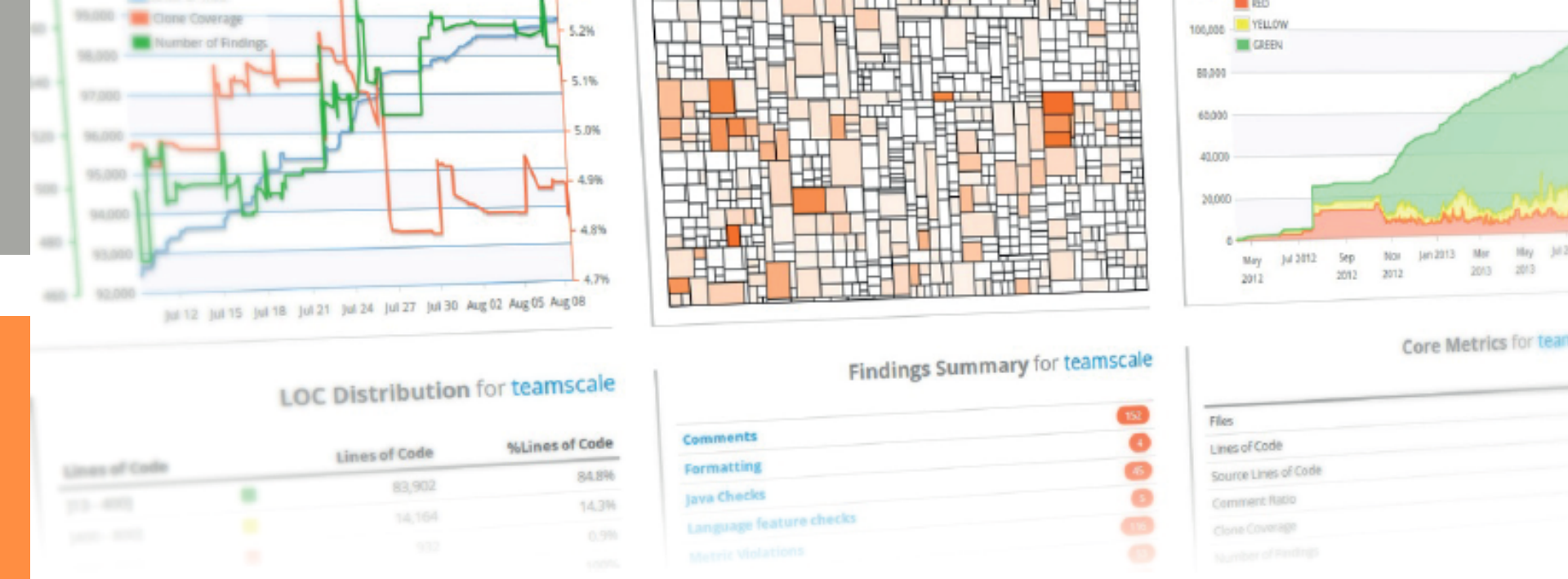


Was kann man aus der Versionshistorie eines Softwaresystems lernen?

JUG Hamburg - 15. Februar 2017

Dr. Dennis Pagano
@dennispagano

CQSE
Continuous Quality in Software Engineering

Ausschnitt aus meiner Historie

Forschung

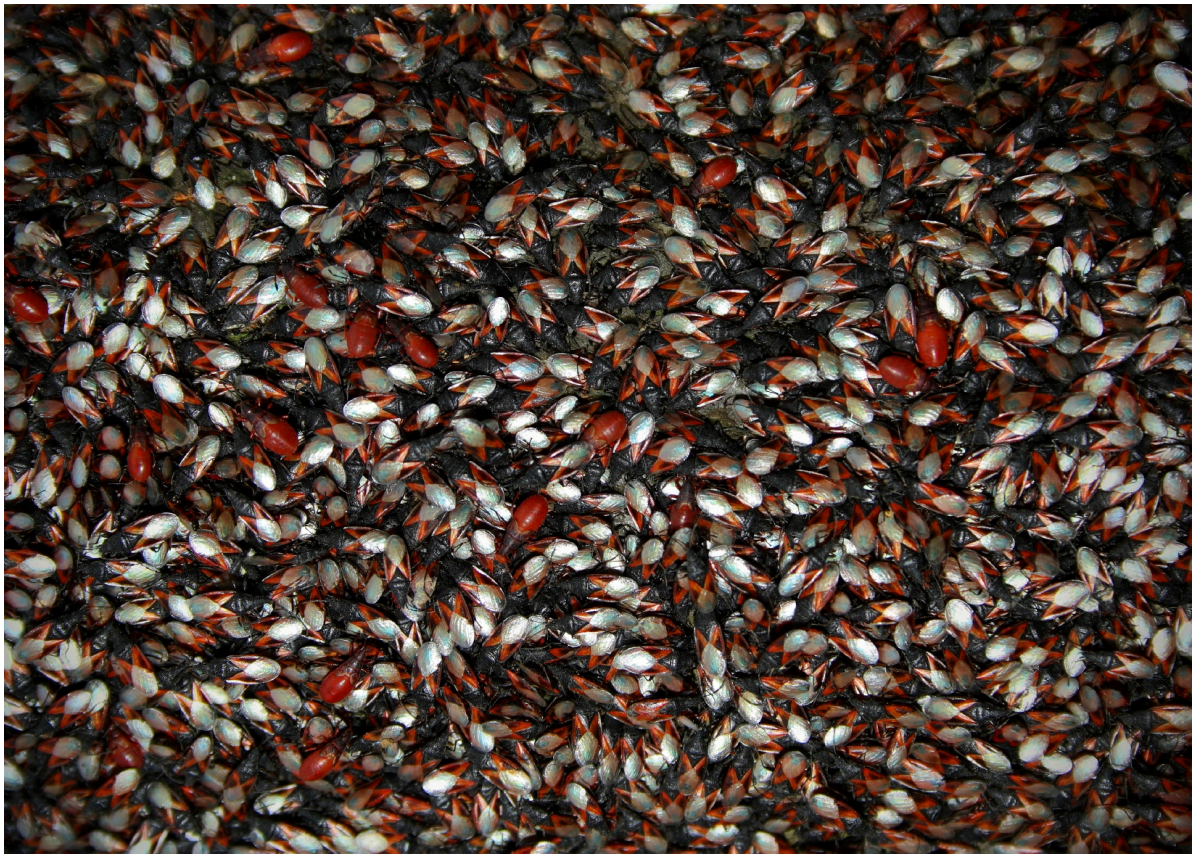
- Analyse von Open Source Communities
- Historie von Code und Kommunikationsartefakten
- Kontinuierliches Einbeziehen von Nutzerfeedback in die Entwicklung

Praxis

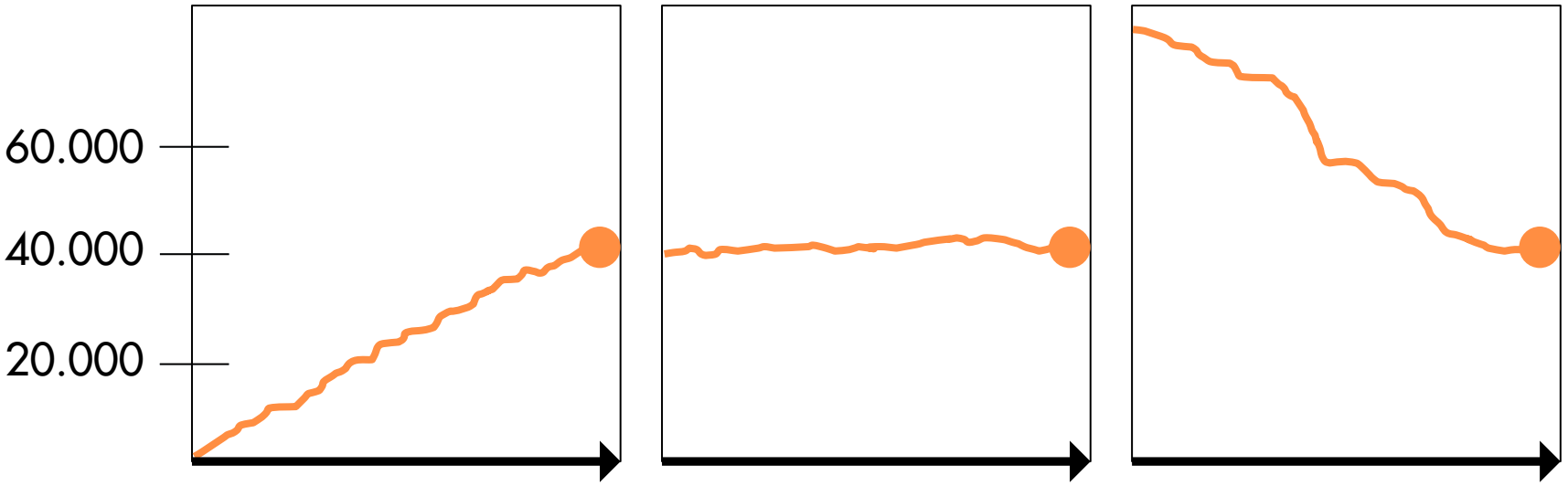
- Software Audits: Qualitätsbewertung
- Quality und Test Control
- Entwicklung: Historisierte Qualitätsanalysen in Echtzeit

CQSE

Hilfe, unser System hat 42.000 Findings!

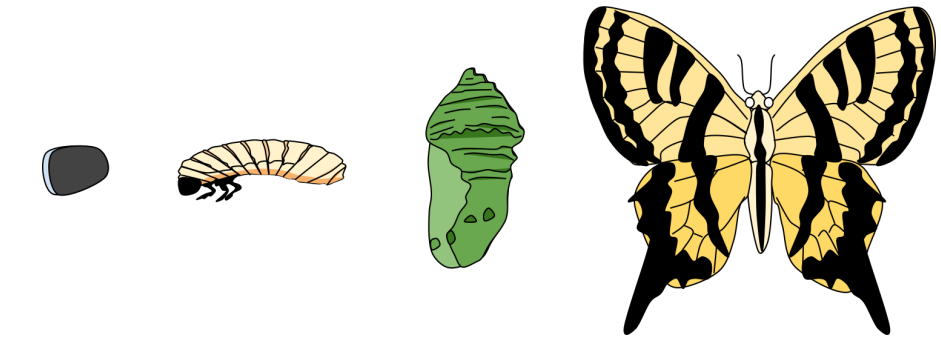


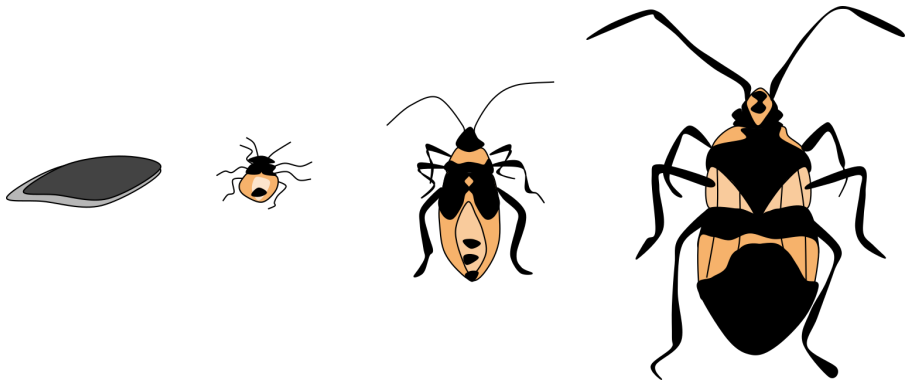
Sind 42.000 Findings schlecht?

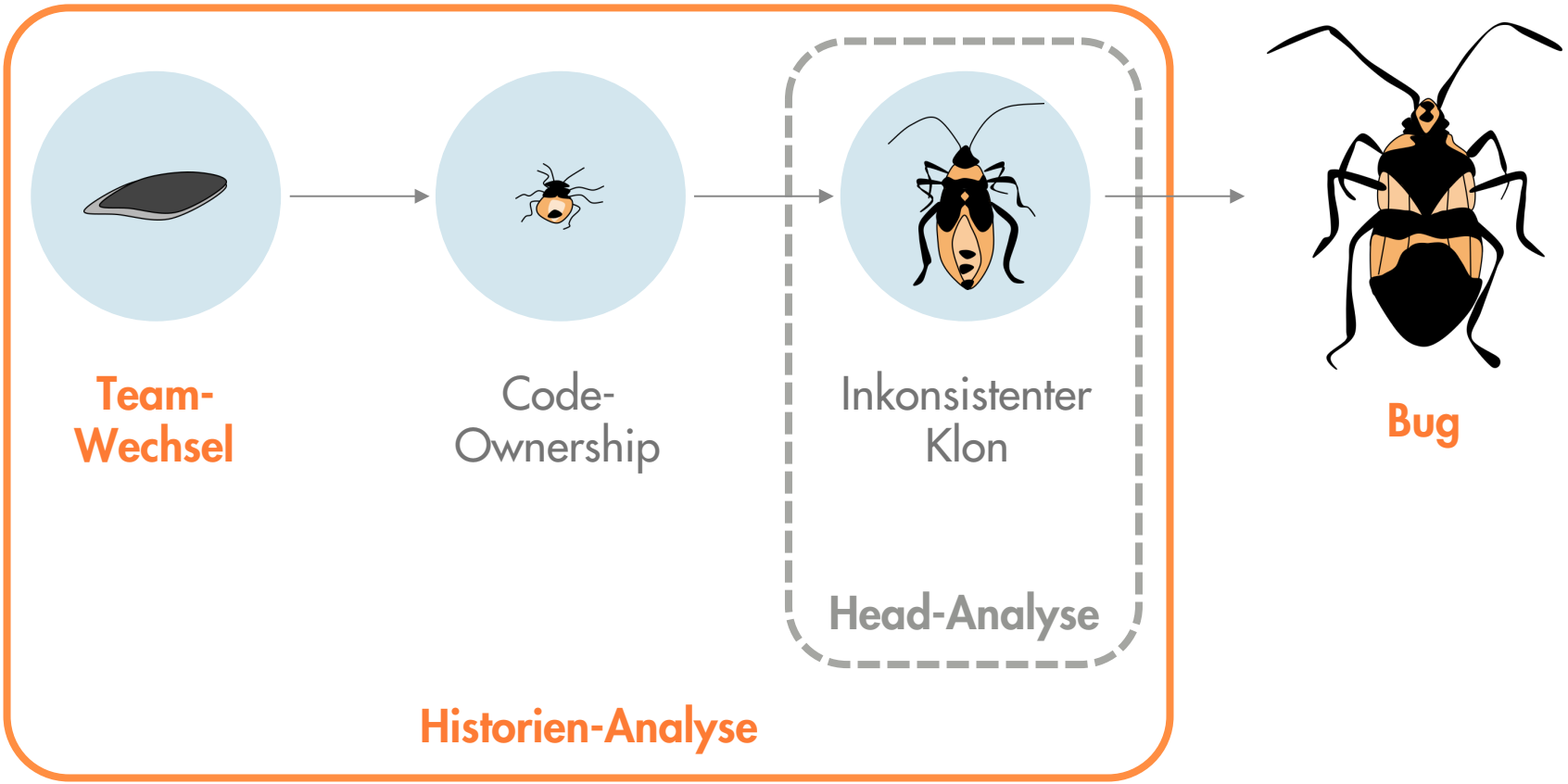


Qualitätsziel?

Die Entstehung der aktuellen Version ist entscheidend für die richtige Reaktion



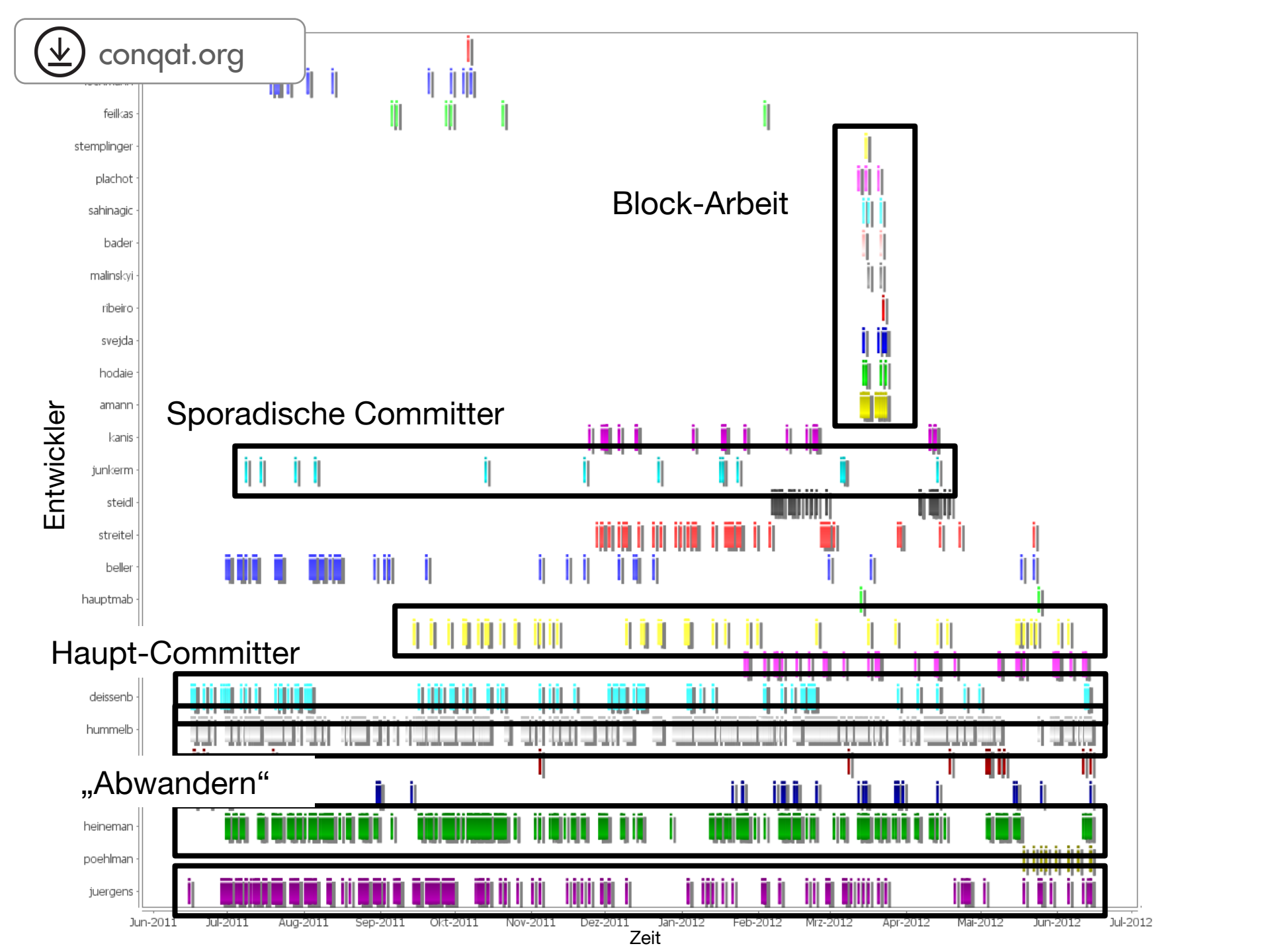



Team-
Wechsel
Code-
Ownership
Inkonsistenter
Klon
Head-Analyse
Historien-Analyse
Bug

Agenda

1. Welche Probleme verrät die Historie?
2. Was kann man im eigenen Projekt machen?

Die Historie verrät, wie sich das Team entwickelt hat.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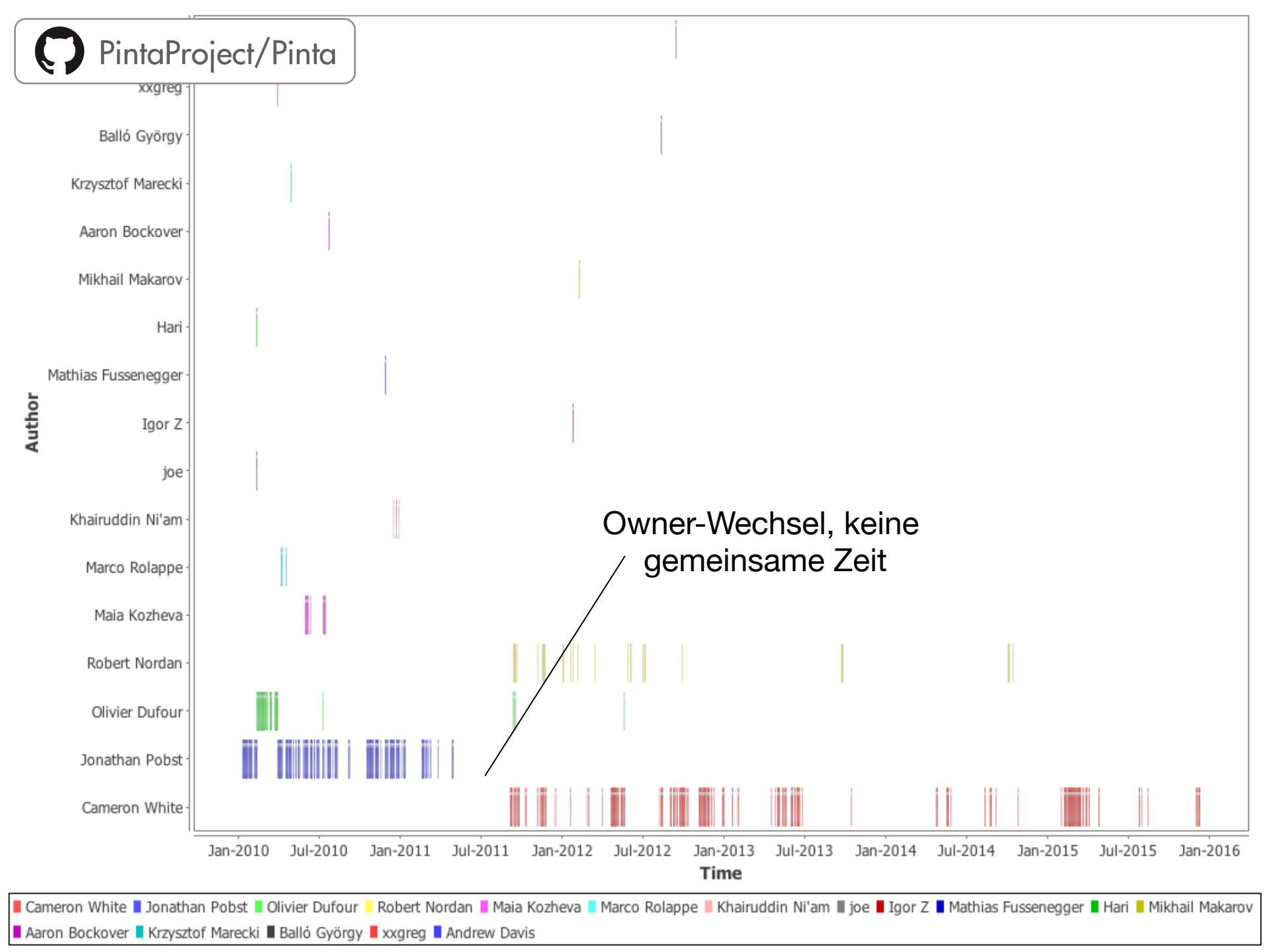
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Igor Z
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Maia Kozheva
Robert Nordan
Olivier Dufour
Jonathan Pobst
Cameron White
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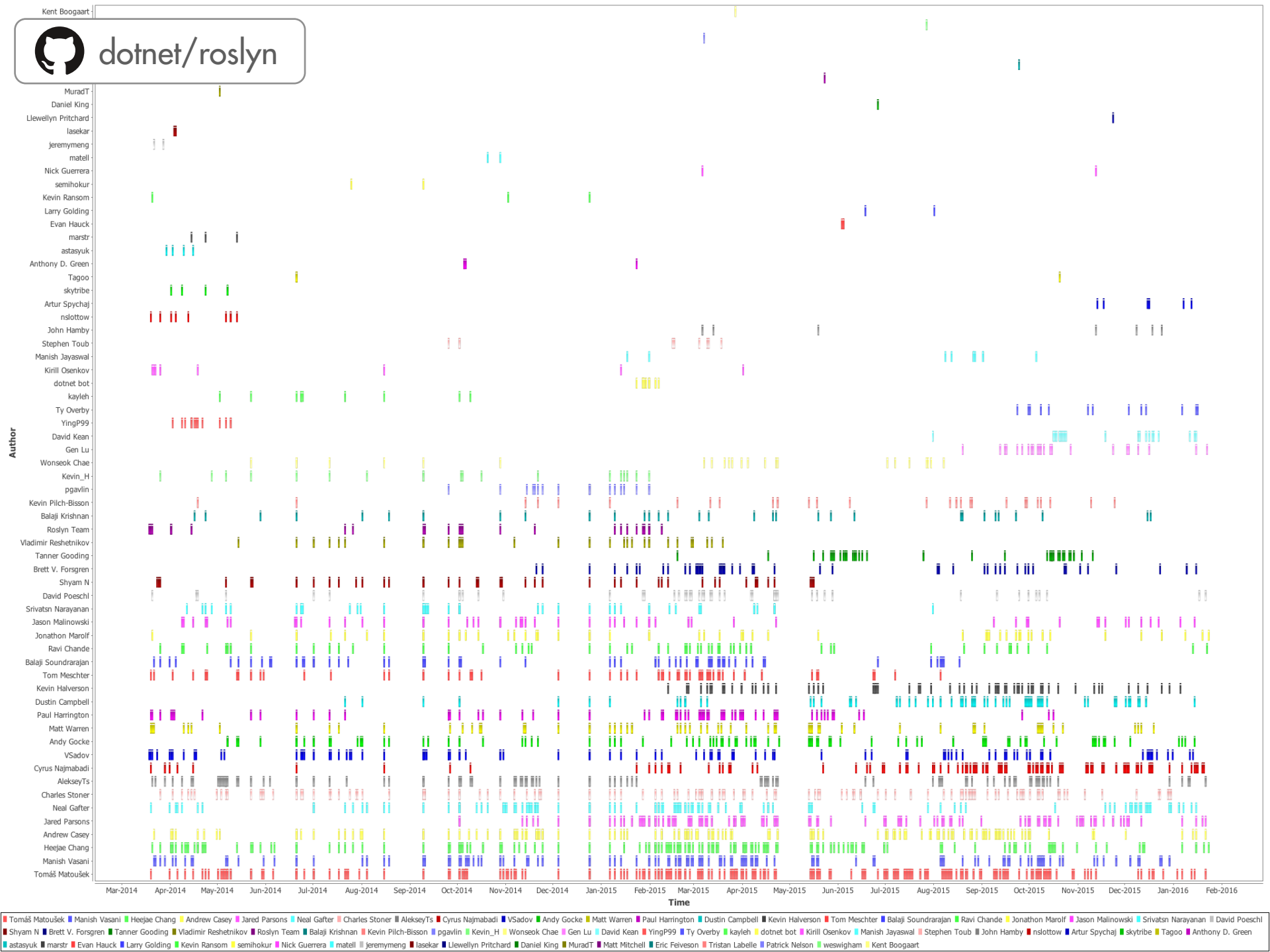
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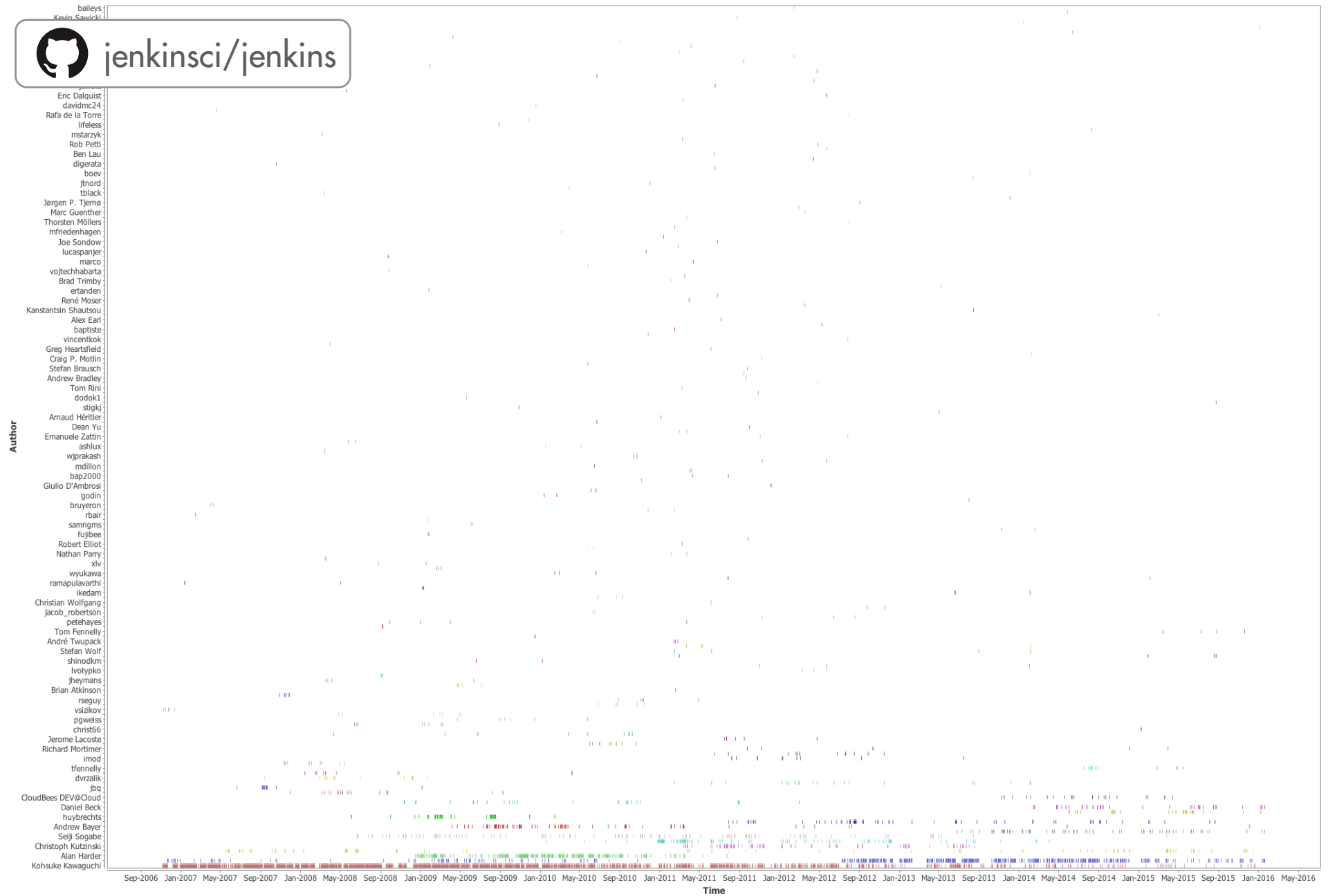
astasyuk marstr Evan Hauck Larry Golding Kevin Ransom semihokur Nick Guerrera matell jeremymeng lasekar Llewellyn Pritchard Daniel King MuradT Matt Mitchell Eric Feiveson Tristan Labelle Patrick Nelson weswigham Kent Boogaart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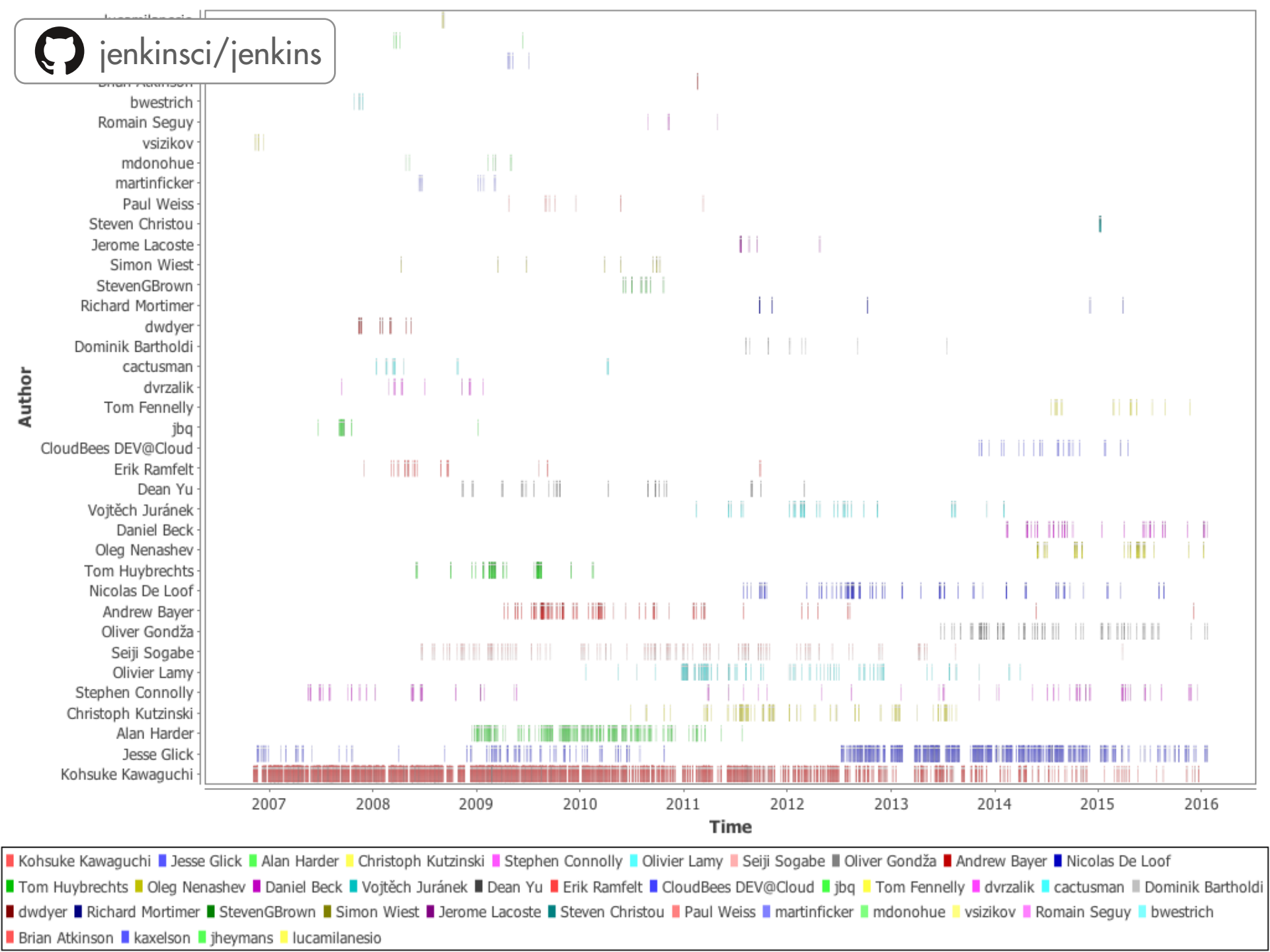
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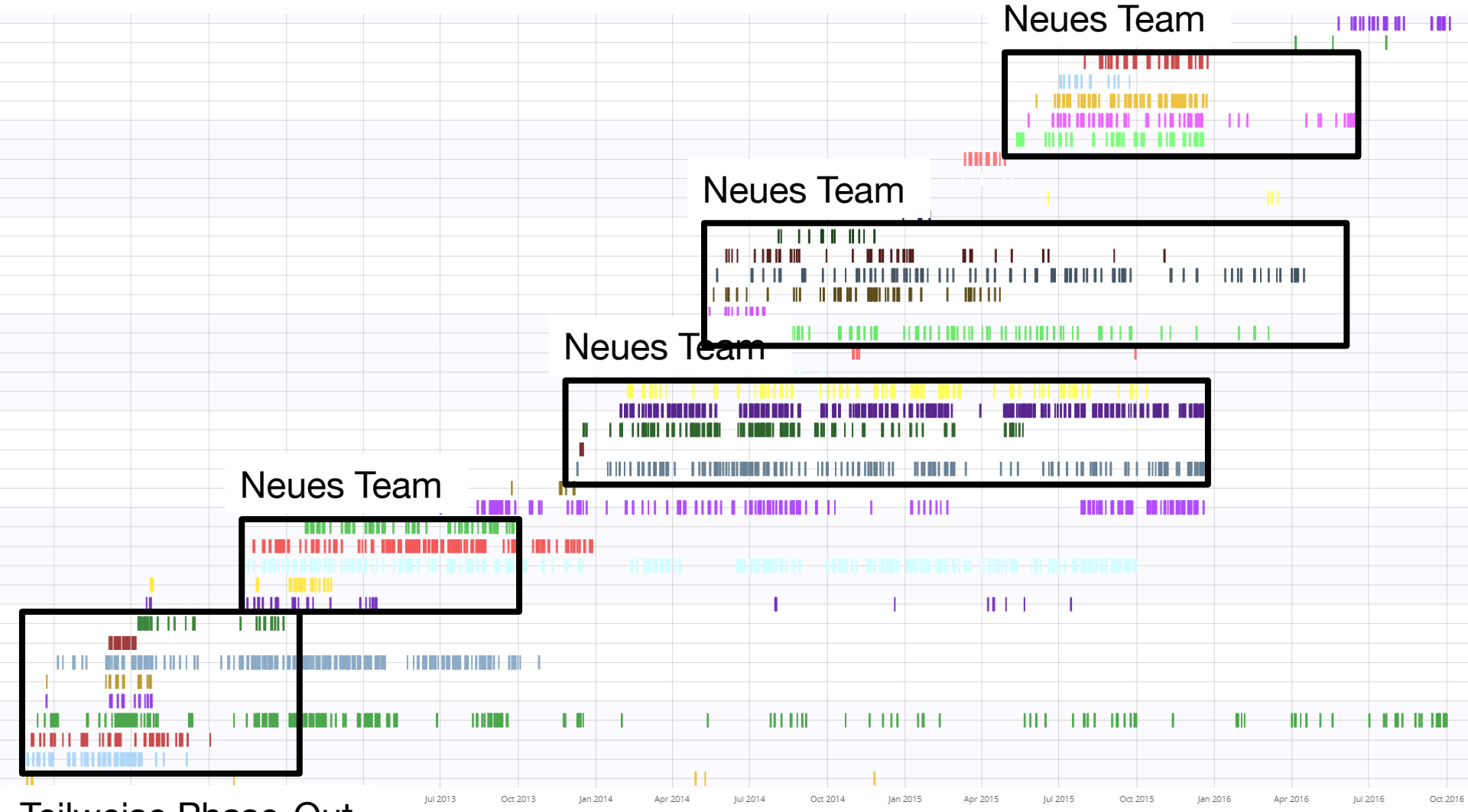
Kundenprojekt (C#)

Kundenprojekt (C#)



Teilweise Phase-Out

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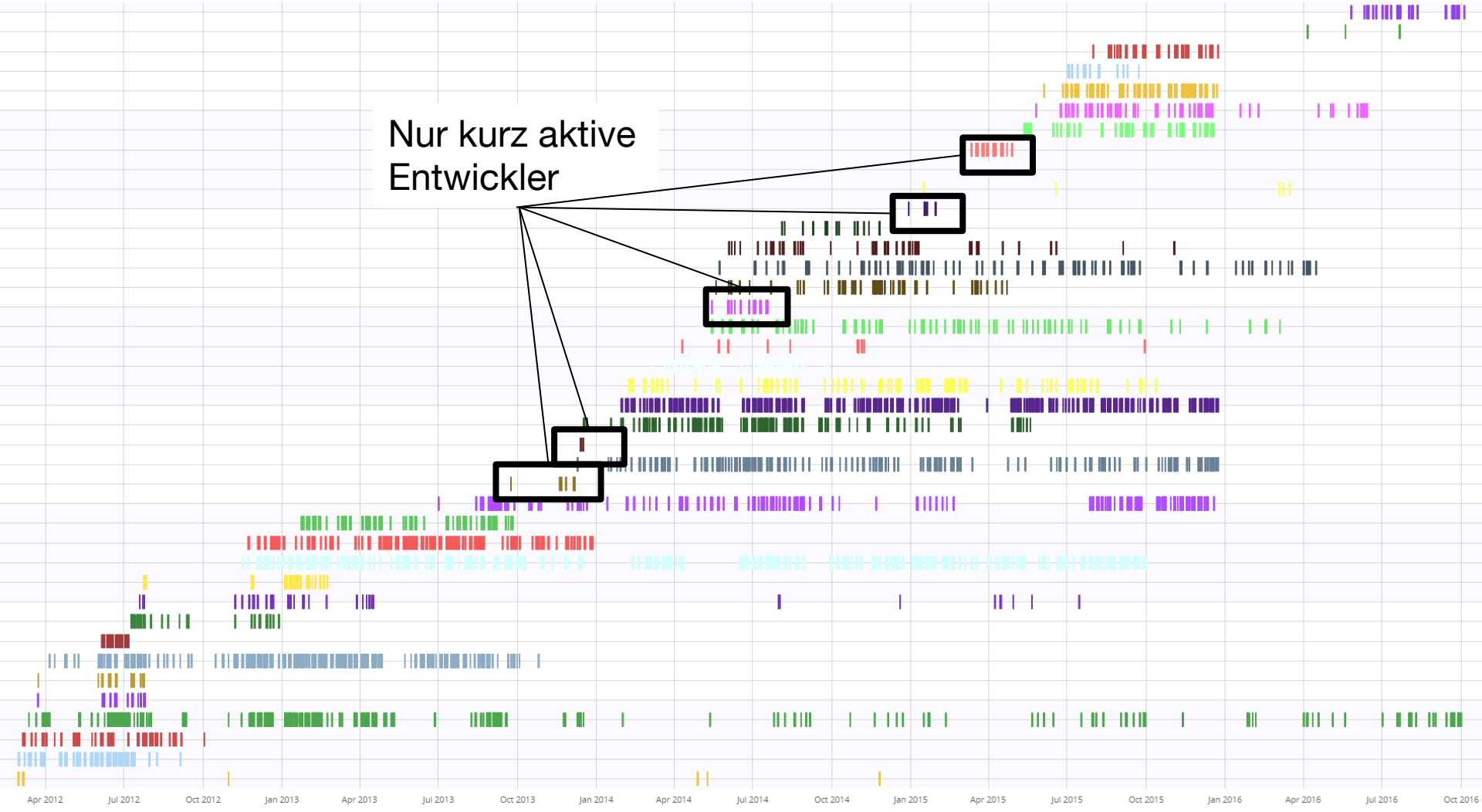

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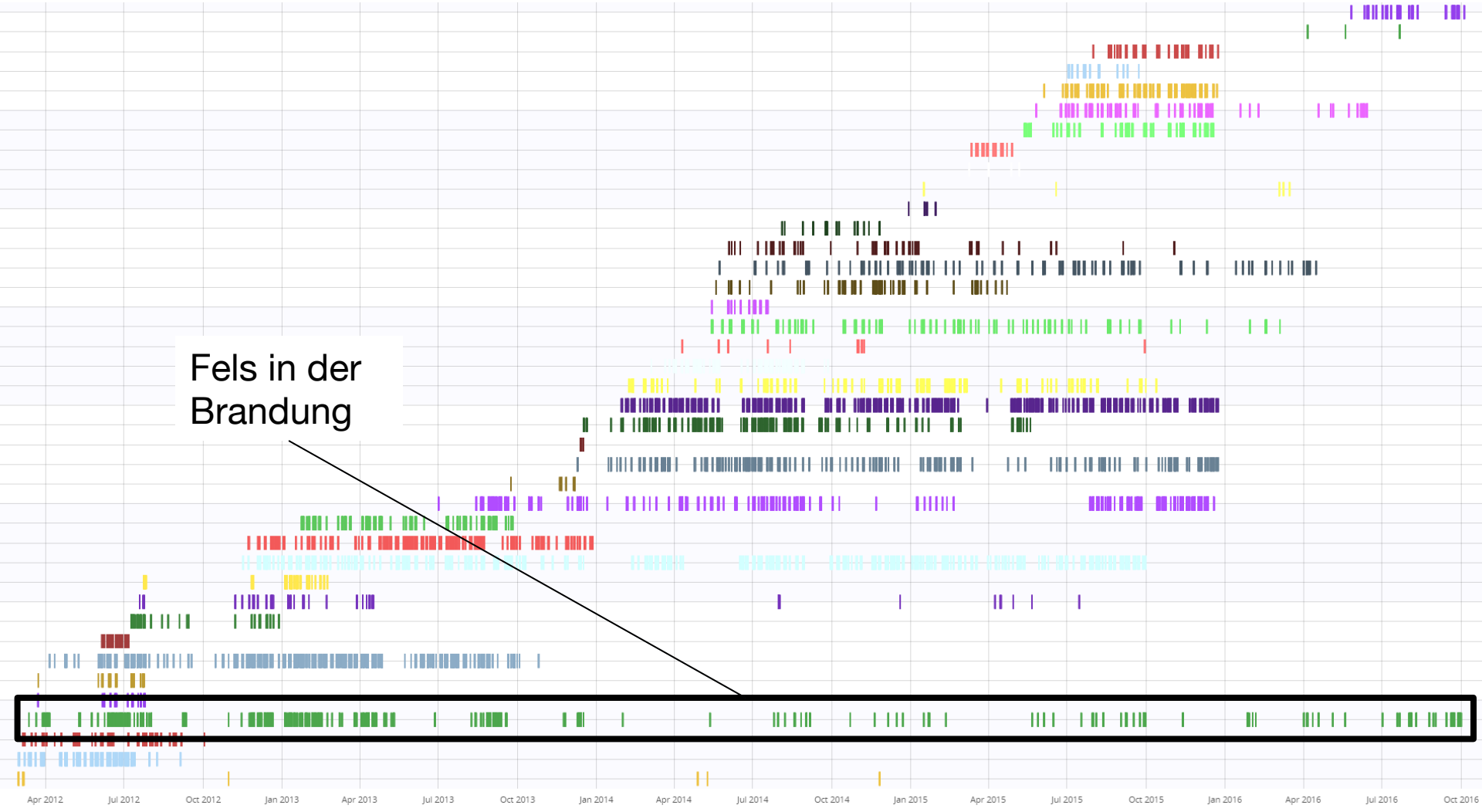

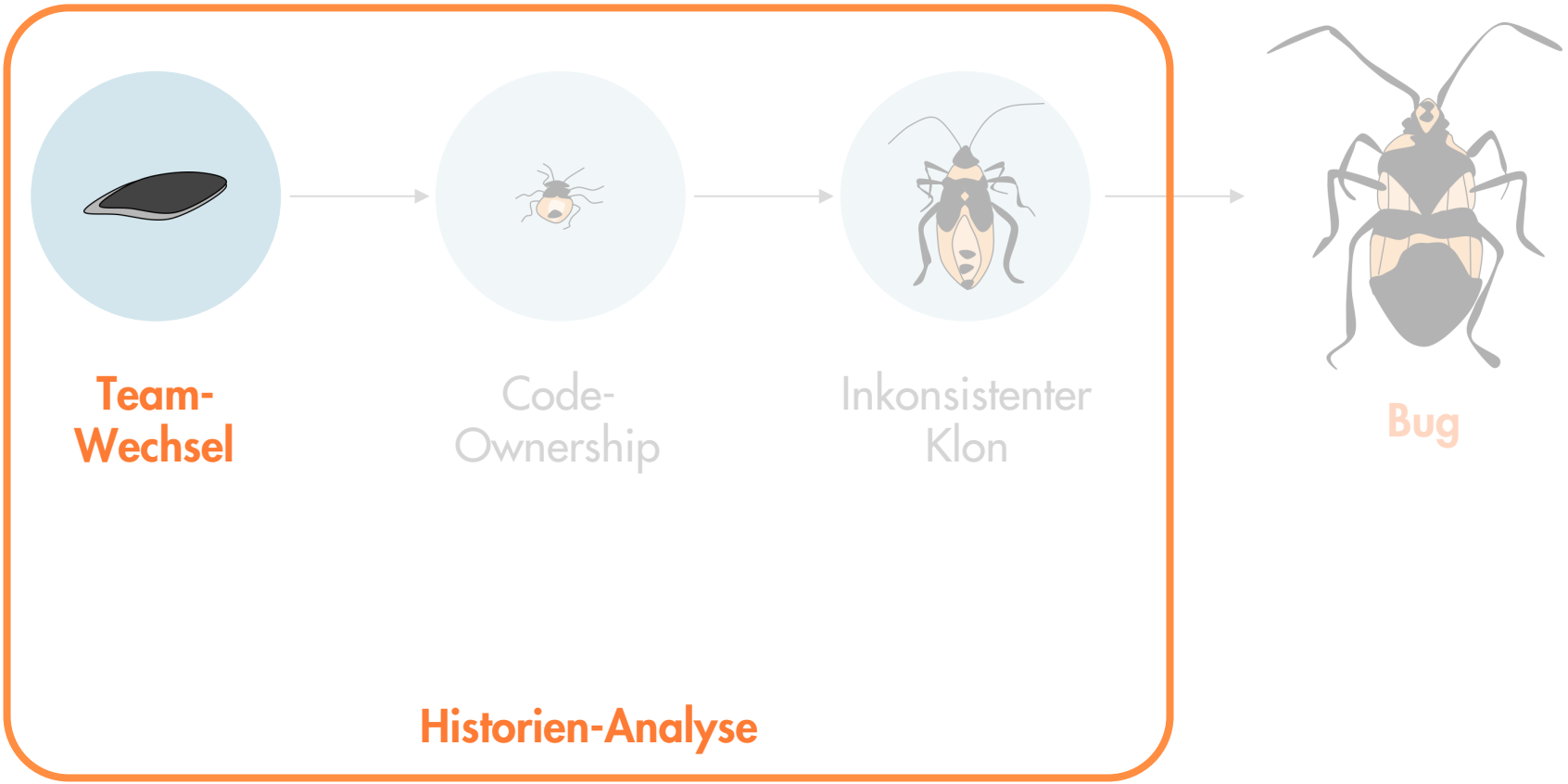
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Code-
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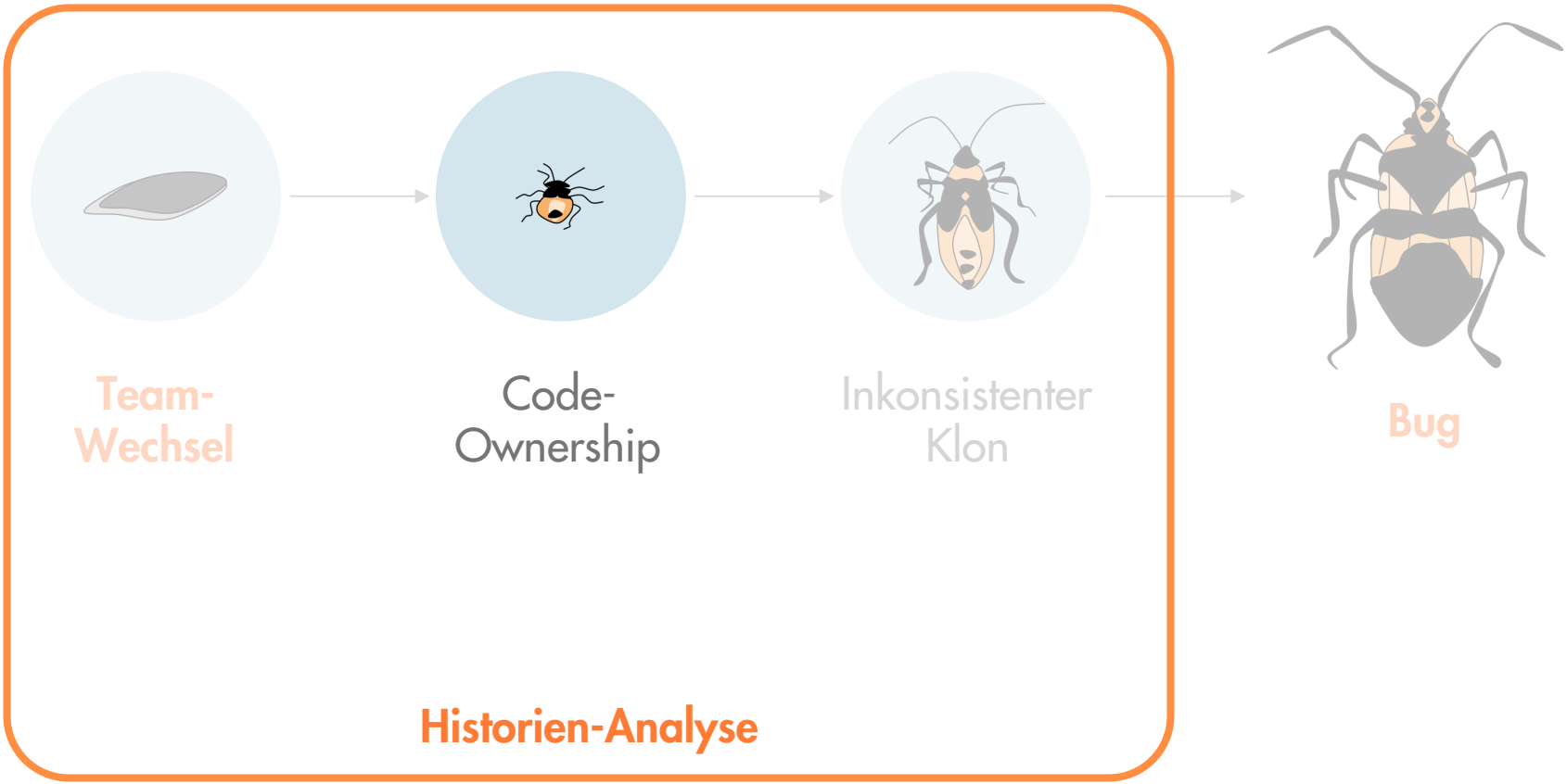
Inkonsistenter
Klon
Bug
Historien-Analyse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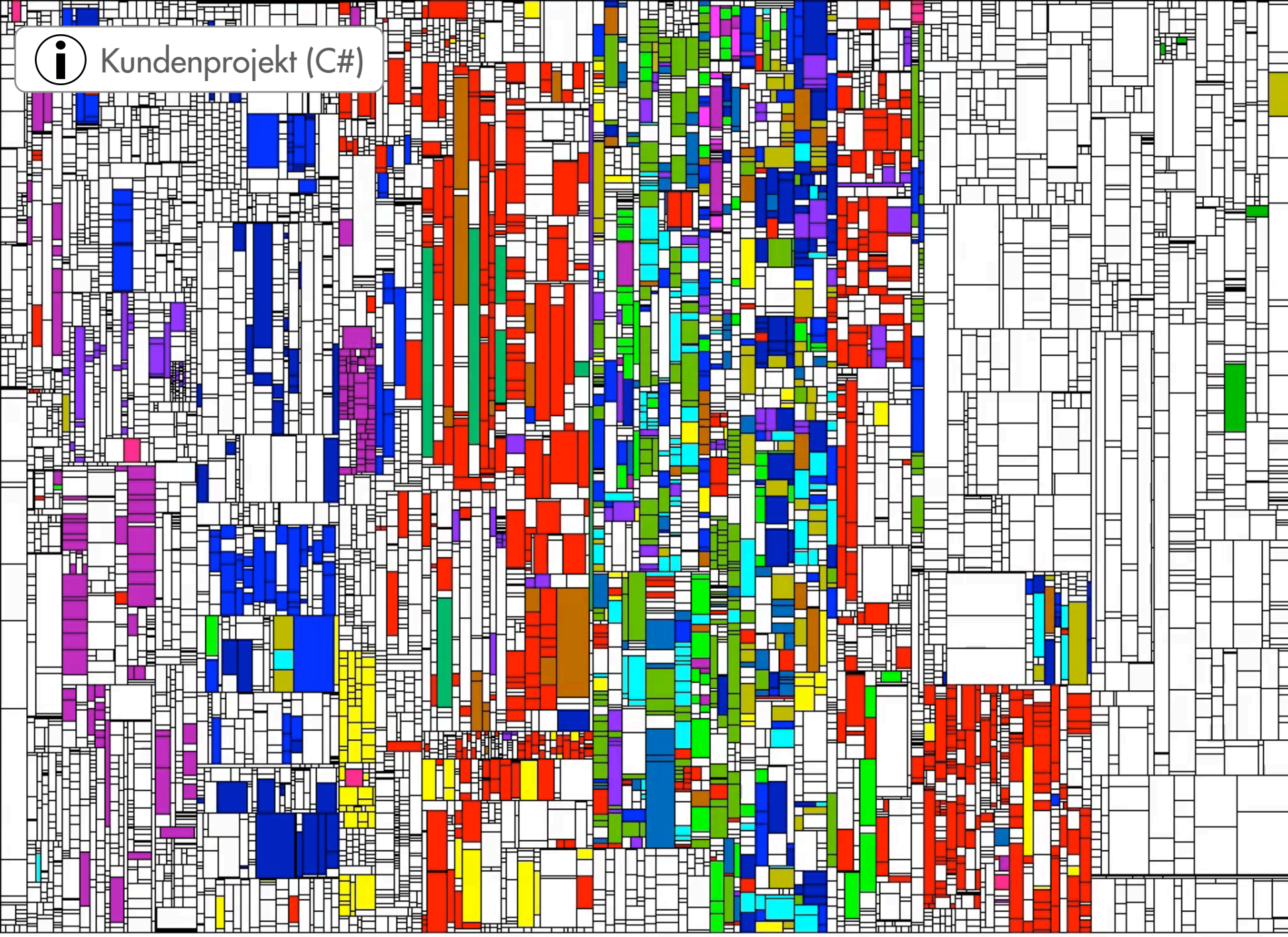
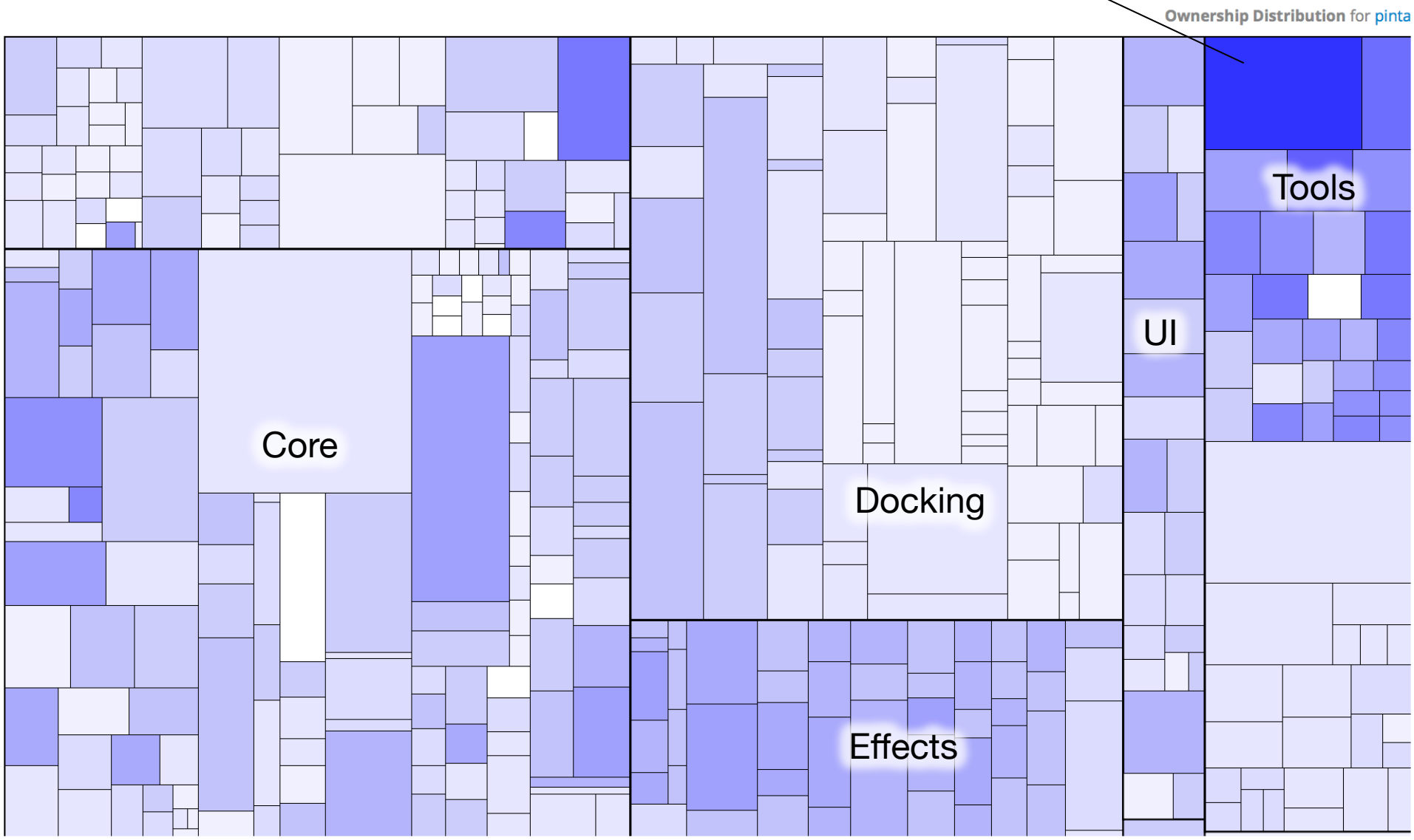
Historien-Analyse

Die Historie verrät, wer welchen Code kennt.


Kundenprojekt (C#)

PintaProject/Pinta

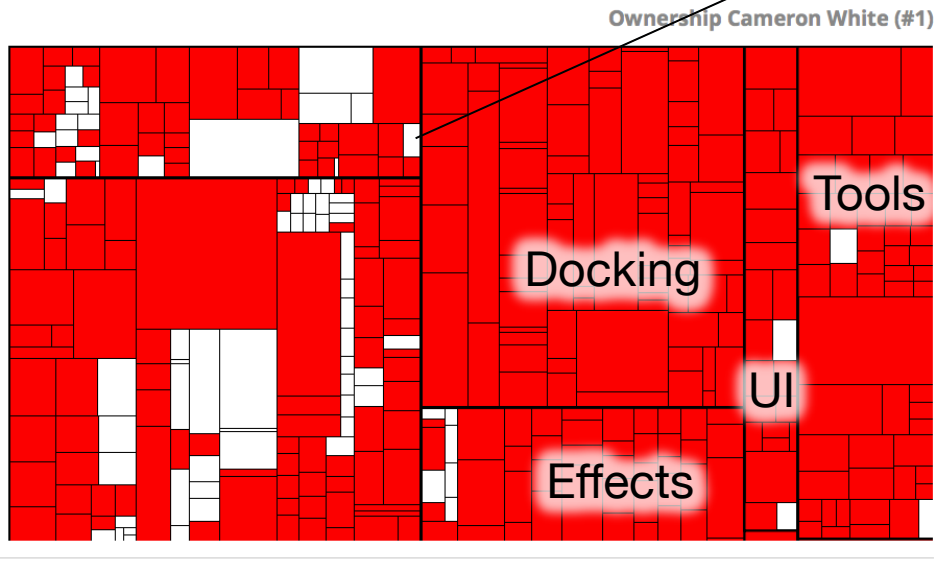
`TextTool.cs` (17 Entwickler)

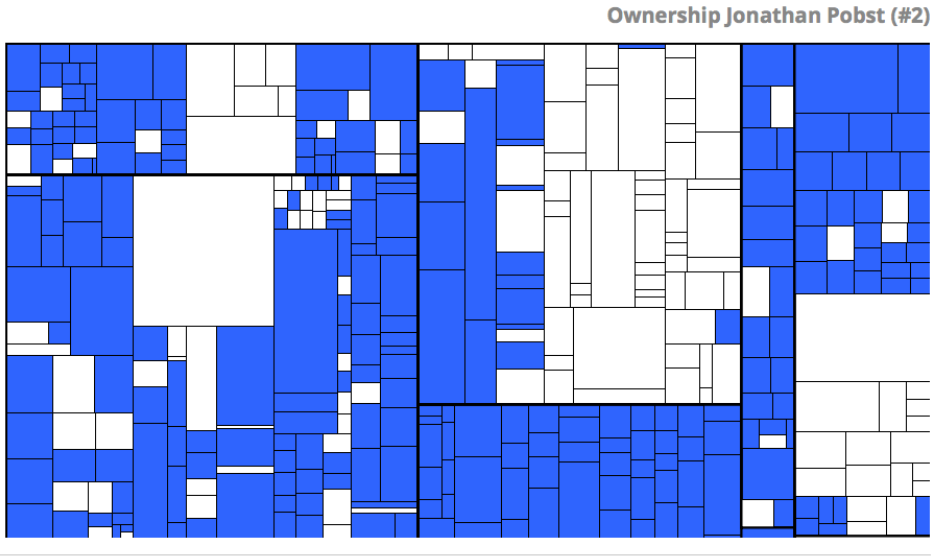


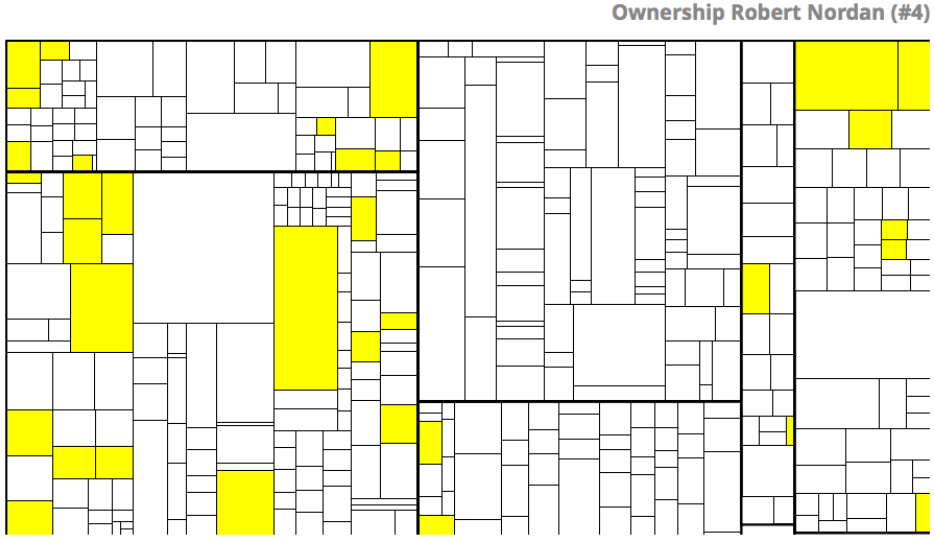
PintaProject/Pinta

Wissenslücke

„Abgewandert“







dotnet/roslyn

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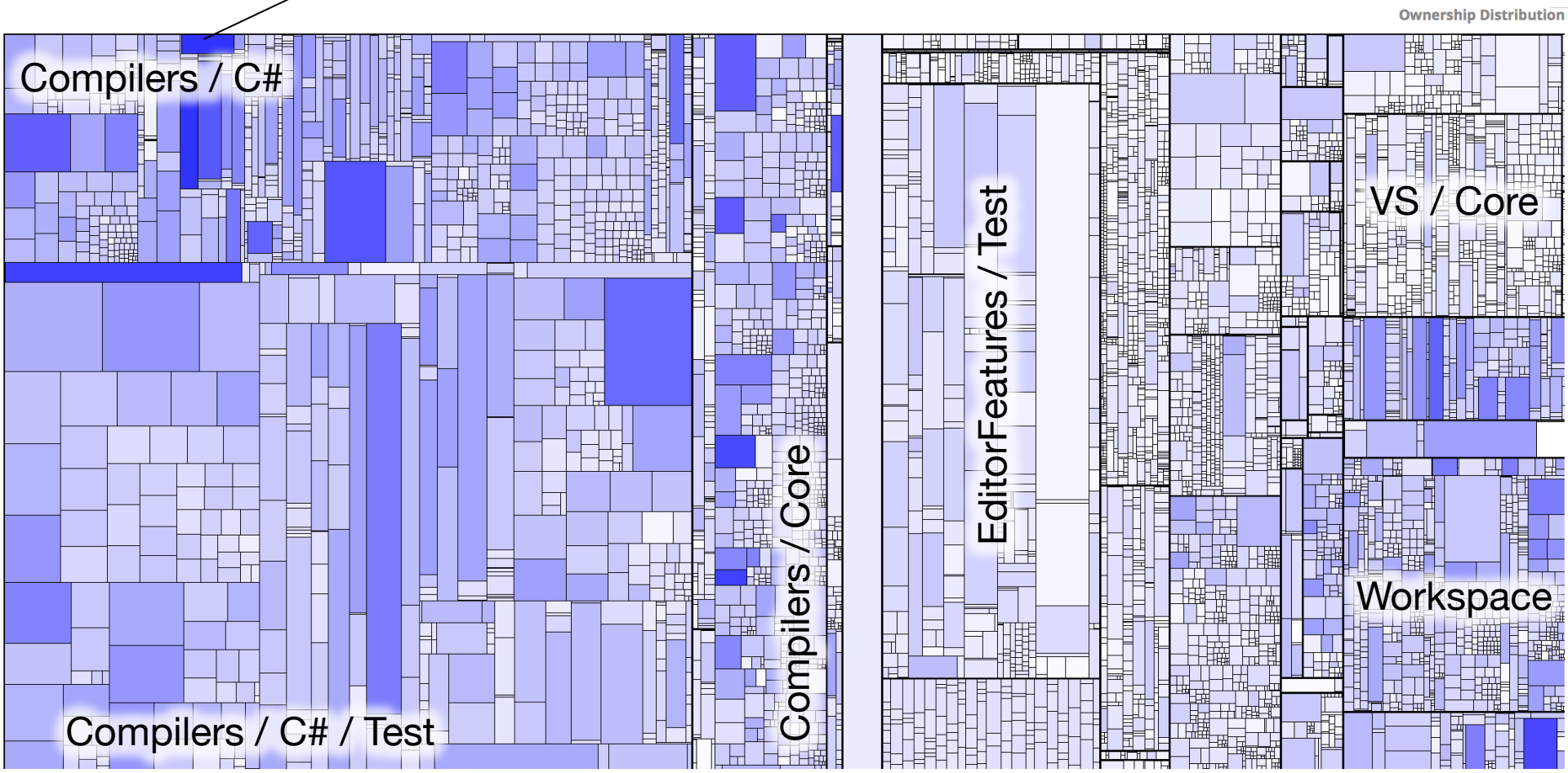
(47 Entwickler)



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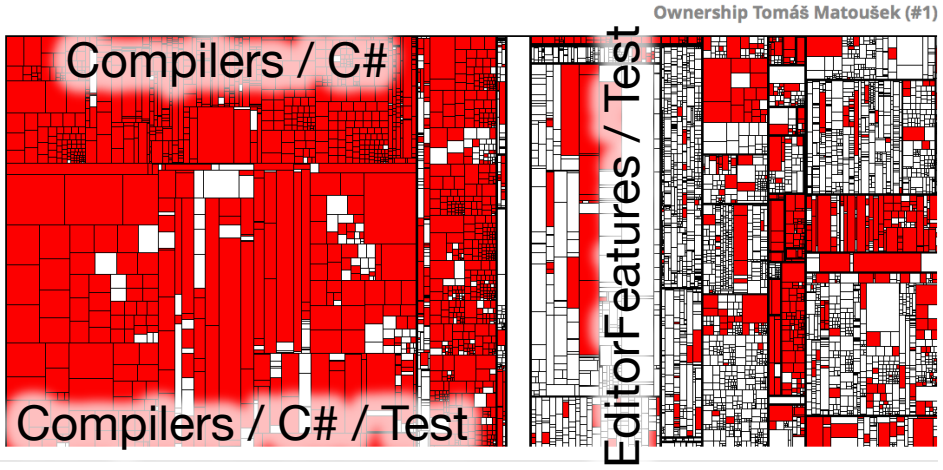

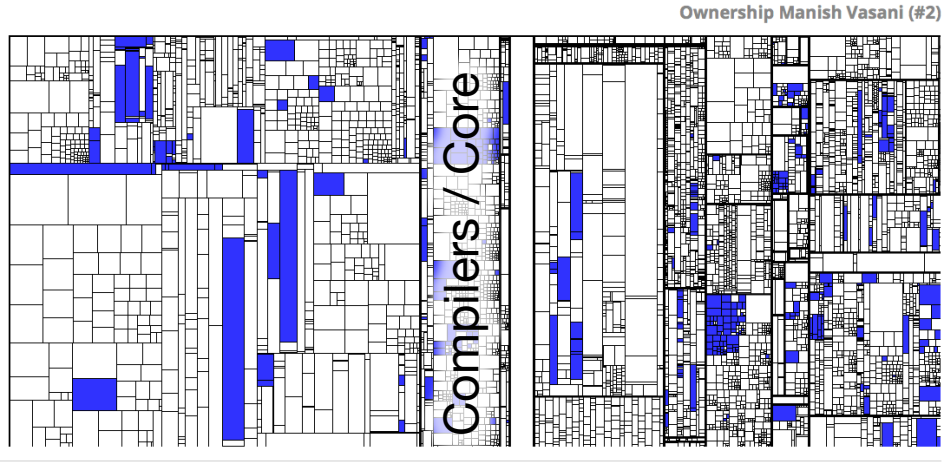

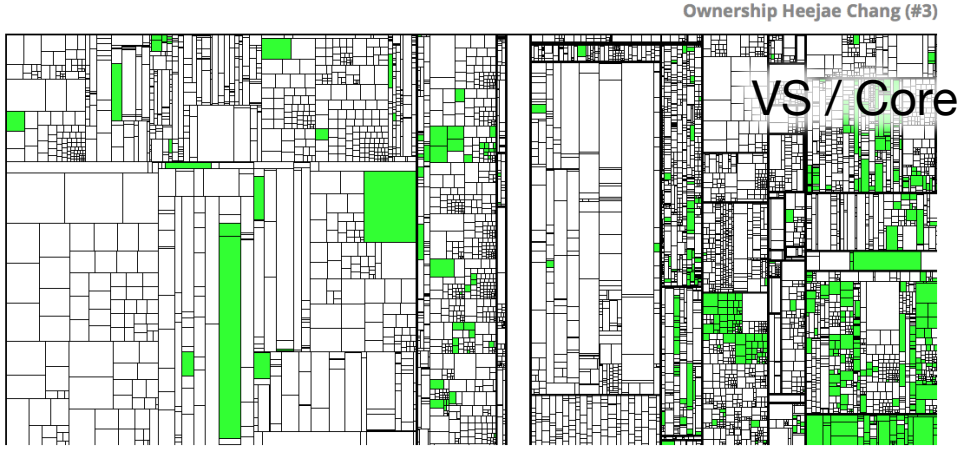

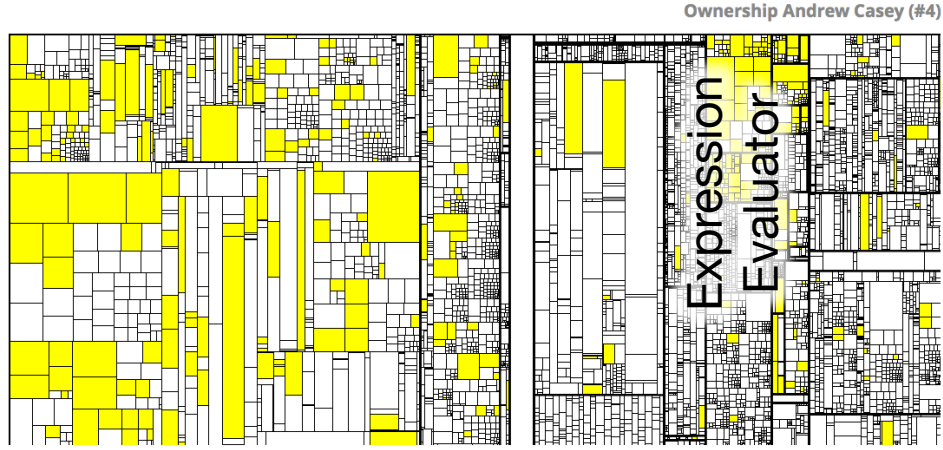

jenkinsci/jenkins

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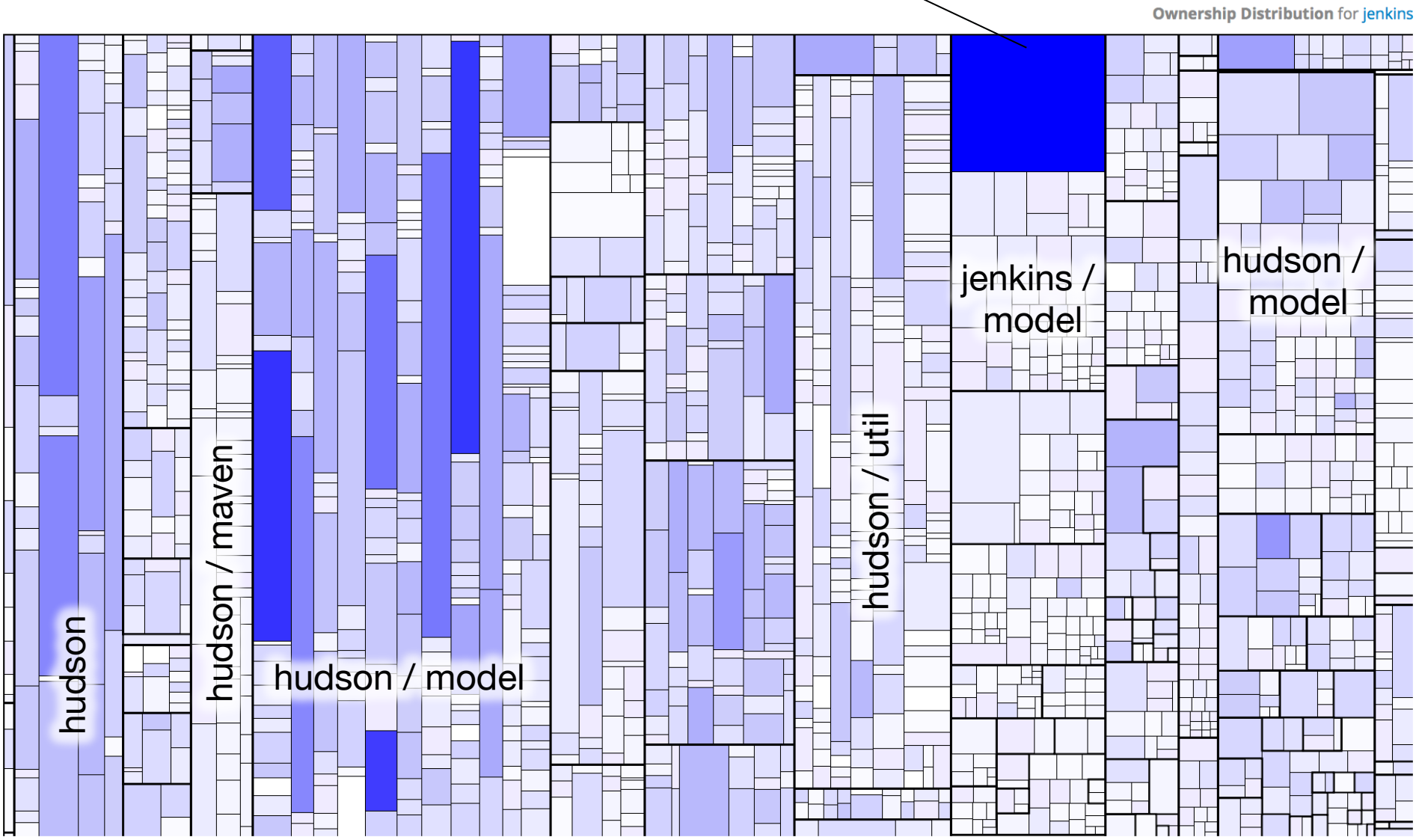
(48 Entwickler)



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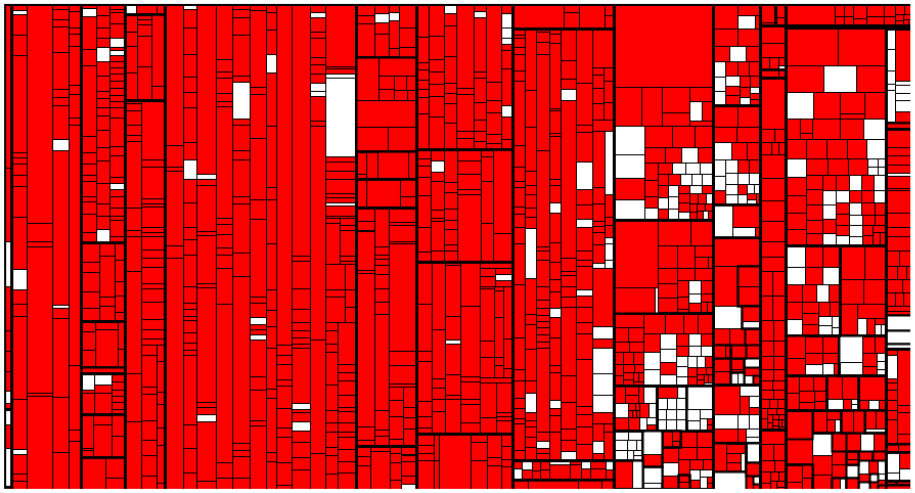
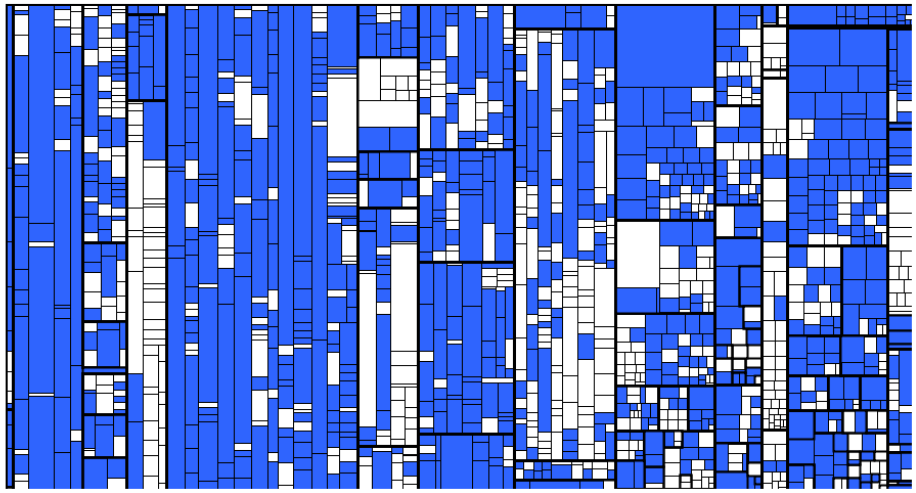
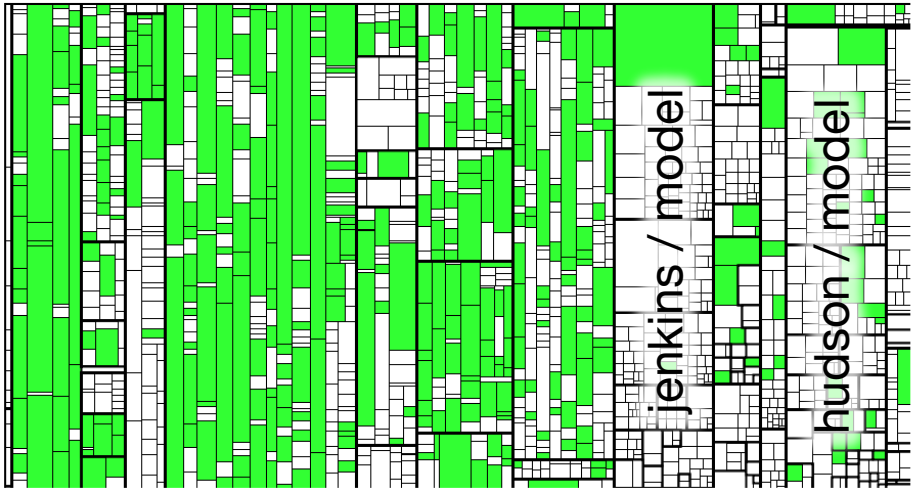
Ownership Kohsuke Kawaguchi (#1)



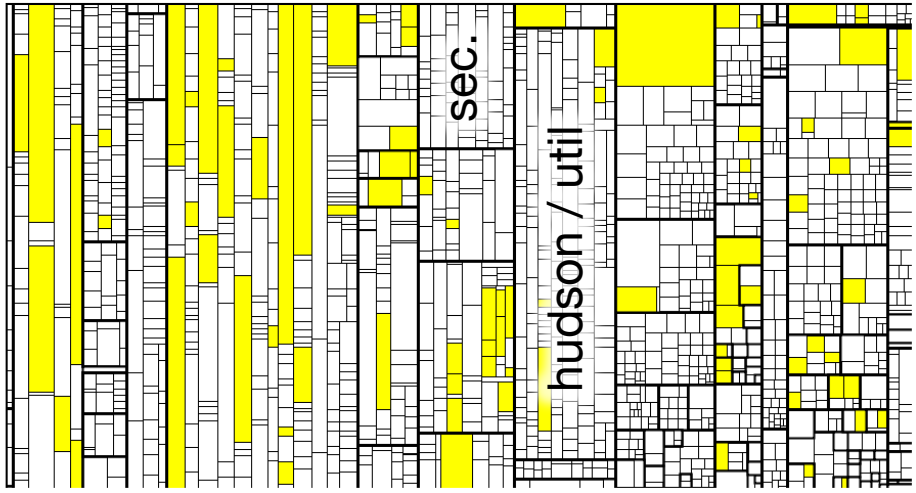
Ownership Jesse Glick (#2)

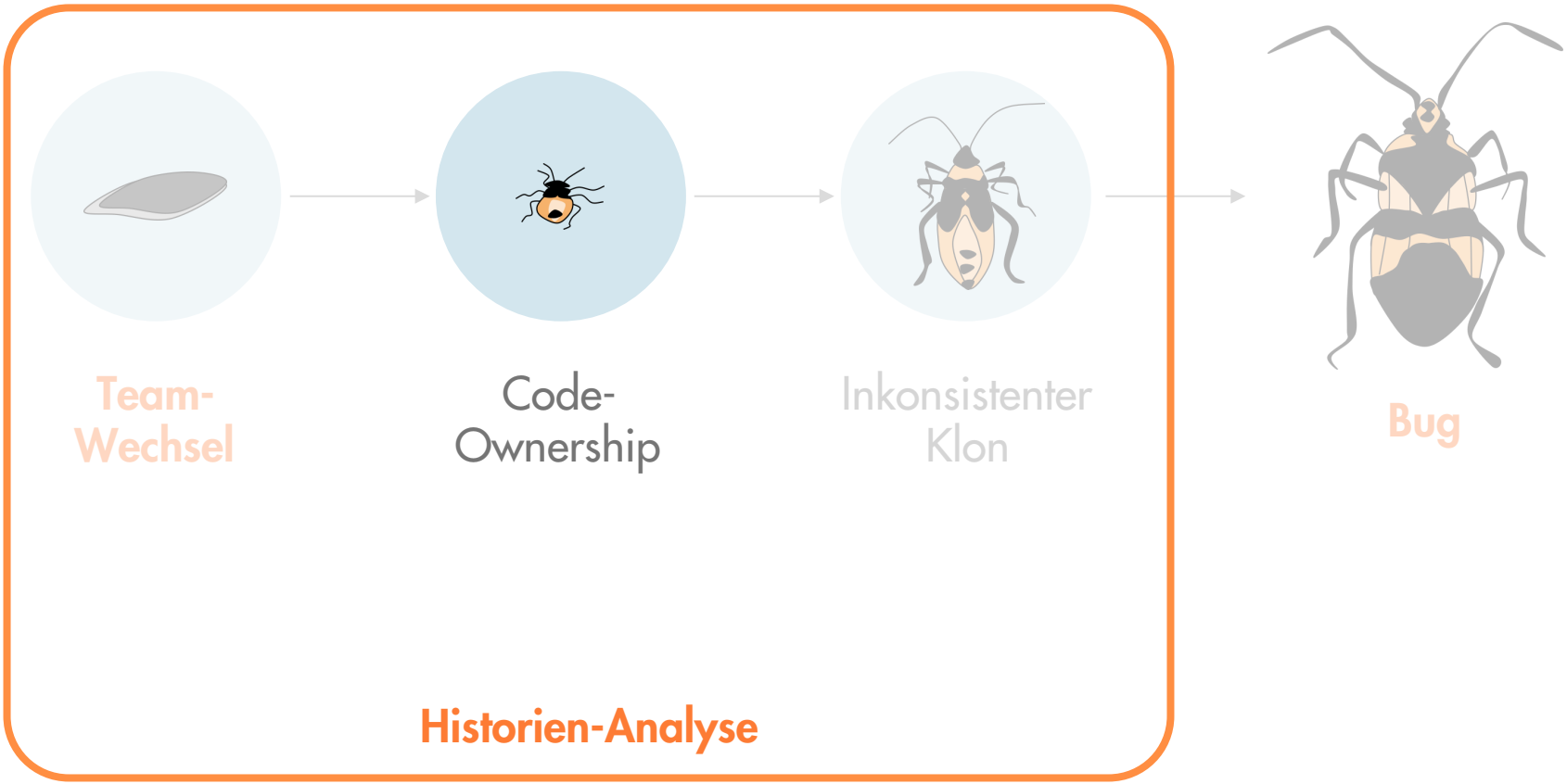


Ownership Alan Harder (#3)



Ownership Christoph Kutzinski (#4)

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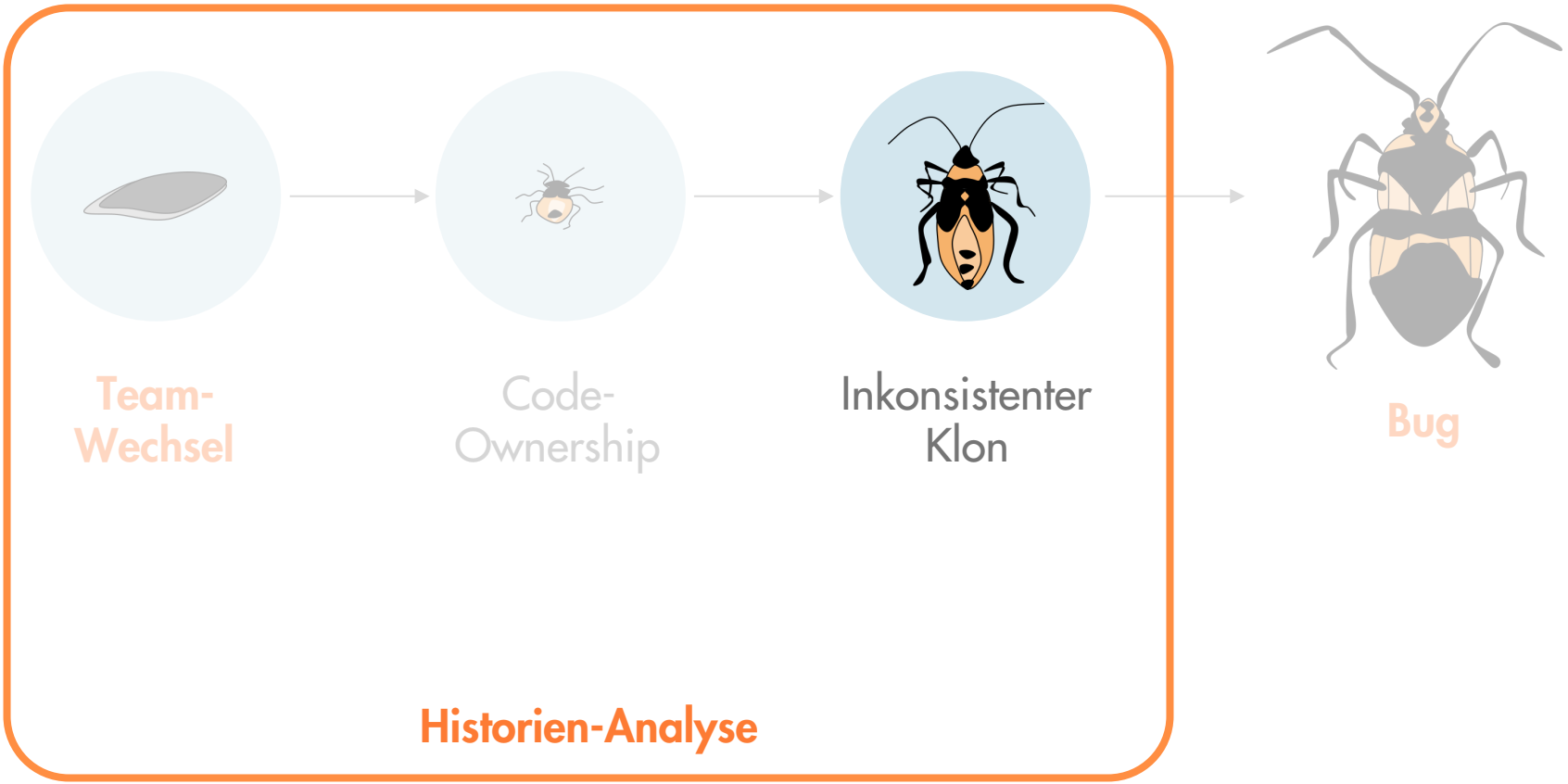
Team-
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Code-
Ownership
Inkonsistenter
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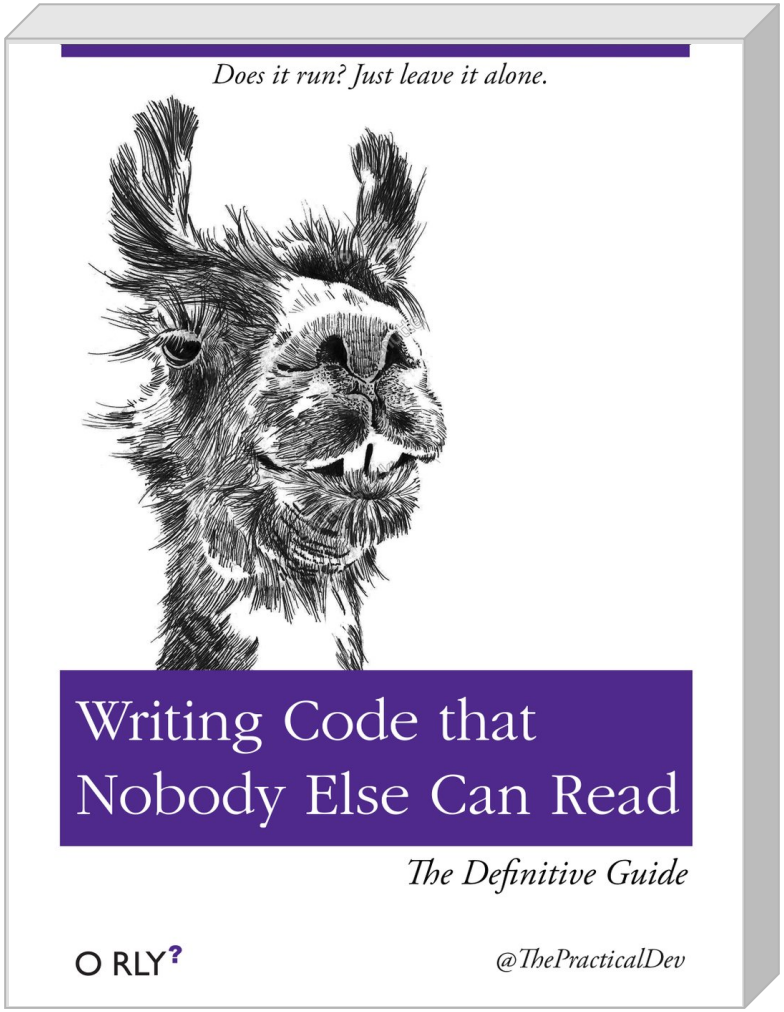
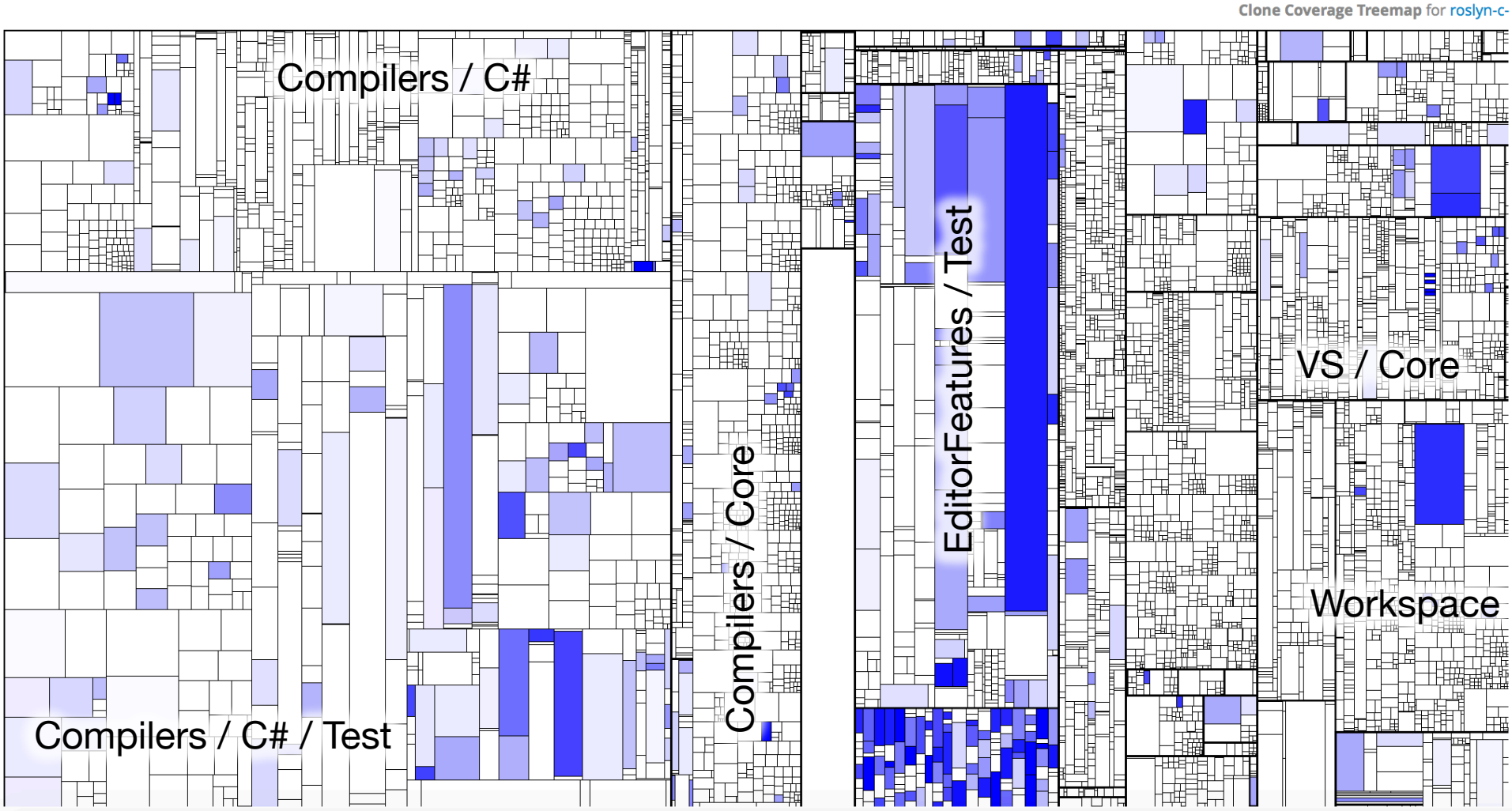
Bug
Historien-Analyse

Die Historie verrät, wie sich die Qualität entwickelt hat.

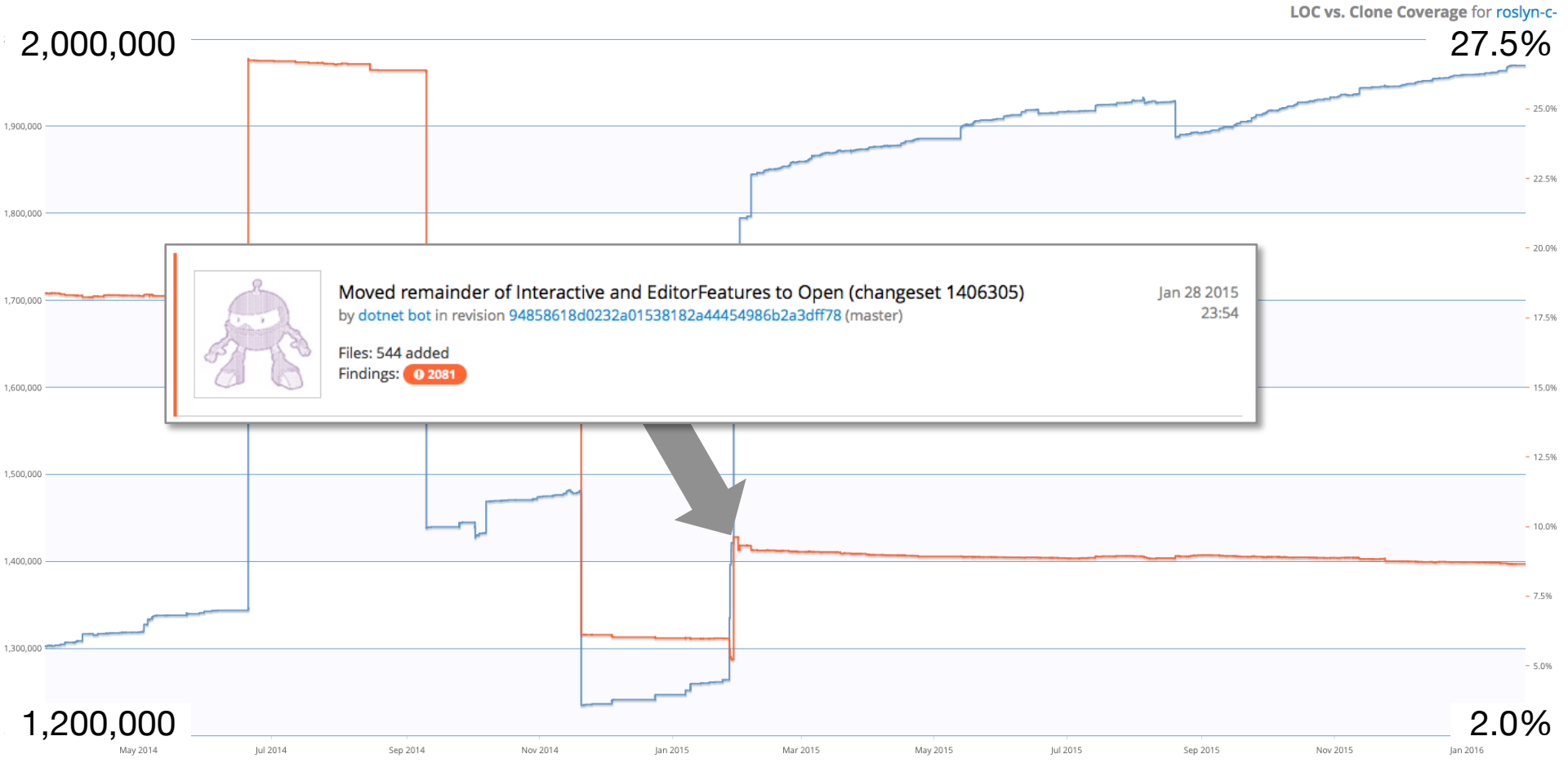


dotnet/roslyn



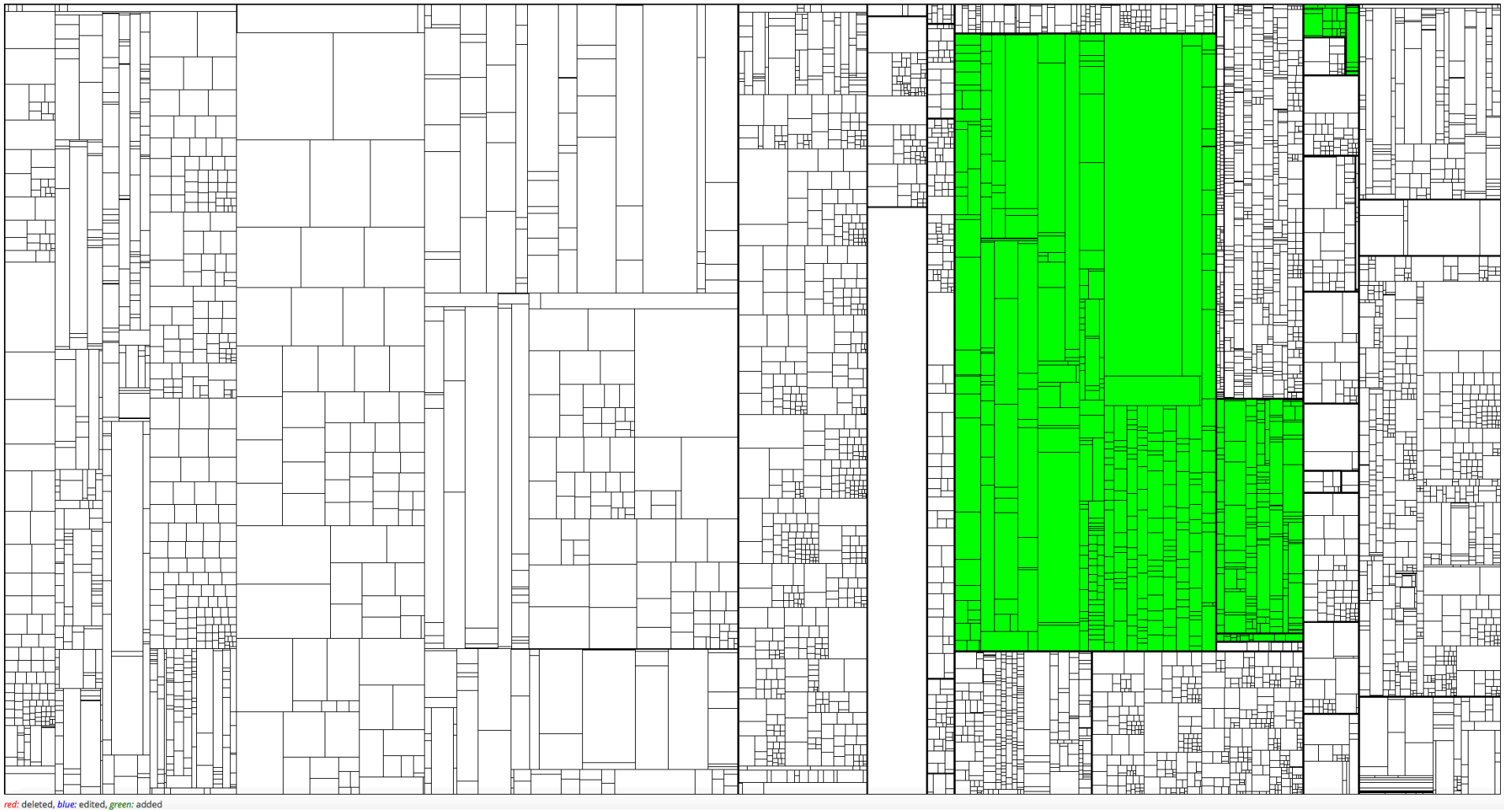
Head (Feb 2016)
Klonüberdeckung: 8,7%

dotnet/roslyn



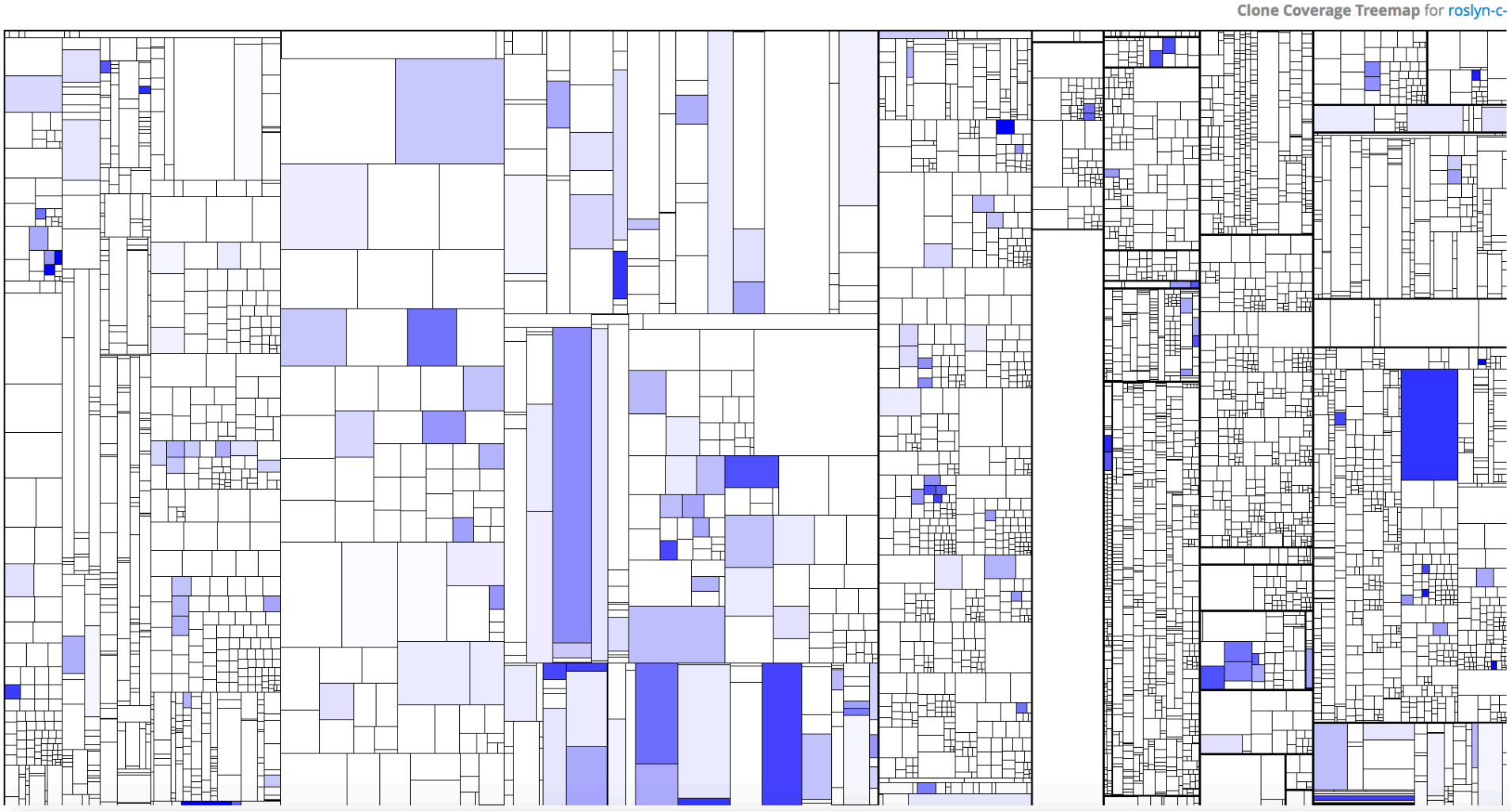
Lines of Code
Clone Coverage

dotnet/roslyn



Änderungen

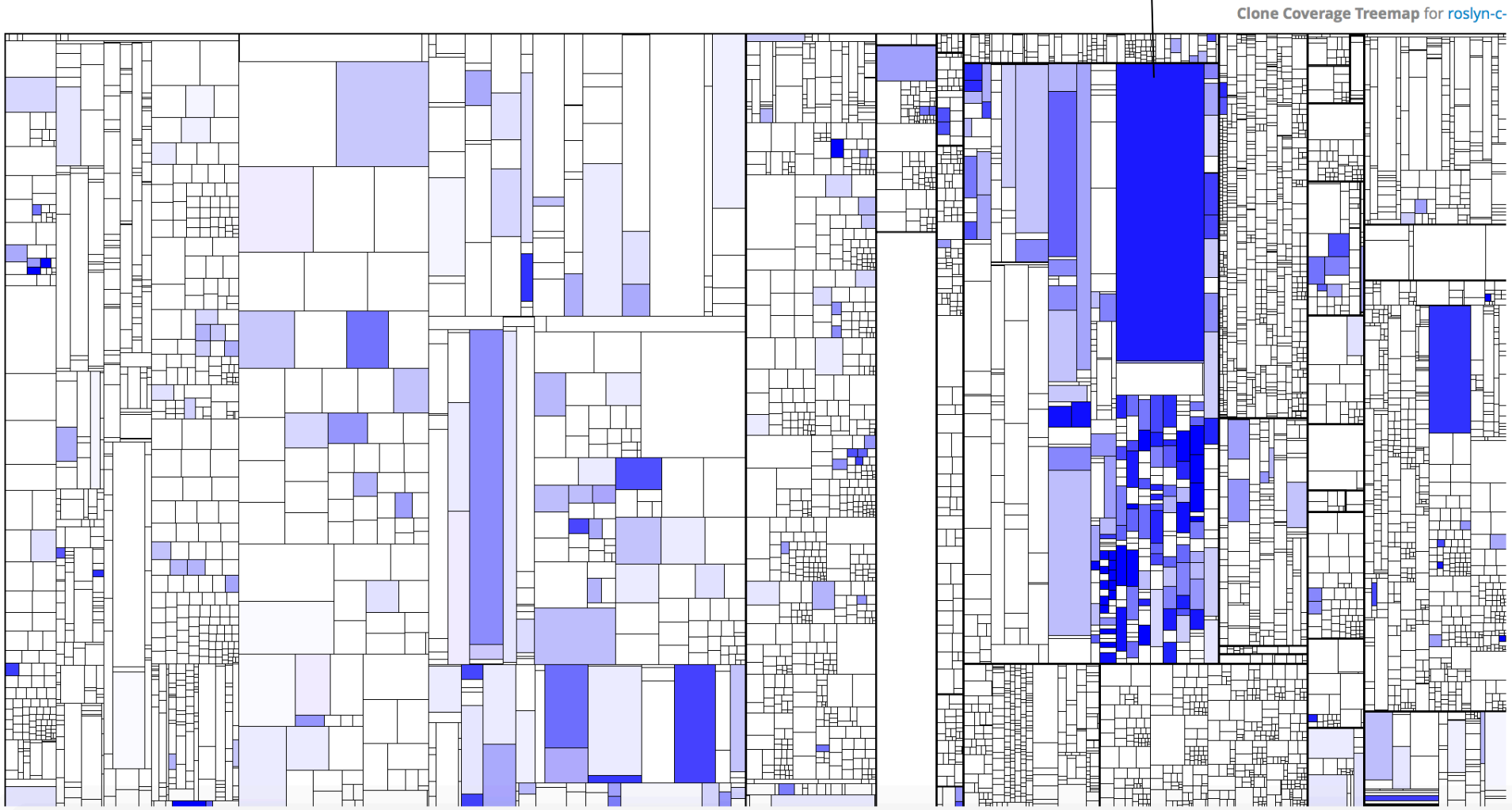
dotnet/roslyn



Vorher
(Klonüberdeckung 5,2%)

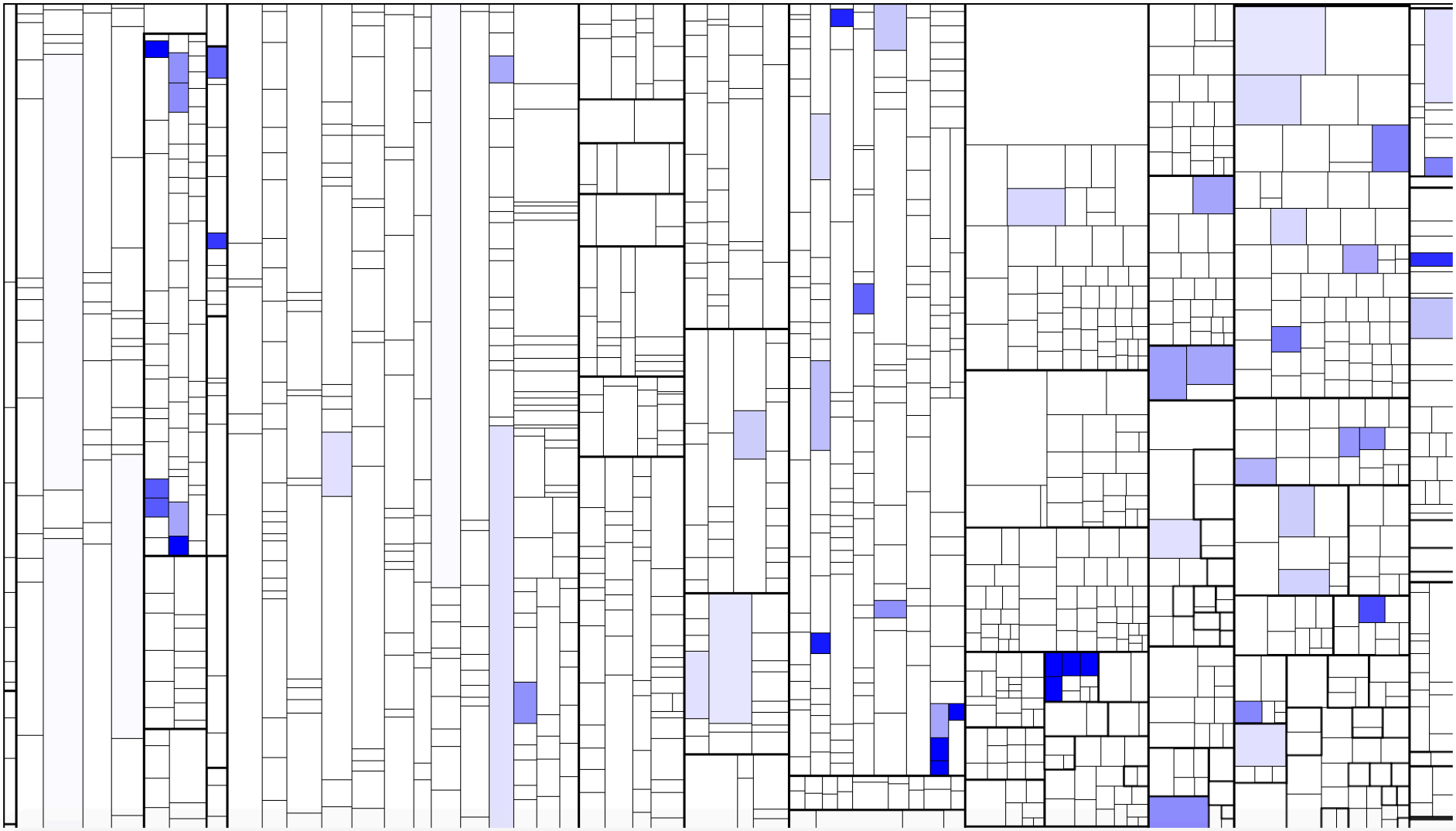
dotnet/roslyn

Performance-Test Case
(89% Klonüberdeckung)



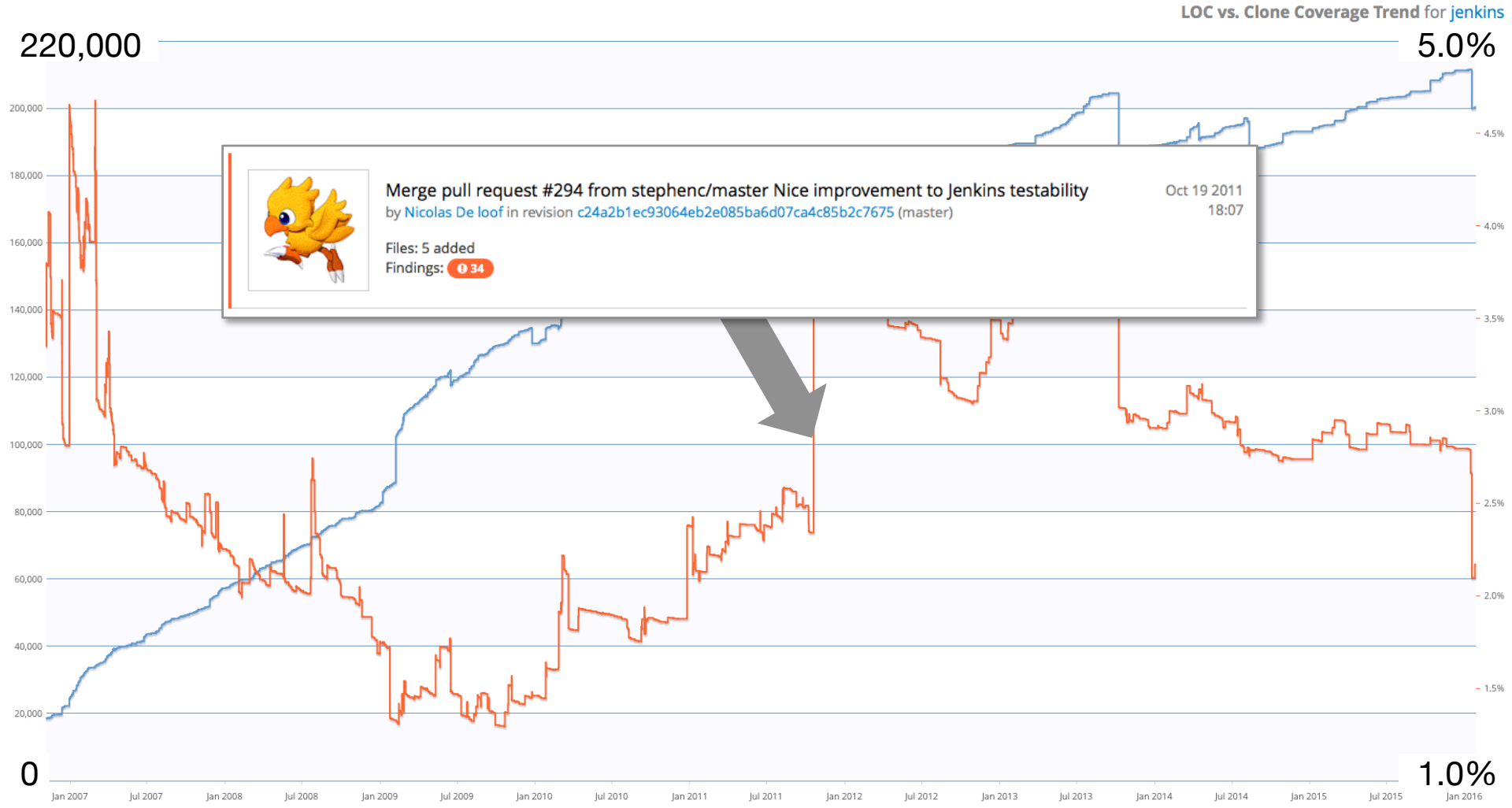
Nachher
(Klonüberdeckung 9,6%)

jenkinsci/jenkins



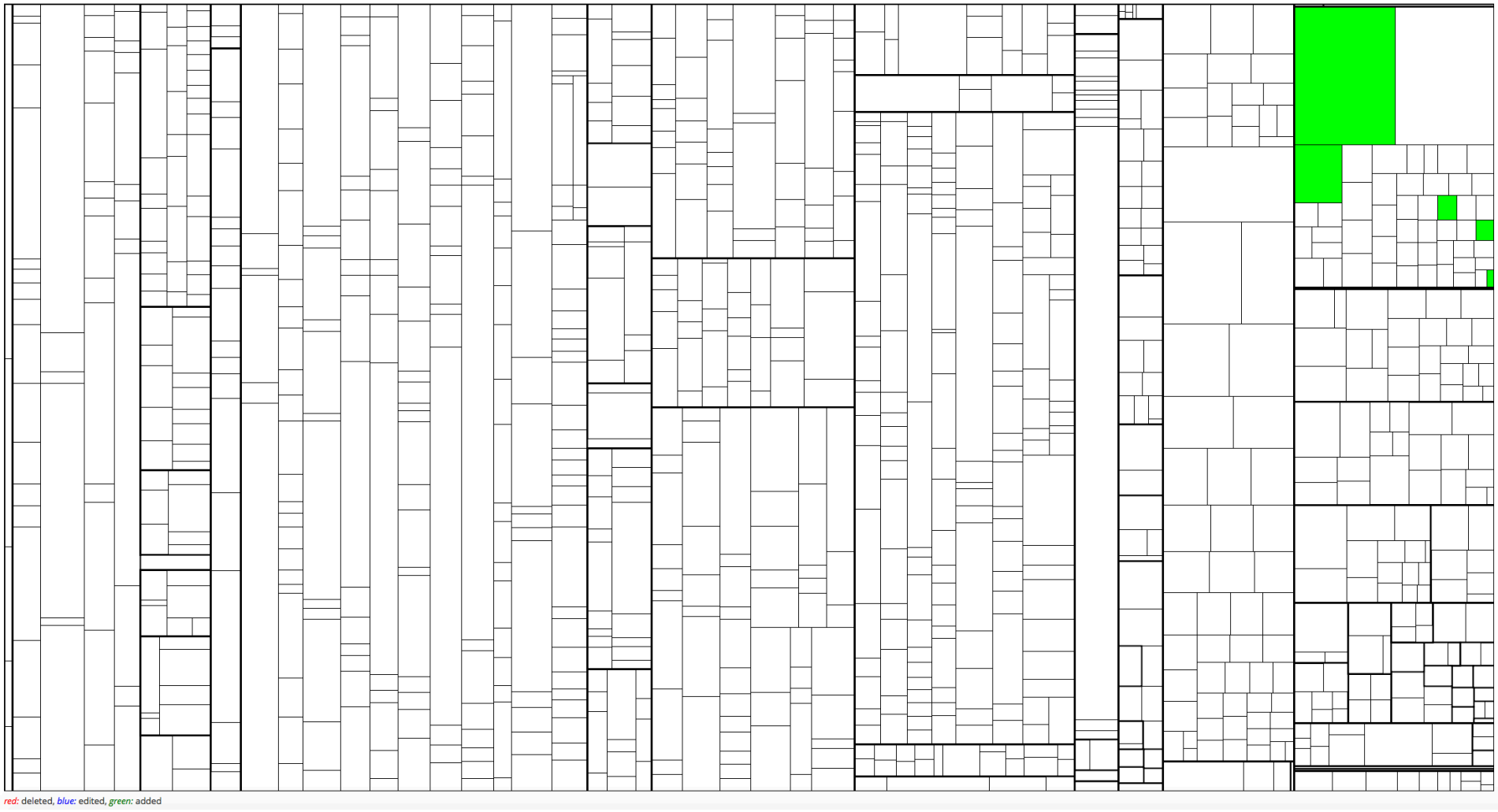
Head (Feb. 2016)
Klonüberdeckung: 2,2%

jenkinsci/jenkins



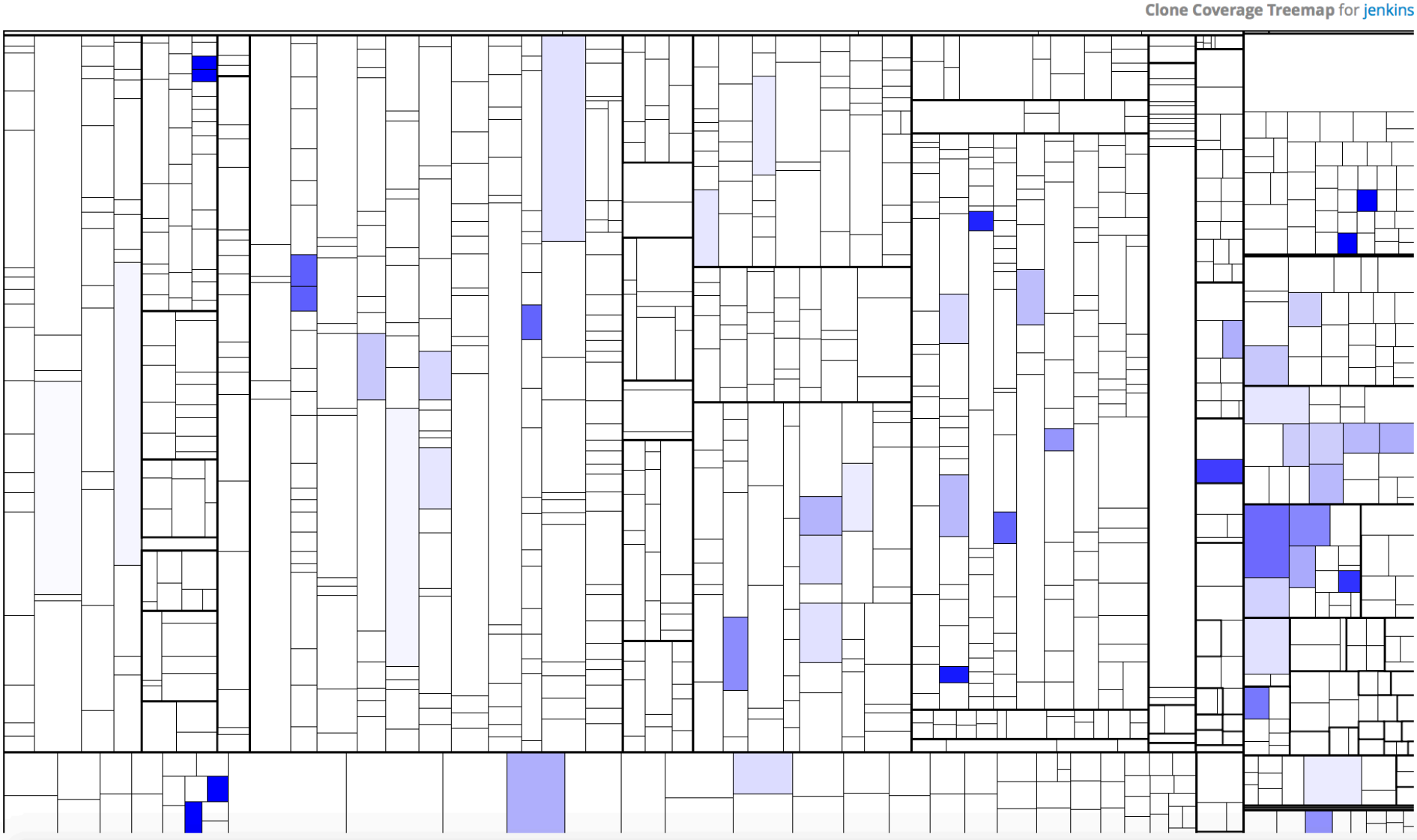
Lines of Code
Clone Coverage

jenkinsci/jenkins



Änderungen

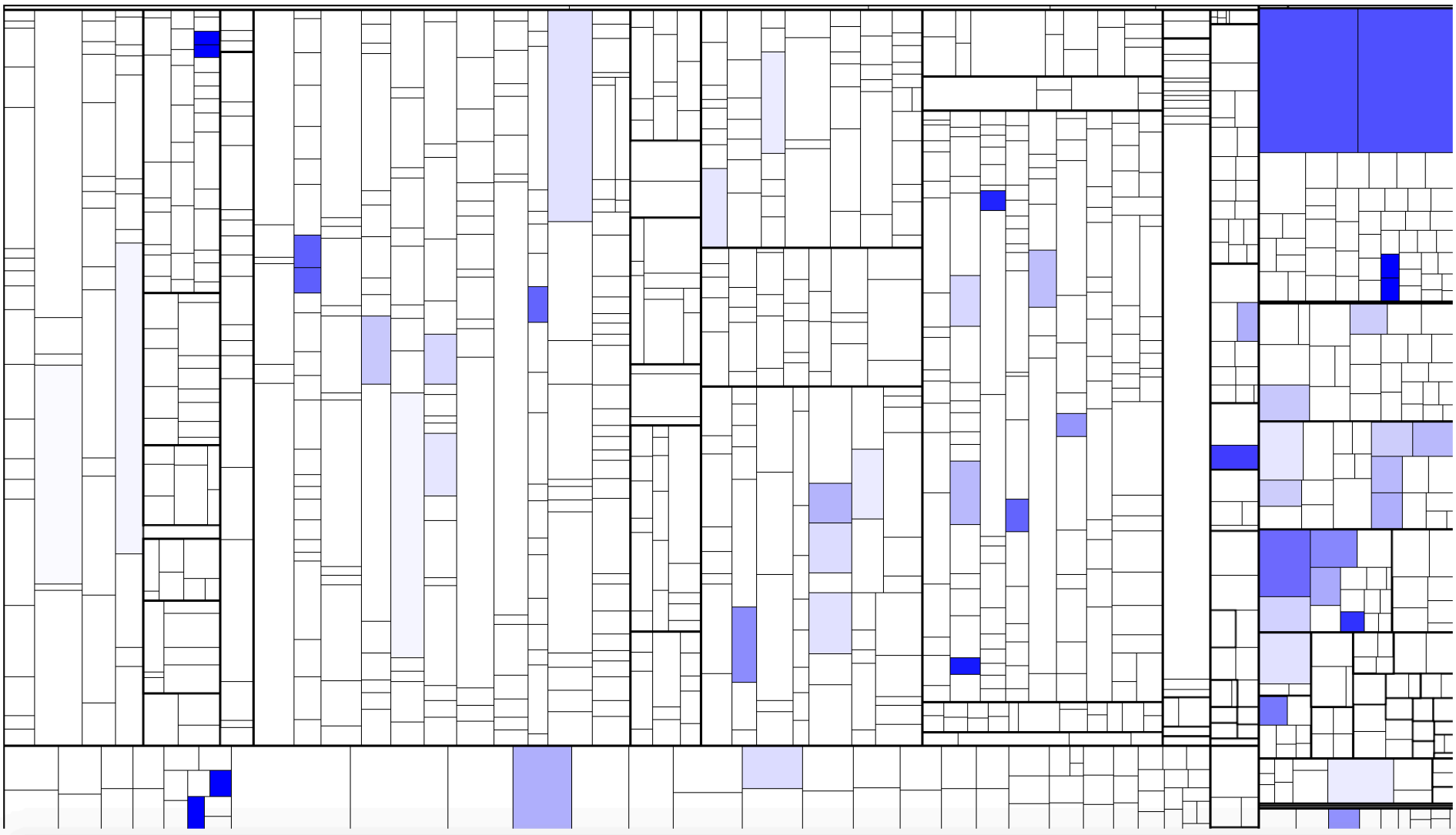
jenkinsci/jenkins



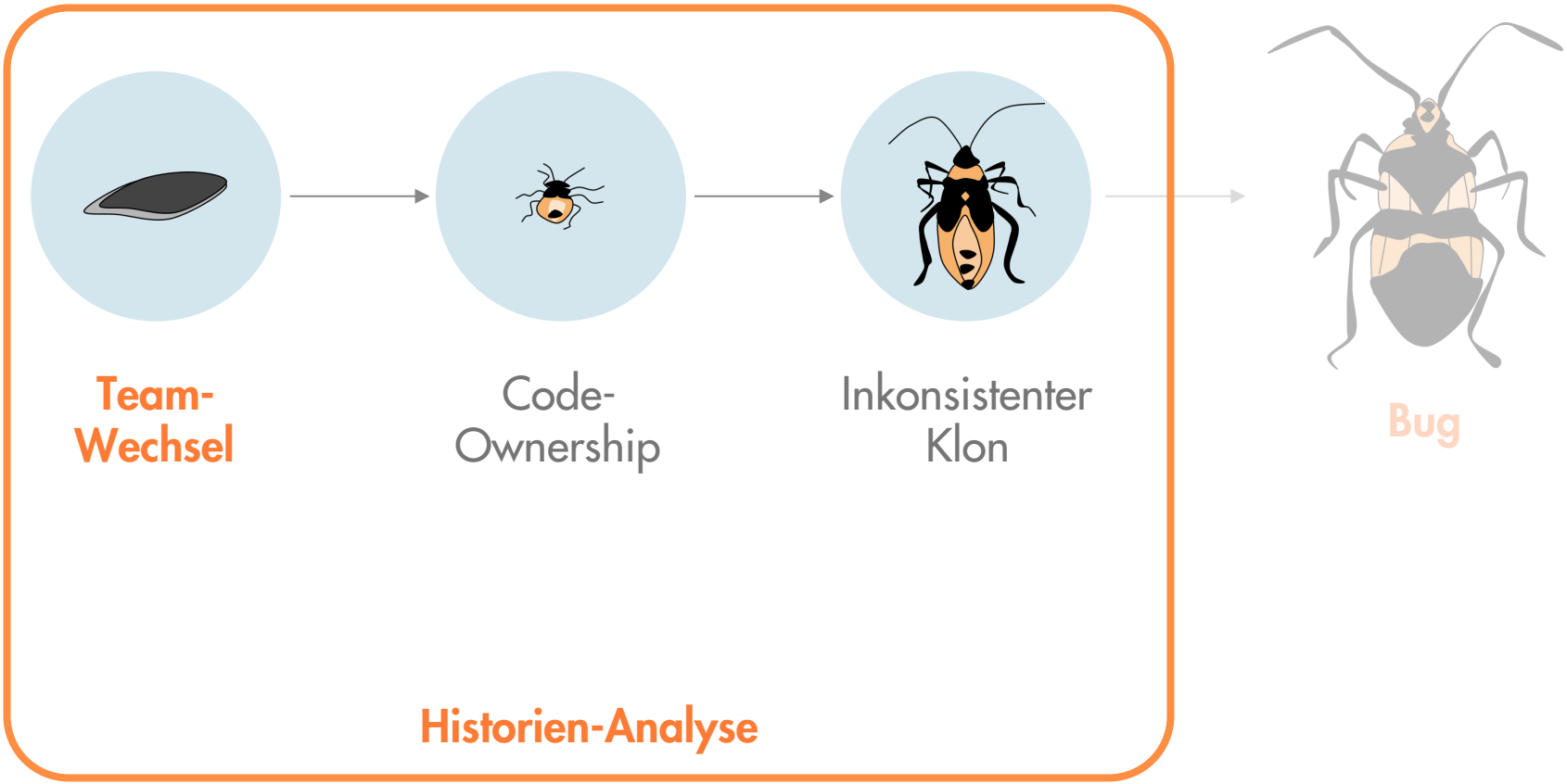
Vorher
(Klonüberdeckung 2,3%)

jenkinsci/jenkins

JenkinsRule.java / HudsonTestCase.java
(68% Klonüberdeckung)



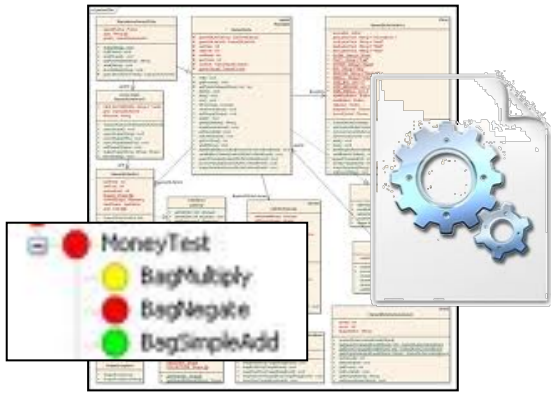
Nachher
(Klonüberdeckung 4,2%)


Team-
Wechsel
Code-
Ownership
Inkonsistenter
Klon
Bug
Historien-Analyse

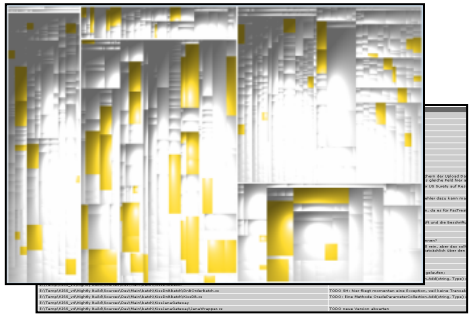
Agenda

1. Welche Probleme verrät die Historie?
2. Was kann man im eigenen Projekt machen?

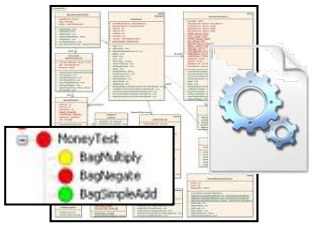
Historienanalysen erfordern neue Werkzeuge.


MoneyTest
BagMultiply
BagNegate
BagSimpleAdd

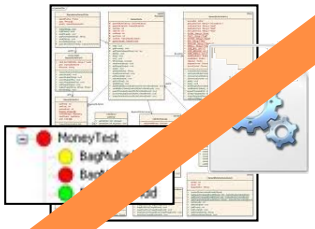

conQAT



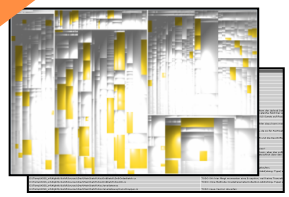
Baseline



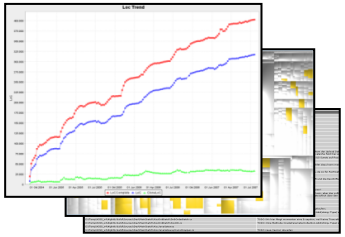
Latest Version



Baseline
Dashboard

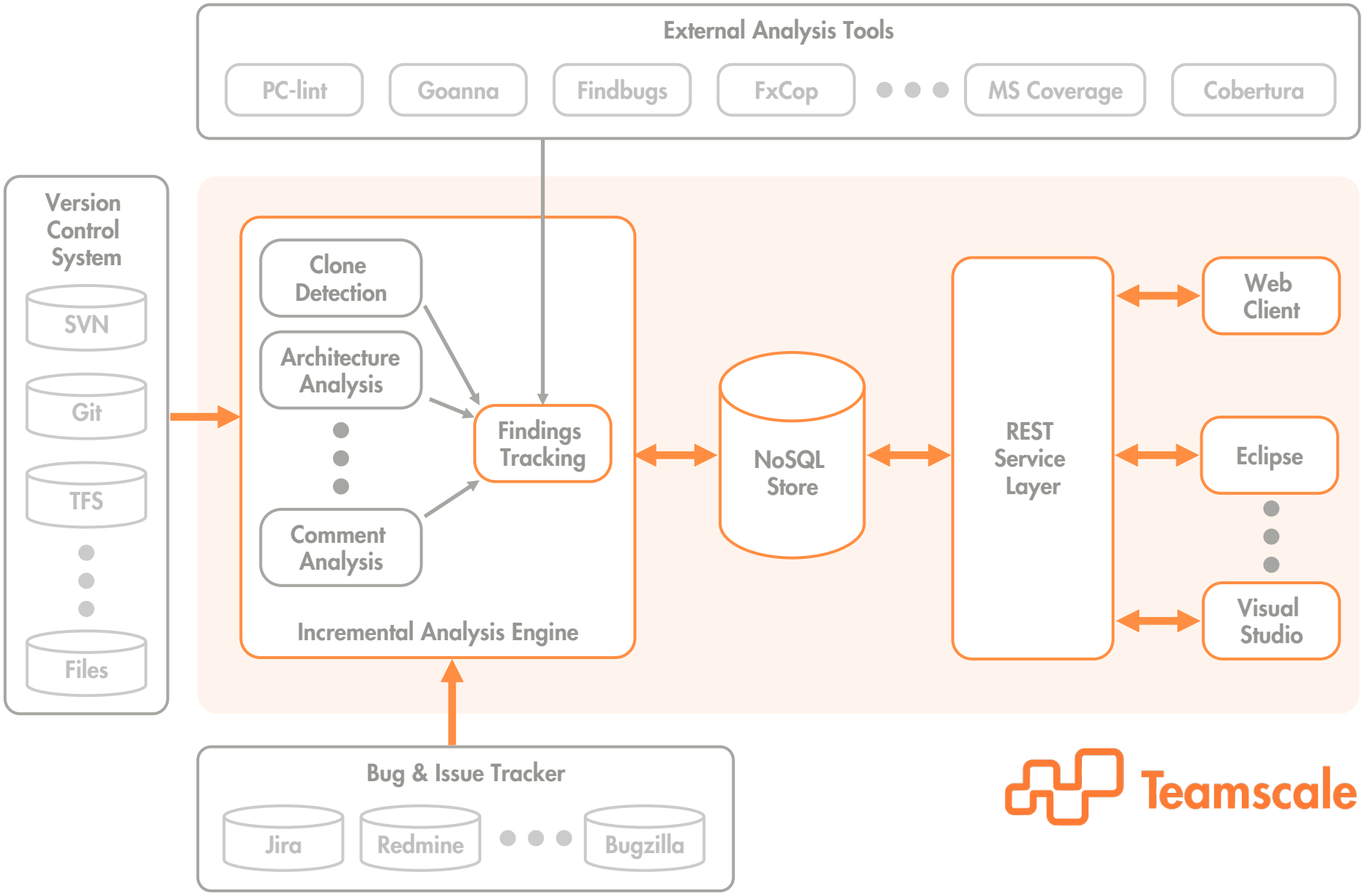


Dashboard
inkl Delta




Teamscale


Free For
Open Source
Software


External Analysis Tools
PC-lint
Goanna
Findbugs
FxCop
MS Coverage
Cobertura
Version Control System
SVN
Git
TFS
Files
Clone Detection
Architecture Analysis
Comment Analysis
Findings Tracking
Incremental Analysis Engine
NoSQL Store
REST Service Layer
Web Client
Eclipse
Visual Studio
Bug & Issue Tracker
Jira
Redmine
Bugzilla
Teamscale

Exclusive and event based gateway can be async as well
by Daniel Lewis in revision e28cd40d7b4ac1e98a370cc6dcacedec6ef1d5b0 (git)

Files: 2 changed
Findings: 0

Jun 25 2015
08:34

Add schema option for Oracle on QA
by Daniel Lewis in revision 93beea0b2623ec52f362d4ca5c7a71039ab14409 (git)

Files: 14 changed, 1 deleted
Findings: 7 6 9

Jun 24 2015
16:35

Merge branch 'master' of https://github.com/mittalabhi2123/Activiti into mittalabhi2123-master
by Isabella Wright in revision 0292ee4f7ace6a1c81af64f71fac78935c39b101 (git)

Files: 4 added, 34 changed
Findings: 44 20 8

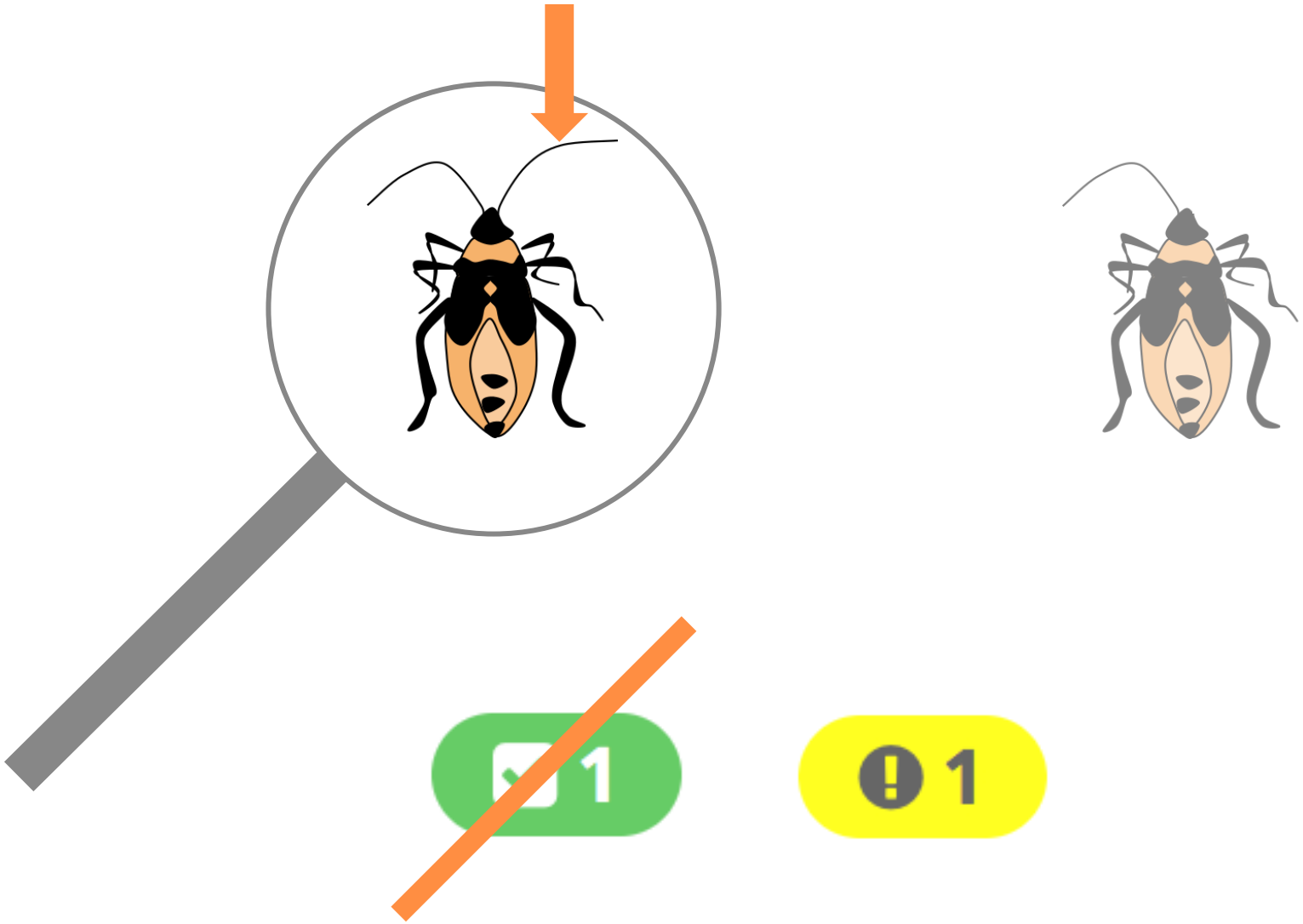
Jun 24 2015
13:07

ACT-4012: IllegalArgumentException when invoking a service task requiring a date (JaxB custom bindings must be used not only when importing the WSDL, but also when creating web-service clients)
by Anya Hill in revision 79db90d23c5af810eea8b830534e3df390aa21a1 (git)

Files: 20 changed, 3 deleted
Findings: 1 15 35

Jun 24 2015
11:06

Mit geerbten Problemen pragmatisch umgehen


1
1

PintaProject/Pinta

Implement a cleaner fix for the gap issues when drawing ellipses.
by Cameron White in revision 10662429ab96515bb2855cde252b04e1fd65212a (master)

Feb 23 2015
01:06

Affected files (4)

Metric changes

1 alerts:

Message	Context
Found potential inconsistent clone change in EllipseEngine.cs	[Broken clone] [Old clone finding] [Code change]

(revision b14ce47783eb93e2a5182cec00bc4ab1e25a54b6)

```
265         }
266
267         /// <summary>
268         /// Calculate each intermediate Point in the specified curve, returning Math.Round(1d / tInterval - 1d)
269         /// </summary>
270         /// <param name="tInterval">The increment value for t (should be between 0-1).</param>
271         /// <param name="x0">Starting point X (not included in the returned Point(s)).</param>
272         /// <param name="y0">Starting point Y (not included in the returned Point(s)).</param>
273         /// <param name="x1">Control point 1 X.</param>
274         /// <param name="y1">Control point 1 Y.</param>
275         /// <param name="x2">Control point 2 X.</param>
276         /// <param name="y2">Control point 2 Y.</param>
277         /// <param name="x3">Ending point X (included in the returned Point(s)).</param>
278         /// <param name="y3">Ending point Y (included in the returned Point(s)).</param>
279         /// <returns></returns>
280         List<IntPoint> CalculateCurvePoints(double tInterval, double x0, double y0, double x1, double y1, double
281         {
282             //Create a new partial Polygon to store the calculated Points.
283             List<IntPoint> calculatedPoints = new List<IntPoint>((int)(1d / tInterval));
284
285             double oneMinusT;
286             double oneMinusTSquared;
287             double oneMinusTCubed;
288
289             double tSquared;
290             double tCubed;
291
292             double oneMinusTSquaredTimesTTimesThree;
293             double oneMinusTTimesTSquaredTimesThree;
294
295             //t will go from tInterval to 1d at the interval of tInterval. t starts
296             //at tInterval instead of 0d because the first Point in the curve is
297             //skipped. This is needed because multiple curves will be placed
298             //sequentially after each other and we don't want to have the same
299             //Point be added to the Polygon twice.
300             for (double t = tInterval; t < 1d; t += tInterval)
301             {
302                 //There are 3 "layers" in a cubic Bezier curve's calculation. These "layers"
303                 //must be calculated for each intermediate Point (for each value of t from
304                 //tInterval to 1d). The Points in each "layer" store [the distance between
305                 //two consecutive Points from the previous "layer" multipled by the value
306                 //of t (which is between 0d-1d)] plus [the position of the first Point of
307                 //the two consecutive Points from the previous "layer"]. This must be
308                 //calculated for the X and Y of every consecutive Point in every layer
309                 //until the last Point possible is reached, which is the Point on the curve.
310
311                 //Note: the code below is an optimized version of the commented explanation above.
312
313                 oneMinusT = 1d - t;
314                 oneMinusTSquared = oneMinusT * oneMinusT;
315                 oneMinusTCubed = oneMinusTSquared * oneMinusT;
316
317                 tSquared = t * t;
318                 tCubed = tSquared * t;
319
320                 oneMinusTSquaredTimesTTimesThree = oneMinusTSquared * t * 3d;
321                 oneMinusTTimesTSquaredTimesThree = oneMinusT * tSquared * 3d;
322
323                 calculatedPoints.Add(new IntPoint(
324                     (long)(oneMinusTCubed * x0 + oneMinusTSquaredTimesTTimesThree * x1 + oneMinusTTimesTSquaredT
```

pinta/Pinta.Tools/Editable/Shapes/EllipseEngine.cs (revision 10662429ab96515bb2855cde252b04e1fd65212a)

```
249         /// <summary>
250         /// Calculate each intermediate Point in the specified curve, returning Math.Round(1d / tInterval - 1d)
251         /// </summary>
252         /// <param name="tInterval">The increment value for t (should be between 0-1).</param>
253         /// <param name="x0">Starting point X (not included in the returned Point(s)).</param>
254         /// <param name="y0">Starting point Y (not included in the returned Point(s)).</param>
255         /// <param name="x1">Control point 1 X.</param>
256         /// <param name="y1">Control point 1 Y.</param>
257         /// <param name="x2">Control point 2 X.</param>
258         /// <param name="y2">Control point 2 Y.</param>
259         /// <param name="x3">Ending point X (included in the returned Point(s)).</param>
260         /// <param name="y3">Ending point Y (included in the returned Point(s)).</param>
261         /// <param name="cPIndex">The index of the previous ControlPoint to the generated points.</param>
262         /// <returns></returns>
263         protected List<GeneratedPoint> calculateCurvePoints(
264             double tInterval,
265             double x0, double y0, double x1, double y1, double x2, double y2, double x3, double y3,
266             int cPIndex)
267         {
268             List<GeneratedPoint> calculatedPoints = new List<GeneratedPoint>((int)(1d / tInterval));
269
270             double oneMinusT;
271             double oneMinusTSquared;
272             double oneMinusTCubed;
273
274             double tSquared;
275             double tCubed;
276
277             double oneMinusTSquaredTimesTTimesThree;
278             double oneMinusTTimesTSquaredTimesThree;
279
280             for (double t = 0; t < 1d; t += tInterval)
281             {
282                 //There are 3 "layers" in a cubic Bezier curve's calculation. These "layers"
283                 //must be calculated for each intermediate Point (for each value of t from
284                 //tInterval to 1d). The Points in each "layer" store [the distance between
285                 //two consecutive Points from the previous "layer" multipled by the value
286                 //of t (which is between 0d-1d)] plus [the position of the first Point of
287                 //the two consecutive Points from the previous "layer"]. This must be
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290
291                 //Note: the code below is an optimized version of the commented explanation above.
292
293                 oneMinusT = 1d - t;
294                 oneMinusTSquared = oneMinusT * oneMinusT;
295                 oneMinusTCubed = oneMinusTSquared * oneMinusT;
296
297                 tSquared = t * t;
298                 tCubed = tSquared * t;
299
300                 oneMinusTSquaredTimesTTimesThree = oneMinusTSquared * t * 3d;
301                 oneMinusTTimesTSquaredTimesThree = oneMinusT * tSquared * 3d;
302
303                 calculatedPoints.Add(new GeneratedPoint(new PointD(
304                     (oneMinusTCubed * x0 + oneMinusTSquaredTimesTTimesThree * x1 + oneMinusTTimesTSquaredTimesTh
305                     (oneMinusTCubed * y0 + oneMinusTSquaredTimesTTimesThree * y1 + oneMinusTTimesTSquaredTimesTh
306                     cPIndex));
307             }
```
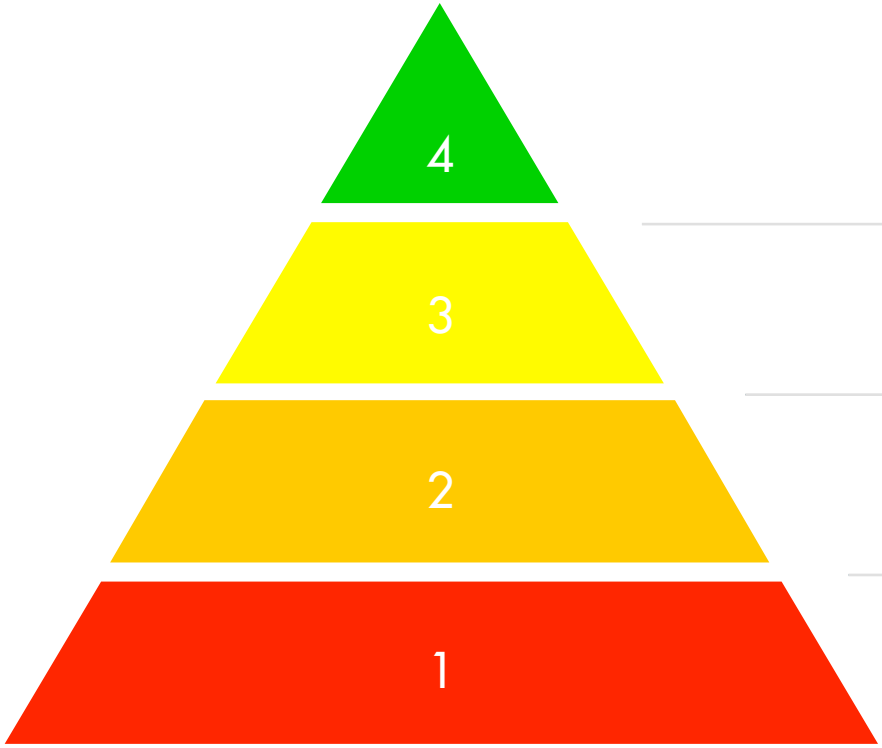

Wartungsprobleme schrittweise aufräumen



Keine Defizite

Keine Defizite in geändertem Code

Keine neuen Defizite

Mir doch egal

6 Findings in **geändertem** Code

Add schema (on for Oracle on QA
by Daniel Lewis vision 93beea0b2623ec52f362d4ca5c7a71039ab14409 (git)

Files: 14 changed, deleted
Findings: 7 6 9

Jun 24 2015
16:35

Merge branch 'master' of https://github.com/mittalabhi2123/Activiti into mittalabhi2123-master
by Isabella Wright in revision 0292ee4f7ace6a1c81af64f71fac78935c39b101 (git)

Files: 4 added, 34 changed
Findings: 44 20 8

Jun 24 2015
13:07

ACT-4012: IllegalArgumentException when invoking a service task requiring a date (JaxB custom bindings must be used not only when importing the WSDL, but also when creating web-service clients)
by Anya Hill in revision 79db90d23c5af810eea8b830534e3df390aa21a1 (git)

Files: 20 changed, 3 deleted
Findings: 1 15 35

Jun 24 2015
11:06

Wirksamkeit von Änderungen überprüfen

Source: unknown

jenkinsci/jenkins

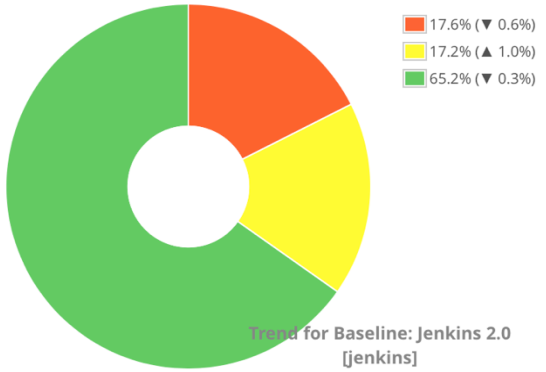
Baseline Delta für Jenkins 2.0

LOC for jenkins

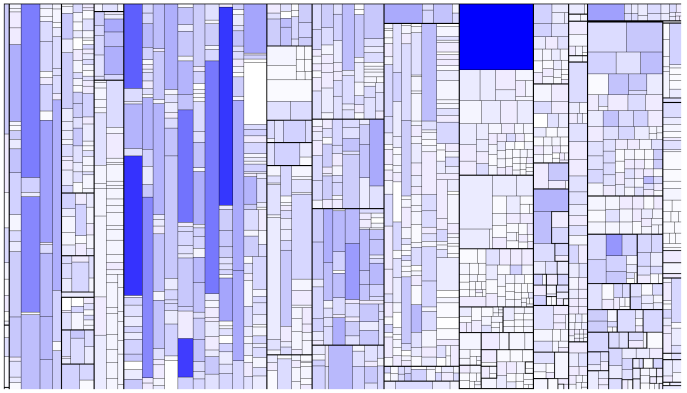
220.7k

+12,903

File Size for jenkins



Ownership for jenkins

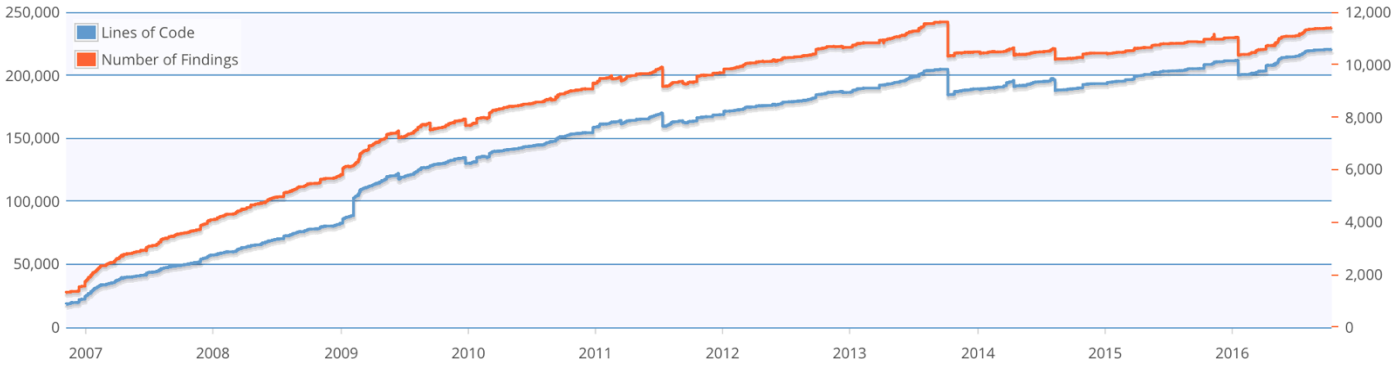


Clone Coverage for jenkins

3.7%

+1.18%

LOC vs. Clone Coverage Trend for jenkins



Fazit

Historienanalysen schaffen ein umfassenderes **Verständnis** als Analysen auf dem aktuellen Stand.

Dadurch erlauben sie die Erkennung und Behebung von **Ursachen**, nicht nur Symptomen.

Kontakt

Ich freue mich auf Diskussionen!

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@dennispagano

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85748 Garching bei München

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Continuous Quality in Software Engineering