Because **you can’t fix what you don’t know** is broken…
About me

- Initiator of the Automated Error Reporting Initiative
- Project Lead of Eclipse Code Recommenders
- Eclipse Committer since 2010
- Plug-in Developer for 10+ years (Eclipse 2.1)
- Member of the Eclipse Architecture Council
- Co-Lead of Java User Group Darmstadt
- CEO of Codetrails

- Passion to improve developers day-to-day work with intelligent and practical tools - mostly using Data Mining on Big (Software Engineering) Data.
Adding a **new character** to the plot

Software User

Application Developer

Product Manager
Imagine the following situation...
But when the user **starts the app**...
Can you feel their pain...?
In the logs you’d find…
The tragedy of manual error reports
The tragedy of manual error reports
Not too happy **but feeling okay...**
What can we do?

Application Developer
The Automated Error Reporting Initiative
Live Demo

Automated Error Reporting Configuration

Thank you for using the Automated Error Reporter
Please take a moment for the initial configuration. All values can be changed in the preferences at any time.

Name: Marcel Bruch
E-mail: marcel.bruch@codetrails.com
Report Anonymization
- Anonymize package, class, and method names
- Anonymize error log messages

Learn more... Provide feedback...

Enable Disable

Eclipse Error Reporting

Welcome to the Eclipse Mars Error Reporting Service. Do you want to help Eclipse?

With your permission Eclipse can inspect errors logged inside the IDE and inform project committers about the issues you experienced. Do you want to help and enable the error reporter?

Enable Disable
„Keep users informed about your progress…“

About server responses, Bugzilla, and immediate feedback
Systems Overview

Eclipse IDEs → AERI Web UI → Eclipse Bugzilla

„Direct Reporter Feedback“
Not yet tracked problems…

To be confirmed: NullPointerException in PluginAction....

Your report is now recorded.

It's not yet confirmed as a bug. Please visit your report and see if you can provide more information.

Thank you for your help!

Visit Submission
Committers needinfo…

Bug 442500 – ….

Status: NEW

Resolution: — — —

Your assistance is requested: NullPointerException in Plugin.

Your issue is known but further information is required.

Visit #460231  Visit Submission
Fixed...

Bug 442500 – ....

Status: RESOLVED
Resolution: FIXED

Fixed: NullPointerException in PluginAction....

Your issue appears to be fixed.
Please visit the bug report for further details.
Thank you for your help!

Visit #460231  Visit Submission
Won’t Fix…

Bug 442500 – ….  
Status: CLOSED  
Resolution: WONTFIX

Minor issue: NullPointerException in PluginAction….  
Your report has been marked as a minor issue.
If you think your report is actually an error, please visit your report and leave a comment.
Thank you for your help!

Visit #460231  Visit Submission
Invalid (aka log messages)
„What goes to eclipse.org?“

About caching, filtering, anonymization, and other shortcuts…
Do we send all errors to Eclipse...?
The error reporting funnel
#1: Structural Filtering

java.net.UnknownHostException: marketplace.eclipse.org

at java.net.AbstractPlainSocketImpl.connect(AbstractPlainSocketImpl.java:184)

at java.net.Socket.connect(Socket.java:538)

at com.example.HttpClient.openServer(HttpClient.java:527)

at com.example.HttpClient.<init>(HttpClient.java:211)

at com.example.HttpURLConnection.connect(HttpURLConnection.java:932)

at org.eclipse.recommenders.internal.news.rcp.PollFeedJob.run(PollFeedJob.java:69)

at org.eclipse.core.internal.jobs.Worker.run(Worker.java:55)

#2: Did I already sent this?
#3: Did anyone else sent this?
If you hit a **known issue**…

If you hit a **known issue** in Eclipse. Now we need your help.

'some error message' appears to be hard to reproduce. Please help us fixing it by providing further details.

View Details

You hit an already fixed issue. Time to update?

'some error message' was marked as FIXED. Please visit Eclipse Bugzilla for details.

View Details  Visit #452200
#4: Review

- structural filter
- personal filter
- global hist.
- review
We noticed a new error event was logged. Such error events may reveal issues in the Eclipse codebase, and thus we kindly ask you to report them to eclipse.org.

Which steps did cause this issue?

Exception: java.lang.ClassNotFoundException: org.apache.commons
at org.eclipse.epp.internal.logging.aeri.ui.actions.Log
at org.eclipse.epp.internal.logging.aeri.ui.actions.Log
at org.eclipse.epp.internal.logging.aeri.ui.actions.Log
at org.eclipse.core.internal.jobs.Worker.run(Worker.java)

REPORT

anonymousId  f8087d7b-9d38-4c73-aeb1-6991603c2a84
name          Marcel Bruch
email         marcel.bruch@codetrails.com
comment       Which steps did cause this issue?
eclipseBuildId unit-tests

- Mark this event as 'not a bug'
- Skip similar errors in the future

☑️ Remember my decision  permanently  
☑️ permanently
until restart
for 24 hours
Walkthrough through the committer front-end

The server side
The core concepts

Welcome!

Welcome to the Error Reports web front end. Pick one of the quickstarter queries below or browse what's new.

Unconfirmed problems by project Quickstarter Queries

- Acceleo
- Accessibility Tools Framework
- AngularJS Support
- Ant
The Core Concepts

- Incidents
- Problems
- Projects
Creating bug reports

![Screenshot of bug report creation](https://cdev.eclipse.org/recommenders/public/contribution/5589244be4b08735226a9d4/details)

- **Problem Summary**
  - **Problem Id:** 5589244be4b08735226a9d4
  - **Summary:** NullPointerException in LauncherUtils.statusHandler.selectWorkspaceField (74)
  - **Projects:** Plug-in Development Environment

- **Watchers:**
  - Email: cedric.brun@obeo.fr
  - When: CC_LIST_ON_CREATION

- **Reporters:**
  - Anonymous Id
    - 8a78fb03-87cd-46ed-950c-327a0dc93ce

- **Opening Incident**
  - **Environment:**
    - Id: 5589244be4b08735226a9d3
    - Created on: 15-06-23 11:18:03
    - Kind: NORMAL
  - **Eclipse:** org.eclipse.epp.package.modeling.product 0700
  - **OSGi:** Windows7 6.1.0, x86_64, win32
  - **Java:** 1.7.0_01-b08
Creating bug reports
Notifying committers
Project Alerts

AERI The Automated Error Reporting Initiative

Alerts Configure how and when Confess informs you about new and updated problems.

Label: Weekly Normal Problems Digest for Recommenders

Conditions
Minimum numbers of distinct reporters: 1

Problem kind: NORMAL OOME SOE

Actions - Automatically executed (once) when above conditions are met

- Bugzilla - Create Bugzilla bugs for every problem when above conditions are met
- Weekly Digest Email - Notify developers listed below by weekly emails.
- Daily Digest Email - Notify developers listed below by daily emails about every problem that met above conditions the first time

recommenders-dev@eclipse.org

Enter email address... Add
Weekly or daily email digests

Weekly Normal Problems Digest

Hi,

this is the weekly digest for Code Recommenders. The status of all problems on this list is open. Items on this list may already be tracked in Bugzilla but were not closed yet. To remove a item from this list, you can either (i) set the status of its associated bug to resolved, verified, or closed or (ii) mark it as log message in the reporter's web ui.

If you have any questions about this report, please send an email to error-reports-inbox@eclipse.org

Top new problems (last 7 days):

1. NullPointerException in BinaryTypeBinding.getMethods (1191)  
   Reporters: 2  Bug: 469460 N
2. ArrayIndexOutOfBoundsException in AssistParser.popElement (1912)  
   Reporters: 1  Bug: 469471 N
3. NullPointerException in BinaryTypeBinding.resolveType (160)  
   Reporters: 1  Bug: -
4. StackInException in PrivacySettingsService.store (147)  
   Reporters: 1  Bug: -

Top unresolved, active problems (last 7 days):

1. OperationCanceledException in CompletionEngine.checkCancel (1683)  
   Reporters: 46  Bug: 459172 U
2. ClassNotFoundException in BundleLoader.findClassInternal (423)  
   Reporters: 25  Bug: 466885 N
3. ClassNotFoundException in BundleLoader.findClassInternal (432)  
   Reporters: 5  Bug: 467950 N
4. LogTraceException in AbstractCompletionSessionProcessor.applied (191)  
   Reporters: 3  Bug: 467798 N
5. LogTraceException in Repositories.getRepository (104)  
   Reporters: 2  Bug: 469016 N
Some fun facts

\[ e = mc^2 \rightarrow \text{errors} = (\text{more code})^2 \]
Disclaimer

Don’t draw preliminary conclusions!
Please consult your personal statistican…
How many milestones testers?

450 simrel committers
1200 eclipse committers
~7000 error reporters
Testers?
Milestones adoption

Do new milestones introduce new problems?
Milestones adoption

- Addition to all EPP packages
- RCs
- Christmas
- Addition to first EPP packages

Legend:
- 4.4.0
- 4.4.1
- 4.4.2
- M1
- M2
- M3
- M4
- M5
- M6
- M7
- RC1
- RC2
- RC3
How hard do they suffer?

1-2 reports
3000 testers

3-50 reports
3600 testers

50-300 reports
330 testers

300 - 3000 reports
25 testers
What do they report?

- 3rd Party Involved
- Stack Overflows
- Freezes
- Out of Memory
- 'Normal' Errors

Top 100 of 7000

Me
What kind of errors are being sent?

'Normal' Errors: 74%
3rd Party Involved: 16%
Stack Overflows: 0%
Freezes: 9%
Out Of Memory: 1%
What are the most popular exceptions?

- 32% (32%)
- 25% (25%)
- 18% (18%)
- 12% (12%)
- 8% (8%)
- 3% (3%)
- 2% (2%)
What are the most popular exceptions?

- NullPointerException: 25%
- IOException: 18%
- ClassCastException: 2%
- IndexOutOfBoundsException: 3%
- IllegalArgumentException: 8%
- No {Class | Method | Field} DefFoundError: 12%
- Other: 32%
NullPointerExceptions by Projects

Statisticians, note: Projects automatically marked as „being responsible“ fixing these NullPointerExceptions but does not mean the NPE happened in their code.
Tip: Enable **null analysis**

```java
@Override
protected void run(@Nullable List<Incident> slice) {
    for (Incident incident : slice) {
        // Potential null pointer access: The variable slice may be null at this location
    }
```
JDT offers a lot...
Tip: Never return `null`

Use `java.util.Optional` or `com.google.common.base.Optional` instead

```java
@Override
public Optional<String> getReason() {
    return Optional.ofNullable(cause);
}
```
Oh Class, Were Art Thou?

Use proper `import` ranges and define `uses` on your exports to get rid of `{Class | Method | Field} DefNotFoundErrors, LinkageErrors, and some ClassCastException`. OSGI needs that information to work properly...

```
Import-Package: 
    com.google.common.annotations;version="[15.0.0,16.0.0)",

Export-Package: org.eclipse.recommenders.utils;
    uses:="org.osgi.framework, 
        org.eclipse.core.runtime, 
        com.google.common.base, 
        com.google.common.collect"
```
Index out of bounds?

-1 and `array.length` do not work. No matter how often you try…

There is no tool support for this. Just unit tests and code that tries to fail gracefully.
Tip: If error messages are not helpful...

21% of all logged errors do not contain stack traces.

```java
try {
    // ...
} catch (Exception e) {
    log("An error occurred", e);
}
```

```java
try {
    // ...
} catch (Exception e) {
    log("Invalid argument 
```
Are your users ready for Java 8?

Which VM do users run the Eclipse IDE with?

Java 1.8
64%

Java 1.7
33%

Java 1.9
0.3%

Both
2.5%
Are you concerned that your exception message may reveal sensitive data?
Speak plain: Does it work?

Bugfixing Rates
Bugzilla Summary

1170 bugs

- 467 in progress (40%)
- 275 fixed (24%)
- 172 duplicates (15%)
- 69 works 4 me
- 100 invalid
- 28 wont fix
- 70 not eclipse

Bugzilla
Fixed bugs by projects

- Xtext: 42
- Recommenders: 41
- Papyrus: 19
- EGit: 15
- Oomph: 58
- More: 84
- More (35): 84
In progress & fixed bugs

- Oomph: In Progress 20, Fixed 58
- TMF: In Progress 29, Fixed 42
- Recommenders: In Progress 17, Fixed 41
- Papyrus: In Progress 14, Fixed 19
- EGit: In Progress 19, Fixed 15
- ---: In Progress 97, Fixed 11

Legend:
- Green: In Progress
- Blue: Fixed
Future Work?

Feature requests are tracked in bugzilla. Make sure your request is in there and vote for it.

Client:
- Separate view to „review, analyze and send later“
- Making client reusable in other (Eclipse- or SWT-based) applications
- Additional client-side automated analysis

Server:
- Ensure scalability of the system
- Improve duplicate detections
- Go Neon if feedback is good.

Hosting an error reporting service for Java software?
- Need one? TTML.
How to reach EPP Logging

• Code: Check out the EPP Logging Oomph profile
• Wiki: https://wiki.eclipse.org/EPP/Logging
• Manual: https://dev.eclipse.org/recommenders/community/confess/#/about
• Bugzilla: https://bugs.eclipse.org/bugs/buglist.cgi?component=logging&product=EPP
• Mail: error-reports-inbox@eclipse.org
Credits

- Daniel Haftstein, Codetrails – Eclipse client conception and implementation
- Marcel Bruch, Codetrails – Server-side conception and implementation
- Webmasters, Eclipse Foundation – Eclipse server infrastructure & integration
- Thanks to many early adopters and committers providing feedback
Feedback

Leave Feedback

Your feedback is important -- how could the talk have been better?

Score *

-1  0  +1

Comments (Edit summary)

I liked that...
I disliked...
Contact Us

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