PRESENTED BY RED HAT

LEARN. NETWORK.
EXPERIENCE OPEN SOURCE.

www.theredhatsummit.com

Effective Eclipse:

Coding, Debugging, Teamwork

Andrew Overholt
Senior Software Developer, Red Hat
25 June 2010

Agenda

- Background
- Code editing
- Build and compiler integration
- Debugging
- Teamwork
- Linux-specific tools

Agenda

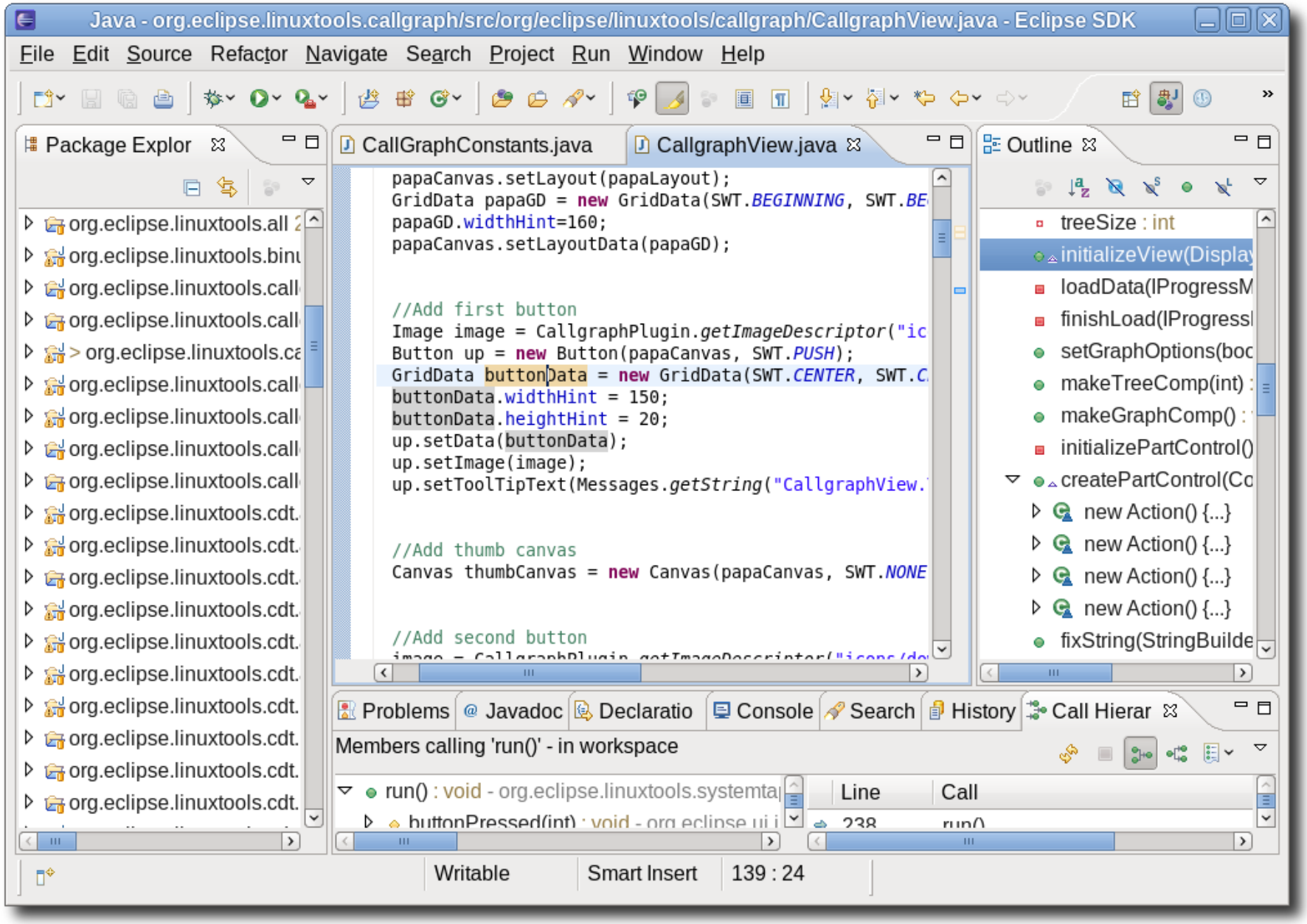
- **Background**
- Code editing
- Build and compiler integration
- Debugging
- Teamwork
- Linux-specific tools

Background

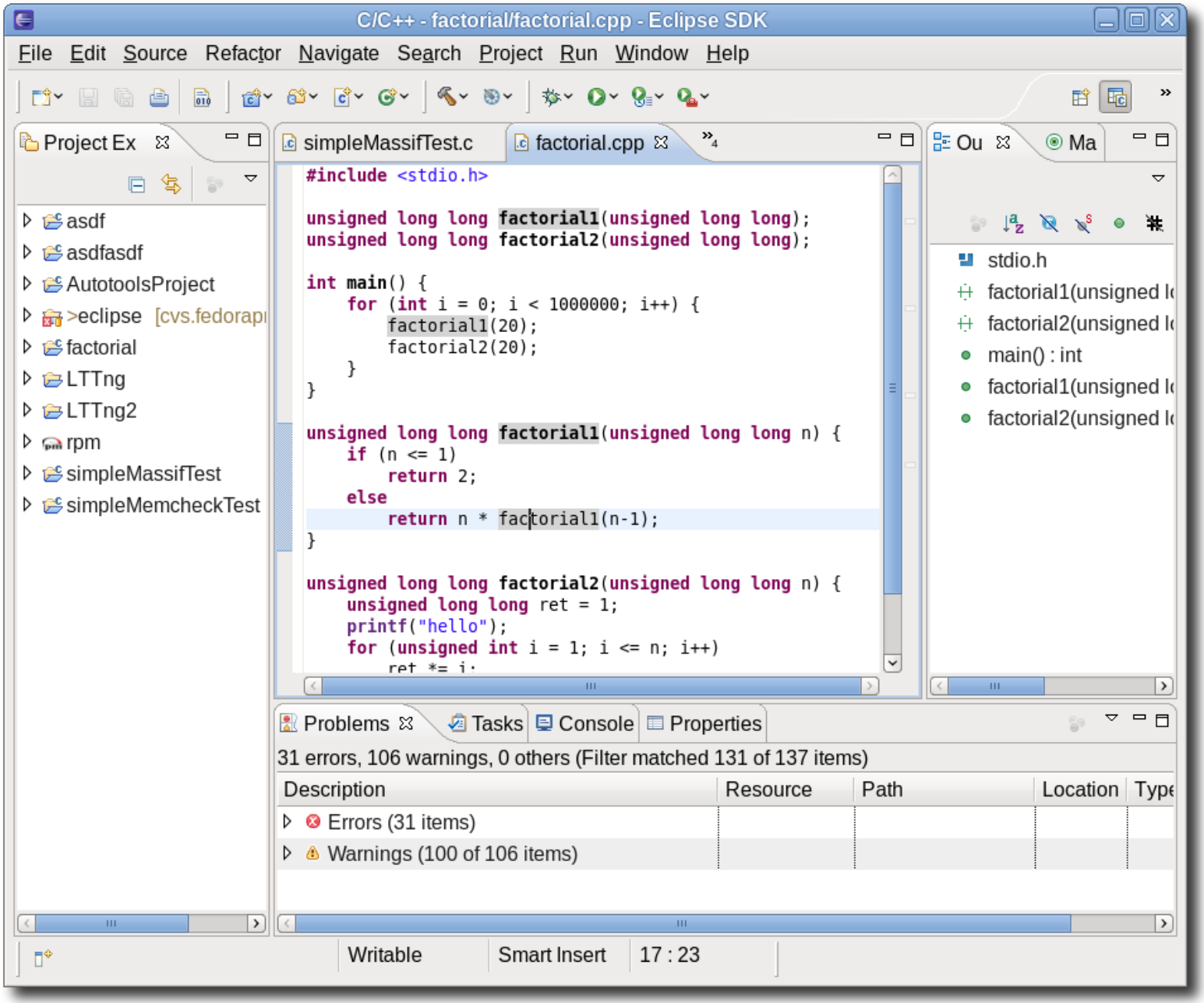
- Eclipse has a long history
- Eclipse community is large
- Eclipse technology is diverse

Eclipse as a development tool

What does it look like?



SUMMIT JBoss WORLD
PRESENTED BY RED HAT



SUMMIT JBoss WORLD
PRESENTED BY RED HAT

RPMs

- C/C++ tools available in `eclipse-cdt` RPM
- Java tools available in `eclipse-jdt` RPM

Agenda

- Background
- **Code editing**
- Build and compiler integration
- Debugging
- Teamwork
- Linux-specific tools

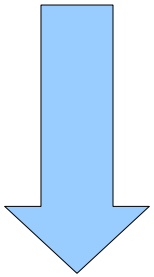
Code Editing

- **Navigation**
- Outline
- Completion
- Error highlighting

```
//Initialize graph
g = new StapGraph(graphComp, SWT.BORDER, treeComp, papaCanvas, this);
g.setLay
up.addSe
```

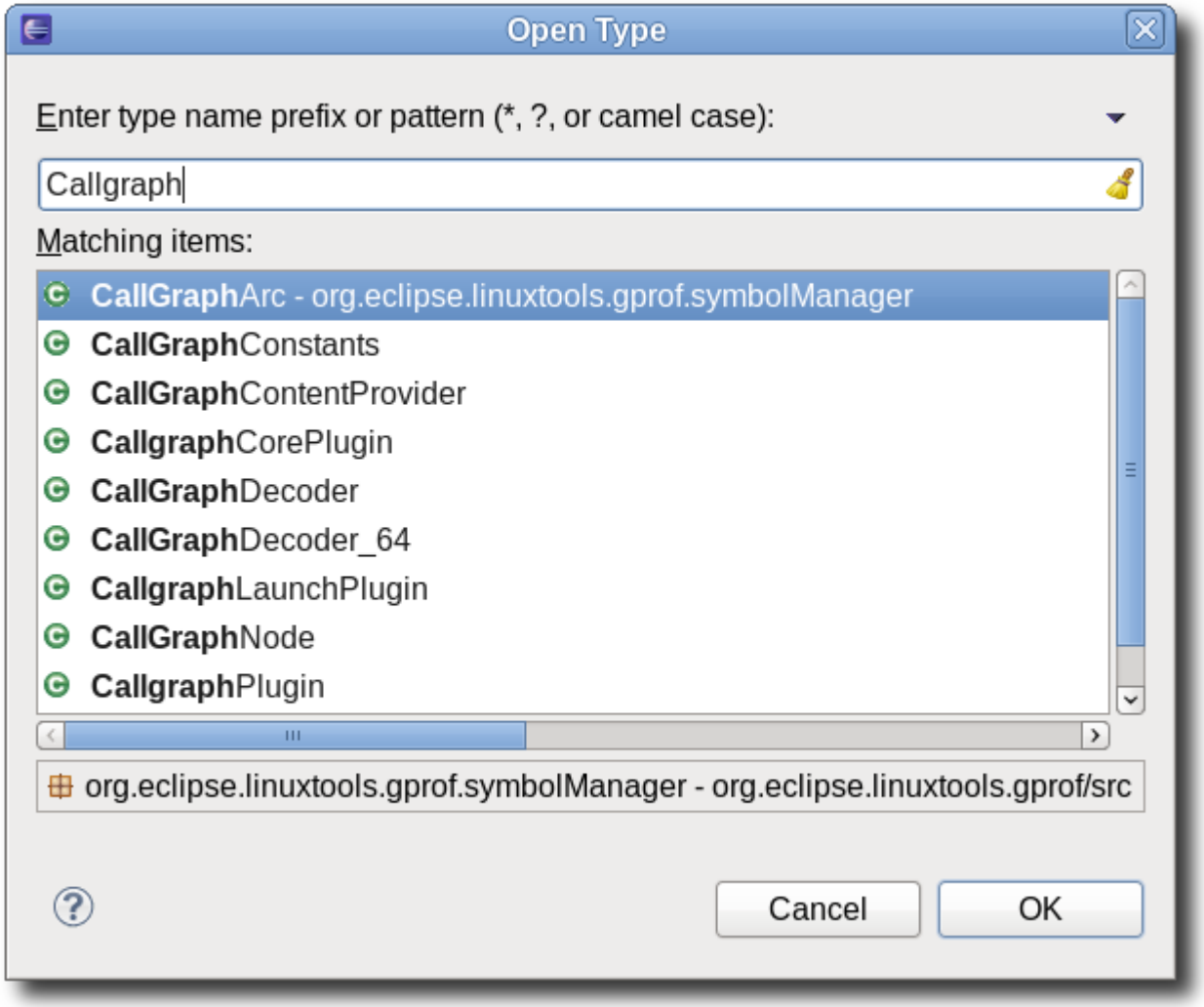
org.eclipse.linuxtools.callgraph.StapGraph.StapGraph(Composite parent, int style, Composite treeComp, Canvas tCanvas, CallgraphView callgraphView)

Ctrl-click or F3

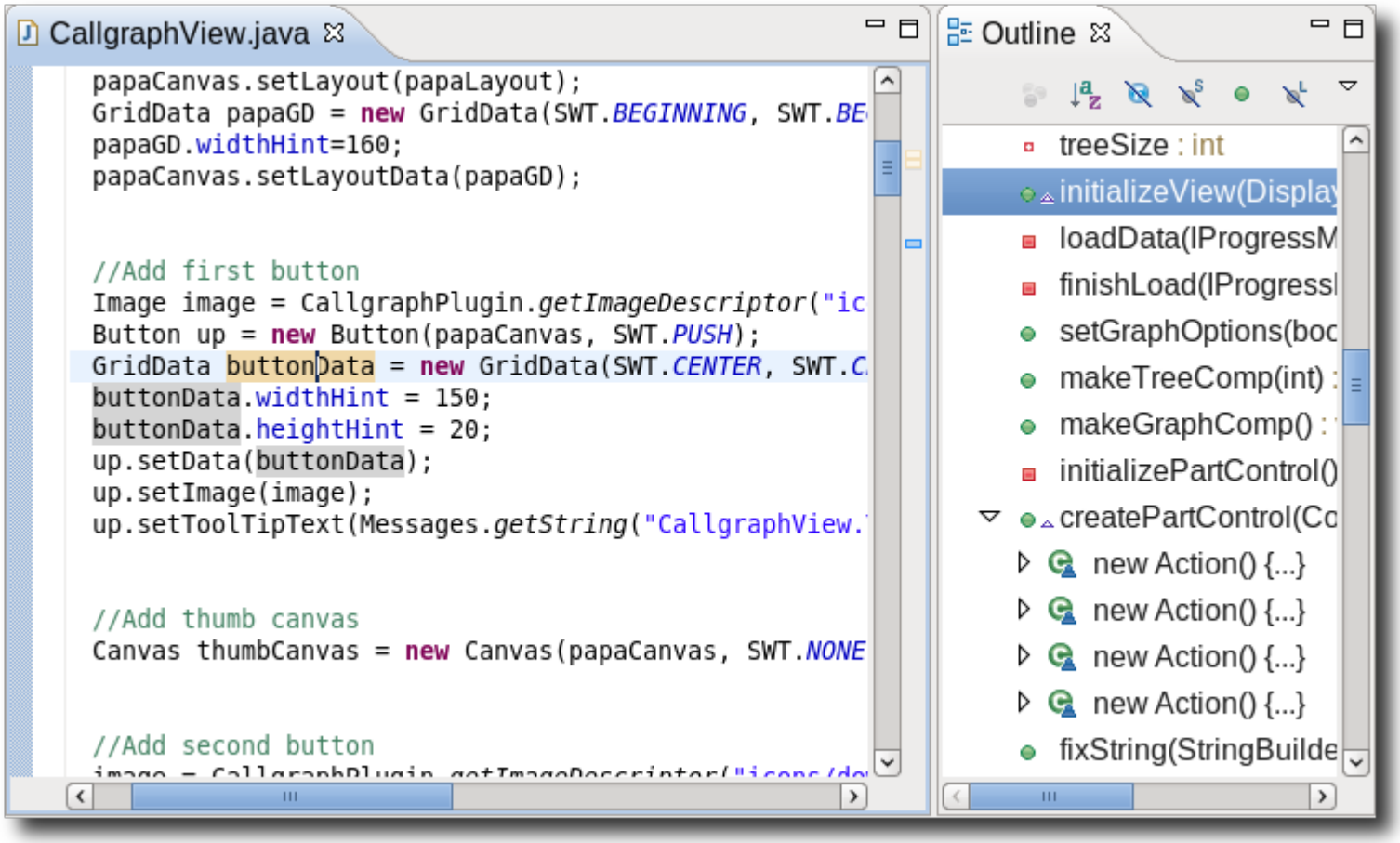


CallgraphView.java | StapGraph.java

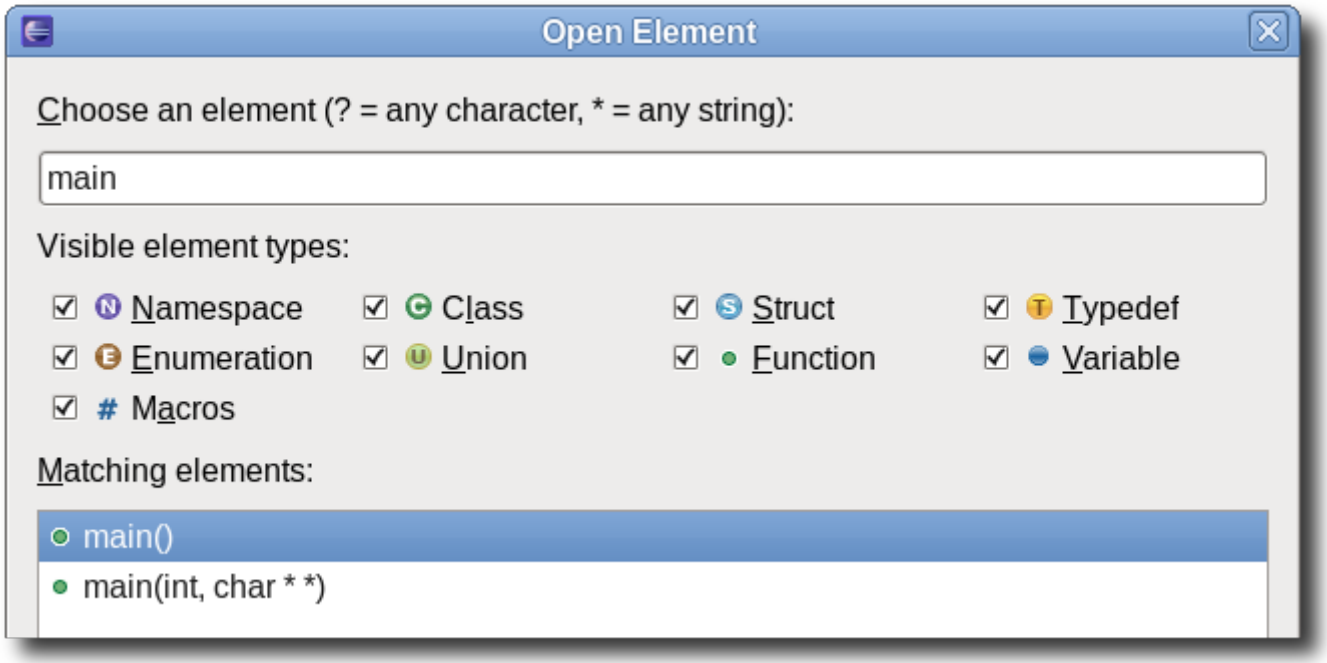
```
    public StapGraph(Composite parent, int style, Composite
            CallgraphView callgraphView) {
        super(parent, style);

        //-------------Initialize variables
        thumbCanvas = tCanvas;
        nodeMap = new HashMap<Integer, StapNode>();
        levels = new HashMap<Integer, List<Integer>>();
        nodeDataMap = new HashMap<Integer, StapData>();
        aggregateTime = new HashMap<String, Long>();
        aggregateCount = new HashMap<String, Integer>();
        currentPositionInLevel = new HashMap<Integer, Intege
        collapsedLevelSize = new HashMap<Integer, Integer>()
        markedNodes = new ArrayList<Integer>();
```



Ctrl-Shift-t – Open Type



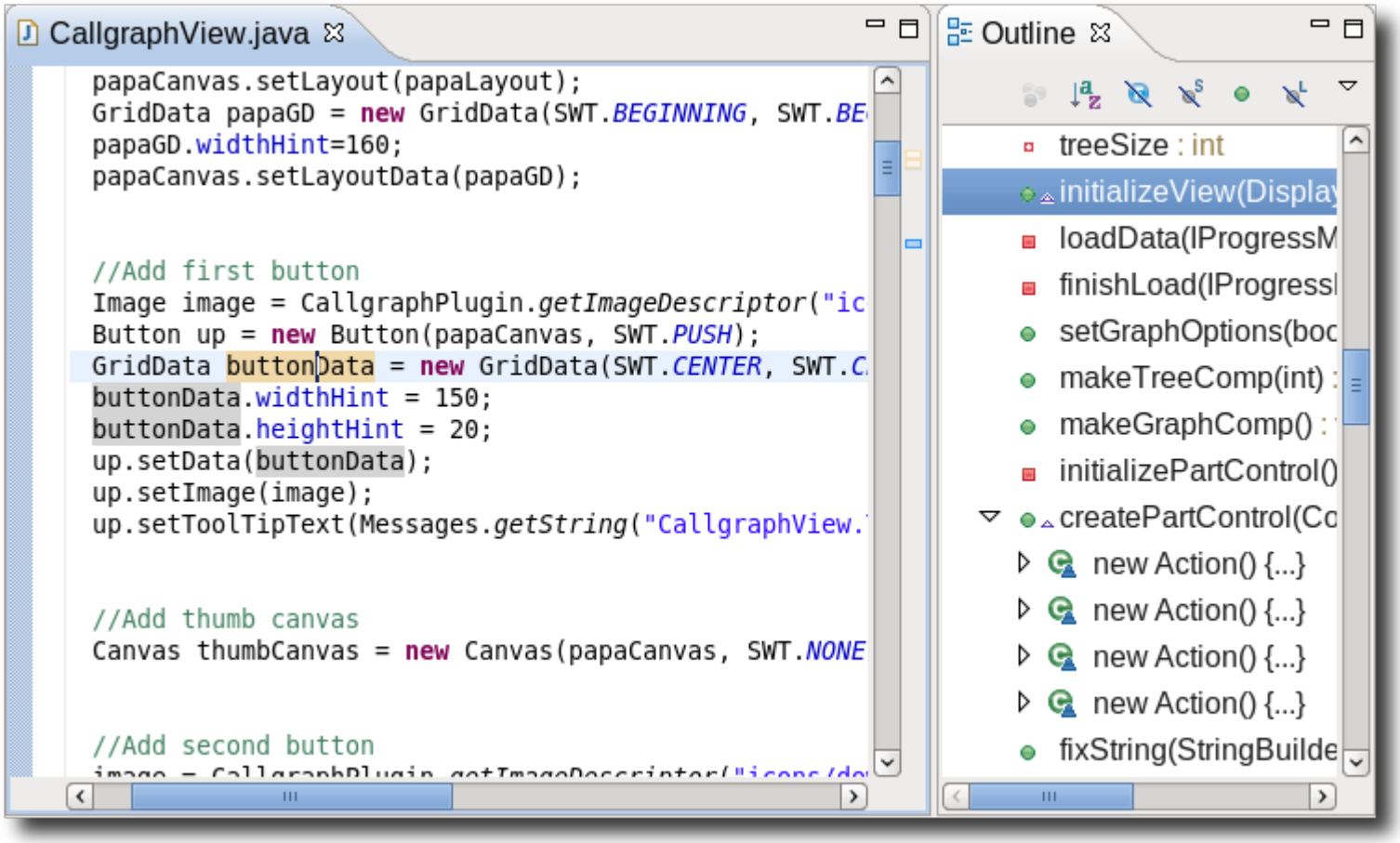
SUMMIT JBoss WORLD
PRESENTED BY RED HAT



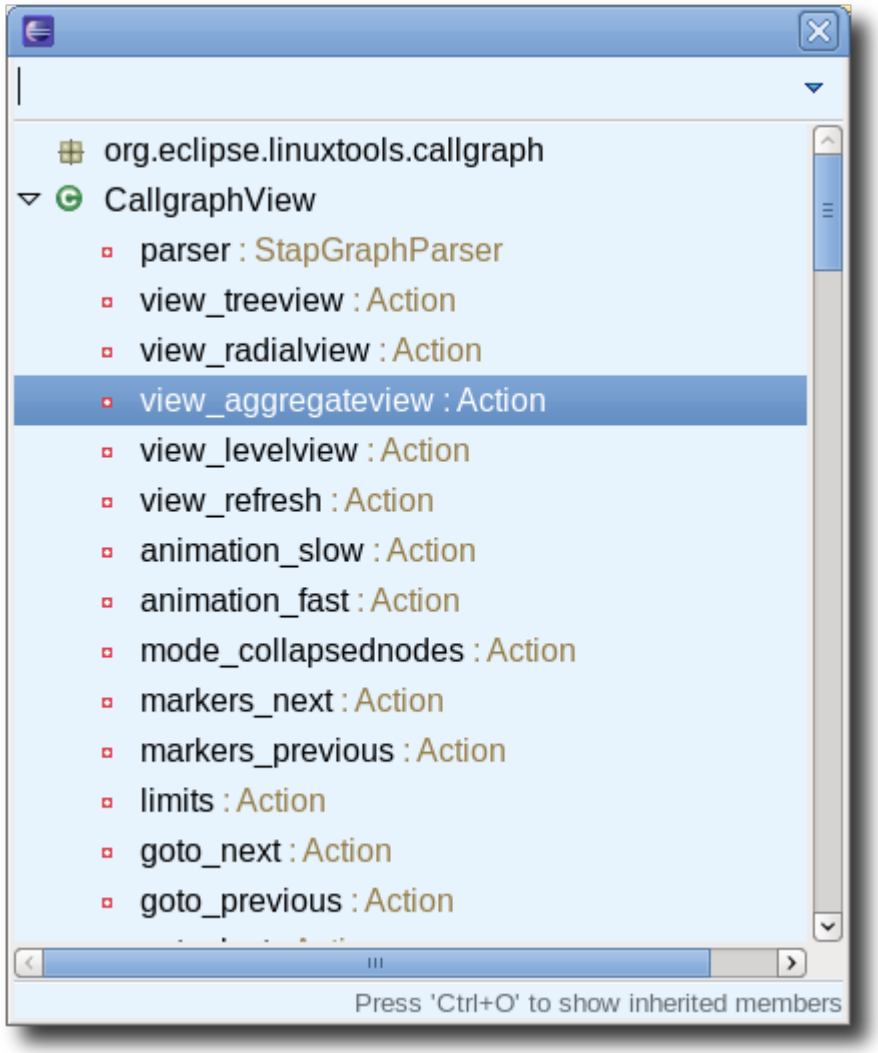
Ctrl-Shift-t – Open Element

Code Editing

- Navigation
- **Outline**
- Completion
- Error highlighting

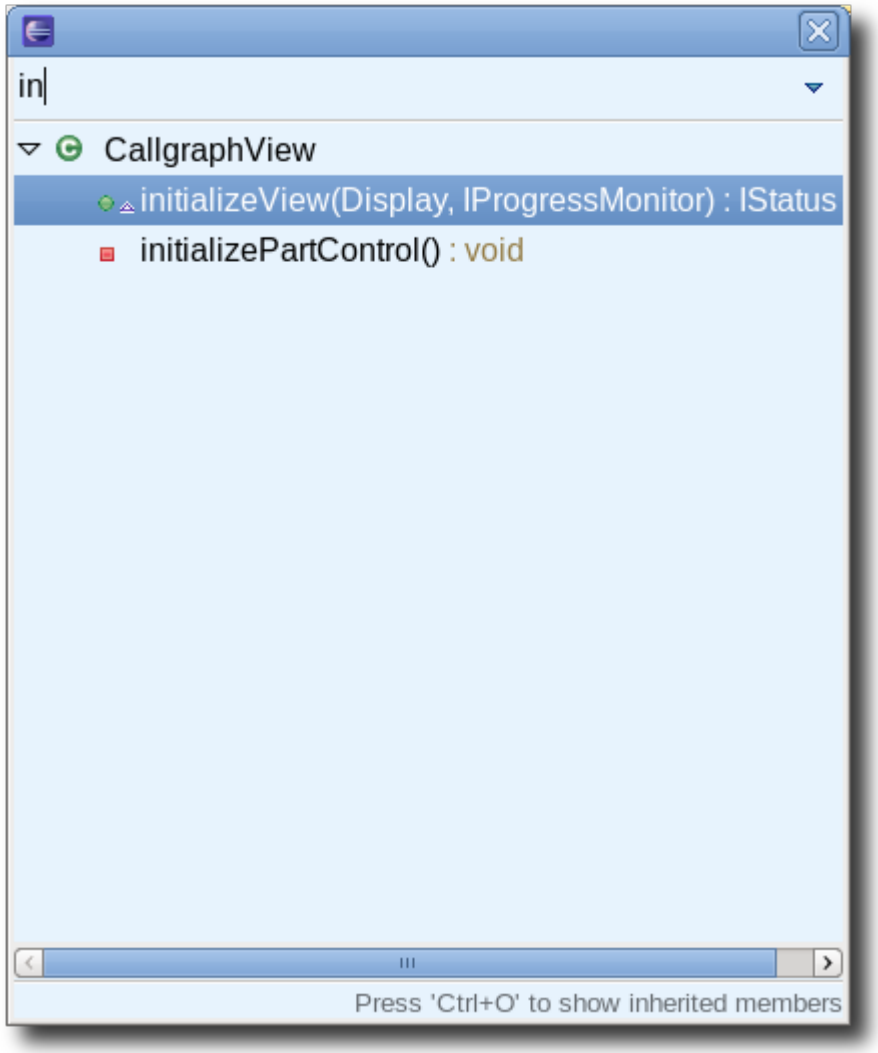


SUMMIT JBoss WORLD
PRESENTED BY RED HAT



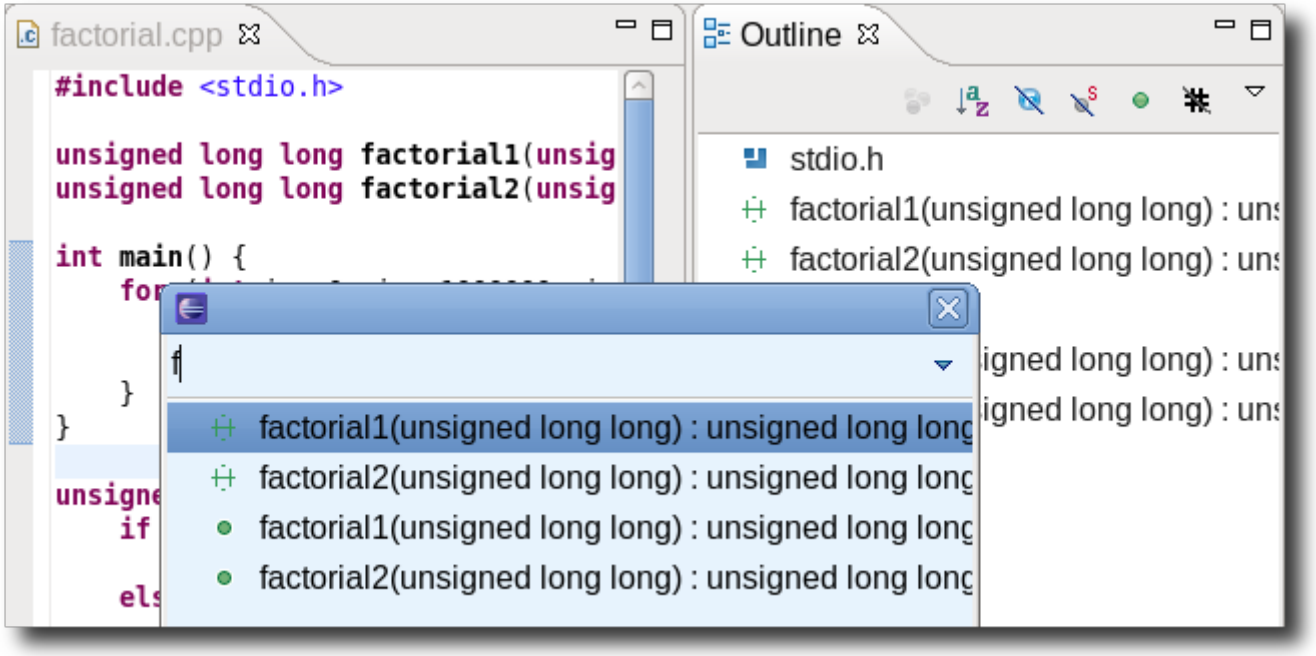
Ctrl-o – Quick Outline

(Java)



Ctrl-o – Quick Outline

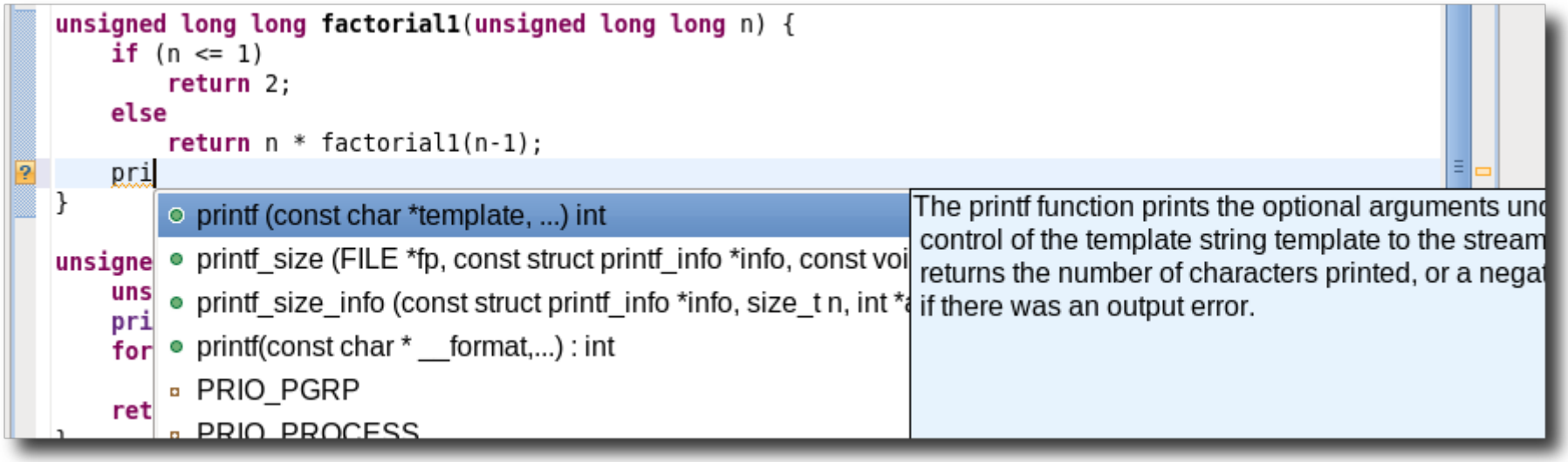
(Java)



Ctrl-o – Quick Outline (C/C++)

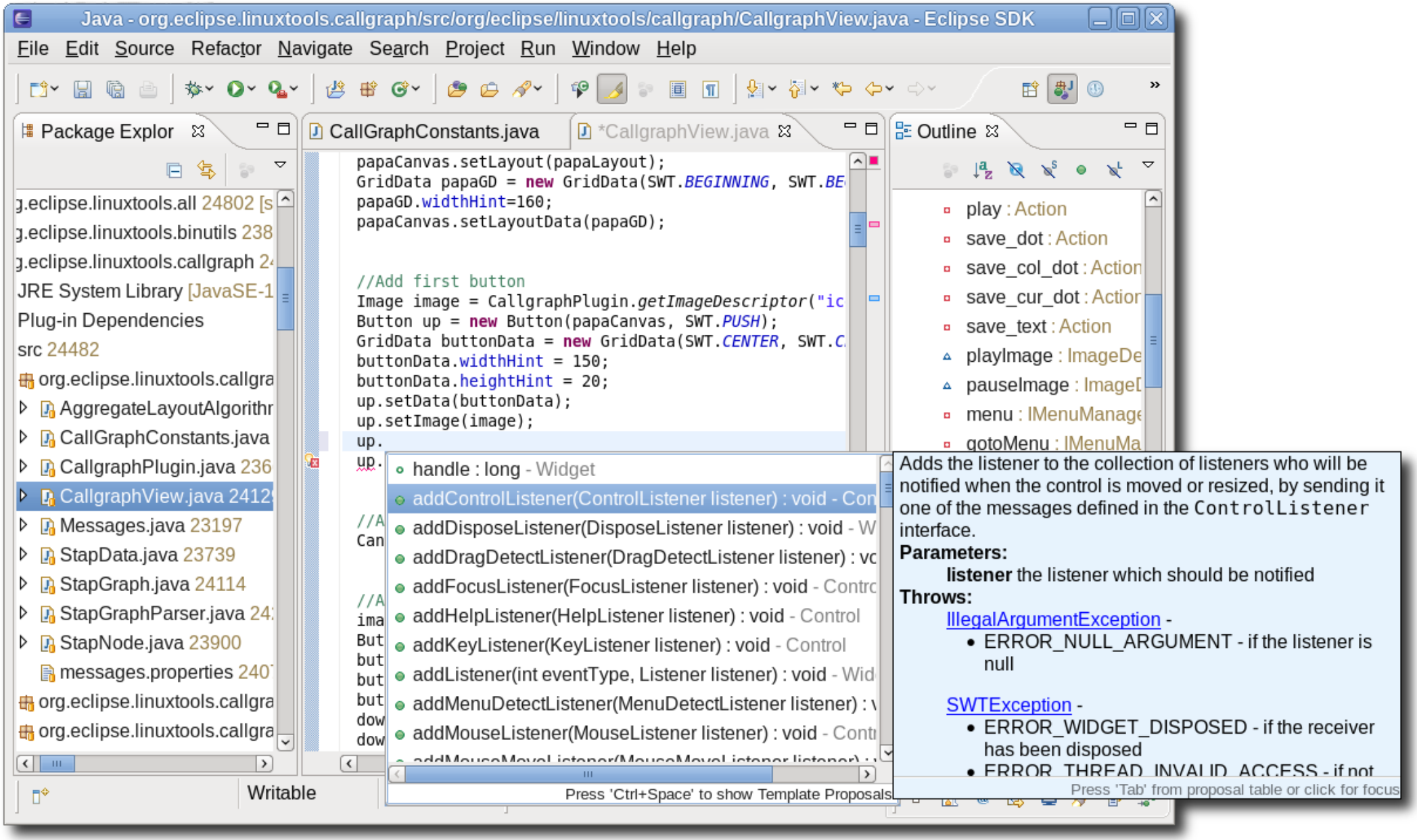
Code Editing

- Navigation
- Outline
- **Completion**
- Error highlighting



Ctrl-<Spacebar>

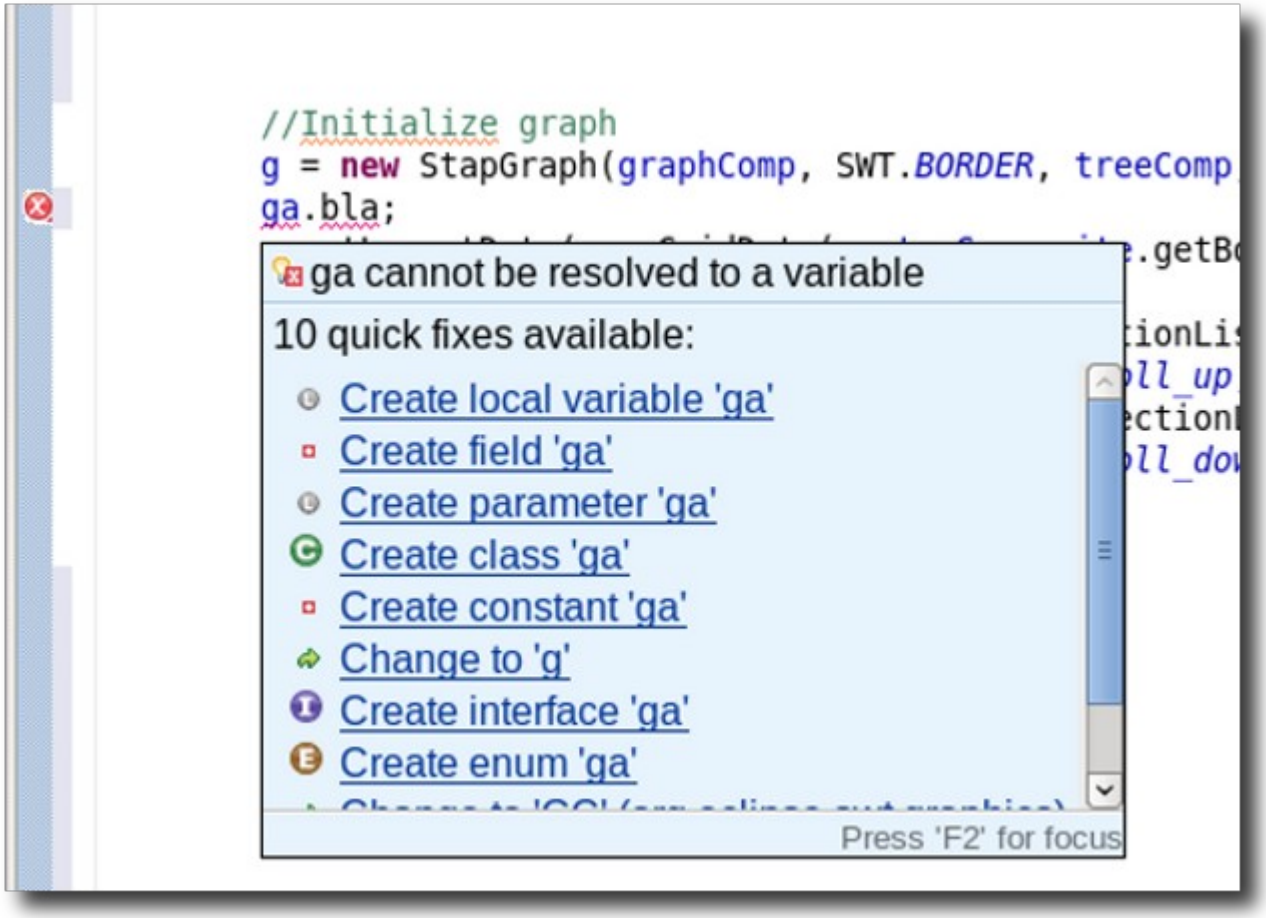
(Almost all languages and tools)

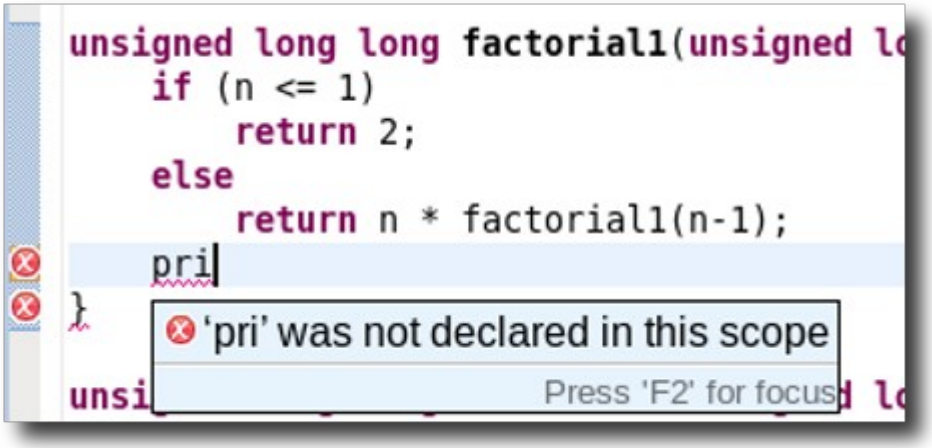


SUMMIT JBoss WORLD
PRESENTED BY RED HAT

Code Editing

- Navigation
- Outline
- Completion
- **Error highlighting**


//Initialize graph
g = new StapGraph(graphComp, SWT.BORDER, treeComp
ga.bla;
ga cannot be resolved to a variable
10 quick fixes available:
Create local variable 'ga'
Create field 'ga'
Create parameter 'ga'
Create class 'ga'
Create constant 'ga'
Change to 'g'
Create interface 'ga'
Create enum 'ga'
Press 'F2' for focus


unsigned long long factorial1(unsigned lo
if (n <= 1)
return 2;
else
return n * factorial1(n-1);
pri
}
'pri' was not declared in this scope
Press 'F2' for focus
unsi

Agenda

- Background
- Code editing
- **Build and compiler integration**
- Debugging
- Teamwork
- Linux-specific Tools

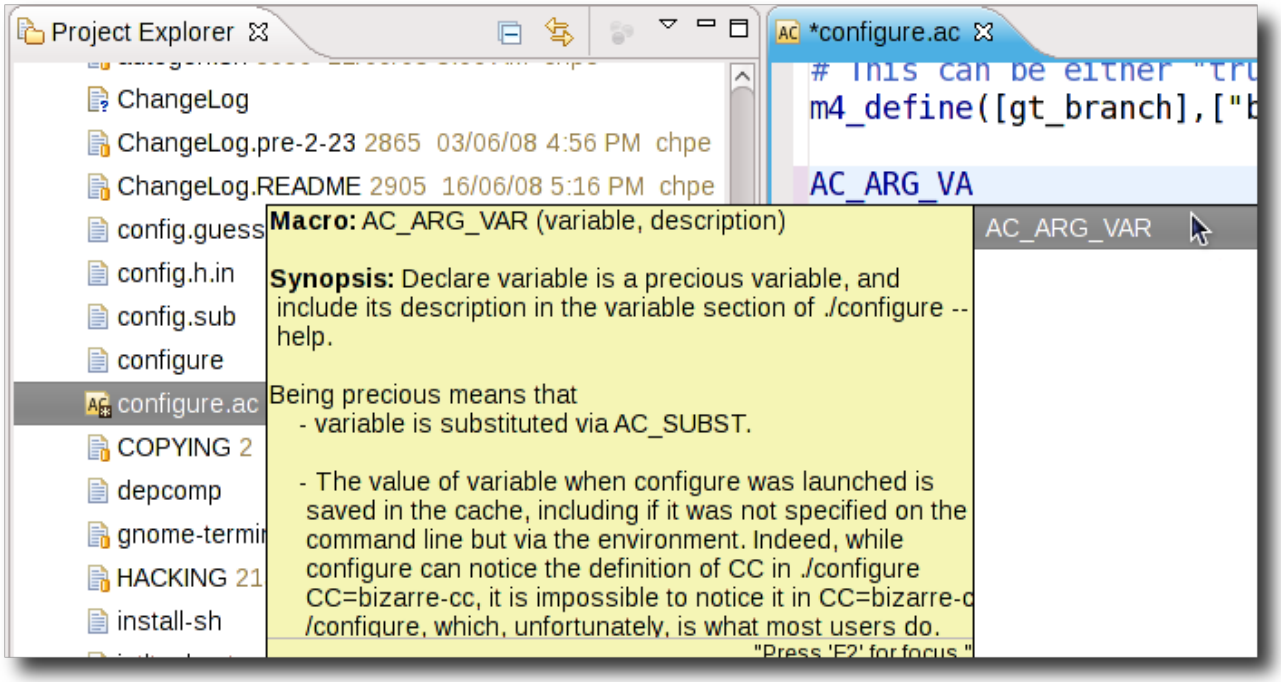
Build and compiler integration

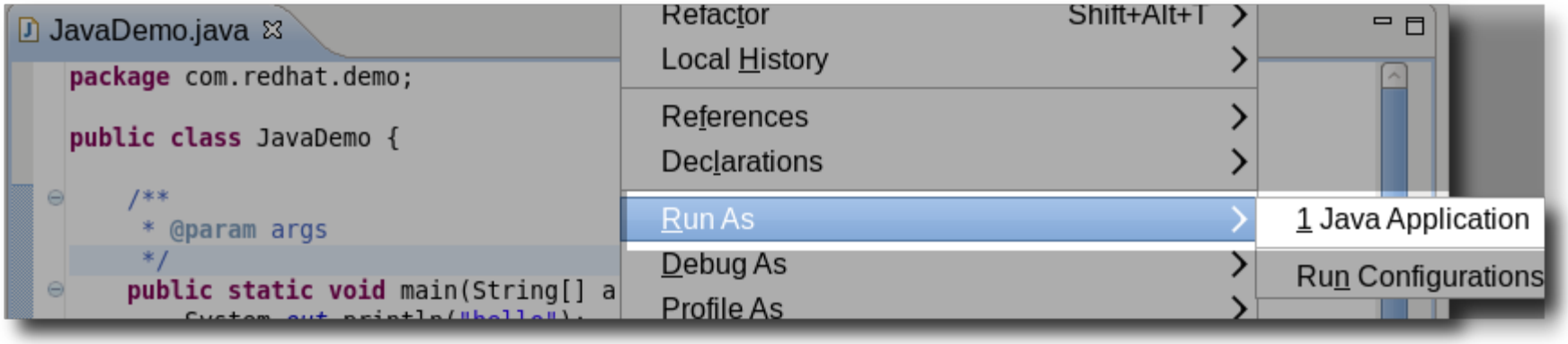
- Java: on-the-fly, built-in compiler
- C/C++: gcc

Build and compiler integration

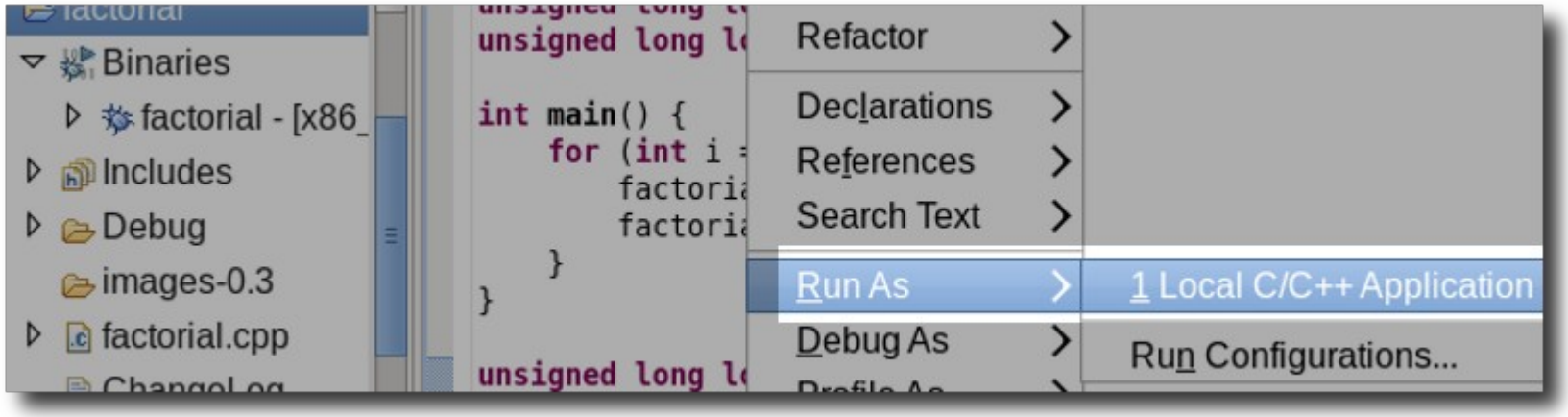
- Java: ant debugging
- C/C++: GNU Autotools, make

GNU Autotools





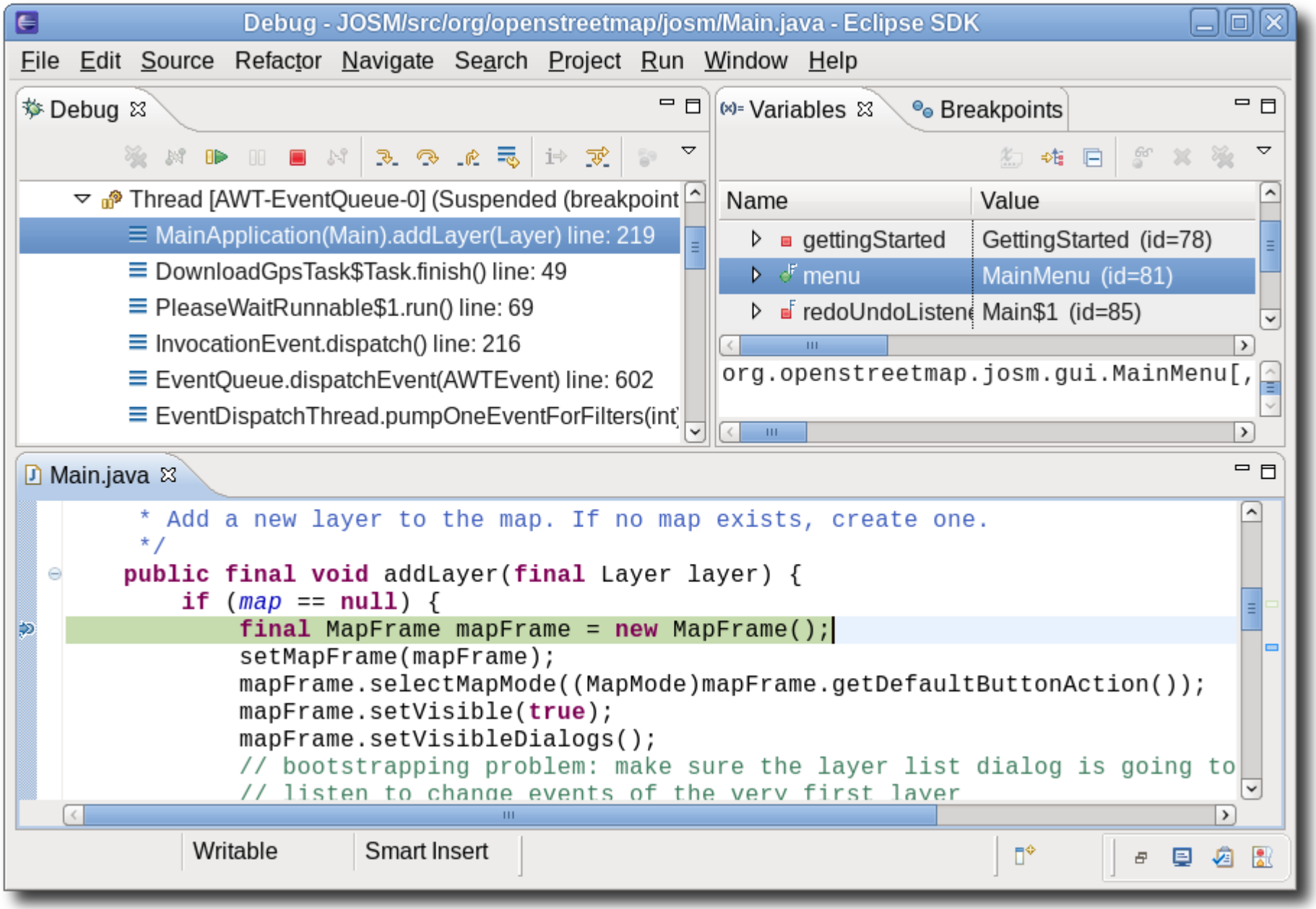
Launching what was built



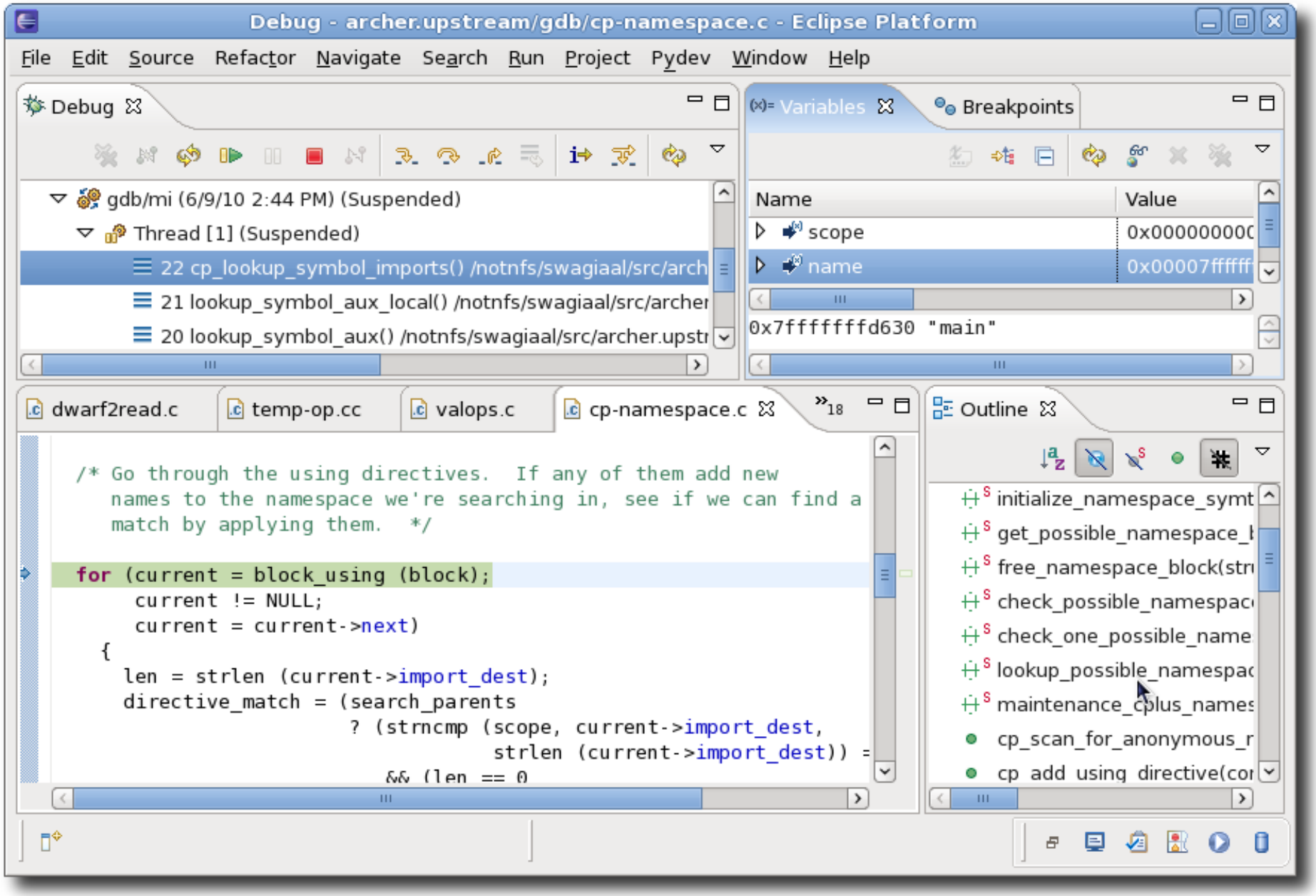
Launching what was built

Agenda

- Background
- Code editing
- Build and compiler integration
- **Debugging**
- Teamwork
- Linux-specific Tools



SUMMIT JBoss WORLD
PRESENTED BY RED HAT

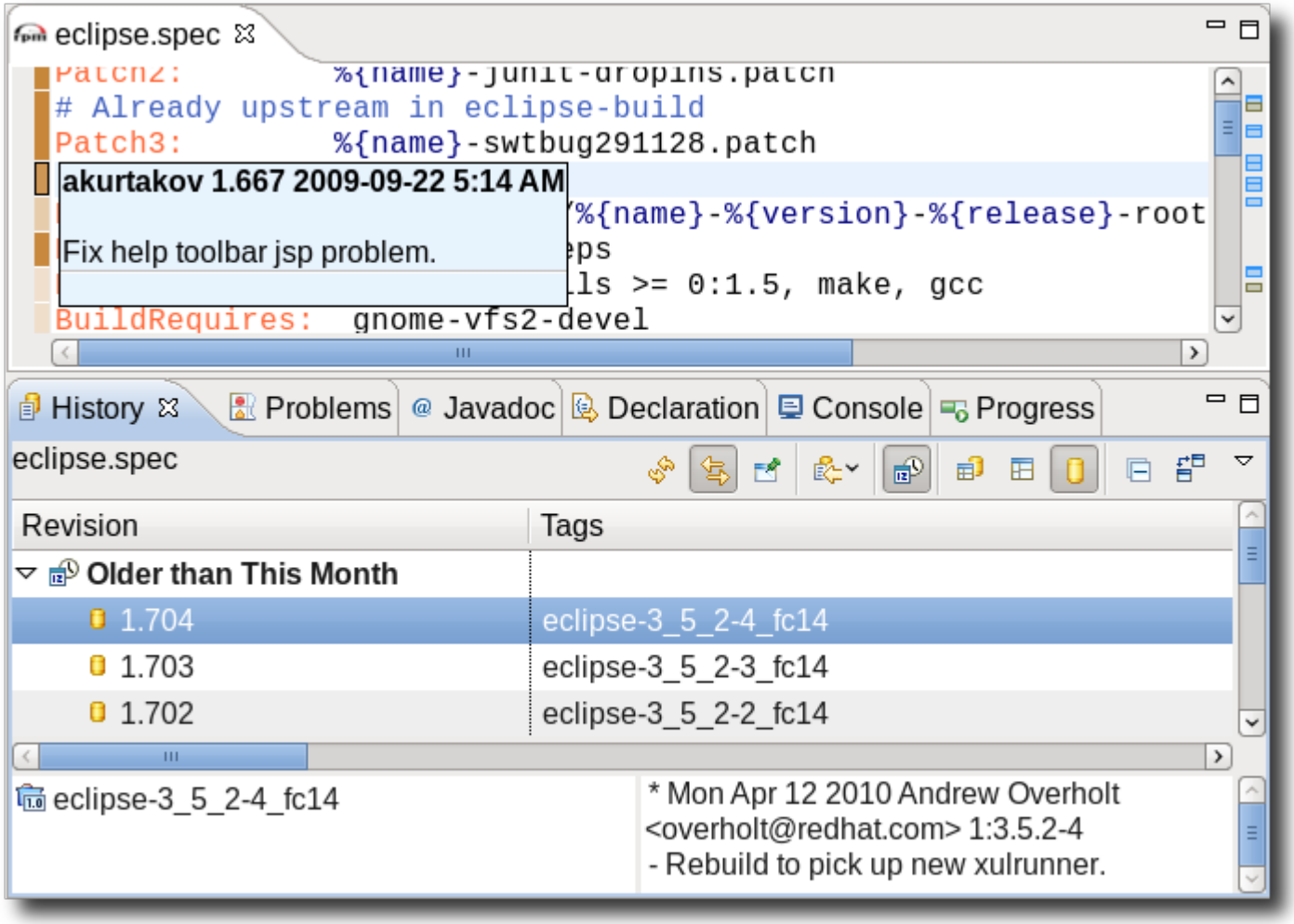


SUMMIT JBoss WORLD
PRESENTED BY RED HAT

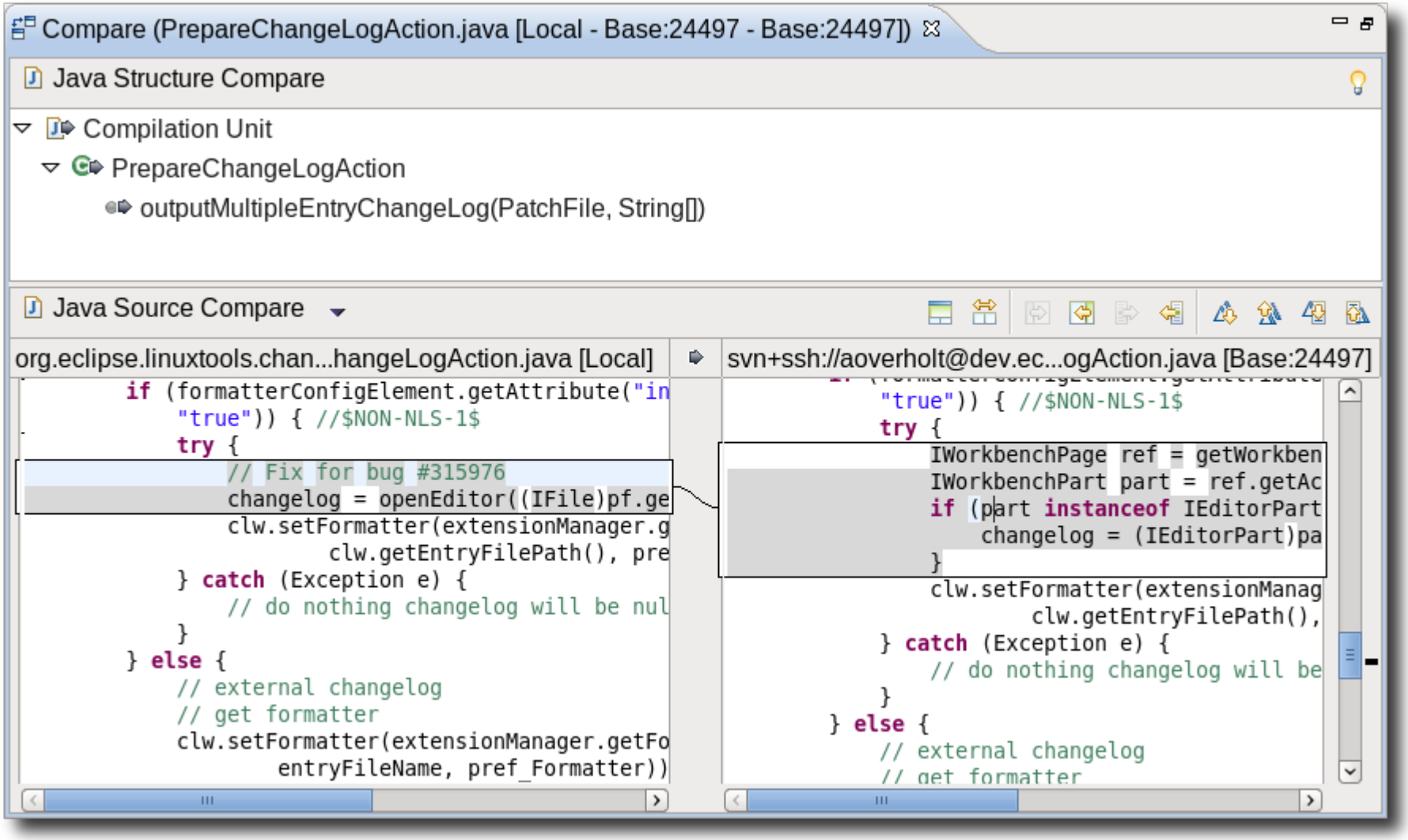
Agenda

- Background
- Code editing
- Build and compiler integration
- Debugging
- **Teamwork**
- Linux-specific Tools

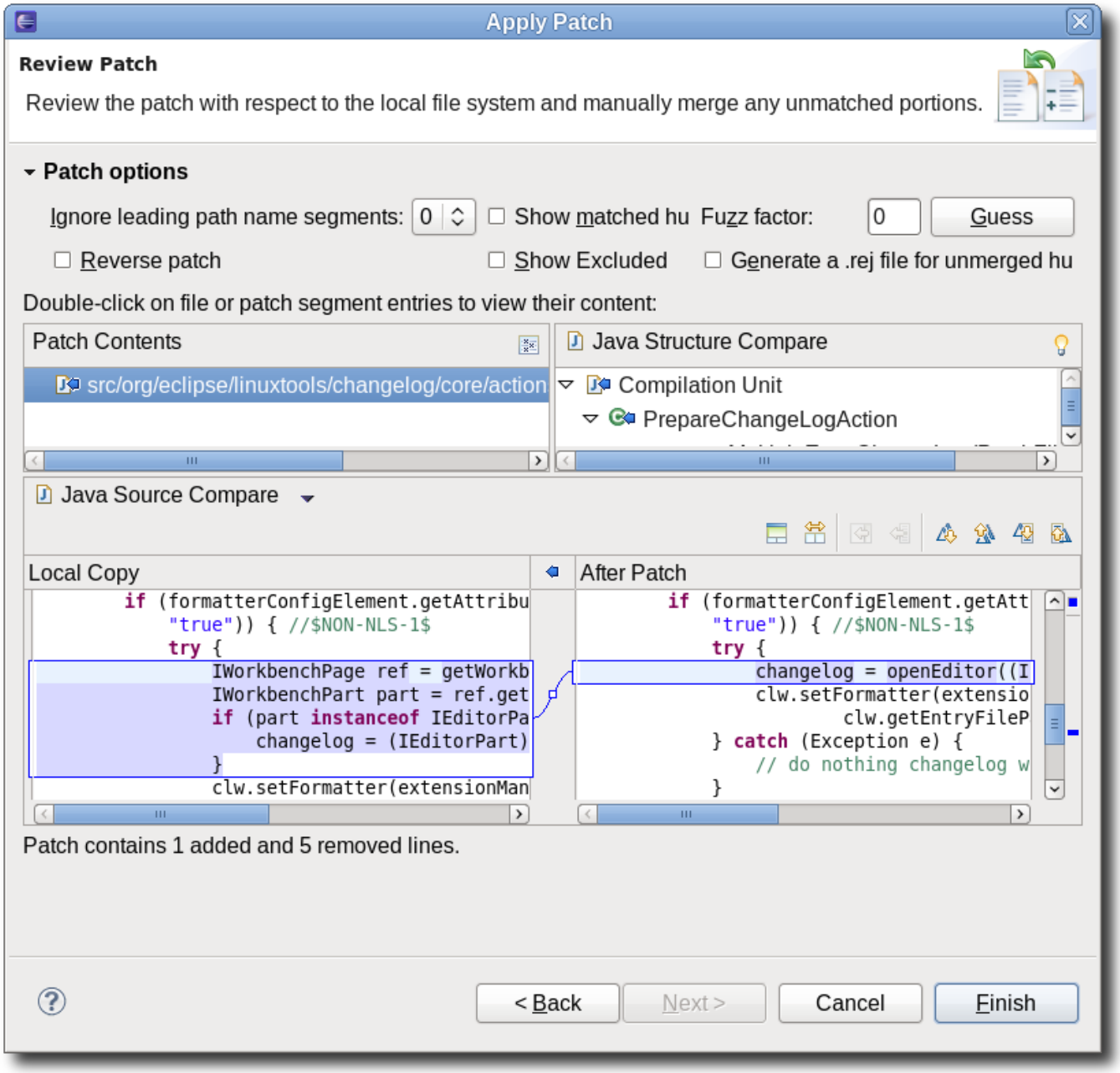
CVS / Subversion Annotation



CVS / Subversion Comparison



Patch Application



SUMMIT JBoss WORLD
PRESENTED BY RED HAT

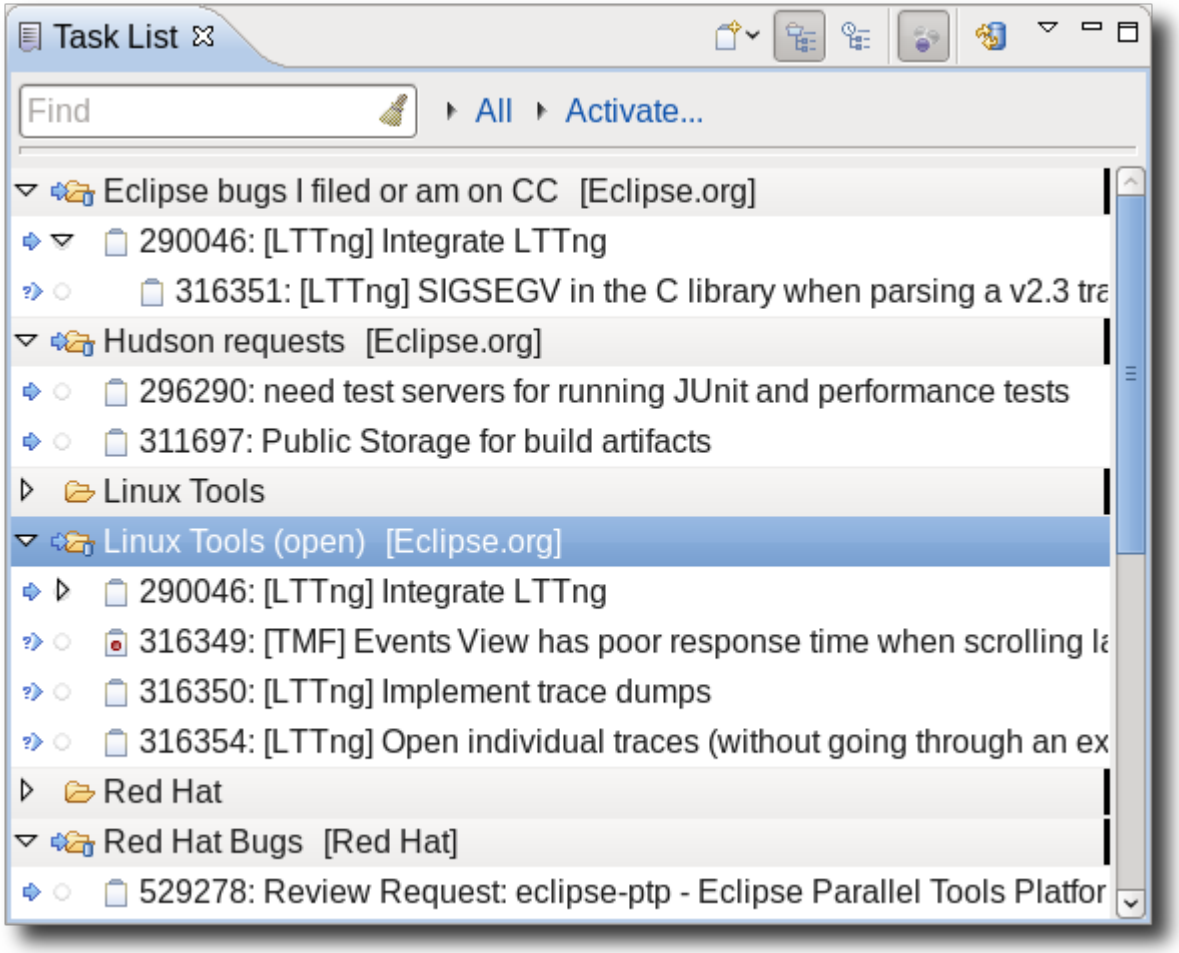
Teamwork with CVS and Subversion

- Commit, revert, etc.
- Comparison
- Annotations
- Branching, tagging
- Patch generation and application

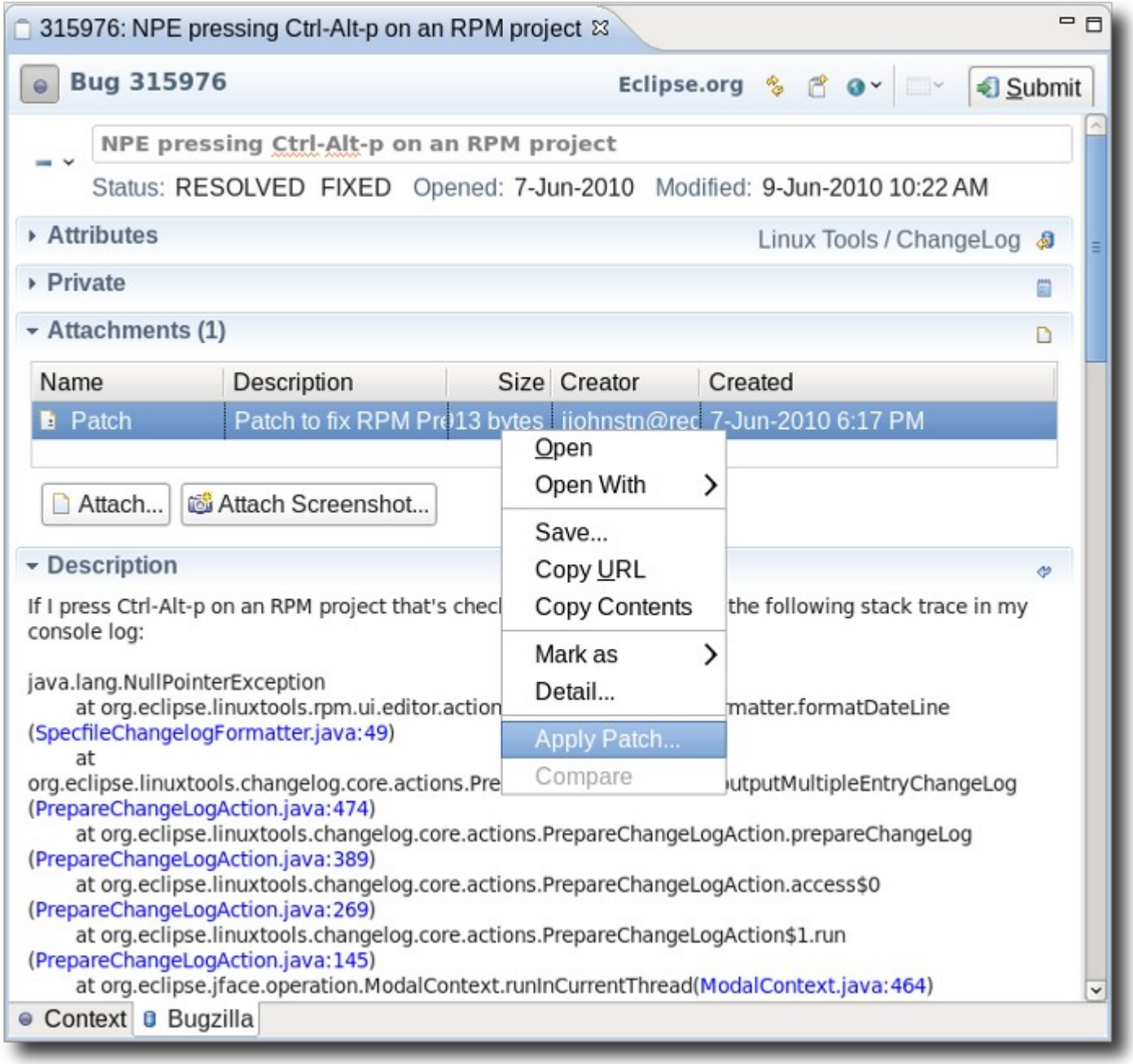
Teamwork with CVS and Subversion

- CVS integration part of all Eclipse RPM installations
- SVN comes with `eclipse-subclipse` RPM

Bugzilla


Task List
Find
All
Activate...
Eclipse bugs I filed or am on CC [Eclipse.org]
290046: [LTTng] Integrate LTTng
316351: [LTTng] SIGSEGV in the C library when parsing a v2.3 tra
Hudson requests [Eclipse.org]
296290: need test servers for running JUnit and performance tests
311697: Public Storage for build artifacts
Linux Tools
Linux Tools (open) [Eclipse.org]
290046: [LTTng] Integrate LTTng
316349: [TMF] Events View has poor response time when scrolling la
316350: [LTTng] Implement trace dumps
316354: [LTTng] Open individual traces (without going through an ex
Red Hat
Red Hat Bugs [Red Hat]
529278: Review Request: eclipse-ptp - Eclipse Parallel Tools Platfor

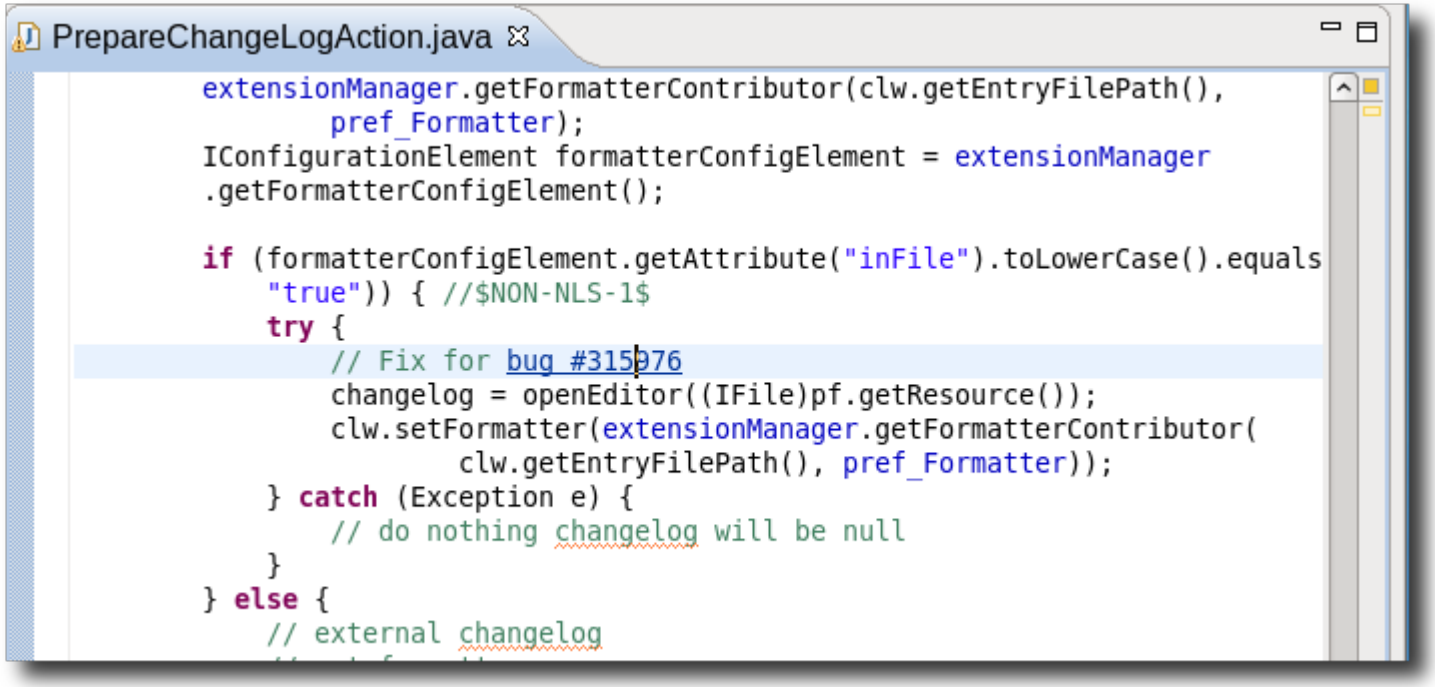
Bugzilla


315976: NPE pressing Ctrl-Alt-p on an RPM project
Bug 315976
Eclipse.org
Submit
NPE pressing Ctrl-Alt-p on an RPM project
Status: RESOLVED FIXED Opened: 7-Jun-2010 Modified: 9-Jun-2010 10:22 AM
Attributes
Linux Tools / ChangeLog
Private
Attachments (1)
Name
Description
Size
Creator
Created
Patch
Patch to fix RPM Pr
13 bytes
jjohnstn@rec
7-Jun-2010 6:17 PM
Attach...
Attach Screenshot...
Open
Open With
Save...
Copy URL
Copy Contents
Mark as
Detail...
Apply Patch...
Compare
Description
If I press Ctrl-Alt-p on an RPM project that's chec
the following stack trace in my console log:
java.lang.NullPointerException
at org.eclipse.linuxtools.rpm.ui.editor.action
matter.formatDateLine
(SpecfileChangelogFormatter.java:49)
at
org.eclipse.linuxtools.changelog.core.actions.Pre
utputMultipleEntryChangeLog
(PrepareChangeLogAction.java:474)
at org.eclipse.linuxtools.changelog.core.actions.PrepareChangeLogAction.prepareChangeLog
(PrepareChangeLogAction.java:389)
at org.eclipse.linuxtools.changelog.core.actions.PrepareChangeLogAction.access$0
(PrepareChangeLogAction.java:269)
at org.eclipse.linuxtools.changelog.core.actions.PrepareChangeLogAction$1.run
(PrepareChangeLogAction.java:145)
at org.eclipse.jface.operation.ModalContext.runInCurrentThread(ModalContext.java:464)
Context
Bugzilla

Bugzilla

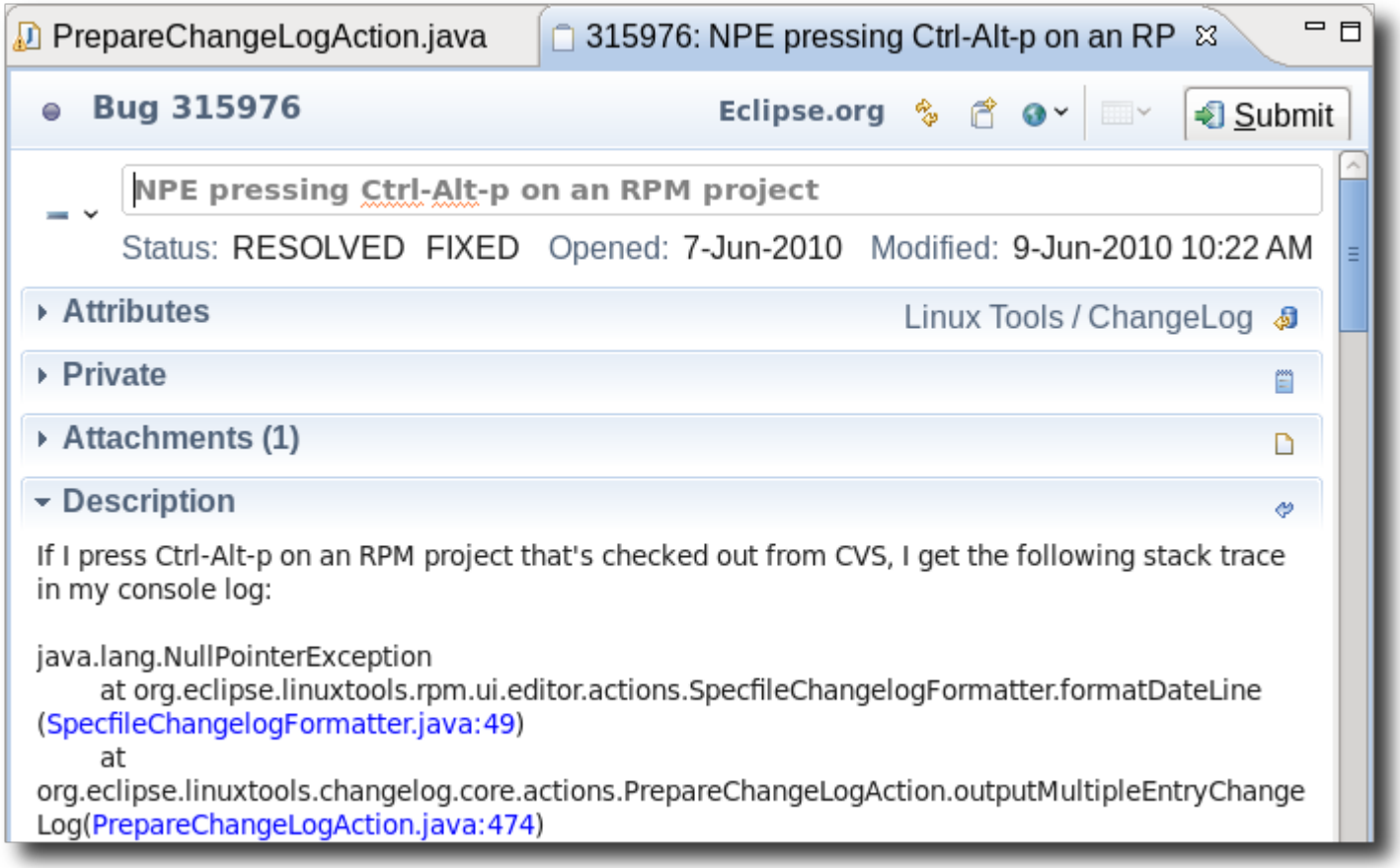
- Cache all data for offline use/manipulation
- Rich editor in Eclipse (no more Ctrl-w problems!)
- Auto-synchronization
- Filing (offline preparation)
- **No more bug email!**
- Also works with Trac, JIRA, etc.

Bugzilla + Code Editor Integration



Ctrl-click on “bug #315976”

Bugzilla + Code Editor Integration

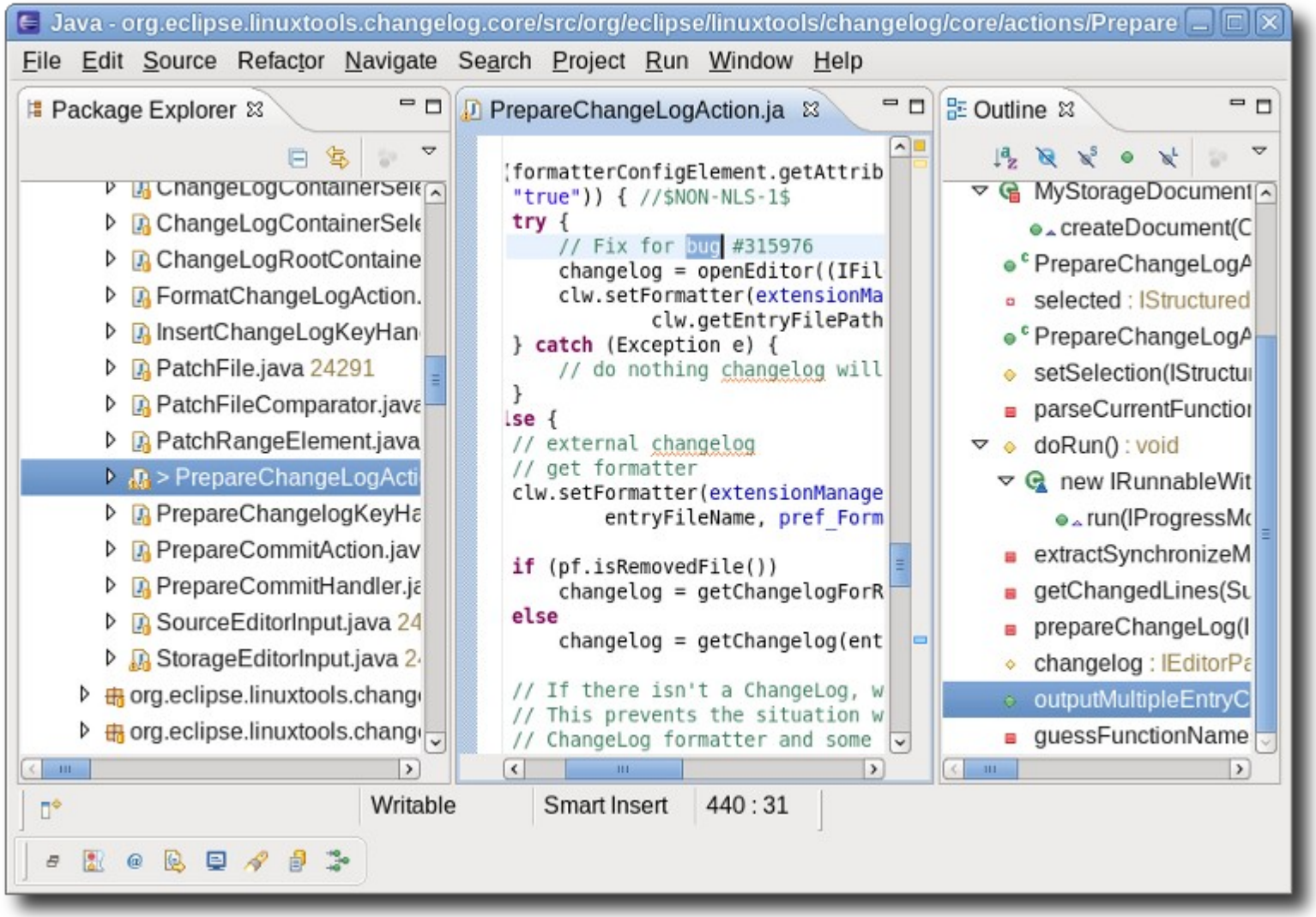


Bug #315976

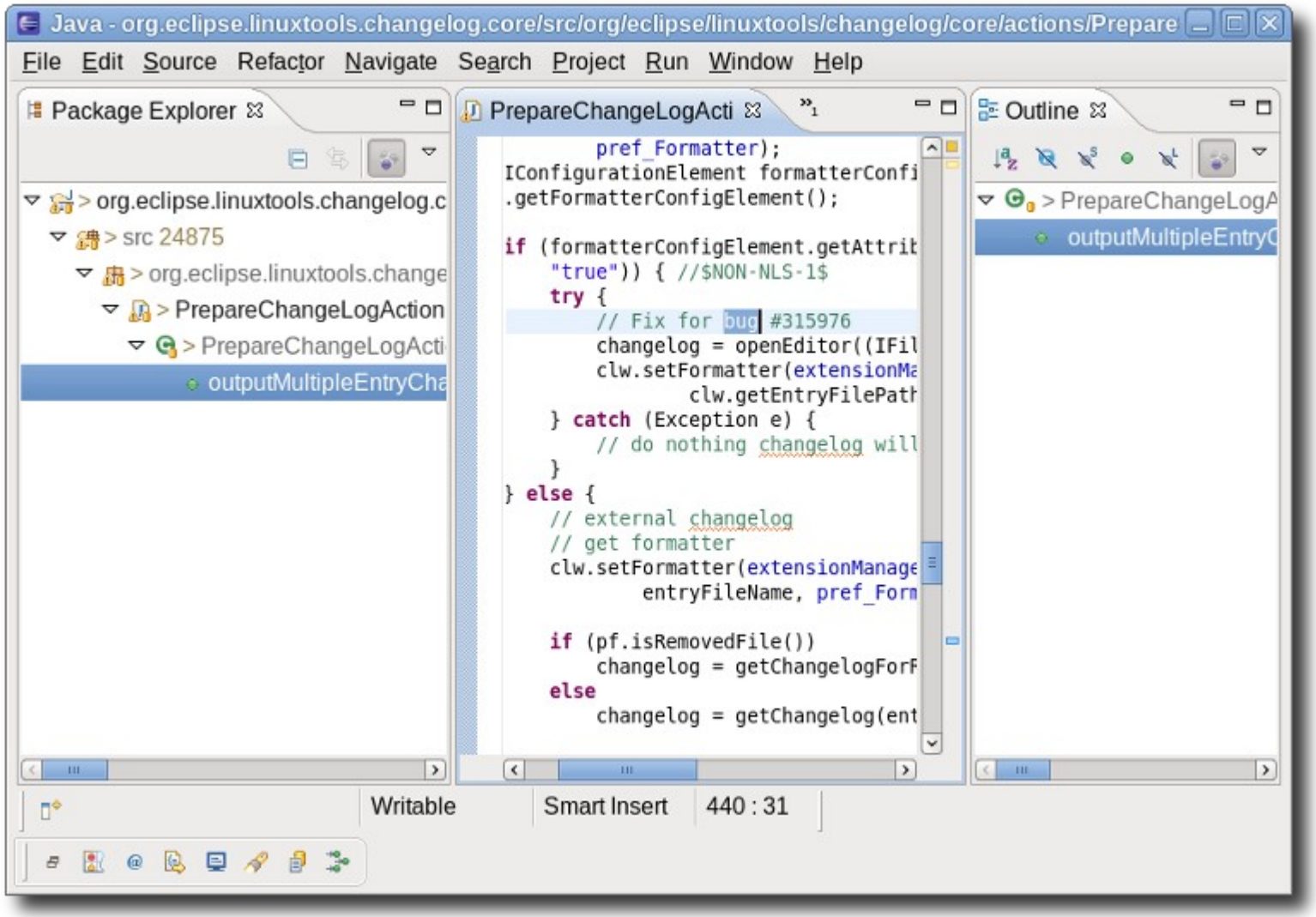
Associate “task” with work

- Automatically keep track of where you navigate and what you edit as you work on a bug
- Build up **context** associated with the task
- Share this context with others and your future self
- Allows for focus on task at hand

Clutter


Java - org.eclipse.linuxtools.changelog.core/src/org/eclipse/linuxtools/changelog/core/actions/Prepare
File Edit Source Refactor Navigate Search Project Run Window Help
Package Explorer
ChangeLogContainerSele
ChangeLogContainerSele
ChangeLogRootContaine
FormatChangeLogAction.
InsertChangeLogKeyHan
PatchFile.java 24291
PatchFileComparator.java
PatchRangeElement.java
> PrepareChangeLogActi
PrepareChangelogKeyHa
PrepareCommitAction.jav
PrepareCommitHandler.ja
SourceEditorInput.java 24
StorageEditorInput.java 2
org.eclipse.linuxtools.chang
org.eclipse.linuxtools.chang
PrepareChangeLogAction.ja
formatterConfigElement.getAttrib
"true")) { //$NON-NLS-1$
try {
// Fix for bug #315976
changelog = openEditor((IFil
clw.setFormatter(extensionMa
clw.getEntryFilePath
} catch (Exception e) {
// do nothing changelog will
}
lse {
// external changelog
// get formatter
clw.setFormatter(extensionManage
entryFileName, pref_Form
if (pf.isRemovedFile())
changelog = getChangelogForR
else
changelog = getChangelog(ent
// If there isn't a ChangeLog, w
// This prevents the situation w
// ChangeLog formatter and some
Outline
MyStorageDocument
createDocument(C
PrepareChangeLogA
selected : IStructured
PrepareChangeLogA
setSelection(IStructu
parseCurrentFunctio
doRun() : void
new IRunnableWit
run(IProgressMo
extractSynchronizeM
getChangedLines(Su
prepareChangeLog(I
changelog : IEditorPa
outputMultipleEntryC
guessFunctionName
Writable
Smart Insert
440 : 31

No clutter


Java - org.eclipse.linuxtools.changelog.core/src/org/eclipse/linuxtools/changelog/core/actions/Prepare
File Edit Source Refactor Navigate Search Project Run Window Help
Package Explorer
> org.eclipse.linuxtools.changelog.c
> src 24875
> org.eclipse.linuxtools.change
> PrepareChangeLogAction
> PrepareChangeLogActi
outputMultipleEntryCha
PrepareChangeLogActi
pref_Formatter);
IConfigurationElement formatterConfi
.getFormatterConfigElement();
if (formatterConfigElement.getAttrib
"true")) { //$NON-NLS-1$
try {
// Fix for bug #315976
changelog = openEditor((IFil
clw.setFormatter(extensionMa
clw.getEntryFilePath
} catch (Exception e) {
// do nothing changelog will
}
} else {
// external changelog
// get formatter
clw.setFormatter(extensionManage
entryFileName, pref_Form
if (pf.isRemovedFile())
changelog = getChangelogForF
else
changelog = getChangelog(ent
Outline
> PrepareChangeLogA
outputMultipleEntryC
Writable
Smart Insert
440 : 31

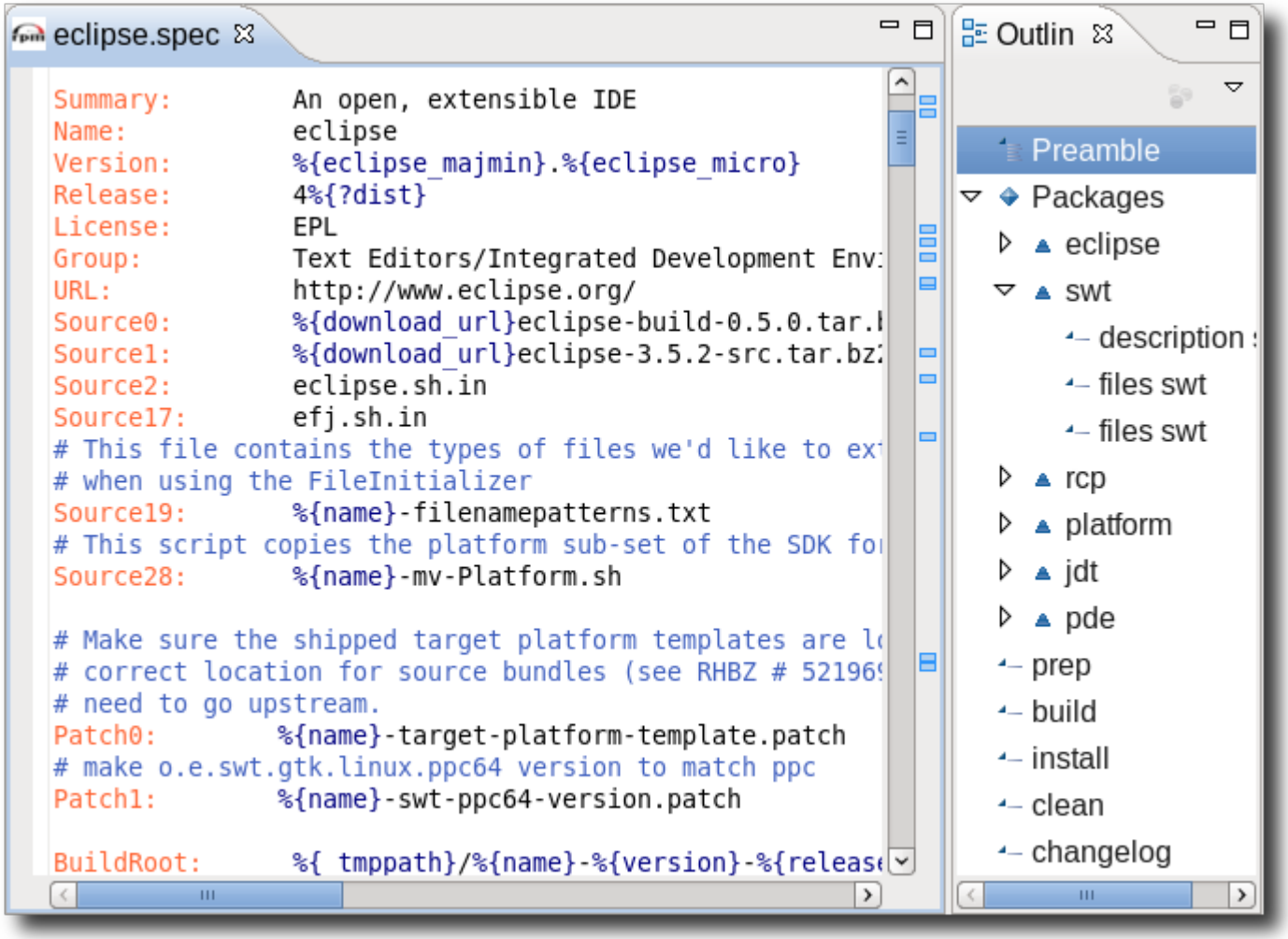
Bugzilla and Tasks

- Bugzilla and task manipulation comes from Eclipse Mylyn project, available in `eclipse-mylyn*` RPMs

Agenda

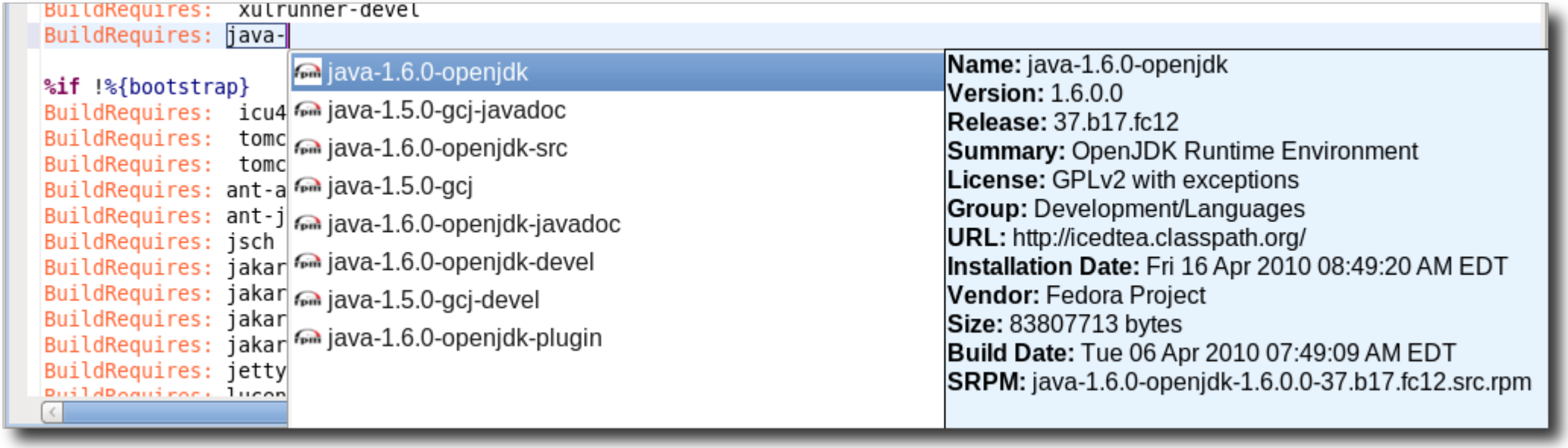
- Background
- Code editing
- Build and compiler integration
- Debugging
- Teamwork
- **Linux-specific Tools**

RPM Specfile Editor



SUMMIT JBoss WORLD
PRESENTED BY RED HAT

RPM Specfile Editor



- Completion of macros, available RPMs
- Error checking as you type
- rpmlint integration

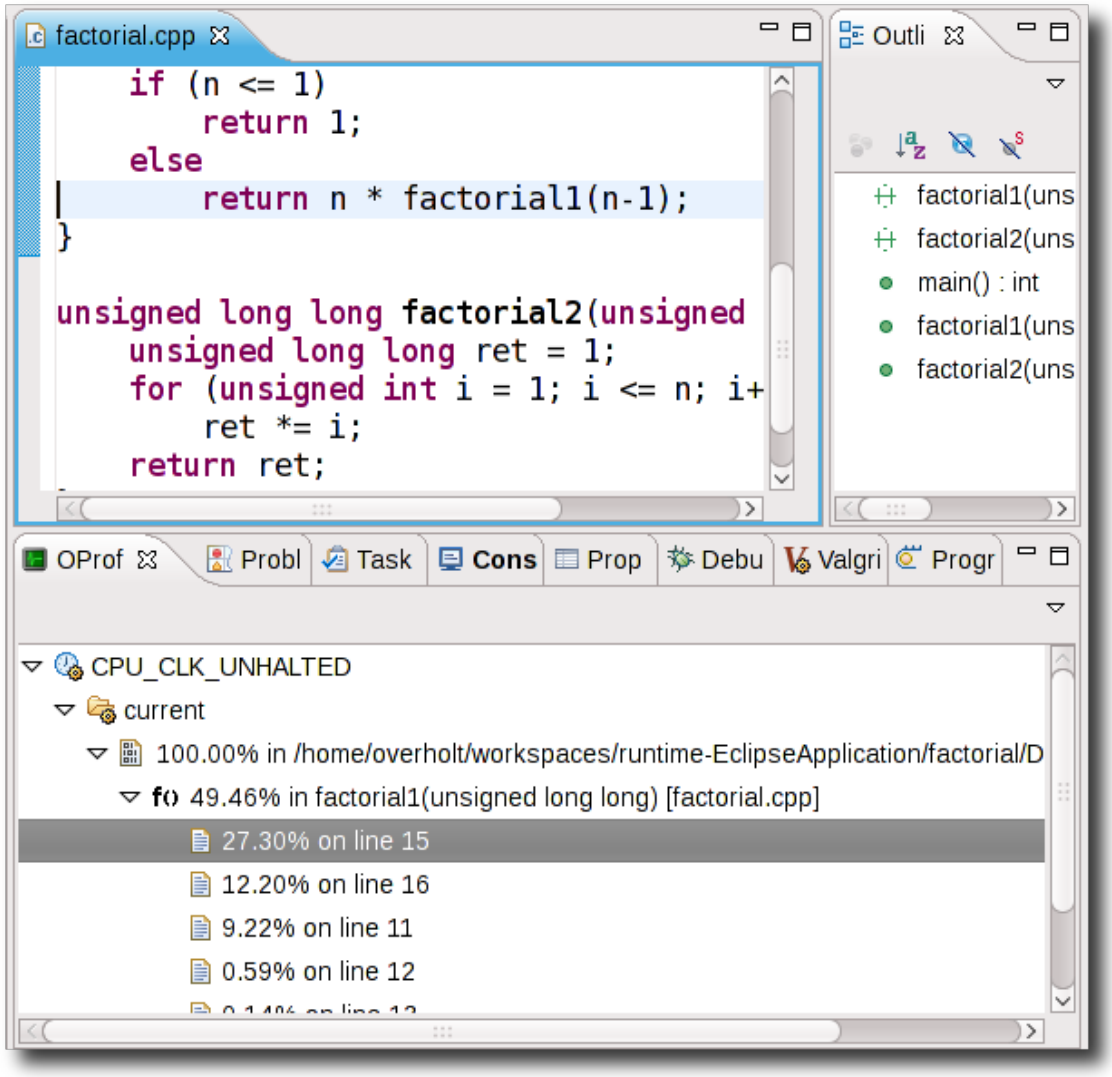
RPM Specfile Editor

- `eclipse-rpm-editor` RPM provides RPM specfile editor

Agenda

- Background
- Code editing
- Build and compiler integration
- Debugging
- Teamwork
- **Linux-specific Tools**

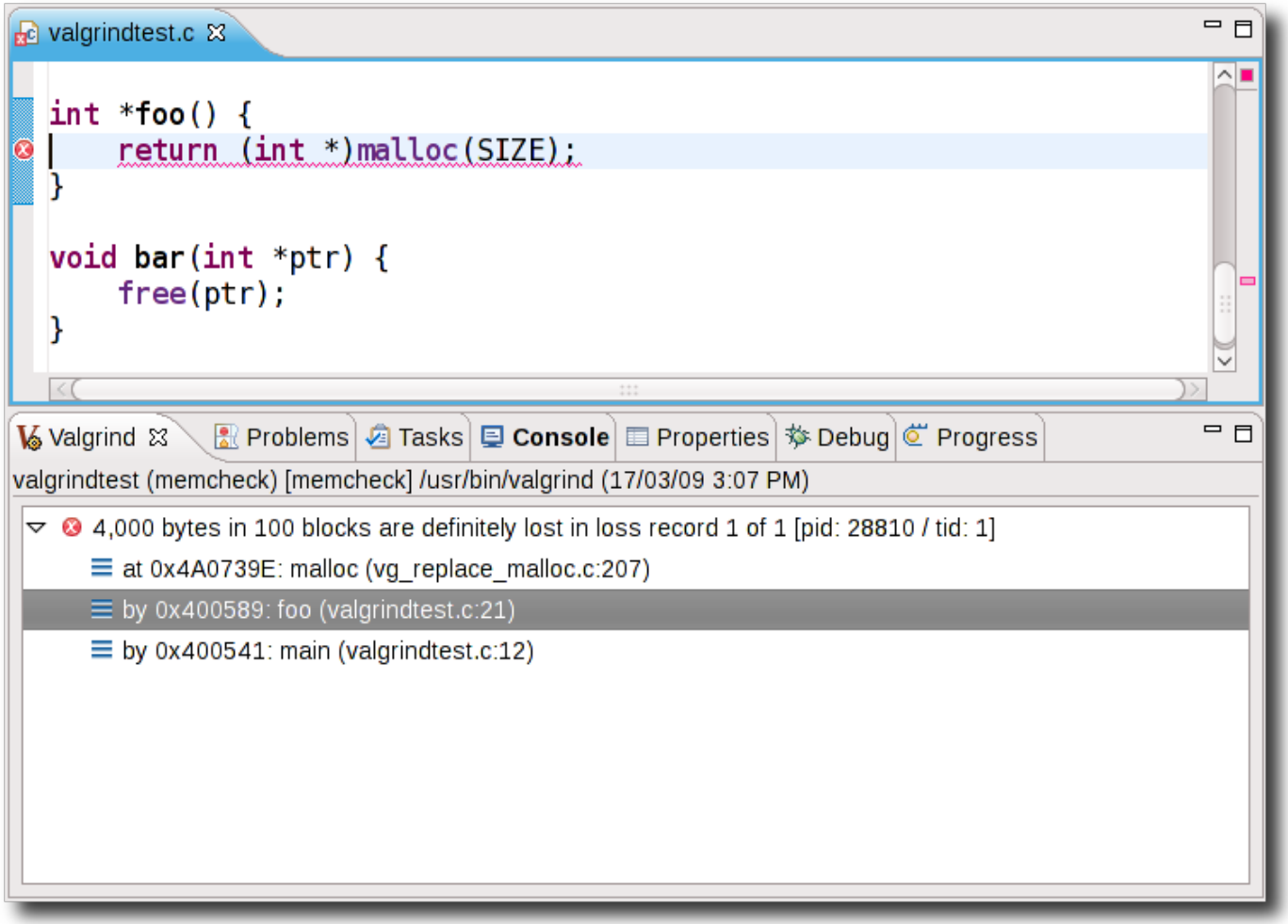
OProfile


factorial.cpp
if (n <= 1)
return 1;
else
return n * factorial1(n-1);
}
unsigned long long factorial2(unsigned
unsigned long long ret = 1;
for (unsigned int i = 1; i <= n; i+
ret *= i;
return ret;
Outli
factorial1(uns
factorial2(uns
main() : int
factorial1(uns
factorial2(uns
OProf
Probl
Task
Cons
Prop
Debu
Valgri
Progr
CPU_CLK_UNHALTED
current
100.00% in /home/overholt/workspaces/runtime-EclipseApplication/factorial/D
f() 49.46% in factorial1(unsigned long long) [factorial.cpp]
27.30% on line 15
12.20% on line 16
9.22% on line 11
0.59% on line 12

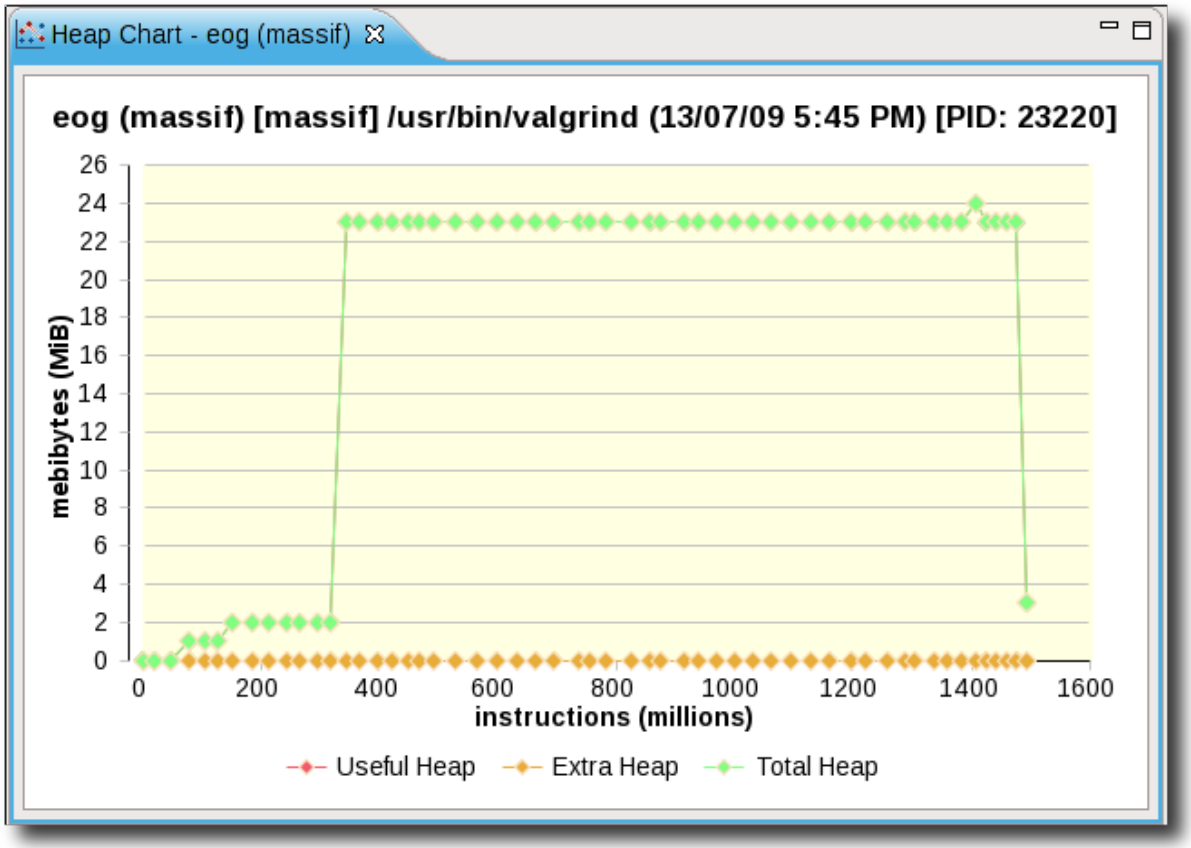
OProfile

- Single-click launch of profiling
- Link hot spots with C/C++ source code
- Available in `eclipse-oprofile` RPM

Valgrind


valgrindtest.c
int *foo() {
return (int *)malloc(SIZE);
}
void bar(int *ptr) {
free(ptr);
}
Valgrind
Problems
Tasks
Console
Properties
Debug
Progress
valgrindtest (memcheck) [memcheck] /usr/bin/valgrind (17/03/09 3:07 PM)
4,000 bytes in 100 blocks are definitely lost in loss record 1 of 1 [pid: 28810 / tid: 1]
at 0x4A0739E: malloc (vg_replace_malloc.c:207)
by 0x400589: foo (valgrindtest.c:21)
by 0x400541: main (valgrindtest.c:12)

Valgrind


Heap Chart - eog (massif)
eog (massif) [massif] /usr/bin/valgrind (13/07/09 5:45 PM) [PID: 23220]
mebibytes (MiB)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
0
200
400
600
800
1000
1200
1400
1600
instructions (millions)
Useful Heap
Extra Heap
Total Heap

Valgrind

- Single-click launch of profiling
- Link hot spots with C/C++ source code
- Available in `eclipse-valgrind` RPM

Agenda

- Background
- Code editing
- Build and compiler integration
- Debugging
- Teamwork
- Linux-specific tools

Why Eclipse?

- Tools to enhance productivity
- Large ecosystem, constant improvement, new tools
- Easily installed RPMs

Try it out!

Contact Information

- Eclipse
  - http://www.eclipse.org
- CDT
  - http://www.eclipse.org/cdt
- Mylyn
  - http://www.eclipse.org/mylyn
- Linux Tools Project
  - http://www.eclipse.org/linuxtools

FOLLOW US ON TWITTER

www.twitter.com/redhatsummit

TWEET ABOUT IT

#summitjbw

READ THE BLOG

http://summitblog.redhat.com/