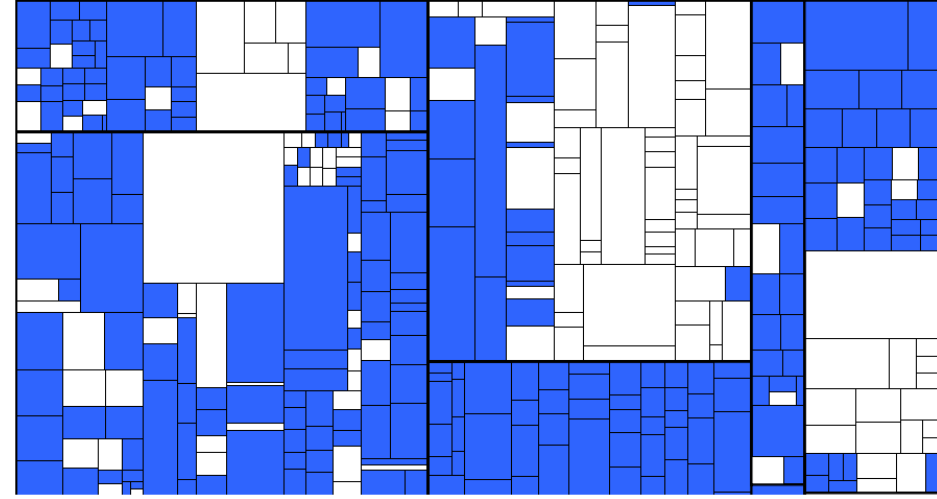
Wissenslücke

Ownership Cameron White (#1)

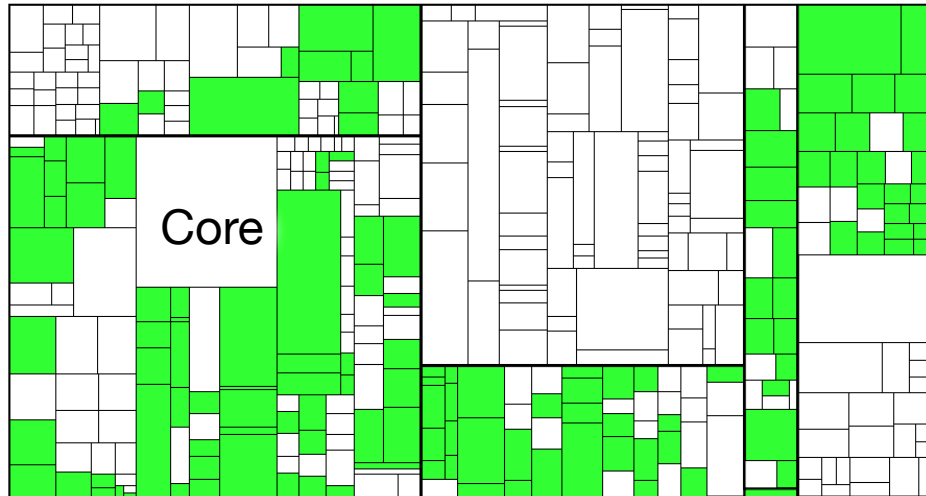


„Abgewandert“

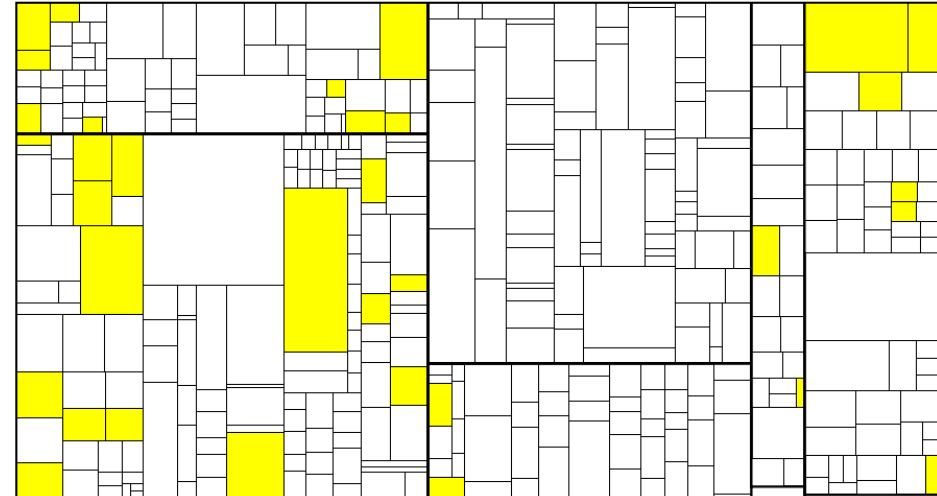
Ownership Jonathan Pobst (#2)



Ownership Olivier Dufour (#3)



Ownership Robert Nordan (#4)

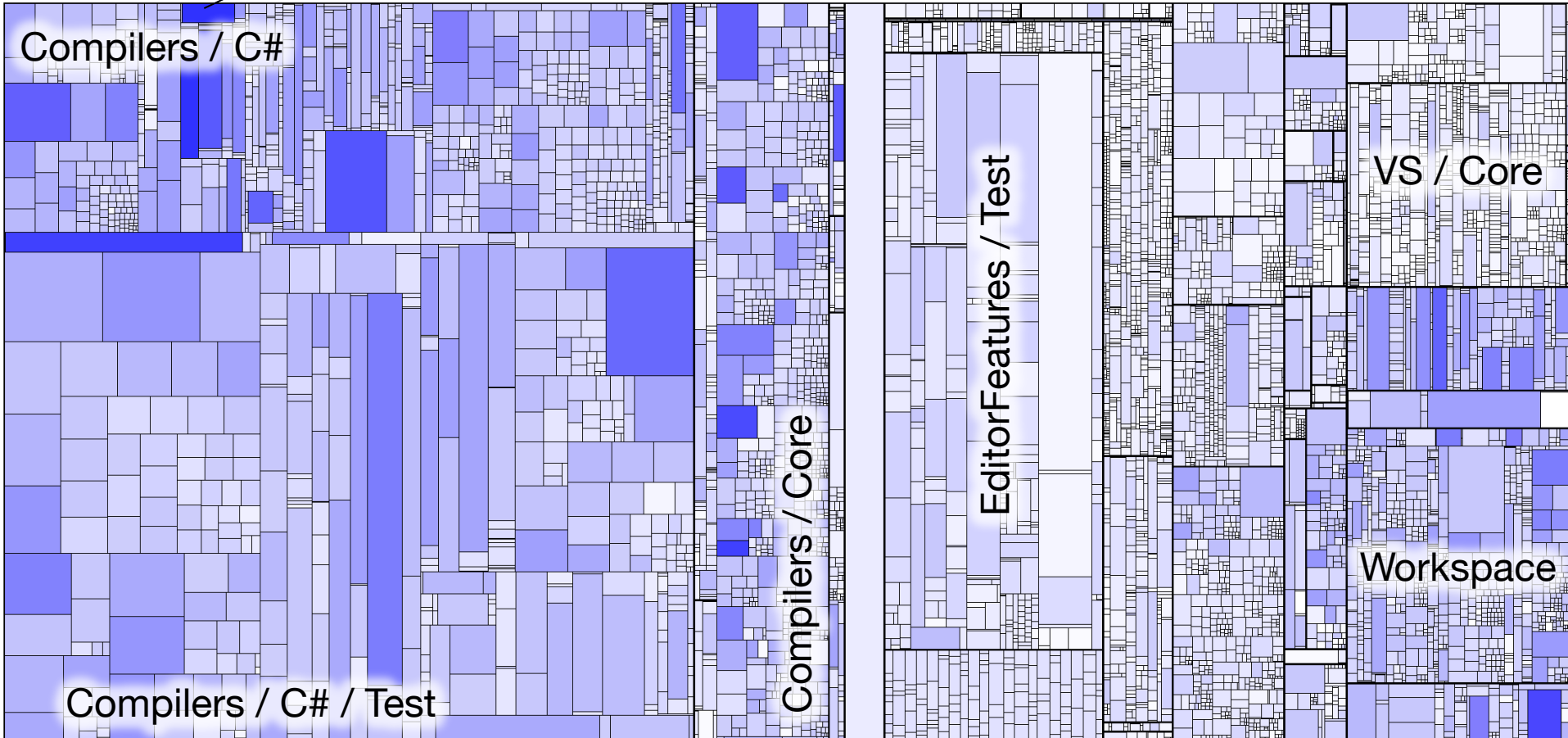




dotnet/roslyn

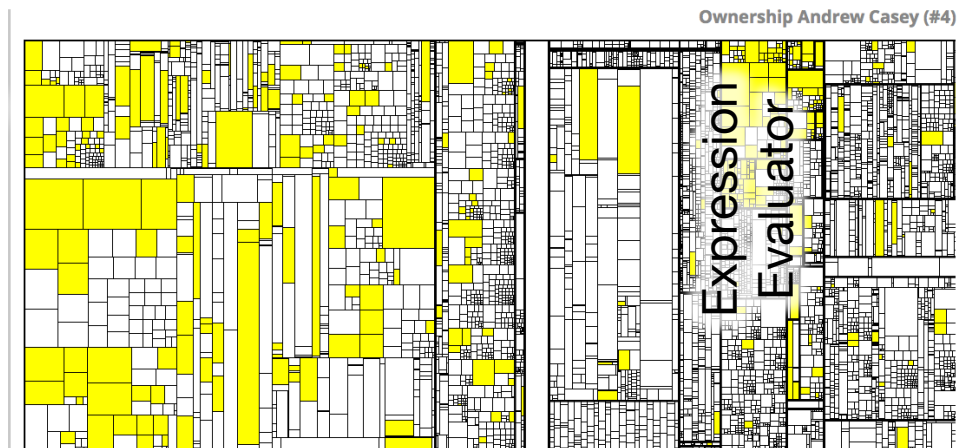
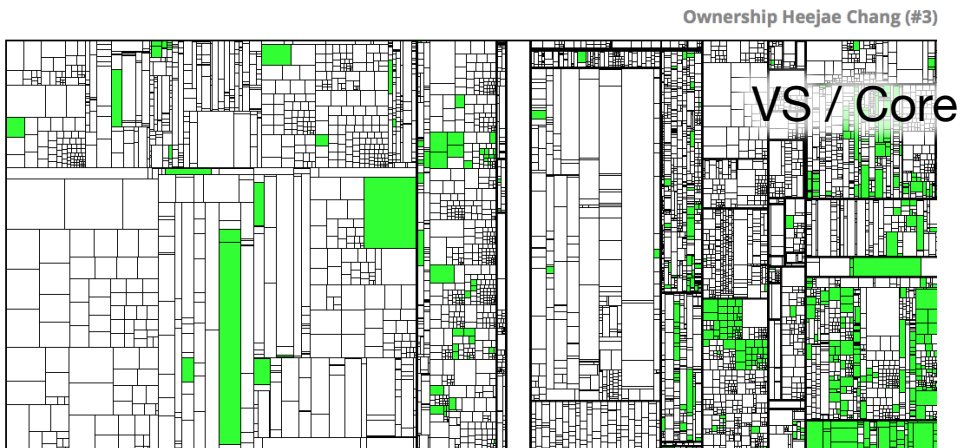
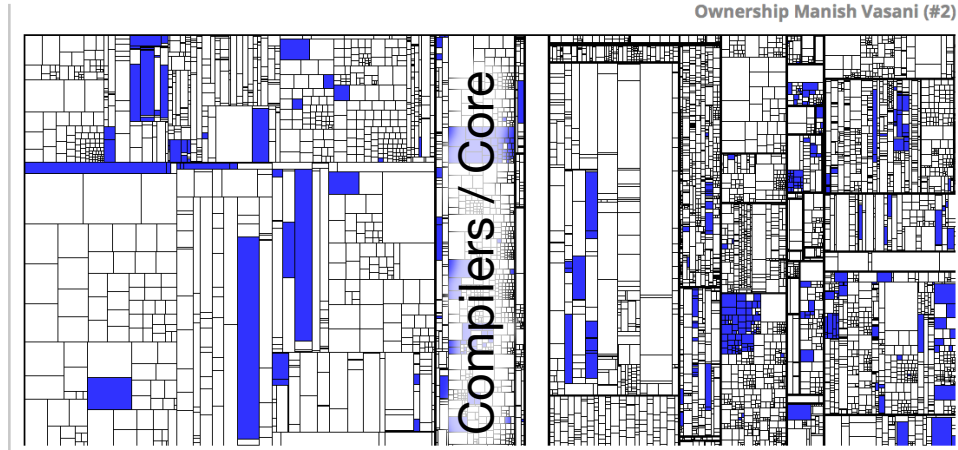
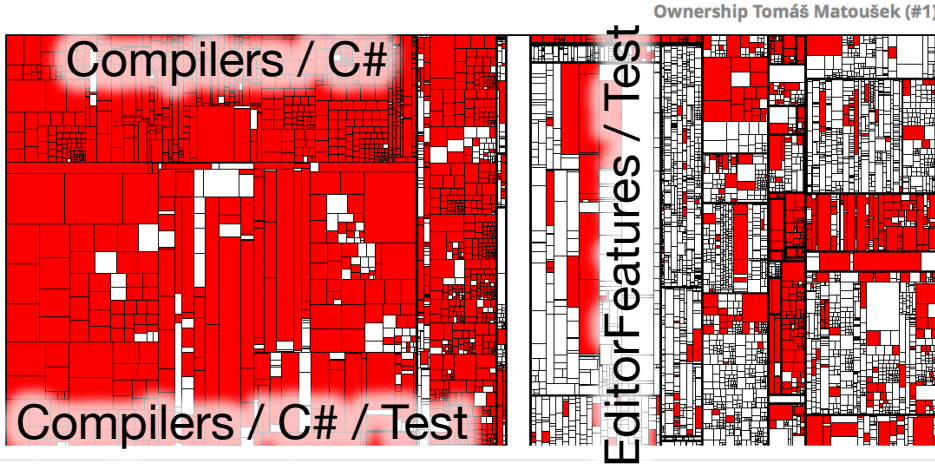
CSharpCommandLineParser.cs (47 Entwickler)

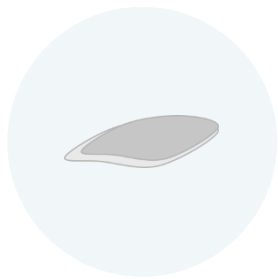
Ownership Distribution



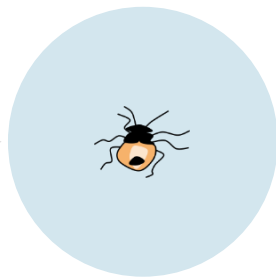


dotnet/roslyn





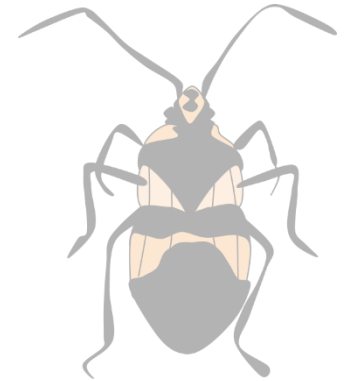
Team-Wechsel



Code-Ownership

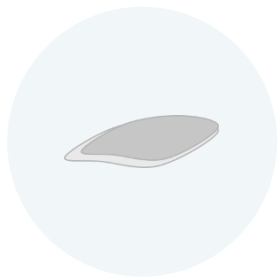


Inkonsistenter Klon



Bug

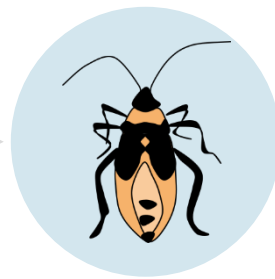
Historien-Analyse



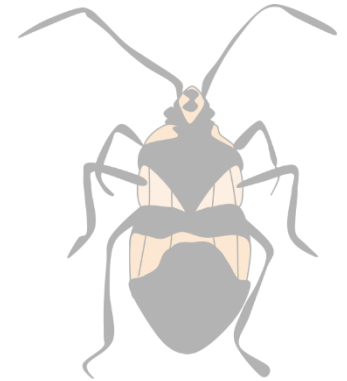
Team-Wechsel



Code-Ownership

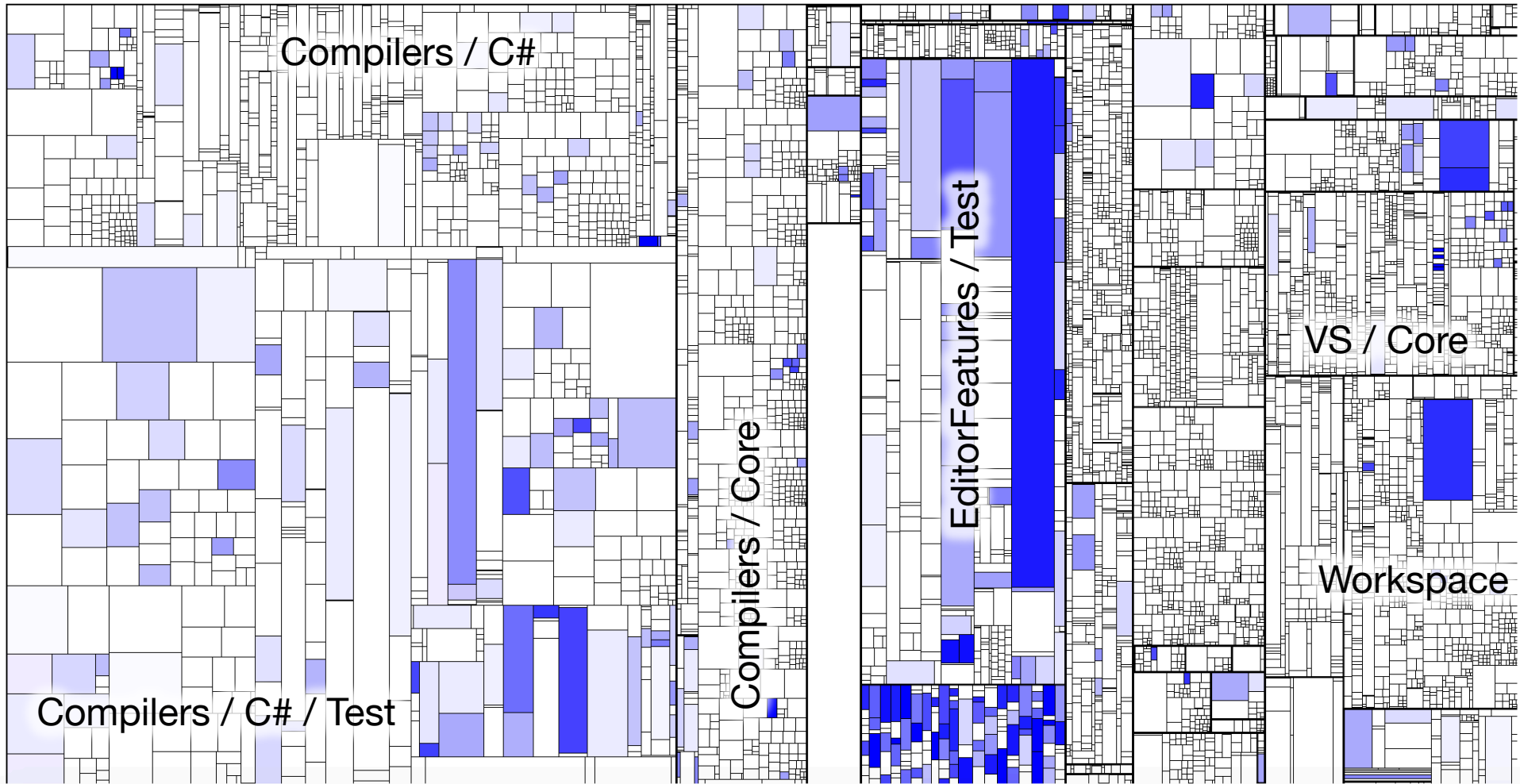


Inkonsistenter Klon



Bug

Historien-Analyse



Head (Feb 2016)
Klonüberdeckung: 8,7%



dotnet/roslyn

LOC vs. Clone Coverage for [roslyn-c](#)

27.5%

2,000,000

1,900,000

1,800,000

1,700,000

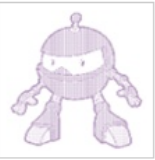
1,600,000

1,500,000

1,400,000

1,300,000

1,200,000



Moved remainder of Interactive and EditorFeatures to Open (changeset 1406305)
by [dotnet bot](#) in revision [94858618d0232a01538182a44454986b2a3dff78](#) (master)

Jan 28 2015
23:54

Files: 544 added

Findings: 2081



25.0%

22.5%

20.0%

17.5%

15.0%

12.5%

10.0%

7.5%

5.0%

2.0%

May 2014

Jul 2014

Sep 2014

Nov 2014

Jan 2015

Mar 2015

May 2015

Jul 2015

Sep 2015

Nov 2015

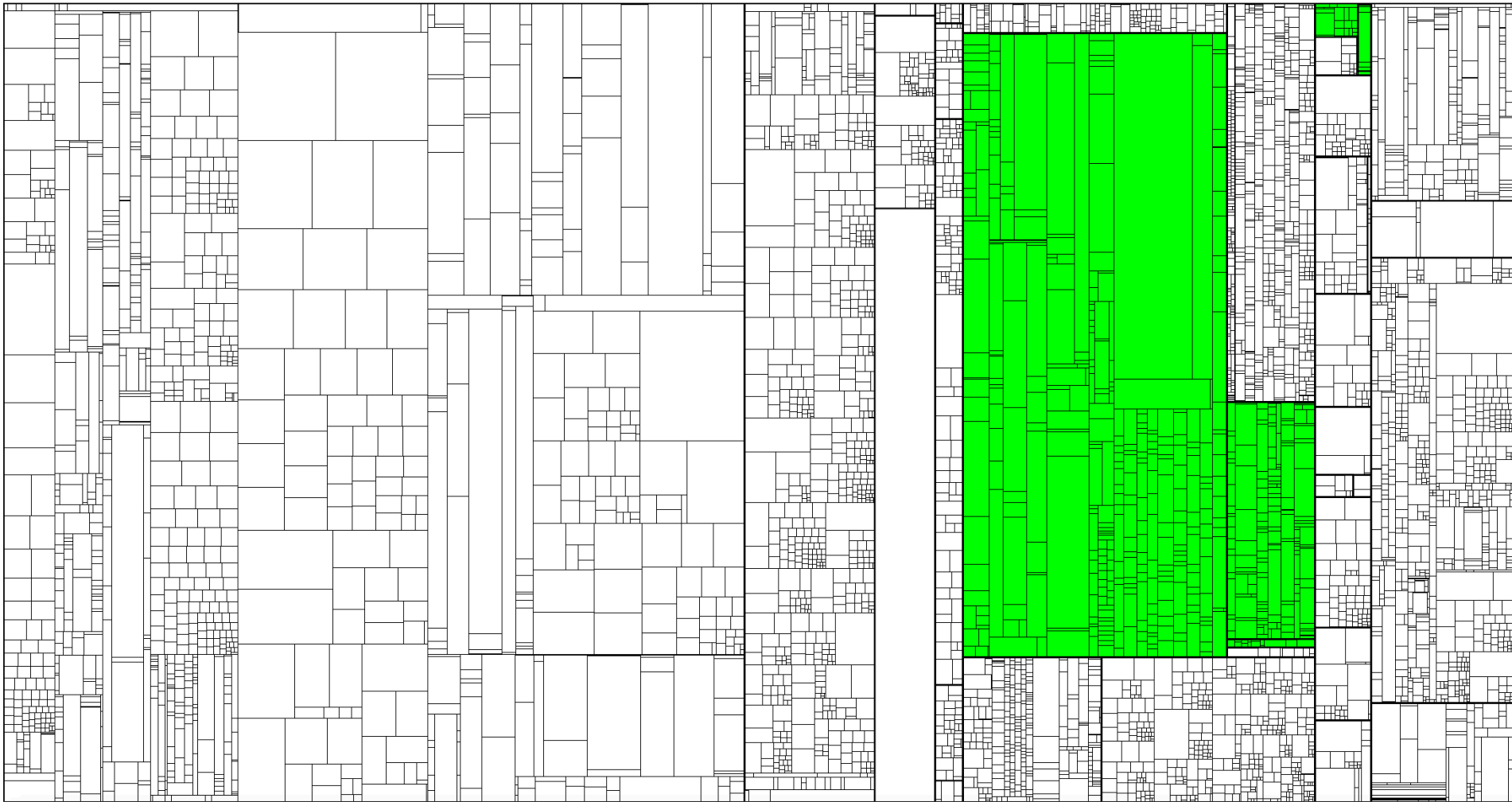
Jan 2016



Lines of Code

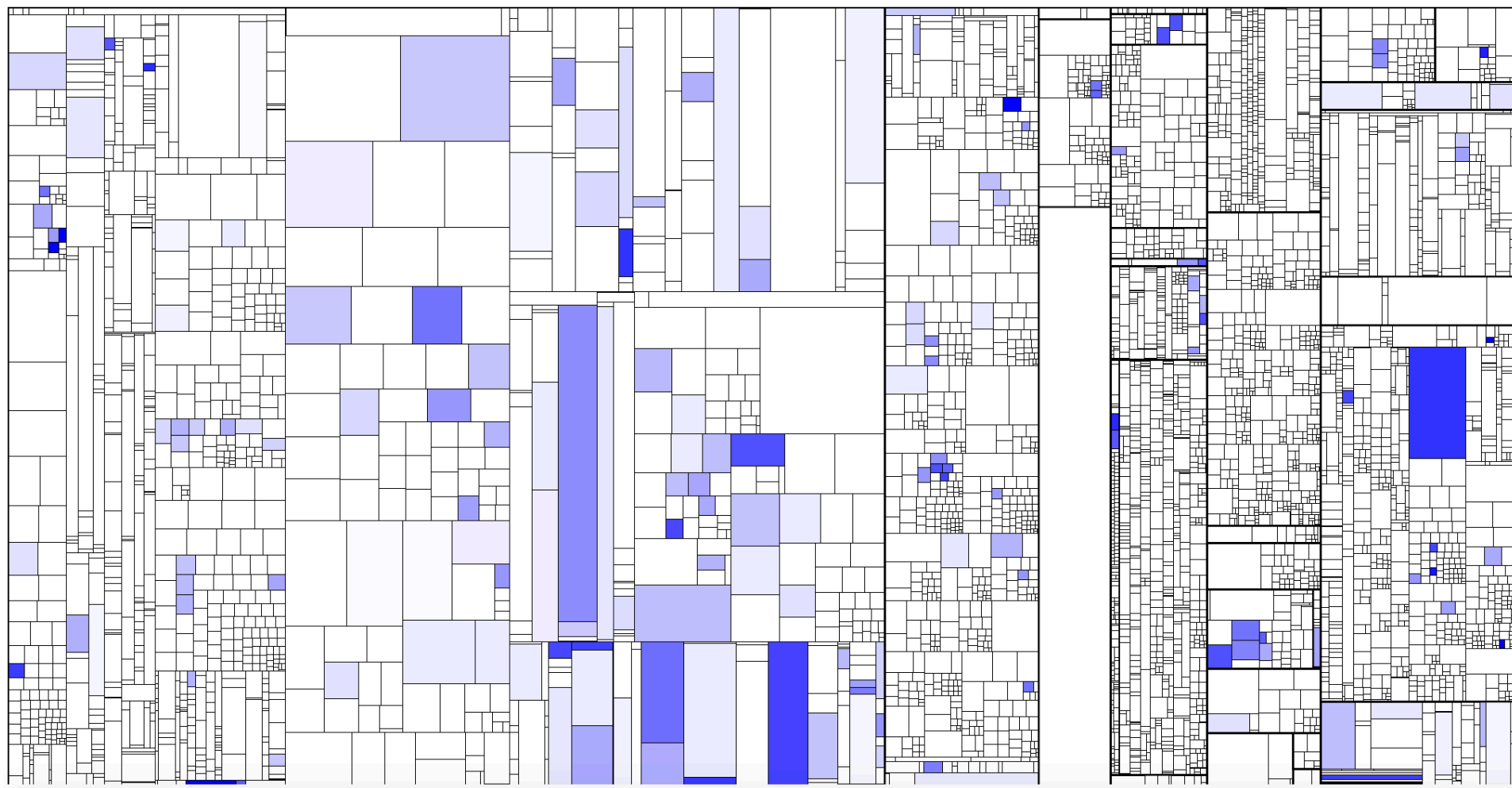


Clone Coverage



red: deleted, blue: edited, green: added

Änderungen

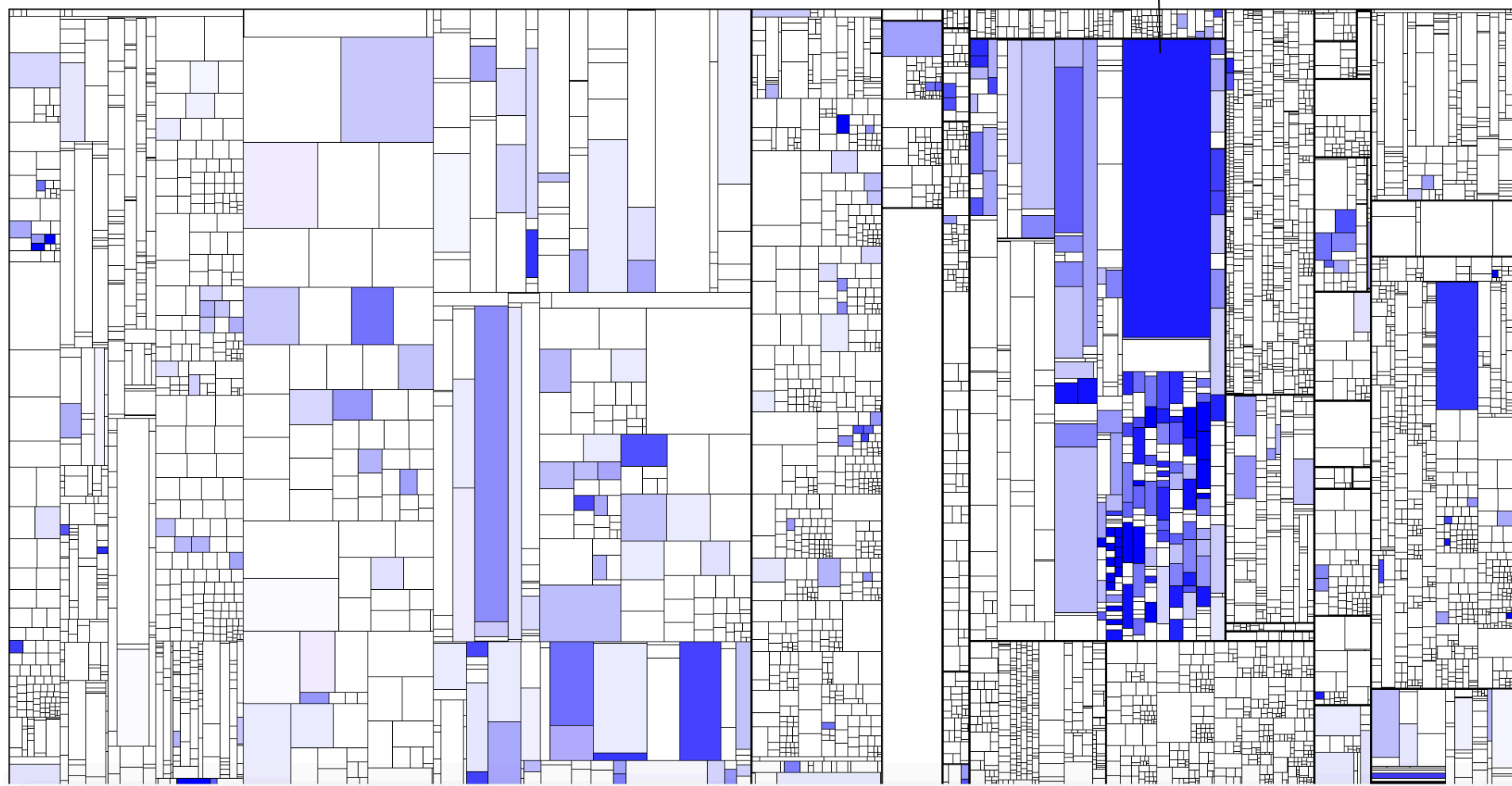


Vorher
(Klonüberdeckung 5,2%)

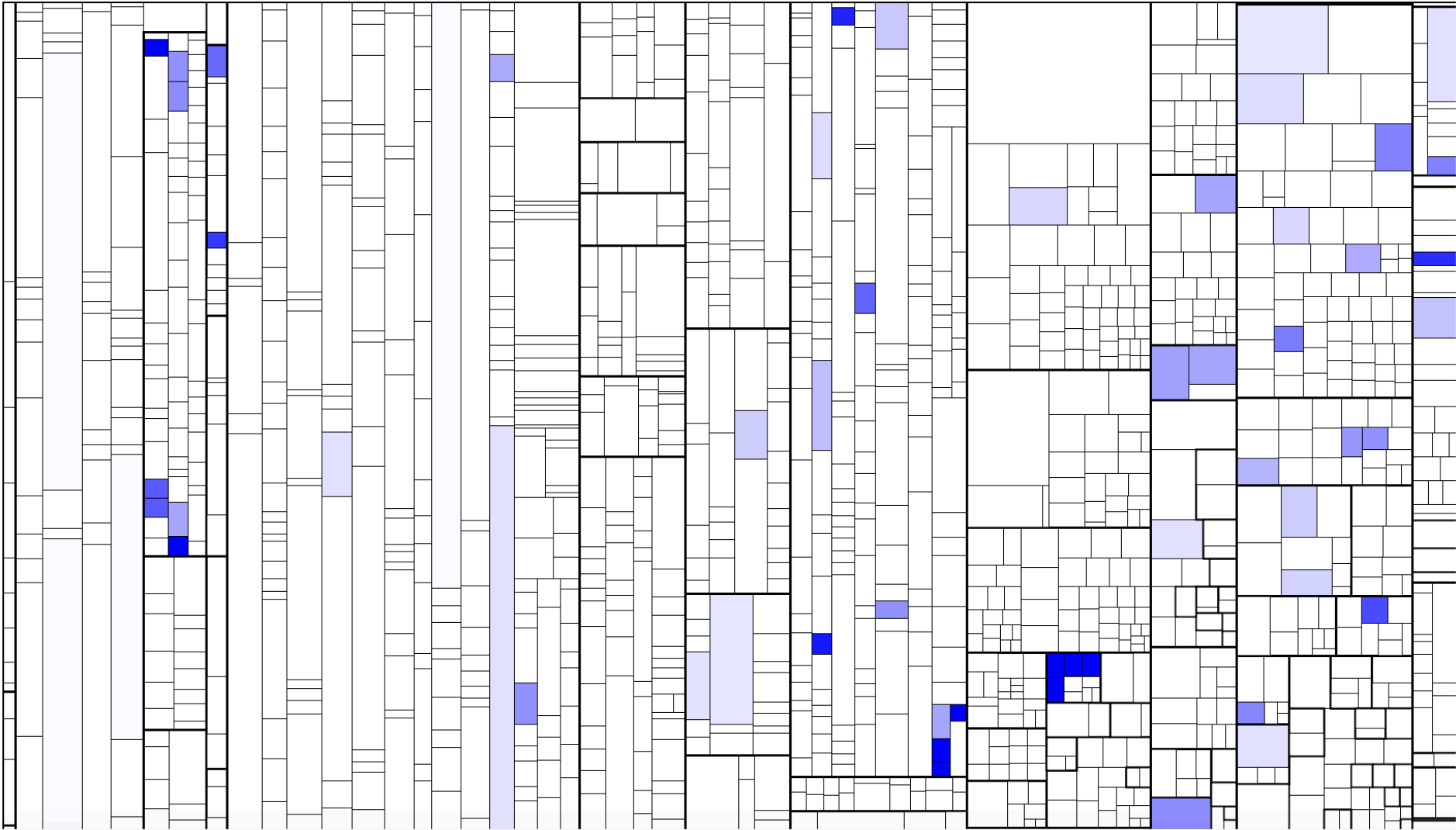


Performance-Test Case (89% Klonüberdeckung)

Clone Coverage Treemap for [roslyn-c-](#)



Nachher
(Klonüberdeckung 9,6%)



Head (Feb. 2016)
Klonüberdeckung: 2,2%



jenkinsci/jenkins

LOC vs. Clone Coverage Trend for jenkins

5.0%

220,000

1.0%



Merge pull request #294 from stephenc/master Nice improvement to Jenkins testability
by Nicolas De loof in revision c24a2b1ec93064eb2e085ba6d07ca4c85b2c7675 (master)

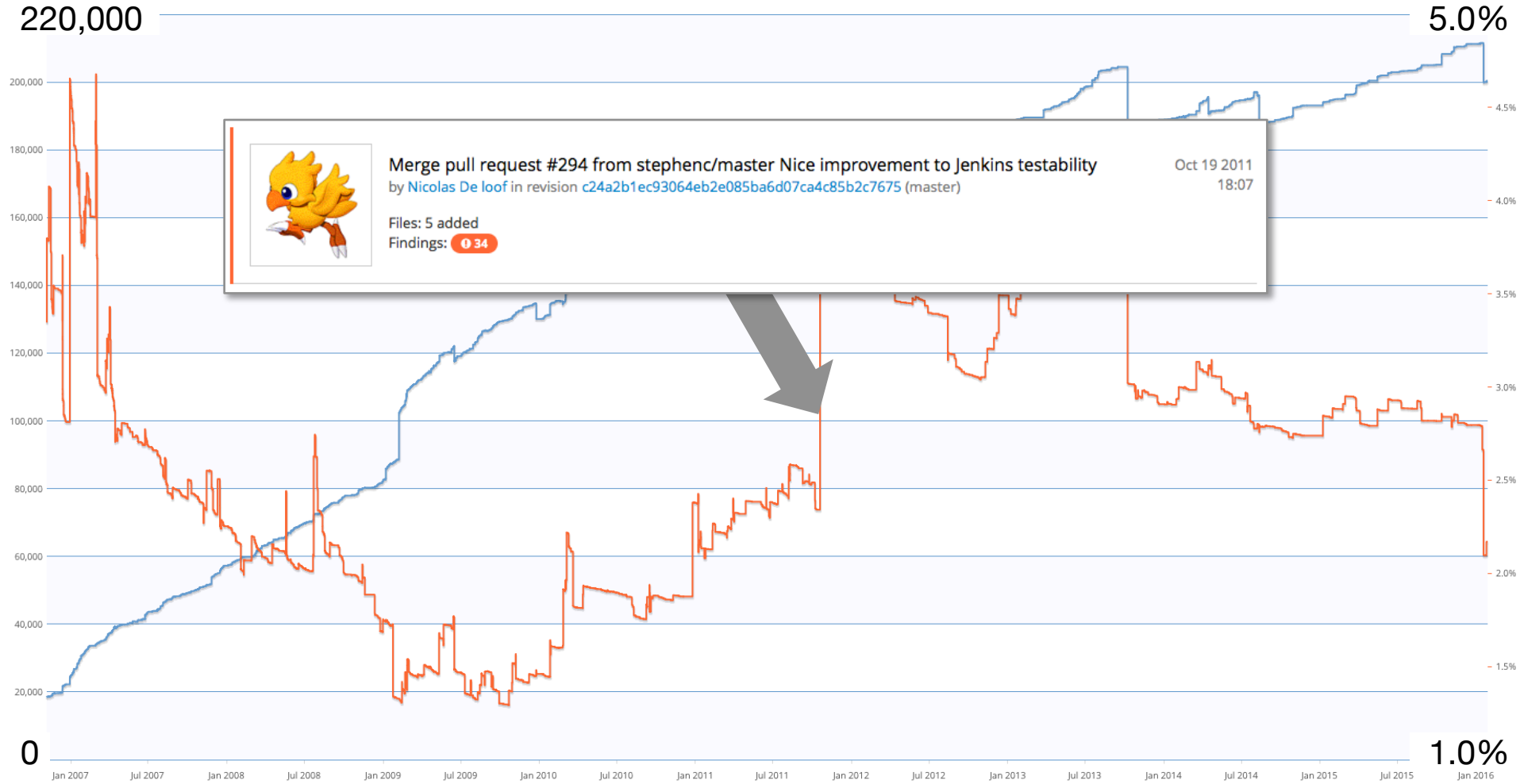
Oct 19 2011
18:07

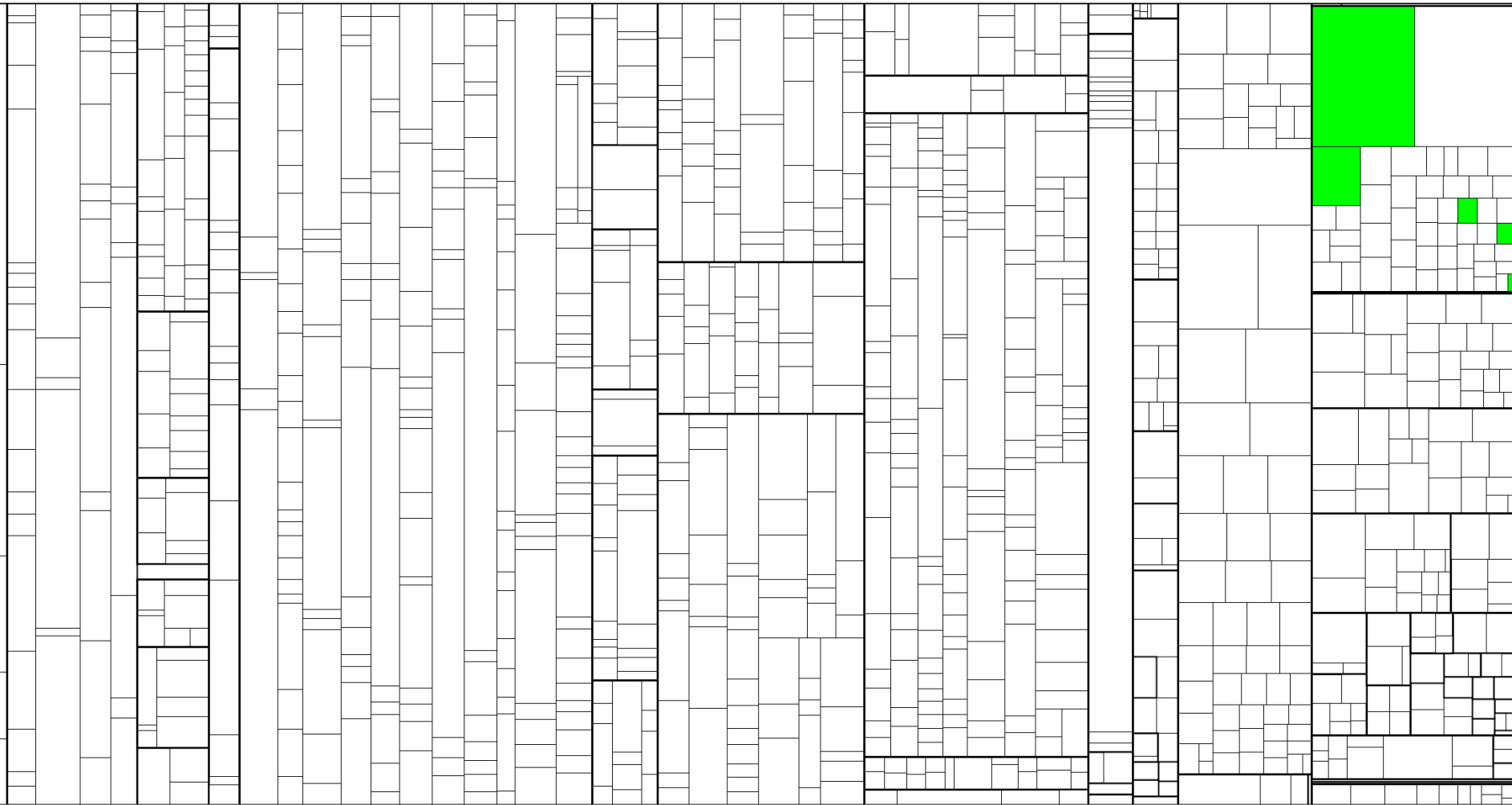
Files: 5 added

Findings: 0 34

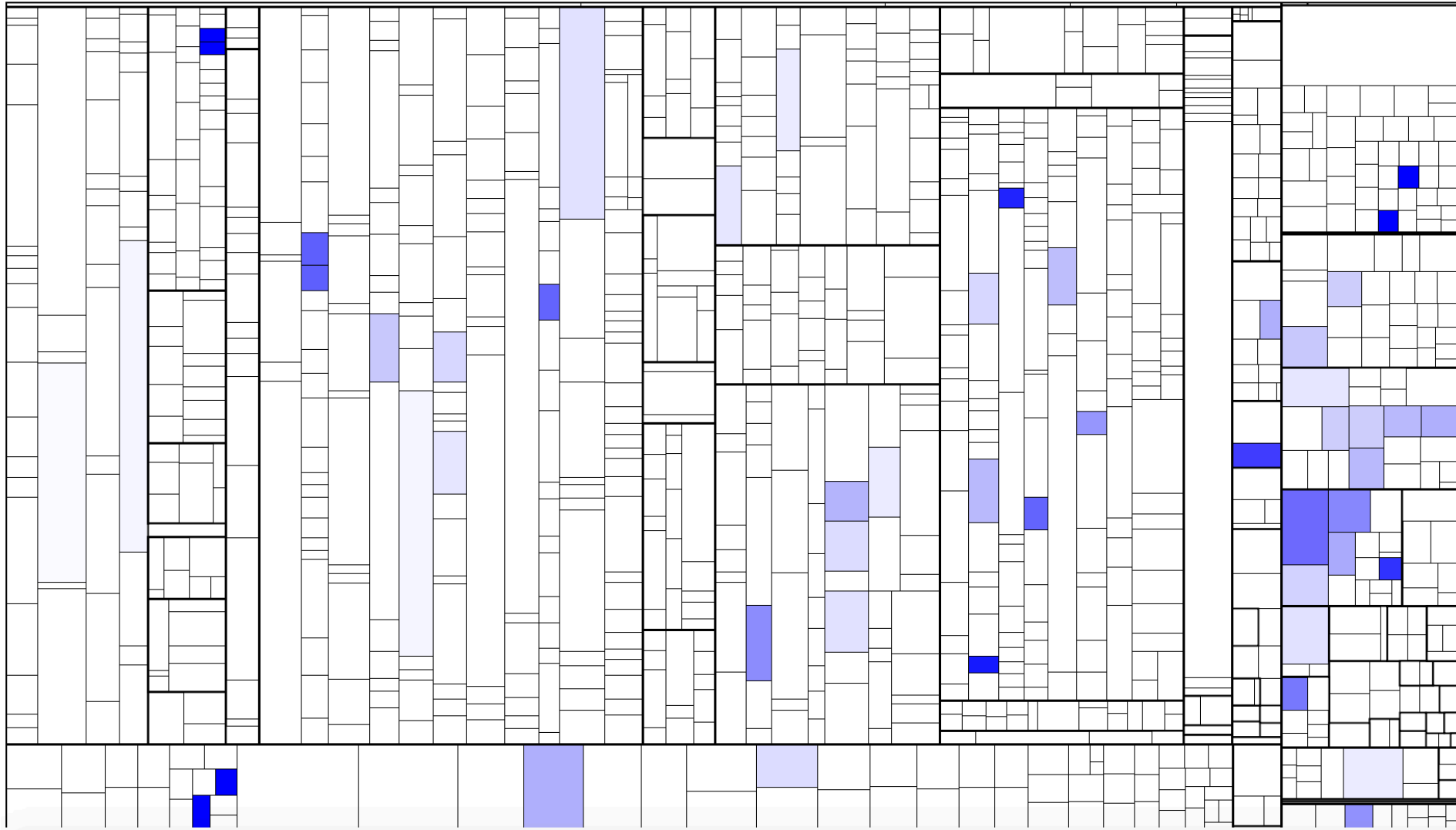


Lines of Code
Clone Coverage

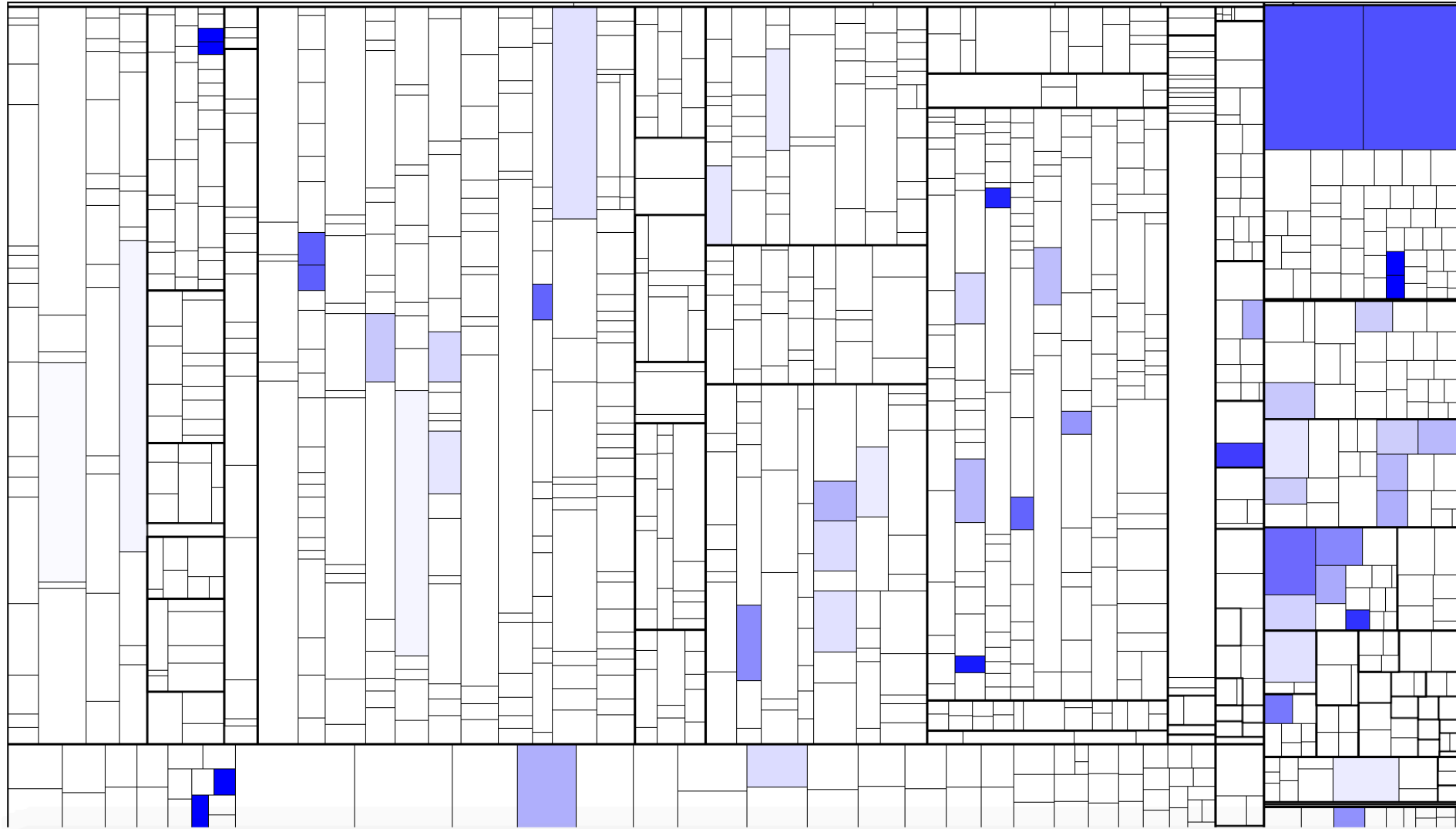




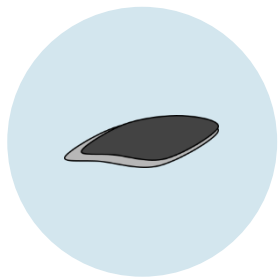
Änderungen



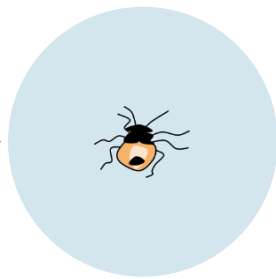
Vorher
(Klonüberdeckung 2,3%)



Nachher
(Klonüberdeckung 4,2%)



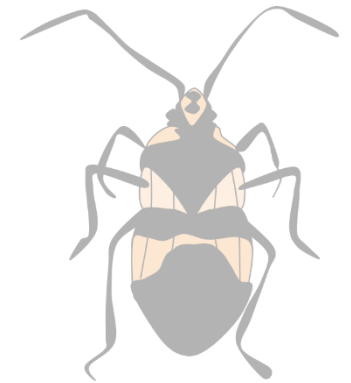
Team-Wechsel



Code-Ownership



Inkonsistenter Klon

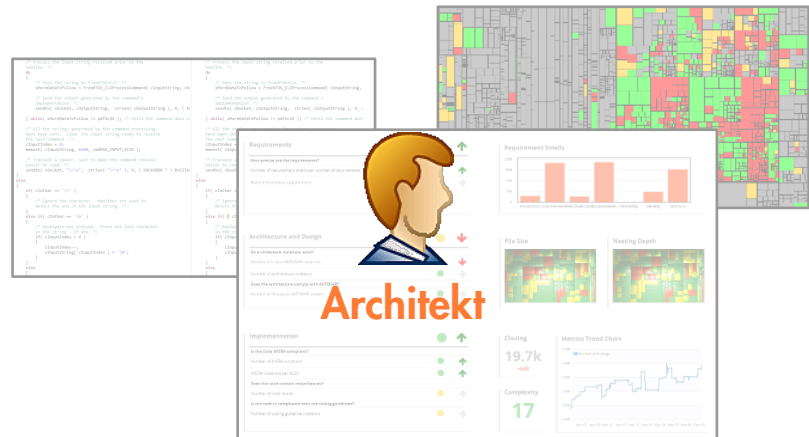


Bug

Historien-Analyse



Warum schon
wieder **dieser**
Fehler?



Entwicklung



Test

Änderungen



Test-Gap-Analyse

Ausführung



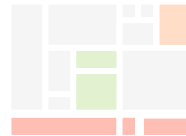
Ungetestete
Änderungen

Änderungen



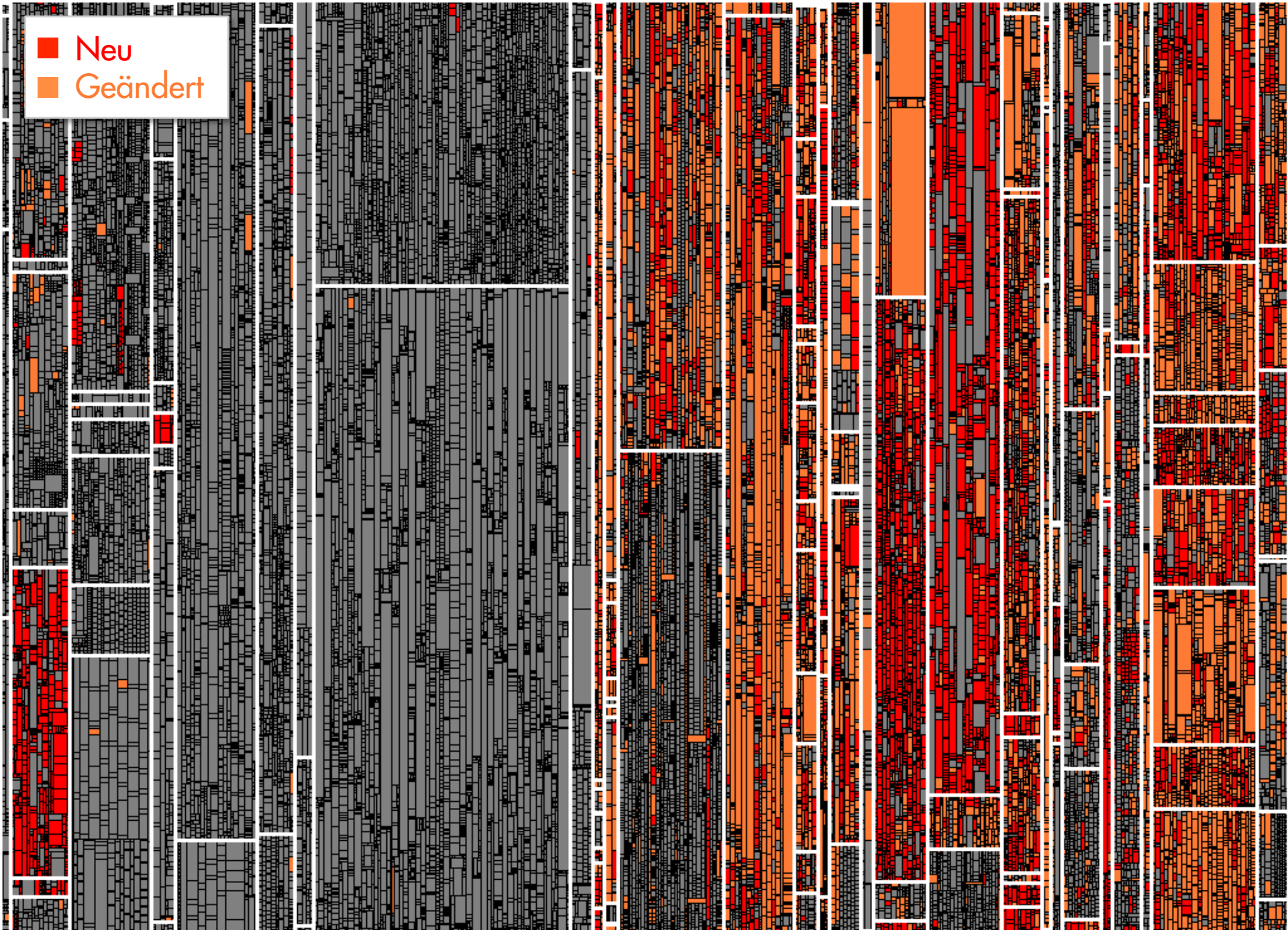
Test-Gap-Analyse

Ausführung

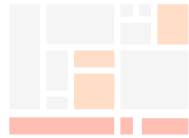


Ungetestete
Änderungen

■ Neu
■ Geändert

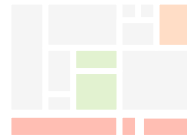


Änderungen



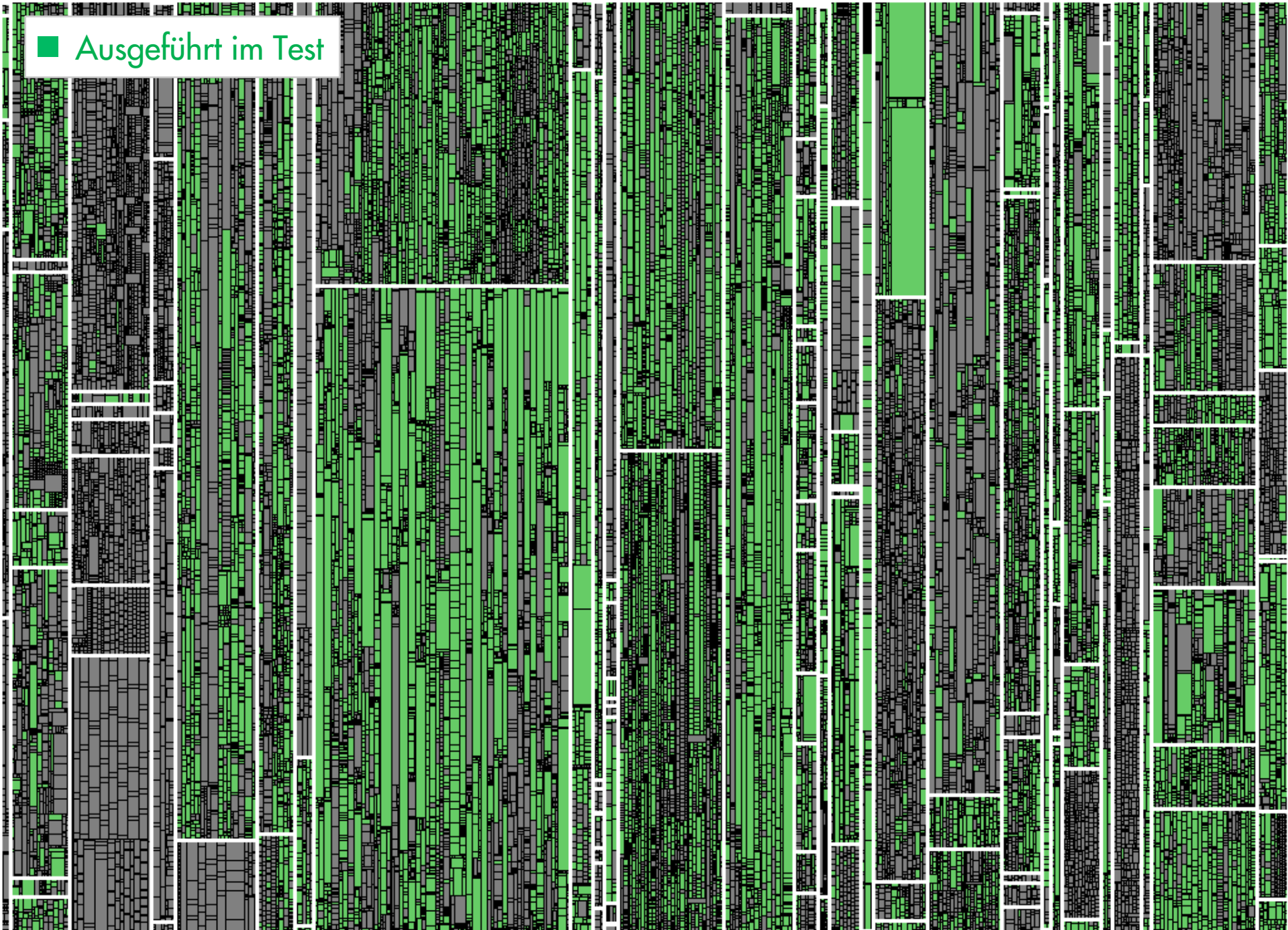
Test-Gap-Analyse

Ausführung

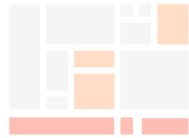


Ungetestete
Änderungen

■ Ausgeführt im Test



Änderungen



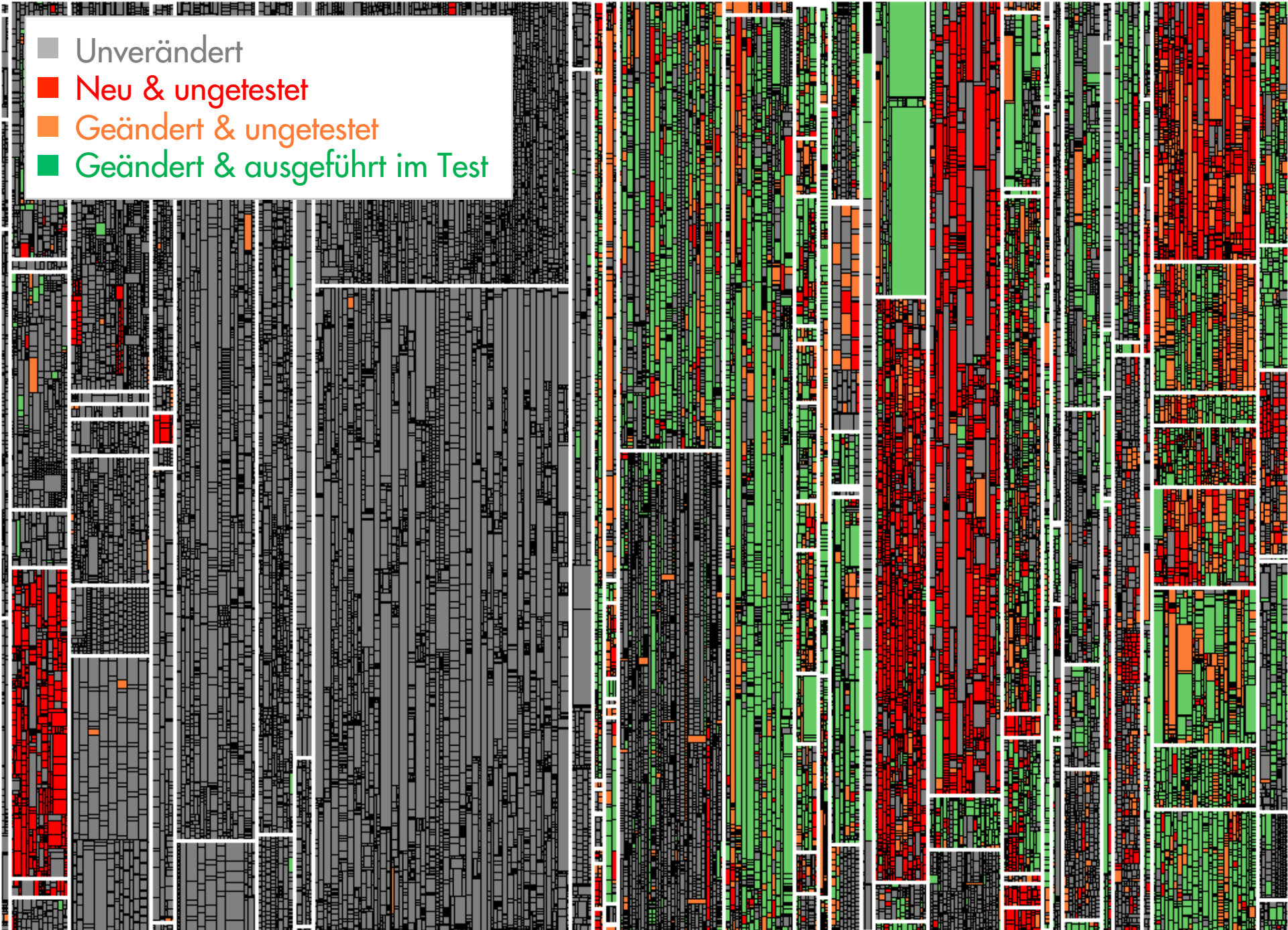
Test-Gap-Analyse

Ausführung

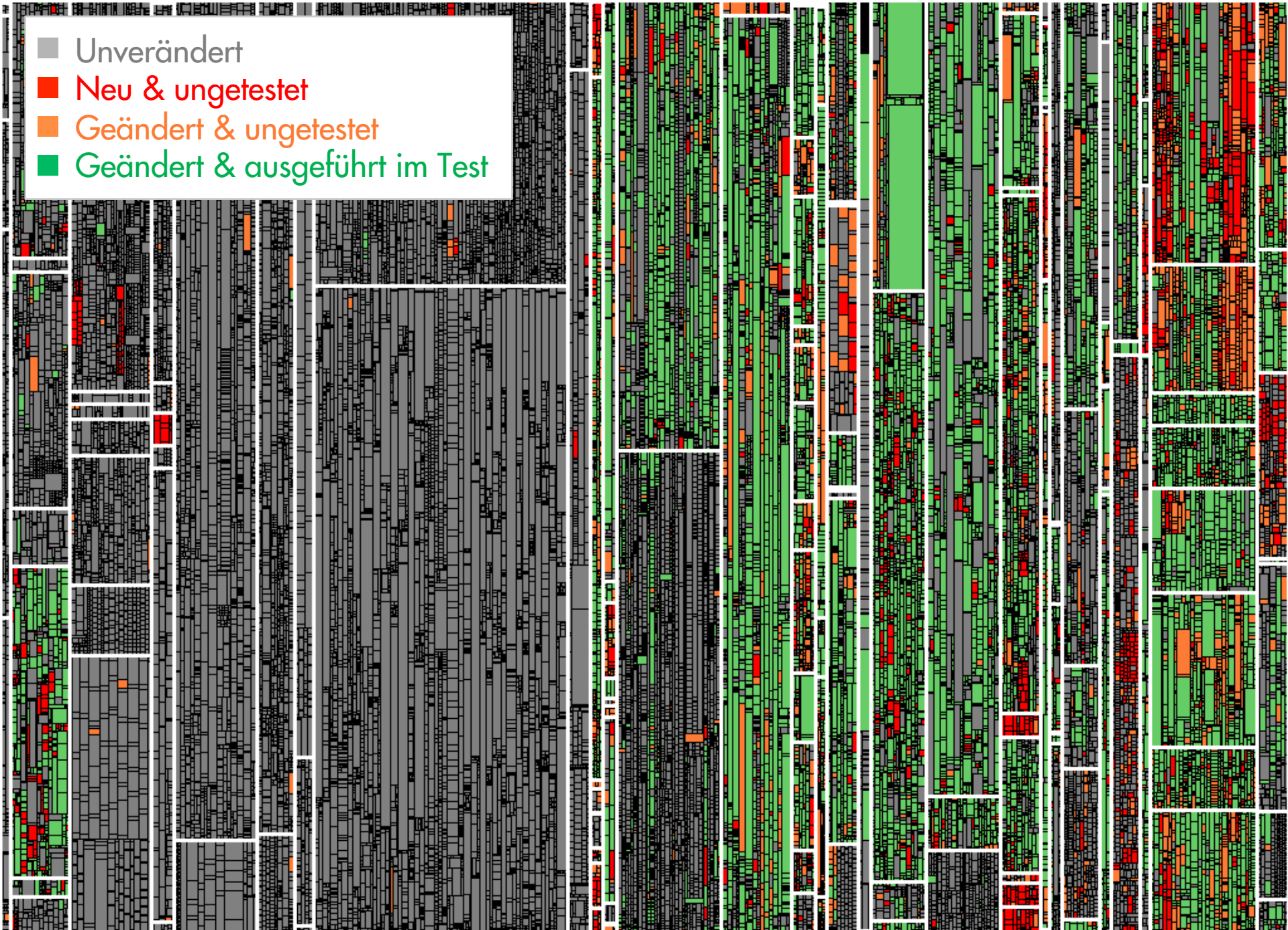


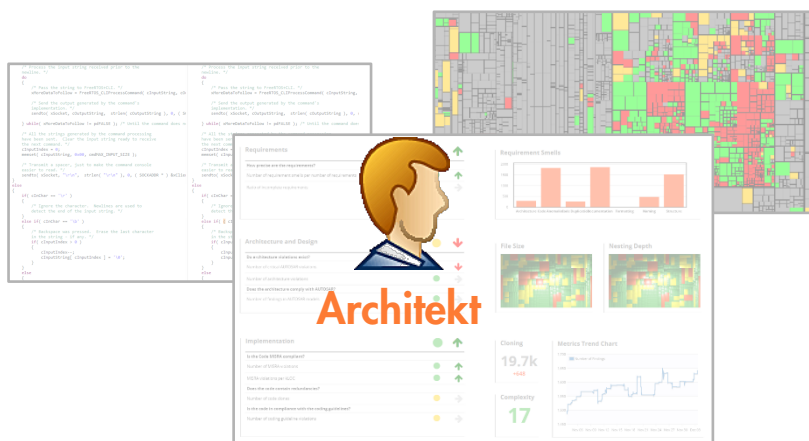
Ungetestete
Änderungen

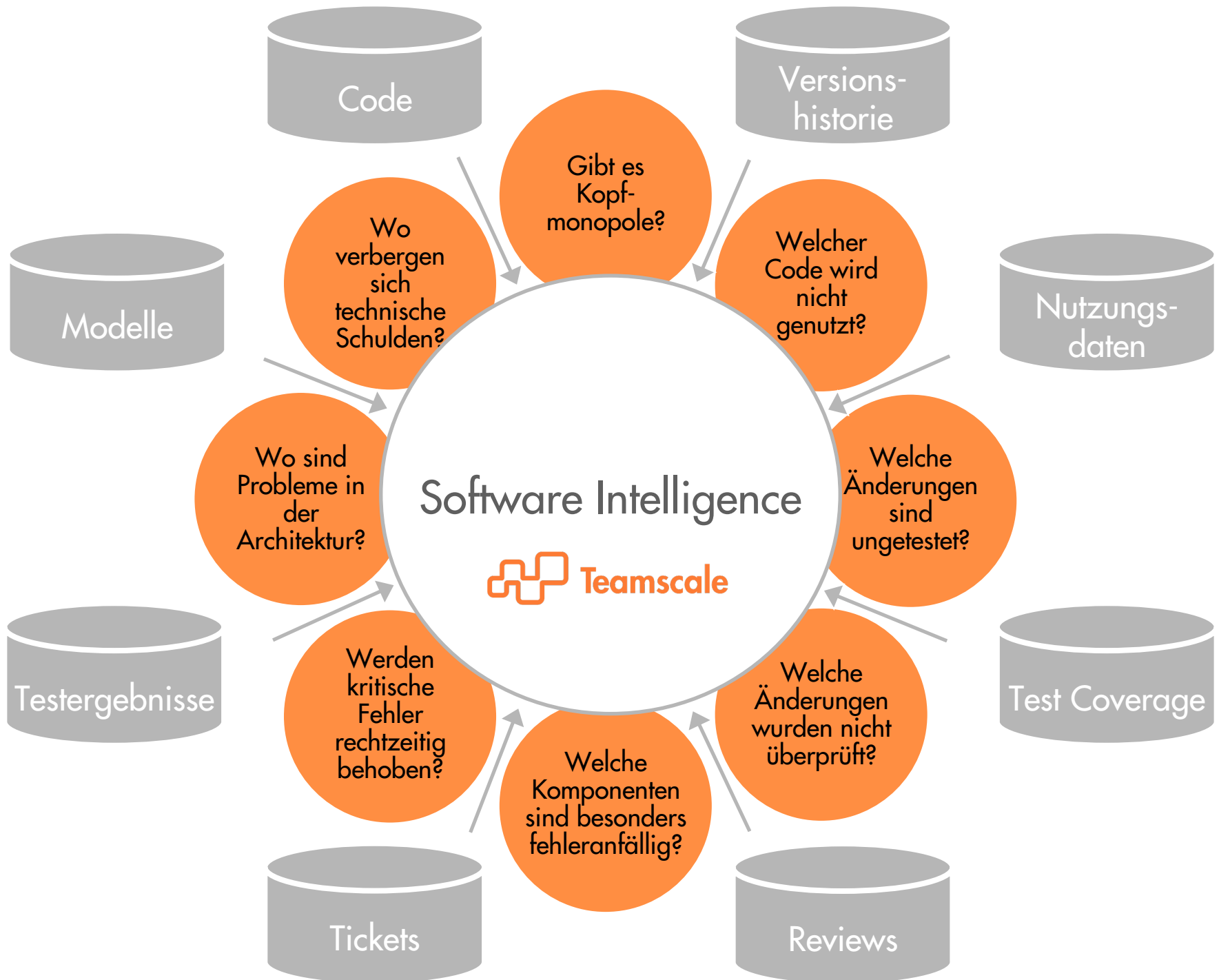
- Unverändert
- Neu & ungetestet
- Geändert & ungetestet
- Geändert & ausgeführt im Test



- Unverändert
- Neu & ungetestet
- Geändert & ungetestet
- Geändert & ausgeführt im Test







Fazit

Als Architekt muss ich über die technische Architektur hinaus komplexe, teamübergreifende Fragestellungen beurteilen und kommunizieren.

Historienanalysen erlauben mir, faktenbasiert von Symptomen auf Ursachen zu schließen und so wirksame Maßnahmen durchzuführen.

Wir teilen unsere Erfahrungen hierzu gerne.

Kontakt



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Dr. Dennis Pagano · pagano@cqse.eu · +49 159 04062957

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