

Tracking and improving software quality with

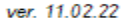


Ahmed Gomaa

Overview



- Code quality (what, why and when)
- The 7 Axes of quality and the Technical Debt
- SonarQube introduction
- SonarQube to the rescue (demo time)




What is code quality?



*“It’s an indicator about how quickly
developers can add business value to a
software system”*

Why measure?



- Source code is the heart of each system 
- Developers don't write new software. They maintain “legacy” systems
- A system is (almost) never “finished”
- You can't improve if you don't measure
- Broken window theory

The broken windows theory





When you should measure?

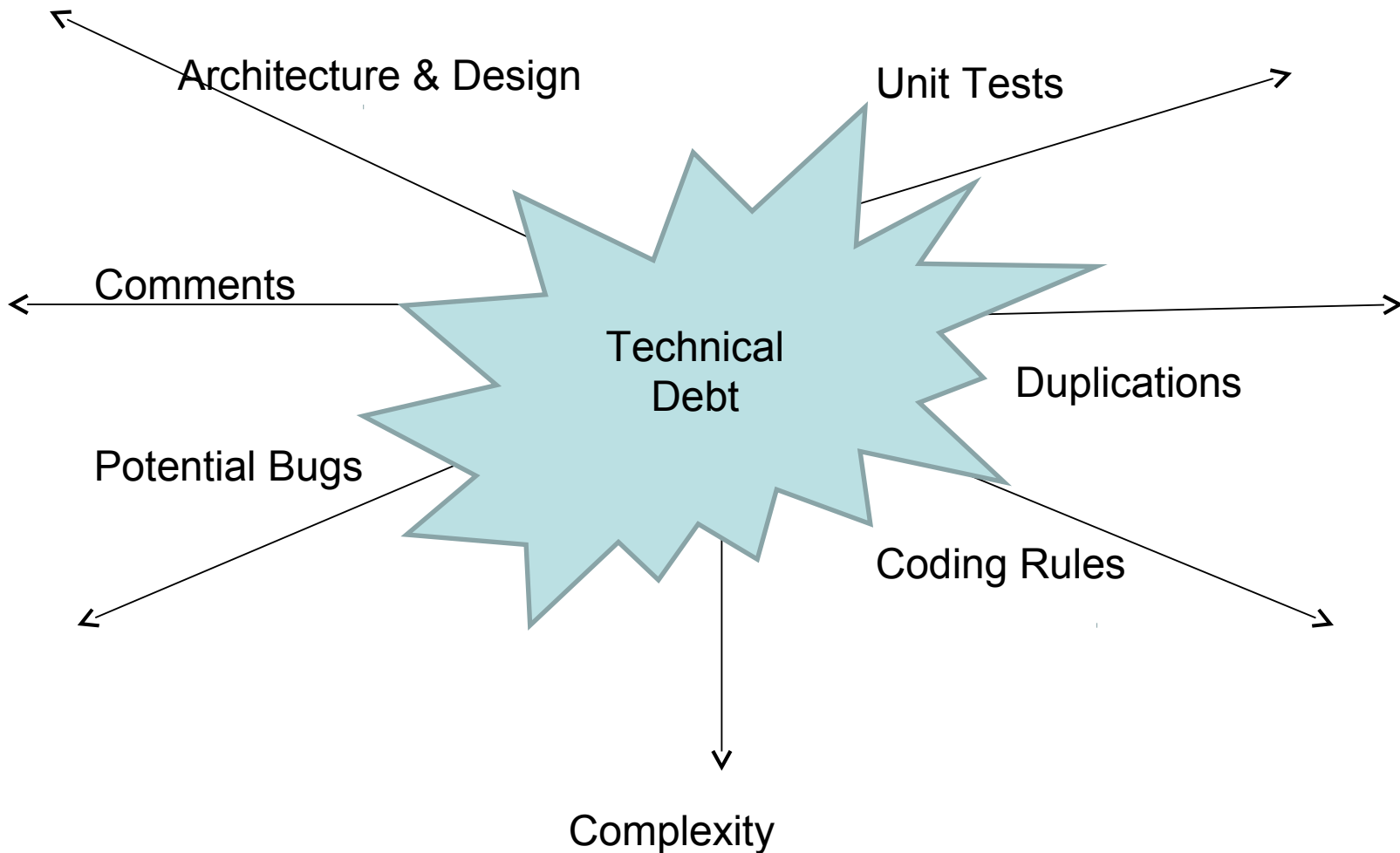
- From project day #0
- Continuously
- Prevent vs post-actions
- Prioritize and plan



What you should measure?

- Not just abstract numbers
- Evolution through time
- Metrics?
- Welcome to the 7 deadly sins of devs

The Seven Axes of Quality



Technical Debt



“If the debt grows large enough, eventually the company will spend more on servicing its debt than it invests in increasing the value of its other assets”



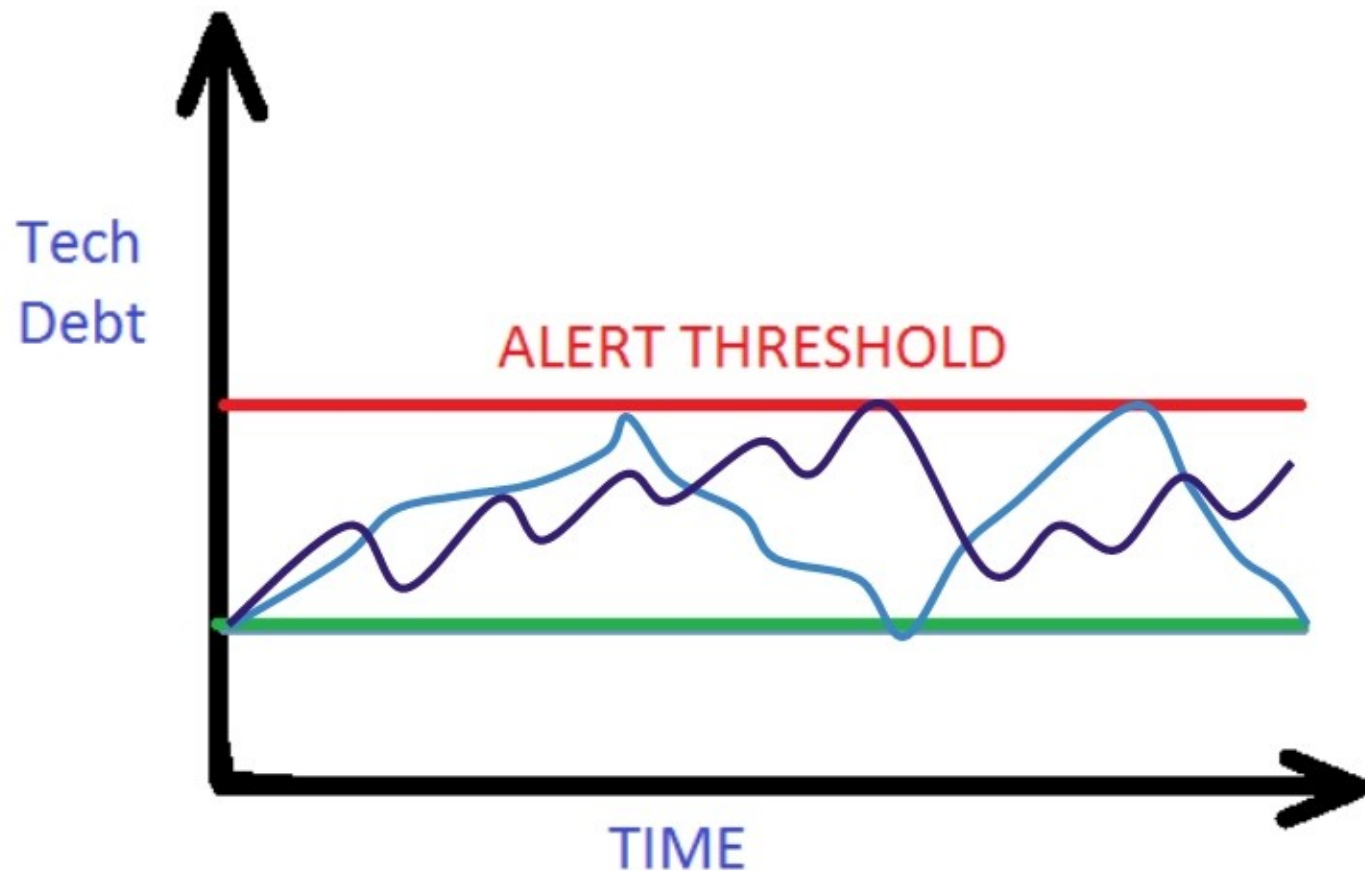
Steve McConnell

(author of code complete)



This is your source code
when you don't pay your
technical debt

How to deal with Technical Debt



What SonarQube is / does

The SonarQube logo, consisting of three concentric blue curved lines, is located in the top right corner of the slide.

- Free & open source “Code Quality Platform”
- Provides moment-in-time quality snapshots
- Gives trends of lagging and leading indicators
- Tracks developers’ seven deadly sins (seven axes of quality)



How does it work?

- Analyzes source code and byte code
- Computes hundreds of metrics
- Associates metrics with analysis snapshots
- Shows the results in dashboards and widgets accessible by any browser

SonarQube for everything



- Initially developed only for Java projects
- Today supports over twenty languages

Commercial : ABAP, C, C++, Cobol, Natural, PL/SQL,
Visual Basic

Open Source : C++, C#, Flex, Groovy, Android,
Javascript, PHP, Python, XML,
Web(xhtml, jsp , jsf,)

... and for everyone



For developers. Is my code “good”?
How can I improve it?



For testers / QA staff. Which parts of
the system lack unit testing?



For architects. Is the initial design
“broken”? How about complexity?



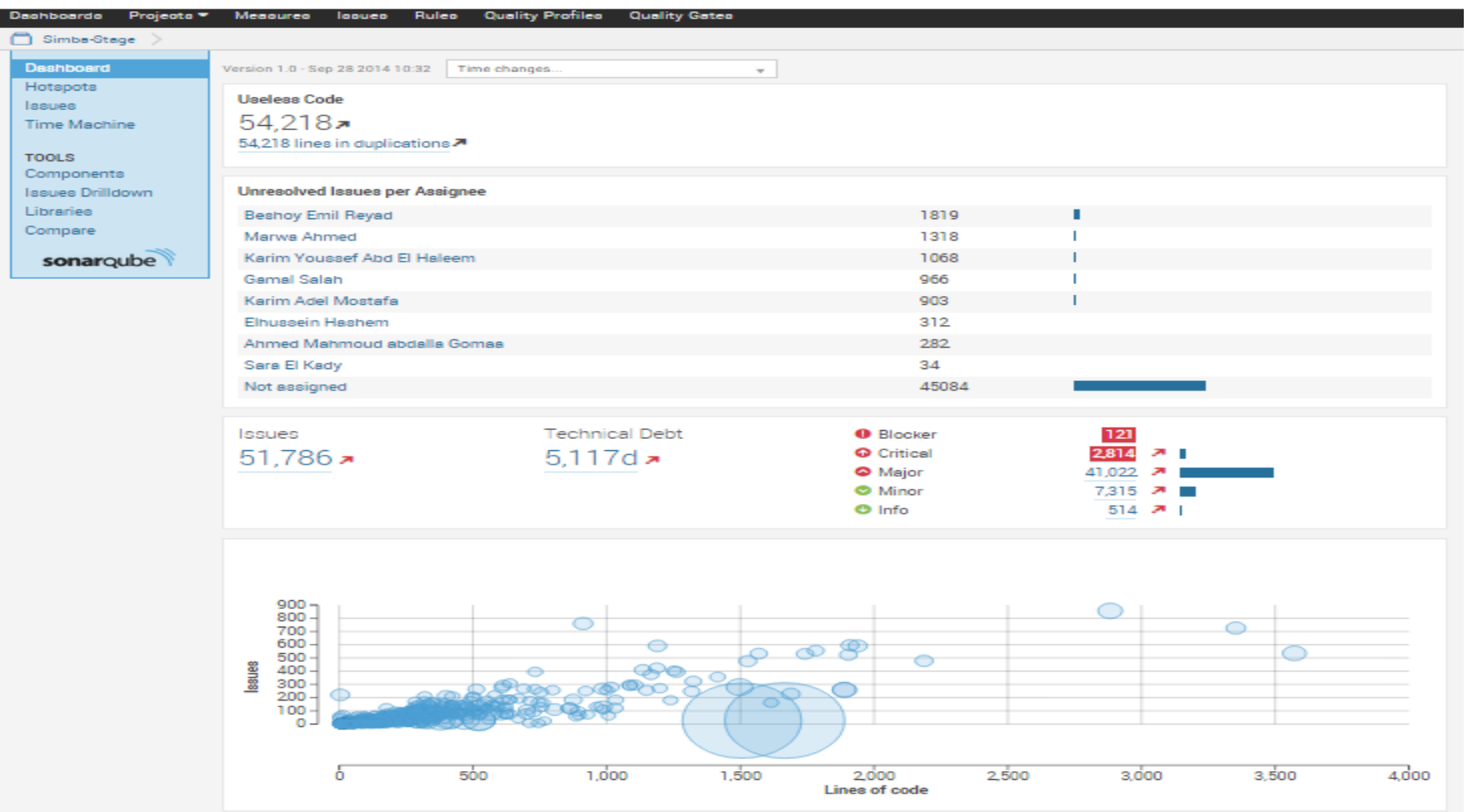
For managers. Give me the numbers!!
Are we going up or down?

Managing code quality

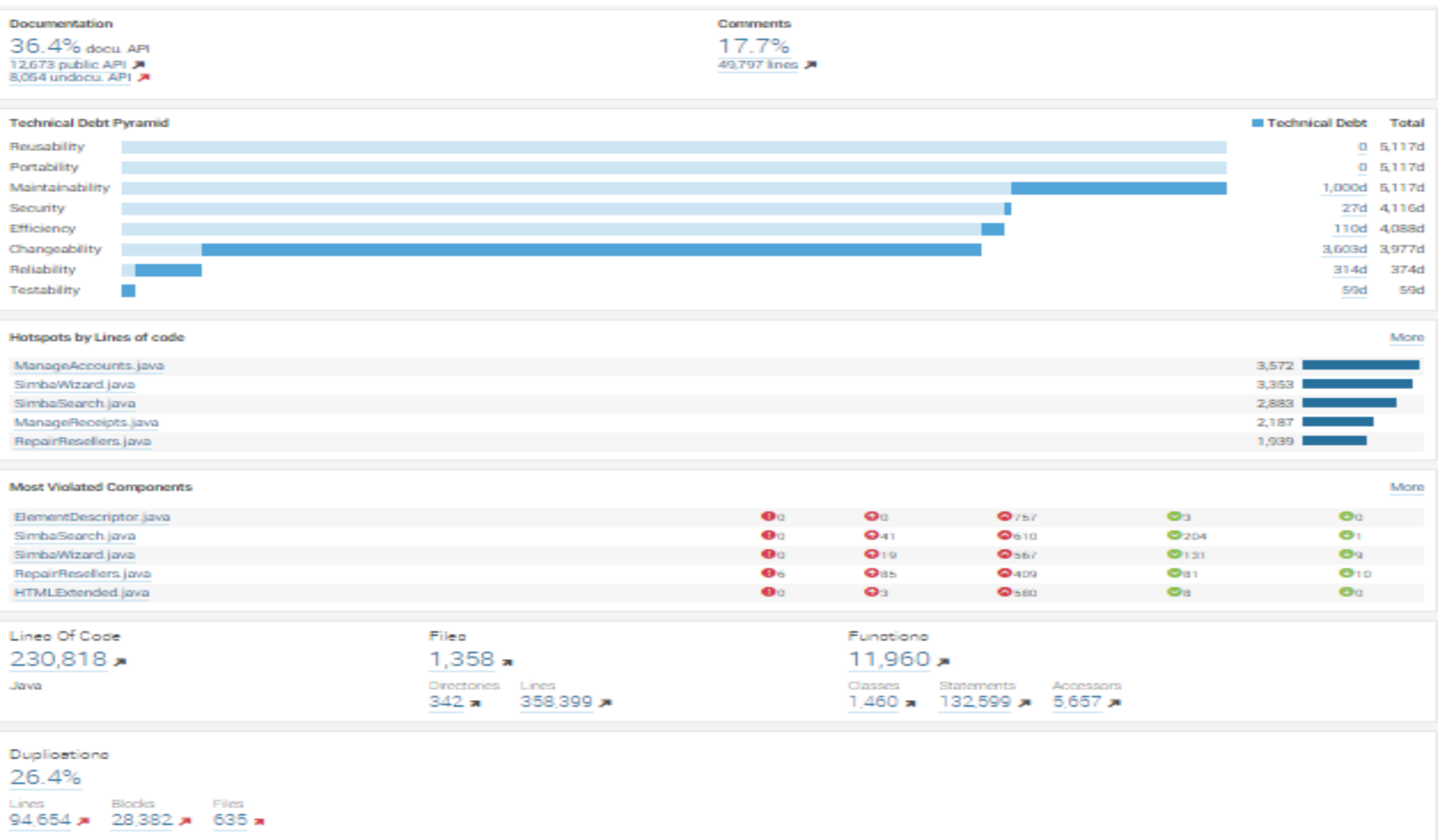


- Dashboards
- Historical data
- Differential views
- Compare service
- Code reviews
- Action plans

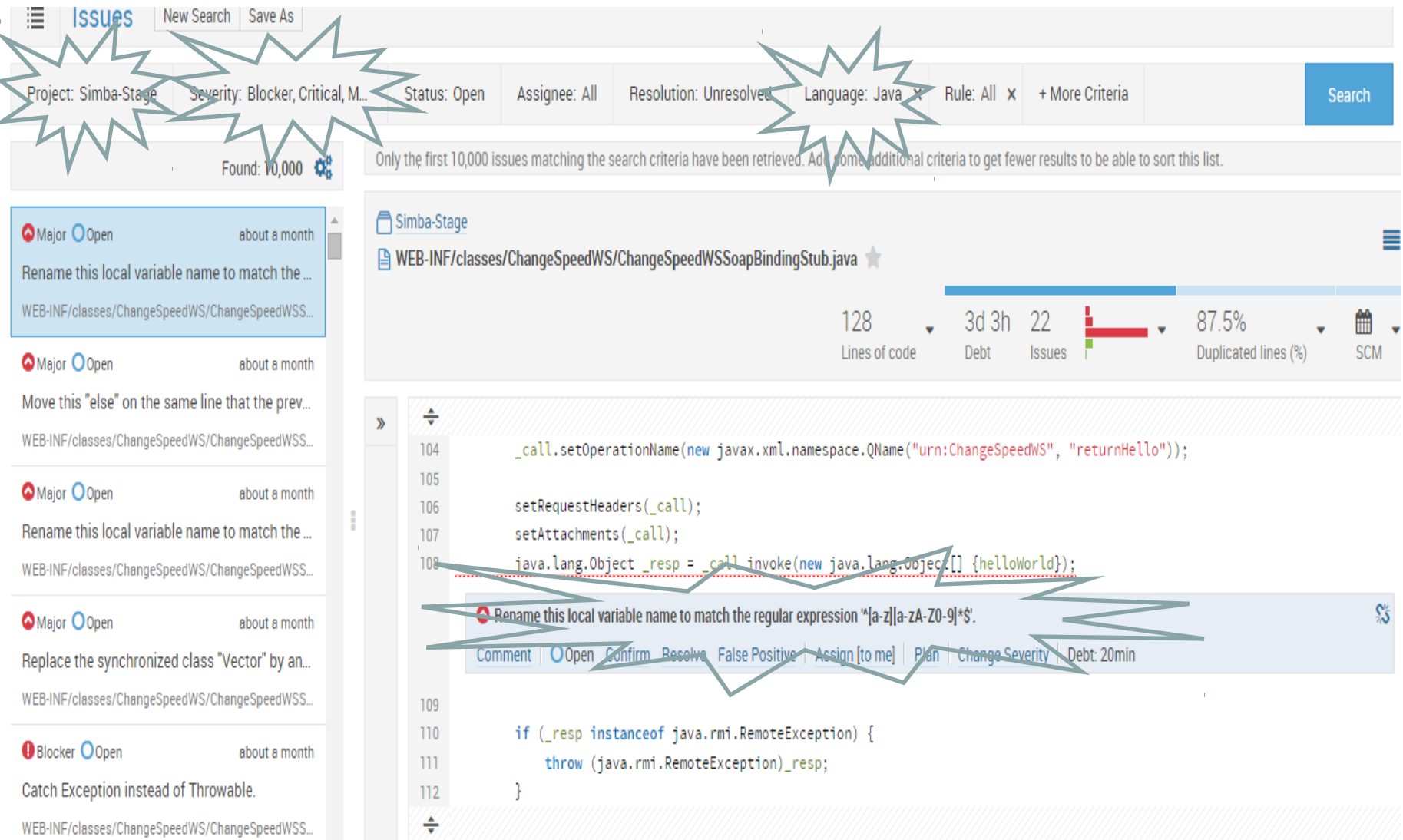
Managing code quality



Sonar – Basic statistics



Sonar – Project Drill Down



The image shows the SonarQube Project Drill Down interface. At the top, there's a search bar with filters: Project: Simba-Stage, Severity: Blocker, Critical, M..., Status: Open, Assignee: All, Resolution: Unresolved, Language: Java, Rule: All, and + More Criteria. A blue 'Search' button is on the right. Below the search bar, it says 'Found: 10,000' and a note: 'Only the first 10,000 issues matching the search criteria have been retrieved. Add some additional criteria to get fewer results to be able to sort this list.'

The left sidebar shows a list of issues. The top issue is 'Rename this local variable name to match the ...' with a severity of 'Major' and status 'Open', dated 'about a month'. The file path is 'WEB-INF/classes/ChangeSpeedWS/ChangeSpeedWSS...'. Below it are two more issues with the same description and file path. The bottom issue has a severity of 'Blocker' and status 'Open', dated 'about a month', with the description 'Catch Exception instead of Throwable.' and the same file path.

The main content area shows the project 'Simba-Stage' and the file 'WEB-INF/classes/ChangeSpeedWS/ChangeSpeedWSSoapBindingStub.java'. It displays statistics: 128 Lines of code, 3d 3h 22 Debt, 22 Issues, and 87.5% Duplicated lines (%). There's also an SCM icon.

The code editor shows the following code:

```
104     _call.setOperationName(new javax.xml.namespace.QName("urn:ChangeSpeedWS", "returnHello"));
105
106     setRequestHeaders(_call);
107     setAttachments(_call);
108     java.lang.Object _resp = _call.invoke(new java.lang.Object[] {helloWorld});
109
110     if (_resp instanceof java.rmi.RemoteException) {
111         throw (java.rmi.RemoteException)_resp;
112     }
```

Issue 108 is highlighted with a red squiggly line and a tooltip that says 'Rename this local variable name to match the regular expression "[a-z][a-zA-Z0-9]*\$'.

Sonar – Time Machine



[Dashboards](#) [Projects](#) [Measures](#) [Issues](#) [Rules](#) [Quality Profiles](#) [Quality Gates](#) [Settings](#) [Ahmed Mahmoud abdalla Gomas](#)

[Simba-Stage](#) [Configuration](#) [Configure widgets](#) [Manage dashboards](#)

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[Issues](#)
[Time Machine](#)

[TOOLS](#)
[Components](#)
[Issues Drilldown](#)
[Libraries](#)
[Compare](#)

Version 1.0 - Sep 28 2014 10:32 Δ over 30 days (Aug 31 2014)

Sep 15, 2014 ● Complexity: 47,703 ● Technical Debt: 51,108

Events All

Sep 28 2014	Version	1.0
Aug 21 2014	Quality Gate	Red
Aug 21 2014	Quality Profile	Changes in 'Sonar way with Findbugs' (Java)
Aug 19 2014	Quality Profile	Sonar way with Findbugs version 1

Duplications

26.4% (-0.2)

Lines

94,654 (+984)

Blocks

28,382 (+217)

Files

635 (+6)

Complexity

4.0 (+0.0) /function

32.8 (+0.0) /class

35.2 (-0.1) /file

Total: 47,865 (+551)

Aug 31 2014

Sep 28 2014

1.0

Issues	51,108	51,786
Blocker issues	121	121
Critical issues	2,729	2,814
Major issues	40,561	41,022
Minor issues	7,198	7,315
Info issues	499	514
Weighted issues	143,736	145,661

[Simba-Stage](#) [Simba](#)

TEData Billing System

Profiles: [Sonar way with Findbugs](#) (Java)

Quality Gate: [SonarQube way](#) (Default)

Documentation

36.4% docu. API (+0.2)

12,673 public API (+125)

8,054 undocu. API (+54)

Comments

17.7% (+0.0)

49,797 lines (+846)

Aug 31 2014

Sep 28 2014

1.0

Coverage
Line coverage
Branch coverage
Unit tests success (%)
Unit tests failures
Unit tests errors
Unit tests
Unit tests duration

The big picture



- Track and reduce Technical Debt on an ongoing basis. (Clean up kitchen every day)
- Engage all developers from project day #1 (Not only mums wash the dishes)
- Get alerted when Technical debt is beyond a threshold (when someone is leaving the kitchen in a mess)

I have a dream...



...that one day code quality management will be as much as important and essential is today source code management

Questions



References



Tracking & Improving S/W Quality with SonarQube by Patroklos Papapetrou)