Faktenbasiertes Debuggen von Software Teams

Dr. Elmar Jürgens

CQSE
Continuous Quality in Software Engineering

Über Mich

Forschung

- Clone Detection, Architekturanalyse, …
- PC Mitglied von MSR, ICPC, ICSE, …

Beratung

- Gründer
- Qualitäts-Bewertung & Qualitäts-Controlling

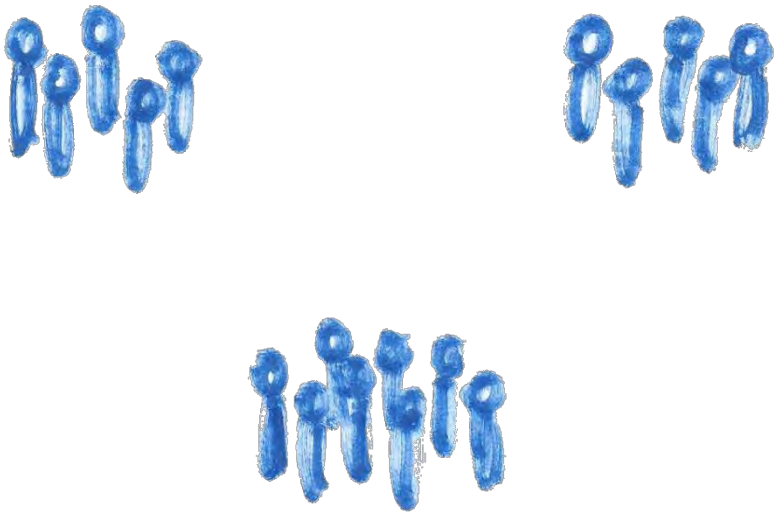
Gesellschaft für Informatik

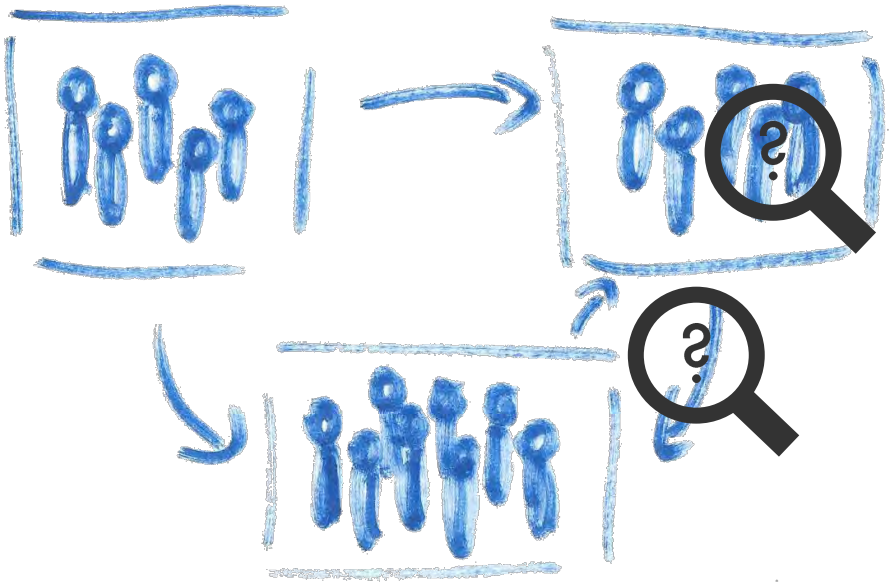
- Zum Junior-Fellow ernannt
- Erfahrungsaustausch Forschung <-> Praxis

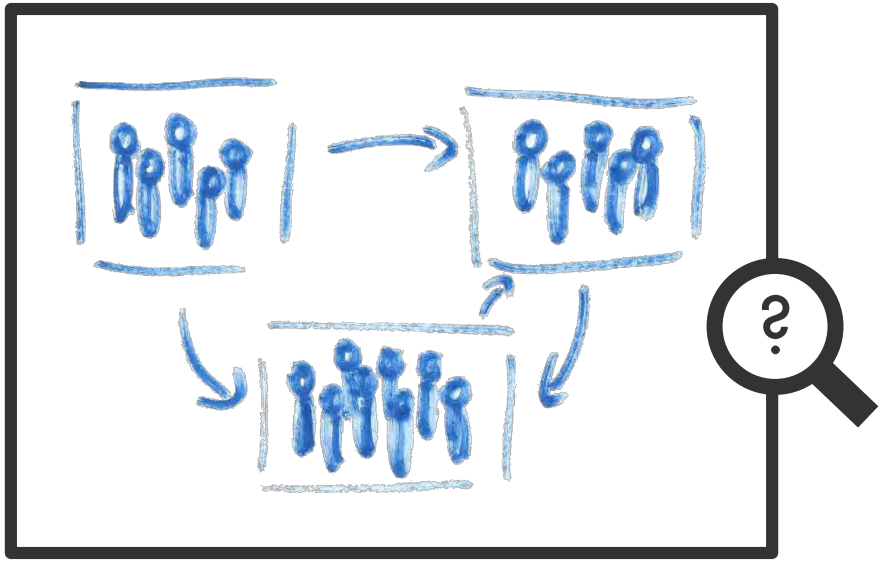
Conway's „Law"

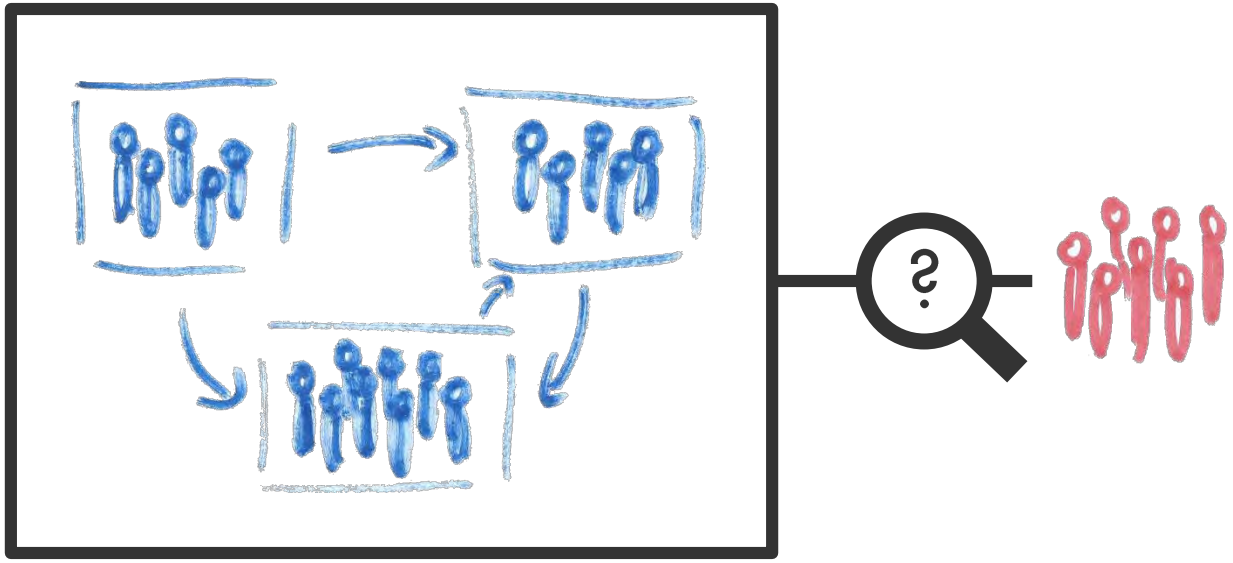
Organizations which design systems ... are constrained to produce designs which are copies of the communication structures of these organizations.

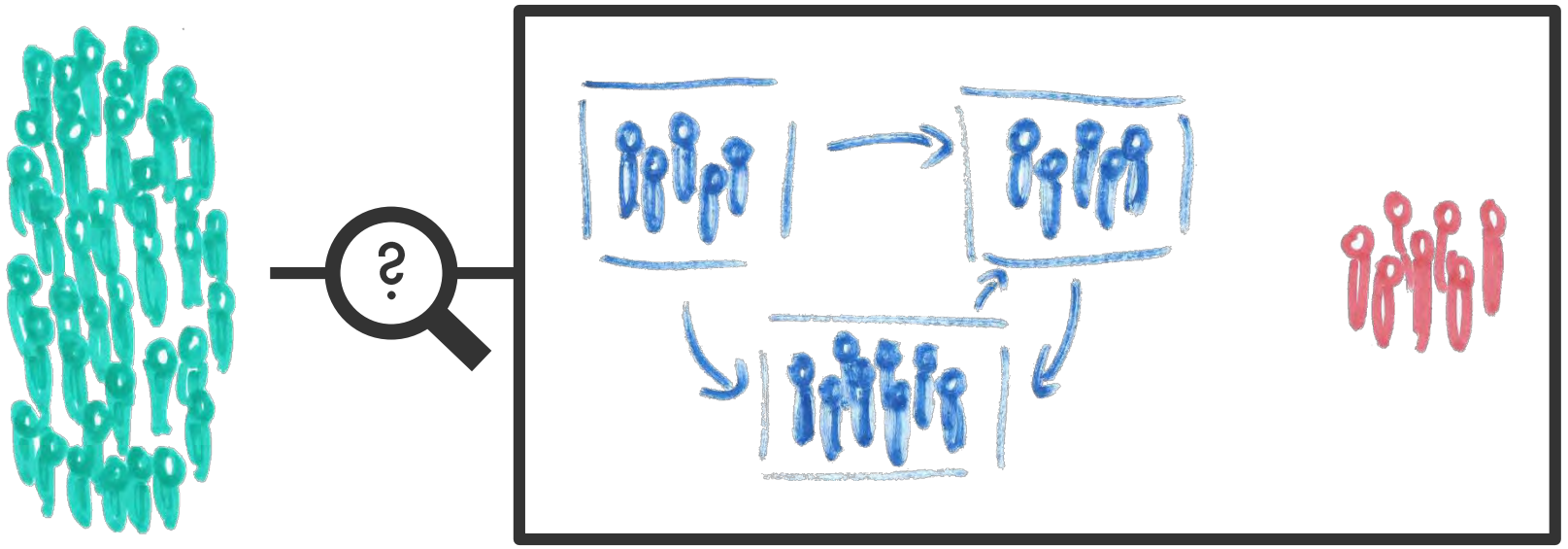
Melvin Conway, 1968

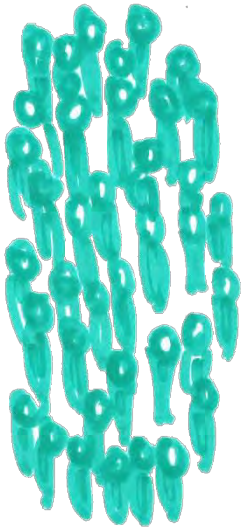


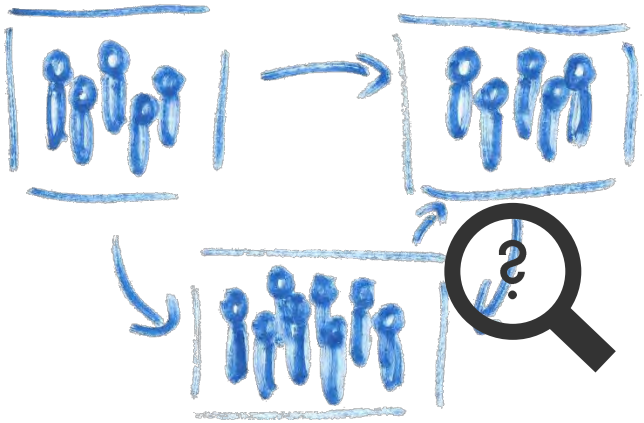


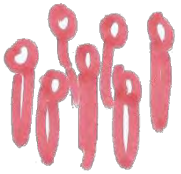


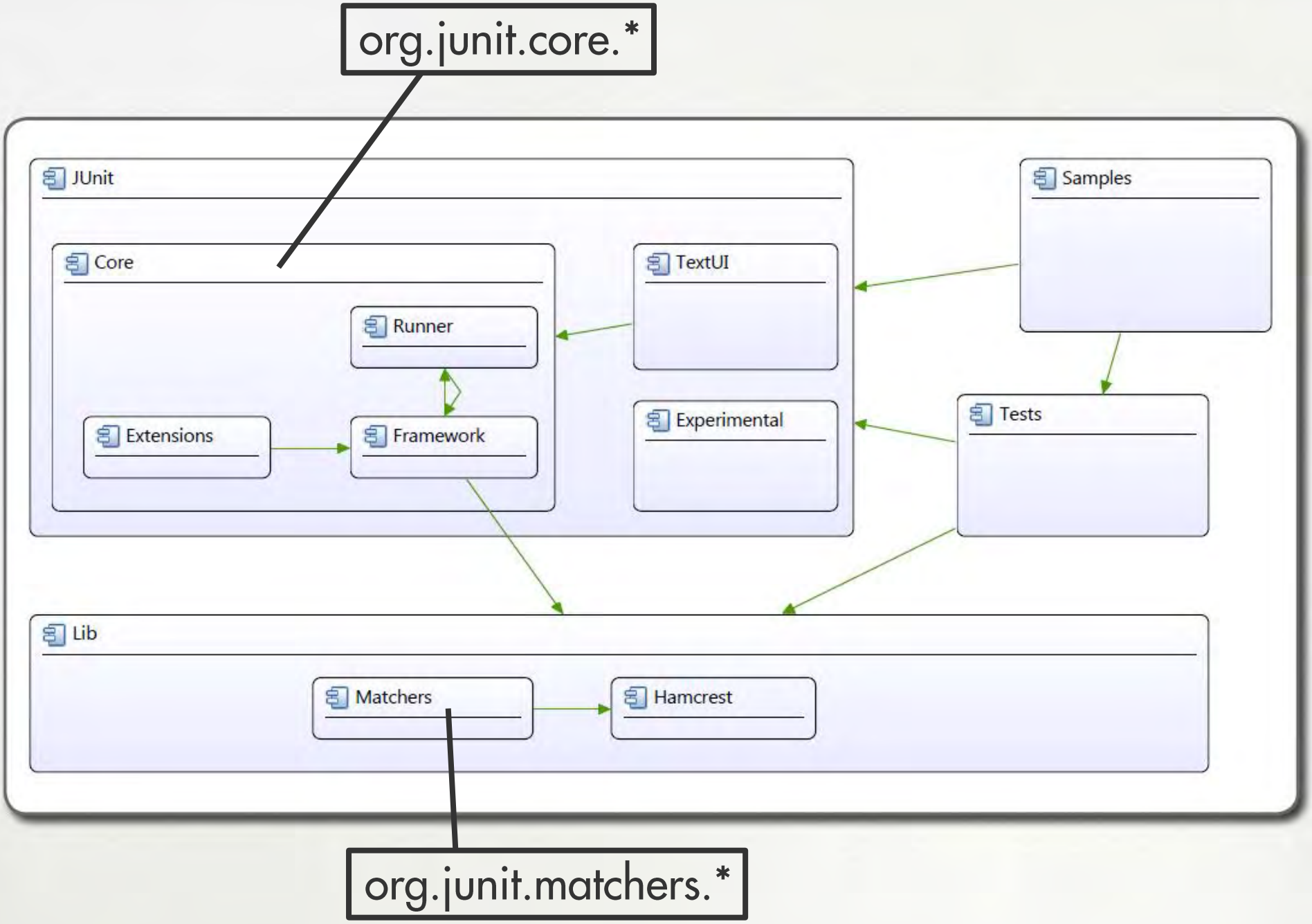


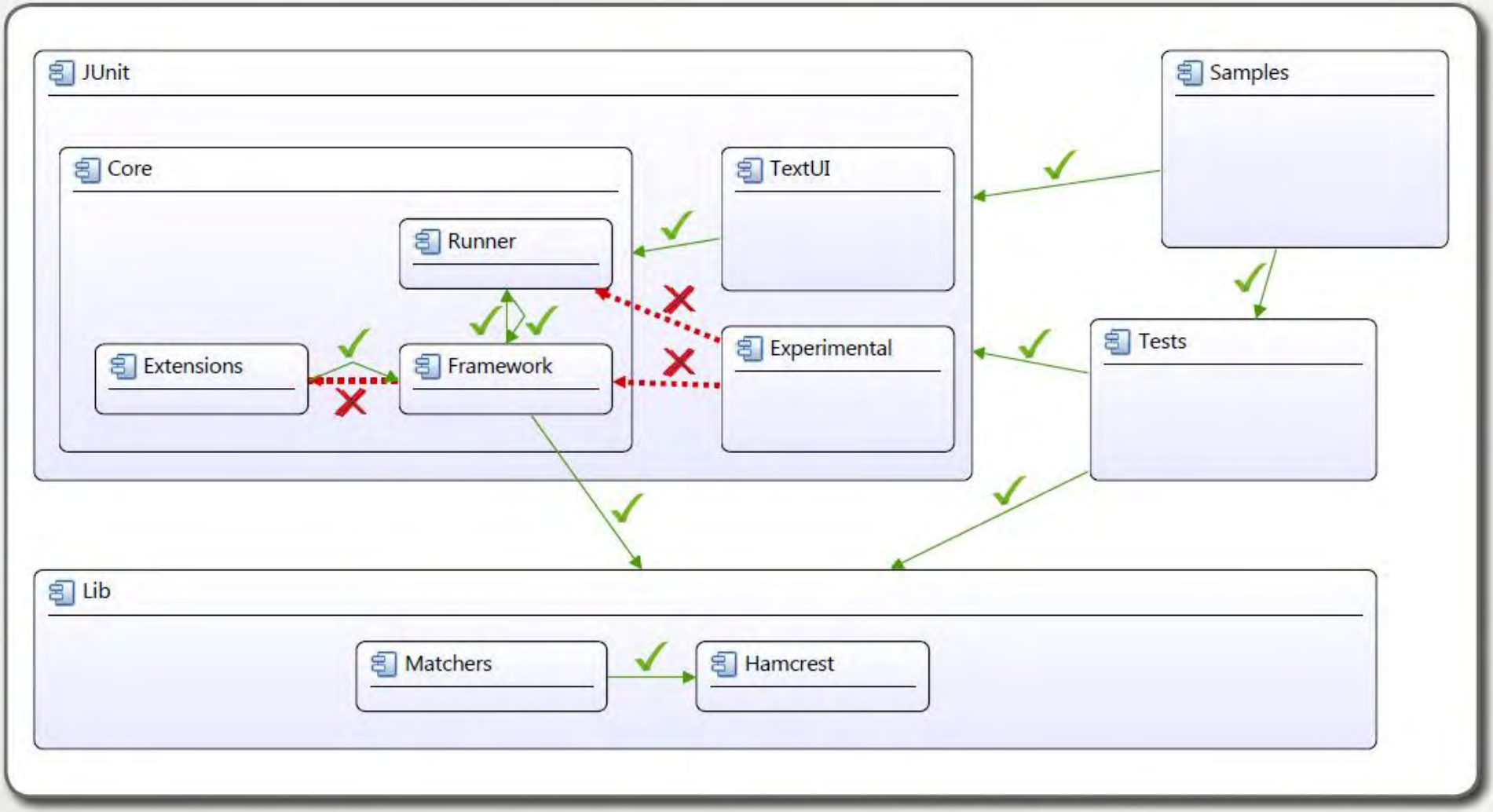


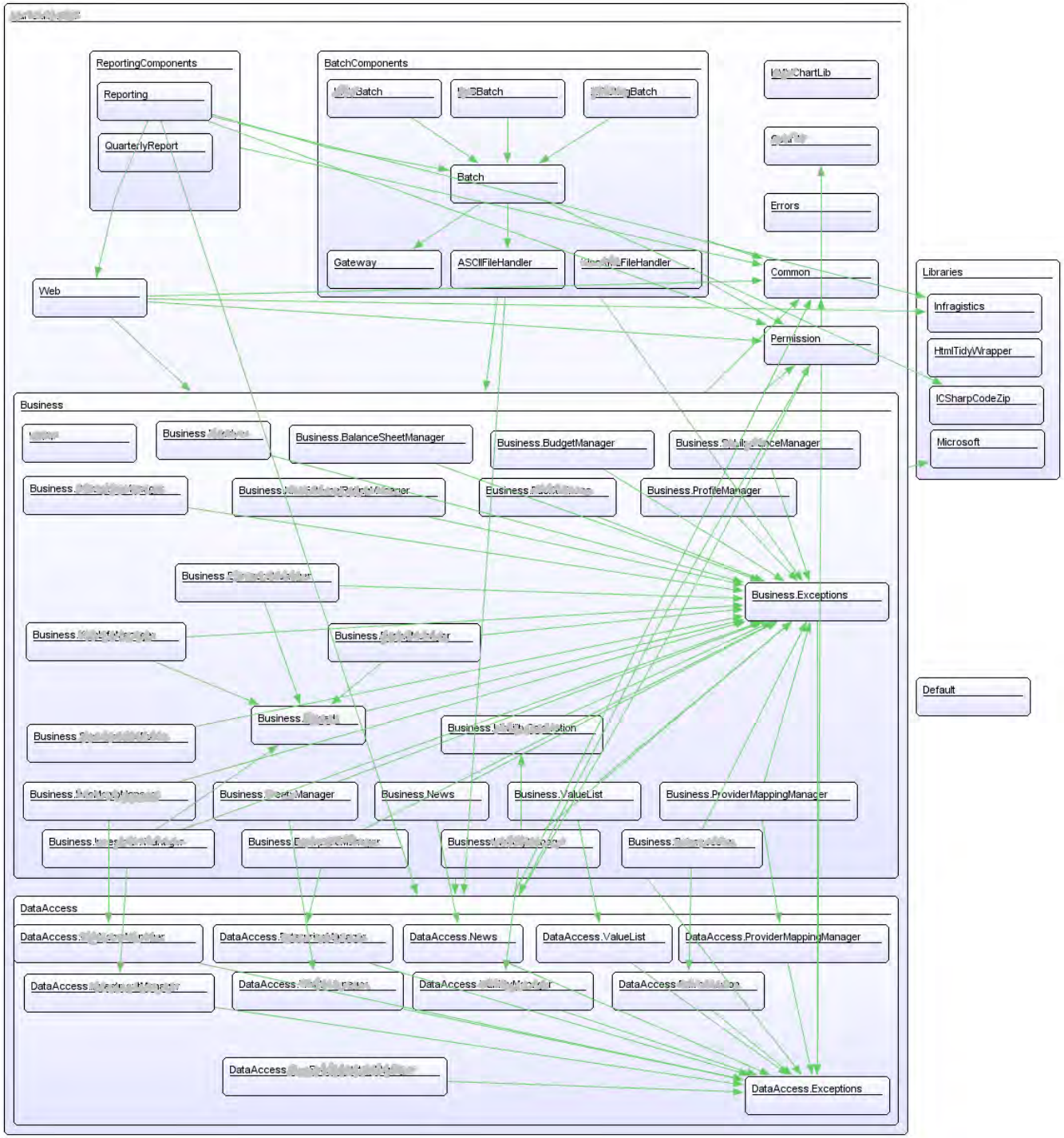


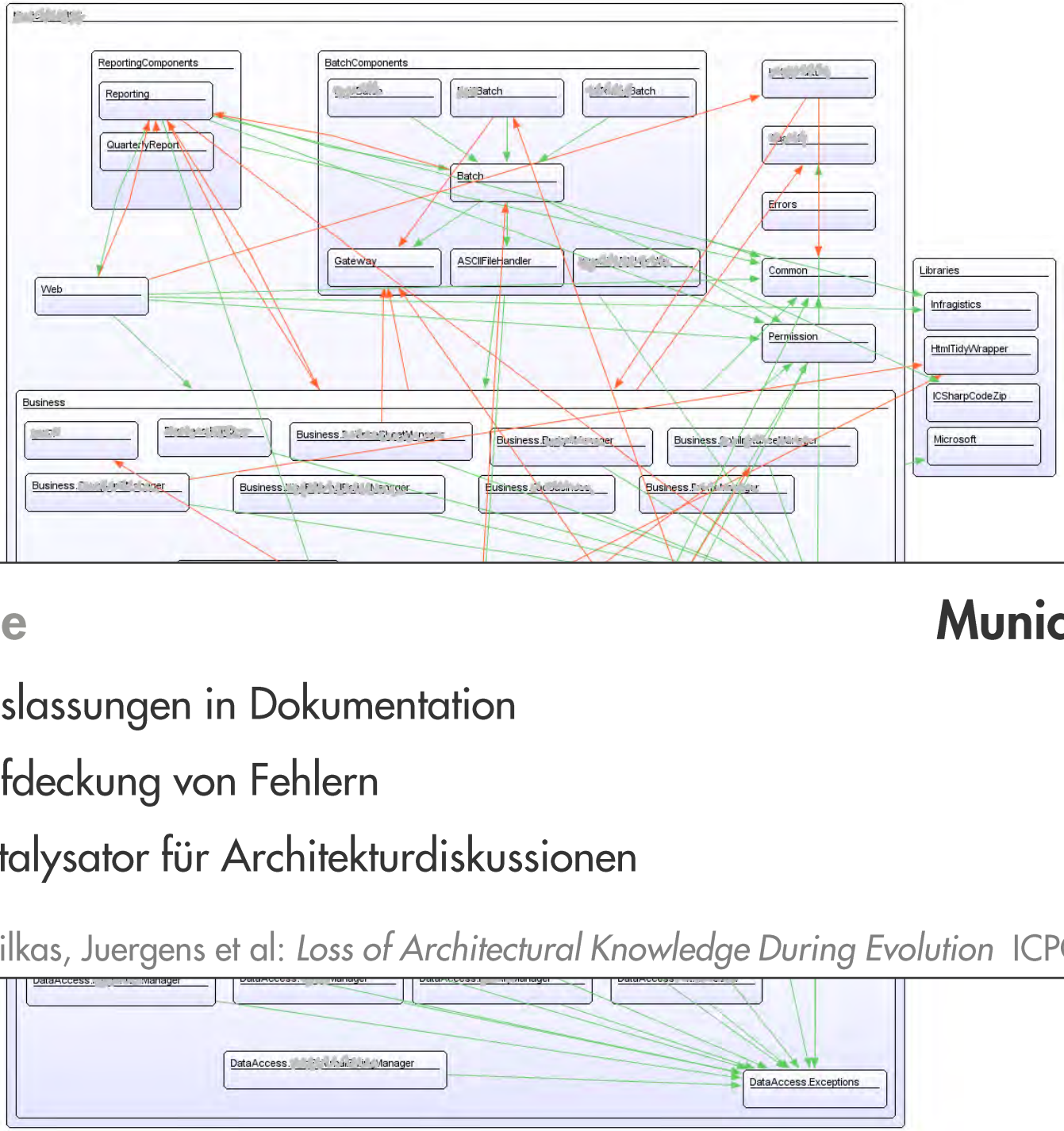





org.junit.core.*
JUnit
Core
Runner
Extensions
Framework
TextUI
Experimental
Samples
Tests
Lib
Matchers
Hamcrest
org.junit.matchers.*


JUnit
Core
Runner
Extensions
Framework
TextUI
Experimental
Samples
Tests
Lib
Matchers
Hamcrest


ReportingComponents
Reporting
QuarterlyReport
BatchComponents
Batch
Gateway
ASCIIFileHandler
Web
Errors
Common
Permission
Libraries
Infragistics
HtmlTidyWrapper
ICSharpCodeZip
Microsoft
Business
Business.BalanceSheetManager
Business.BudgetManager
Business.ProfileManager
Business.Exceptions
Default
DataAccess
DataAccess.News
DataAccess.ValueList
DataAccess.ProviderMappingManager
DataAccess.Exceptions

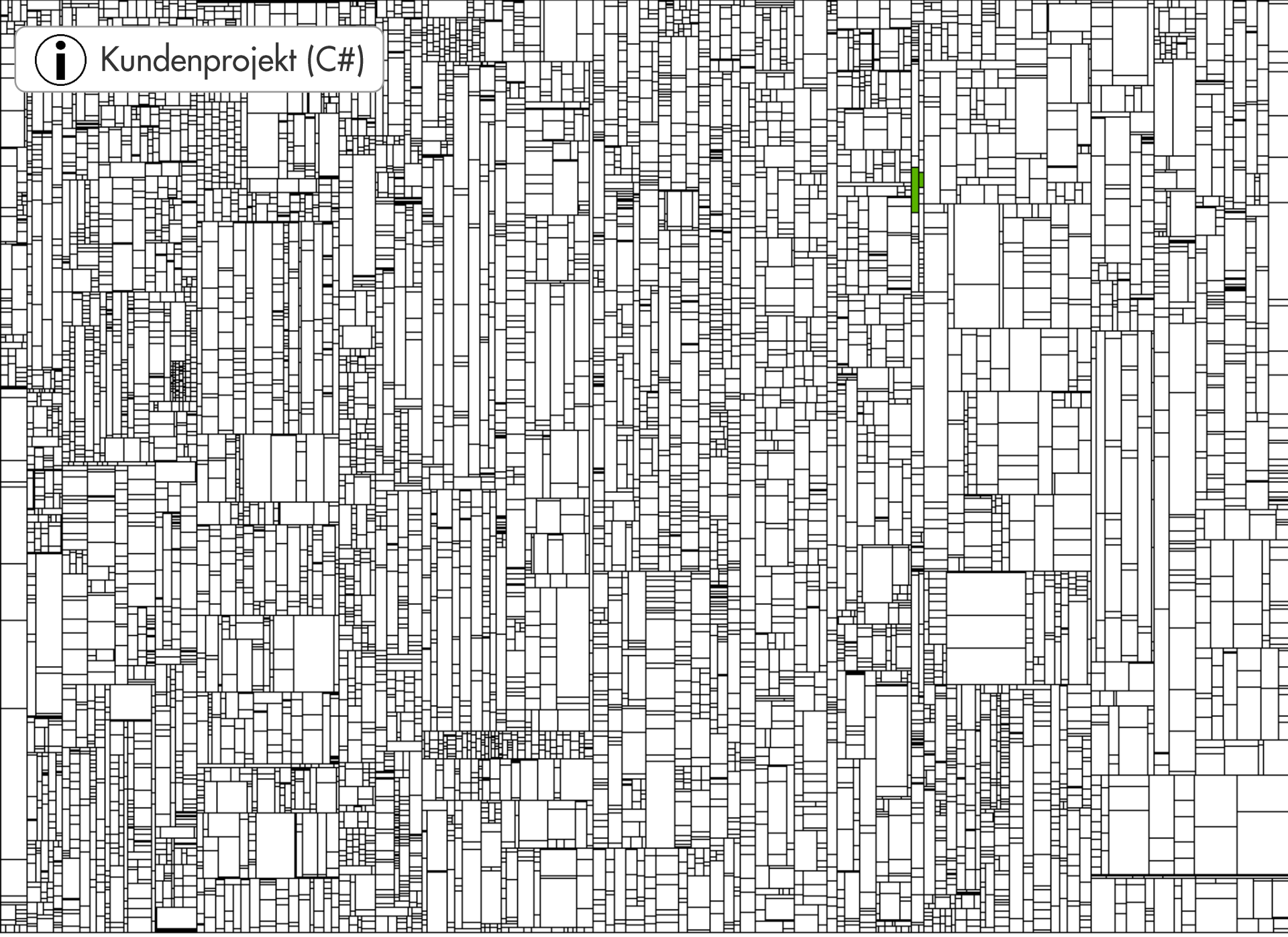


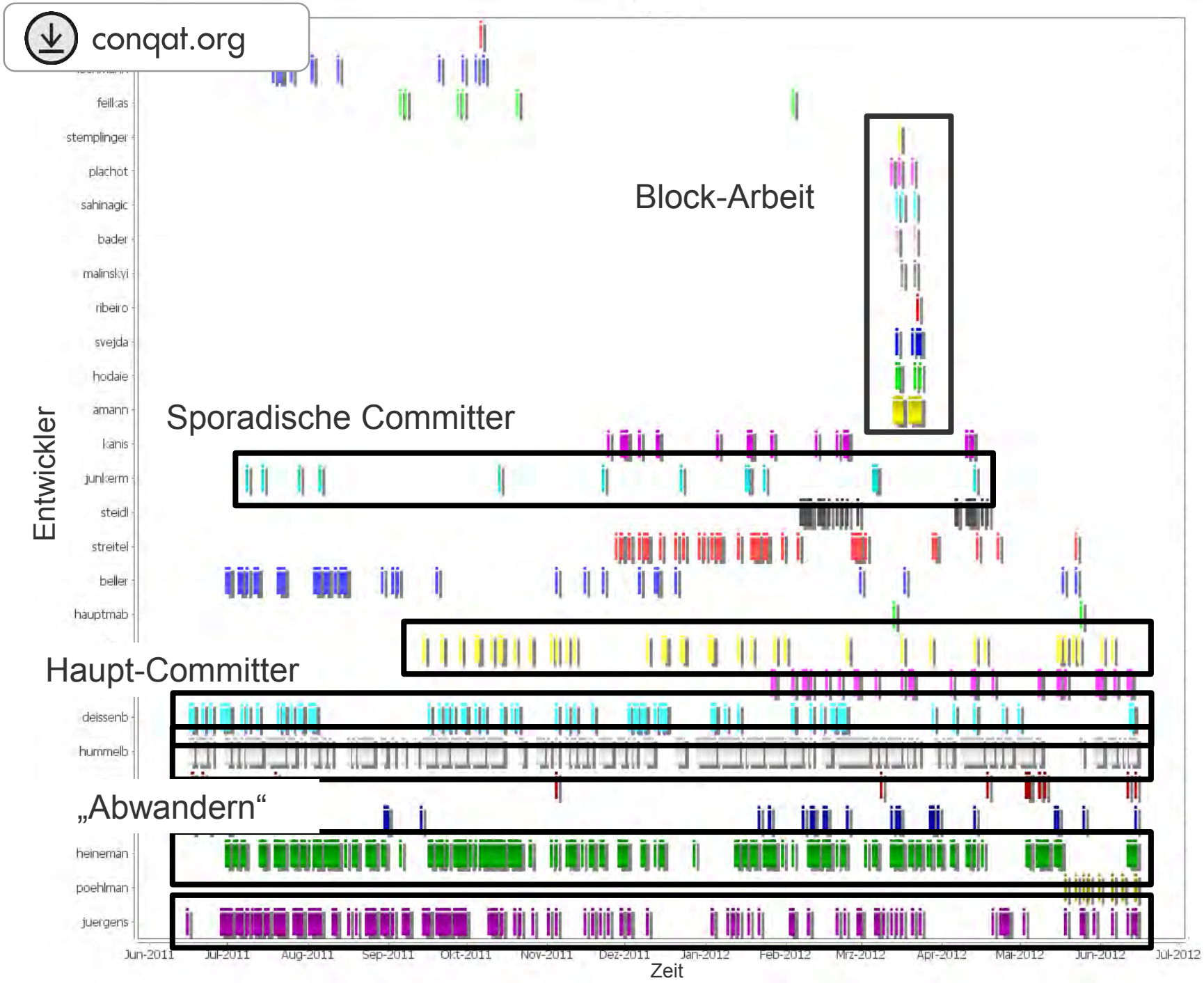
Studie

Munich Re

- Auslassungen in Dokumentation
- Aufdeckung von Fehlern
- Katalysator für Architekturdiskussionen

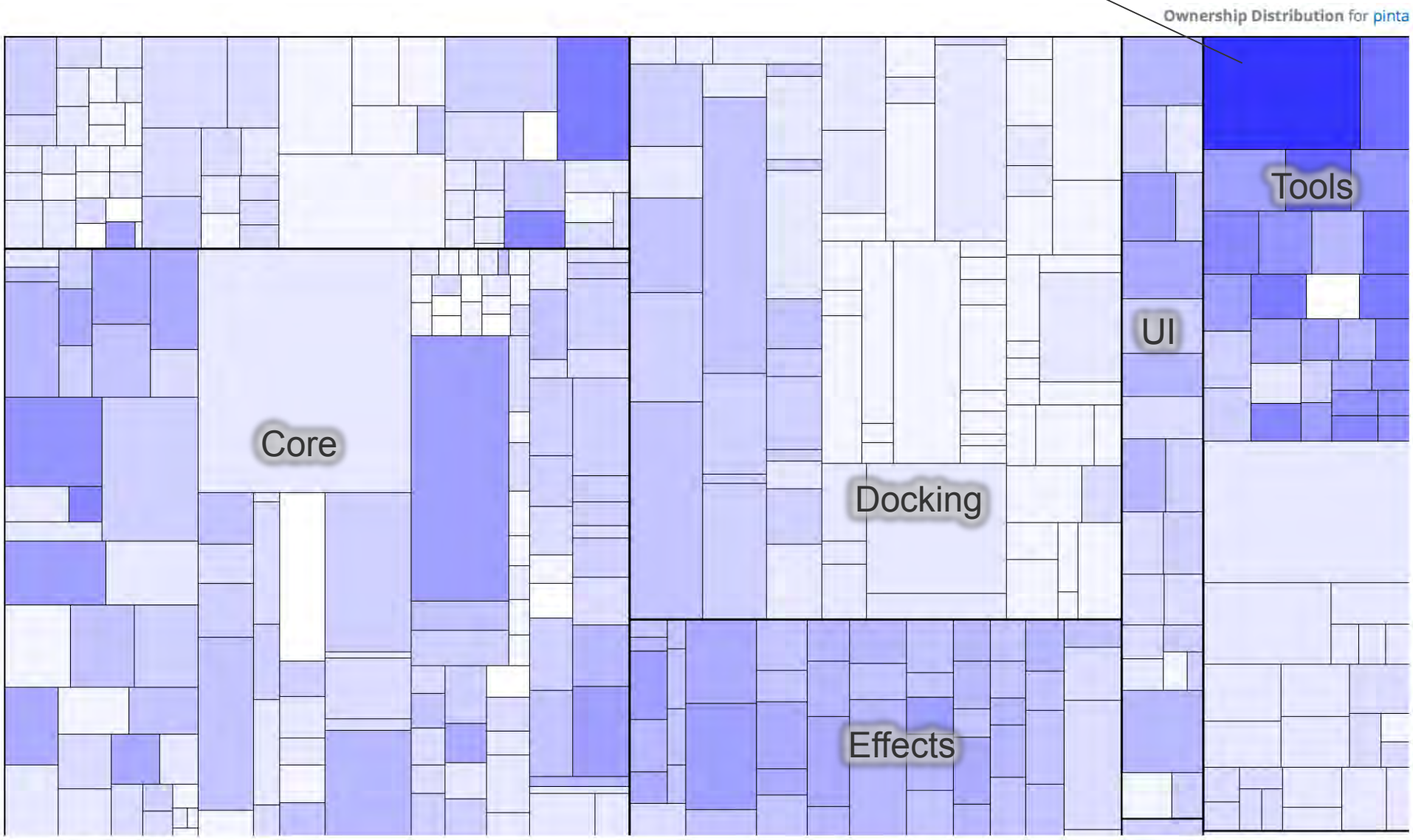
Feilkas, Juergens et al: *Loss of Architectural Knowledge During Evolution* ICPC 2009

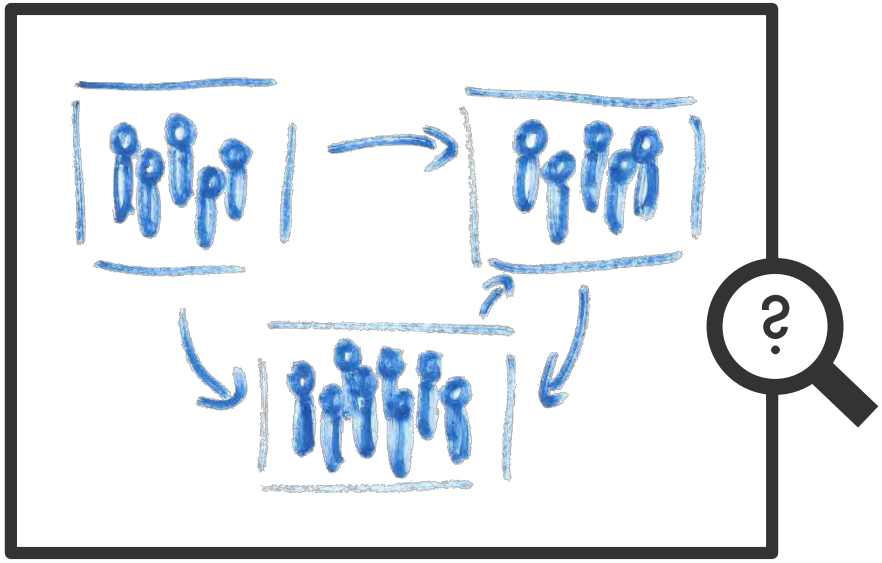

Kundenprojekt (C#)

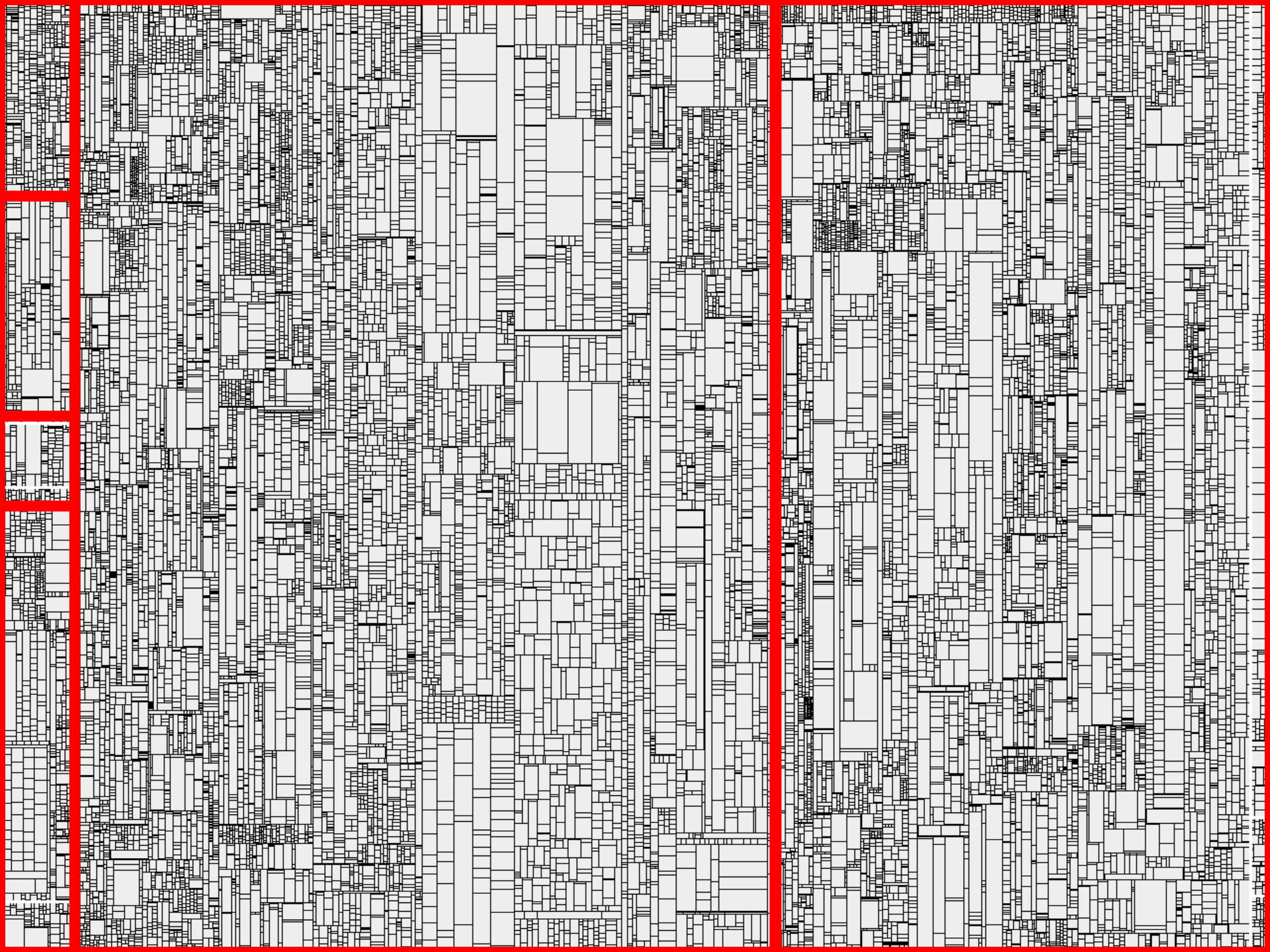

conqat.org
Block-Arbeit
Sporadische Committer
Haupt-Committer
„Abwandern“
Entwickler
feilkas
stemplinger
plachot
sahinagic
bader
malinskyi
ribeiro
svejda
hodaie
amann
kanis
junkerm
steidl
streitel
beller
hauptmab
deissenb
hummelb
heineman
poehlman
juergens
Jun-2011
Jul-2011
Aug-2011
Sep-2011
Okt-2011
Nov-2011
Dez-2011
Jan-2012
Feb-2012
Mrz-2012
Apr-2012
Mai-2012
Jun-2012
Jul-2012
Zeit

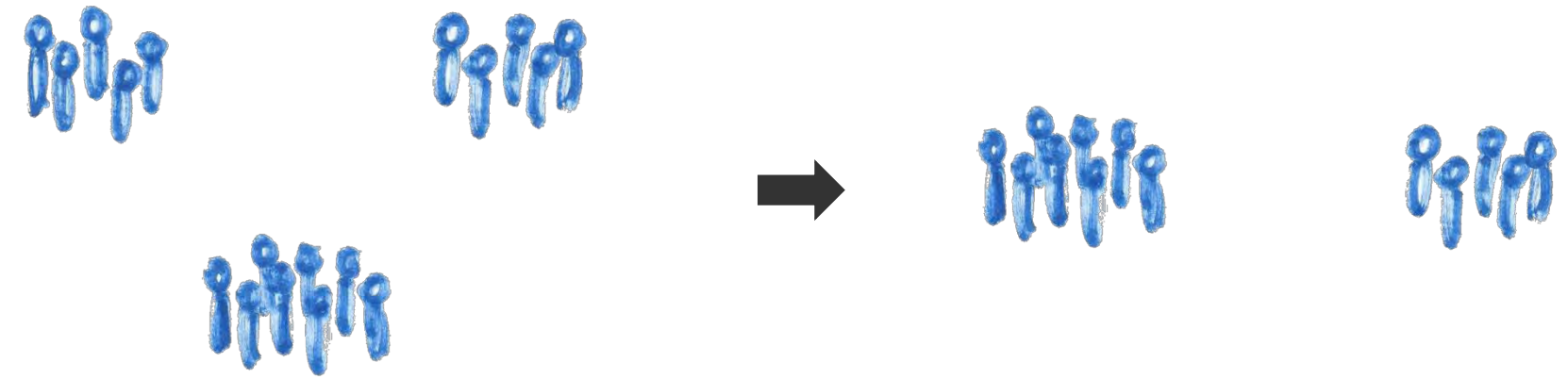
PintaProject/Pinta

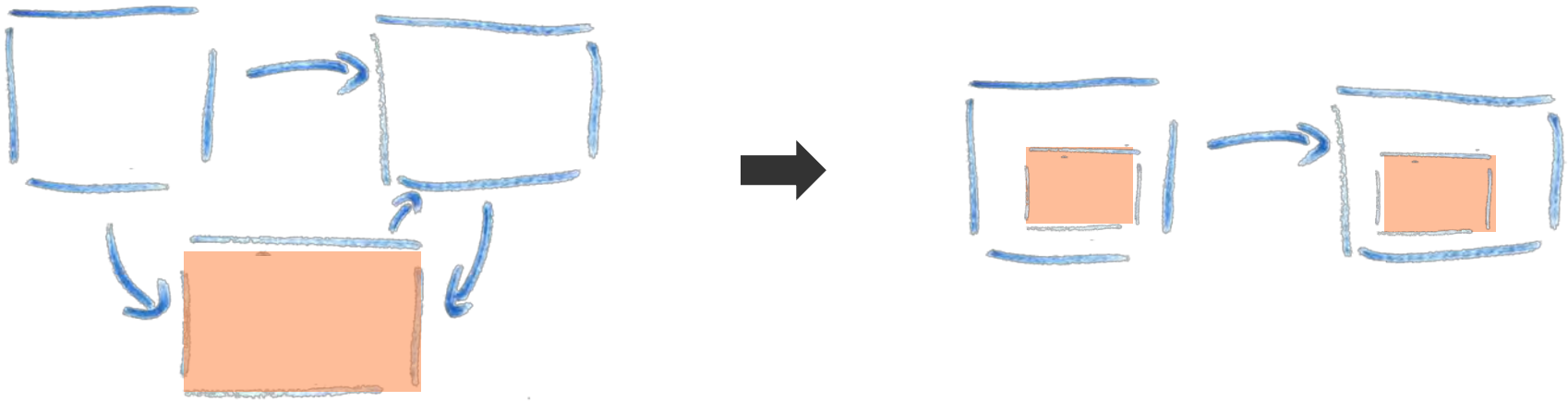
TextTool.cs (17 Entwickler)

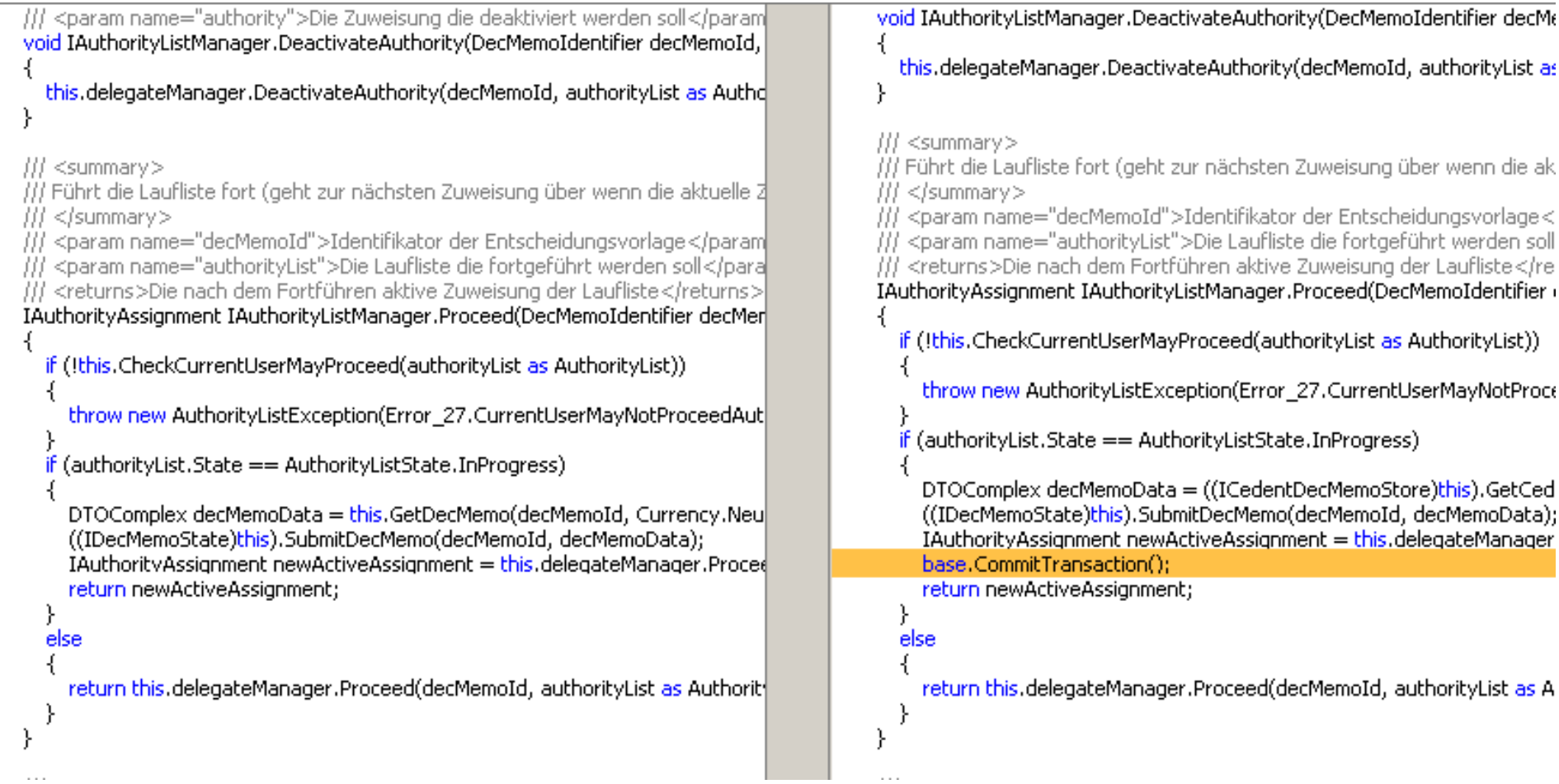












```
/// <param name="authority">Die Zuweisung die deaktiviert werden soll</param
void IAuthorityListManager.DeactivateAuthority(DecMemoIdentifier decMemoId,
{
   this.delegateManager.DeactivateAuthority(decMemoId, authorityList as Autho
}

/// <summary>
/// Führt die Laufliste fort (geht zur nächsten Zuweisung über wenn die aktuelle Z
/// </summary>
/// <param name="decMemoId">Identifikator der Entscheidungsvorlage</param
/// <param name="authorityList">Die Laufliste die fortgeführt werden soll</para
/// <returns>Die nach dem Fortführen aktive Zuweisung der Laufliste</returns>
IAuthorityAssignment IAuthorityListManager.Proceed(DecMemoIdentifier decMem
{
   if (!this.CheckCurrentUserMayProceed(authorityList as AuthorityList))
   {
      throw new AuthorityListException(Error_27.CurrentUserMayNotProceedAut
   }
   if (authorityList.State == AuthorityListState.InProgress)
   {
      DTOComplex decMemoData = this.GetDecMemo(decMemoId, Currency.Neu
      ((IDecMemoState)this).SubmitDecMemo(decMemoId, decMemoData);
      IAuthorityAssignment newActiveAssignment = this.delegateManager.Proce
      return newActiveAssignment;
   }
   else
   {
      return this.delegateManager.Proceed(decMemoId, authorityList as Authorit
   }
}
...
```

```
void IAuthorityListManager.DeactivateAuthority(DecMemoIdentifier decMe
{
   this.delegateManager.DeactivateAuthority(decMemoId, authorityList as
}

/// <summary>
/// Führt die Laufliste fort (geht zur nächsten Zuweisung über wenn die ak
/// </summary>
/// <param name="decMemoId">Identifikator der Entscheidungsvorlage<
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IAuthorityAssignment IAuthorityListManager.Proceed(DecMemoIdentifier
{
   if (!this.CheckCurrentUserMayProceed(authorityList as AuthorityList))
   {
      throw new AuthorityListException(Error_27.CurrentUserMayNotProce
   }
   if (authorityList.State == AuthorityListState.InProgress)
   {
      DTOComplex decMemoData = ((ICedentDecMemoStore)this).GetCed
      ((IDecMemoState)this).SubmitDecMemo(decMemoId, decMemoData);
      IAuthorityAssignment newActiveAssignment = this.delegateManager
      base.CommitTransaction();
      return newActiveAssignment;
   }
   else
   {
      return this.delegateManager.Proceed(decMemoId, authorityList as A
   }
}
...
```

fixed: latest change is no longer lost when assigning entry to a keyword group while it is being edited

May 26 2005
15:58

by jzieren in revision e0ca9a51b50c8b01f579f4eef79028bff6c34028 (git)

1 alerts:

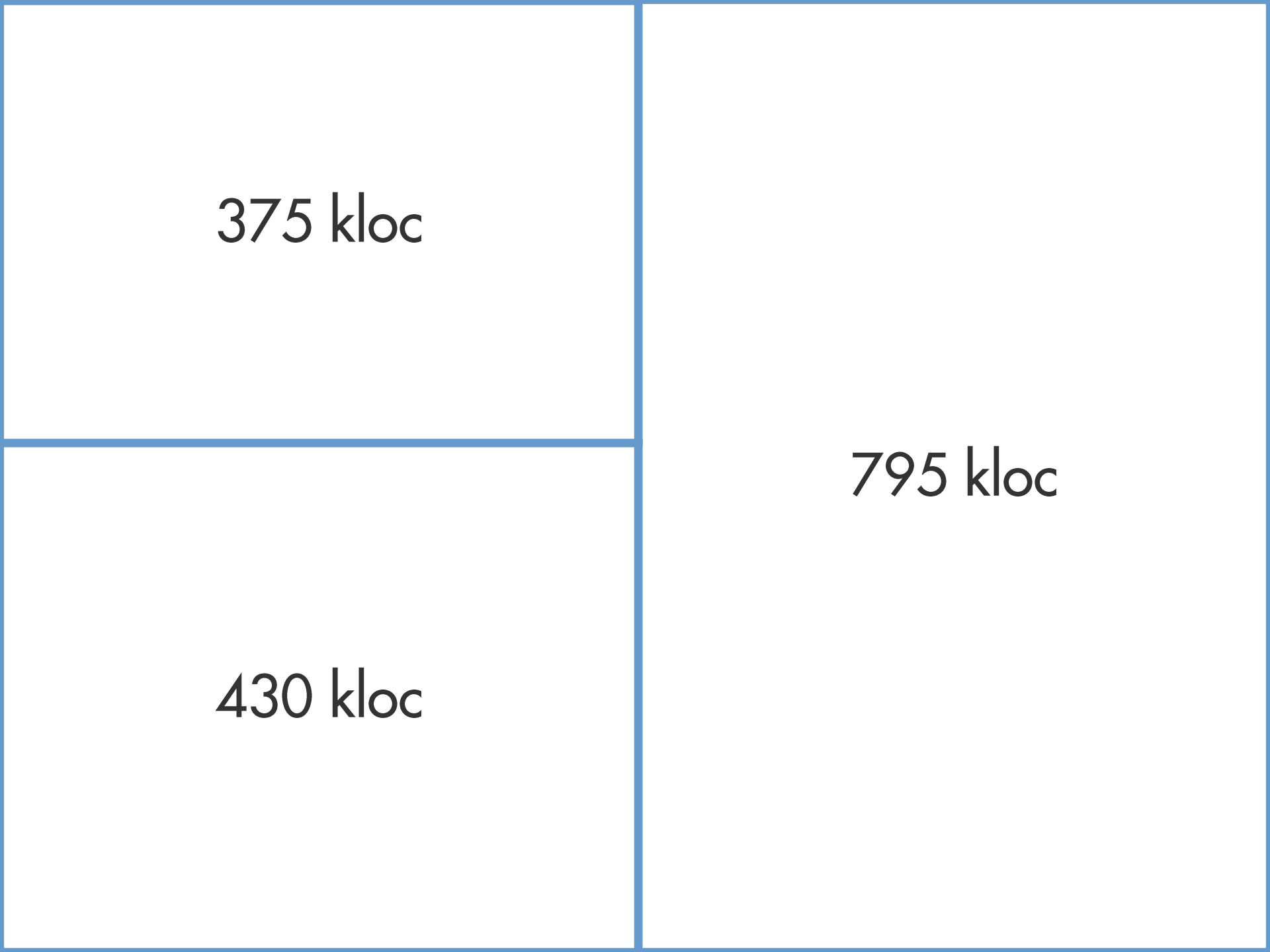
Message	Context
Found potential inconsistent clone change in RightClickMenu.java	[Broken clone] [Old clone finding] [Code change]

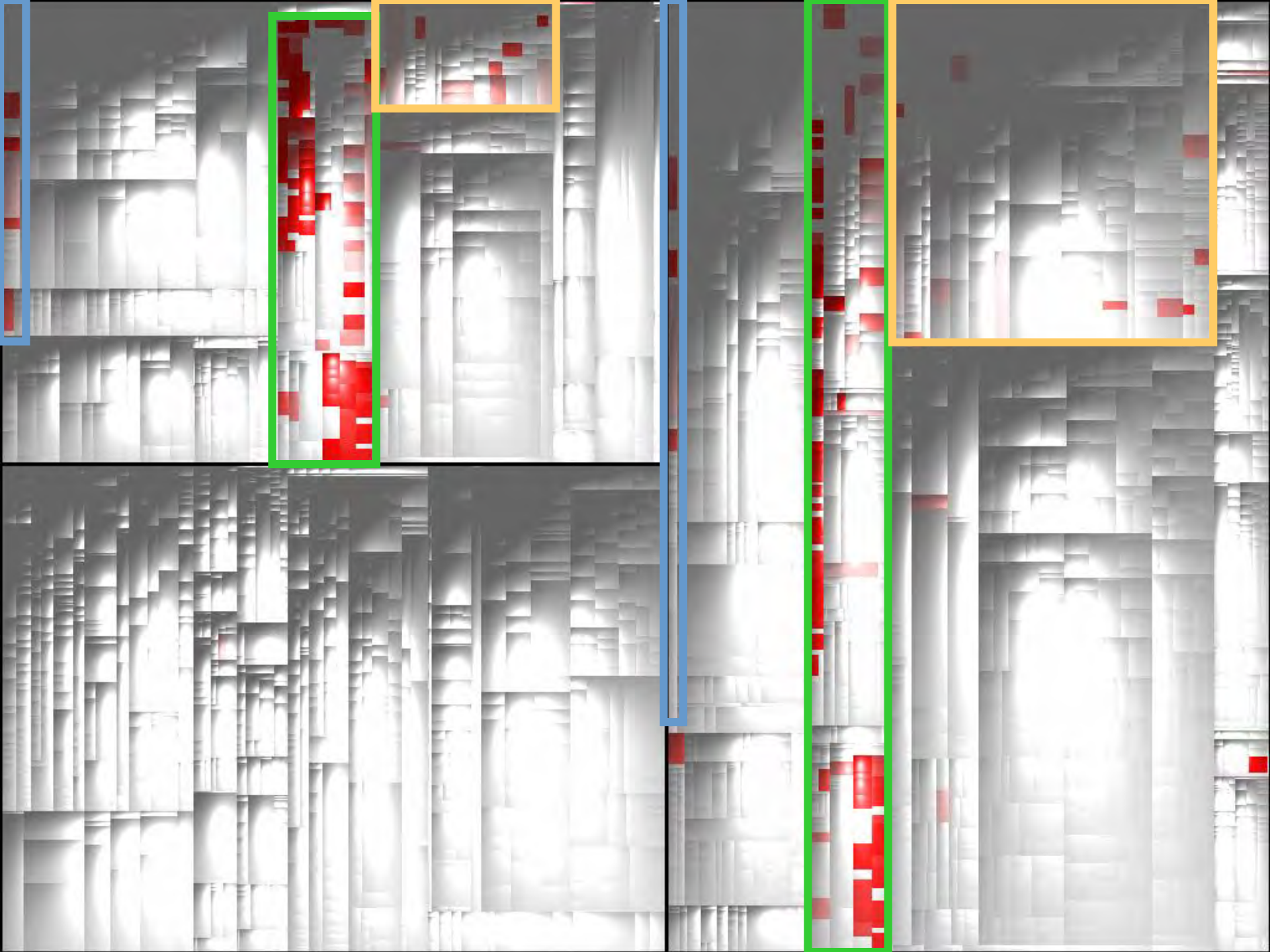
2 removed findings:

Message	Location	Finding Group
Clone with 2 instances of length 10	src/java/net/sf/.../RightClickMenu.java:366-380	Code Duplication / Cloning
Clone with 2 instances of length 10	src/java/net/sf/.../RightClickMenu.java:340-354	Code Duplication / Cloning

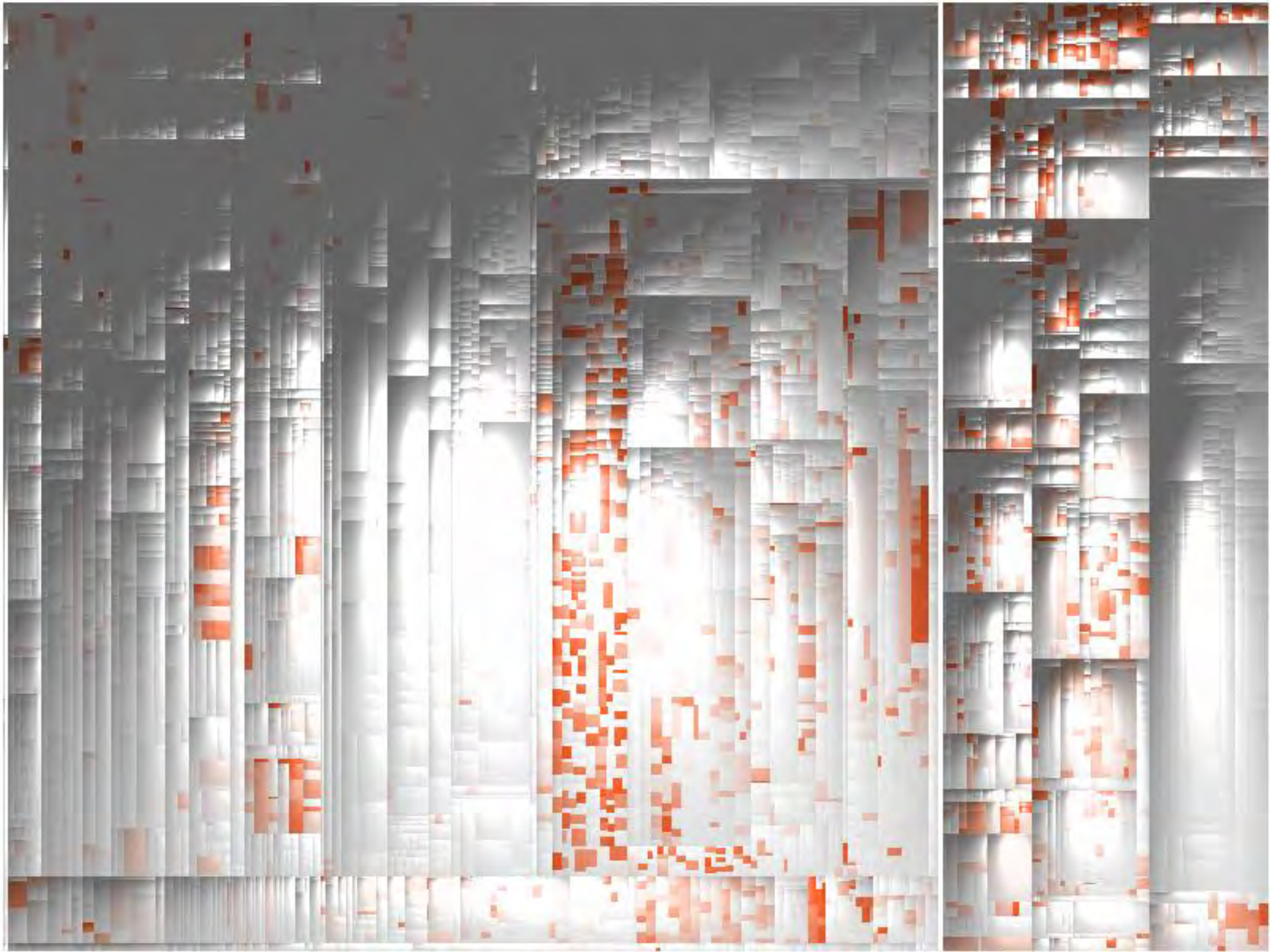
Teamscale

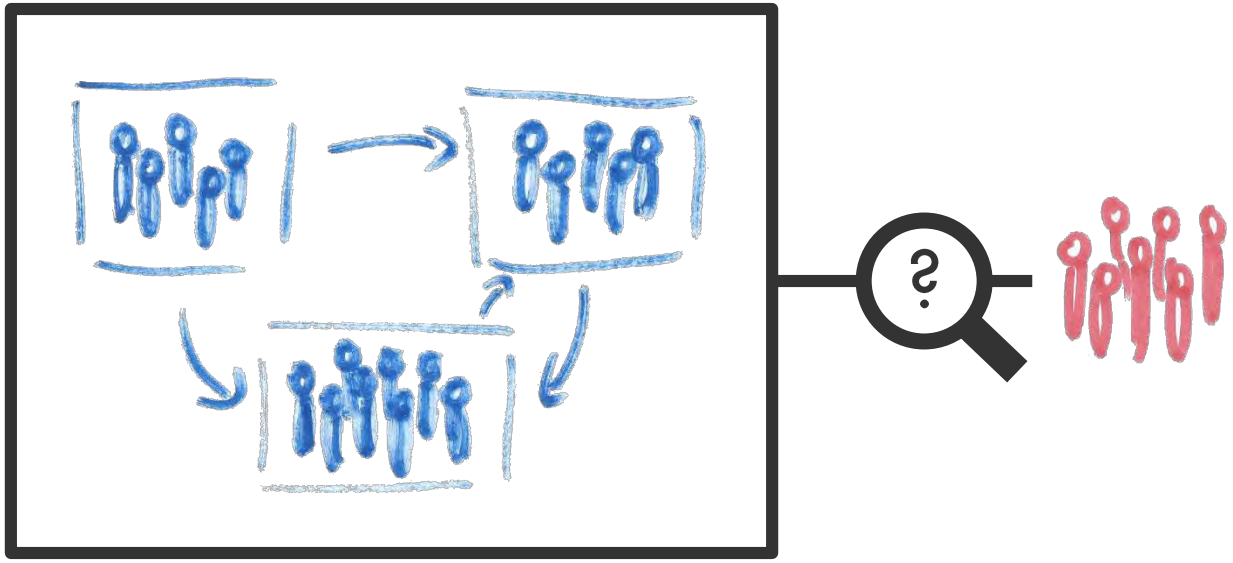
Mehrere Anwendungen in einer Abteilung


375 kloc
795 kloc
430 kloc

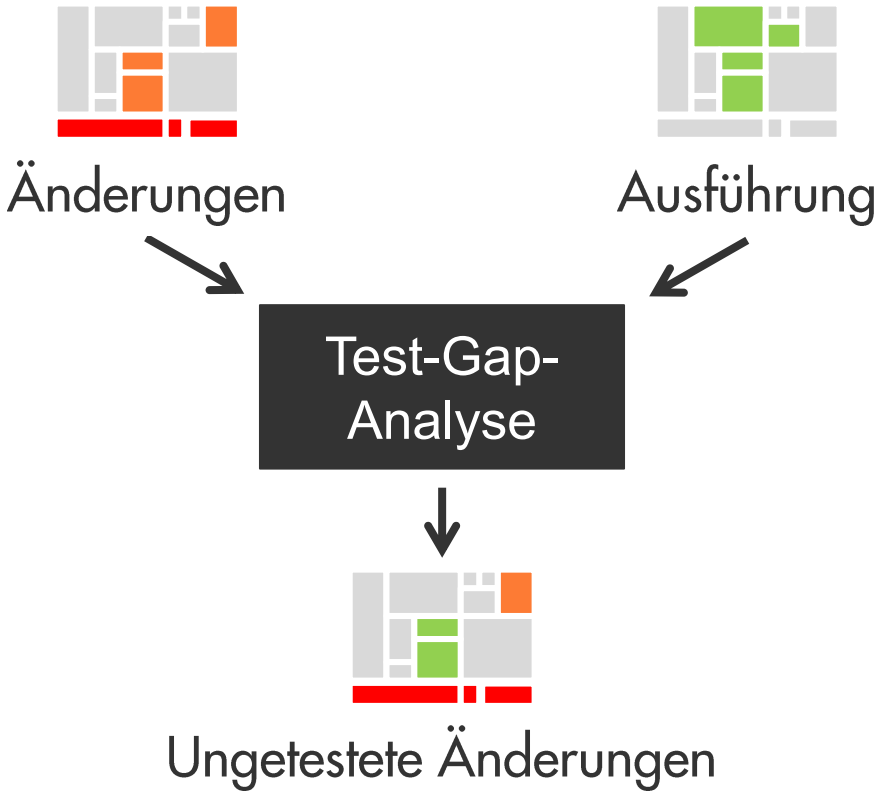


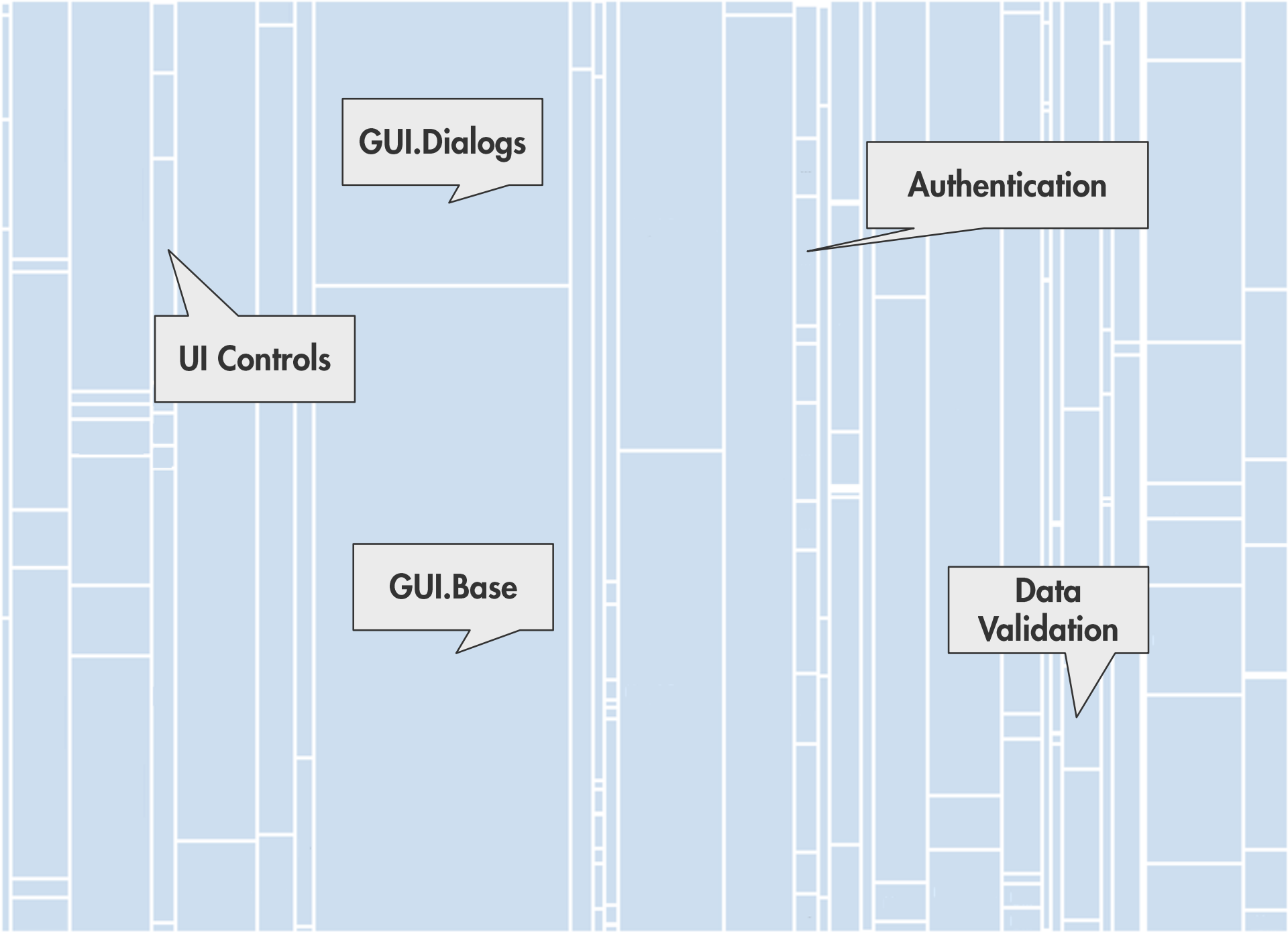
Architektur einer Produktlinie

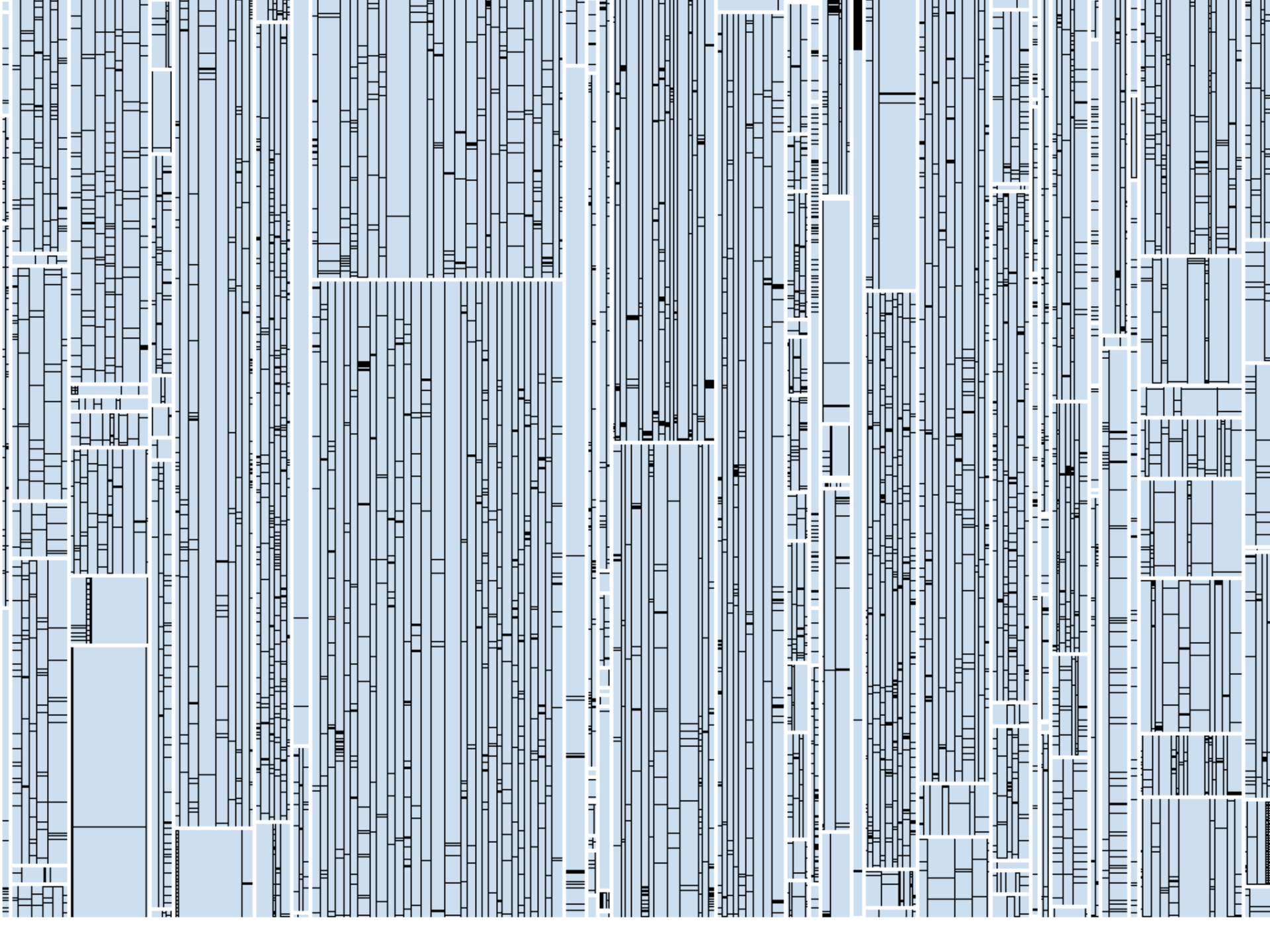


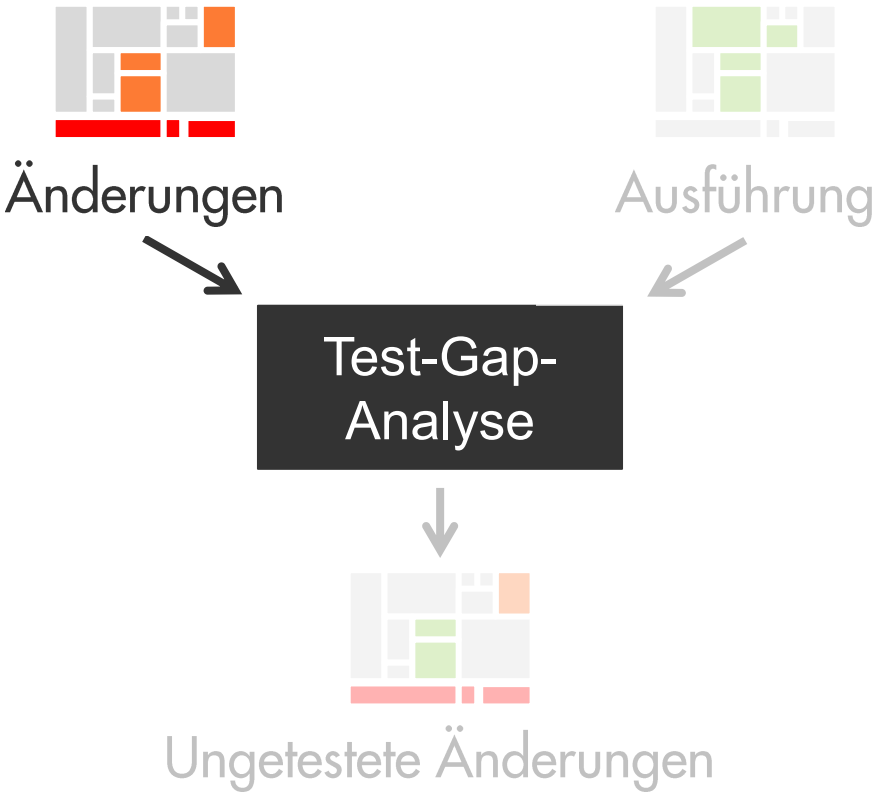


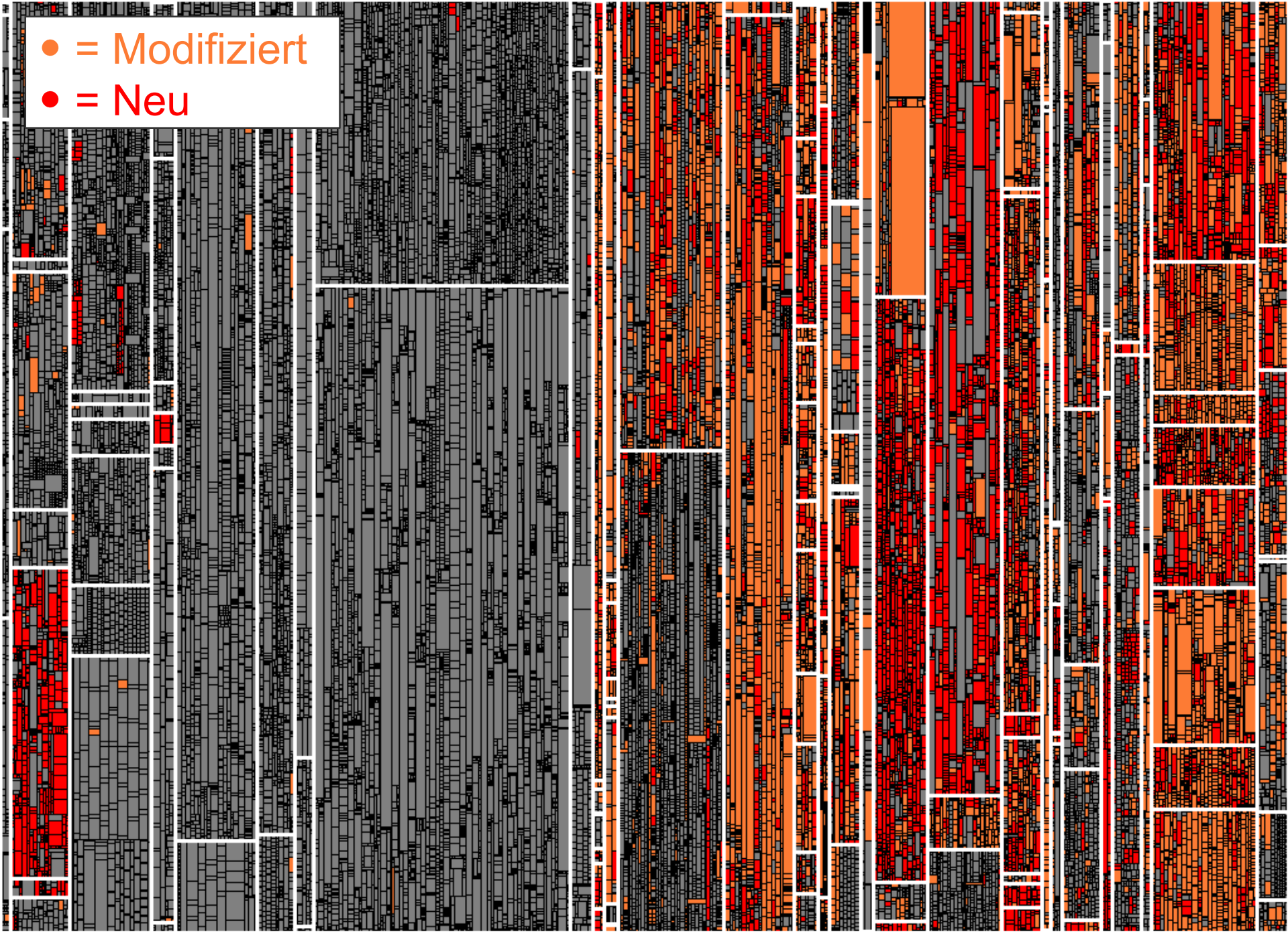
Anatomie Test-Gap-Analyse

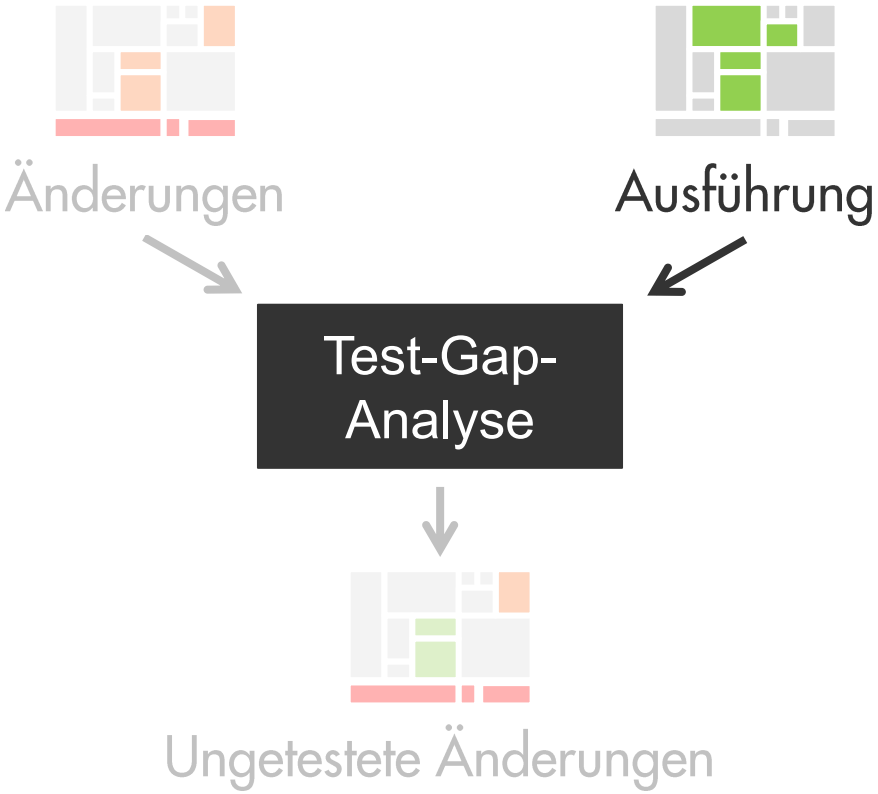


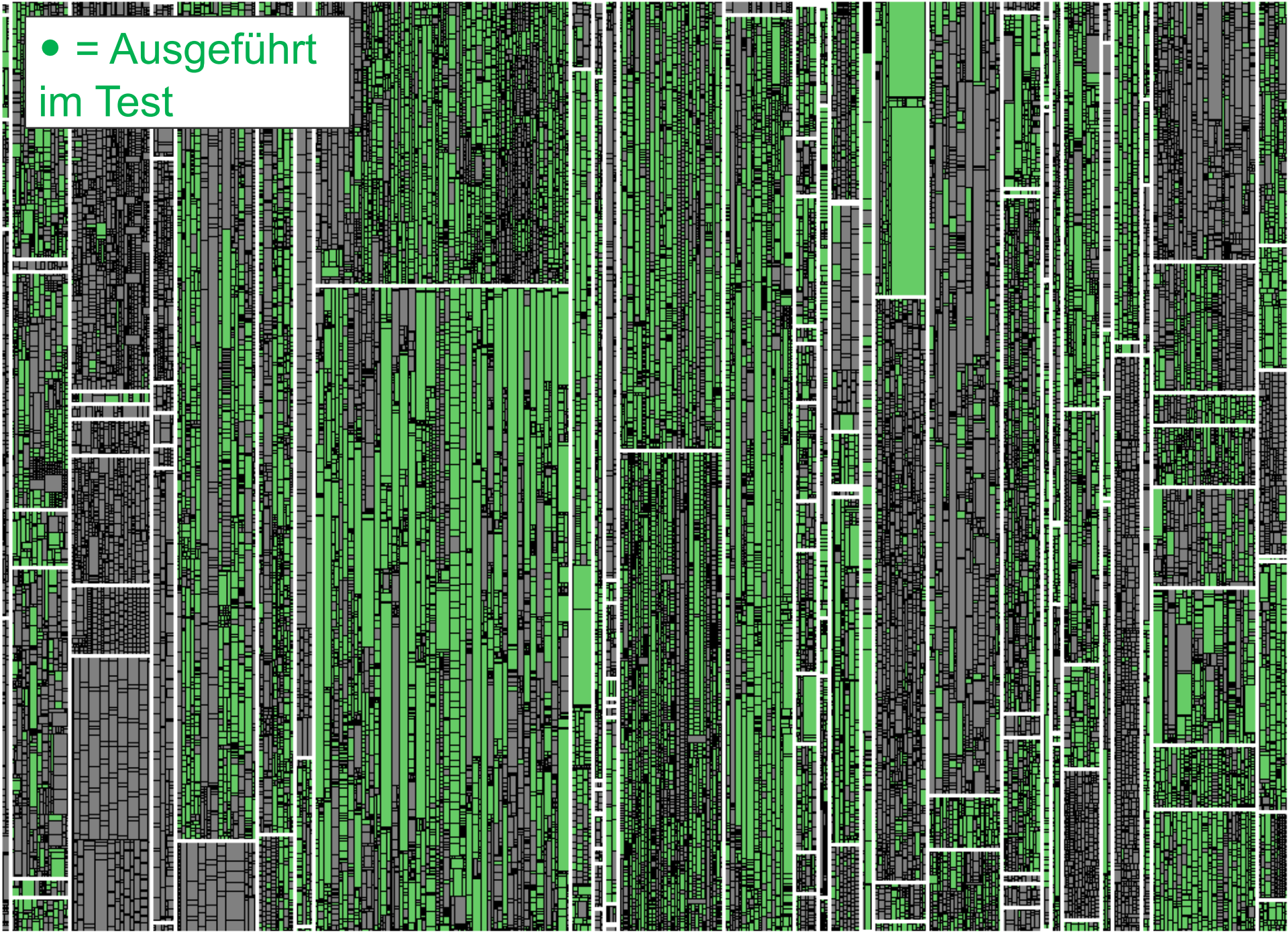

GUI.Dialogs
Authentication
UI Controls
GUI.Base
Data
Validation

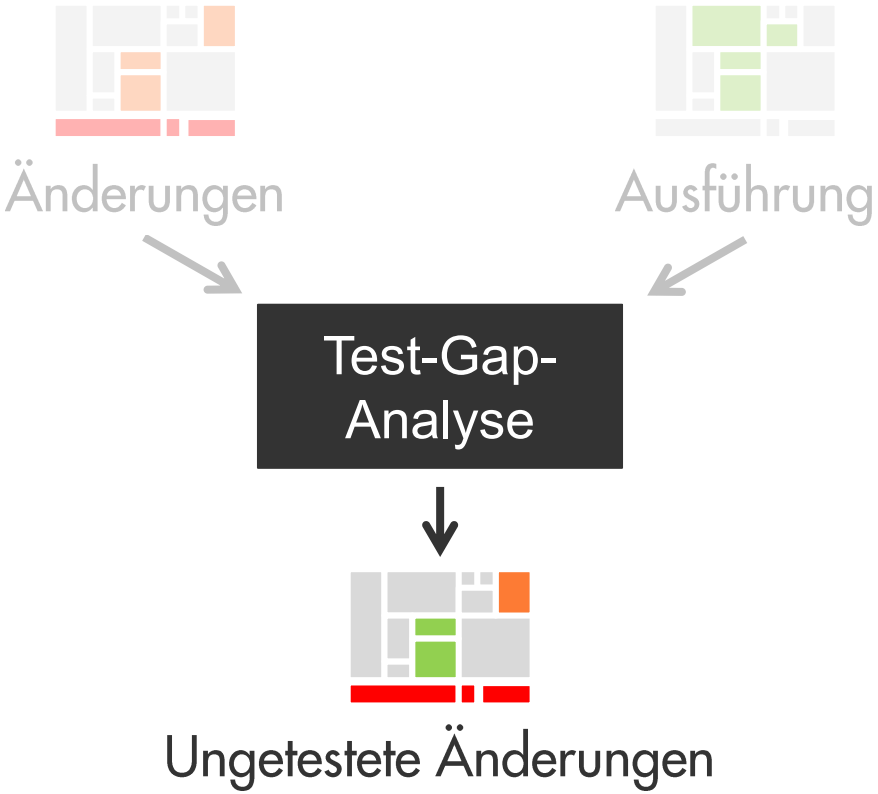


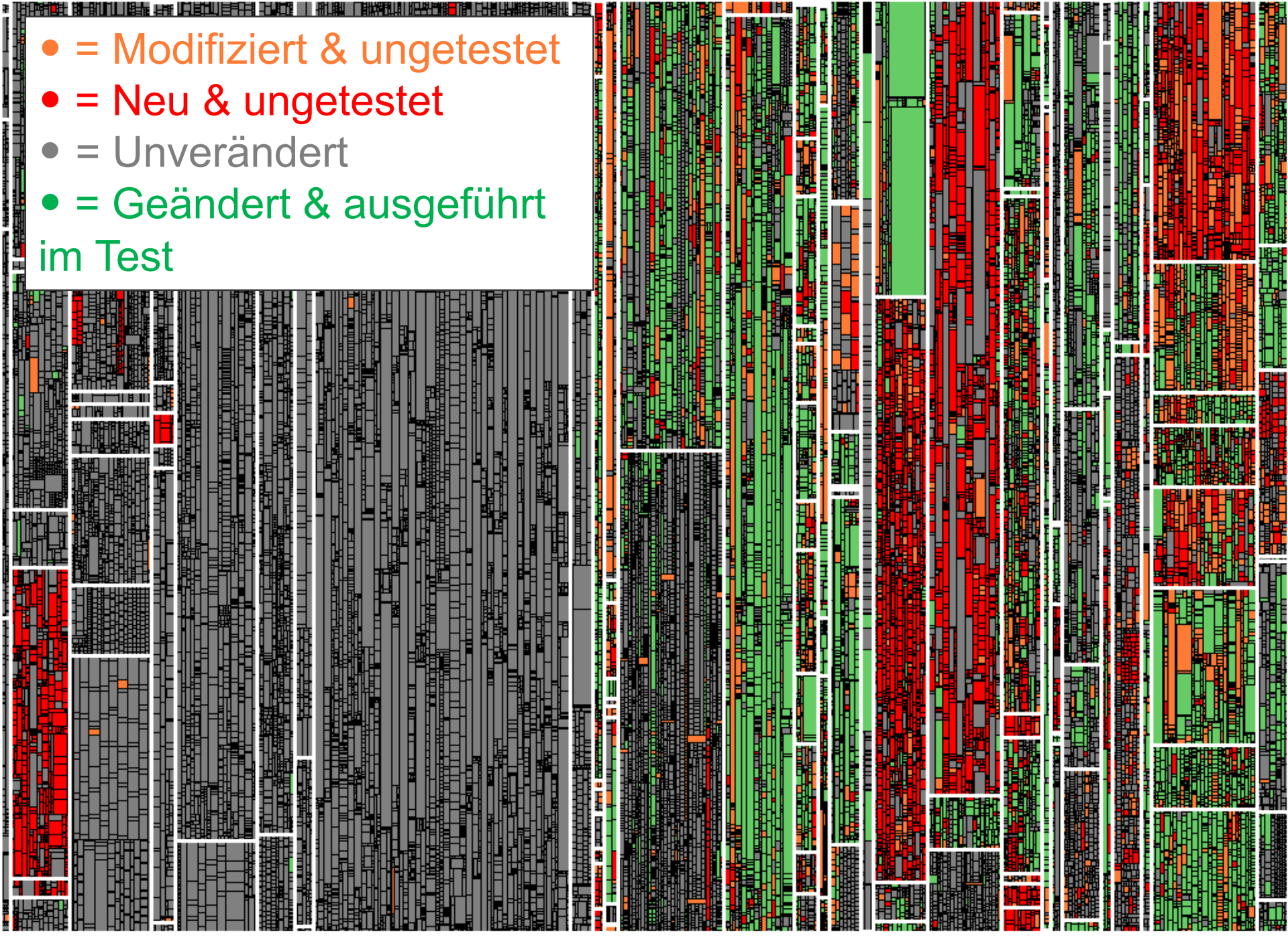

Änderungen
Ausführung
Test-Gap-Analyse
Ungetestete Änderungen

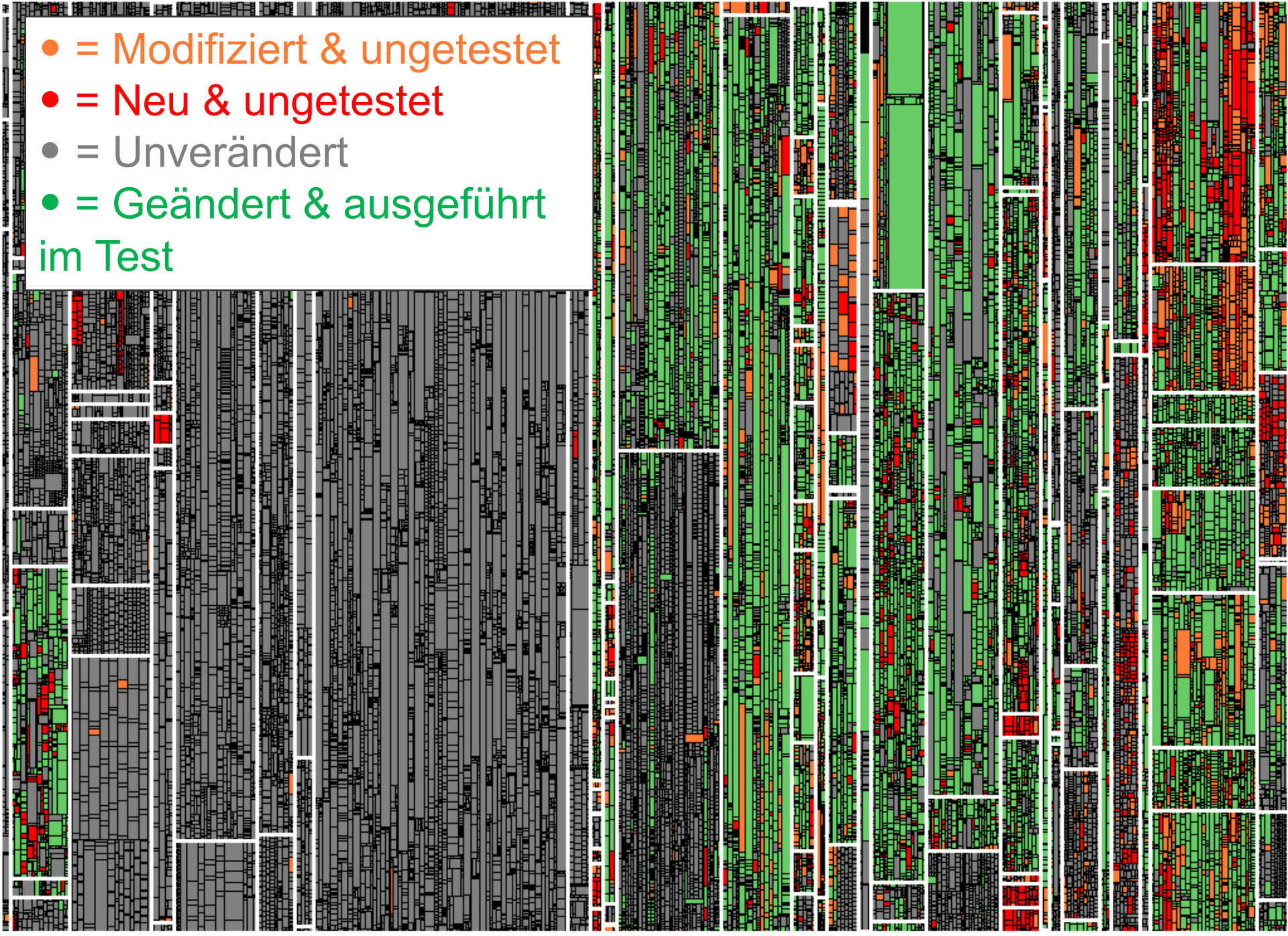

= Modifiziert
= Neu

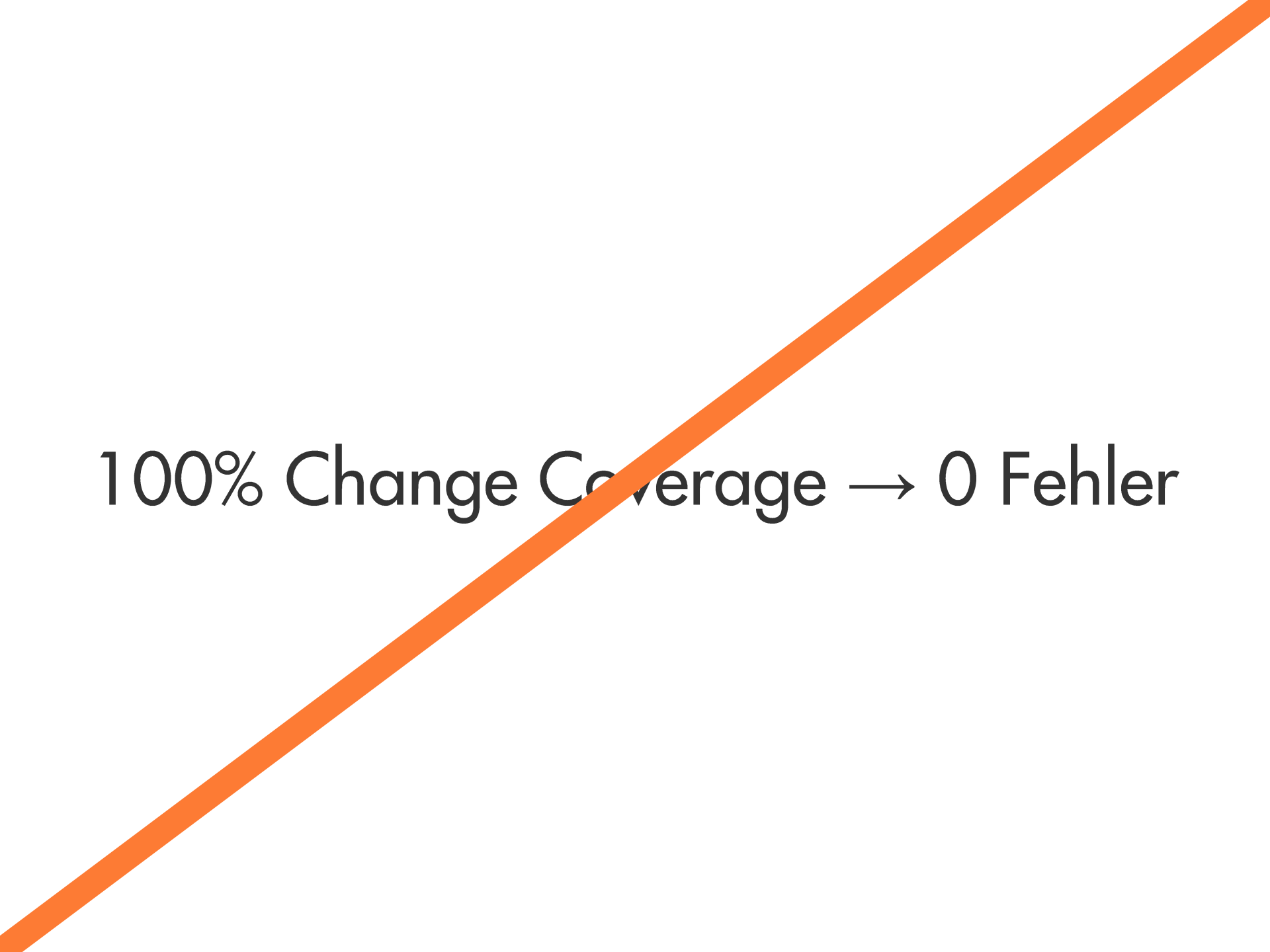

Änderungen
Ausführung
Test-Gap-Analyse
Ungetestete Änderungen

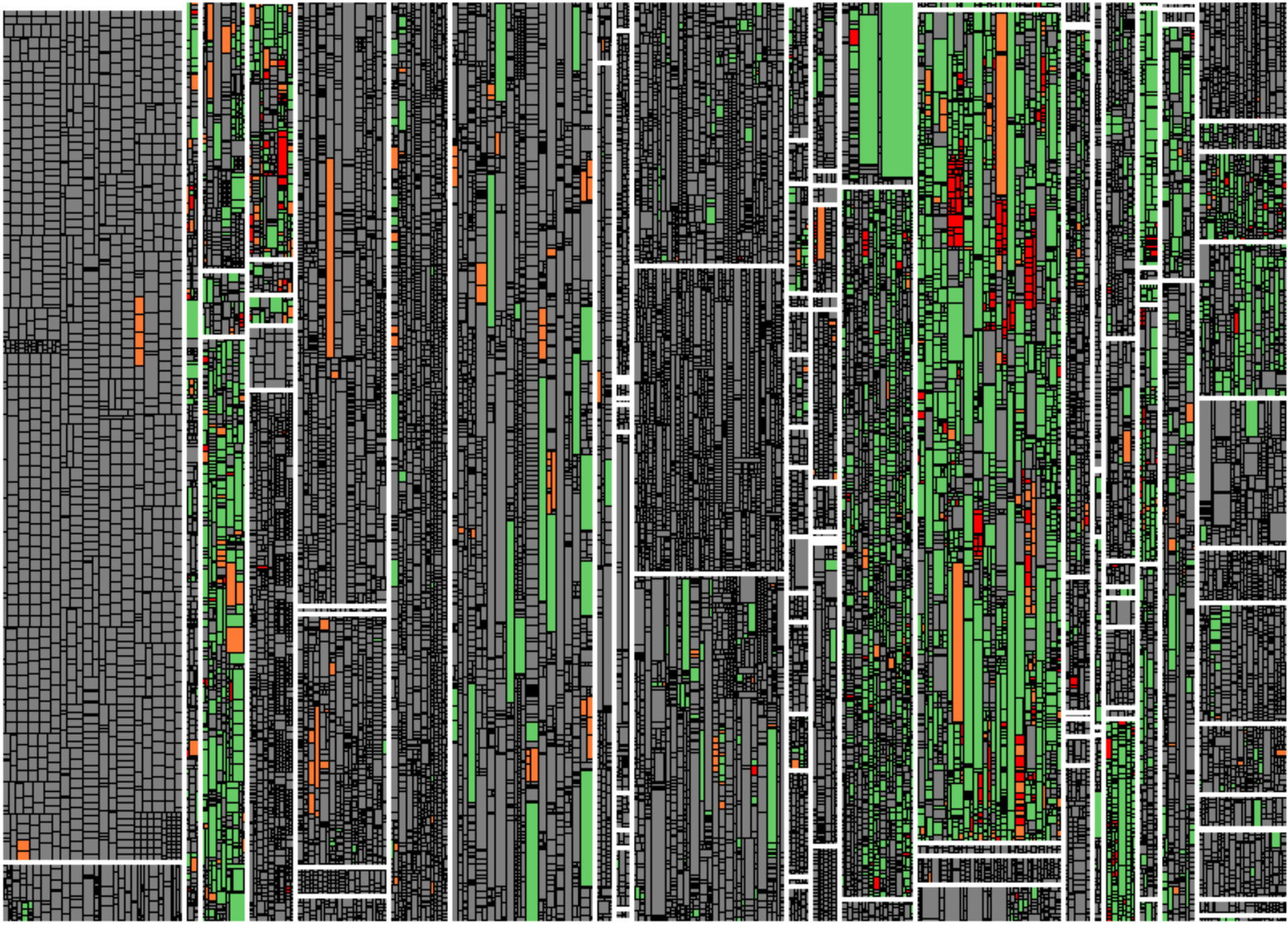

● = Ausgeführt
im Test

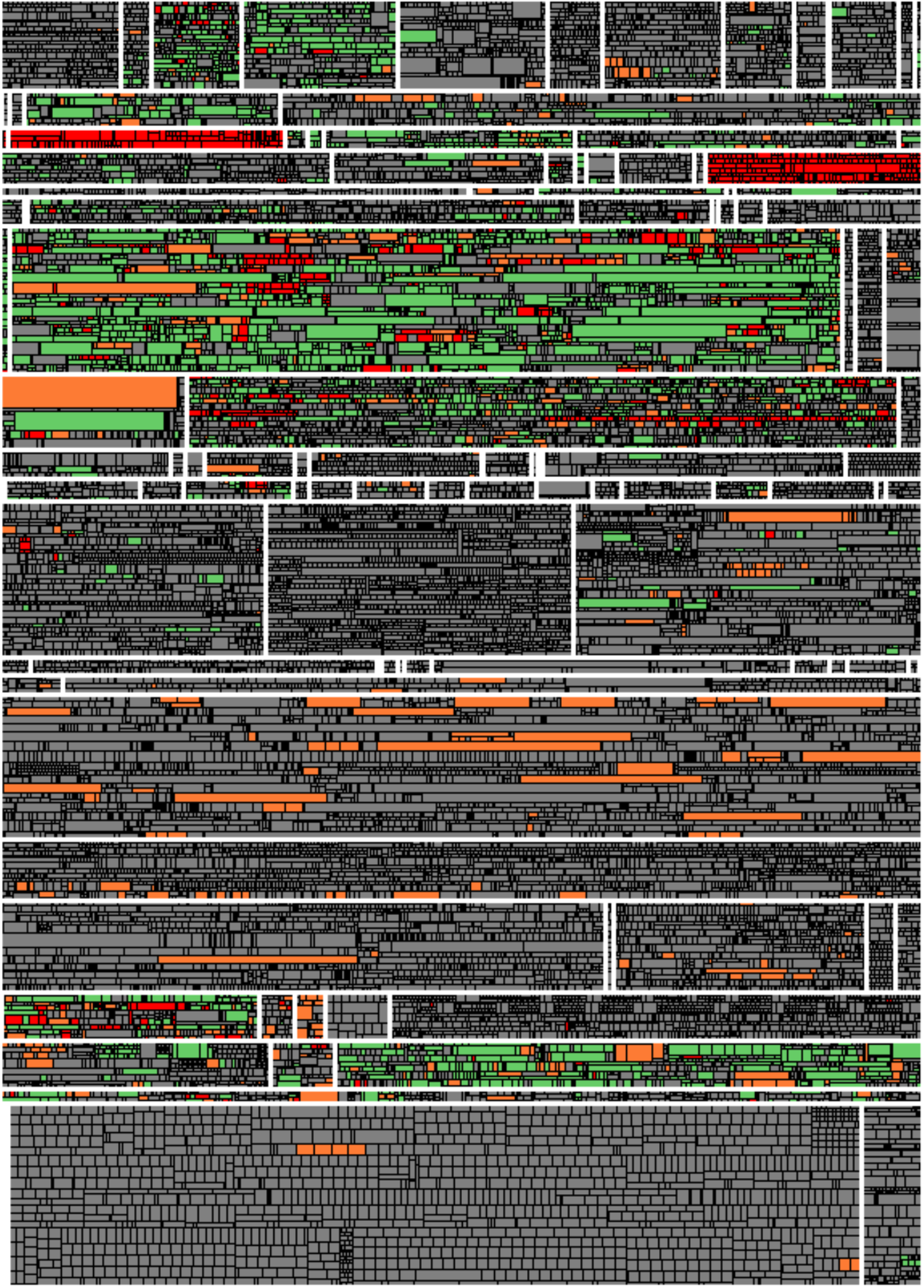

Änderungen
Ausführung
Test-Gap-Analyse
Ungetestete Änderungen

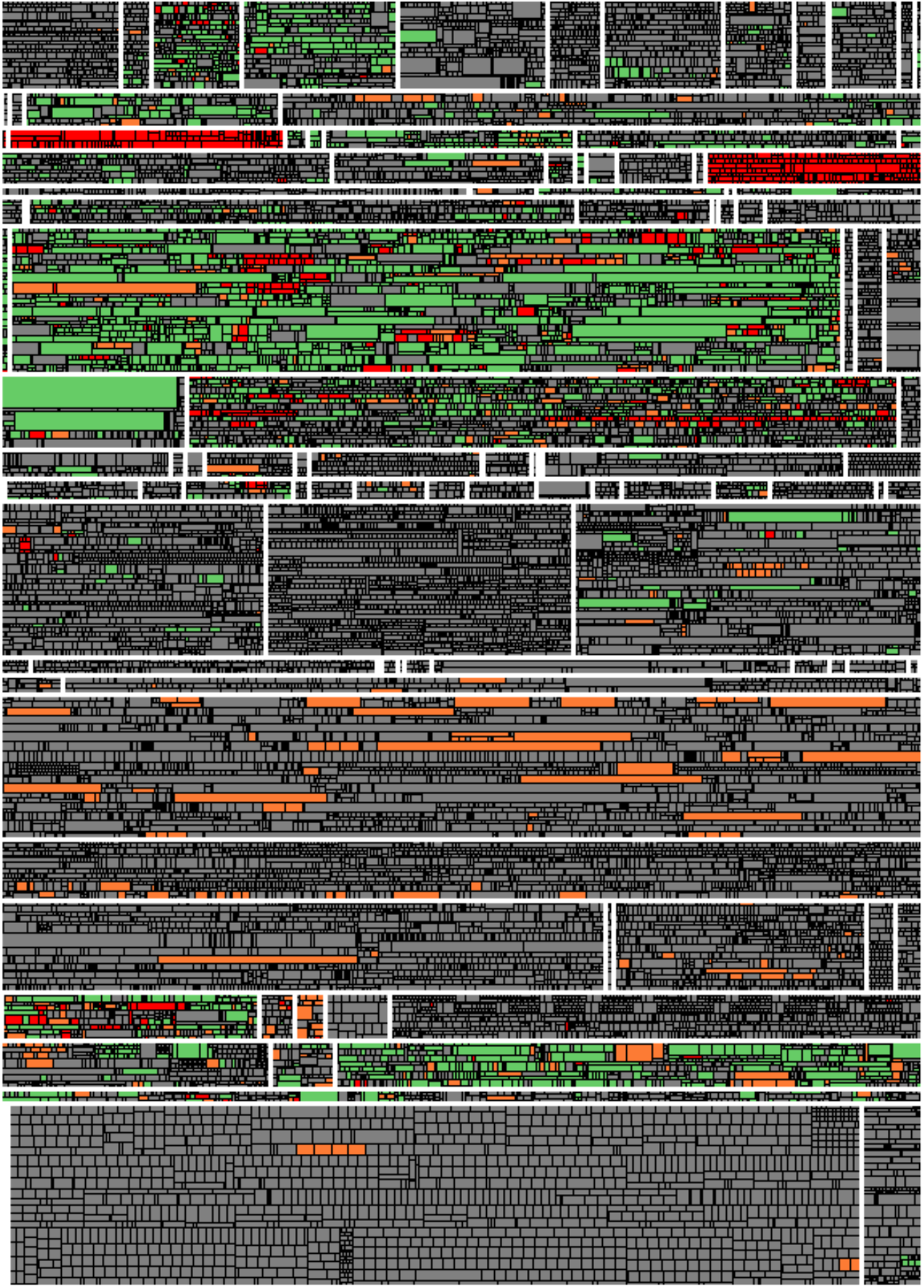

• = Modifiziert & ungetestet
• = Neu & ungetestet
• = Unverändert
• = Geändert & ausgeführt
im Test

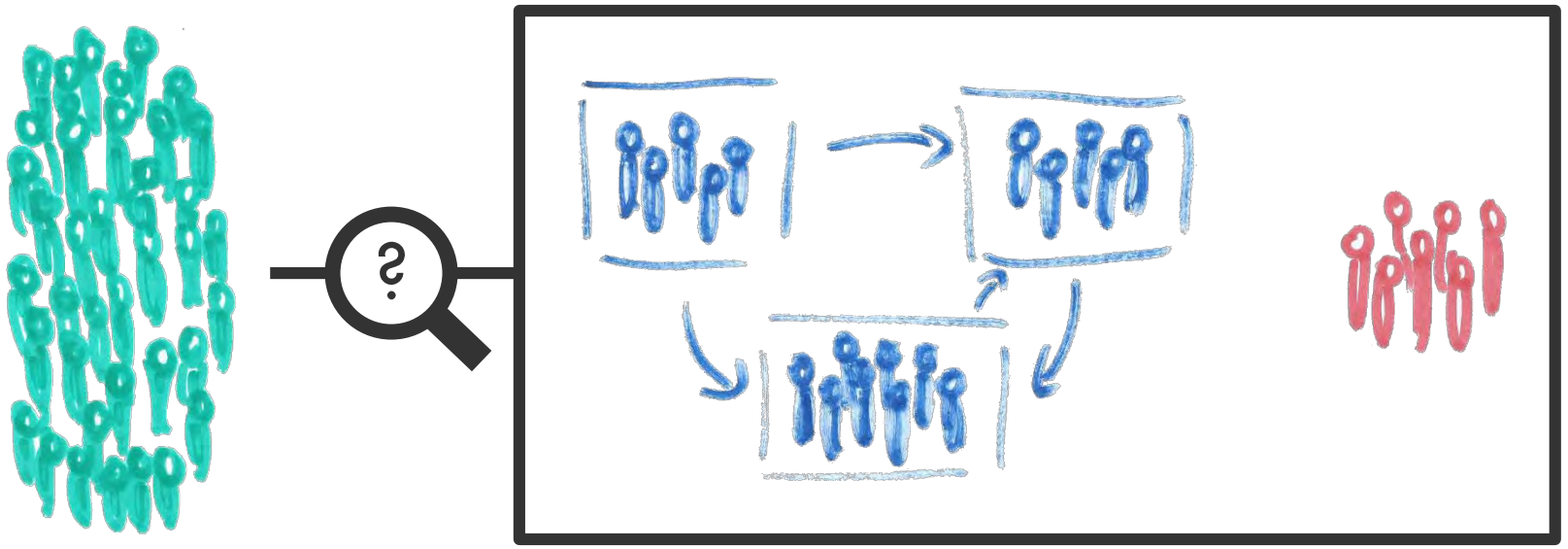

• = Modifiziert & ungetestet
• = Neu & ungetestet
• = Unverändert
• = Geändert & ausgeführt
im Test

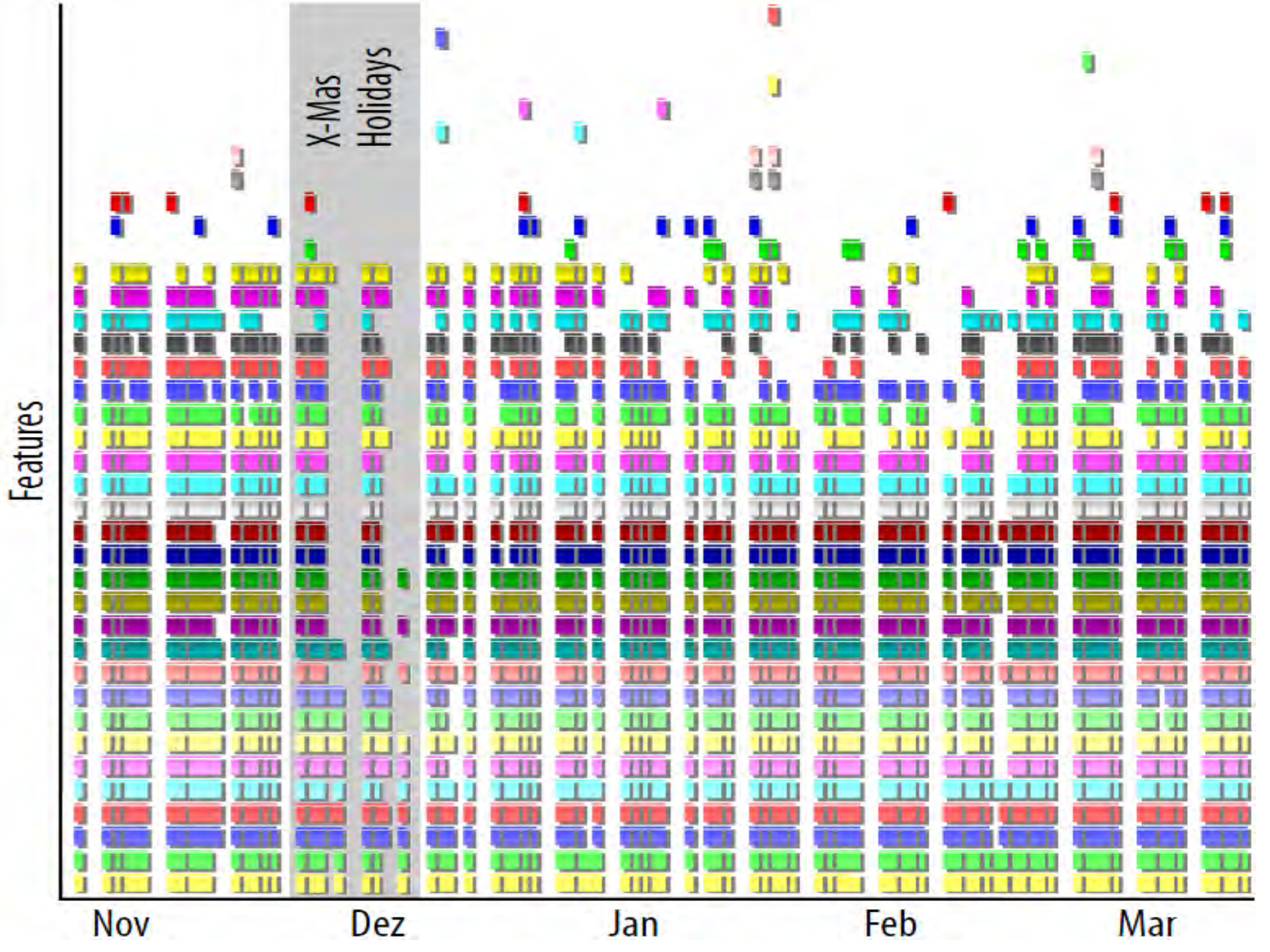

100% Change Coverage → 0 Fehler





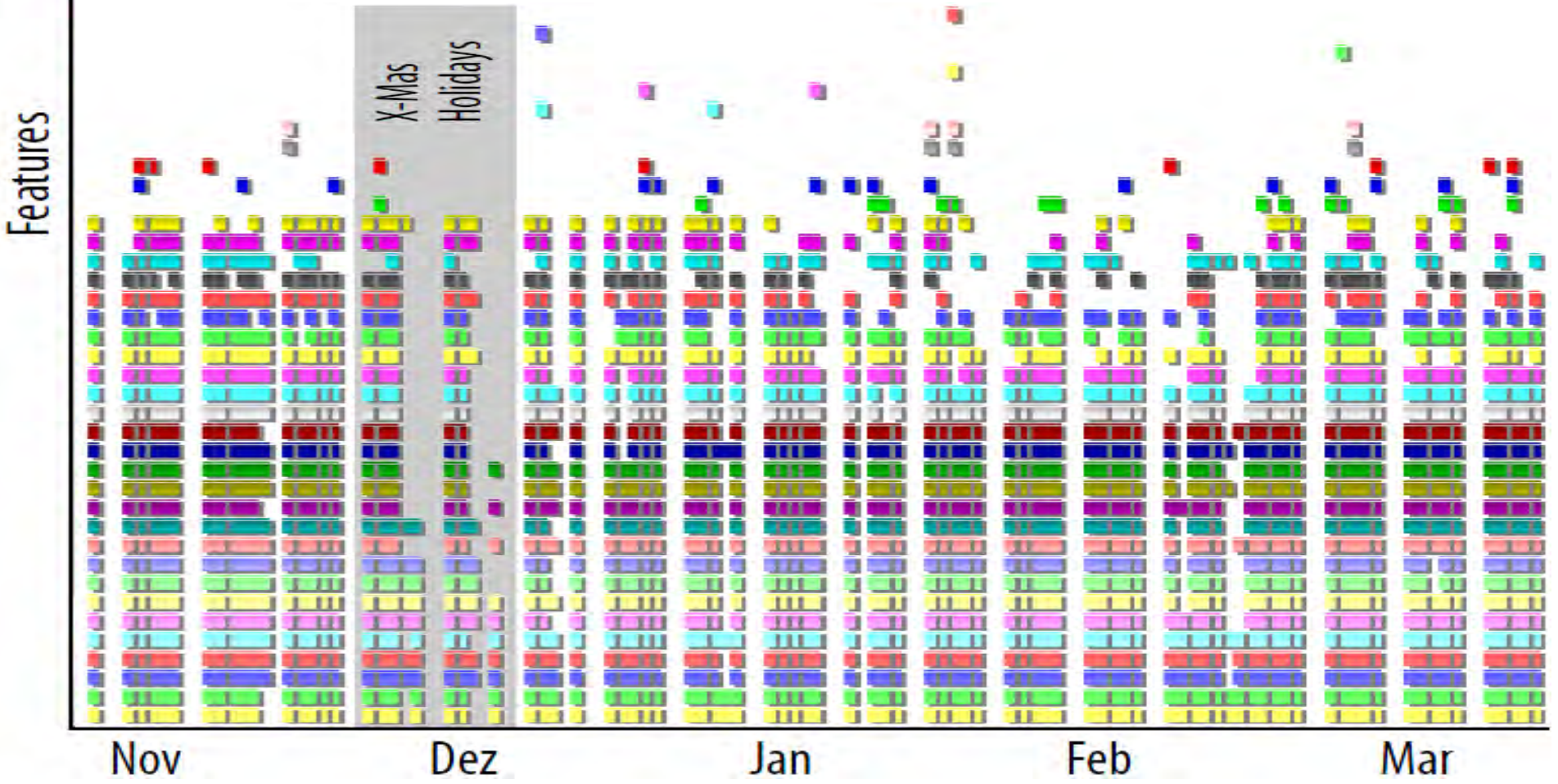


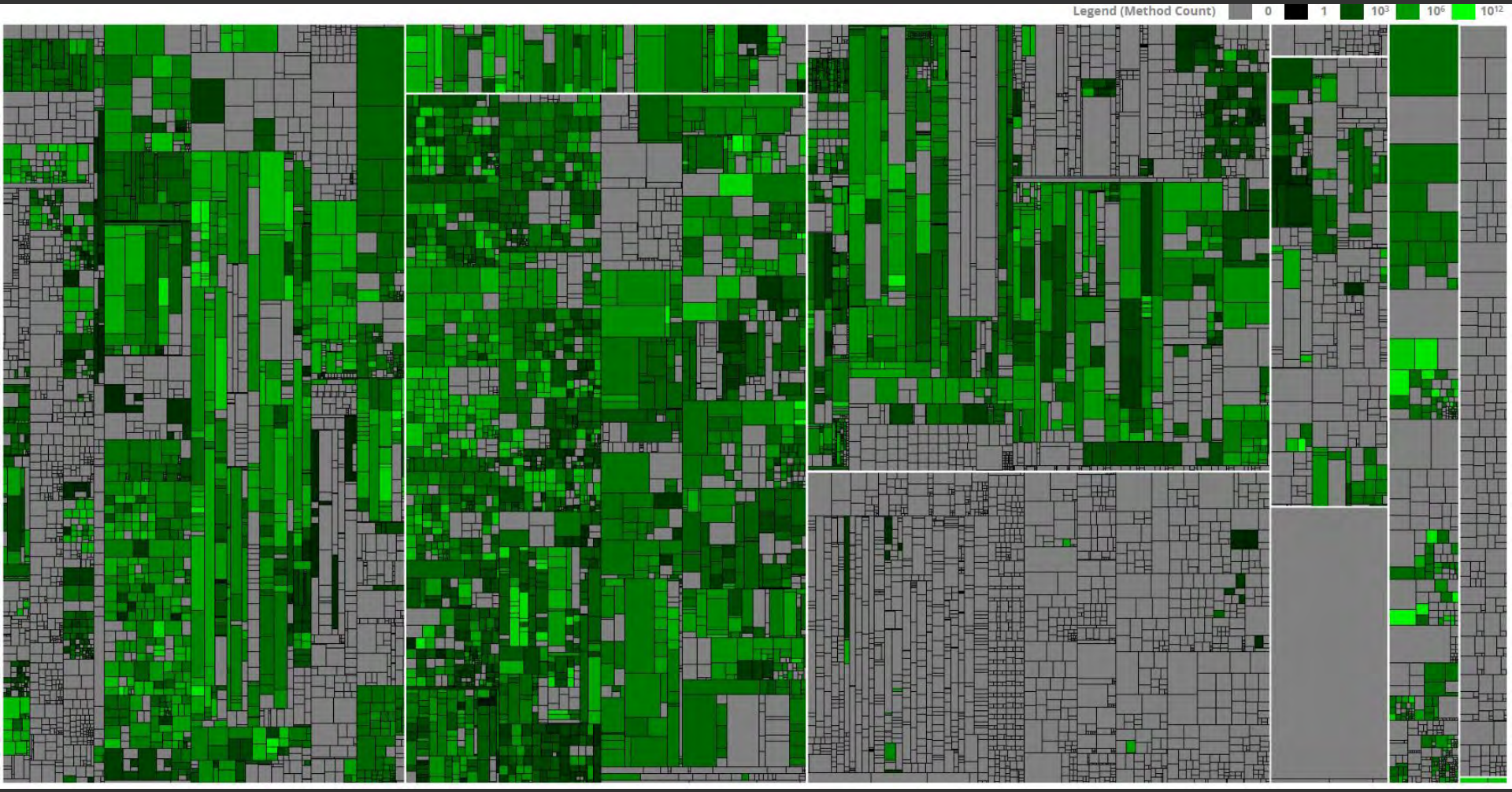


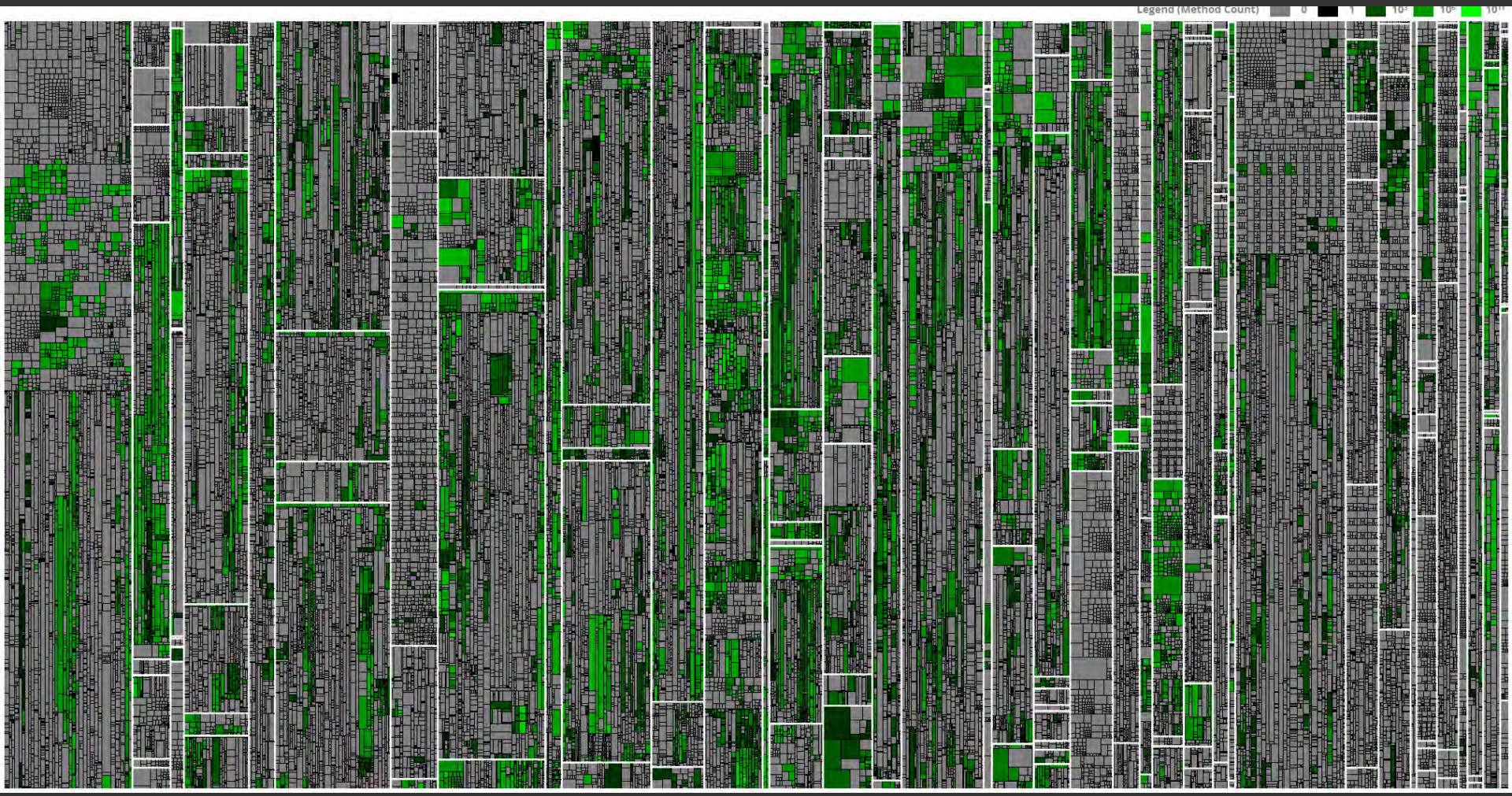

X-Mas
Holidays
Features
Nov
Dez
Jan
Feb
Mar

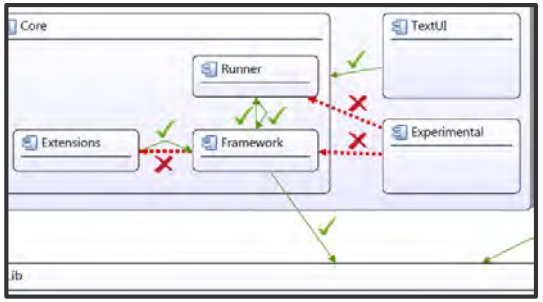
28% Features ungenutzt (15/53)

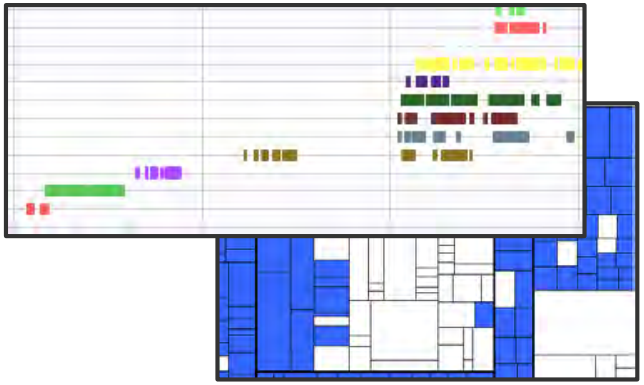
- 11 unerwartet

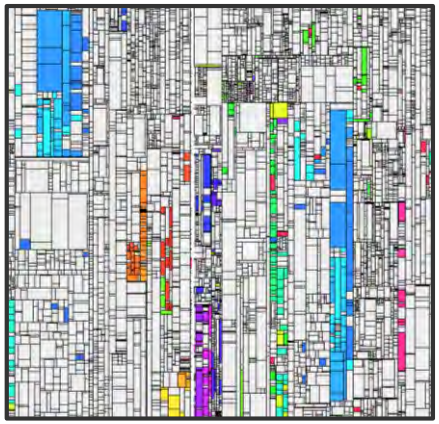


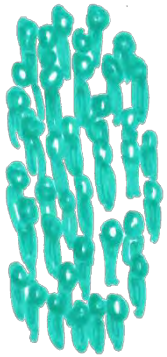

Legend (Method Count)
0
1
10^3
10^6
10^12

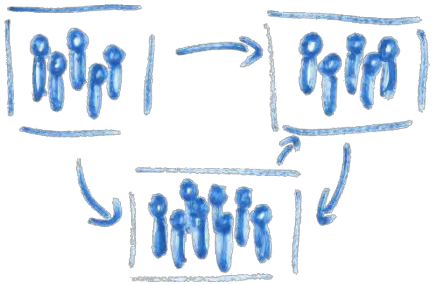

Legend (Method Count)
0
1
10^3
10^6
10^11

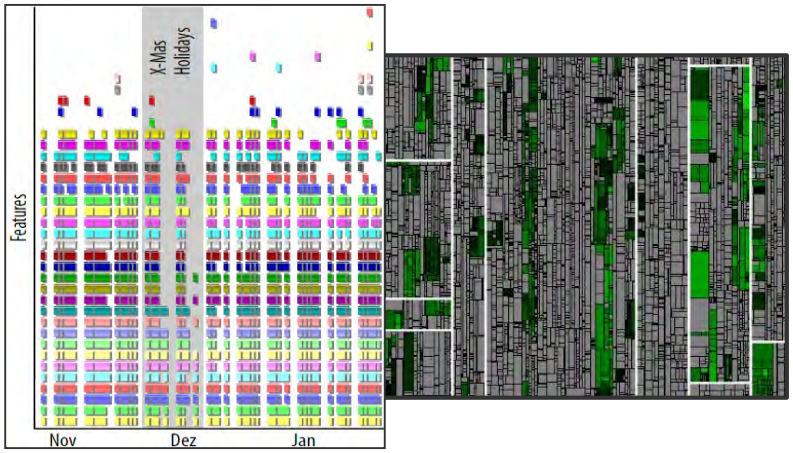

Core
TextUI
Runner
Extensions
Framework
Experimental
lib







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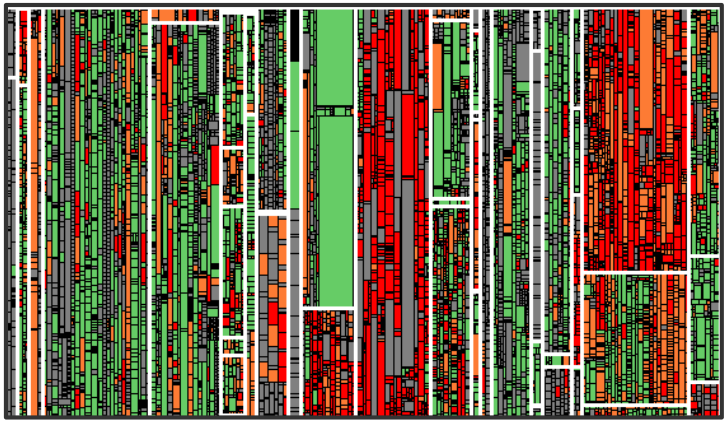
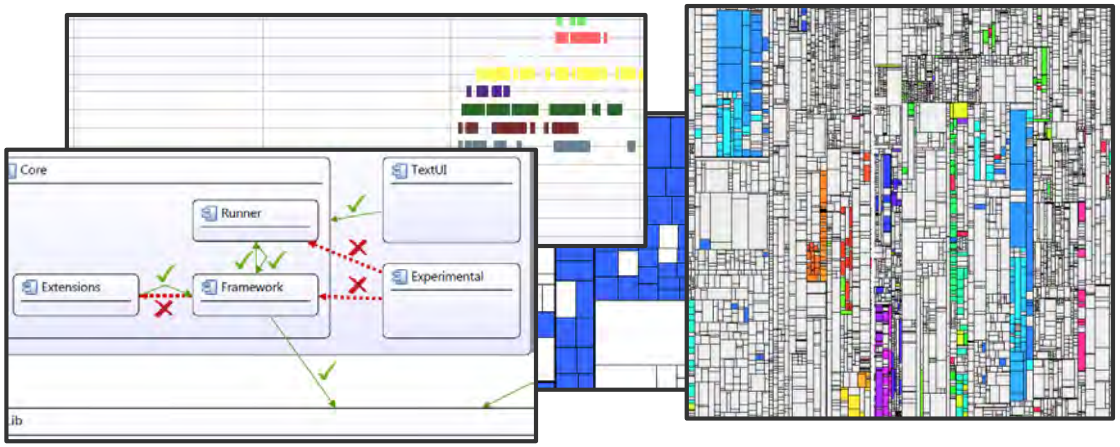
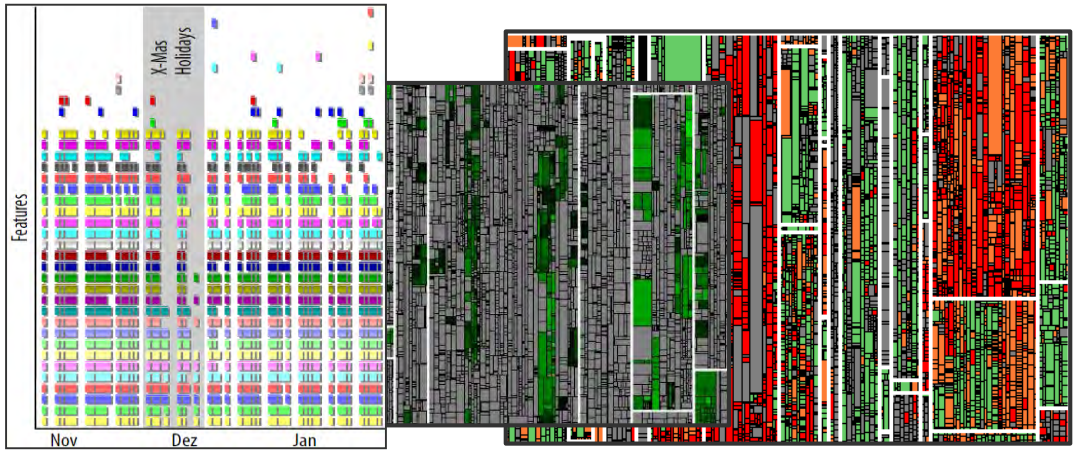


Statische Analysen



Dynamische Analysen



Fazit

Es treten oft Probleme auf, wenn Architektur und Organisation nicht gut zusammenpassen.

Es gibt nützliche dynamische und statische Analysen, die Symptome ermitteln können, damit Ursachen abgestellt werden können.

Sie sind zu einem großen Grad automatisiert, erfordern aber Erfahrung in Konfiguration und Interpretation. Meine Kollegen und ich unterstützen gerne.

https://www.cqse.eu/en/blog

Bridge your Test Gaps with Teamscale

Posted on 04/27/2016 *by* Dr. Dennis Pagano

Many companies employ sophisticated testing processes, but still bugs find their way into production. Often they hide among the subset of changes that were not tested. Actually, we found that untested changes are five times more error prone than the rest of the system.

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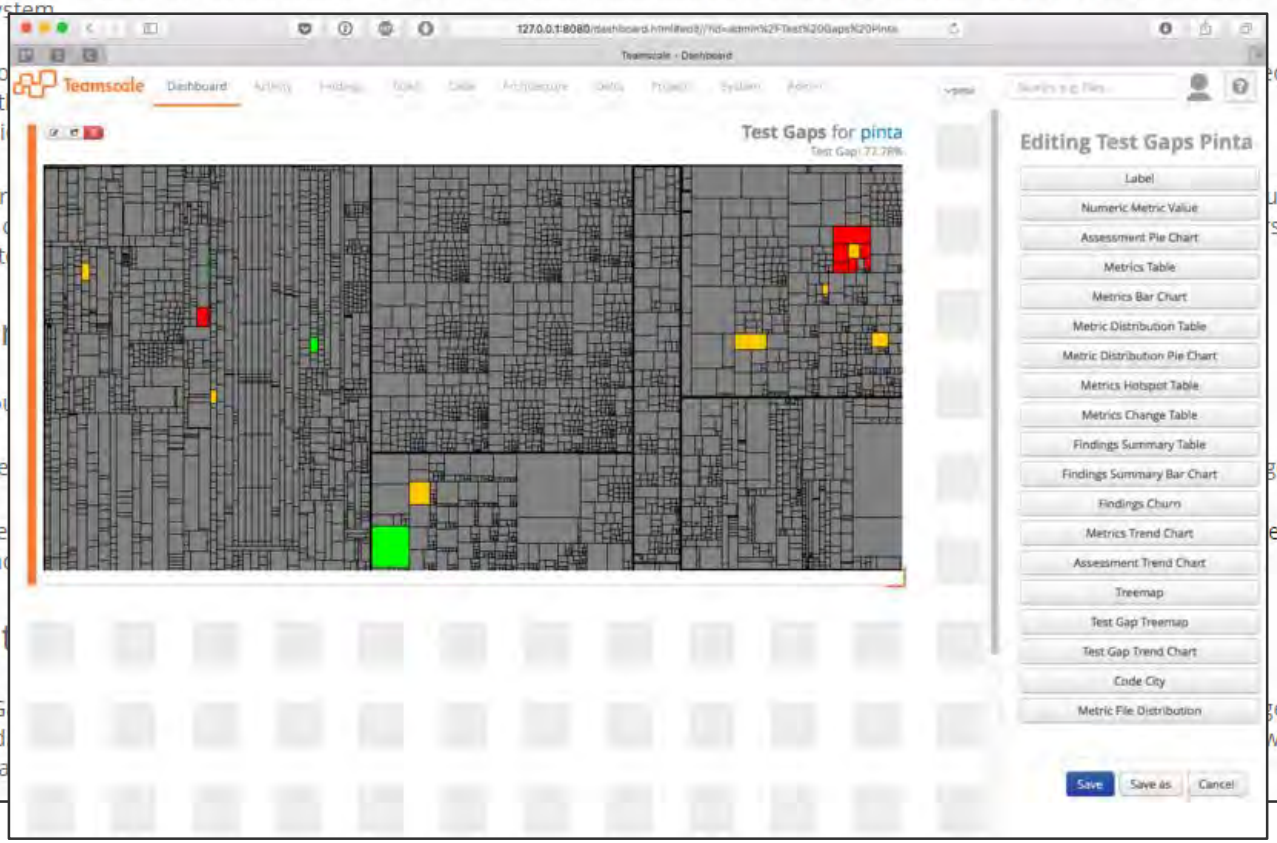

Software Quality Blog

Testing Changes in SAP BW Applications

Posted on 04/29/2015 *by* Dr. Andreas Göb

As my colleague Fabian explained a few weeks ago, a combination of change detection and execution logging can substantially increase transparency regarding which recent changes of a software system have actually been covered by the testing process. I will not repeat all the details of the Test Gap Analysis approach here, but instead just summarize the core idea: Untested new or changed
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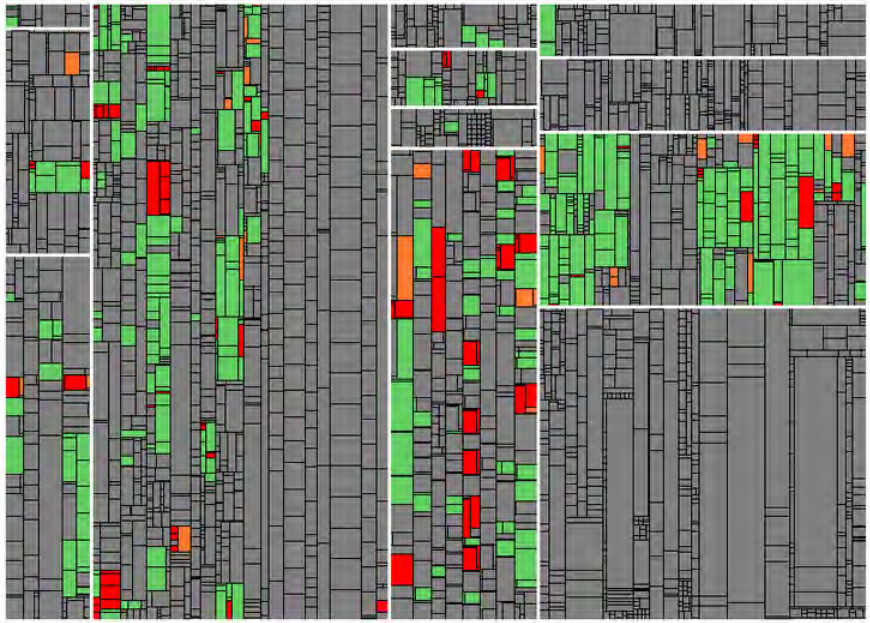

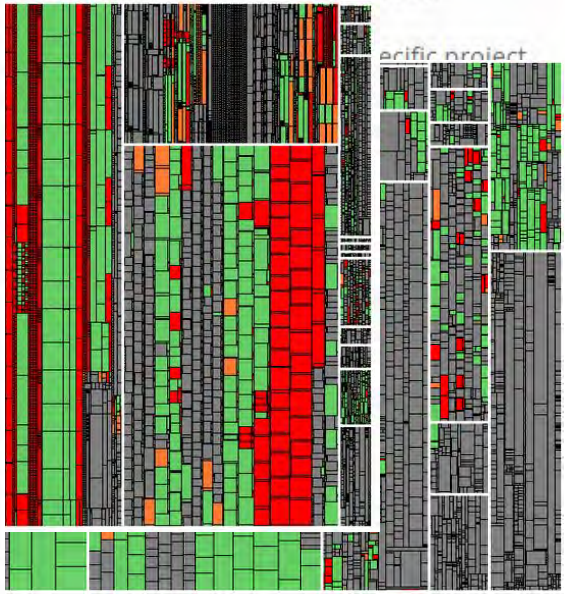

Figure 1: Test Gaps in Manually Maintained ABAP code only

https://www.cqse.eu/en/blog/testing-changes-in-sap-bw/

Software Quality Blog

Practical Guide to Code Clones (Part 1)

Posted on 07/16/2014 *by* Dr. Benjamin Hummel

One well known principle in software engineering states *don't repeat yourself*, also known as the DRY principle. A very obvious violation of DRY is the application of copy/paste to create duplicates of large portions of source code within the same code base. These duplicate pieces of code, also known as *code clones*, have been subject to lots of research in the last two decades. In this two-part post I want to summarize those parts of the current knowledge that I find most relevant to the practitioner, especially the impact of clones on software dev

Practical Guide to Code Clones (Part 2)

Posted on 07/30/2014 *by* Dr. Benjamin Hummel

In the previous part we introduced the notion of code clones and discussed, whether and under which circumstances cloning in your code base can be a problem for development and maintenance. In this post, I will introduce ways and tools to deal with code clones in your code base. After reading this, you should be able to select and apply a detection tool to inspect the clones in your own code base.

https://www.cqse.eu/en/blog/practical-guide-to-code-clones-part1/

Software Intelligence

Welche Überraschungen lauern in Ihrer Software?

CQSE

Wo sind Probleme in Ihrem Quelltext?

Gibt es Bereiche, die niemand im Team beherrscht?

Wird Ihr Code mit der Zeit immer schlechter?

Welche Schwächen hat Ihre Architektur?

Sind die zugrunde liegenden Technologien zukunftssicher?

Haben Architekturprobleme ihre Ursache auf Teamebene?

Welche Änderungen sind ungetestet?

Was wird von den Anwendern eigentlich verwendet?

Wo verbergen sich vermutlich die meisten Fehler?

CQSE

Wie sag ichs meinem Entwicklungsleiter?

Mit Vorträgen über Softwarequalität sind wir regelmäßig auf Industriekonferenzen oder Kunden-internen Workshops vertreten.

Impulsvorträge

Gerne kommen wir auch zu Ihnen ins Haus, beispielsweise für interne Konferenzen oder Workshops. Unsere Themen reichen von Qualitätsanalysen über Qualitätscontrolling bis hin zu Testcontrolling oder der Einführung von Reviews. Oder aber Sie schlagen uns ein Thema Ihrer Wahl vor.

DAS ANGEBOT

- 60-90 MIN VORTRAG
- SOFTWAREQUALITÄT ALS THEMA
- BEI IHNEN IM HAUS
- € NUR UNSERE ANREISEKOSTEN
- TERMIN NACH VEREINBARUNG

IMPULSVORTRAG ANFRAGEN

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