

Hipikat: A Developer's Recommender

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Introduction

Hipikat

- suggests artifacts that might be useful to a developer for a task underway

Prototype instantiated for Eclipse

- client as an Eclipse plug-in
- daily updates with Eclipse development

The problem

Best knowledge about a software system:

- resides in developers' heads
- spread via informal and lightweight processes

What happens in virtual teams?

- Time and distance separation
- Communication more difficult

Mentoring and support weak or non-existent

The virtual alternative

Everybody collaborates via the Internet

Turn electronic communication into an asset:

- Source code versioning
- Archives of electronic communication
- Test information
- Design decisions

Give developers access to this implicit and latent group memory



Information is there

Information overload:
hundreds of emails and
newsgroup postings
every week



Searching it is
tedious and time-
consuming

The solution

Create a group memory of all artifacts in the project

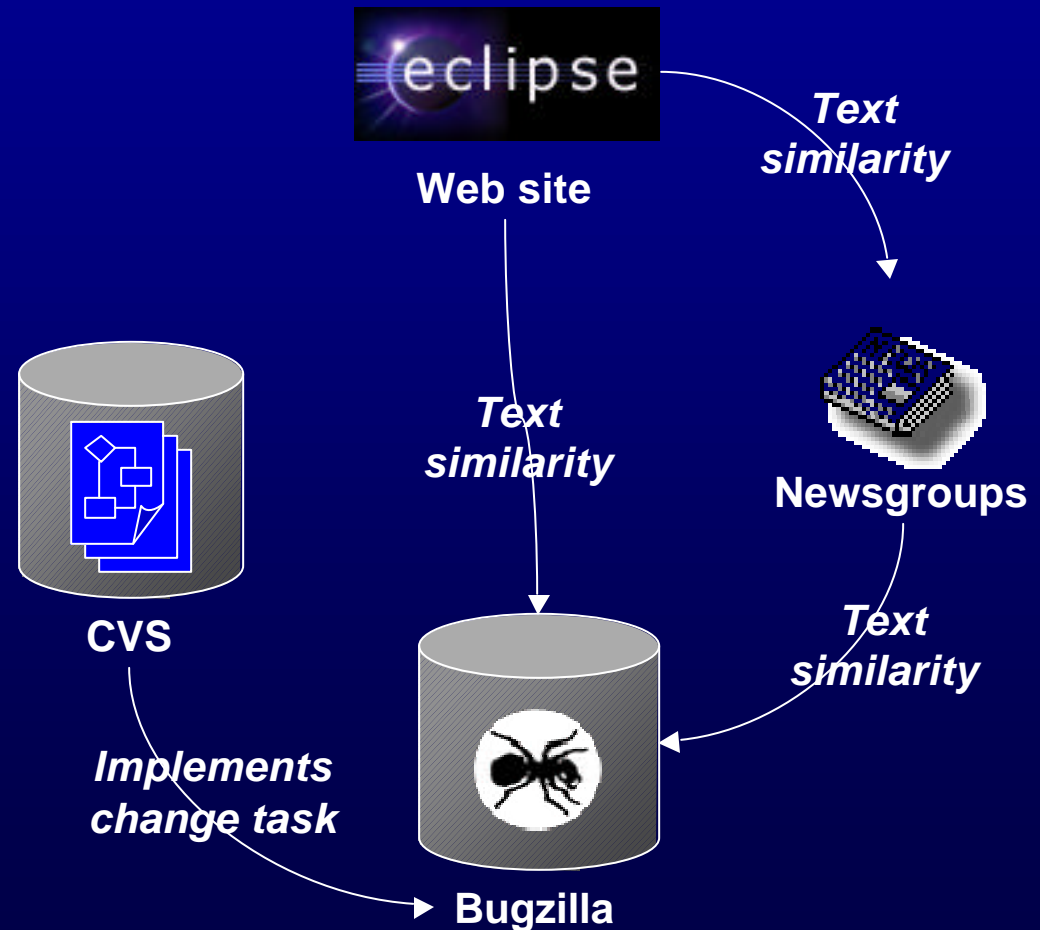
Recommend artifacts that might be of value when performing a task

- similar changes
- related email discussions
- relevant project Web pages

Minimal changes to existing work practices

Information schema

Artifacts from various
information sources
Infer “linkages” within
and across sources
Issue-tracking system
at the centre



Eclipse.org

Intense development

- Avg. 170 revisions checked in daily (in Oct.)
- Avg. 47 new bug reports entered into Bugzilla
- Avg. 149 comments/day on existing reports

Active developer lists

- Over 100 articles/day on newsgroups

Daily Hipikat updates

Hipikat in Eclipse

The screenshot shows the Eclipse IDE interface. The Package Explorer on the left displays the project structure for 'org.eclipse.core.runtime'. The main editor area shows the details for Bug 7017, titled 'Bug 7017 - New project location dialog misleading'. The bug report includes fields for Bug#, Version, OS/Version, Severity, Resolution, Reported By, Target Milestone, Product, Platform, Status, Priority, Assigned To, and Component. The description explains that many reports of people creating new projects and specifying default content locations getting confused and specifying the parent location rather than the location itself.

Bug 7017 - New project location dialog misleading

Bug#: 7017 **Product:** Platform
Version: 2.0 **Platform:** PC
OS/Version: Windows 2000 **Status:** RESOLVED
Severity: normal **Priority:** P2
Resolution: FIXED **Assigned To:** ryan_cooper
Reported By: Jeff_McAffer@oti.com **Component:** UI
Target Milestone: --- **URL:**

Summary:
New project location dialog misleading

Keywords:

Description:
There have been many reports of people creating new projects and specifying default content locations getting confused and specifying the parent location rather than the location itself. For example, a typical user would create a project Foo and have it actually live in c:\projects\foo...

Hipikat (Bug 7017)

Type	Name	Reason	Confide...
cvs	dev.eclipse.org;/home/eclipse/org.eclipse.ui/...	Check-in close to bug resolution	High - c...
cvs	dev.eclipse.org;/home/eclipse/org.eclipse.ui/...	Check-in close to bug resolution	High - c...
bugzilla	Bug 5632 - Hability to create folders when sp...	Text similarity	0.3448...
bugzilla	Bug 7857 - Confirm project delete dialog coul...	Text similarity	0.3387

Accessing Hipikat

Any artifact in the Eclipse Workspace can serve as a query point

Hipikat keyword search from the Eclipse search dialog

The screenshot shows the Eclipse IDE interface. The main window displays a bug report for Bug 21349. The bug report details include:

- Bug#:** 21349
- Version:** 2.0
- OS/Version:** Windows 2000
- Severity:** major
- Resolution:** FIXED
- Reported By:** shaldon@counterp.com
- Target Milestone:** ---
- Product:**
- Platform:**
- Status:**
- Priority:**
- Assigned To:**
- Component:**
- URL:**

The **Summary:** is "Team error when Synchronizing with repository". The **Description:** includes the text "SETUP PRODUCING THIS ERROR:" and "CVSNT 1.11.1.3 is installed on 'Machine A' - Server running...".

In the bottom right corner, a search dialog is open, showing a list of search results. A button labeled "Query Hipikat" is circled in red.

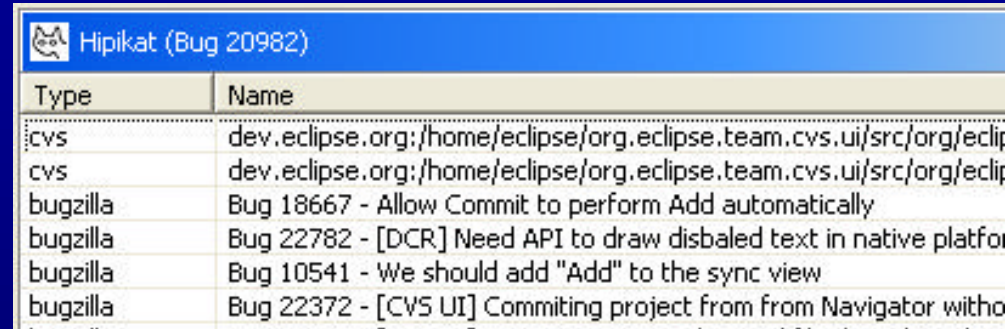
Revision	Summary	Author	Time	URL
1.23				
1.22				
1.21				
1.20				
1.19				
1.18	SETUP PRODUCING THIS ERROR:			
1.17.2.1	CVSNT 1.11.1.3 is installed on "Machine A" - Server running...			
1.17		vlad	2/6/02 5:50 AM	Removed R1.0 La
1.16		dwilson	2/6/02 11:47 ...	8288 - Registry C
1.15		vlad	1/31/02 1:08 ...	changes for 2.0 u

Viewing results

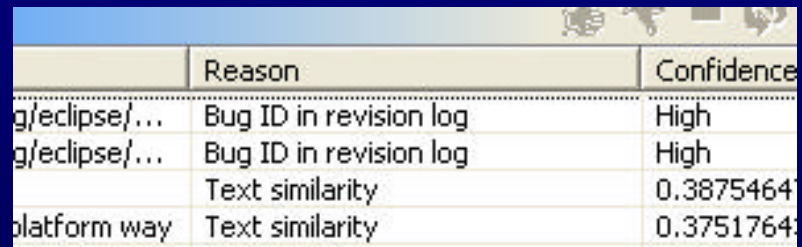
Matching artifacts listed in the Hipikat view

Includes reason for recommendation and confidence

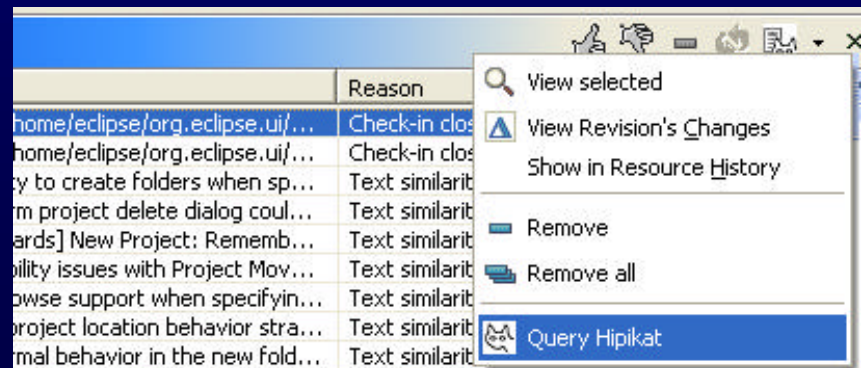
Can make further queries on the recommendations



Type	Name
cvs	dev.eclipse.org:/home/eclipse/org.eclipse.team.cvs.ui/src/org/eclip
cvs	dev.eclipse.org:/home/eclipse/org.eclipse.team.cvs.ui/src/org/eclip
bugzilla	Bug 18667 - Allow Commit to perform Add automatically
bugzilla	Bug 22782 - [DCR] Need API to draw disabled text in native platform
bugzilla	Bug 10541 - We should add "Add" to the sync view
bugzilla	Bug 22372 - [CVS UI] Committing project from from Navigator witho



	Reason	Confidence
g/eclipse/...	Bug ID in revision log	High
g/eclipse/...	Bug ID in revision log	High
	Text similarity	0.3875464
platform way	Text similarity	0.3751764



	Reason
home/eclipse/org.eclipse.ui/...	Check-in clos
home/eclipse/org.eclipse.ui/...	Check-in clos
ty to create folders when sp...	Text similarit
m project delete dialog coul...	Text similarit
ards] New Project: Rememb...	Text similarit
ility issues with Project Mov...	Text similarit
rowse support when specifyin...	Text similarit
project location behavior stra...	Text similarit
mal behavior in the new fold...	Text similarit

- View selected
- View Revision's Changes
- Show in Resource History
- Remove
- Remove all
- Query Hipikat

Example 1: Using the API

Change task:

Adding files to version control

Immediate goal:

Traverse the directory tree looking for unmanaged resources

Relevant Eclipse API:

IResource interface with its subinterfaces

IFolder and *IFile* represent resources in the file system

IResource code-assist

Problem: Not immediately obvious how to use the API to traverse the directory tree

The screenshot shows a code editor with the following Java code snippet:

```
protected boolean isEnabled() throws TeamException {
    IResource[] resources = getSelectedResources();
    if (resources.length == 0) return false;
    for (int i = 0; i < resources.length; i++) {
        IResource resource = resources[i];
        // ...
    }
    return true;
}
```

A tooltip is displayed over the `getParent()` method call in the code. The tooltip lists several methods of the `IResource` interface:

- `getFileExtension() String - IResource`
- `getFullPath() IPath - IResource`
- `getLocation() IPath - IResource`
- `getMarker(long id) IMarker - IResource`
- `getModificationStamp() long - IResource`
- `getName() String - IResource`
- `getParent() IContainer - IResource` (highlighted)

The tooltip also contains the following text:

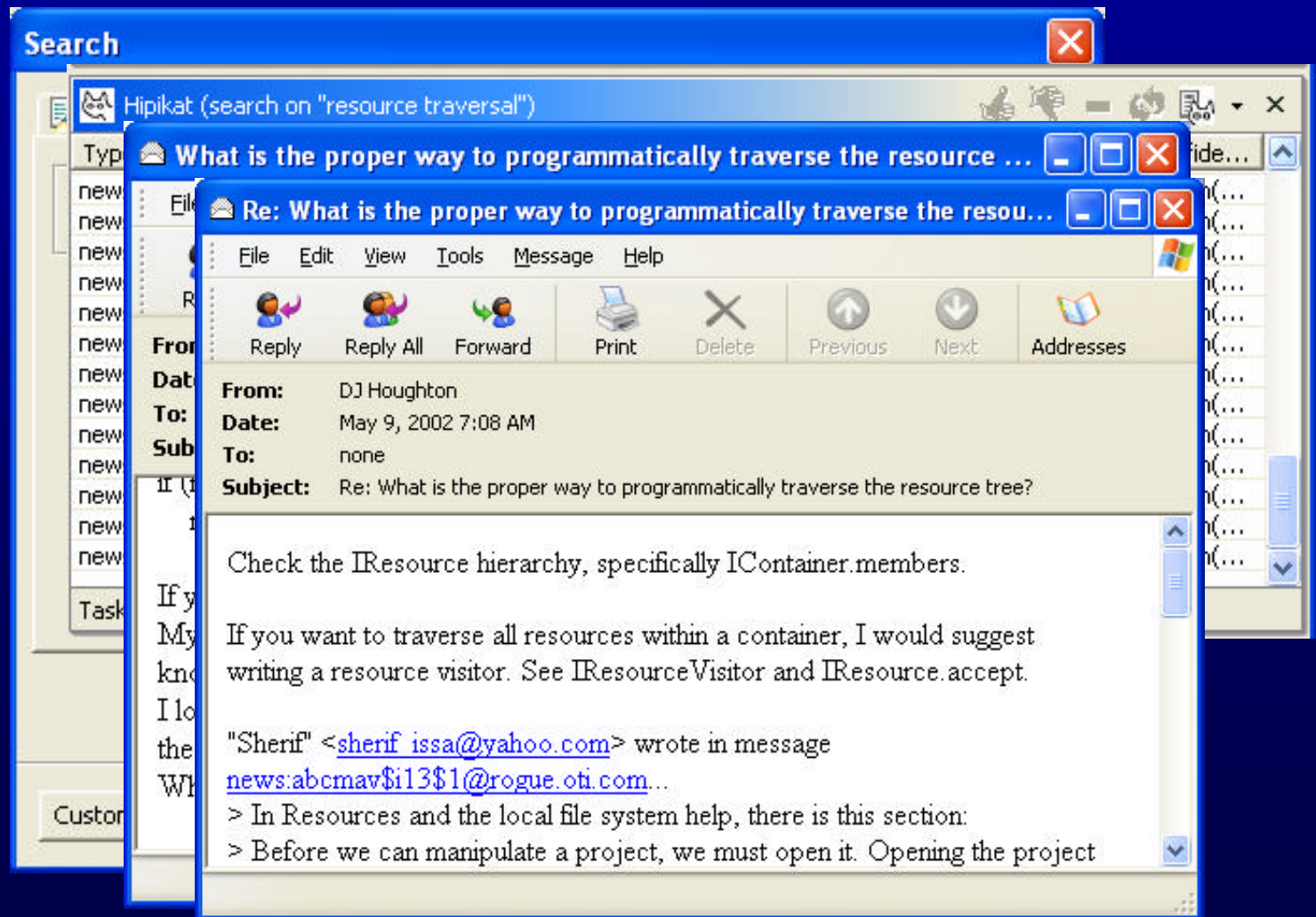
Returns the resource which is the parent of this resource, or null if it has no parent (that is, this resource is the workspace root).

The full path of the parent resource is the same as this resource's full path with the last segment removed.

This is a resource handle operation; neither the resource nor the resulting resource need exist.

Returns:
the parent resource of this resource, or

Hipikat search

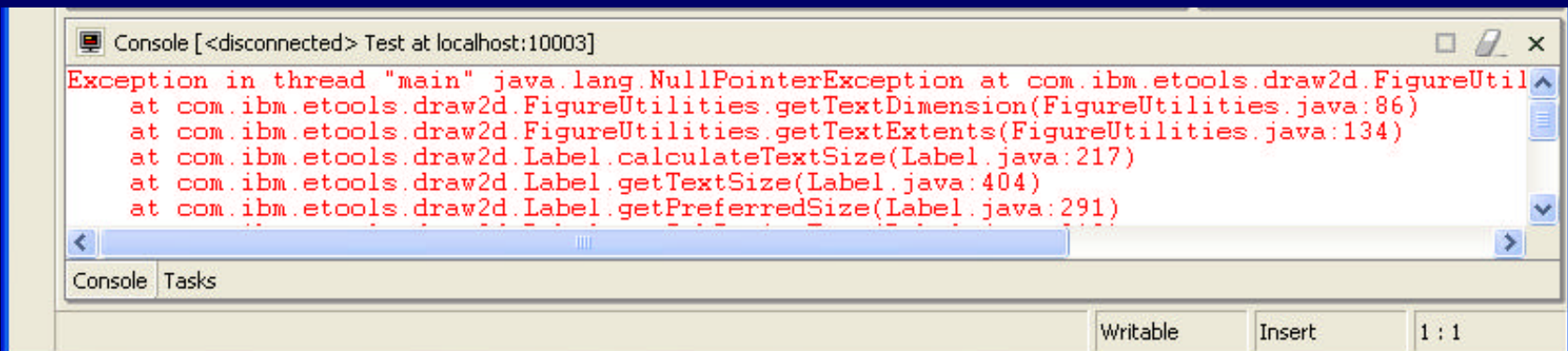


Example 2:

Debugging exceptions

A NullPointerException persistently occurs from Eclipse UI call, although it is not clear why from the documentation

Eclipse bug?

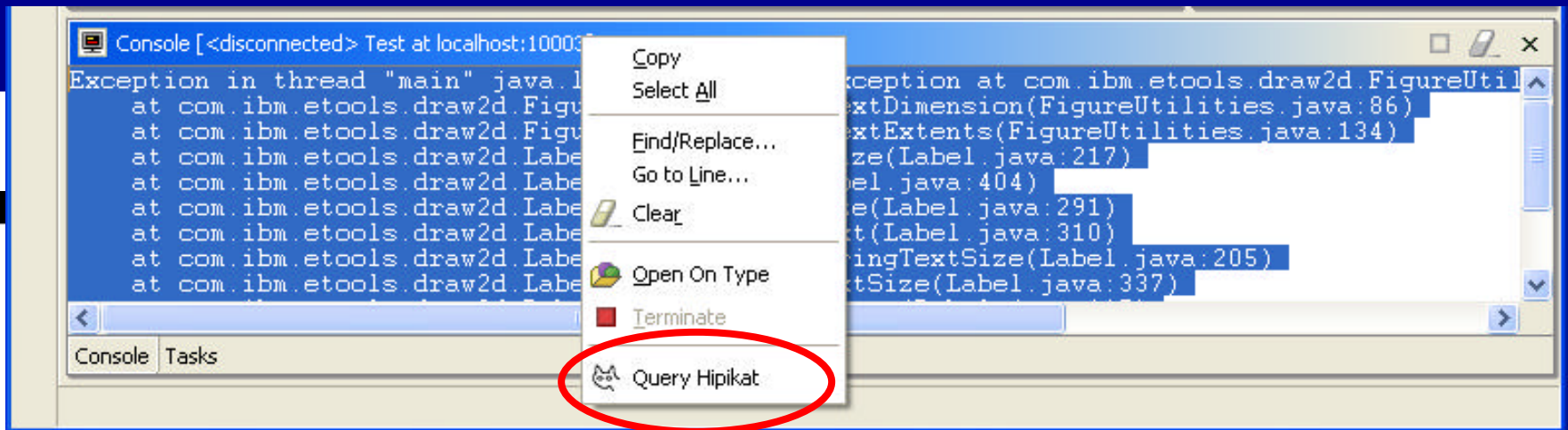


```
Console [<disconnected> Test at localhost:10003]
Exception in thread "main" java.lang.NullPointerException at com.ibm.etools.draw2d.FigureUtil
  at com.ibm.etools.draw2d.FigureUtilities.getTextDimension(FigureUtilities.java:86)
  at com.ibm.etools.draw2d.FigureUtilities.getTextExtents(FigureUtilities.java:134)
  at com.ibm.etools.draw2d.Label.calculateTextSize(Label.java:217)
  at com.ibm.etools.draw2d.Label.getTextSize(Label.java:404)
  at com.ibm.etools.draw2d.Label.getPreferredSize(Label.java:291)
```

Console Tasks

Writable Insert 1 : 1

Query on console output



the label. Not really nice if you want to do a fallback if icon bounds couldn't be calculated.

----- *Additional Comment #9 From [Randy Hudson](#) 2002-06-11 09:06* -----

getIconBounds() is undefined until the figure has been "laid out". It will not layout until you put it in a LightweightSystem. You EditPart's figure is eventually added to its parent's figure (and therefore a LWS), but during `validate()` the figure is not parented.

should not call getIconBounds() until after the Label has been validated.

Example 3: Making a change

A project newcomer is about to start working on an enhancement request

Where to start?

Look at similar work that was done in the past, and see how it was implemented

- starting point
- code to reuse
- project idioms and implementation patterns

Hipikat

A developer's recommender

Prototype instantiated for the Eclipse IDE

Download from

www.cs.ubc.ca/labs/spl/projects/hipikat/

Work supported by CSER and OTI

Project Web site:

www.cs.ubc.ca/labs/spl/projects/hipikat/