EclipseSource

# Escaping the Works-On-My-Machine badge

*Continuous Integration with PDE Build and Git*


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# About EclipseSource

- Eclipse development and consulting in Germany and around the world
- Committers and Leaderships in over 10 Eclipse projects, among them Equinox, RAP, EPP

# The Works-On-My-Machine certificate


- Compile application code (optionally check out latest changes from other developers)
- Launch application
- Execute one simple code path of your code changes (Unless you are certain your code works)
- Check in changes

# Release Engineering with Eclipse


- OSGi and p2 have special requirements
- Build tools with steep learning curve
- Release engineering is not a normal programming task

# Choice of the Build system

| | **PDE Build/Ant** | **Tycho/Maven** |
|---|---|---|
| *Make simple things simple* | - | X |
| *Make advanced stuff possible* | X | (X) |

# A working example with PDE Build and Git

- An example product: Hyperbola
- Build for a RCP product and Test Automation
- System independent, mostly self-contained
- Versioning System: Git

# A working example with PDE Build and Git

- Fetch **git://github.com/mkempka/hyperbola-pde-build-demo.git**
- Adjust values in `o.e.h.releng/custom.properties`
- Execute ant file `o.e.h.releng/build.xml`
- Preconditions:
  - Eclipse BaseBuilder >= Indigo
  - Git must be on your $PATH

# Scope of this talk

- Walk through some common challenges of projects in the real life
- Present common patterns to address these challenges
- Point to the implementation in the example

# Problem: Code in SCM does not compile

- Wrong source code level
- Forgot to check in a class
- Developed against different target
- But: Where should it compile?

# Solution: Have a Continuous Integration Build

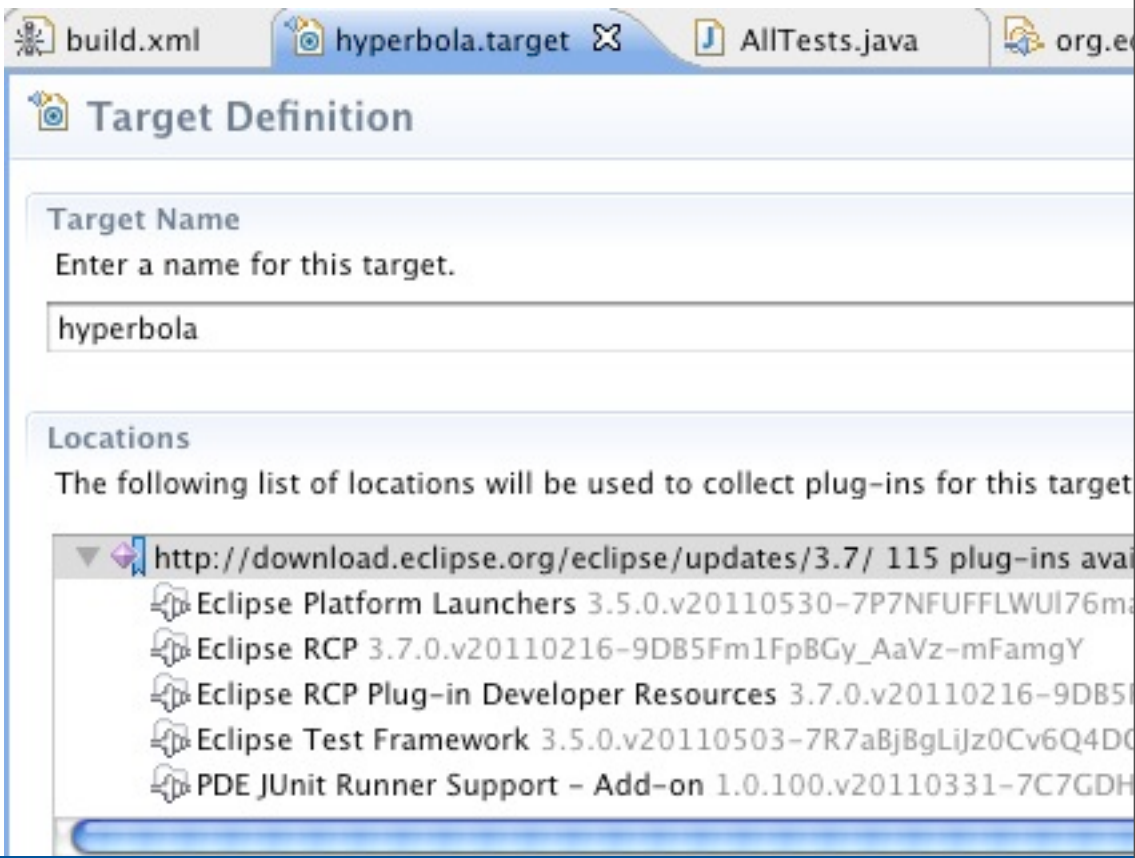
- Defines the current project sanity
- CI is an Agile best practice
- Feedback from an independent server
  - Best run with a CI server, i.e. Jenkins, Bamboo, ...
- Ideally executed soon after a commit

# Problem: Setting up a new workspace

- Which projects do I need?
- Where should they be on the disk?
- What is my target?
- Where does the target come from?

# Solution

- Workspace Provisioning with Yoxos
- Target Definition



# Managing a Target

- Use “Add Content” from “Software Site” and add a p2 repository
- A target definition against p2 repository at Eclipse will work
  - most of the time
  - potentially very slow
- Use the p2 mirror application to manage your own mirror
  - See http://wiki.eclipse.org/Equinox_p2_Repository_Mirroring

# Target content

- For a RCP application use these features:
  - Eclipse RCP
  - Eclipse RCP Plug-in Developer Resources
  - Eclipse Platform Launchers
  - ... Your own
- To enable the Test framework
  - Eclipse Test Framework
  - PDE JUnit Runner Support - Add-on

# Build target

- PDE Build does not understand Target Definitions yet
  - See Bug 266311
- In `customTargets.xml`, step `preProcessRepos`, use

```
<p2.mirror source="${baseRepository}"
           destination="file:${repoBaseLocation}/mirrored">
    <iu id="org.eclipse.equinox.executable.feature.group"
        version="3.5.0.v20110530-7P7NFUFFLWUl76mart"/>
    ...
</p2.mirror>
```

- Tip: id and version tag can be copied&pasted from the target definition source

# Problem: A Software Update is required

- A customer needs a hotfix for a bug
  - The Master branch has already moved beyond the release state
- Or you just have to update your software
  - How big is your update?

# Solution: Release from tags

- Separate between CI and release builds
- Release builds are tested and eventually released
- Release builds contain tagged bundles
- Tags are managed in map files

# A map file

- A map file contains a line per artifact like this:

```
plugin@o.e.h.core=GIT,tag=v20100110,repo=REPO,path=o.e.h.core
```

- During the build, the fetch factory will fetch the tag `v20100110` tag from repository `REPO`

# Map files and CI builds

- To build the latest version of a specific branch, start the build with

```
-DfetchTag=master
```

- For getting useful qualifiers, also use

```
-DforceContextQualifier=$NOW
```

# Releasing from map files

- Edit map files by hand only to
  - Add a plugin/fragment/feature
  - Remove a plugin/fragment/feature
- Automation for managing the tags
  - Eclipse Releng tool for CVS/SVN


  - Scripts for Git, see Bug 328745

# Problem: Builds take longer and longer

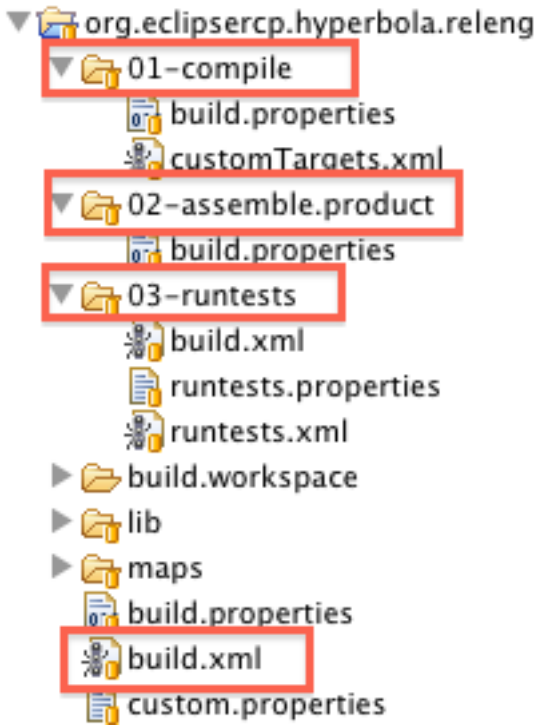
- Compiling more often than required
- Unnecessary compression and extraction
- Test execution takes a long time

# Compile only once

- Compile an ‘Everything’ feature up front into a p2 repository
- Use that repository for the next steps
  - Bundle up products
  - Install test feature

# Separated steps in the example

- The example has a main build.xml
- It configures and kicks of 2 consecutive PDE Builds and the test run
  - Compilation
  - Product Assembly
  - Run Tests with Eclipse Testing Framework



# Categorize and separate test execution

- Separate fast from long running tests
  - Execute them i.e. at CI Build and Nightly builds
- Patterntesting library can help with test annotations
  - @IntegrationTest("online access needed")
  - @SmokeTest
  - @RunTestOn(osName = "Windows")
  - @SkipTestOn(osName = "Windows")
  - @Broken(till = "31-Jul-2011")

# Problem: Poor definition of executed tests

- Developers rarely execute all tests in the workspace
- Build has some unknown method of test identification

# Solution: Define a mandatory test suite

- The same test suite must be able to run from the workspace and the automated builds
- Use a test suite that can pick up tests automatically, i.e. Bundle Test Collector

# BundleTestCollector

- A bundle o.e.h.alltests contains
  - the class BundleTestCollector (c&p'd)
  - the Test Suite(s)

```
public class AllTests {

    public static Test suite() {
        TestSuite result = new TestSuite("All Hyperbola Tests");
        BundleTestCollector collector = new BundleTestCollector();
        collector.collectTests(result, "o.e.h", "o.e.h", "*_Test");
        return result;
    }
}
```

# Problem: Unknown Test Quality

- Writing tests is optional in some teams
- Tests with a high abstraction execute only some code in distant classes

# Solution: Check your code coverage

- EclEmma does a good job in the workspace
- Emma also has an integration in Hudson/Jenkins
- Use Emma in the build automation

# Setting up Emma with PDE build

- Set up test environment
- Trigger offline instrumentation
- Execute tests
- Run Emma report

# Setting up the Test Environment

- Unzip your product
- Install test feature with the p2 director
  - Do not drop files into dropins/ folder, logging output is very unreliable there
- See `o.e.h.releng/03-runtests/build.xml` for an example
  - This is the place for additional setup hooks, i.e. server/ database setup

# Trigger offline instrumentation

```
<!-- this requires emma.jar and emma_ant.jar and emma_ant.properties in
your ant classpath -->
<taskdef resource="emma_ant.properties" />

<emma enabled="${emma.enabled}">
       <instr mode="overwrite"
              metadatafile="${coverageOutputDir}/ecp.em"
              filter="my.namespace.*">
           <instrpath>
              <fileset dir="${plugins-dir}">
                <include name="my.namespace*.jar"/>
              </fileset>
           </instrpath>
       </instr>
</emma>
```

# Running the Tests

- Instrumented code requires Emma classes
  - They are not in the bundle dependencies
- Put `emma-<version>.jar` in `${JRE_HOME}/lib/ext`
- Launch the test run with

```
-Dosgi.parentClassloader=ext
```

# Run Emma report

```
<emma enabled="${emma.enabled}">
  <report >
    <infileset dir="${coverageOutputDir}" includes="*.em,*.ec"  />
    <xml outfile="${coverageOutputDir}/coverage.xml"
         columns="class, name, method, block"/>
    <html outfile="${coverageOutputDir}/coverage.html"/>
  </report>
</emma>
```

# Configure Hudson/Jenkins

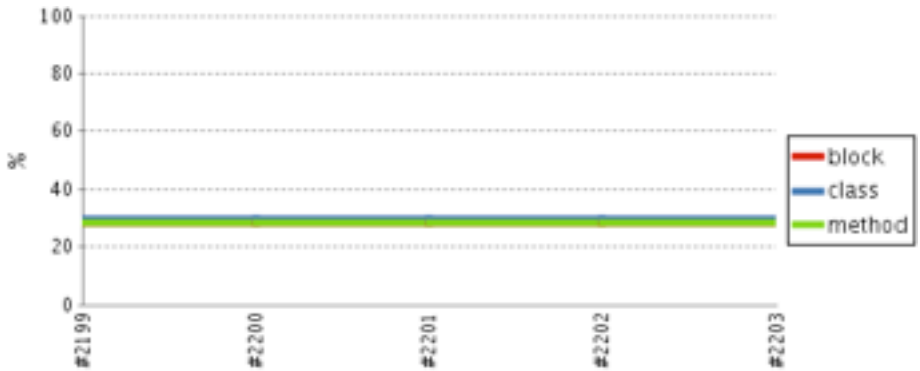
- Install Emma Plug-in
- Configure project

Record Emma coverage report

Folders or files containing Emma XML reports

builds/tests/ecp/results/testreports/coverage*.xml

- Enjoy coverage reports



# Other features in the example

- Start PDE from an ant build file
  - No need to specify the version of org.eclipse.equinox.launcher_<version>.jar
- Build feature branches before committing

# Conclusion

- Setting up and maintaining a build has many facettes
- The example has many features already integrated and for similar builds only a handful properties need to be adjusted
- More about this at http://eclipsesource.com/blogs

# Image Sources

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