

What Makes a Good Bug Report?

by Nicolas Bettenburg, Sascha Just, Adrian Schröter,
Cathrin Weiss, Rahul Premraj, Thomas Zimmermann

Presentation by Brogle Pascal
Software Engineering Seminar FS10



Mozilla Bug #109242: GUI ^[1]

The page is too clumsy

[1] https://bugzilla.mozilla.org/show_bug.cgi?id=109242

Eclipse Bug #175222; Create a new plugin using CDT

I want to create a new plugin in Eclipse using CDT. Shall it be possible. I had made a R&D in eclipse documentation. I had got an idea about creating a plugin using Java. But I want to create a new plugin (user defined plugin) using CDT. After that I want to implement it in my program. If it is possible?. Anyone can help me please...

[2] https://bugs.eclipse.org/bugs/show_bug.cgi?id=175222

Idea: Tool support



Mockup of CUEZILLA's user interface ^[3]

Online Survey

- Apache, Eclipse and Mozilla
- „Experienced“ Developer and Reporter
- Five minutes only
- 3 Parts:
 - Content of bug reports
 - Problems with bug reports
 - Optional part: rating bug reports
- Developer: 872 contacted
- Reporter: 1354 contacted

The Questionnaire: Contents of bug reports

Developers:

- D1: Which of the following items have you previously used when fixing bugs?
- D2: Which three items helped you the most?

product	hardware	observed behavior	screenshots
component	operating system	expected behavior	code examples
version	summary	steps to reproduce	error reports
severity	build information	stack traces	test cases

The Questionnaire: Contents of bug reports

Reporters:

- R1: Which of the following items have you previously provided when reporting bugs?
- R2: Which three items were the most difficult to provide?
- R3: In your opinion, which three items are most relevant for developers when fixing bugs?

The Questionnaire:

Problems with bug reports

- D3: Which of the following problems have you encountered when fixing bugs?
- D4: Which three problems caused you most delay in fixing bugs?

You were given wrong:

- product name
- component name
- version number
- hardware
- operating system
- observed behaviour
- expected behaviour

You were errors in:

- code examples
- steps to reproduce
- test cases
- stack traces

Others:

- duplicates
- spam
- incomplete information
- viruses/worms

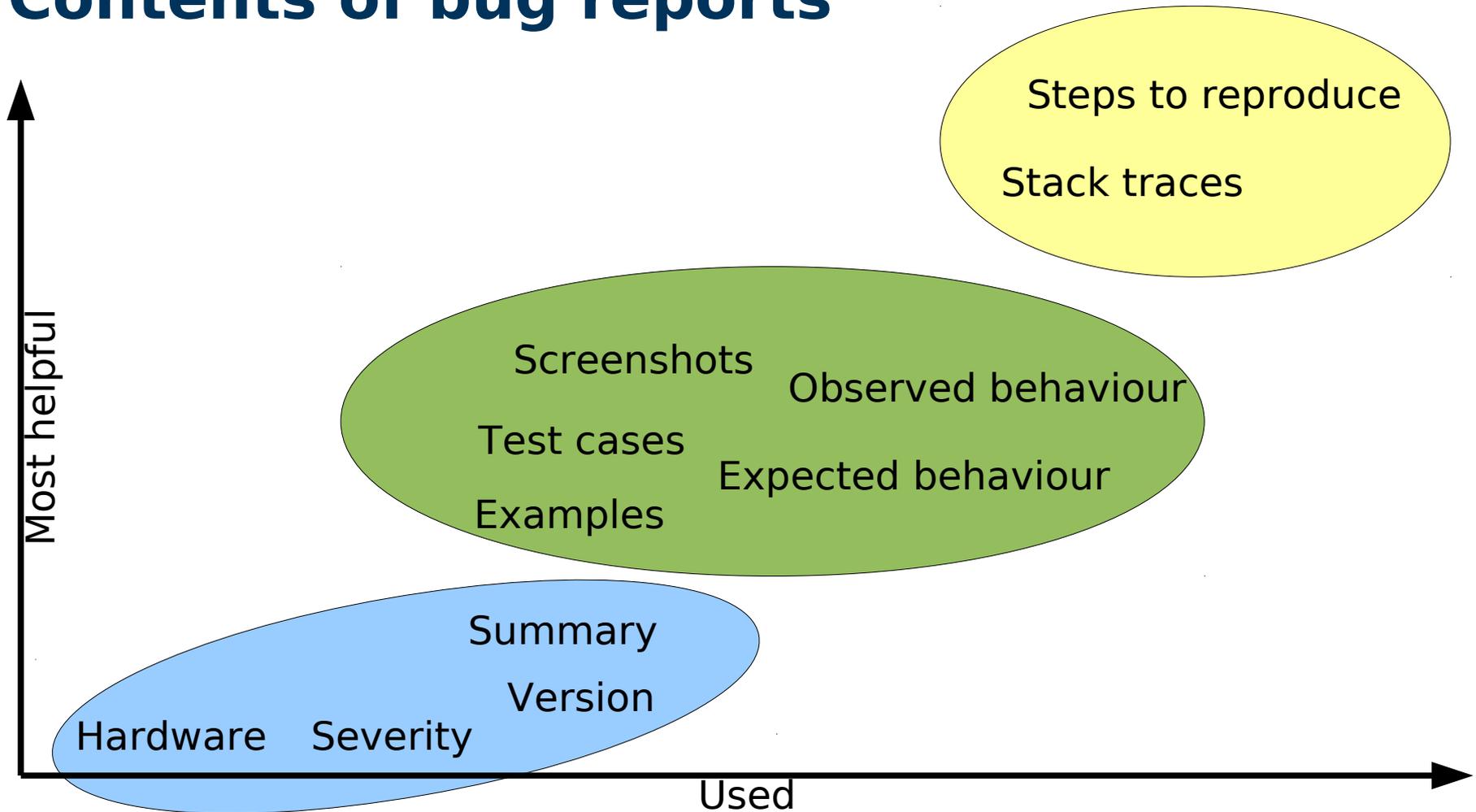
The reporter used:

- bad grammar
- unstructured text
- prose text
- too long text
- non-technical language
- no spell check

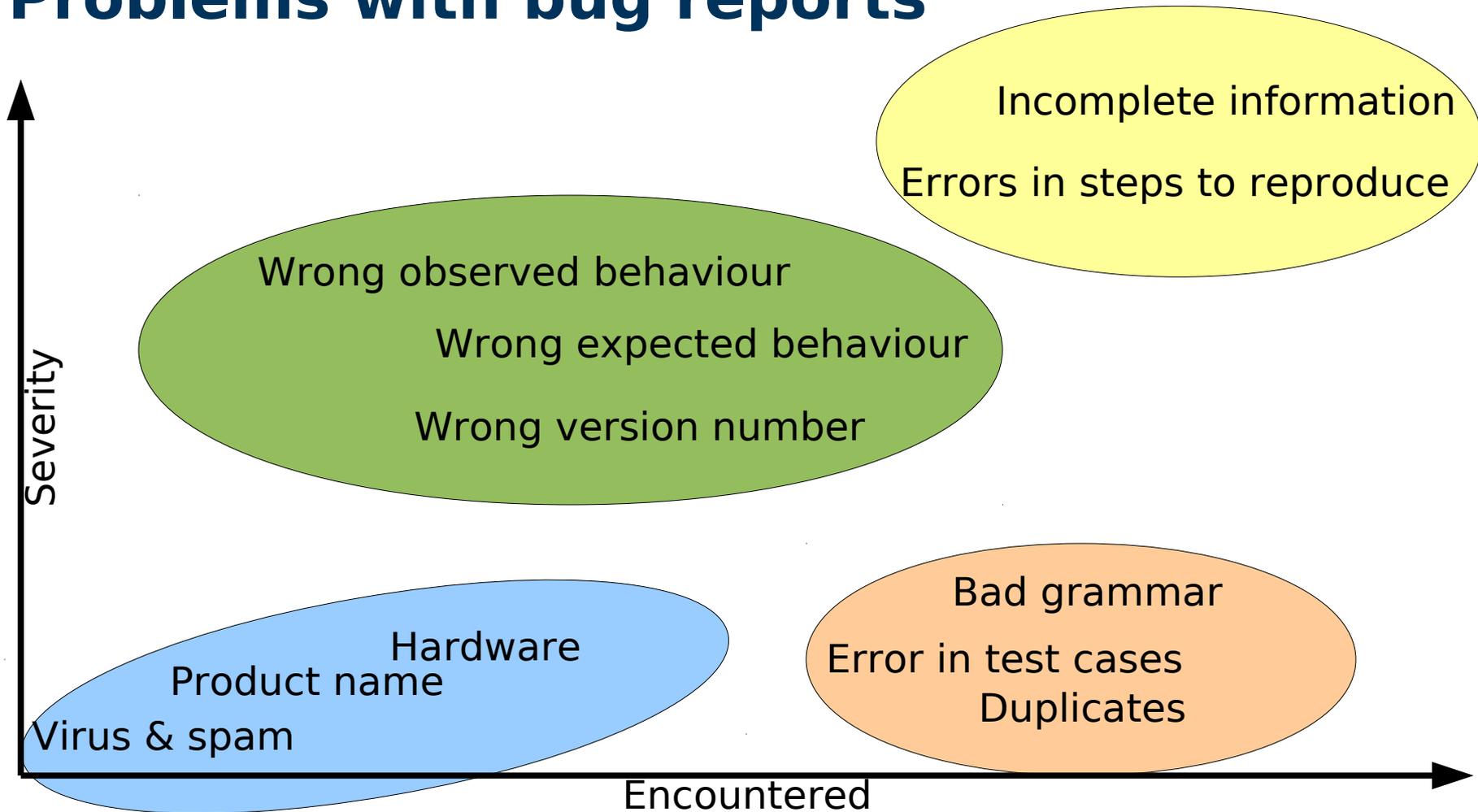
Survey Results

- Overall response rate of 23.2%
- Developer: 156 responses, 26 inconsistent (16.7%)
- Reporter: 310 responses, 95 inconsistent (30.6%)

Survey Results: Contents of bug reports



Survey Results: Problems with bug reports



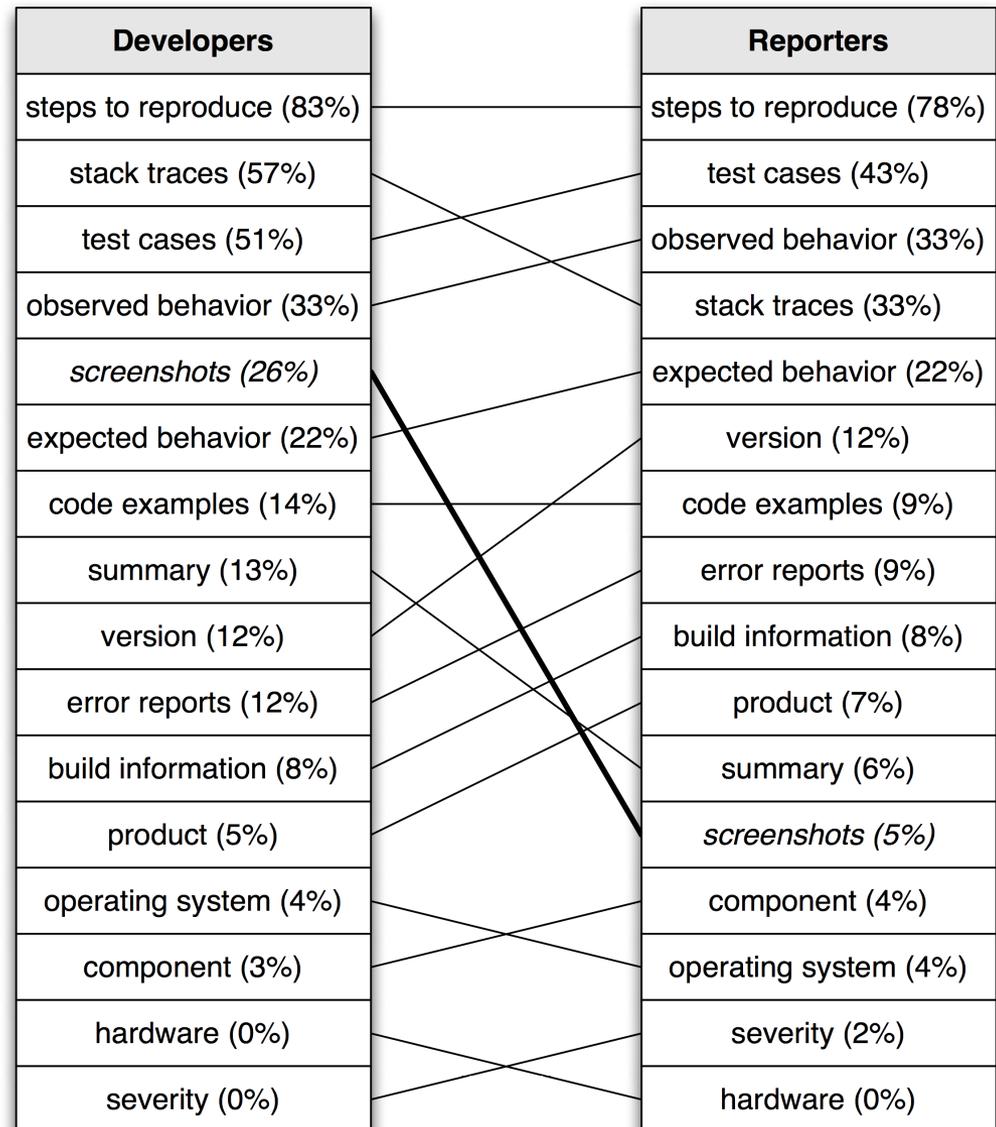
Information Mismatch

- most helpful but less provided
 - Stack traces
 - Test cases
 - Code examples
- Most provided but less helpful
 - Product
 - Operating system
 - Severity

Developers	Reporters
steps to reproduce (83%)	steps to reproduce (98%)
<i>stack traces</i> (57%)	observed behavior (96%)
<i>test cases</i> (51%)	expected behavior (94%)
observed behavior (33%)	<i>product</i> (94%)
screenshots (26%)	version (91%)
expected behavior (22%)	<i>operating system</i> (90%)
<i>code examples</i> (14%)	summary (90%)
summary (13%)	component (87%)
version (12%)	<i>severity</i> (77%)
error reports (12%)	build information (60%)
build information (8%)	screenshots (60%)
<i>product</i> (5%)	<i>test cases</i> (56%)
<i>operating system</i> (4%)	error reports (53%)
component (3%)	<i>stack traces</i> (50%)
hardware (0%)	hardware (48%)
<i>severity</i> (0%)	<i>code examples</i> (36%)

Most helpful for developers vs. provided by reporters

(Almost) No Information Mismatch



Most helpful for developers vs.
reporters expected to be helpful

Evidence for Information Mismatch

- Mismatch between what developers consider most helpful and what users provide
- Items difficult to provide by bug reporters?
 - Stack traces hard to find in log files
 - Lack of tools to record behaviour
- Consequences
 - Improve tool support for collecting important information
 - Improve bug reporting systems → CUEZILLA

Rating bug reports

- Optional part in survey
- 100 random samples per project selected
- Presented one by one in random order
- Five point rating scale
 - from very poor (1) to very good (5)
- Possibility to skip
- Showed avg. rating of last rated report

Rating bug reports

Based upon
5
ratings

Score 1.8000



**Results for last
report**

Visualizer and InPath weaving

PC → Linux

AJDT → UI → unspecif → —

105822 → NEW

enhancement

The visualizer does not display information regarding the weaving into jar files.

It would be nice to have an idea of which classes are affected, perhaps as well which methods, maybe even putting bars in places corresponding to the bytecode listing where the weaving has occurred, and (even better) source-code locations when a source location has been associated to the jar file in Eclipse.

This would be a nice enhancement, otherwise the visualizer does not help as much in projects involving weaving into libraries.



Skip

☹️ 😞 😐 😊 😄

Rate this bug report

Rating bug reports: Results

- In total 1186 ratings
- Total # rated reports: 289
- Only developer ratings considered
- Most frequent ratings: 3 (average) and 4 (good).
- Remember bug report
„Create a new plugin using CDT“?
 - Average score: 1.57
 - Worst score among rated bug reports

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Measuring bug report quality: CUEZILLA

- Measure on basis of content
 - Keywords
 - Code samples
 - Stack traces
 - Patches
 - Screenshots
 - Readability
- Trained and tested with ratings obtained in survey

Evaluation

- Leave-one-out cross-validation technique
- Perfect agreement accuracy: 44%
- Close by one agreement accuracy: 87%

CUEZILLA	Ratings				
	very poor	poor	medium	good	very good
very poor	0	0	1	0	0
poor	0	2	0	0	0
medium	4	11	29	17	4
good	0	1	6	12	5
very good	0	1	2	4	1

Recommendations

- Why should a reporter care?
- Solution: Provide incentives
- Mining Facts
- Correlate rating with
 - Time to fix
 - Fixed or not



Key findings

- Bug reports that are easier to read have lower lifetimes. (APACHE/ECLIPSE/MOZILLA)
- Including code samples in your bug report increases the chances of it getting fixed. (MOZILLA)

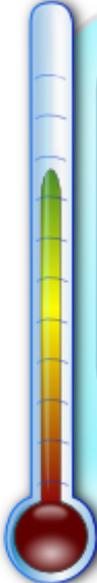


Bug reports that contain stacktraces get fixed sooner.

Did you know?

NEWS

CUEZILLA



Improve your Bug Report:

Enhance the quality of your bug report by 20%, by adding a stacktrace, a screenshot, or a patch.

Quality-Meter



Bug reports that contain stacktraces get fixed sooner.

Did you know?



Threats to validity

- Stated by paper
 - Selection of “experienced” participants
 - Participation was voluntary
 - Selection of items restricted
 - Only open source projects
- Small data set
 - 130 developers
 - 215 reporters
- Bug report rating
 - Only ~ 4 votes per report (not all data published)

References

- [1] https://bugzilla.mozilla.org/show_bug.cgi?id=109242
- [2] https://bugs.eclipse.org/bugs/show_bug.cgi?id=175222
- [3] <http://www.st.cs.uni-saarland.de/softevo/bugreports.php>