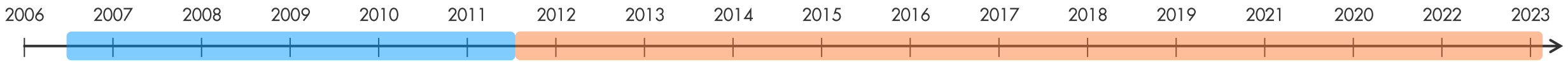
Software Intelligence

Was verraten unsere Entwicklungsdaten über Probleme in unserer Software?

Dr. Elmar Jürgens

CQSE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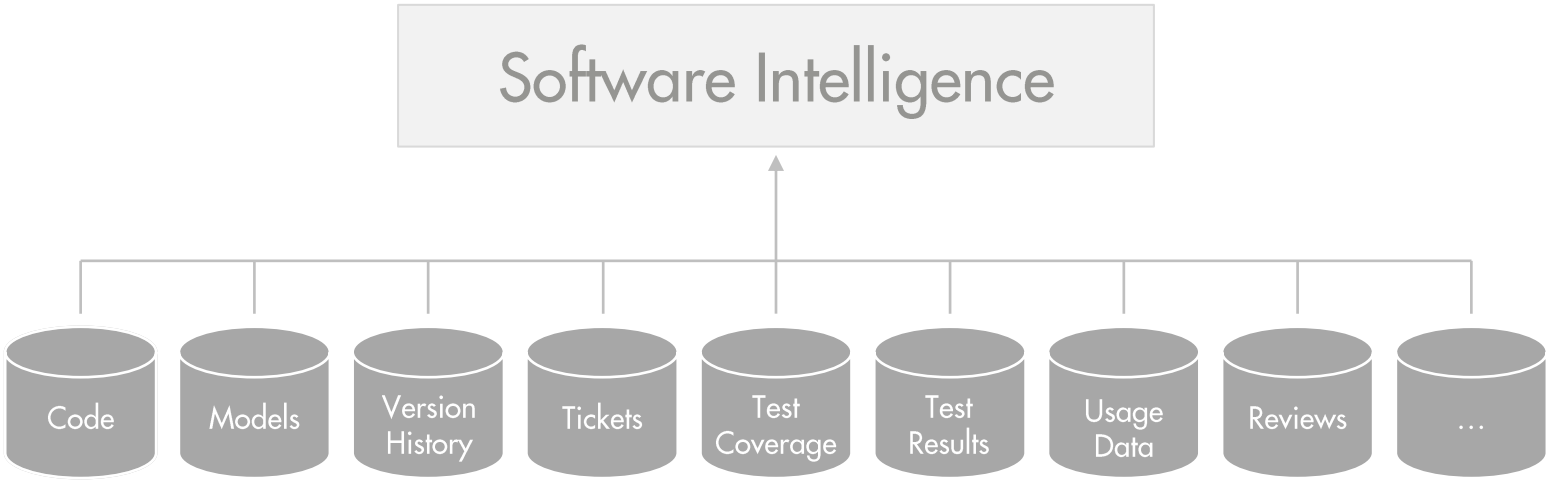
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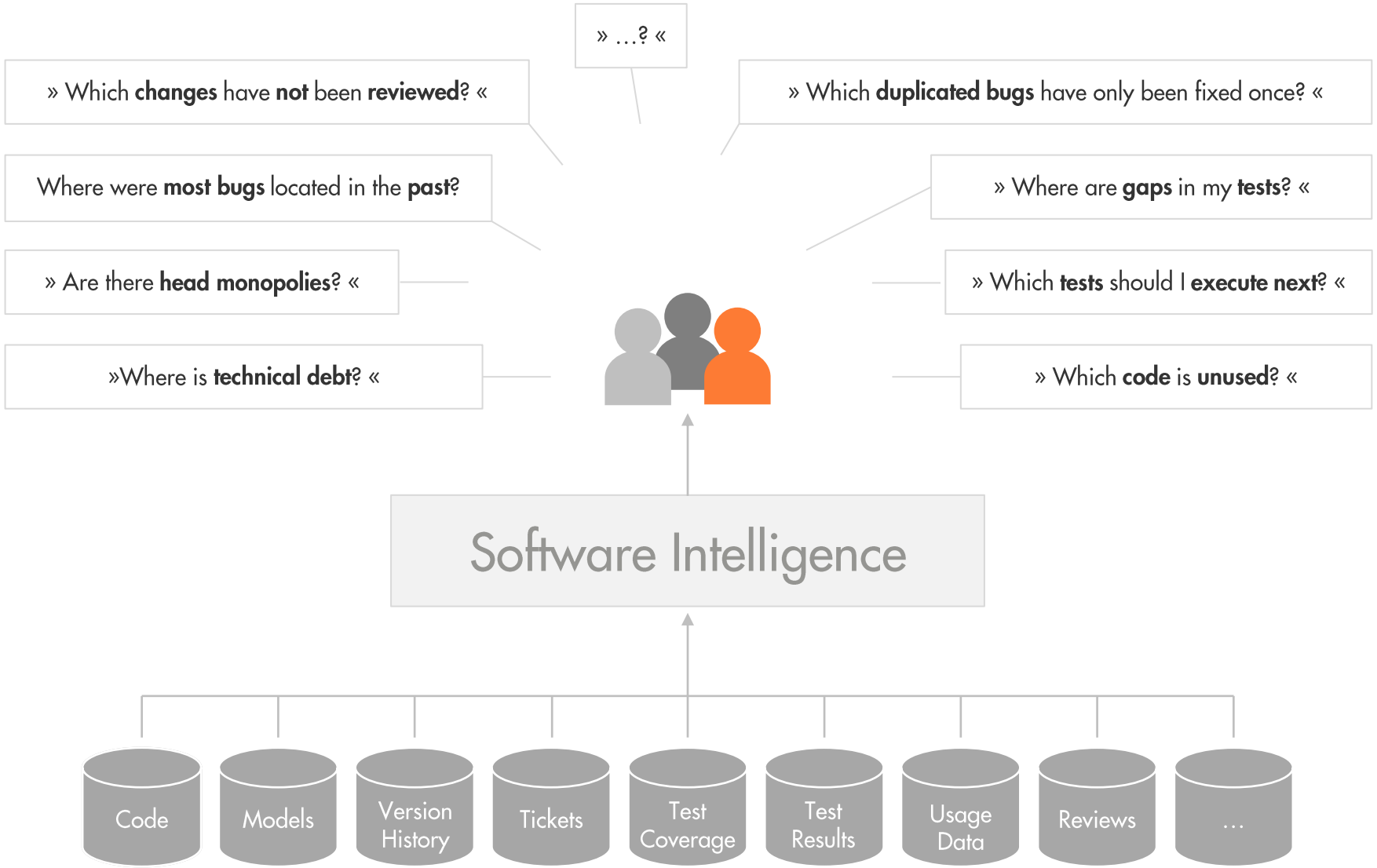
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Where were **most bugs** located in the **past**?
» Where are **gaps** in my **tests**? «
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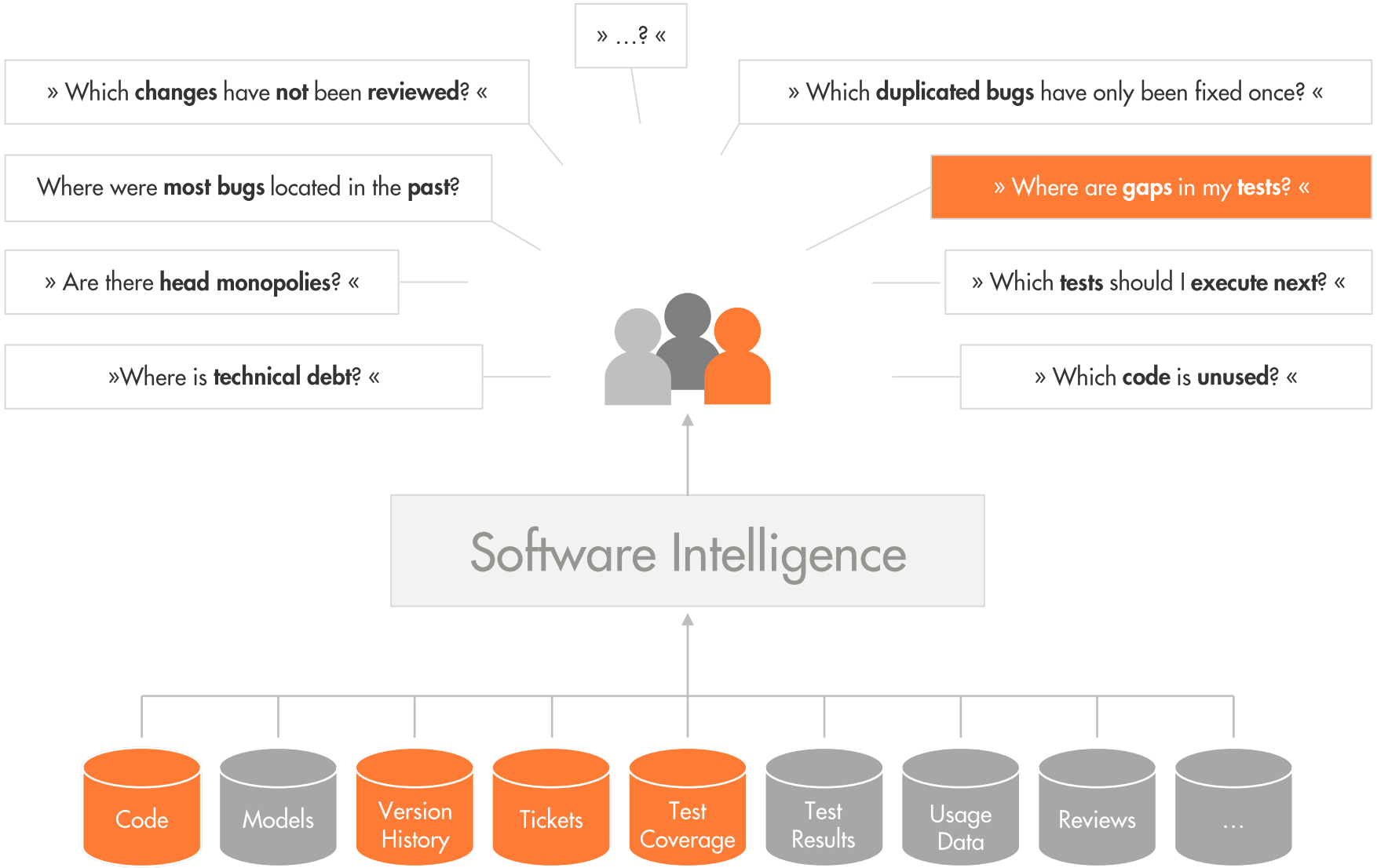
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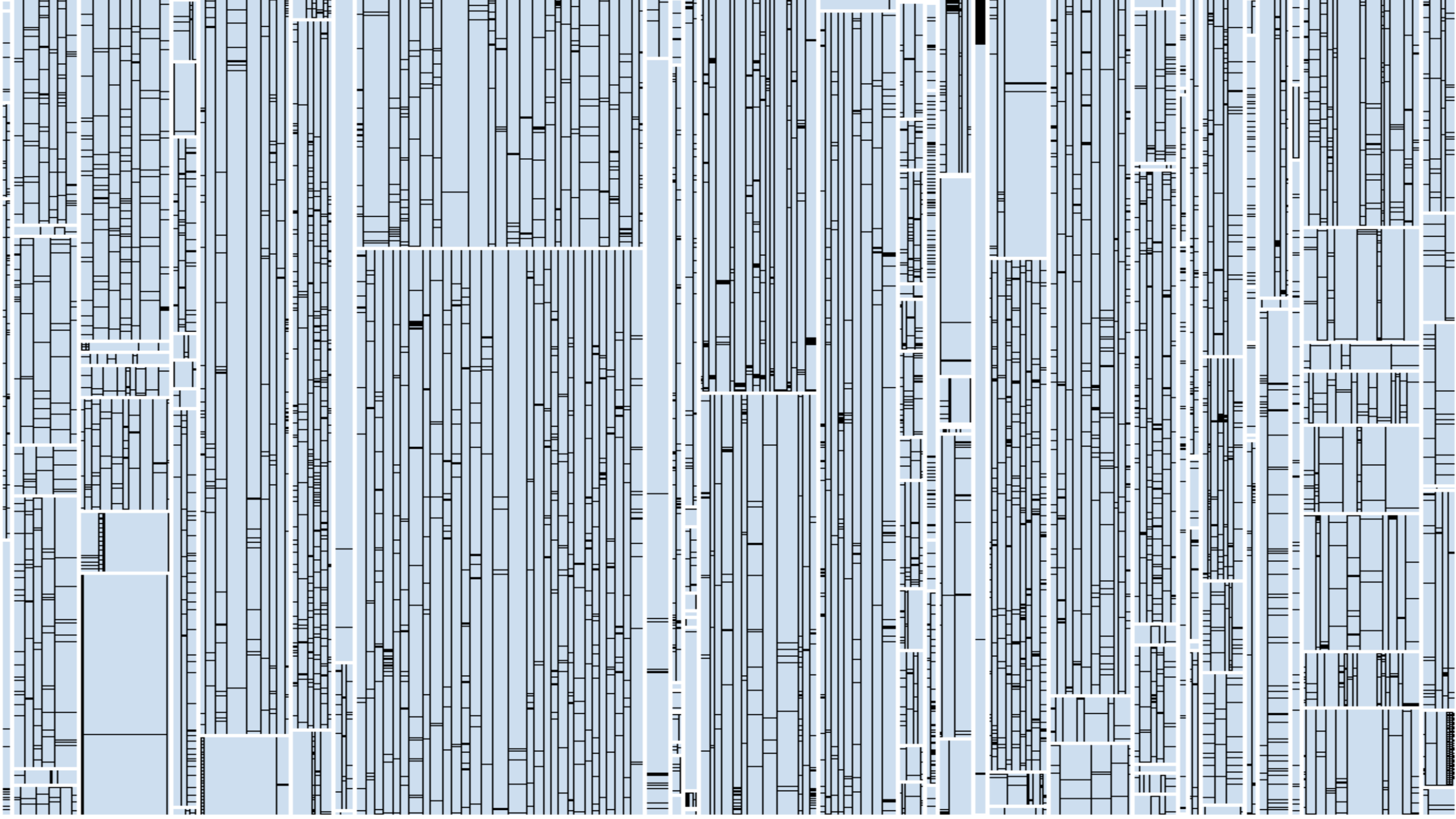
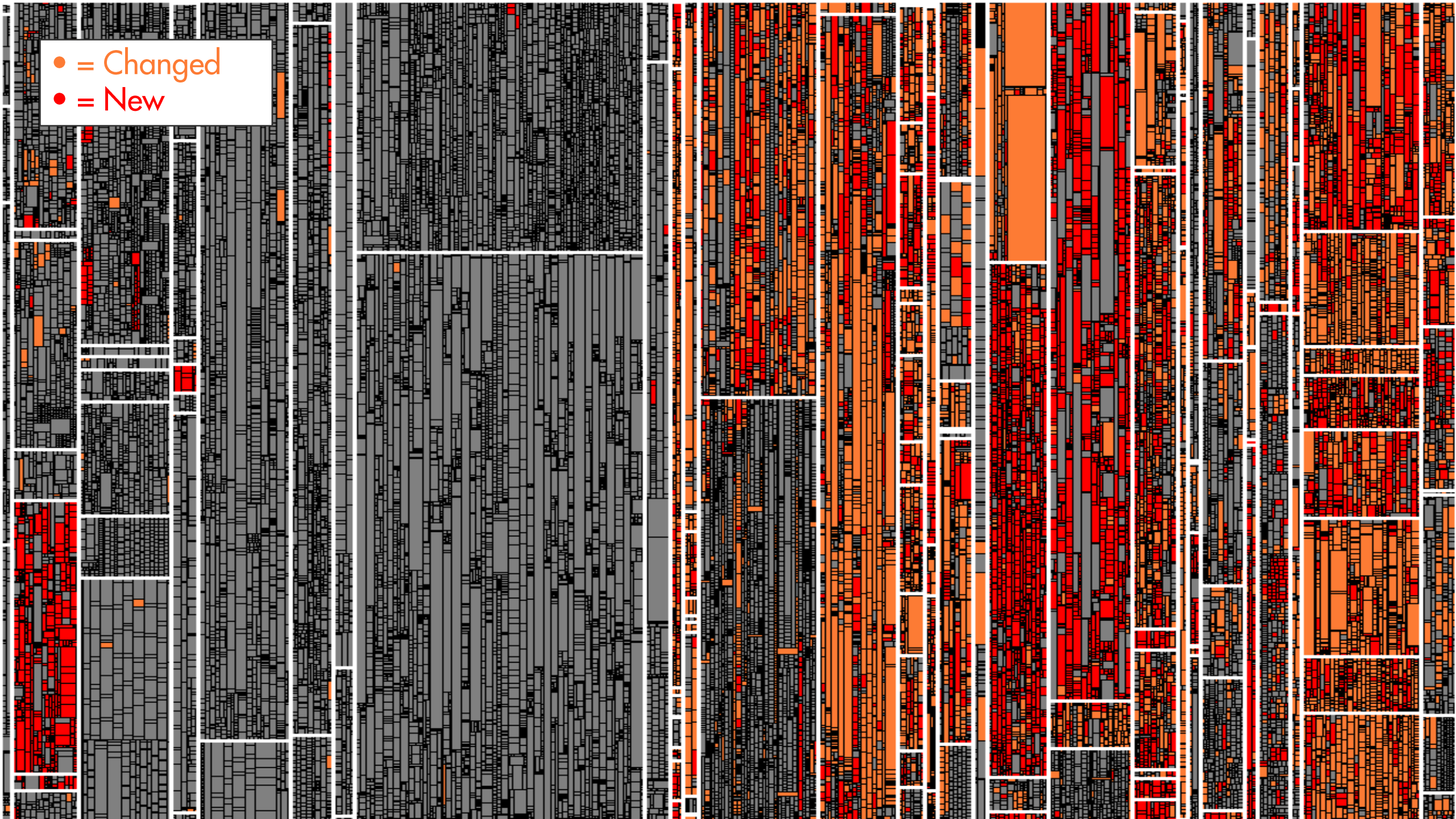
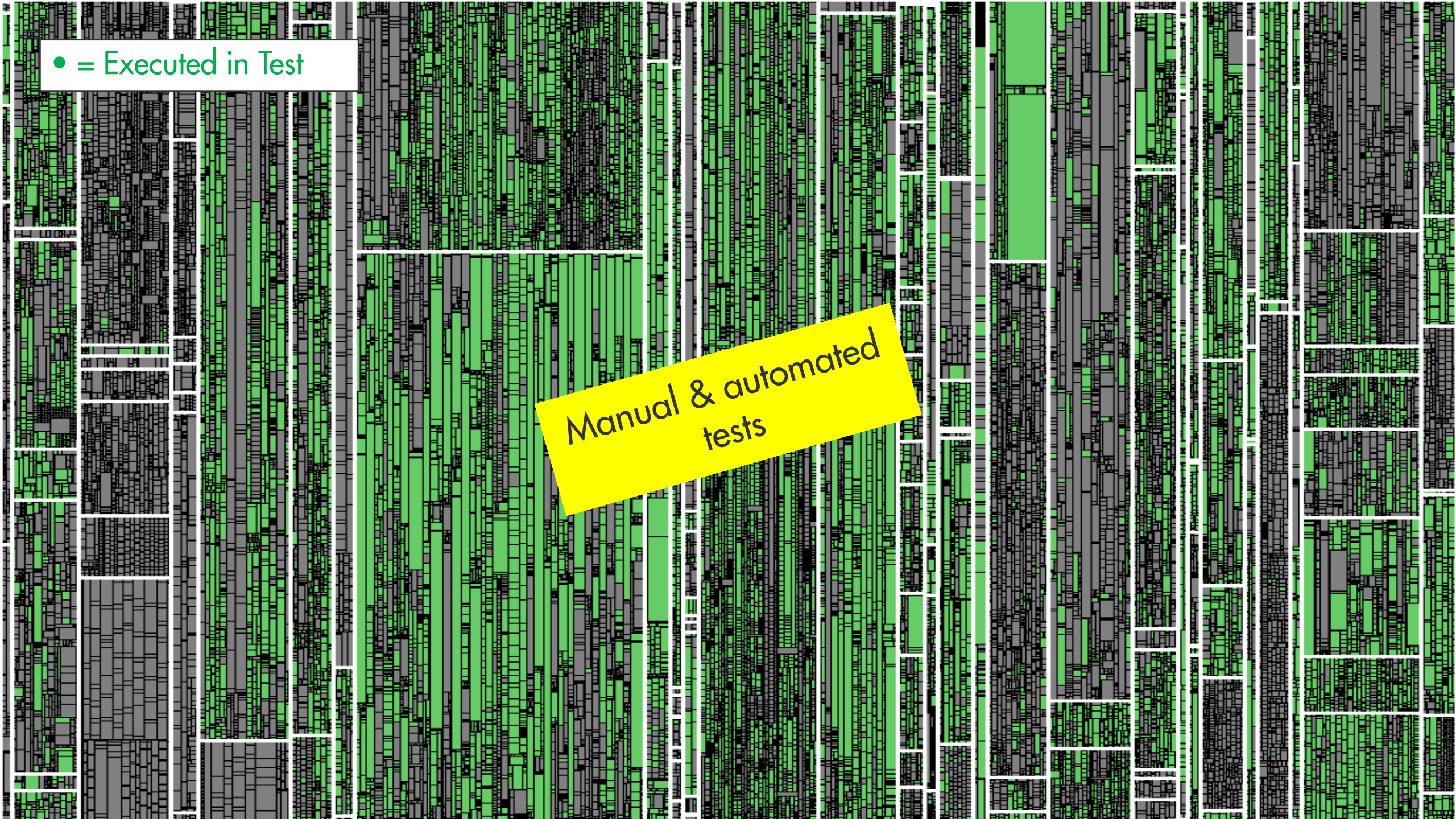
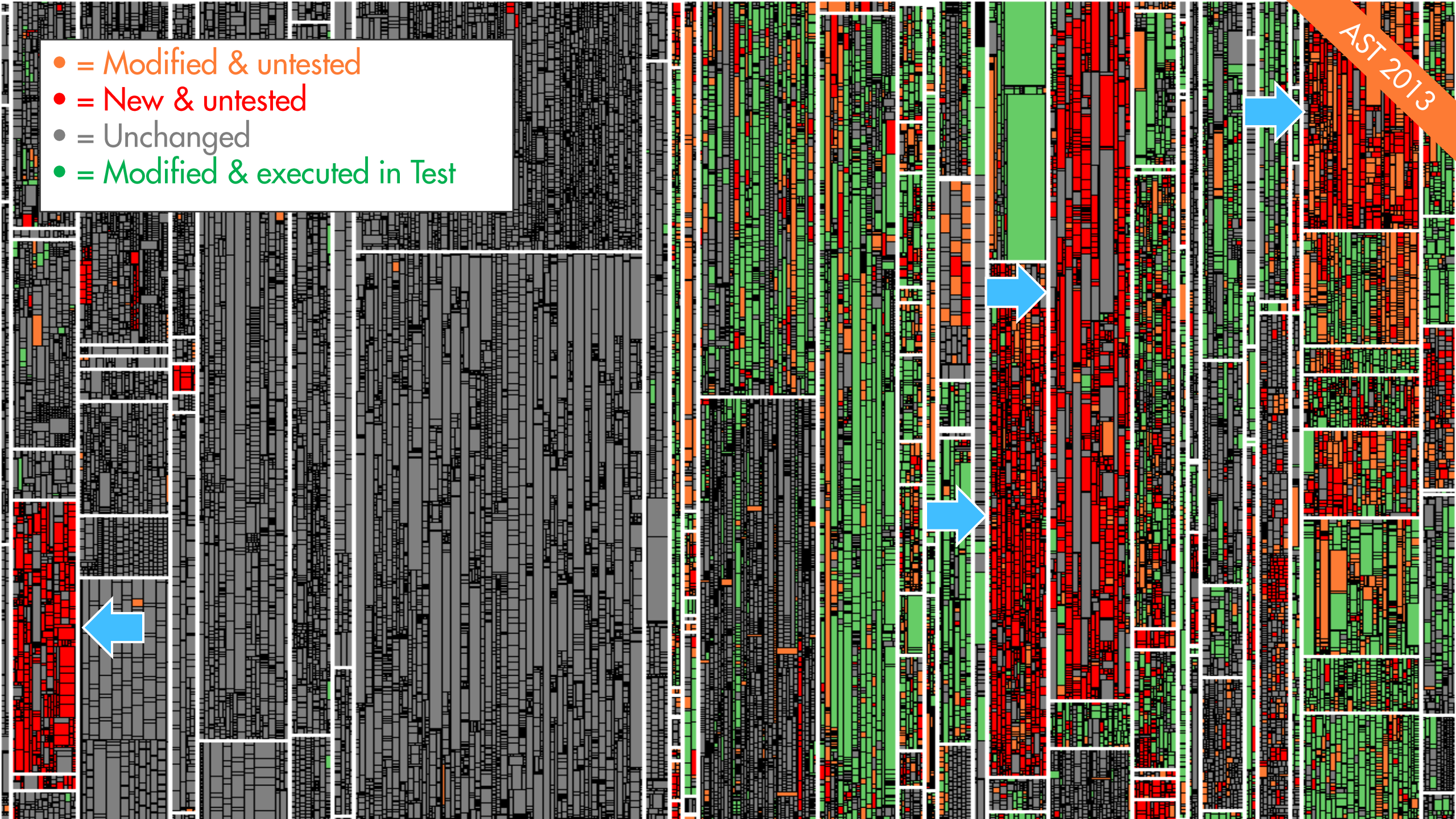
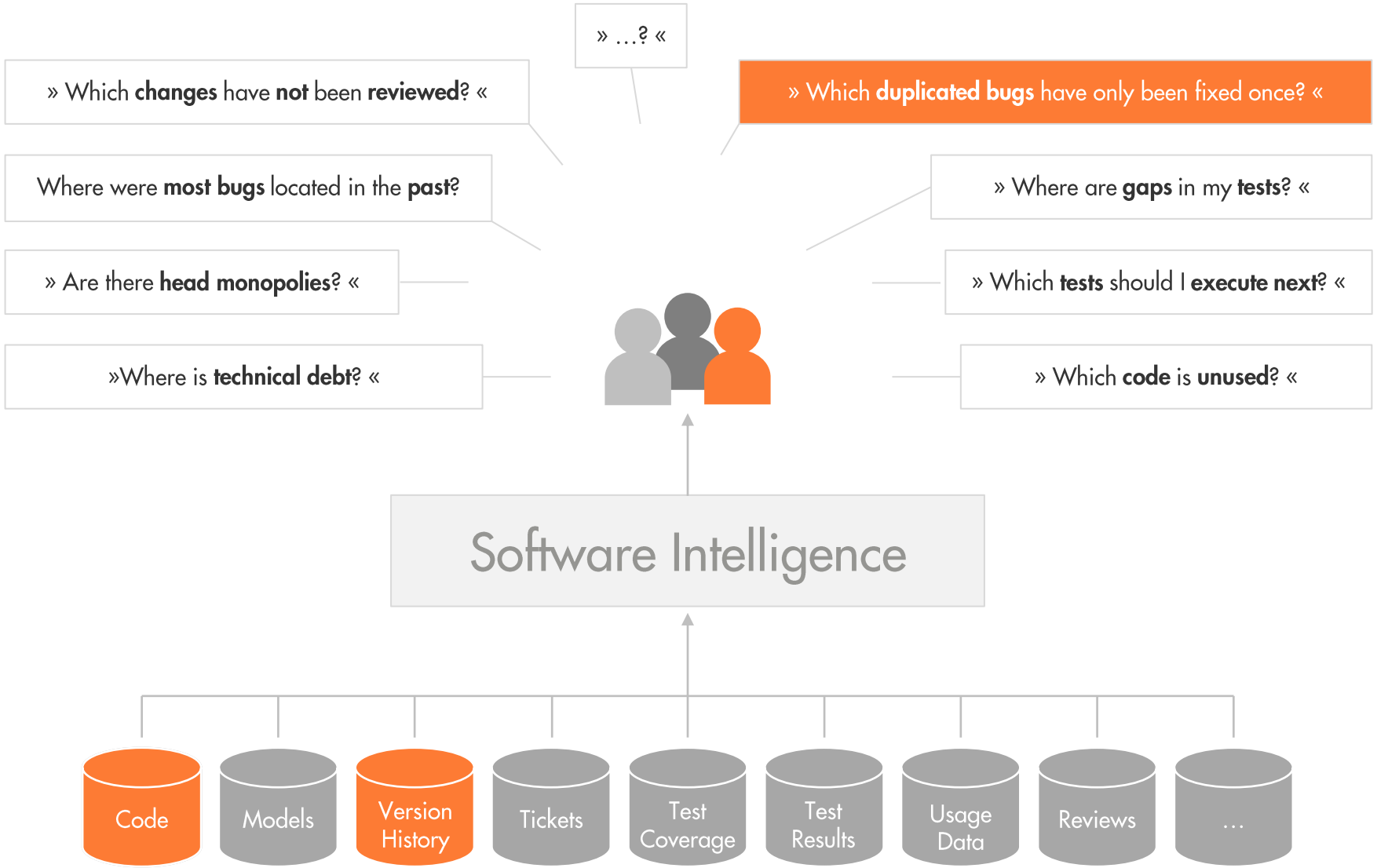



• = Changed
• = New


• = Executed in Test
Manual & automated tests


• = Modified & untested
• = New & untested
• = Unchanged
• = Modified & executed in Test
AST 2013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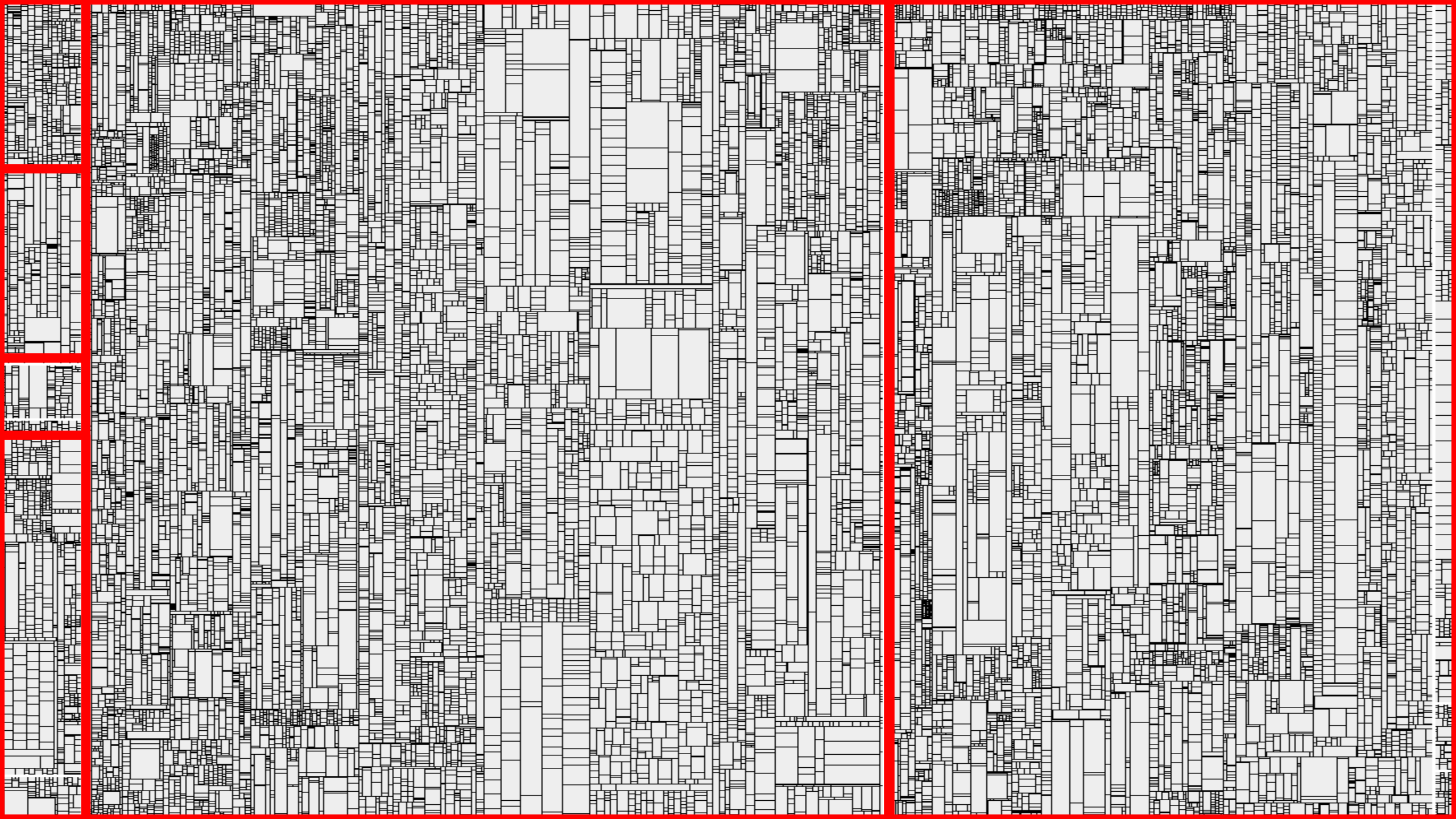

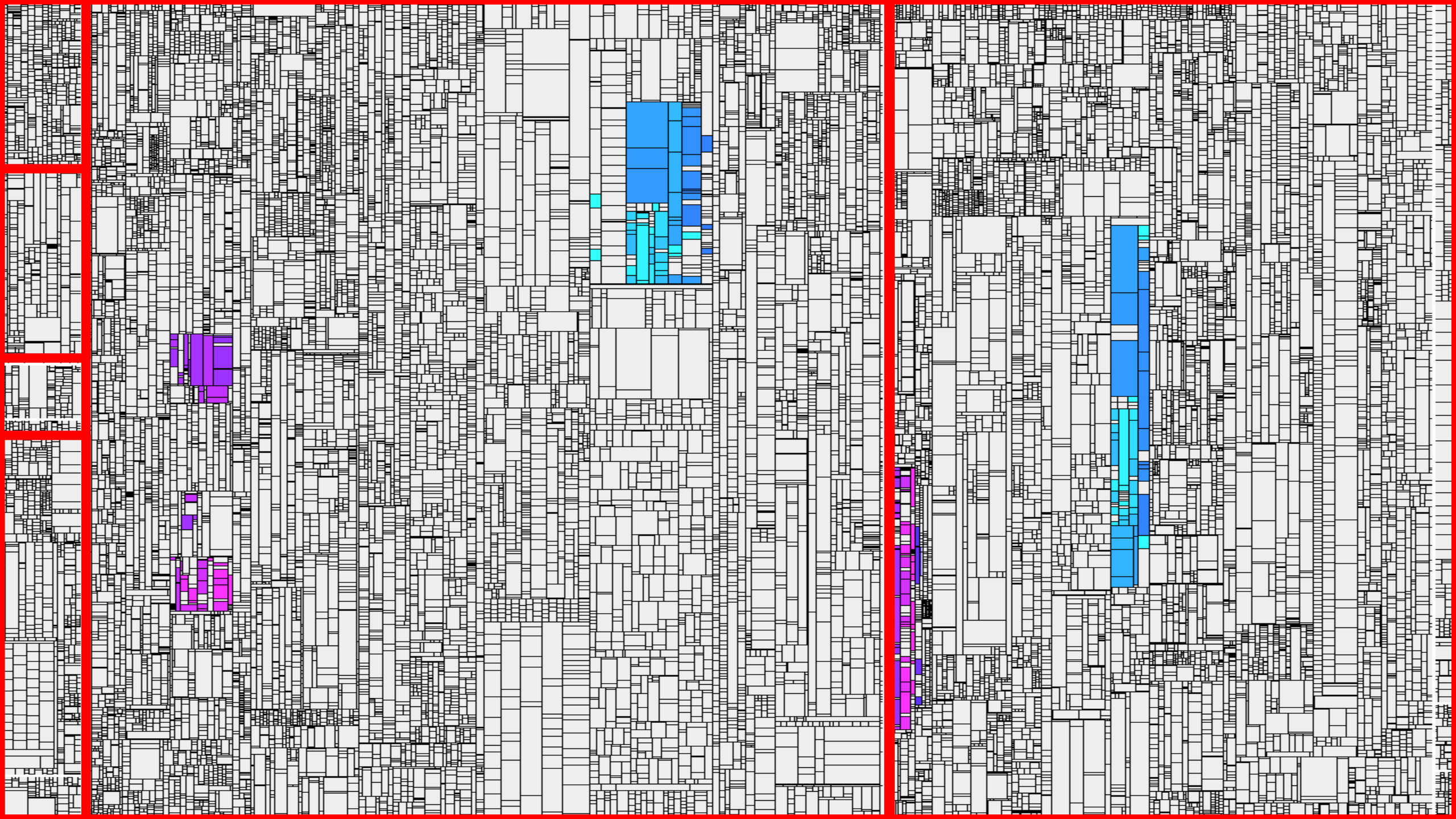

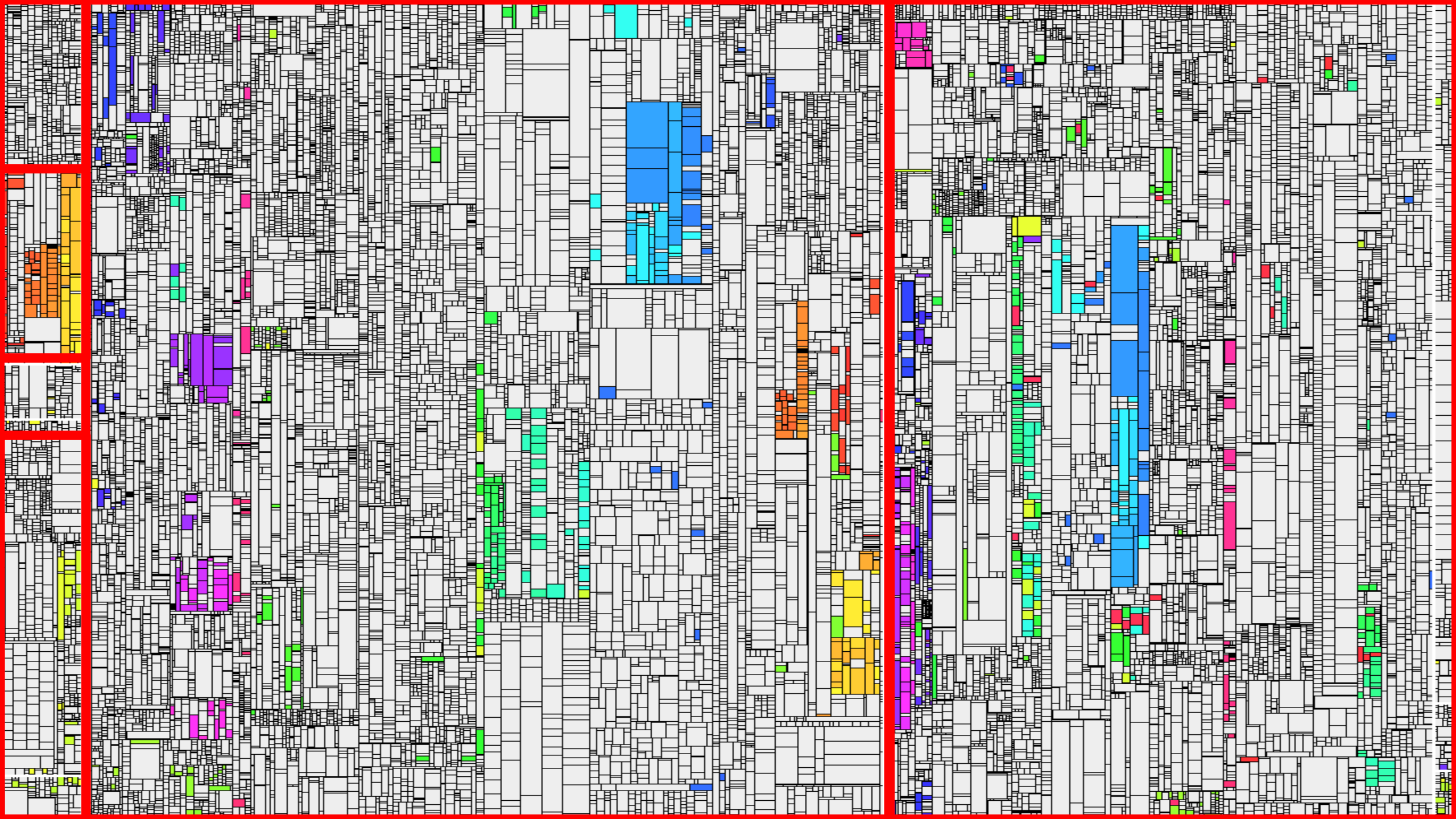

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Collapse

jenkins/test/src/main/java/org/jvnet/hudson/test/HudsonTestCase.java (revision 12d96a56...)

```
 if (lhs==null && rhs==null)     return;
 if (lhs==null)      fail("lhs is null while rhs="+rhs);
 if (rhs==null)      fail("rhs is null while lhs="+lhs);

 Constructor<?> lc = findDataBoundConstructor(lhs.getClass());
 Constructor<?> rc = findDataBoundConstructor(rhs.getClass());
 assertEquals("Data bound constructor mismatch. Different type?",lc,rc);

 List<String> primitiveProperties = new ArrayList<String>();

 String[] names = ClassDescriptor.loadParameterNames(lc);
 Class<?>[] types = lc.getParameterTypes();
 assertEquals(names.length,types.length);
 for (int i=0; i<types.length; i++) {
     Object lv = ReflectionUtils.getPublicProperty(lhs, names[i]);
     Object rv = ReflectionUtils.getPublicProperty(rhs, names[i]);

     if (Iterable.class.isAssignableFrom(types[i])) {
         Iterable lcol = (Iterable) lv;
         Iterable rcol = (Iterable) rv;
         Iterator ltr,rtr;
         for (ltr=lcol.iterator(), rtr=rcol.iterator(); ltr.hasNext() && rtr.hasNext();)
             Object litem = ltr.next();
             Object ritem = rtr.next();

             if (findDataBoundConstructor(litem.getClass())!=null) {
                 assertEqualDataBoundBeans(litem,ritem);
             } else {
                 assertEquals(litem,ritem);
             }
         }
         assertFalse("collection size mismatch between "+lhs+" and "+rhs, ltr.hasNext() ^
     } else
     if (findDataBoundConstructor(types[i])!=null || (lv!=null && findDataBoundConstructo
         // recurse into nested databound objects
         assertEqualDataBoundBeans(lv,rv);
     } else {
         primitiveProperties.add(names[i]);
     }
 }

 // compare shallow primitive properties
 if (!primitiveProperties.isEmpty())
     assertEqualBeans(lhs,rhs,Util.join(primitiveProperties,","));


*
 Makes sure that two collections are identical via {@link #assertEqualDataBoundBeans(Objec
/
blic void assertEqualDataBoundBeans(List<?> lhs, List<?> rhs) throws Exception {
 assertEquals(lhs.size(), rhs.size());
```

jenkins/test/src/main/java/org/jvnet/hudson/test/JenkinsRule.java (revision 3909f5ac...)

```
 if (lhs==null && rhs==null)     return;
 if (lhs==null)      fail("lhs is null while rhs="+rhs);
 if (rhs==null)      fail("rhs is null while lhs="+lhs);

 Constructor<?> lc = findDataBoundConstructor(lhs.getClass());
 Constructor<?> rc = findDataBoundConstructor(rhs.getClass());
 assertThat("Data bound constructor mismatch. Different type?", (Constructor)rc, is((Cons

 List<String> primitiveProperties = new ArrayList<String>();

 String[] names = ClassDescriptor.loadParameterNames(lc);
 Class<?>[] types = lc.getParameterTypes();
 assertThat(types.length, is(names.length));
 for (int i=0; i<types.length; i++) {
     Object lv = ReflectionUtils.getPublicProperty(lhs, names[i]);
     Object rv = ReflectionUtils.getPublicProperty(rhs, names[i]);

     if (lv != null && rv != null && Iterable.class.isAssignableFrom(types[i])) {
         Iterable lcol = (Iterable) lv;
         Iterable rcol = (Iterable) rv;
         Iterator ltr,rtr;
         for (ltr=lcol.iterator(), rtr=rcol.iterator(); ltr.hasNext() && rtr.hasNext();)
             Object litem = ltr.next();
             Object ritem = rtr.next();

             if (findDataBoundConstructor(litem.getClass())!=null) {
                 assertEqualDataBoundBeans(litem,ritem);
             } else {
                 assertThat(ritem, is(litem));
             }
         }
         assertThat("collection size mismatch between " + lhs + " and " + rhs, ltr.hasNex
                 is(false));
     } else
     if (findDataBoundConstructor(types[i])!=null || (lv!=null && findDataBoundConstructo
         // recurse into nested databound objects
         assertEqualDataBoundBeans(lv,rv);
     } else {
         primitiveProperties.add(names[i]);
     }
 }

 // compare shallow primitive properties
 if (!primitiveProperties.isEmpty())
     assertEqualBeans(lhs,rhs,Util.join(primitiveProperties,","));


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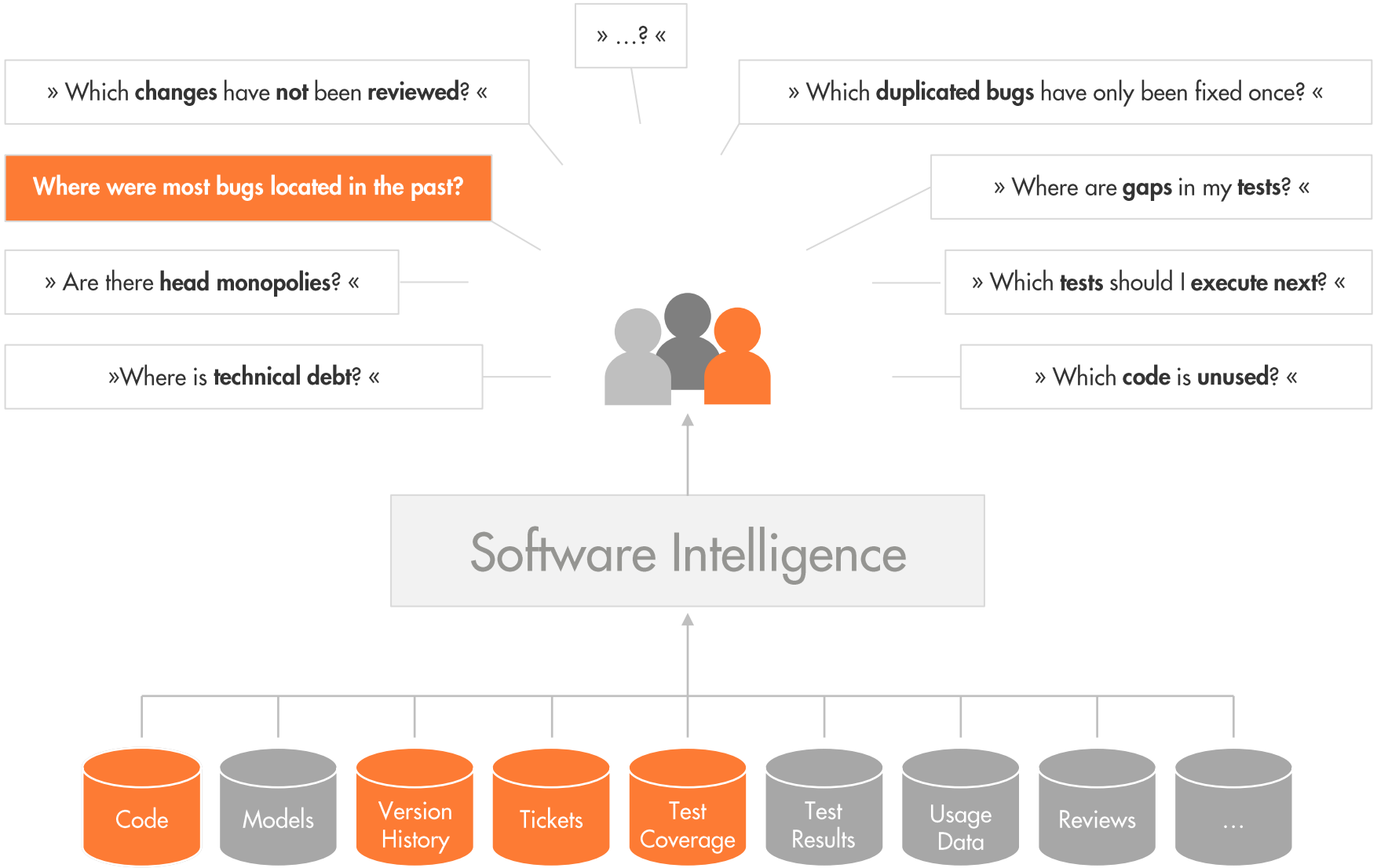
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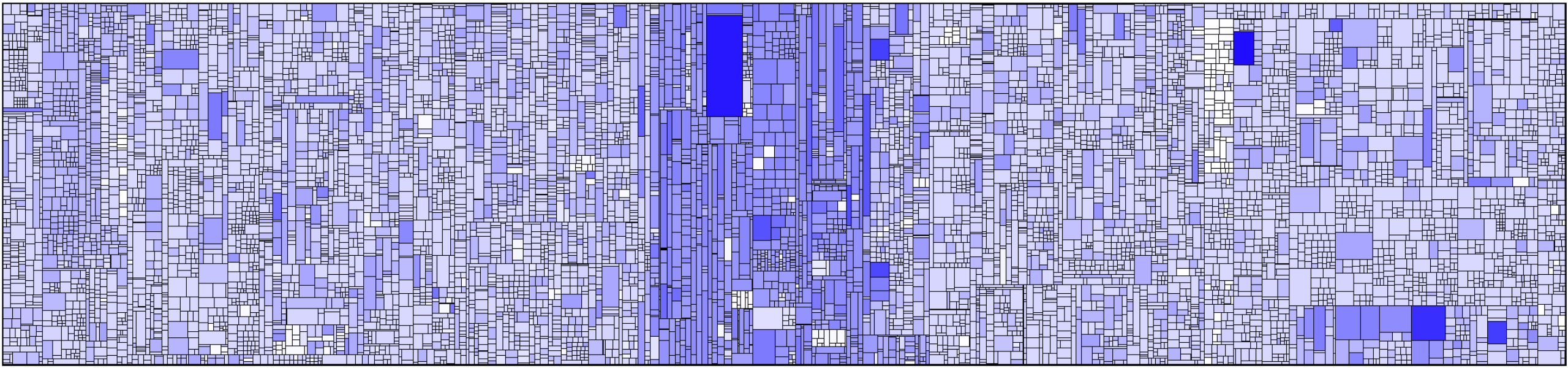

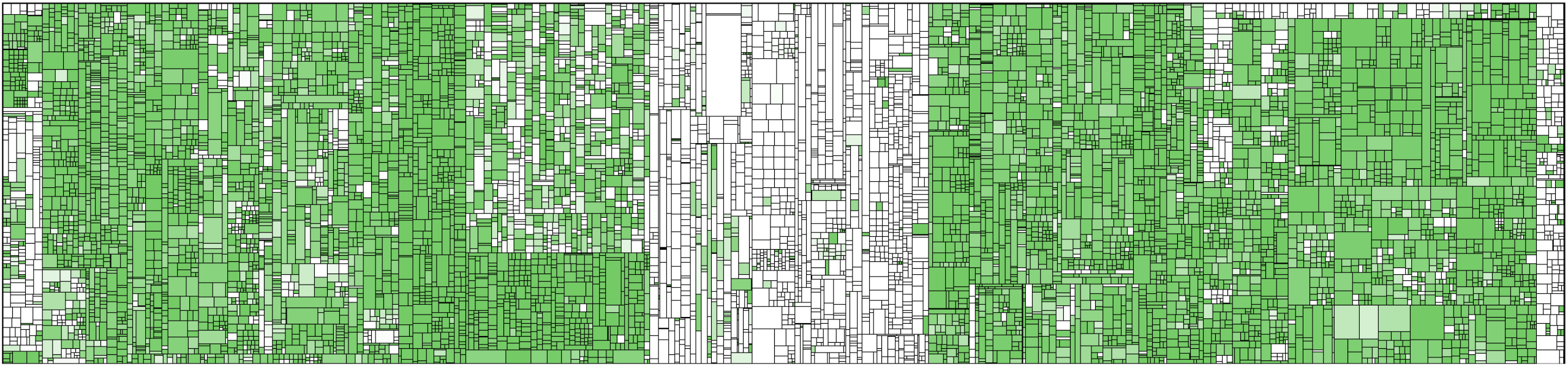

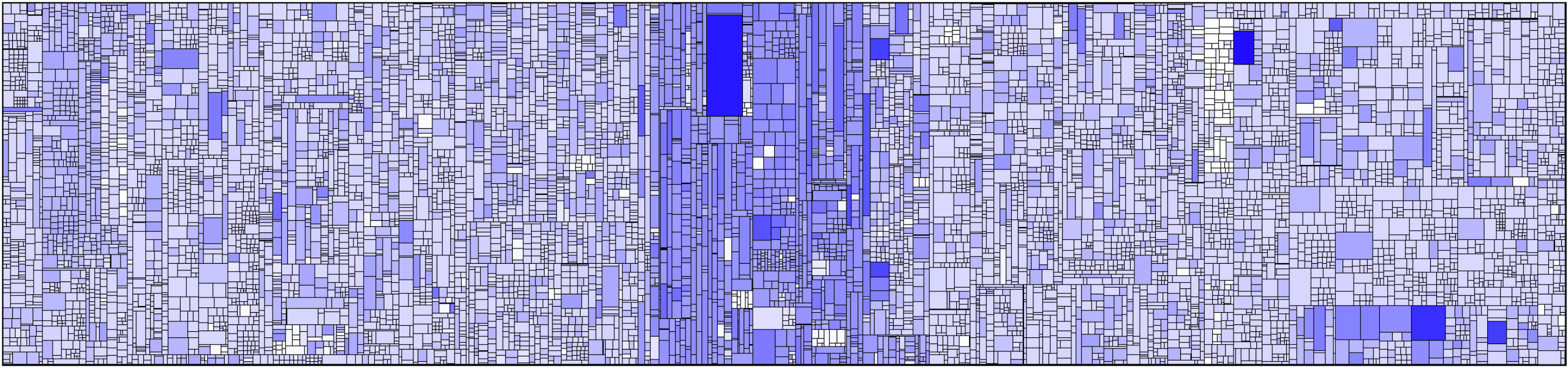

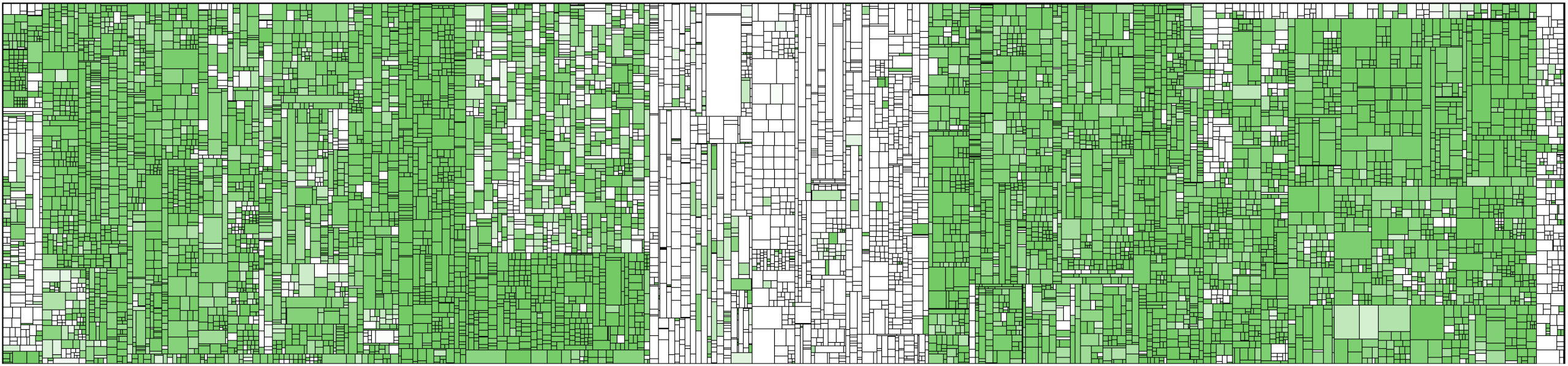

Ich freue mich auf Fragen ☺

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Link zu Folien

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