

Software Quality – you know it when you see it

Erik Doernenburg
ThoughtWorks

Software Quality

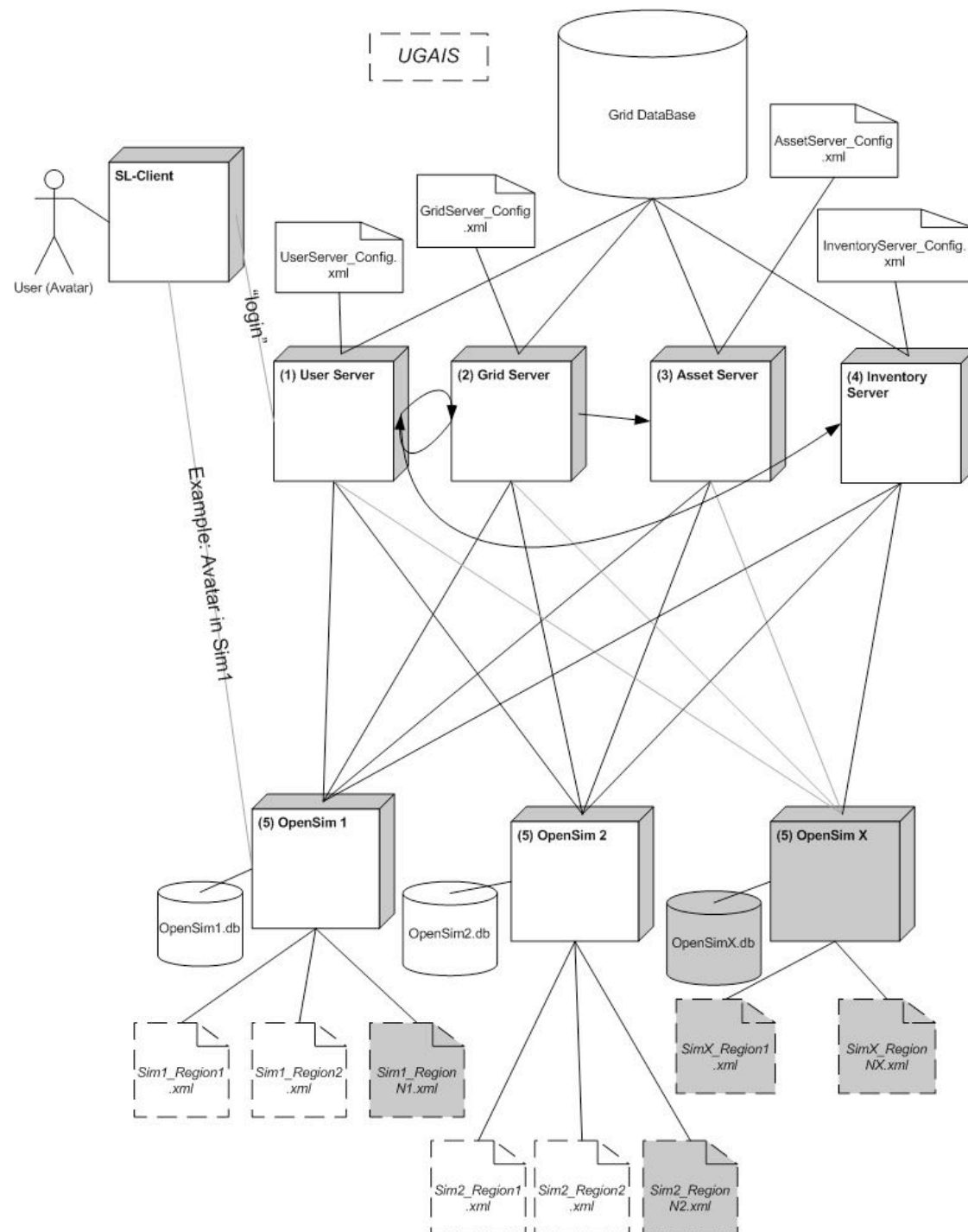
External perspective

- Is the software of value to its users?

Internal perspective

- How appropriate is the design?
- How easy is it to understand and extend? 
- How maintainable is the software?

30.000ft and ground level



```
public void mergePluginOutput(BuildDetail build, Map parameter
Iterator iterator = lines().iterator();
while (iterator.hasNext()) {
    try {
        assemblePlugin(build, parameters, (String) iterat
    } catch (Exception e) {
        logger.error(e);
        continue;
    }
}
```

```
void assemblePlugin(BuildDetail build, Map parameters, String
String className = line.trim();
if (className.startsWith("#") || StringUtils.isEmpty(class
    return;
}
Class clazz = Class.forName(className);
Widget digesterService = (Widget) clazz.newInstance();
mergeParameters(build, parameters);
build.addPluginOutput(digesterService.getDisplayName(), c
    .getOutput(parameters));
}
```

```
private void mergeParameters(BuildDetail build, Map parameter
parameters.put(Widget.PARAM_CC_ROOT, configuration.getCC
parameters.put(Widget.PARAM_DT_NAME, build.getProjectName
```

http://opensimulator.org/wiki/Grid_Architecture_Diagram

The 1000ft view

Is at the *right* level

Aggregates data and metrics

Utilises visualisation techniques

Makes every pixel count

Depends on the question

Metrics

- lines of code
- method length
- class size
- boolean expression complexity
- cyclomatic complexity



ckjm



More metrics

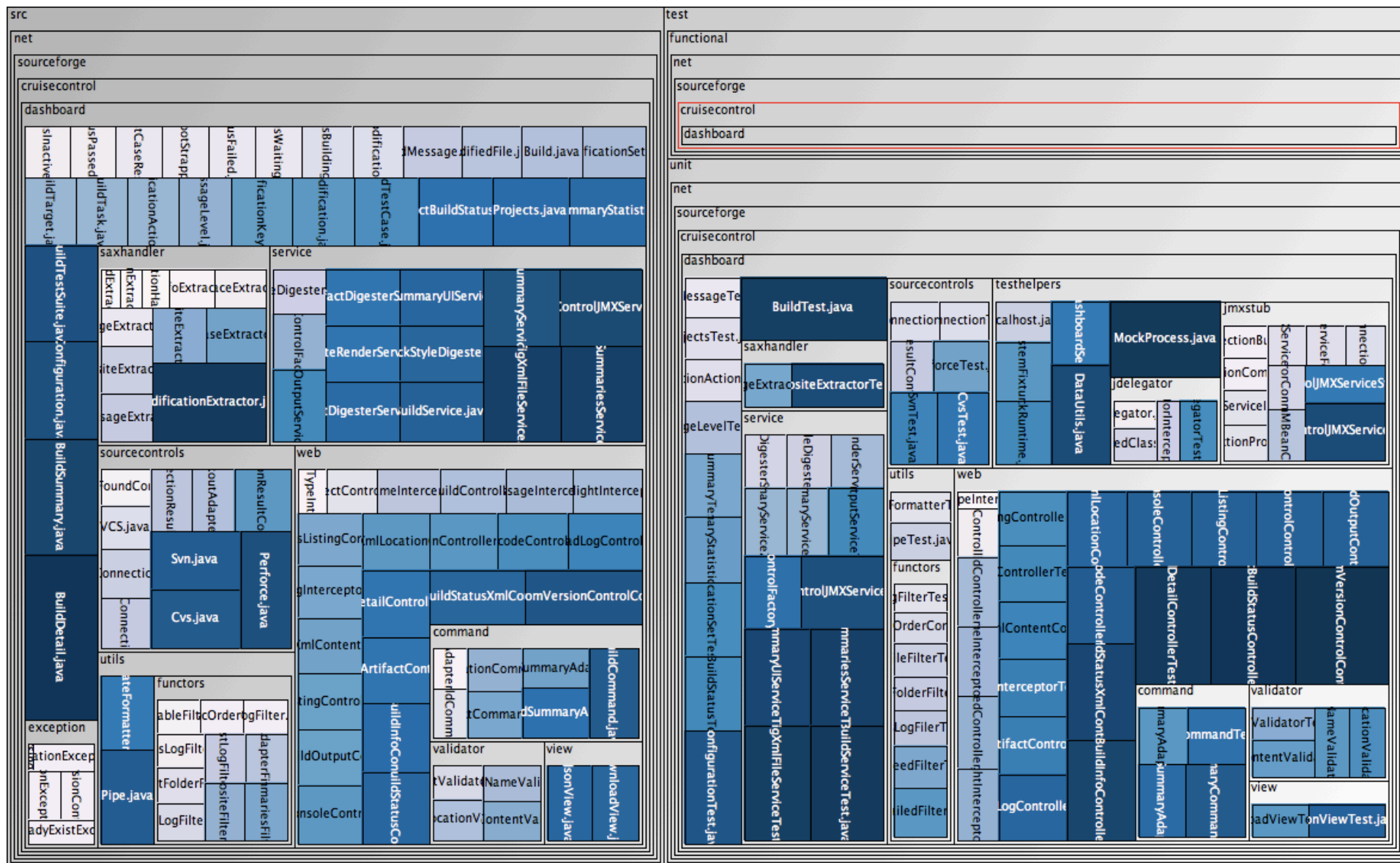
- duplication
- coverage
- testability
- test/code ratio



simian

**Testability
Explorer**

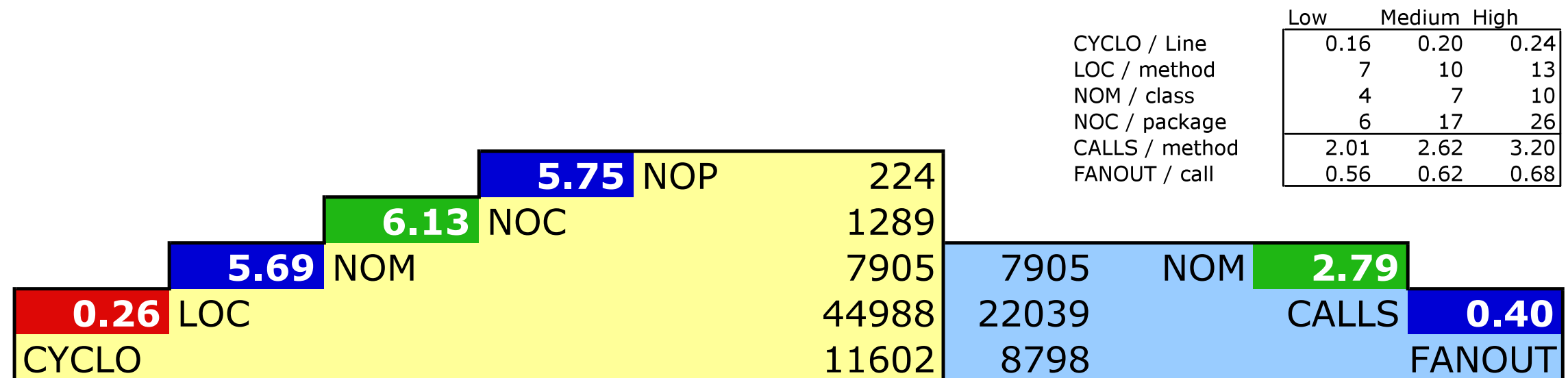
Tree maps



Show distribution of metrics

Created with checkstyle and InfoVis

Size & complexity pyramid



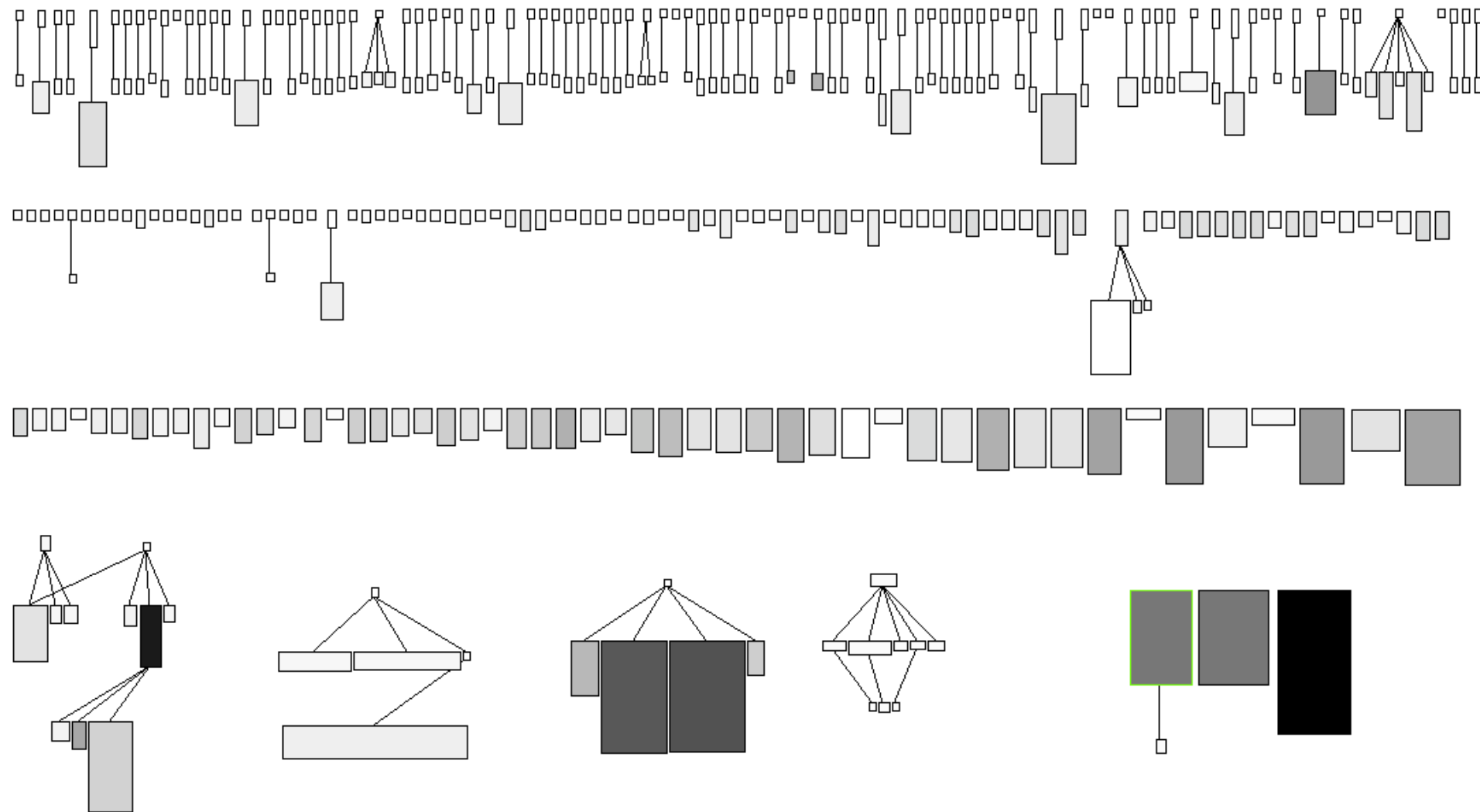
Developed at Universities of Berne and Lugano

Shows key metrics and their relationships

Allows comparison to “industry standards”

Created by iPlasma tool from source code

Code Crawler

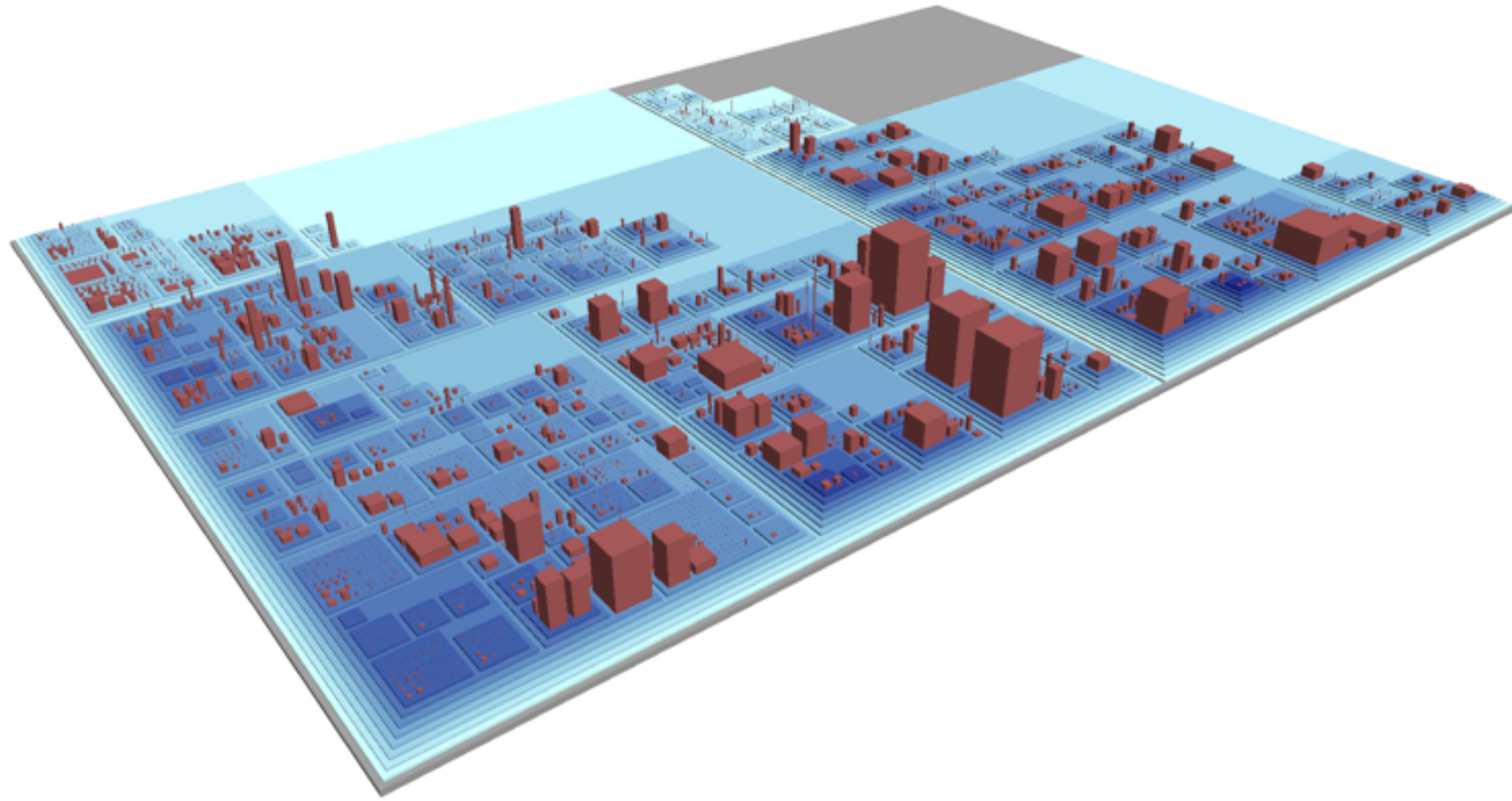


Part of the *Moose* academic initiative

Allows exploration of quality metrics

Reads Famix XML data

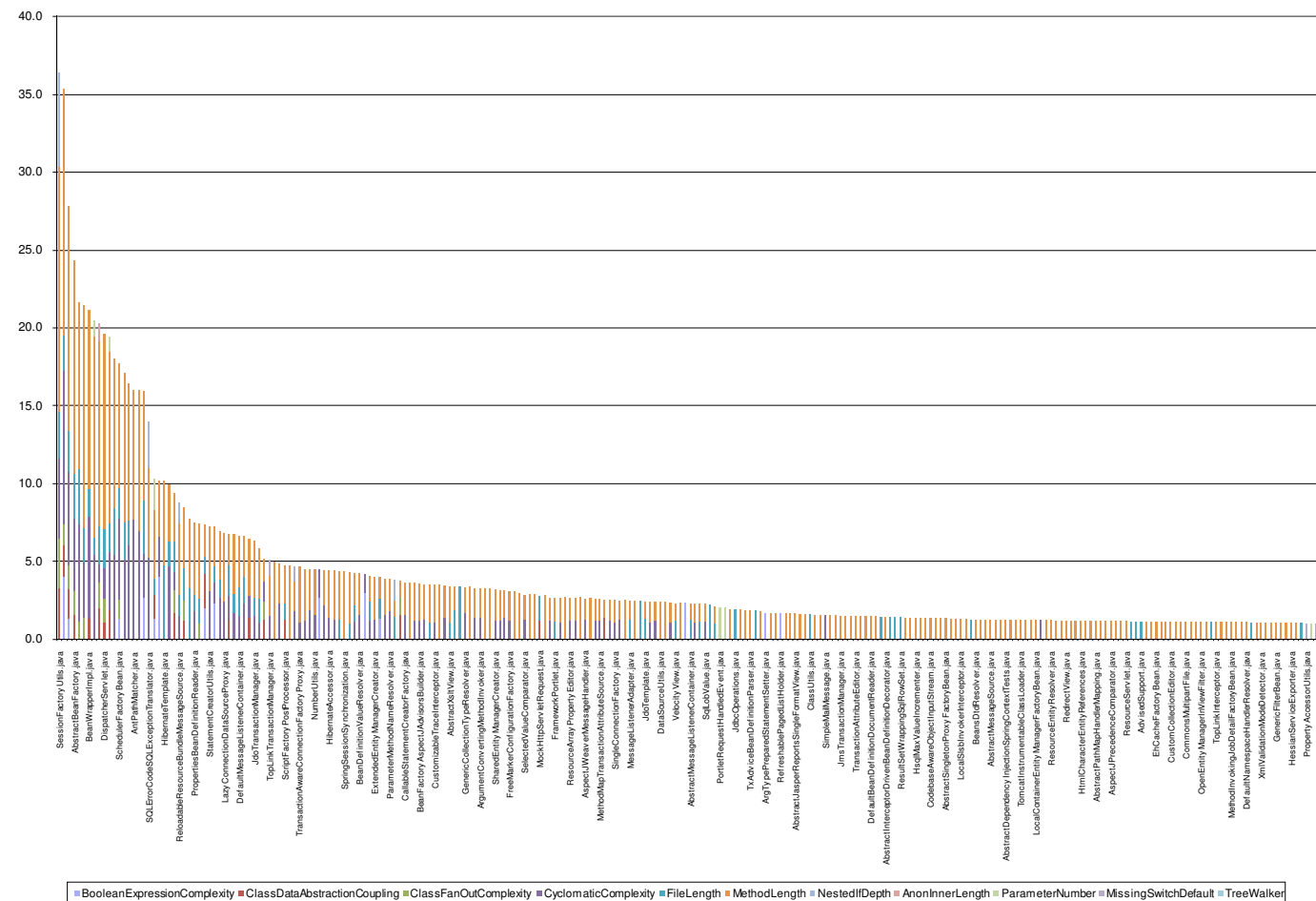
CodeCity



The next step after Code Crawler

Reads Famix MSE data

Toxicity chart



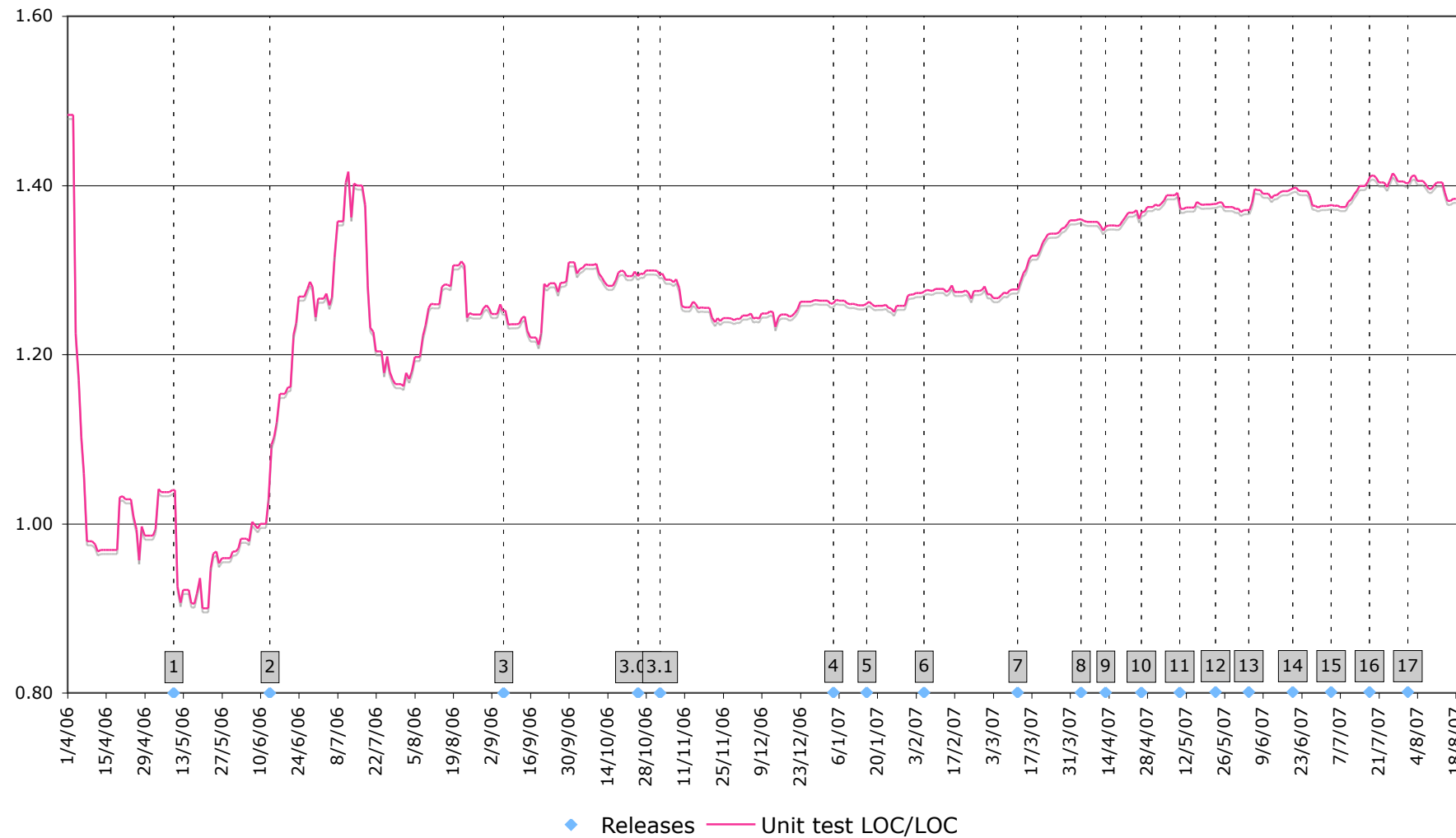
Developed by ThoughtWorks

Provides easy to compare overview of quality

Created with checkstyle and Excel

Test to code ratio

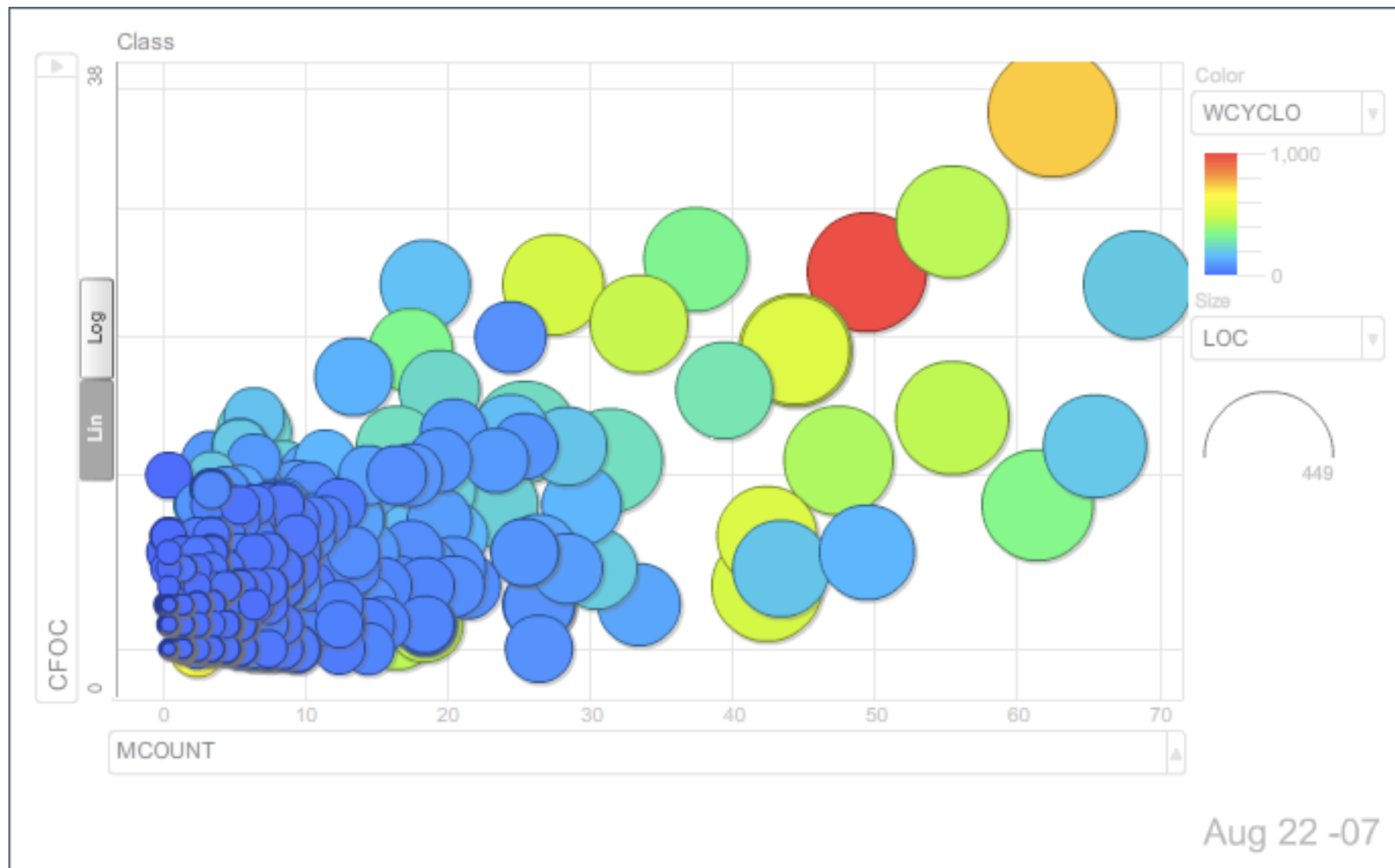
Lines of unit test code per line of production code



Shows the test to code ratio over time

Created with Unix tools and Excel

Class metrics chart



Takes class as the basic entity and explore highly dimensional properties/metrics

Uses Google Docs and Motion Chart gadget

DIY

1. Get metrics

- checkstyle, text tools, etc
- iPlasma, et al.

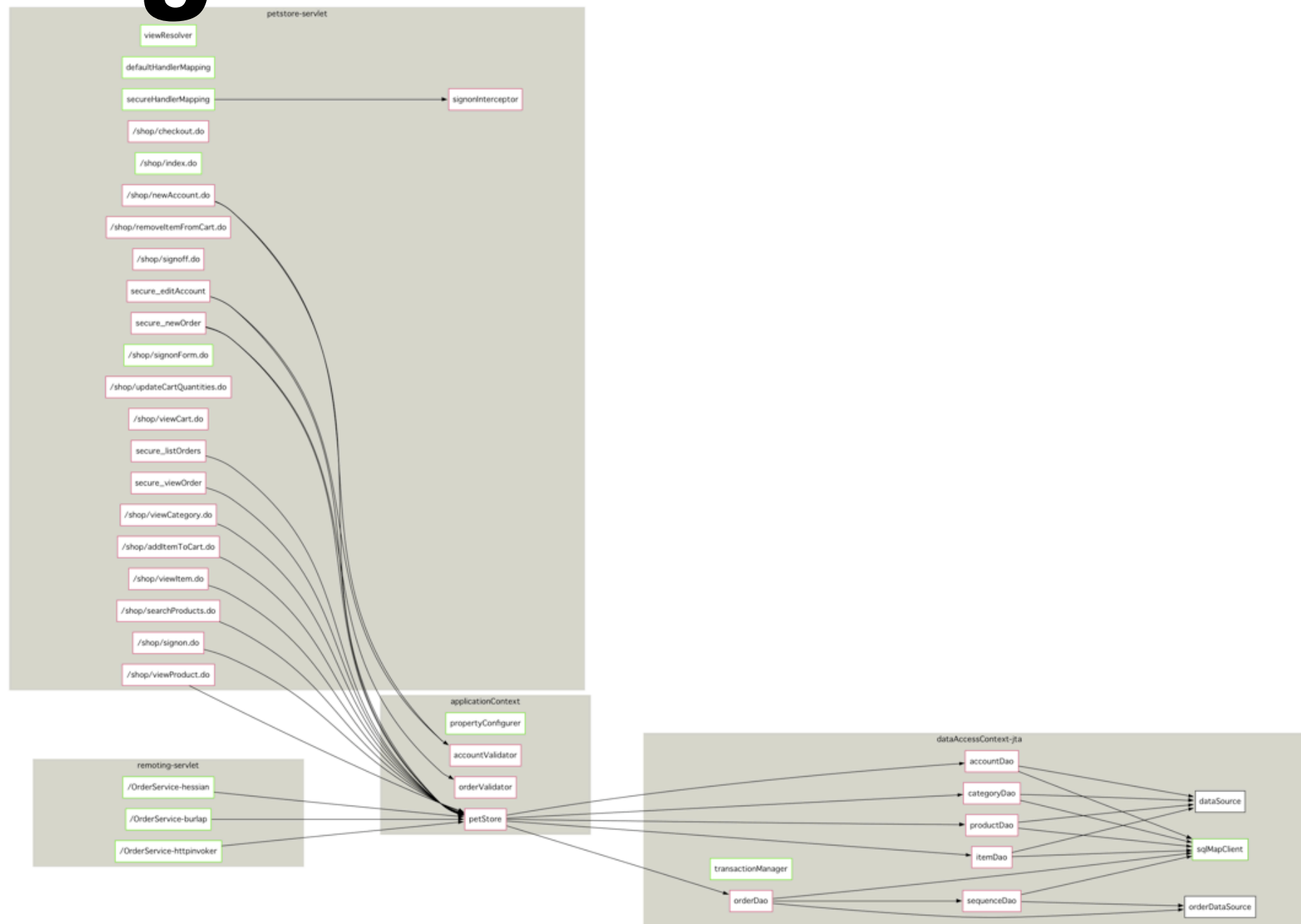
2. Aggregate data

- Ruby scripts, unix tools, etc
- VBA and pivot tables

3. Render graphics

- Excel is a powerful graphing tool
- Gnuplot and InfoViz are easy to use

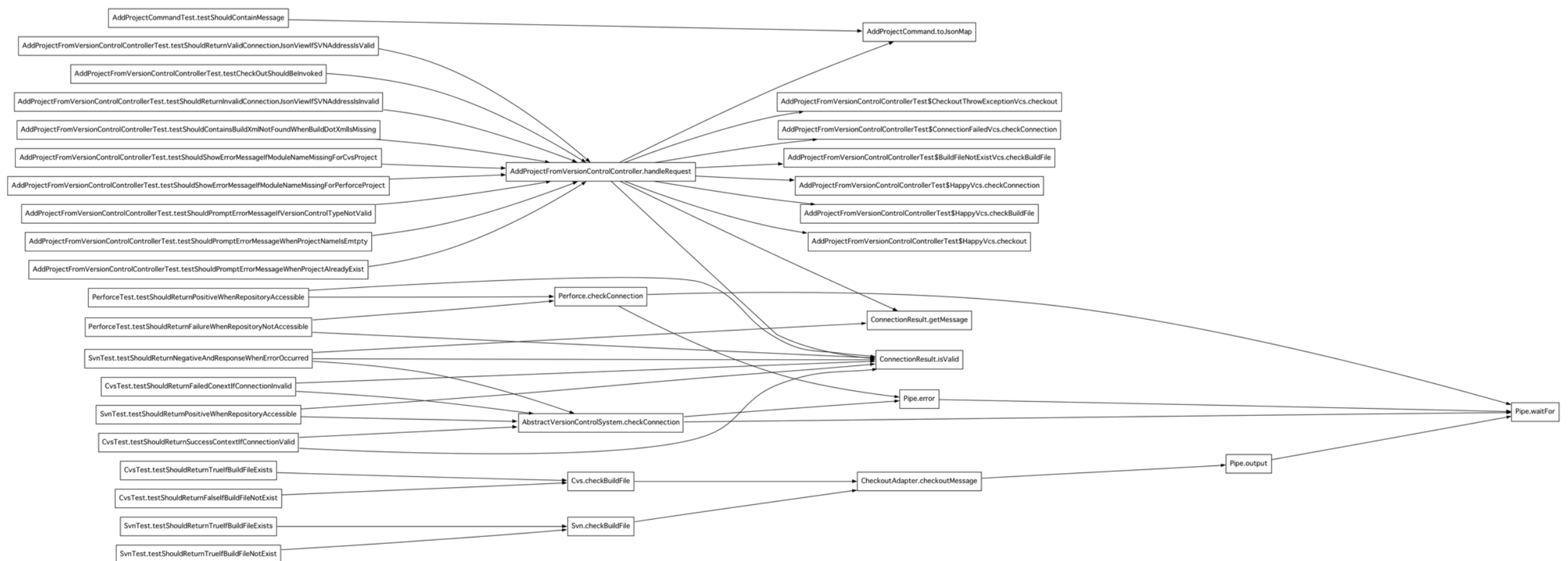
SpringViz



Not based on metrics, shows configuration

100 lines XSLT + 60 lines Ant + GraphViz

Test coverage



Not based on metrics, shows call graph

AspectJ + GraphViz

How do you see quality?

Comparisons

- industry standards
- different revisions: trends
- different parts: outliers

Aesthetics

- symmetry
- balance/harmony

What next?

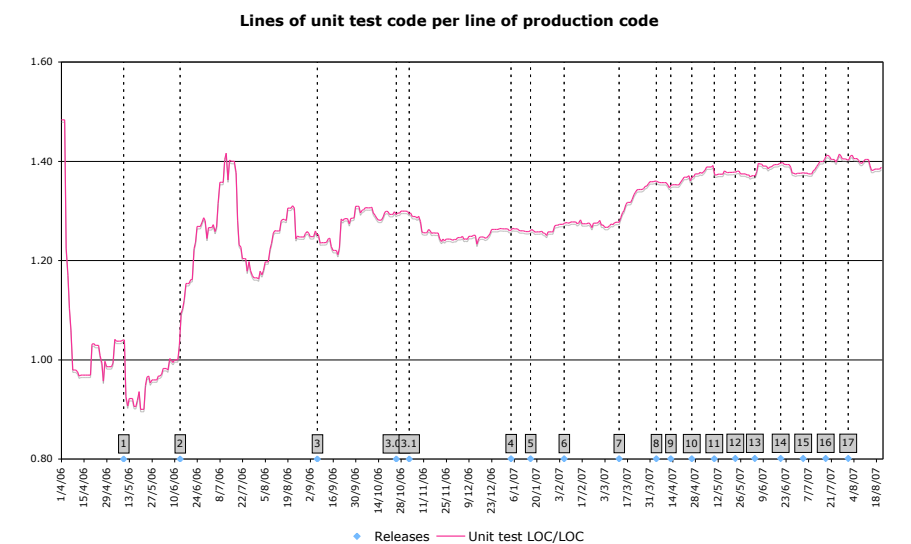
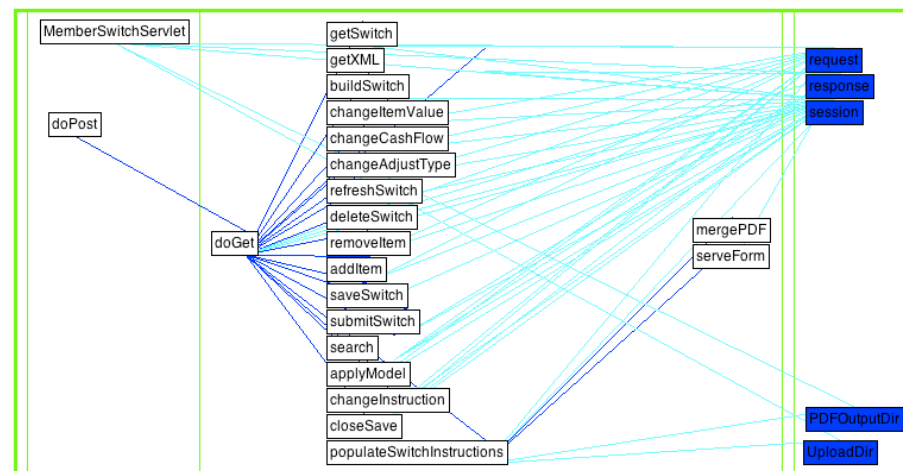
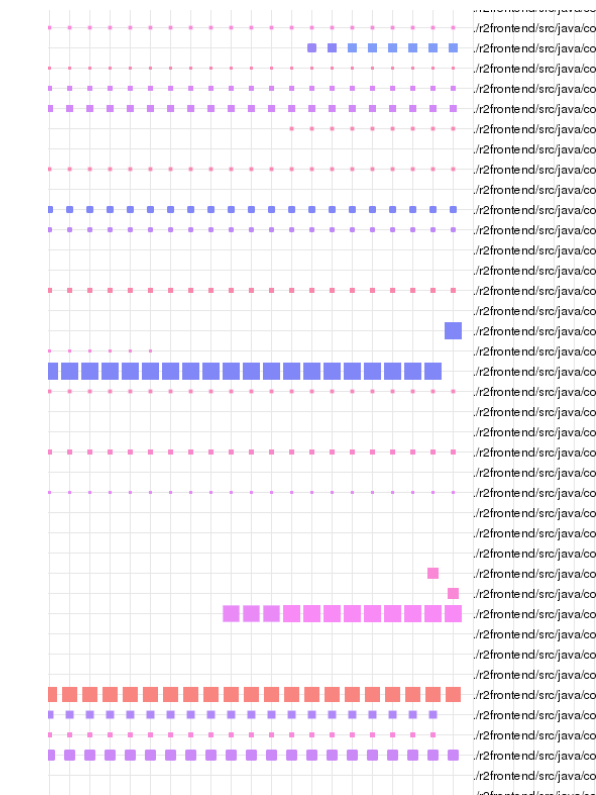
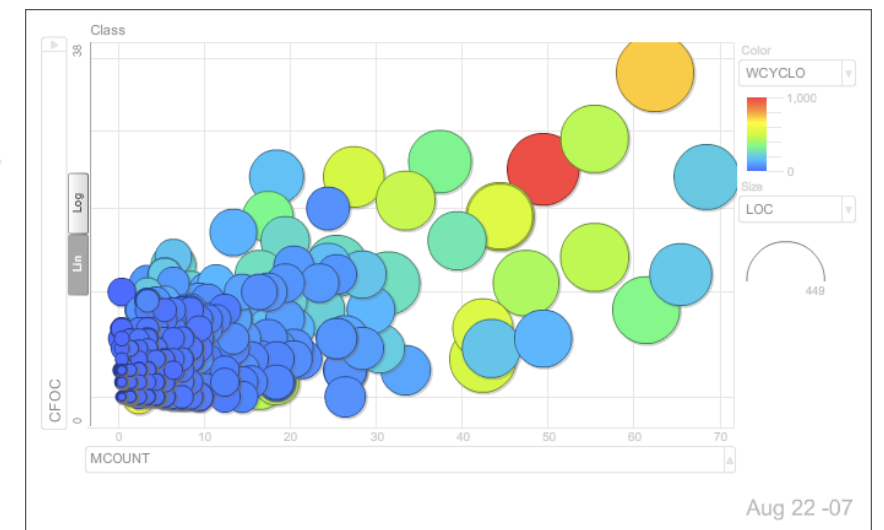
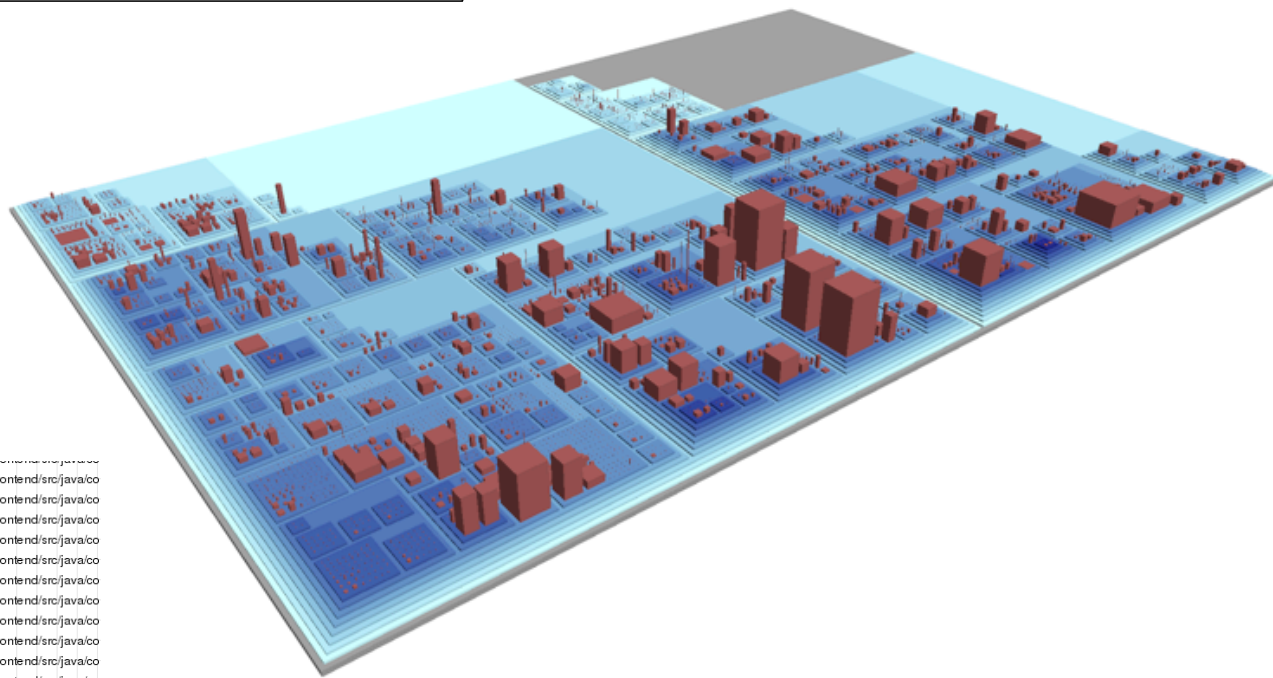
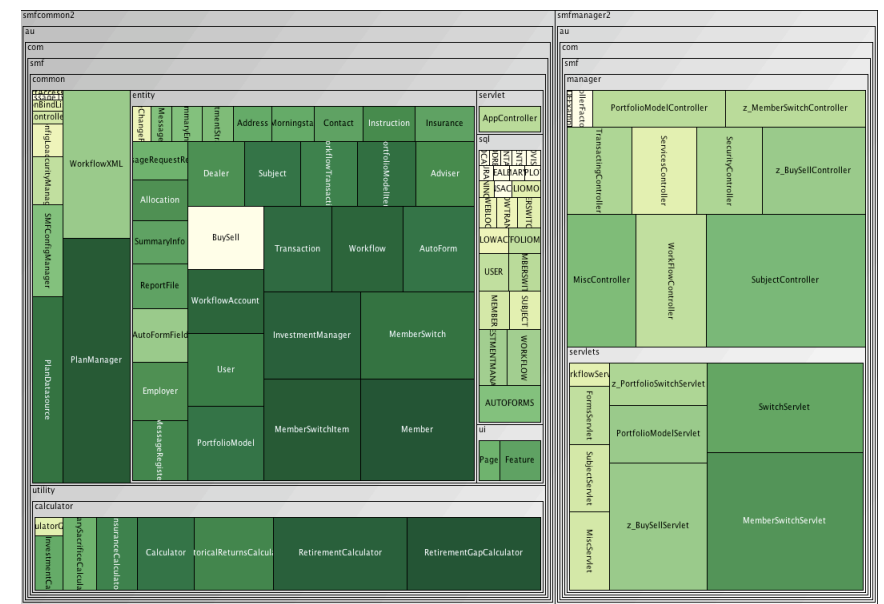
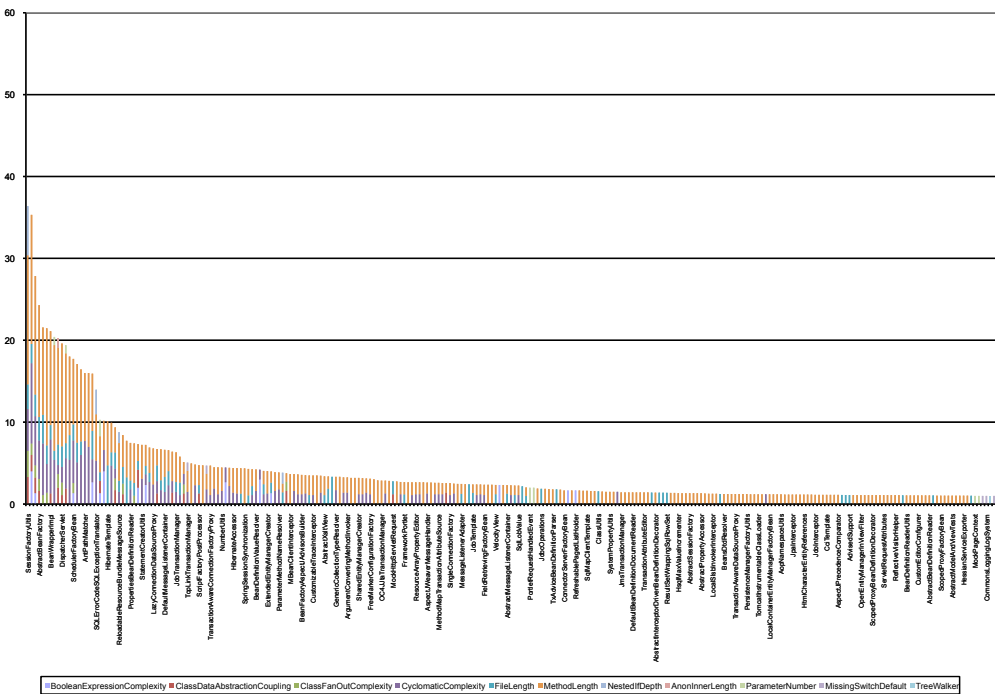
Measure

- tech debt
- effectiveness of training

Guide

- refactoring
- clean-up

Celebrate



Thank you

erik.doernenburg.com
www.thoughtworks.com