

Software

**QS-TAG** Continuous 'Everything'

# Test-Impact-Analyse

Frühe Fehlererkennung trotz großer, langlaufender Test-Suites

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CQSE GmbH

CQSE

# Über Mich

## Forschung

- Test-Gap-Analyse, Defect Prediction, ...
- PC Mitglied von MSR, ICPC, ICSE, ...

## Beratung

- Gründer und Mitglied der Geschäftsleitung
- Qualitäts-Bewertung & Qualitäts-Controlling

## Gesellschaft für Informatik


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





com.teamscale.test.ui.architecture.ArchitecturePerspectiveTest - testViewingArchitectureElements

Runs: 1/227

 Errors: 0

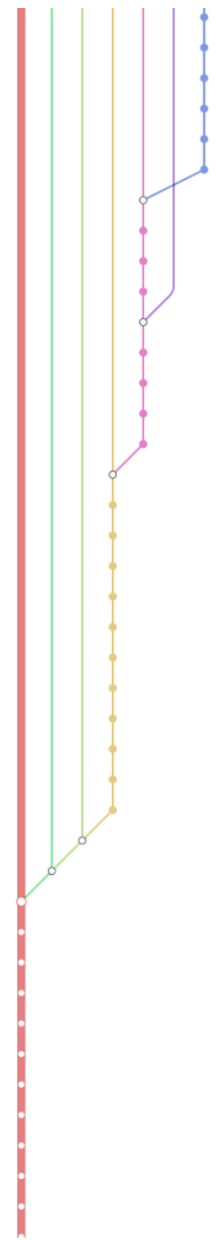
 Failures: 0

- ▼   com.teamscale.test.ui.architecture.ArchitecturePerspectiveTest [Runner: JUnit 5]
  -  testViewingArchitectureElements
  -  createArchitectureTest
  -  testTimetravelMode
  -  testUndoRedo
  -  testArchitecturePolicyUpdate
  -  testOpenCodeOfOrphans

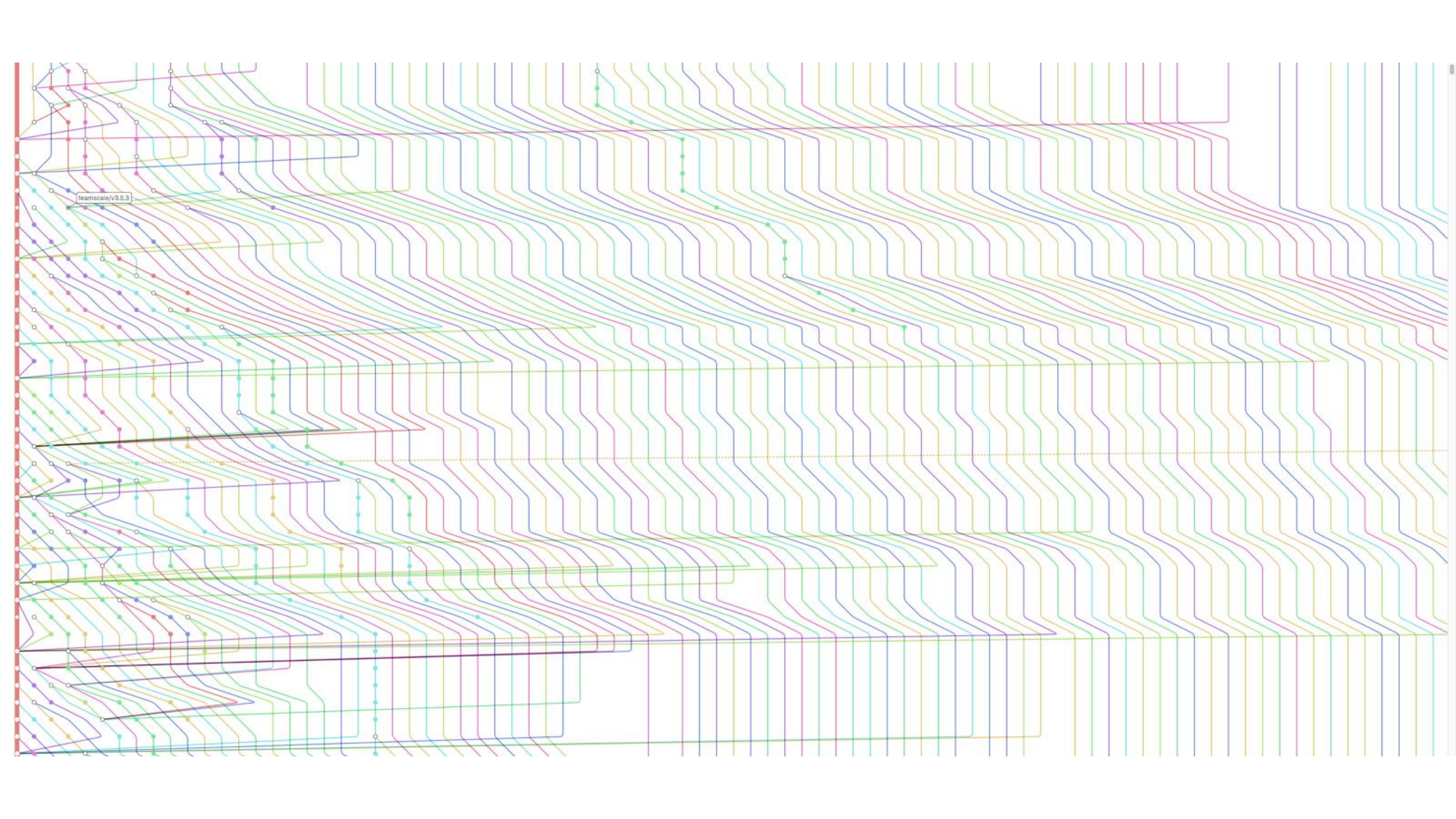
 Failure Trace



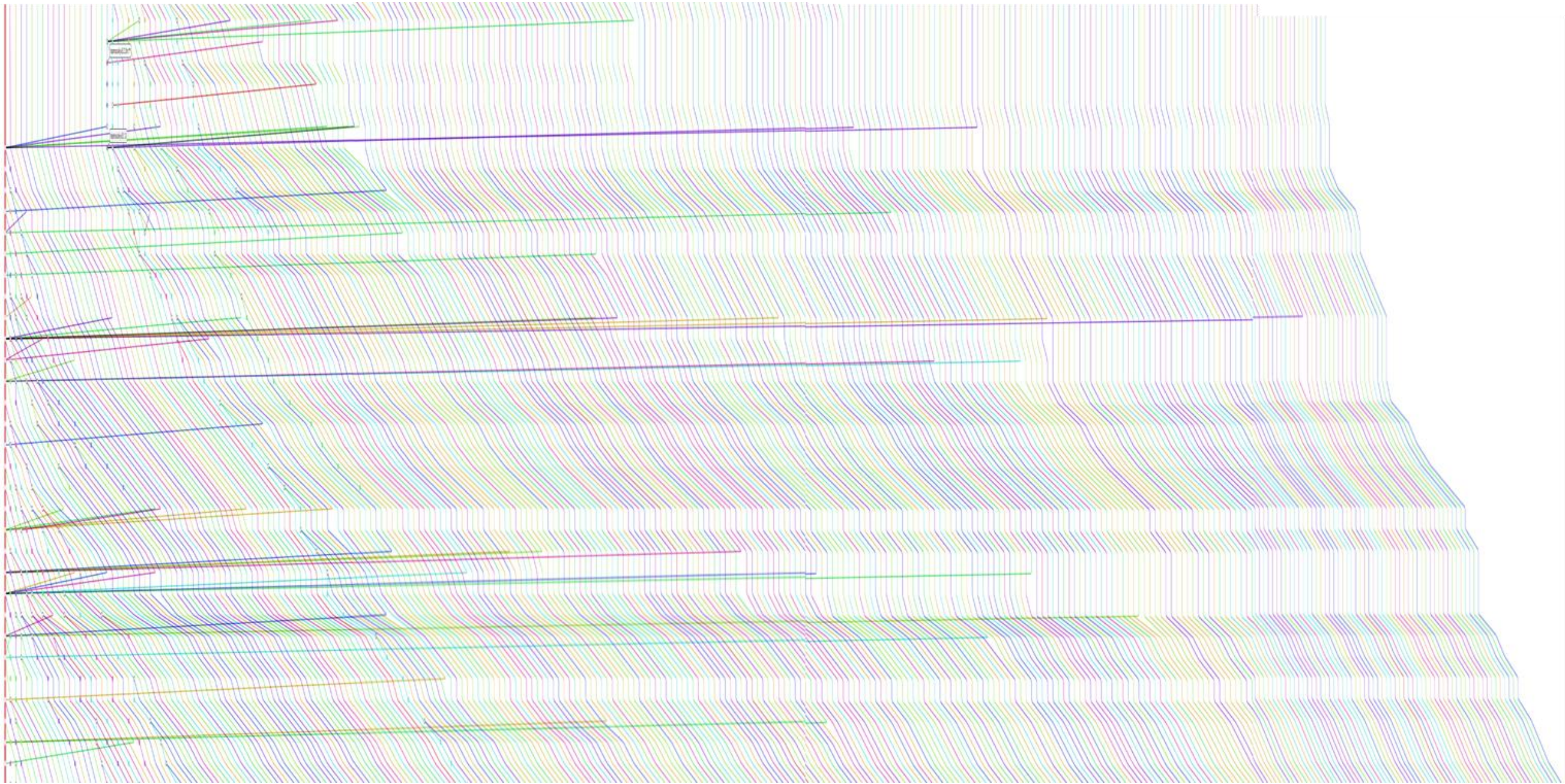




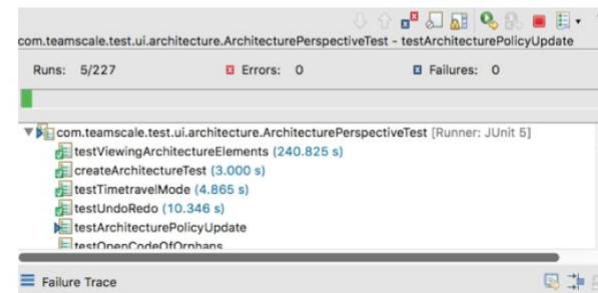
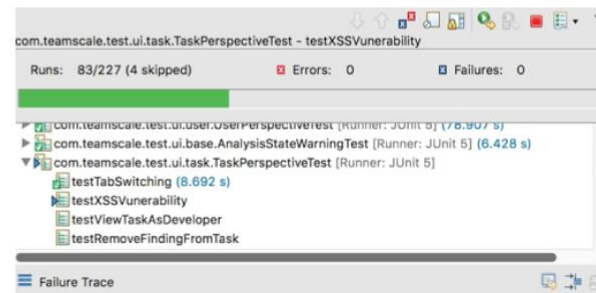
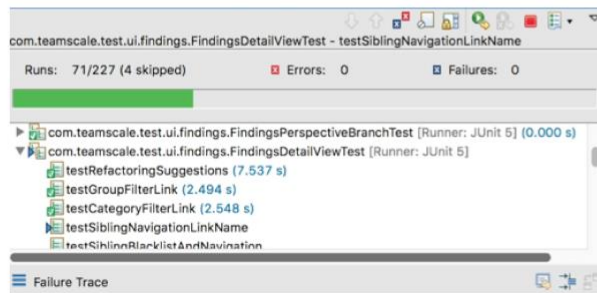
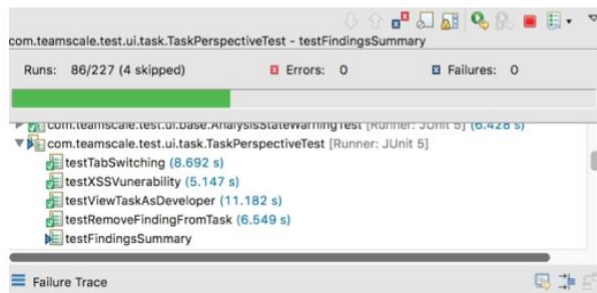
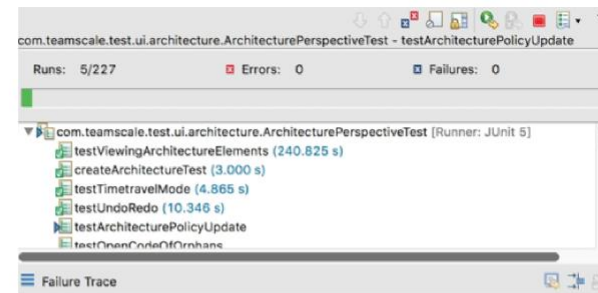
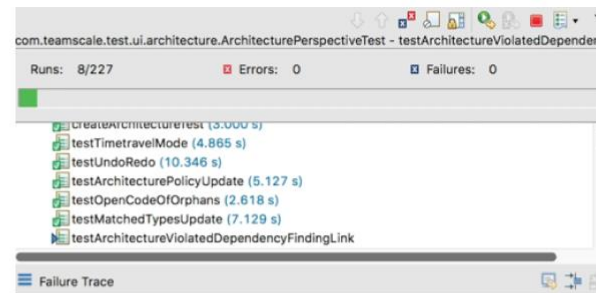
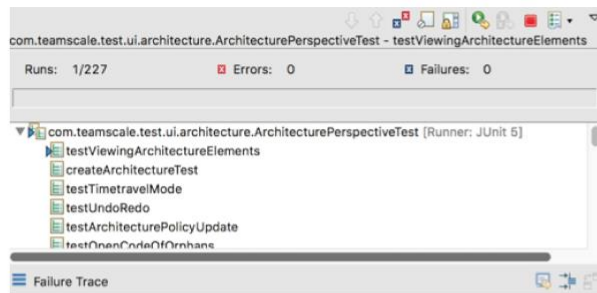
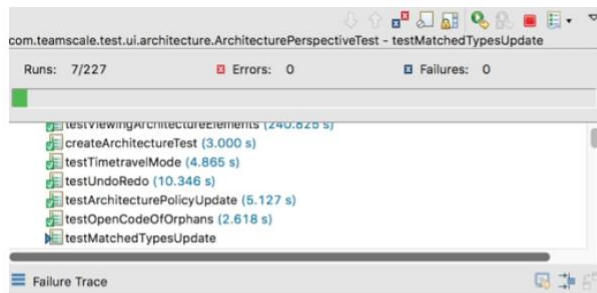
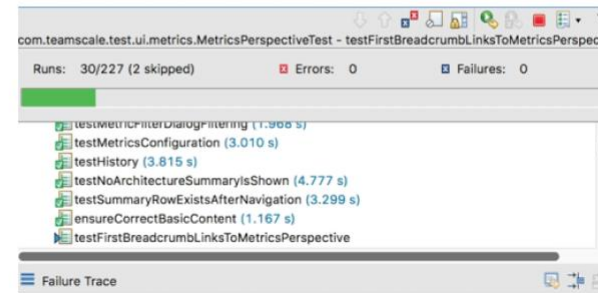
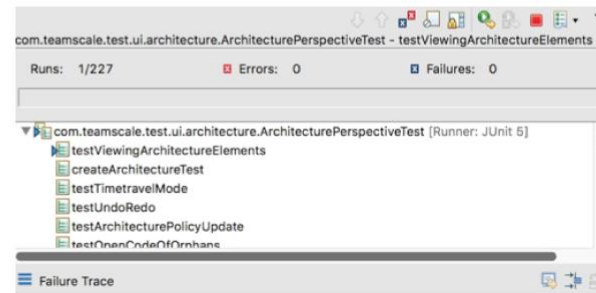
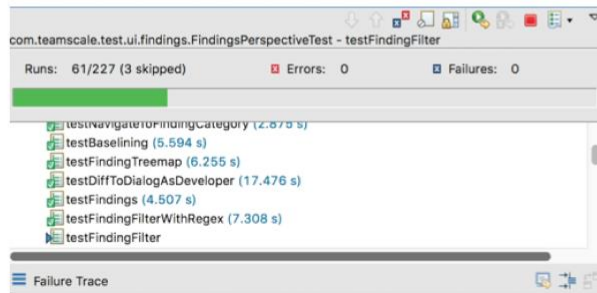
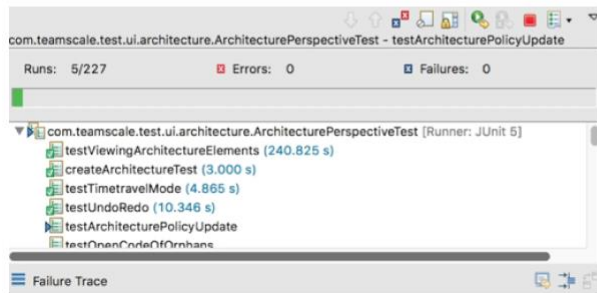
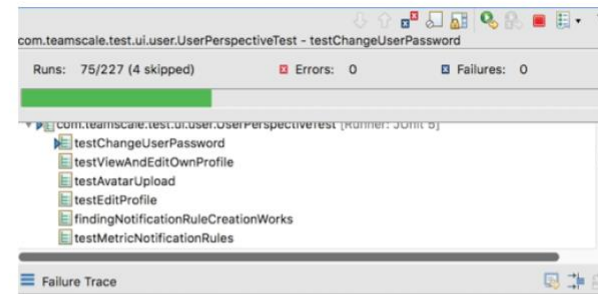
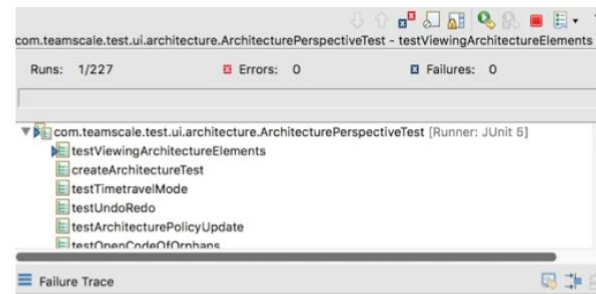
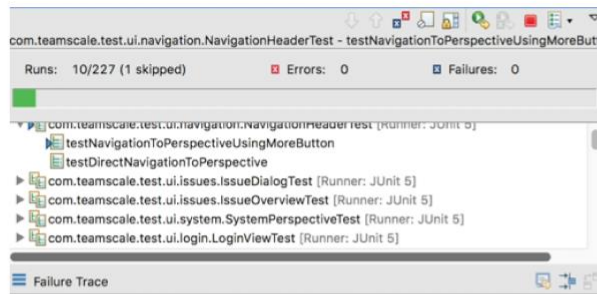
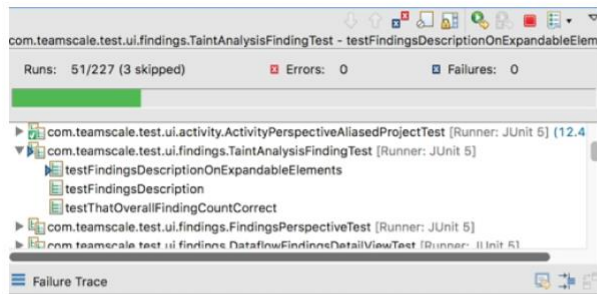






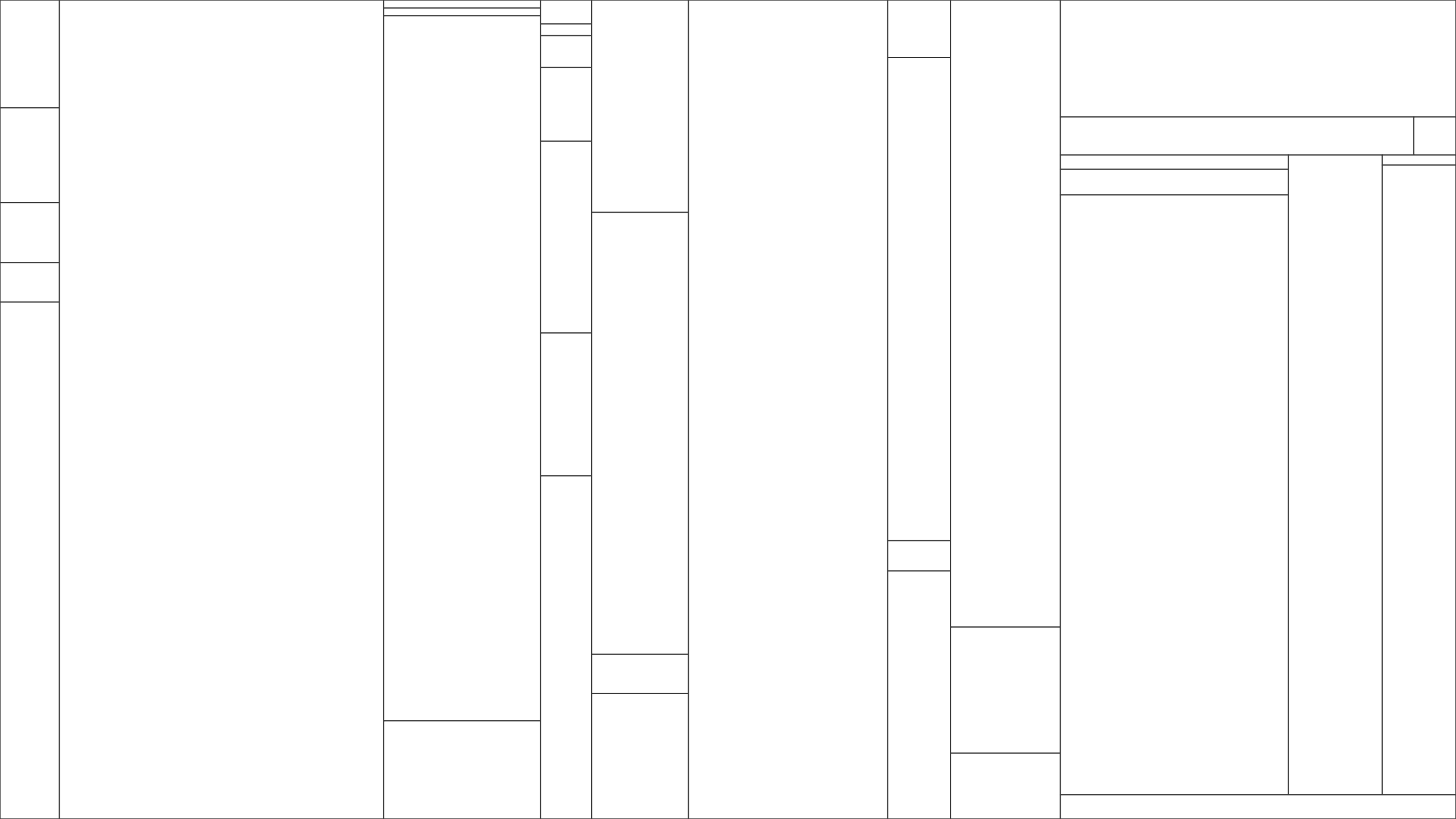




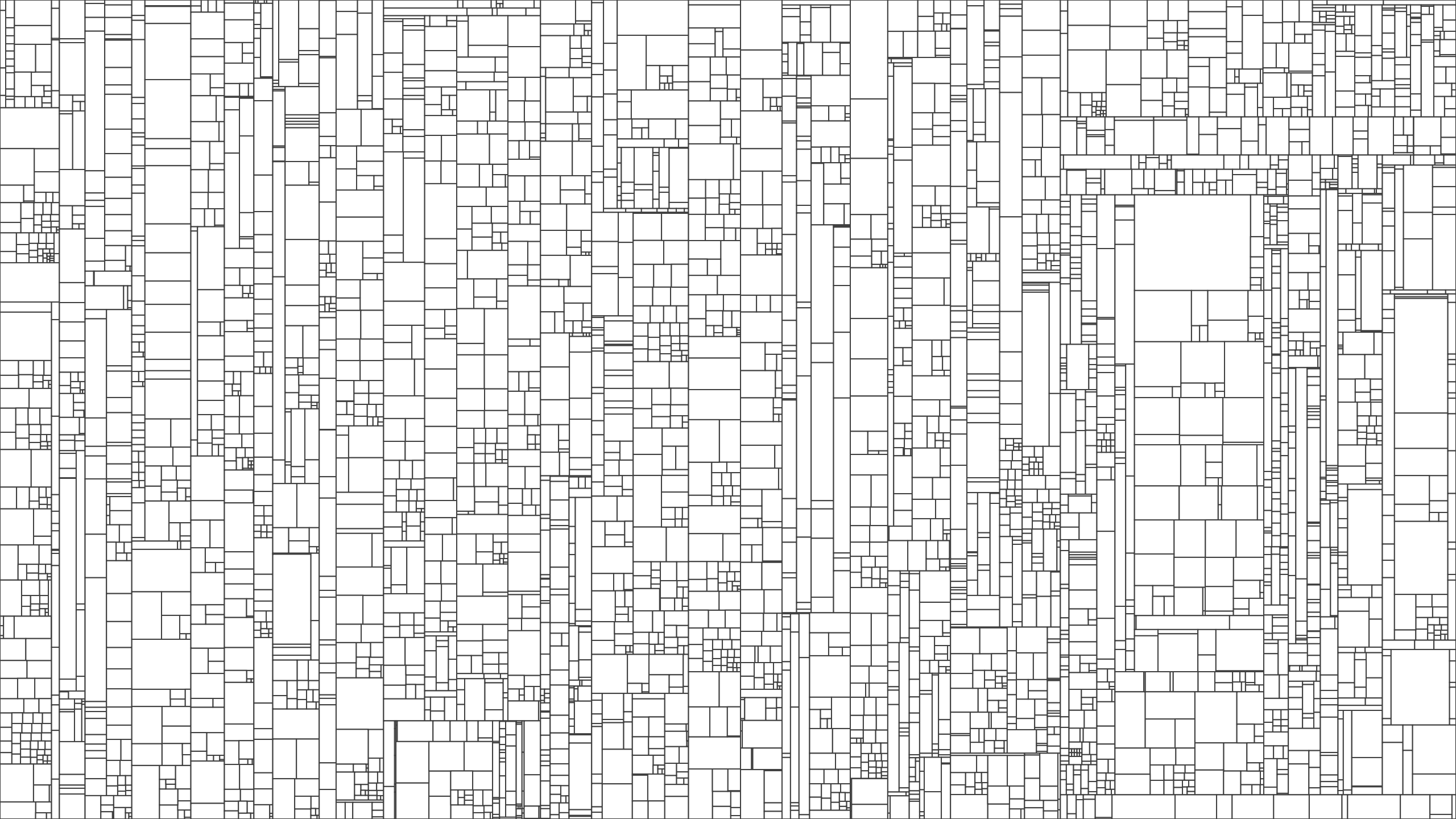


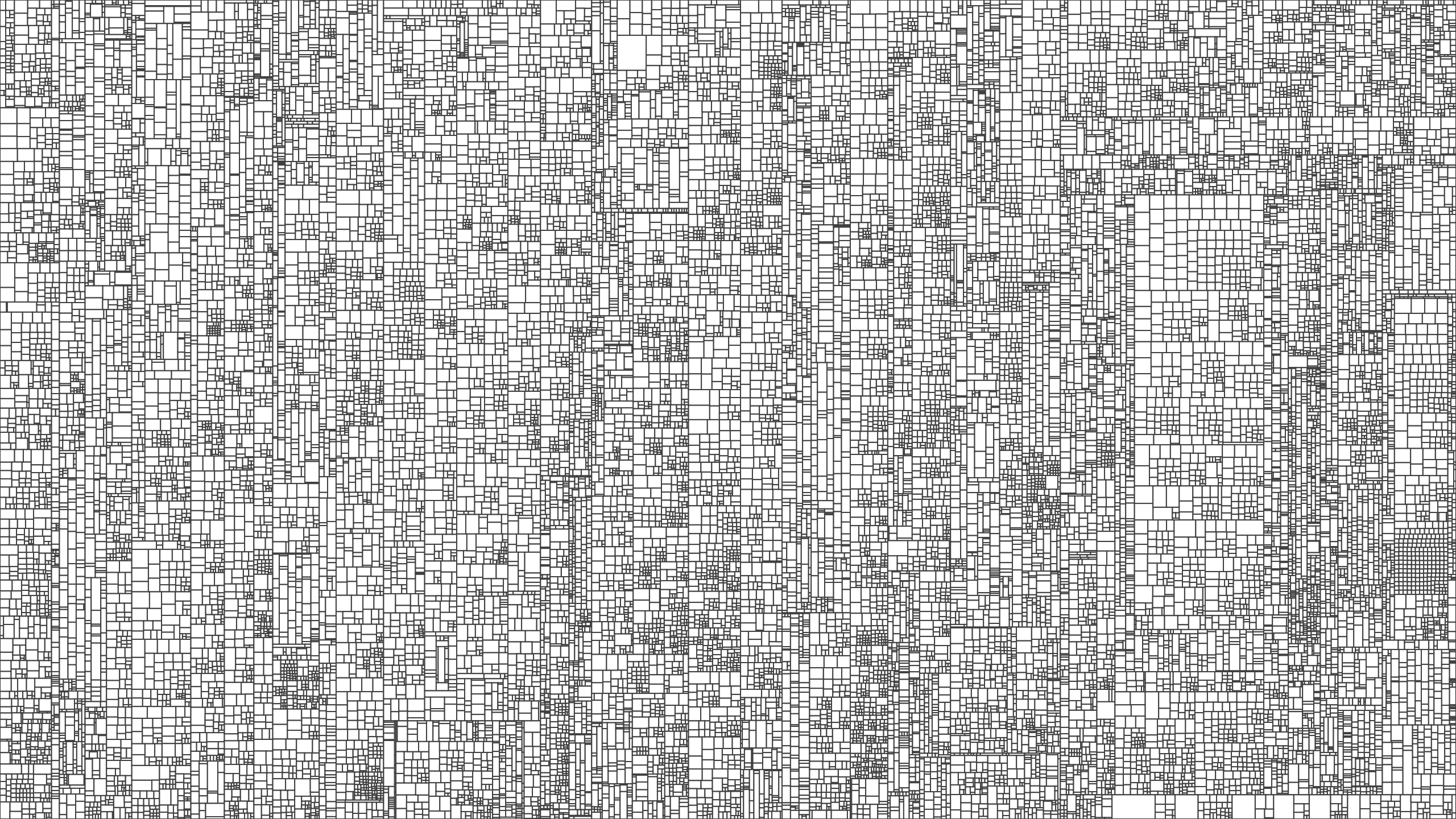




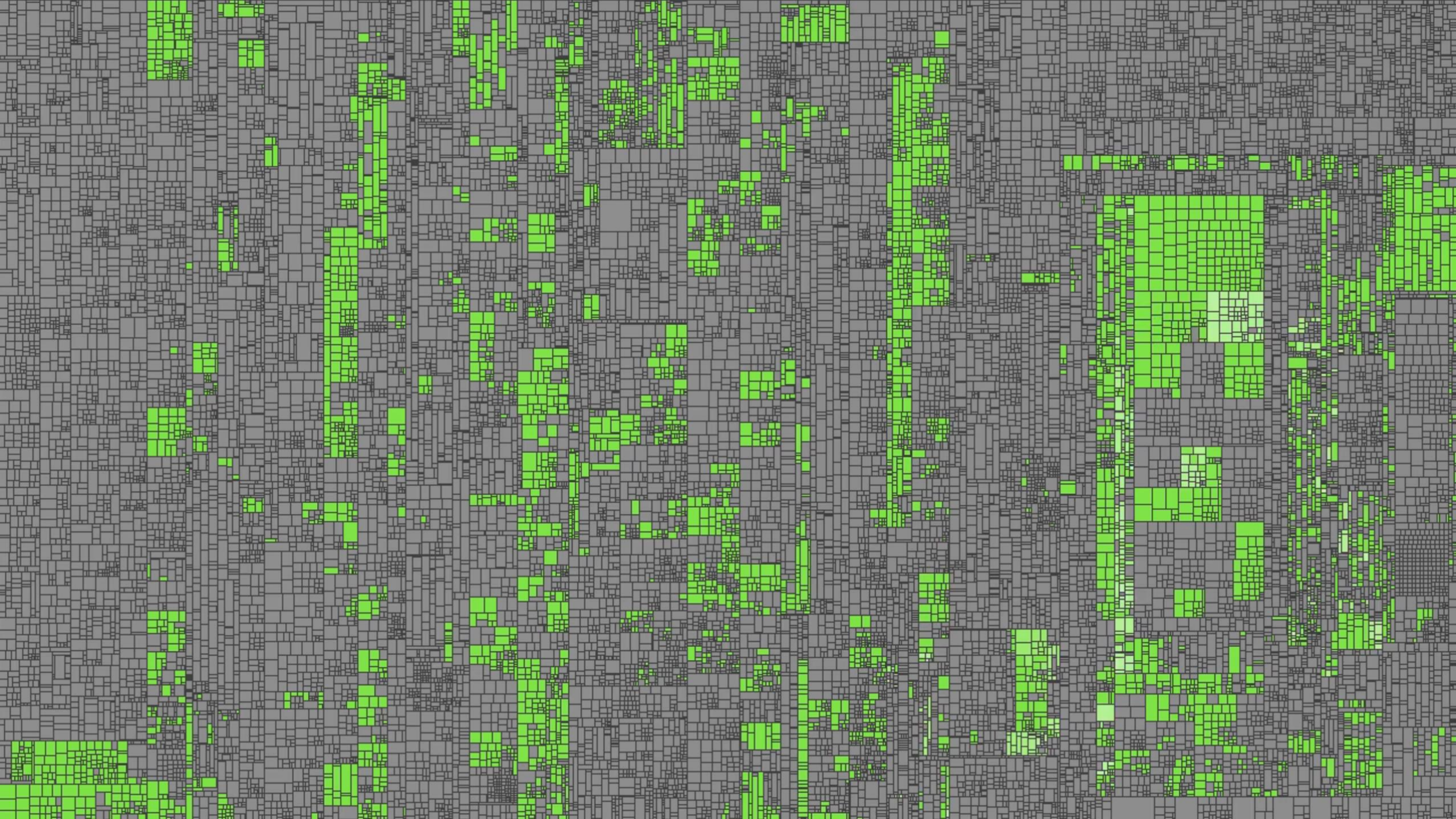




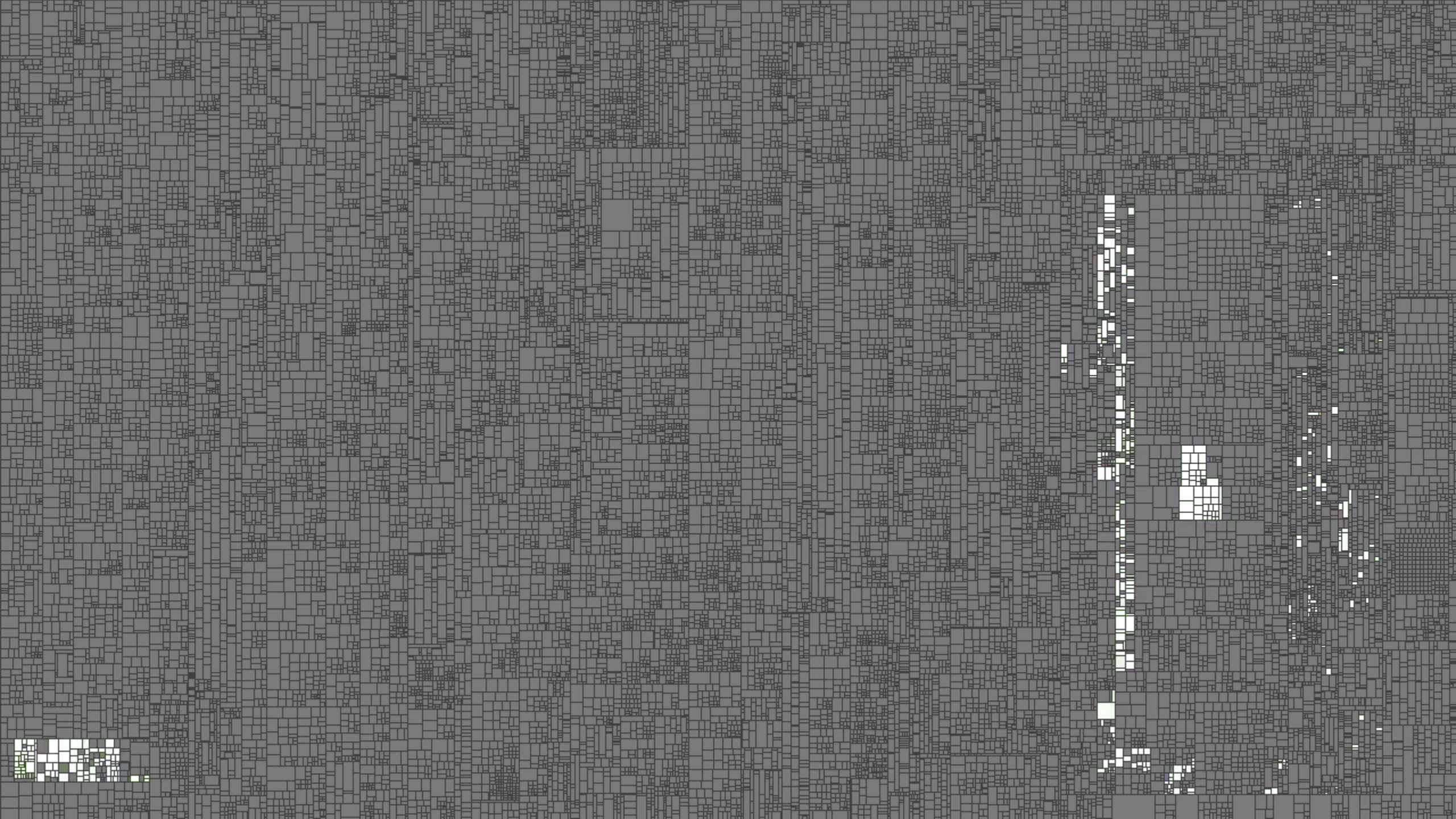
















# Data Flow Analysis can not handle java lambdas (logs many errors currently)

- Edit
- Comment
- Assign
- More ▾
- Back to New



## Details

Type:	<span style="color: red;">■</span> Bug	Status:	<span style="background-color: green; color: white; padding: 2px;">DONE</span> (View Workflow)
Priority:	<span style="color: orange;">↑</span> High	Resolution:	Green
Component/s:	Backend	Fix Version/s:	Teamscale 4.3
Labels:	<span style="border: 1px solid #ccc; padding: 2px;">dataflow</span> <span style="border: 1px solid #ccc; padding: 2px;">java</span>		
Affected Version:	master		
Merge Request:	<a href="https://git.cqse.eu/cqse/teamscale/merge_requests/2734">https://git.cqse.eu/cqse/teamscale/merge_requests/2734</a>		
PDash Task:	#4886		

## People

Assignee:	Andreas Sewe <a href="#">Assign to me</a>
Reporter:	Rainer Niedermayr
QA-Contact:	Alexander von Rhein
Votes:	<span style="border: 1px solid #ccc; border-radius: 50%; padding: 2px;">2</span> Vote for this issue
Watchers:	<span style="border: 1px solid #ccc; border-radius: 50%; padding: 2px;">3</span> Start watching this issue

## Description

Analysis profile: Java  
 Repository: JabRef, start revision 9efd23b71871747fe5e18e915e637891d7e55b6d

```

ERROR : An error occurred while trying to construct a CFG for function 'null' in element src/main/java/net/sf/jabref/exporter/layout/format/DOI
[STATEMENT: lambda expression: null (lines 33-33)
]
Tokens: doi . getURL ( )
Occurred in src/main/java/net/sf/jabref/exporter/layout/format/DOICheck.java:32-32 (com.teamscale.index.dataflow.DataFlowFindingsSynchronizer.c
org.conqat.engine.core.core.ConQATException: Could not find any rule that applies to the following entity list:
[STATEMENT: lambda expression: null (lines 33-33)
]
Tokens: doi . getURL ( )
Occurred in src/main/java/net/sf/jabref/exporter/layout/format/DOICheck.java:32-32
    at org.conqat.engine.sourcecode.dataflow.heuristics.ControlFlowCreator.findApplicableRule(ControlFlowCreator.java:164)
    at org.conqat.engine.sourcecode.dataflow.heuristics.ControlFlowCreator.transformOneStep(ControlFlowCreator.java:139)
    at org.conqat.engine.sourcecode.dataflow.heuristics.ControlFlowCreator.transform(ControlFlowCreator.java:92)

[...]

ERROR : An error occurred while trying to construct a CFG for function 'null' in element src/main/java/net/sf/jabref/exporter/layout/format/DOI
[STATEMENT: lambda expression: null (lines 31-31)
]
Tokens: doi . getDOI ( )
Occurred in src/main/java/net/sf/jabref/exporter/layout/format/DOIStrip.java:30-30 (com.teamscale.index.dataflow.DataFlowFindingsSynchronizer.c
org.conqat.engine.core.core.ConQATException: Could not find any rule that applies to the following entity list:

```

## Dates

Created:	24/Nov/16 8:35 AM
Updated:	4 days ago
Resolved:	08/May/18 12:42 PM

## Time Tracking

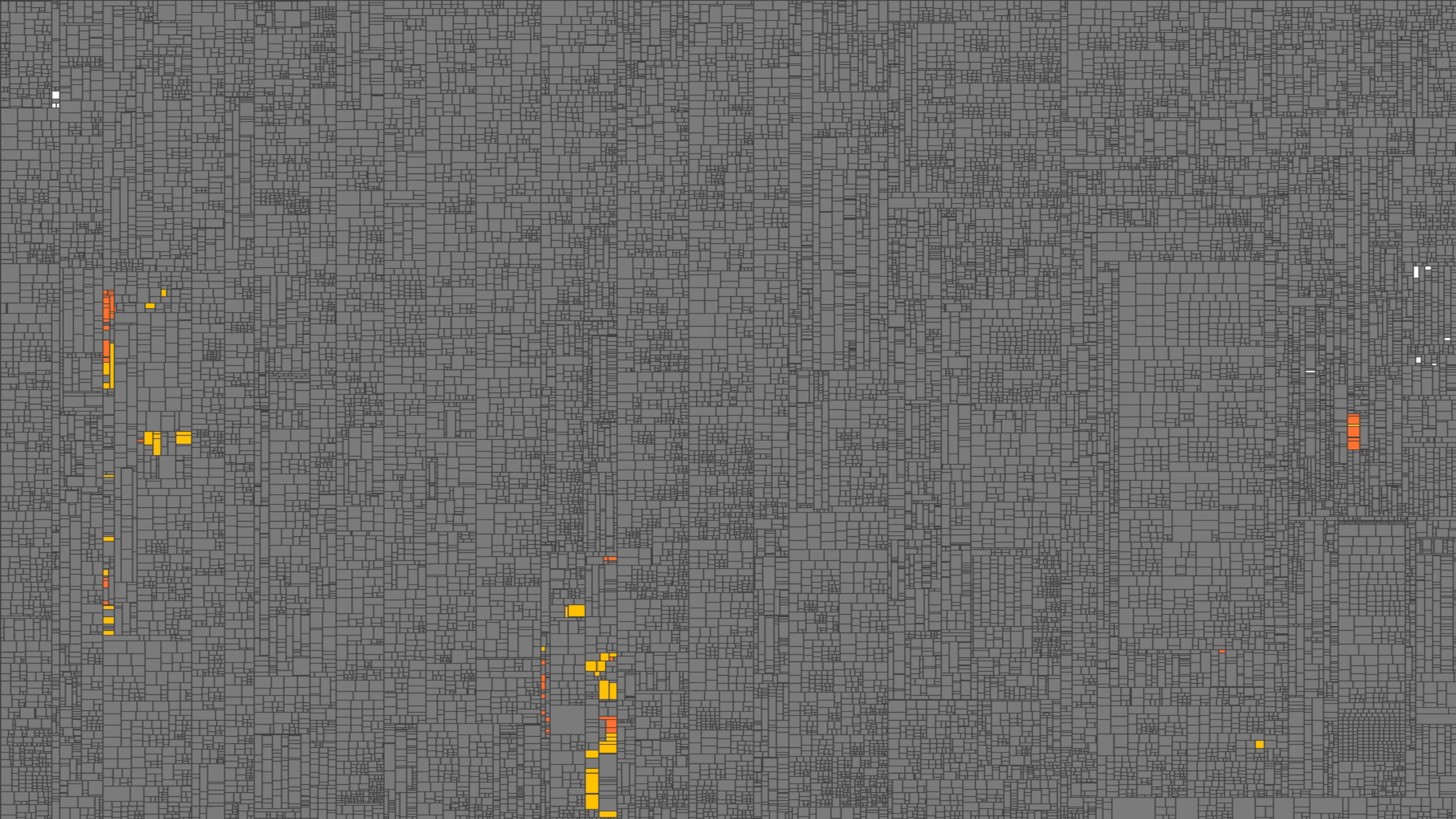
Estimated:	<div style="width: 100%; height: 10px; background-color: #ccc;"></div> Not Specified
Remaining:	<div style="width: 100%; height: 10px; background-color: #ccc;"></div> 0m
Logged:	<div style="width: 100%; height: 10px; background-color: #4CAF50;"></div> 4d 1h 57m

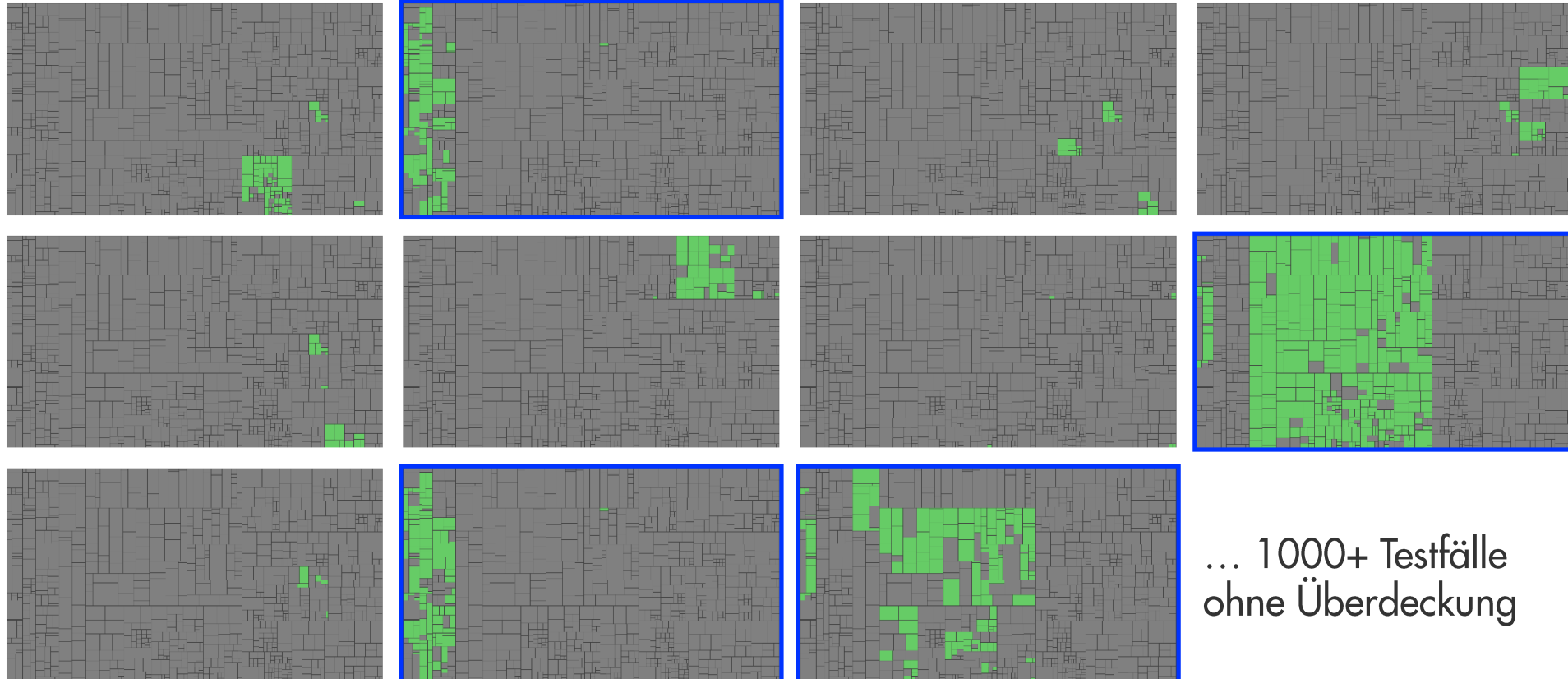
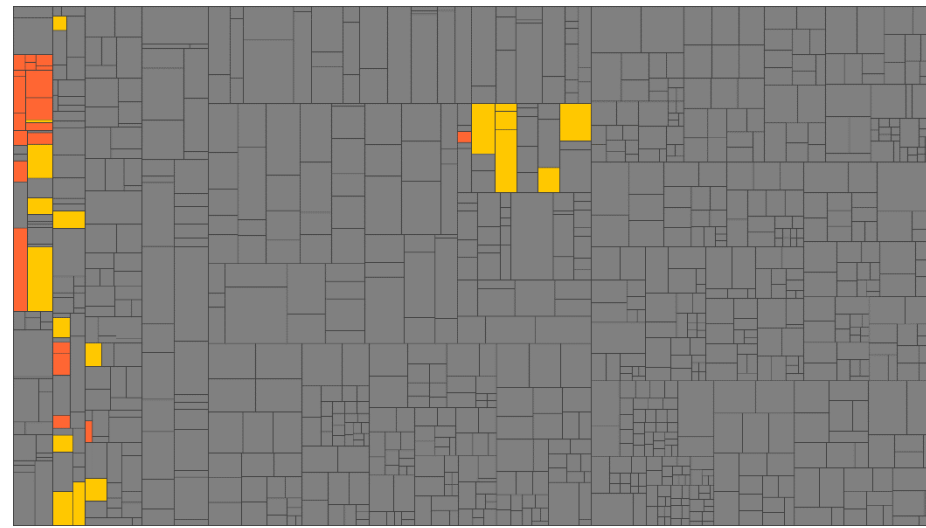
## Agile

[View on Board](#)

## Gitlab CI

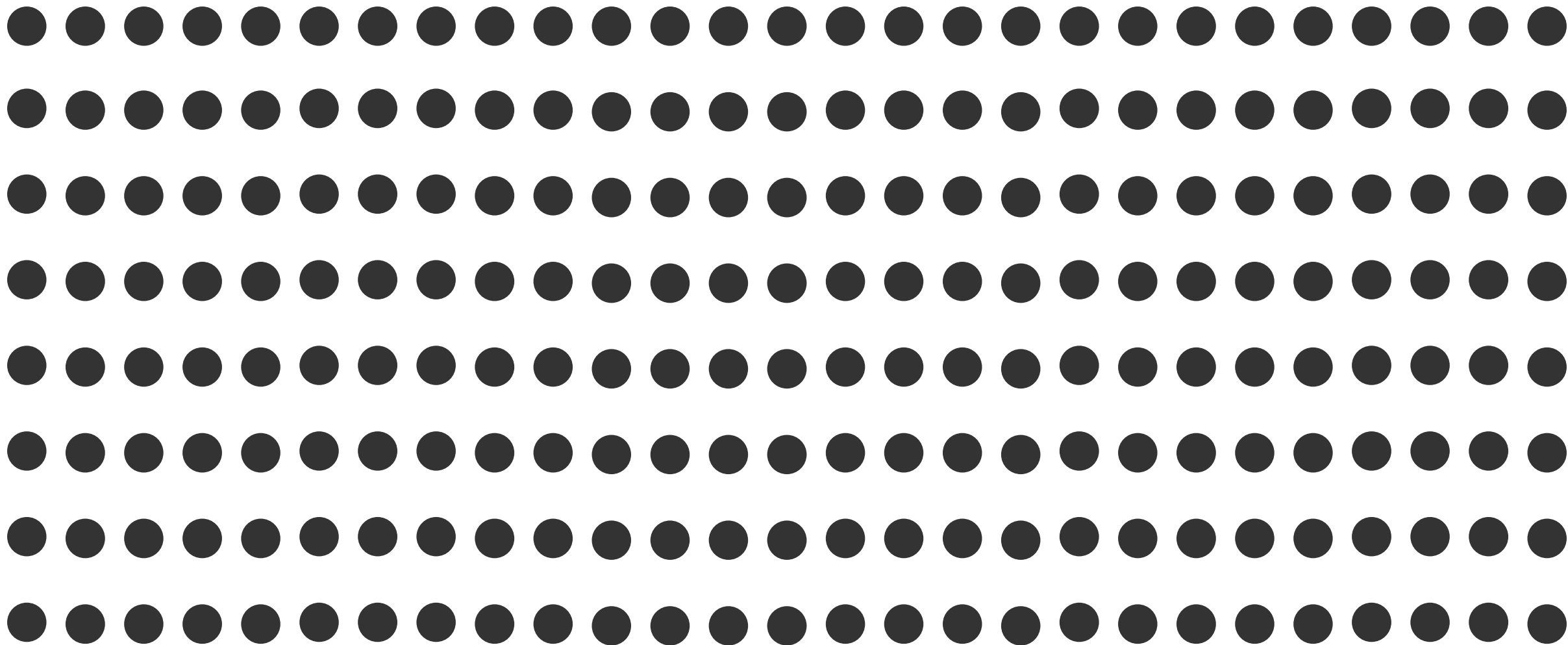






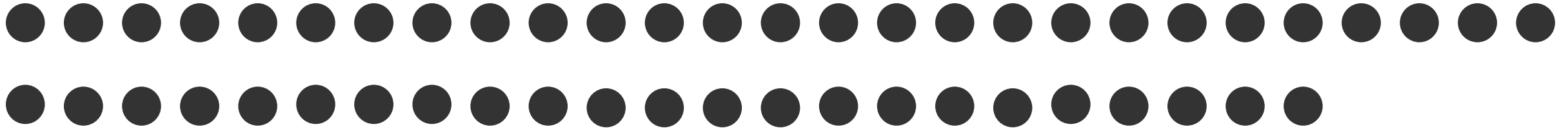
... 1000+ Testfälle  
ohne Überdeckung





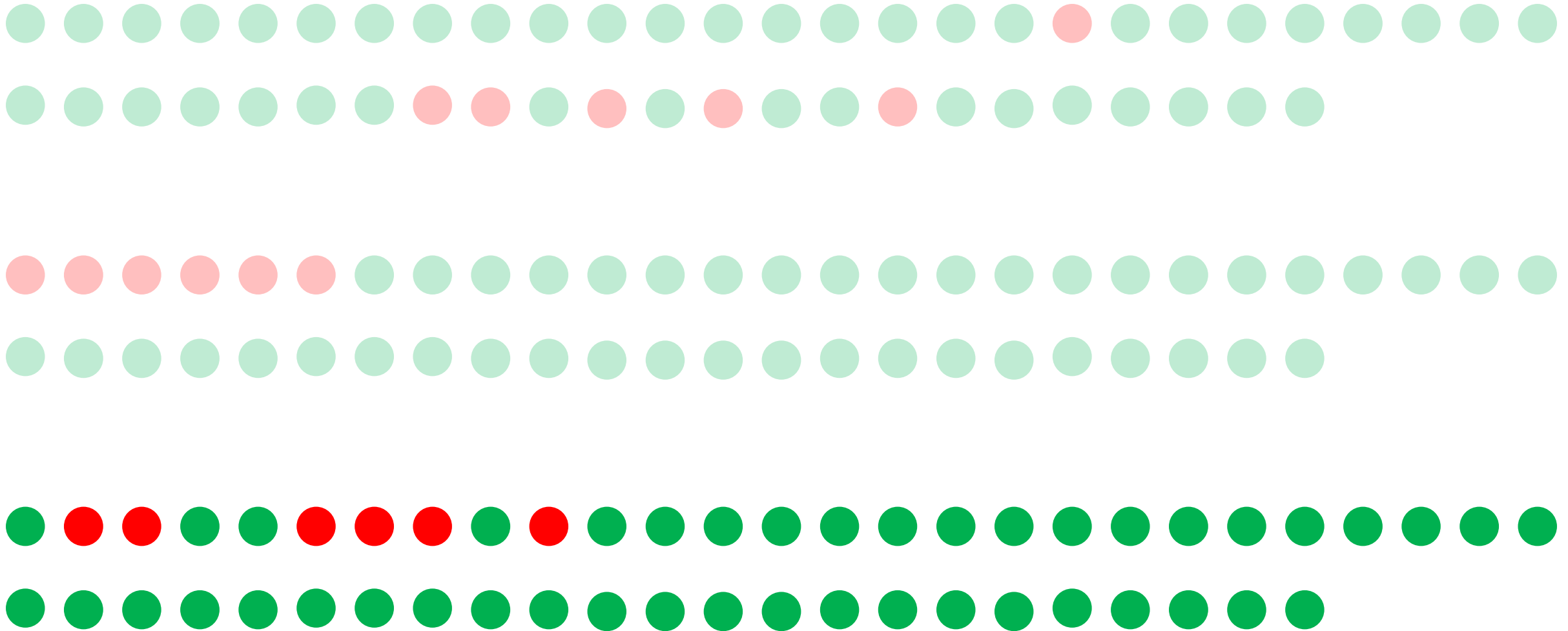


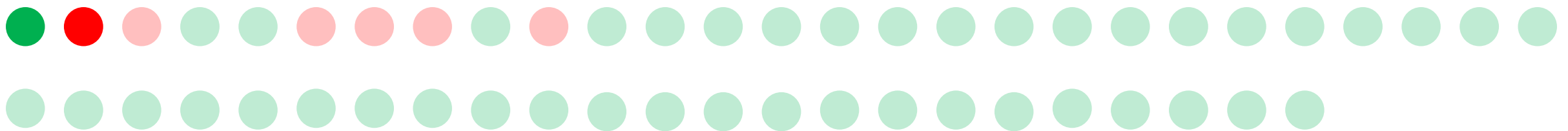
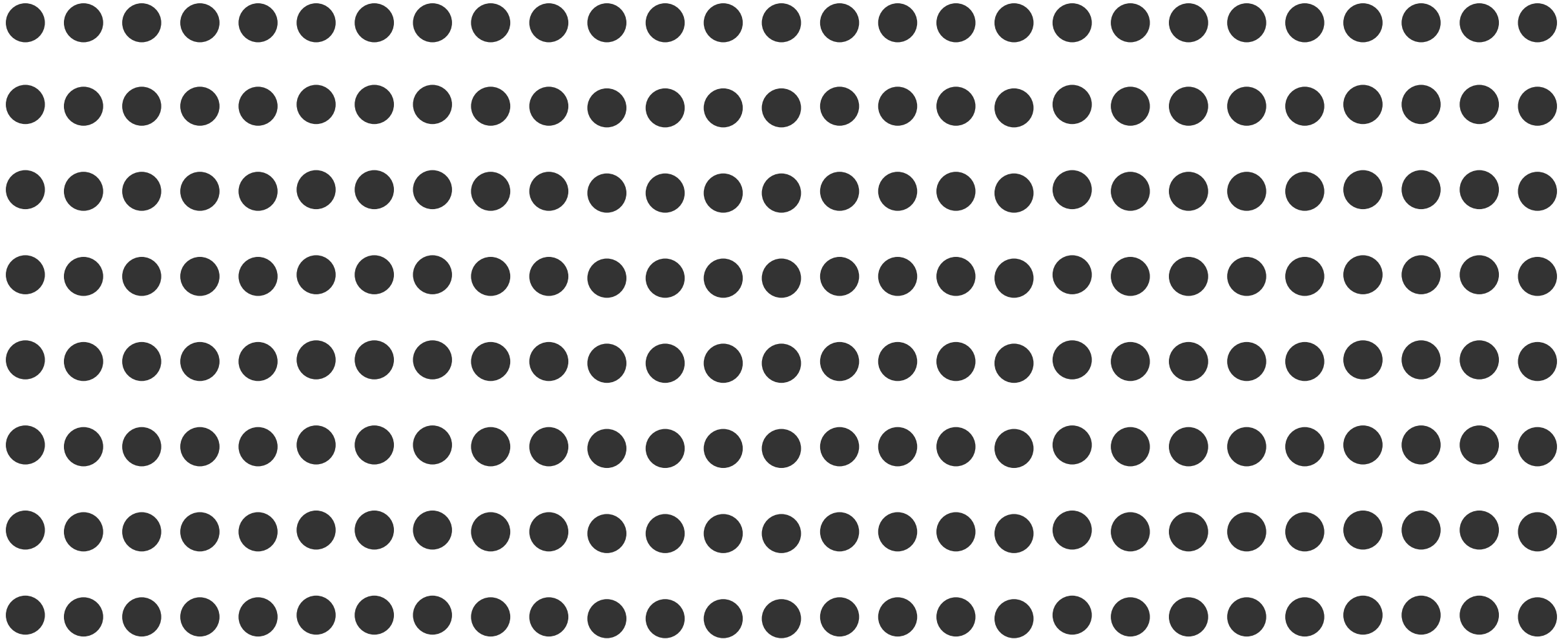
# Schritt 1: Selektion betroffener Testfälle





## Schritt 2: Priorisierung selektierter Testfälle



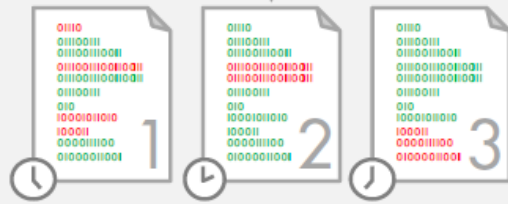




Alle Tests



Testumgebung



Testfallspezifische  
Coverage und Laufzeiten



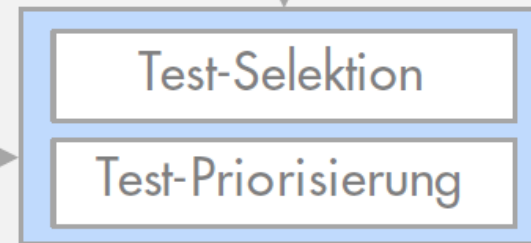
1



Versionskontrollsystem



Änderungen



Änderungsrelevante,  
geordnete Teilmenge  
der Tests



2



# Grenzen von Test-Impact-Analyse

- Manche Änderungen betreffen alle Tests
  - Änderungen von Konfigurationsinformation
  - Änderungen an Testdaten
- Wenn sich die Tests selbst ändern, müssen sie erneut ausgeführt werden
- Es gibt keine Garantie, dass die selektierten Tests alle Fehler finden

⇒ In regelmäßigen Abständen alle Tests ausführen

⇒ Hält testfallspezifische Coverage-Daten aktuell

## EINSPARUNG DURCH AUSFÜHRUNG DER IMPACTED TESTS

Studienobjekt	Laufzeit (ms)		Ersparnis
	Alle Tests	Impacted Tests	
Apache Commons Collections	25.277		
Apache Commons Lang	24.987	3.111	87,55%
Apache Commons Math	160.391	114.042	28,90%
Histone Template Engine 2	34.603	32.204	6,93%
JabRef	119.849	40.721	66,02%
Joda-Time	20.782	1.297	93,76%
Lightweight-Stream-API	1.523	480	68,48%
LittleProxy	155.334	150.406	3,17%
OkHttp	96.671	76.457	20,91%
RxJava	464.018	170.575	63,24%
Symia Commons Math Parser	528	528	0,00%
Teamscale	1.249.088	196.684	84,25%

Einsparung bei Erkennung aller fehlschlagenden Tests schwankt stark

PROZENTUALER ANTEIL ERKANNTER FEHLERHAFTER  
SYSTEMVERSIONEN NACH ANTEIL TESTZEIT

Studienobjekt	1%	2%	5%	10%
Apache Commons Collections	84,25	96,58	99,83	100,00
Apache Commons Lang	94,23	96,43	98,49	99,31
Apache Commons Math	80,20	85,92	91,55	92,96
Histone Template Engine 2	88,46	88,46	88,46	88,46
JabRef	95,71	95,71	95,71	95,71
Joda-Time	98,10	98,61	99,11	99,87
Lightweight-Stream-API	60,76	90,73	94,74	97,25
LittleProxy	74,29	77,14	80,00	80,00
OkHttp	90,70	90,70	90,70	96,51
RxJava	91,89	94,59	94,59	94,59
Symia Commons Math Parser	78,46	86,15	89,23	89,23
Teamscale	91,86	95,93	96,57	96,57

Einsparung bei Erkennung erster fehlschlagender Test sehr stabil!

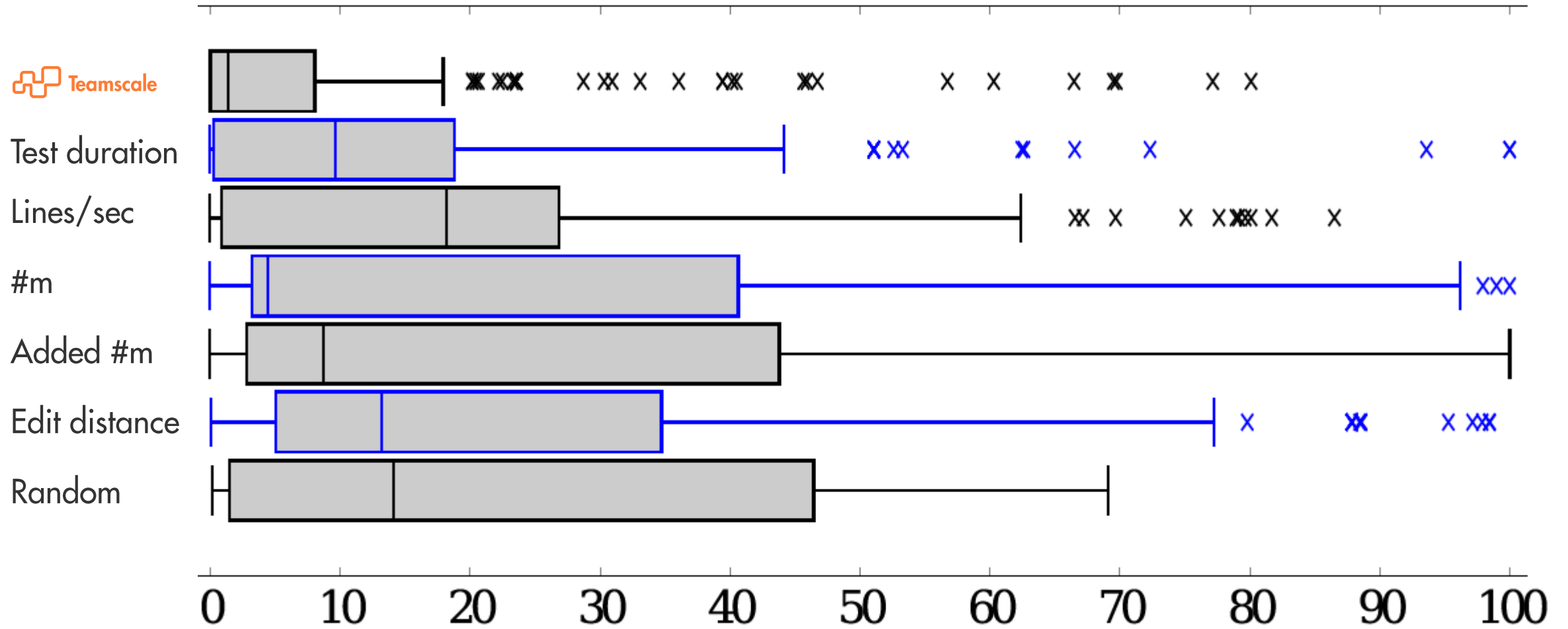


80% der fehlerhaften Builds in 1% der Zeit erkannt

90% der fehlerhaften Builds in 2% der Zeit erkannt











<https://www.technica-engineering.de/produkte/bts-body-electronic-test-system/>



# Evaluierung im HIL-Test



<https://www.technica-engineering.de/produkte/bts-body-electronic-test-system/>

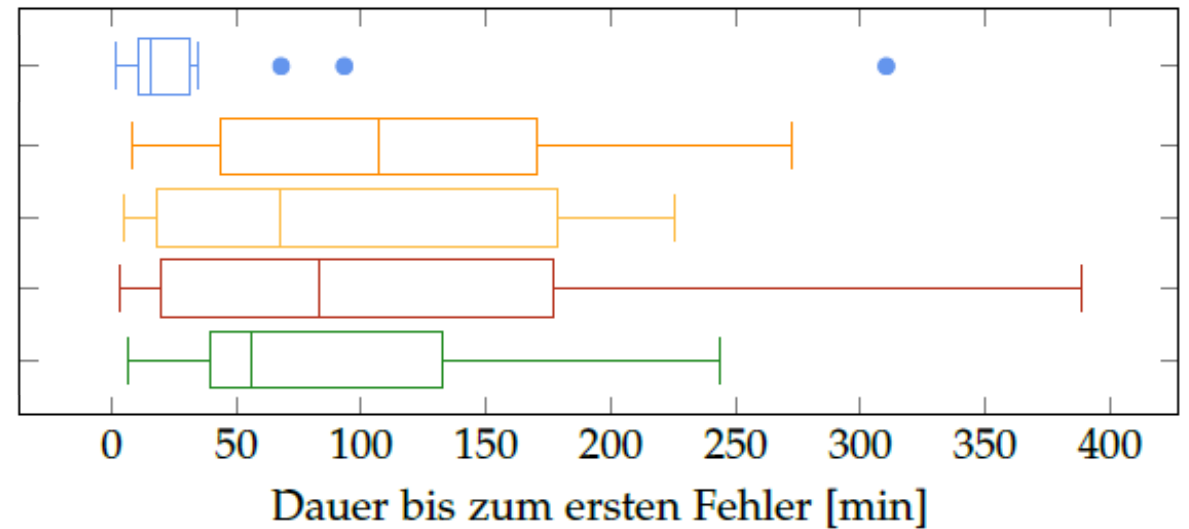
 Teamscale

#m / sec

Random

Duration

Duration desc

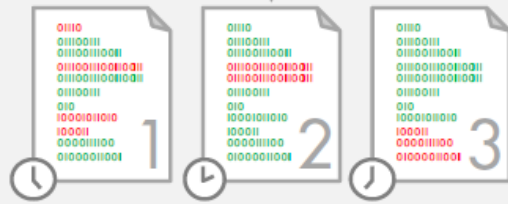




Alle Tests



Testumgebung



Testfallspezifische  
Coverage und Laufzeiten



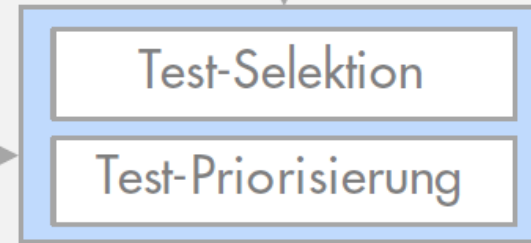
1



Versionskontrollsystem



Änderungen

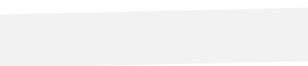
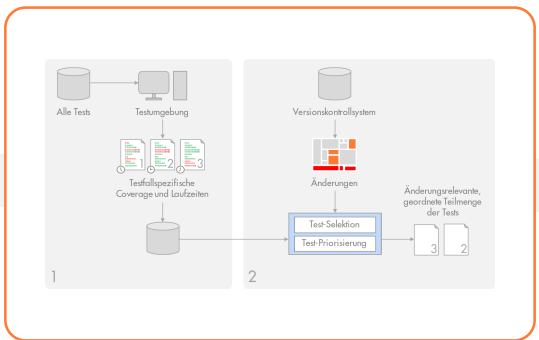
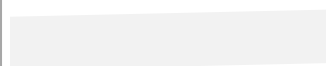


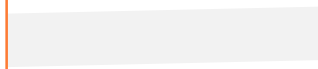
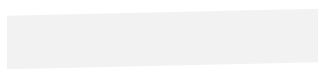
Änderungsrelevante,  
geordnete Teilmenge  
der Tests



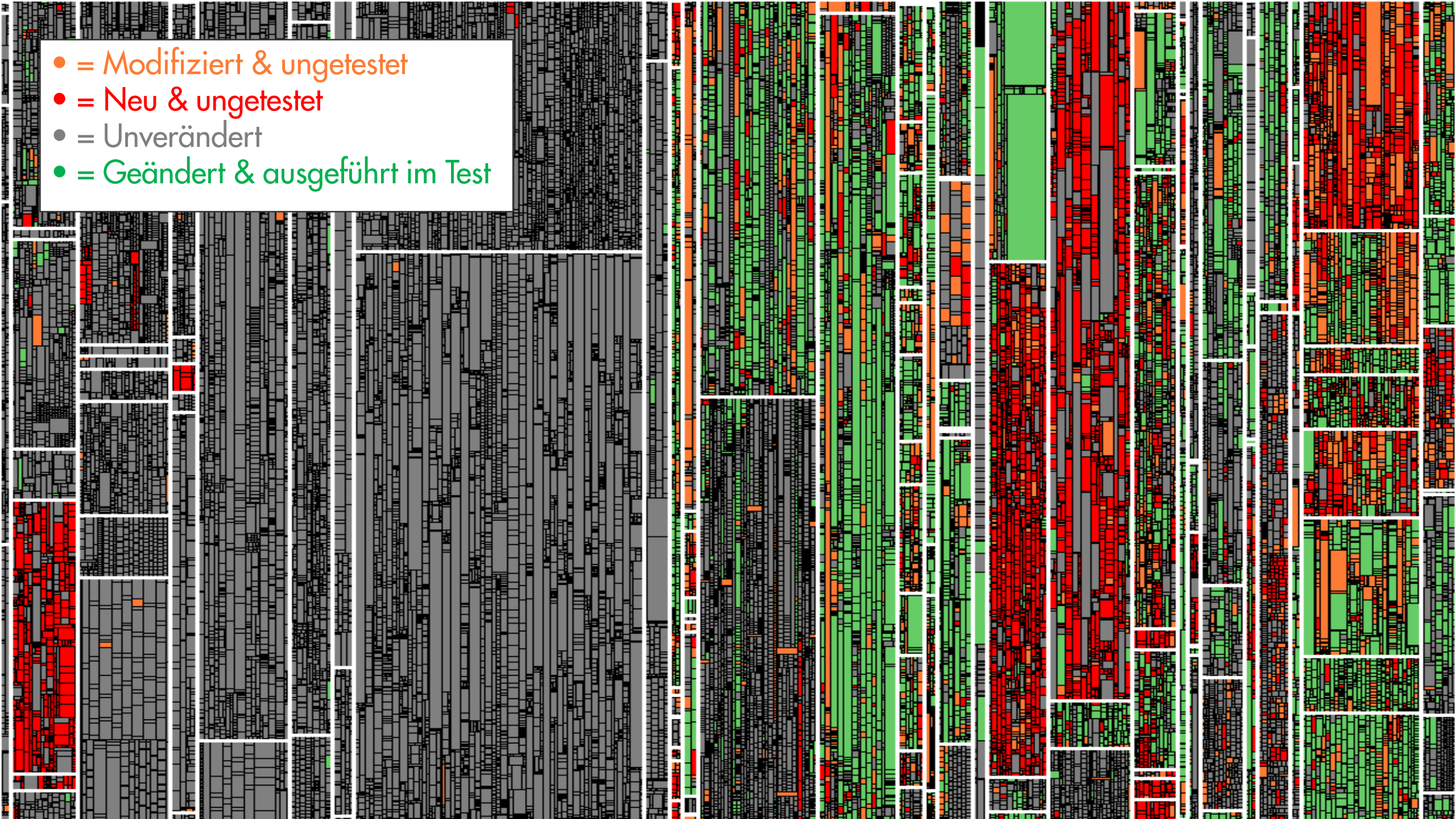
2





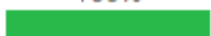
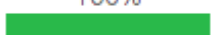
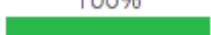
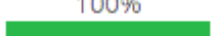
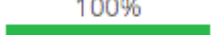
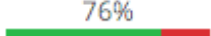




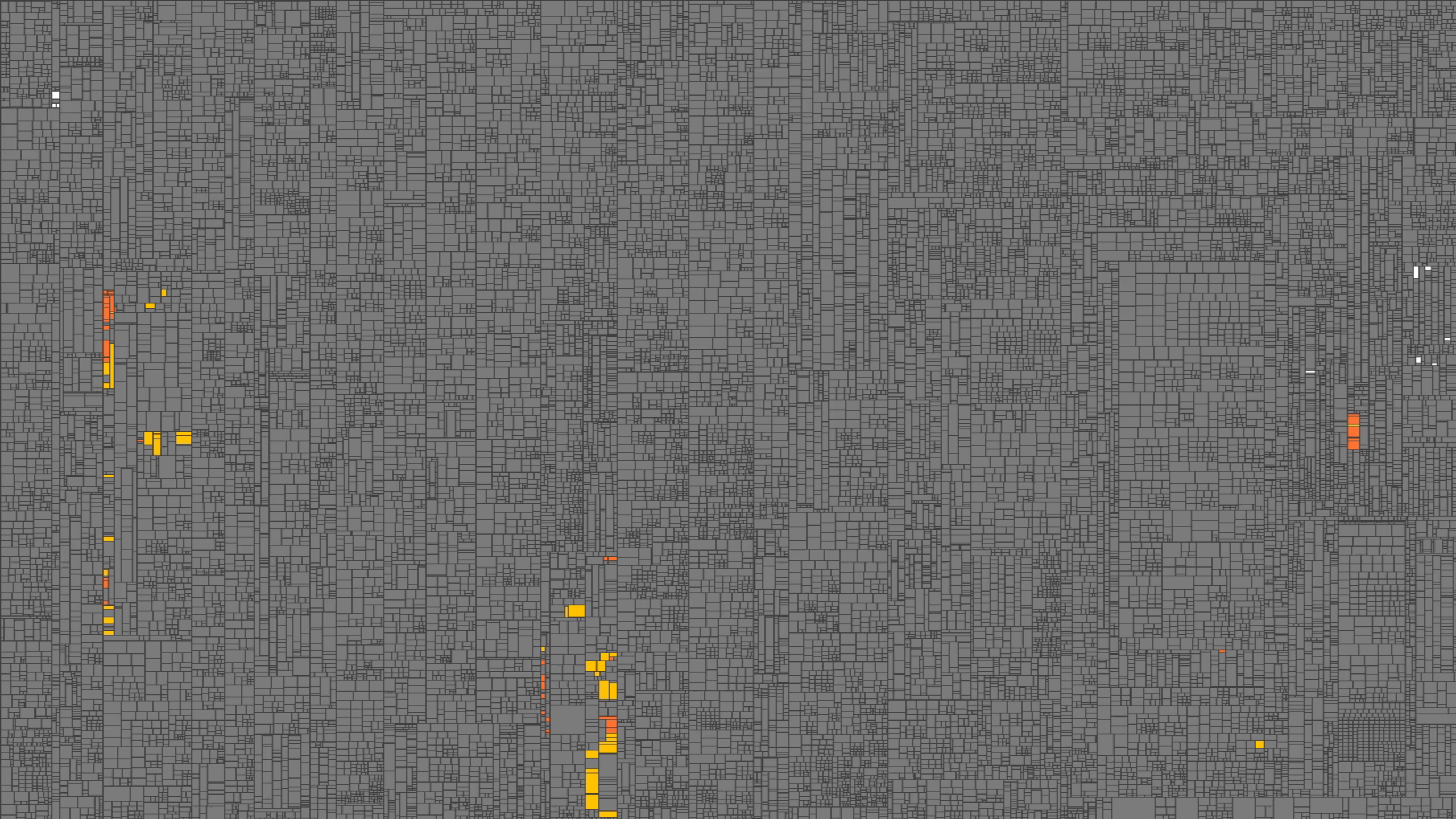


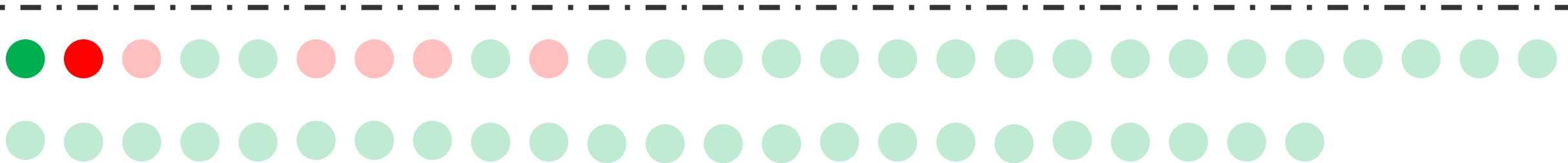
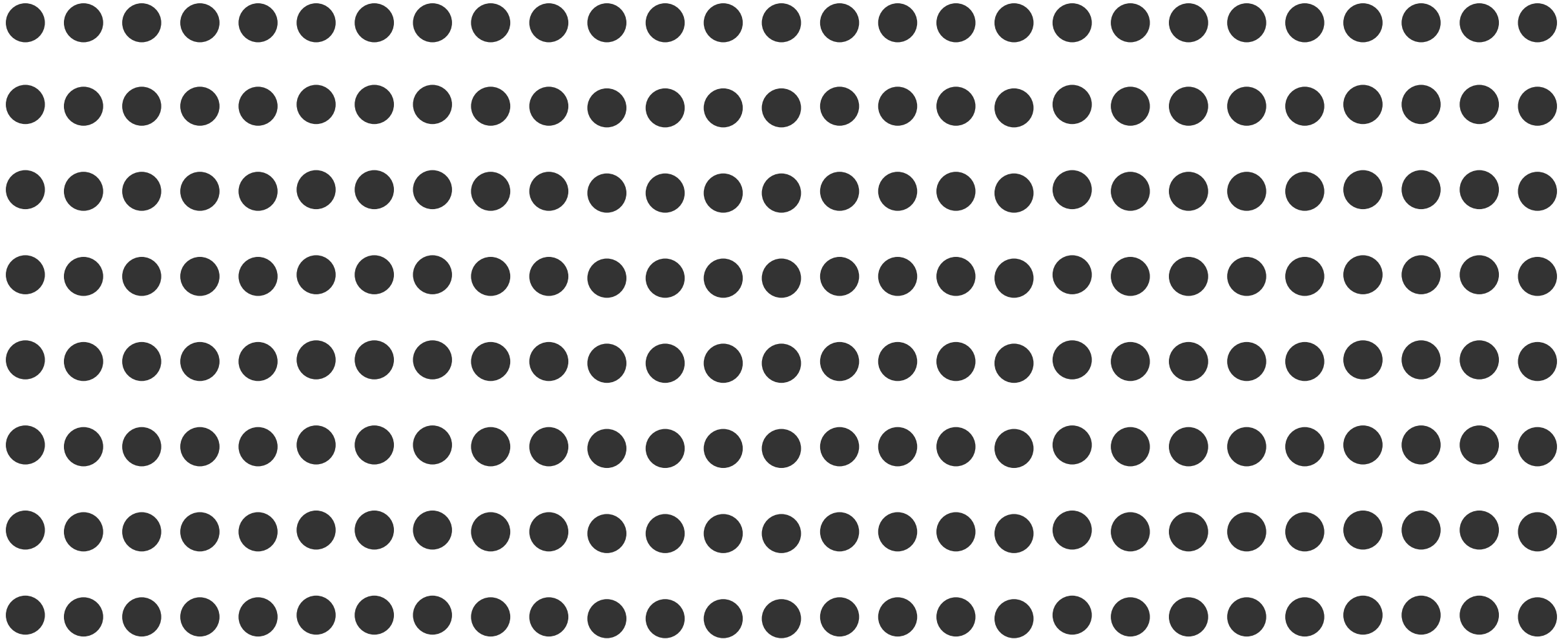
- = Modifiziert & ungetestet
- = Neu & ungetestet
- = Unverändert
- = Geändert & ausgeführt im Test



Issue #	Subject	Ticket Coverage
<a href="#">TS-13689</a>	Undo/Redo for web-based architecture editor	70% 
<a href="#">TS-13701</a>	Implement metric 'Nesting Depth' for Simulink	35% 
<a href="#">TS-13704</a>	Fix long method finding in TaintAnalysisRunner	100% 
<a href="#">TS-13714</a>	External findings are not registered during first upload	100% 
<a href="#">TS-13727</a>	Manual test coverage upload during development	100% 
<a href="#">TS-13731</a>	Tool for transferring Finding Blacklists and Tasks (w/ Findings) between instances	100% 
<a href="#">TS-13734</a>	Cannot set/alter alias without reanalysis	100% 
<a href="#">TS-13735</a>	Fetch parent relationship of TFS Work Items	100% 
<a href="#">TS-13742</a>	Show data timestamp in project analysis warning	100% 
<a href="#">TS-13766</a>	Get rid of ESLintFindingsSynchronizer and TSLintFindingsSynchronizer blocks	76% 







80% der fehlerhaften Builds in 1% der Zeit erkannt

90% der fehlerhaften Builds in 2% der Zeit erkannt



# Kontakt – Wir freuen uns auf Diskussionen 😊



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