Introduction to Eclipse and Eclipse RCP

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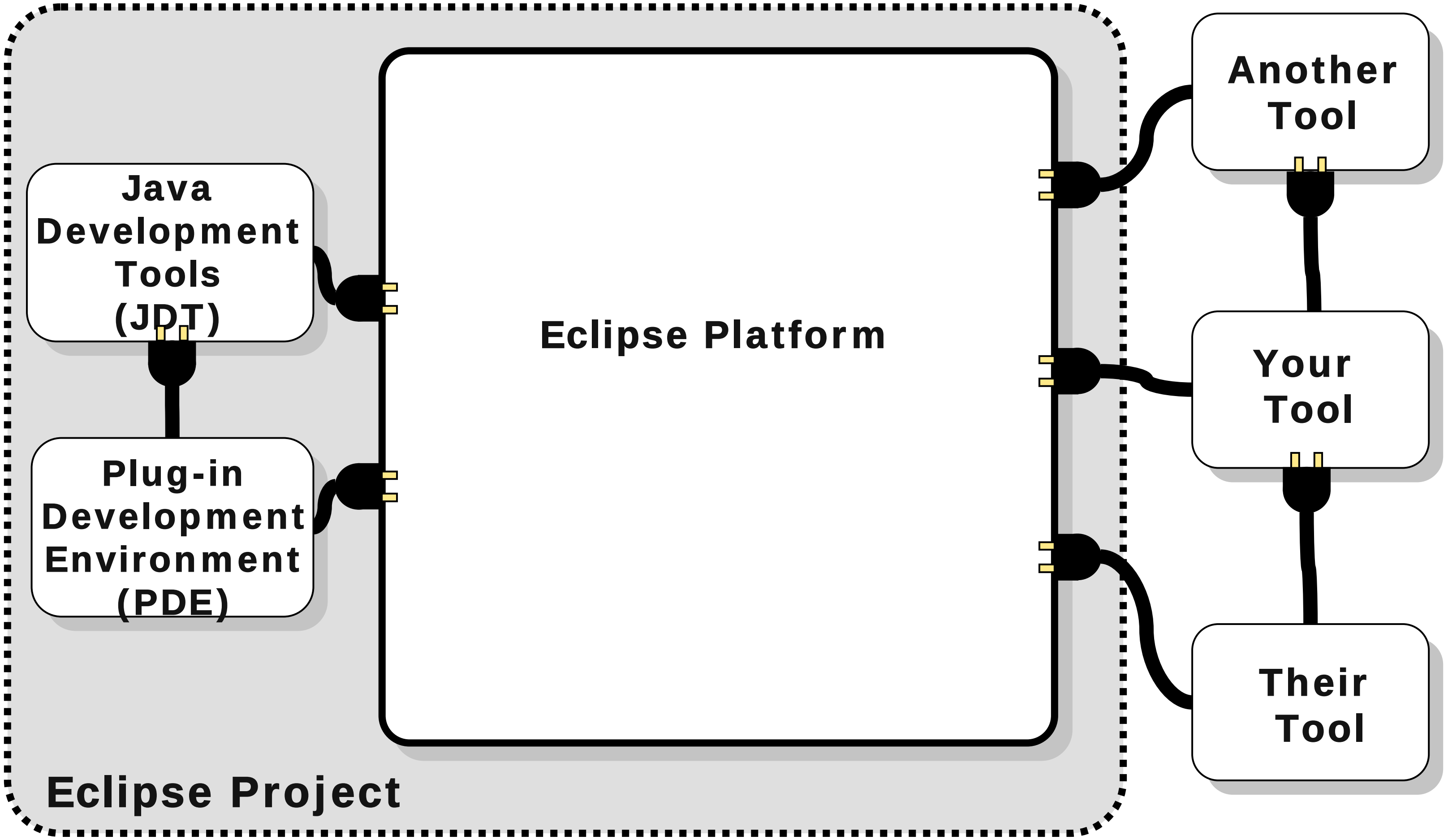
June 13, 2006

Argonne National Laboratory, Argonne, IL

Eclipse

- Eclipse is an Open Source community
- It was started in 2001 by IBM
  - IBM donated a lot of research
  - Controlled the early development, but later relinquished control
- Out of the box it looks like a Java IDE
- It is really a Plug-in manager
  - That happens to come with Java Development plug-ins.
  - You can take these out and put your own (and/or others) in

Very Extensible and Very Flexible


Another Tool
Java Development Tools (JDT)
Eclipse Platform
Your Tool
Plug-in Development Environment (PDE)
Their Tool
Eclipse Project

Modified From: Tony Lam, ICALEPCS Presentation, October 2004

Eclipse Foundation Membership

- Strategic Developers (13 as of Jan 2006)
  - At least 8 developers assigned full time to developing Eclipse
  - Contribution up to $250K
- Strategic Consumers (4)
  - Contribution up to $500K
  - Can reduce the dues by contributing 1-2 developers
- Three other tiers

- Bottom line
  - $$$ and Developers (currently > 150 full time)

Eclipse Consortium Strategic Members

ACTUATE®

IBM®

IONA®

*hp® invent

*SAP

Borland®

Scapa Technologies

SYBASE®

*montavista™

bea®

intel®

*serena™ Automating Change to Enterprise Code and Content

NOKIA

COMPUWARE®

Zend The php Company

ca Computer Associates®

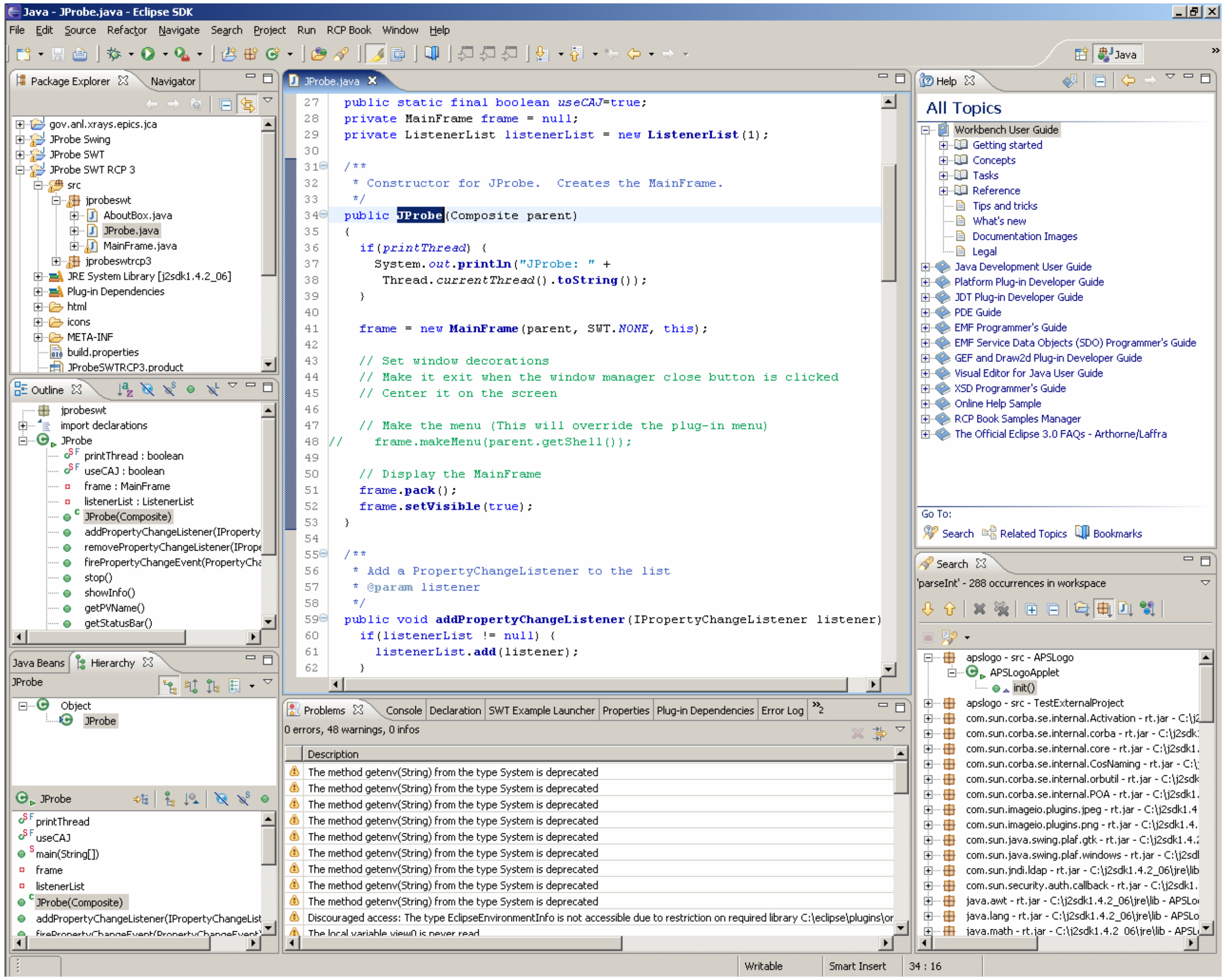
WIND RIVER

Microsoft Windows

Sun microsystems We make the net work.

* Strategic Consumer

Eclipse as a Java IDE


Java - JProbe.java - Eclipse SDK
File Edit Source Refactor Navigate Search Project Run RCP Book Window Help
Java
Package Explorer
Navigator
gov.anl.xrays.epics.jca
JProbe Swing
JProbe SWT
JProbe SWT RCP 3
src
jprobeswt
AboutBox.java
JProbe.java
MainFrame.java
jprobeswtrcp3
JRE System Library [j2sdk1.4.2_06]
Plug-in Dependencies
html
icons
META-INF
build.properties
JProbeSWTRCP3.product
Outline
jprobeswt
import declarations
JProbe
printThread : boolean
useCAJ : boolean
frame : MainFrame
listenerList : ListenerList
JProbe(Composite)
addPropertyChangeListener(IProperty
removePropertyChangeListener(IPrope
firePropertyChangeEvent(PropertyCha
stop()
showInfo()
getPVName()
getStatusBar()
Java Beans
Hierarchy
JProbe
Object
JProbe
JProbe
printThread
useCAJ
main(String[])
frame
listenerList
JProbe(Composite)
addPropertyChangeListener(IPropertyChangeList
JProbe.java
Help
All Topics
Workbench User Guide
Getting started
Concepts
Tasks
Reference
Tips and tricks
What's new
Documentation Images
Legal
Java Development User Guide
Platform Plug-in Developer Guide
JDT Plug-in Developer Guide
PDE Guide
EMF Programmer's Guide
EMF Service Data Objects (SDO) Programmer's Guide
GEF and Draw2d Plug-in Developer Guide
Visual Editor for Java User Guide
XSD Programmer's Guide
Online Help Sample
RCP Book Samples Manager
The Official Eclipse 3.0 FAQs - Arthorne/Laffra
Go To:
Search
Related Topics
Bookmarks
Search
'parseInt' - 288 occurrences in workspace
apslogo - src - APSLogo
APSLogoApplet
init()
apslogo - src - TestExternalProject
com.sun.corba.se.internal.Activation - rt.jar - C:\j2
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com.sun.corba.se.internal.CosNaming - rt.jar - C:\j
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com.sun.jndi.ldap - rt.jar - C:\j2sdk1.4.2_06\jre\lib
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java.awt - rt.jar - C:\j2sdk1.4.2_06\jre\lib - APSLo
java.lang - rt.jar - C:\j2sdk1.4.2_06\jre\lib - APSLo
java.math - rt.jar - C:\j2sdk1.4.2_06\jre\lib - APSL
Problems
Console
Declaration
SWT Example Launcher
Properties
Plug-in Dependencies
Error Log
Writable
Smart Insert
34 : 16

```java
public static final boolean useCAJ=true;
private MainFrame frame = null;
private ListenerList listenerList = new ListenerList(1);

/**
 * Constructor for JProbe.  Creates the MainFrame.
 */
public JProbe(Composite parent)
{
  if(printThread) {
    System.out.println("JProbe: " +
     Thread.currentThread().toString());
  }

  frame = new MainFrame(parent, SWT.NONE, this);

  // Set window decorations
  // Make it exit when the window manager close button is clicked
  // Center it on the screen

  // Make the menu (This will override the plug-in menu)
//    frame.makeMenu(parent.getShell());

  // Display the MainFrame
  frame.pack();
  frame.setVisible(true);
}

/**
 * Add a PropertyChangeListener to the list
 * @param listener
 */
public void addPropertyChangeListener(IPropertyChangeListener listener)
  if(listenerList != null) {
    listenerList.add(listener);
  }
```

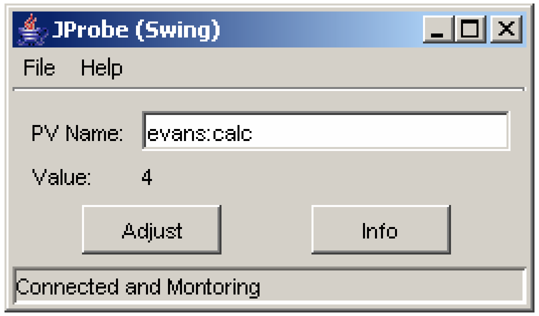
```
0 errors, 48 warnings, 0 infos
Description
The method getenv(String) from the type System is deprecated
The method getenv(String) from the type System is deprecated
The method getenv(String) from the type System is deprecated
The method getenv(String) from the type System is deprecated
The method getenv(String) from the type System is deprecated
The method getenv(String) from the type System is deprecated
The method getenv(String) from the type System is deprecated
The method getenv(String) from the type System is deprecated
The method getenv(String) from the type System is deprecated
Discouraged access: The type EclipseEnvironmentInfo is not accessible due to restriction on required library C:\eclipse\plugins\or
The local variable view0 is never read
```

Rich Client Platform (RCP)

- “Rich Client” is a term from the early 1990’s that distinguished applications built with Visual Basic and the like from “Console” or “Simple” applications
- Eclipse is particularly suited to Rich Client applications
- The possibility of using the Eclipse platform for applications was there from the beginning, but foreshadowed by its use as an IDE
  - In the early days it required hacking to make Rich Clients
- RCP is now (as of Eclipse 3.1) supported by the interface and encouraged
- You essentially use Eclipse as a framework for your application
  - You inherit all of its built-in features
  - As well as those from other community plug-ins
- You include only the plug-ins you need
- Is a very extensible development platform
  - You can use plug-ins developed by others as needed
  - Others can use yours and extend them

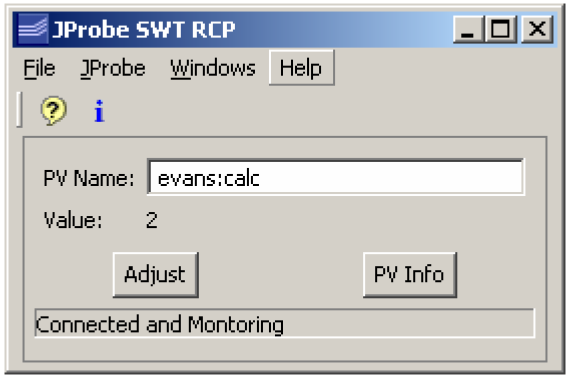
Eclipse As a Rich Client Platform

- Looks like an application, not an IDE
- Inherits a lot of functionality
  - Persistence (Properties and Preferences)
  - Help
  - Featured About dialog (like Eclipse's)
  - Splash screen
  - Dockable windows, and much more …



PV Name: evans:calc
Value: 4
Connected and Montoring

Java Application



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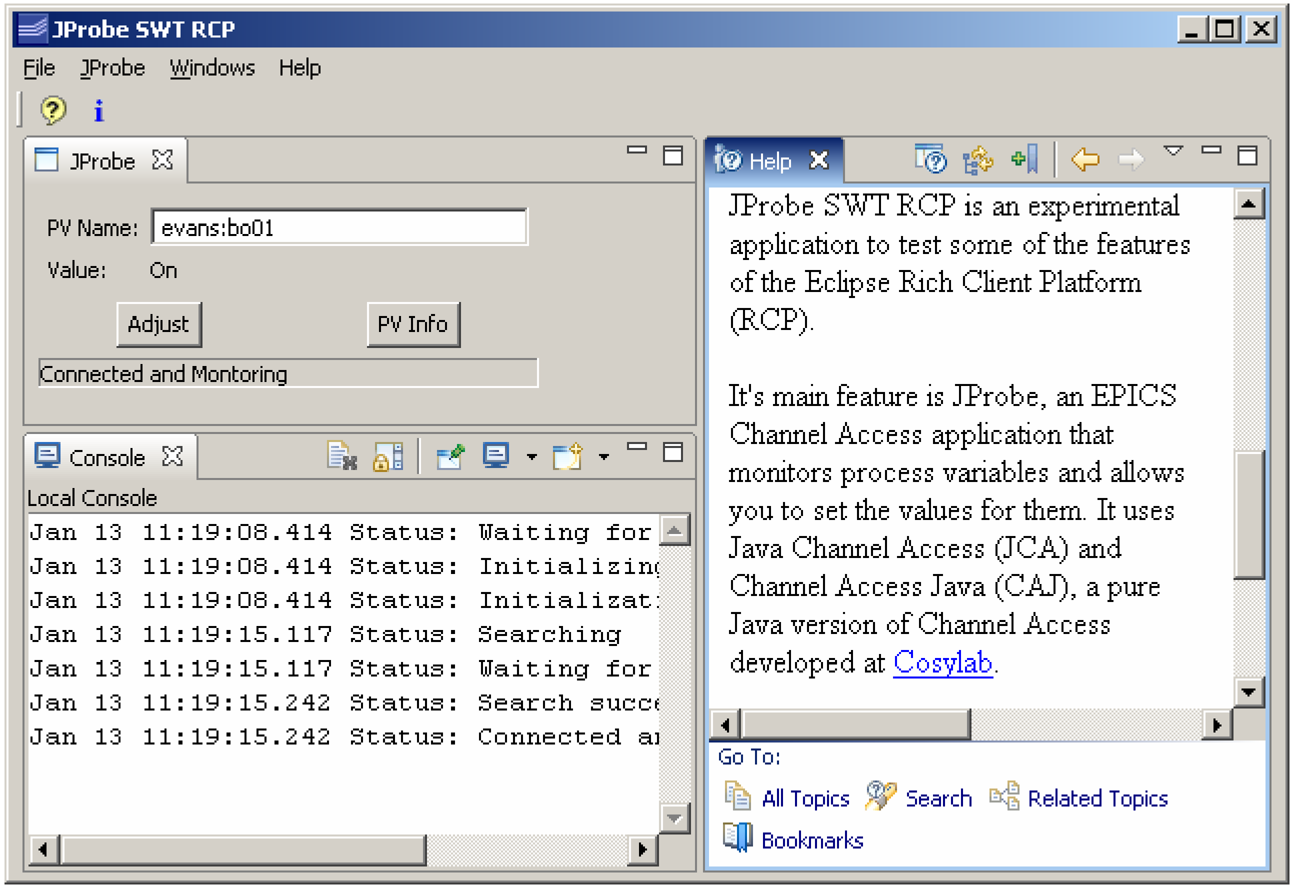
Connected and Montoring

RCP Application

Probe on Steroids
Leveraging the Eclipse Framework



PV Name: evans:bo01

Value: On

Connected and Montoring

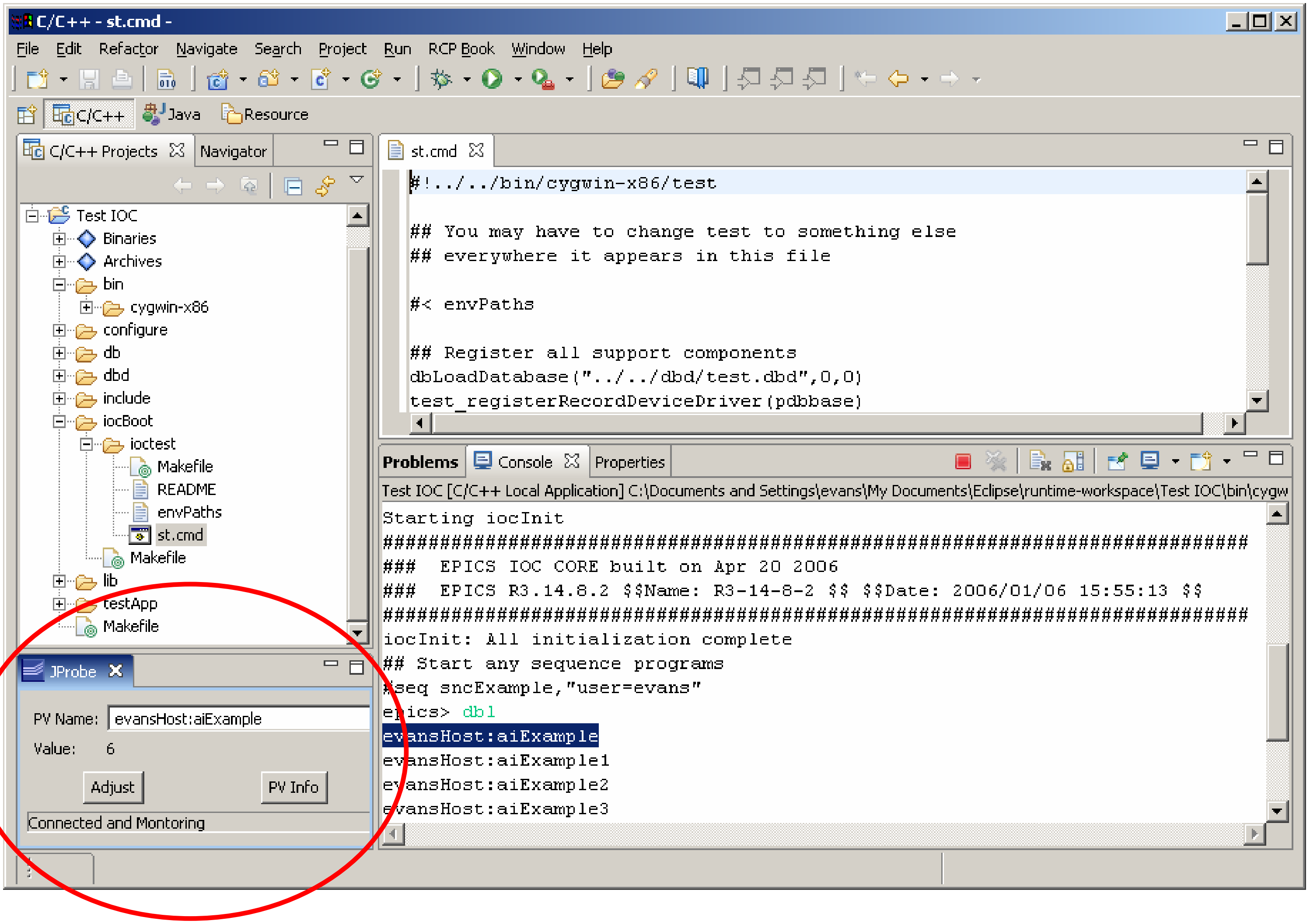
Local Console

```
Jan 13 11:19:08.414 Status: Waiting for
Jan 13 11:19:08.414 Status: Initializing
Jan 13 11:19:08.414 Status: Initializat
Jan 13 11:19:15.117 Status: Searching
Jan 13 11:19:15.117 Status: Waiting for
Jan 13 11:19:15.242 Status: Search succe
Jan 13 11:19:15.242 Status: Connected ar
```

JProbe SWT RCP is an experimental application to test some of the features of the Eclipse Rich Client Platform (RCP).

It's main feature is JProbe, an EPICS Channel Access application that monitors process variables and allows you to set the values for them. It uses Java Channel Access (JCA) and Channel Access Java (CAJ), a pure Java version of Channel Access developed at Cosylab.

An RCP Application is Also a Plug-In



PV Name: evansHost:aiExample
Value: 6
Connected and Montoring

```
#!../../bin/cygwin-x86/test

## You may have to change test to something else
## everywhere it appears in this file

#< envPaths

## Register all support components
dbLoadDatabase("../../dbd/test.dbd",0,0)
test_registerRecordDeviceDriver(pdbbase)
```

Test IOC [C/C++ Local Application] C:\Documents and Settings\evans\My Documents\Eclipse\runtime-workspace\Test IOC\bin\cygw

```
Starting iocInit
############################################################################
###  EPICS IOC CORE built on Apr 20 2006
###  EPICS R3.14.8.2 $$Name: R3-14-8-2 $$ $$Date: 2006/01/06 15:55:13 $$
############################################################################
iocInit: All initialization complete
## Start any sequence programs
#seq sncExample,"user=evans"
epics> dbl
evansHost:aiExample
evansHost:aiExample1
evansHost:aiExample2
evansHost:aiExample3
```

Bottom Line

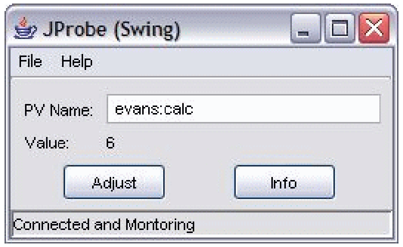
- Is a very powerful and extensible IDE and Framework
- Is Open Source
- Has a community
- Is supported by most of the industry
- Has a large number of developers (>150)
- Has significant financial backing
- Are many 3rd-party Plug-ins, both free and commercial
- Is continuing to expand and improve rapidly
- Is free
- Downsides
  - Is a continually changing, moving target

AWT vs. SWT
You have to decide

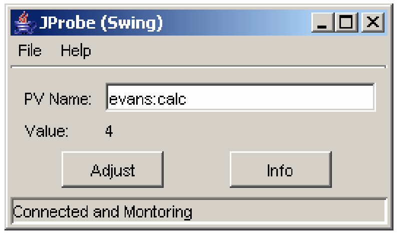
- AWT / Swing (Abstract Windowing Toolkit)
  - Write once, run anywhere
  - Formerly ugly, with bad performance
  - Now look and work well
  - Use garbage collection
  - Come with the JDK and JRE
- SWT / JFace (Standard Window Toolkit)
  - The important fact is that Eclipse uses SWT, not AWT
  - Supposed to look better, run faster
  - A thin wrapper around native widgets
  - SWT components must be disposed (vs. garbage collected)
    - *Owing to need to free native resources*
  - Need JNI libraries for each platform
  - Distribution is through the Eclipse Foundation, not Sun

AWT vs. SWT
More Considerations

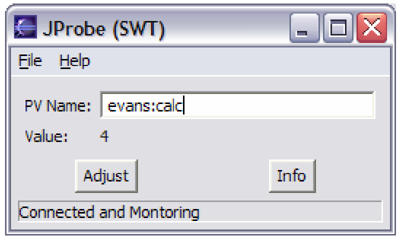
- It is not easy to convert between them
- The SWT look is not obviously better
- The performance difference may not be there either, today
- Eclipse uses SWT
  - They are supposed to mix and match, but ???
- Sun is unlikely to include SWT support in the JDK and JRE soon



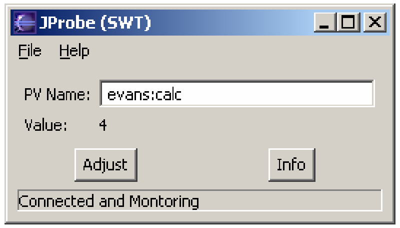
PV Name: evans:calc
Value: 6
Connected and Montoring



PV Name: evans:calc
Value: 4
Connected and Montoring



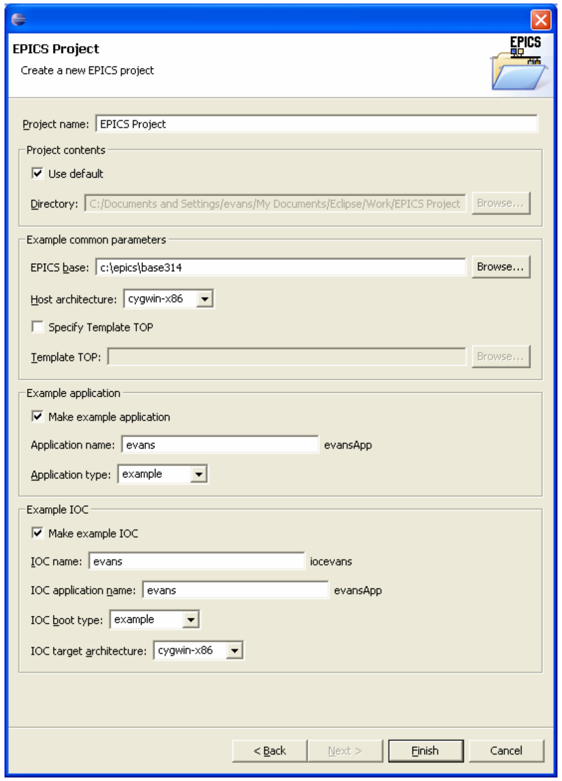
PV Name: evans:calc
Value: 4
Connected and Montoring



PV Name: evans:calc
Value: 4
Connected and Montoring

SWT Platform Dependence

- Example: Working Windows dialog doesn't work right on Linux



EPICS Project

Create a new EPICS project

Project name: EPICS Project

Project contents

☑ Use default

Directory: C:/Documents and Settings/evans/My Documents/Eclipse/Work/EPICS Project [Browse...]

Example common parameters

EPICS base: c:\epics\base314 [Browse...]

Host architecture: cygwin-x86

☐ Specify Template TOP

Template TOP: [Browse...]

Example application

☑ Make example application

Application name: evans evansApp

Application type: example

Example IOC

☑ Make example IOC

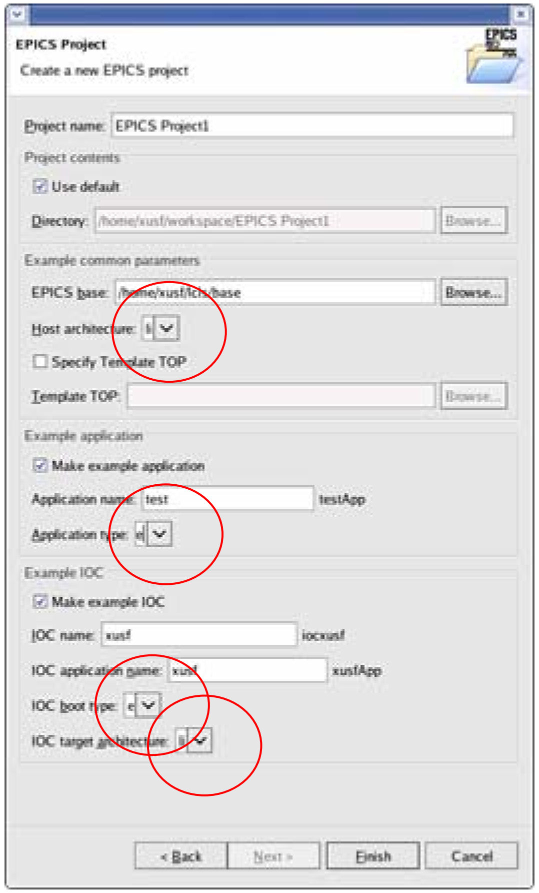
IOC name: evans iocevans

IOC application name: evans evansApp

IOC boot type: example

IOC target architecture: cygwin-x86

[< Back] [Next >] [Finish] [Cancel]



EPICS Project

Create a new EPICS project

Project name: EPICS Project1

Project contents

☑ Use default

Directory: /home/xusf/workspace/EPICS Project1 [Browse...]

Example common parameters

EPICS base: /home/xusf/ics/base [Browse...]

Host architecture: li

☐ Specify Template TOP

Template TOP: [Browse...]

Example application

☑ Make example application

Application name: test testApp

Application type: e

Example IOC

☑ Make example IOC

IOC name: xusf iocxusf

IOC application name: xusf xusfApp

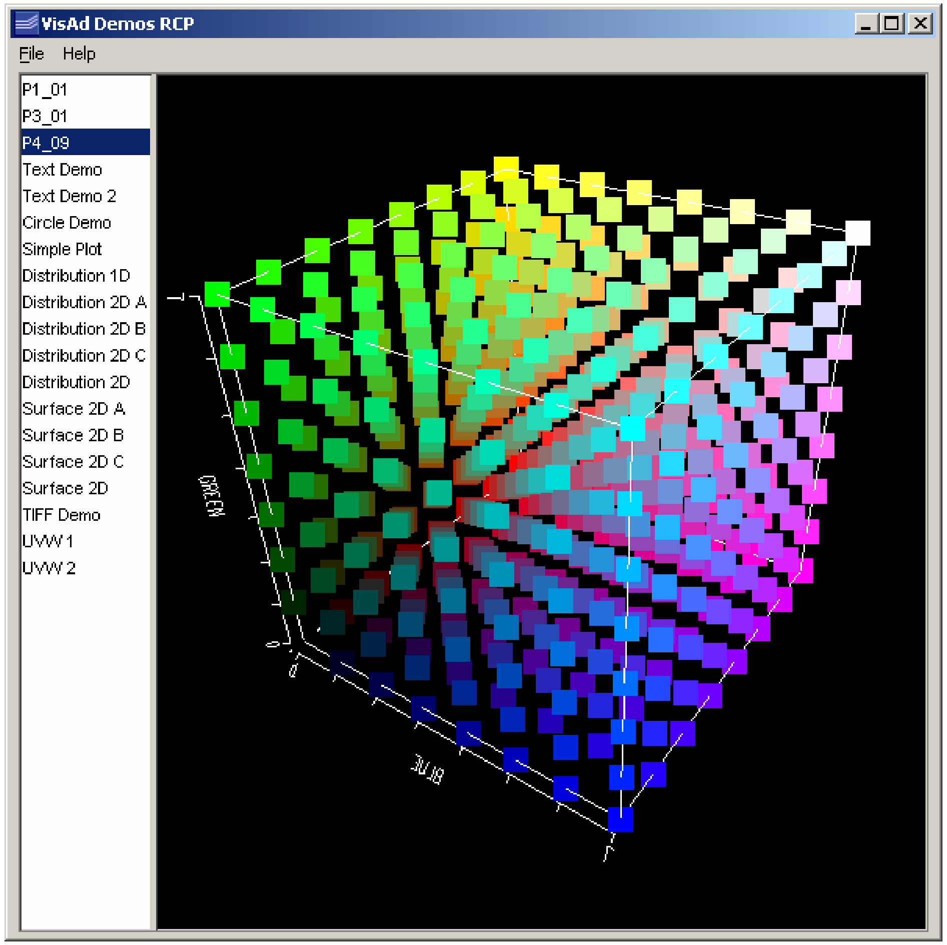
IOC boot type: e

IOC target architecture: li

[< Back] [Next >] [Finish] [Cancel]

Combining Swing and SWT SWT_AWT Bridge

- ContentPane of JFrame is embedded in an SWT Composite
- Menu Initialization is separate from other UI initialization
  - Standalone Swing version uses Swing menus
  - RCP versions uses RCP workbench menus
  - Both can call same instance methods (or not)
- This application also uses JAI and J3D
  - Both are Java extensions
  - Don't play well with Eclipse



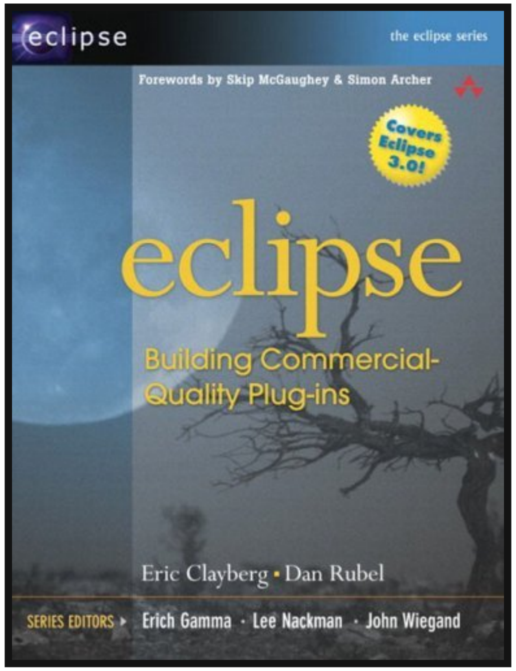
Handling Legacy code

- The JNI version of JProbe does **not** run in Eclipse RCP
  - Has to do with Eclipse class loaders and its handling of CLASSPATH
    - *Your RCP application executable is really eclipse.exe*
    - *-classpath = startup.jar, period*
- Problem is generic and not limited to JCA
  - Bottom line: Your working JNI application may not work under Eclipse
- Has been worked around for JCA by rewriting the JNI part of JCA
  - Now released as JCA 2.1.7 and CAJ 1.0.5

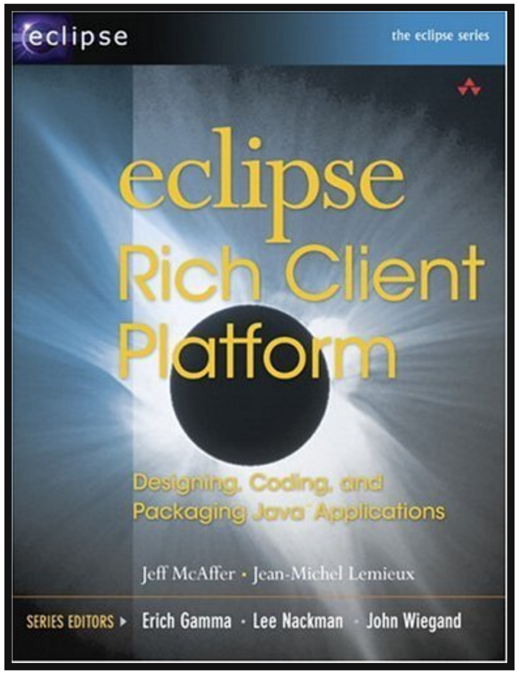
- Further explanation is beyond the scope of this presentation

Useful Books

Excellent, Must have


eclipse
the eclipse series
Forewords by Skip McGaughey & Simon Archer
Covers Eclipse 3.0!
eclipse
Building Commercial-Quality Plug-ins
Eric Clayberg • Dan Rubel
SERIES EDITORS Erich Gamma · Lee Nackman · John Wiegand

Only RCP book


eclipse
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eclipse
Rich Client Platform
Designing, Coding, and Packaging Java Applications
Jeff McAffer • Jean-Michel Lemieux
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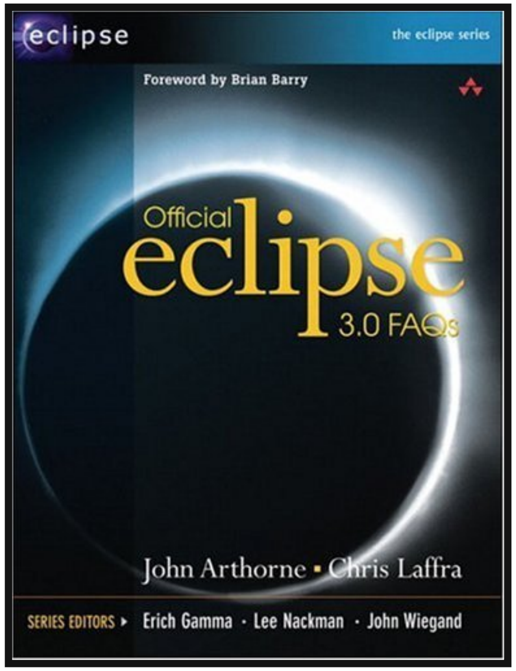
For the Help Plug-in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Thank You

This has been an

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