Developing a Platform

Pawel Pogorzelski
epawpog

Eclipse 3.7 Indigo

- Released on 22/06/2011
  - 62 project teams participated in Indigo
  - 46 million lines of code released on the same day
  - 408 committers contributed code
  - 49 organizations collaborated
- Eclipse a leader
  - for java client development
  - gaining more ground on the server side

Transparency

- Eclipse Foundation is an independent company
  - well defined, transparent rules
- All the decisions made in public
- All the work done though Bugzilla

Stable rythm

- Shipping end of June each year (for 10 years)
- 7 milestones
  - 6-7 weeks each
  - M6 API freeze (this year March 18)
  - M7 feature freeze (this year May 6)
  - RC1 (this year May 20) – RC4 (this year June 10)
- Weekly integration builds
- Nightly builds
- Throwing out features rather than slipping

Technologies

- Lazy loading
- OSGi
- JDT
- PDE

- Technologies to build on
  - extensibility

API

- Stable API
  - one of key factors Eclipse is so successful
  - around 500 products build on Eclipse only in IBM
  - other 5000 with direct and indirect dependencies
  - huge focus on wise and stable API
- API plays nice with OSGi
  - non API is not referable
  - versioning used to specify requirements
  - multiple API versions coexisting in one JVM

What is API?

- org.eclipse.xyz.*
- org.eclipse.xyz.internal.*
- org.eclipse.xyz.internal.provisional*

- API class or interface
  - a public class or interface in an API package, or a public or protected class or interface member declared in or inherited by some other API class or interface
- Similarly for methods and fields

API Tools

- Tools designed to facilitate API evolution

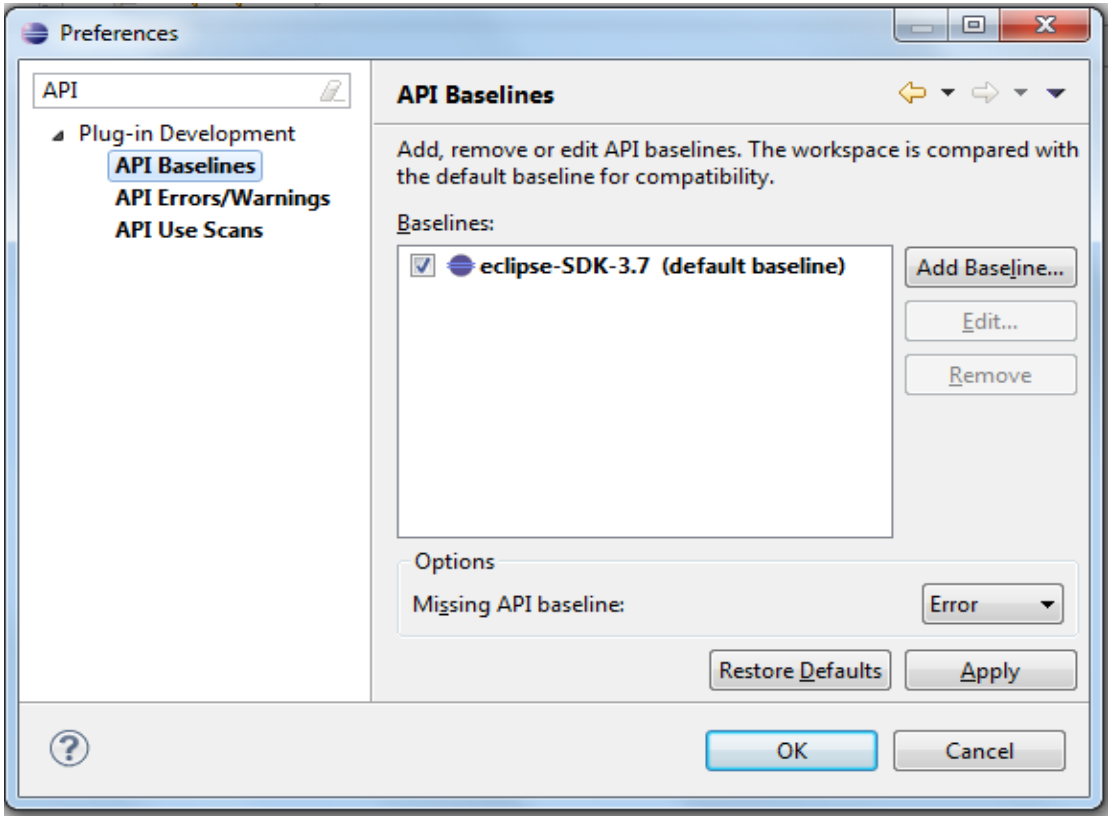
- Features
  - update version numbers (Eclipse versioning scheme)
  - identify binary compatibility issues
  - identify usage of non API packages
  - identify internal types leakages into API
  - provide a set of additional markers

Setup

- The baseline
  - new API developed based on the last released
- Add the builder
- You're ready to go

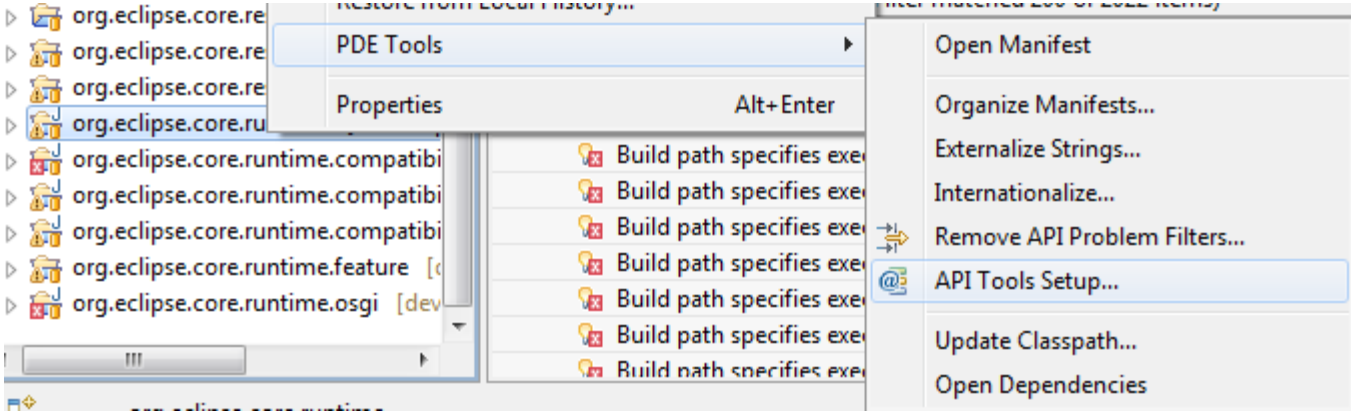
API Baseline

- Defines the what to compare workspace bundles against
- Set to 3.7 at the beginning of 3.8 stream

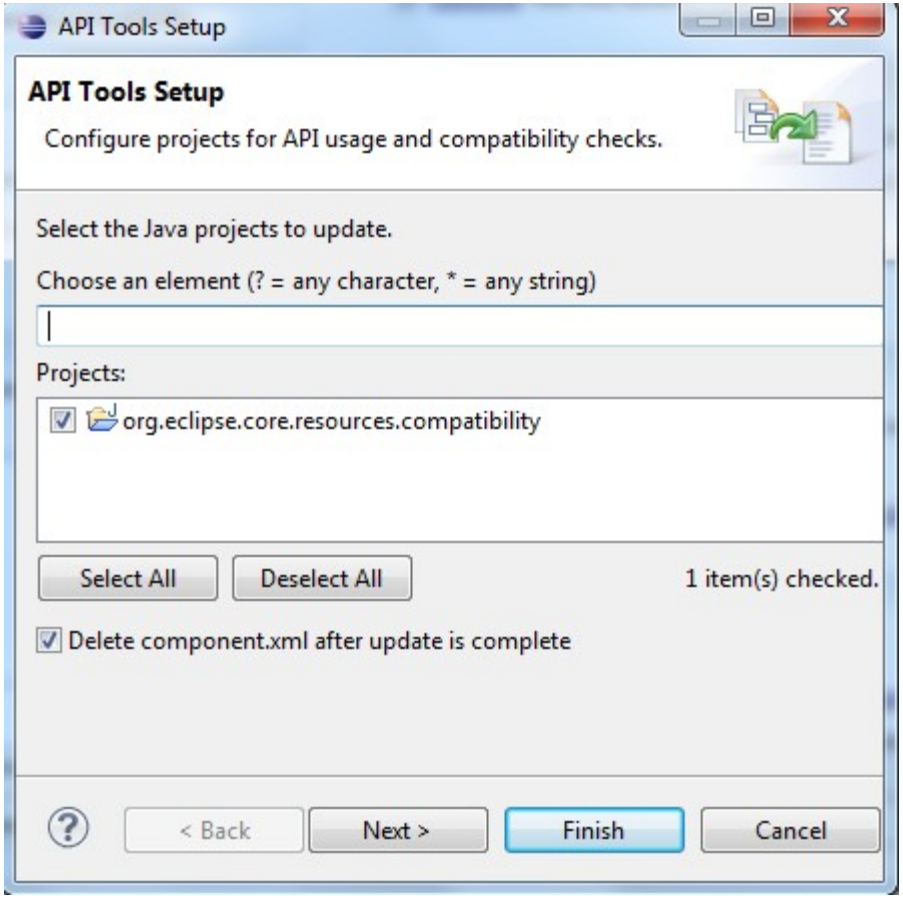


Configuring bundles

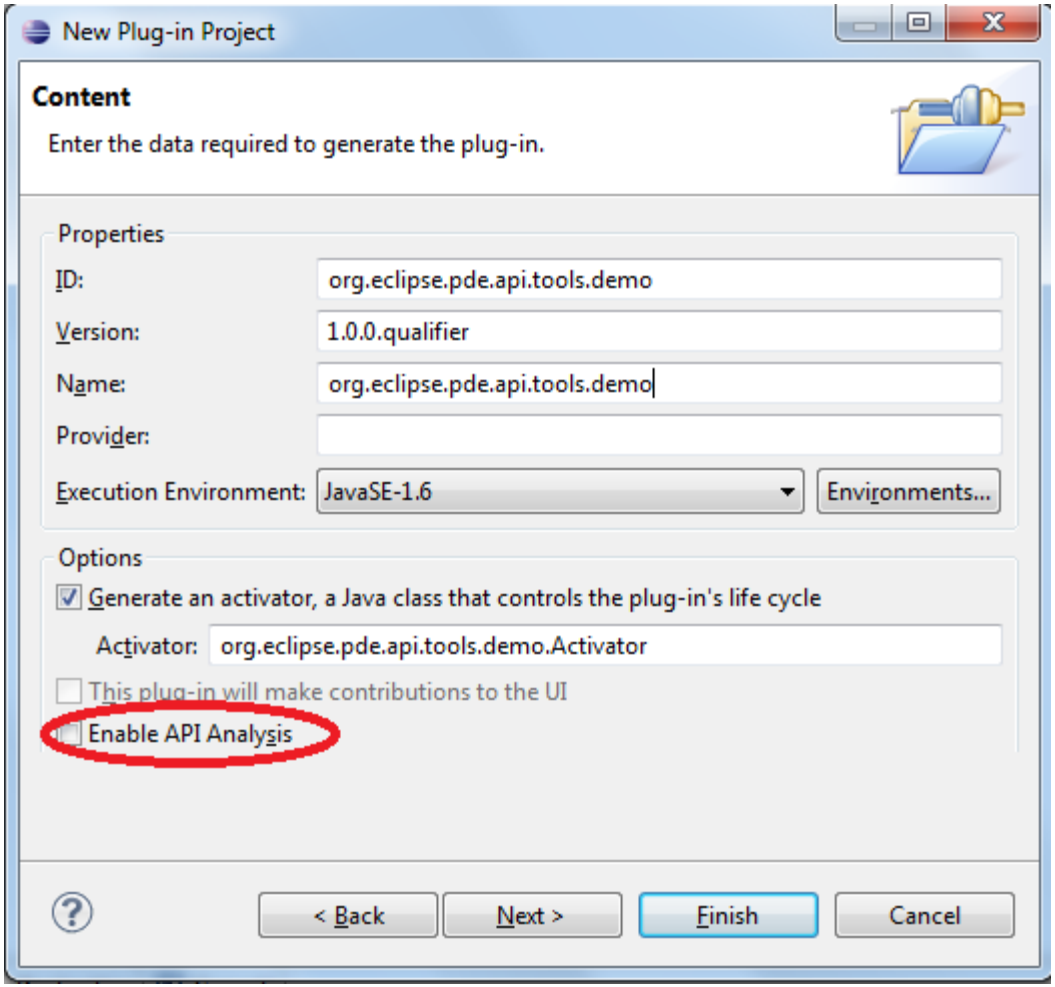
› Add API



Configuring bundles

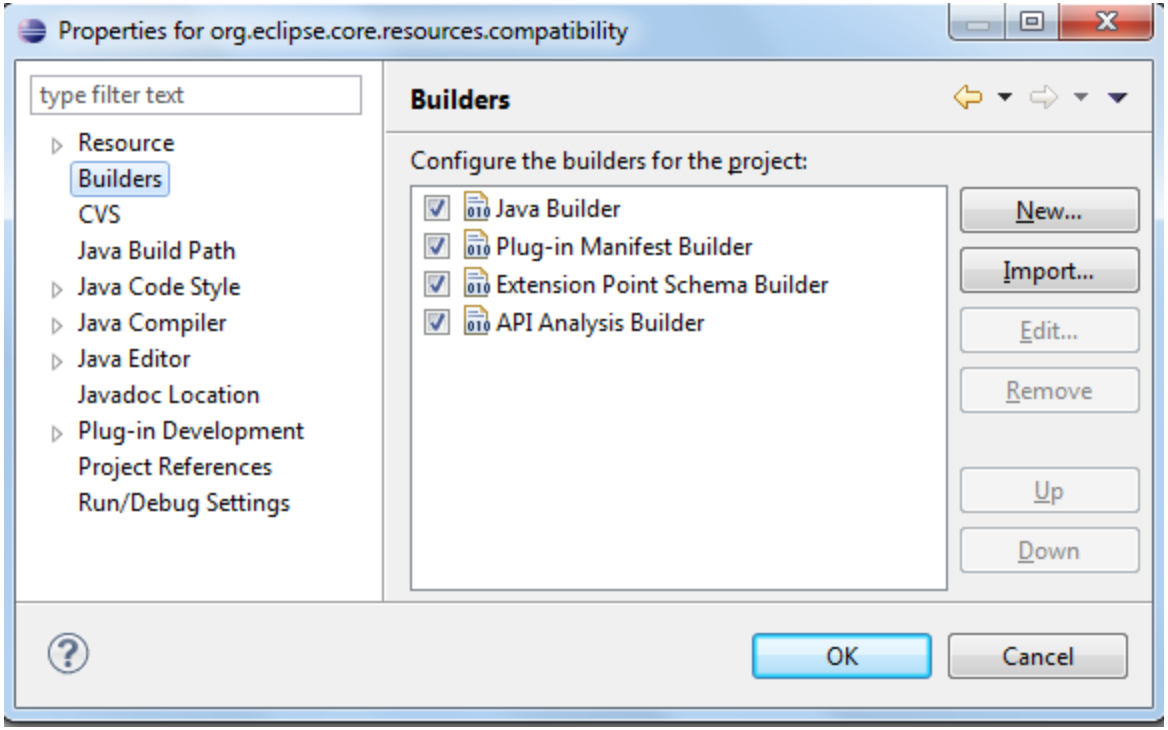


Configuring bundles



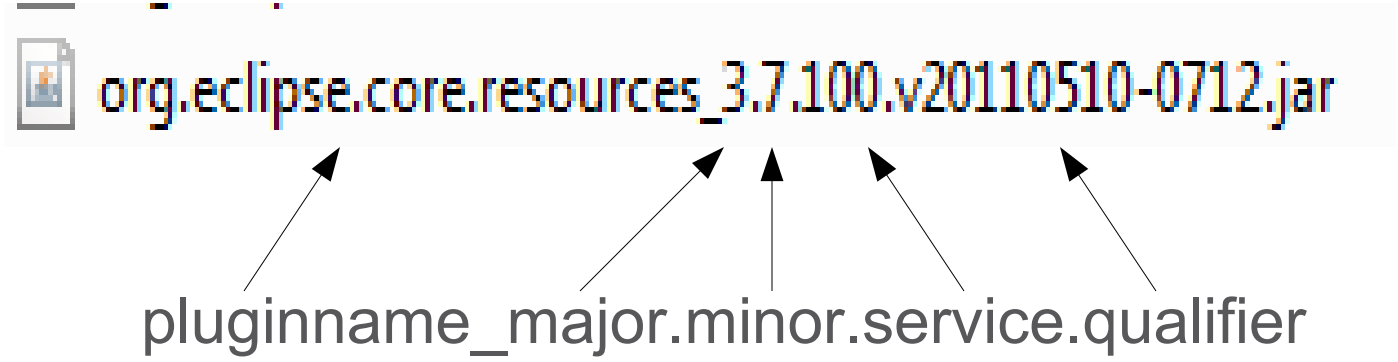
Configuring bundles

› As a result **API Analysis Builder** is added



Version numbering

› Bundle versioning:



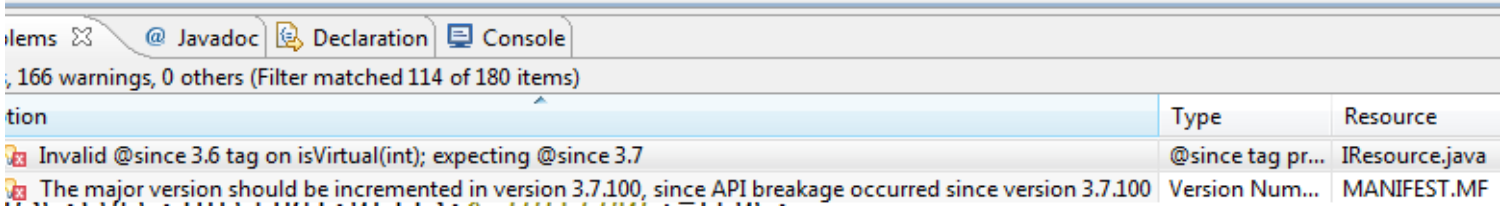
› The same for packages:

```
org.osgi.framework;version="1.6",
org.osgi.framework.hooks.bundle;version="1.0",
org.osgi.framework.hooks.resolver;version="1.0",
```

Major segment

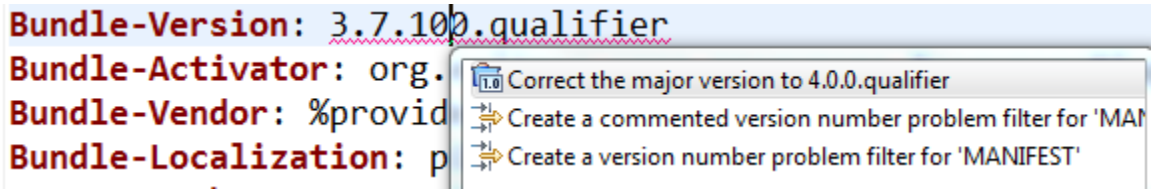
- Incremented when API breaking changes occurs

```
 * @see IFile#create(java.io.InputStream, int, IProgressMonitor)
 * @see #VIRTUAL
 * @since 3.6
 */
public boolean isVirtual(int options);
```



Problem: Adding an argument for API interface

Fix: Change plug-in version from 3.7.100 to 4.0.0



- Maintenance branch: not possible

Minor segment

- Increased for "externally visible" changes
  - binary compatible API changes
  - significant performance changes
  - major code rework
- Still not decided?
  - if to big to consider bug fixes but not breaking
- Maintenance branch
  - not recommended
  - known to consumers in advance
  - 1.0 release – version 2.2.7
  - 1.0.1 release – version 2.3.0
  - 1.1 release – version 2.4.0

Minor segment

```
Import-Package: org.eclipse.xyz;version="[1.6.0,2.0.0)"
```

```
public void execute(String request) {
    messaging.sendRequest(request, 1000);
}
```

```
Export-Package: org.eclipse.xyz;version="1.5.0"
```

```
public interface IMessaging {

    public String sendRequest(String request);

}
```

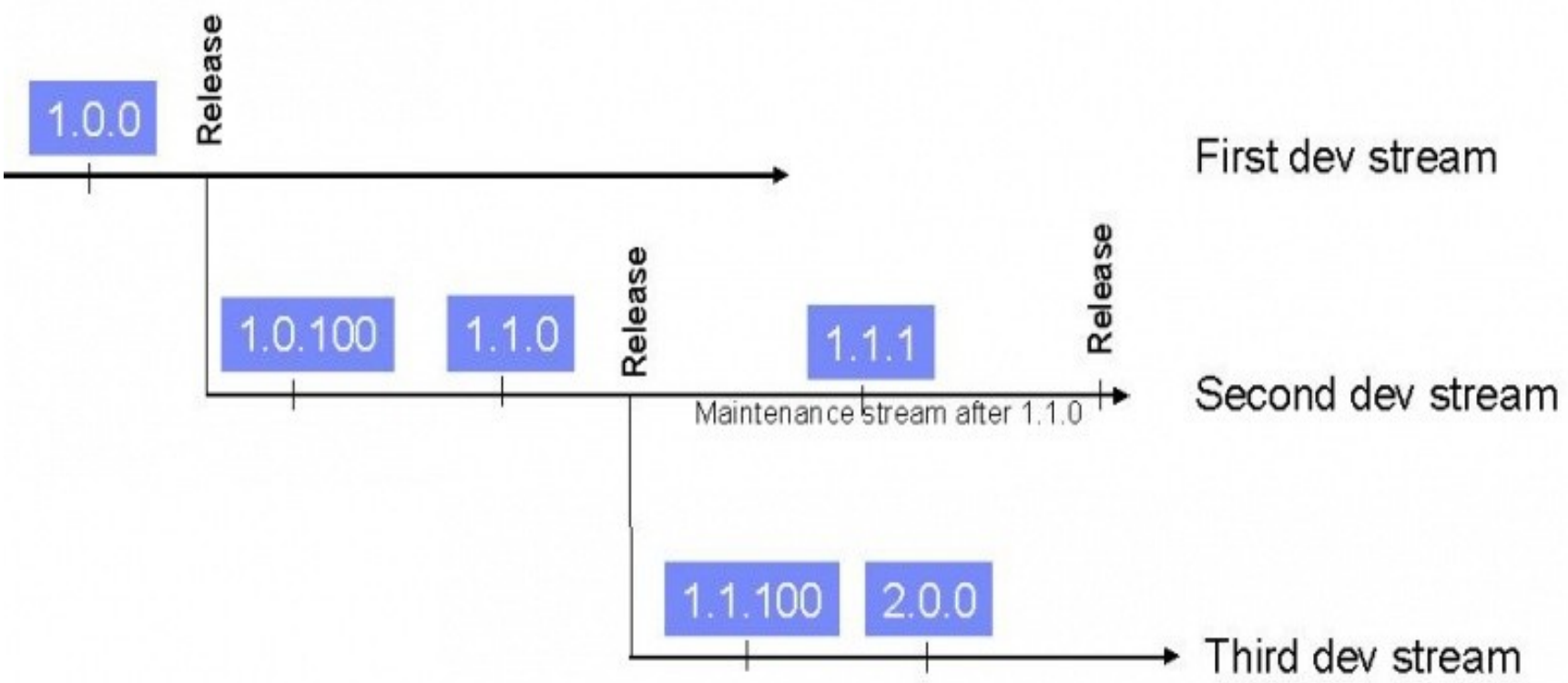
Service segment

- Changes not visible in API
  - bug fixes
  - the plug-in manifest has changed
  - documentation
  - compiler settings have changed
- Make room for maintenance
  - 3.0 release – version 2.4.8
  - 3.0.1 relese – 2.4.9
  - 3.1 first fix – version 2.4.108

Qualifier

- Usually composed of timestamp
  - derived from build input
- Enables teams to use p2 during the development cycle
- Eclipse format
  - vYYYYMMDD
- Having multiple builds a day?
  - vYYYYMMDD-HHMM
- Use different qualifier for maintenance streams
  - R20x
  - be consistent with the prefix
  - 1.0.1.R20x_v20090629 may appear in both 1.0.1 and 1.0.2

Evolving version numbers



Specyfing requirements

- Including all non breaking updates from 3.7
  - “[3.7.0, 4.0.0)“
- Only non visible changes
  - “[3.7.0, 3.8.0)“
- No changes
  - “3.7.0”

Binary vs Source

- Difference between JC and JVM

- Updating sources not a problem
- You care about not breaking binaries
- Decouples the system
  - components can be compiled independently
  - important in multi vendor environment

Binary vs Source

```
public interface IMessaging {

    public static final int ASYNC = 0x1;
    public static final int CONTROL = 0x2;

    public String sendRequest(String request);

    public String sendRequest(String request, int timeout);

}
```

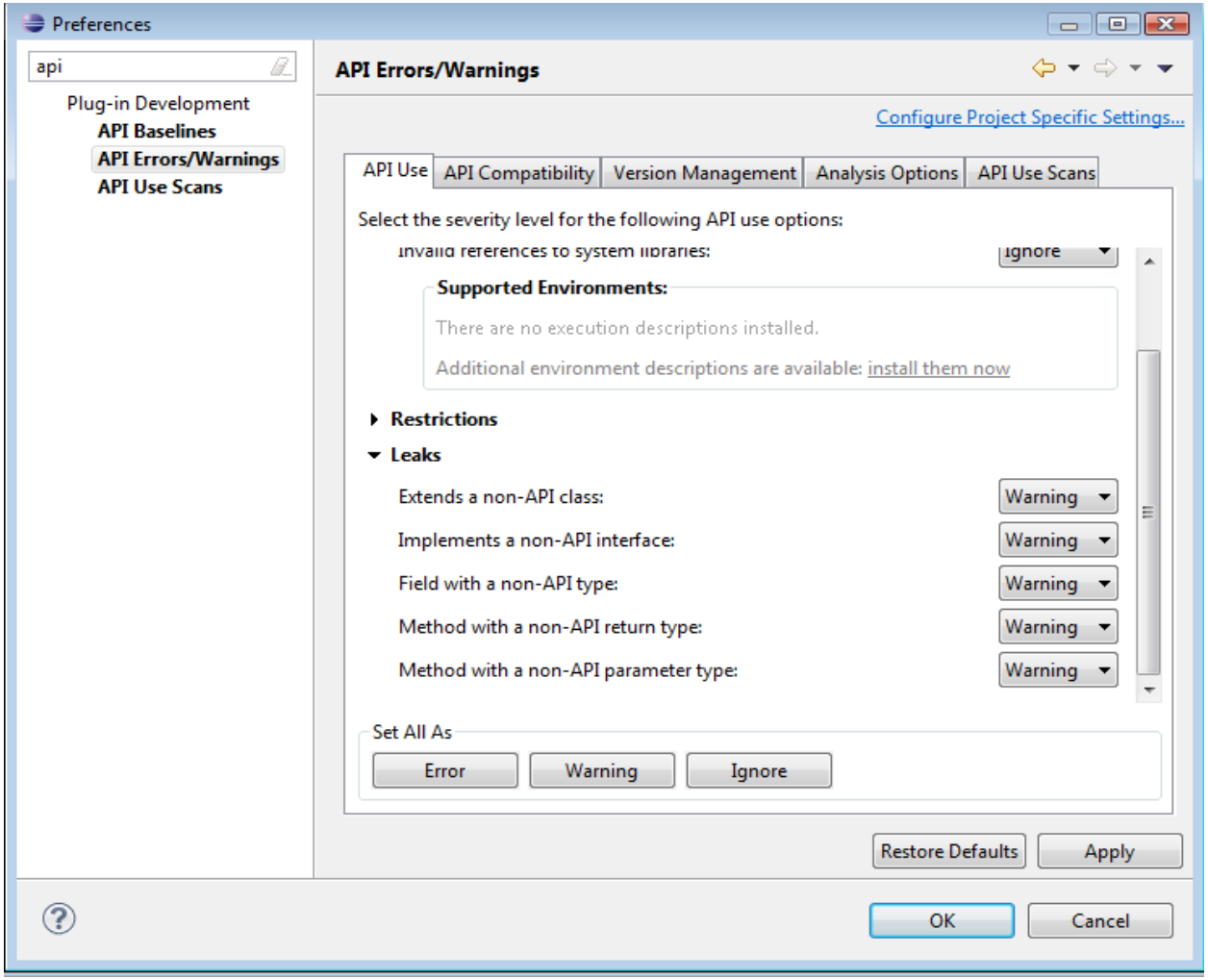
API restrictions

- @noimplement (Interfaces)
- @noextend (Classes, Interfaces)

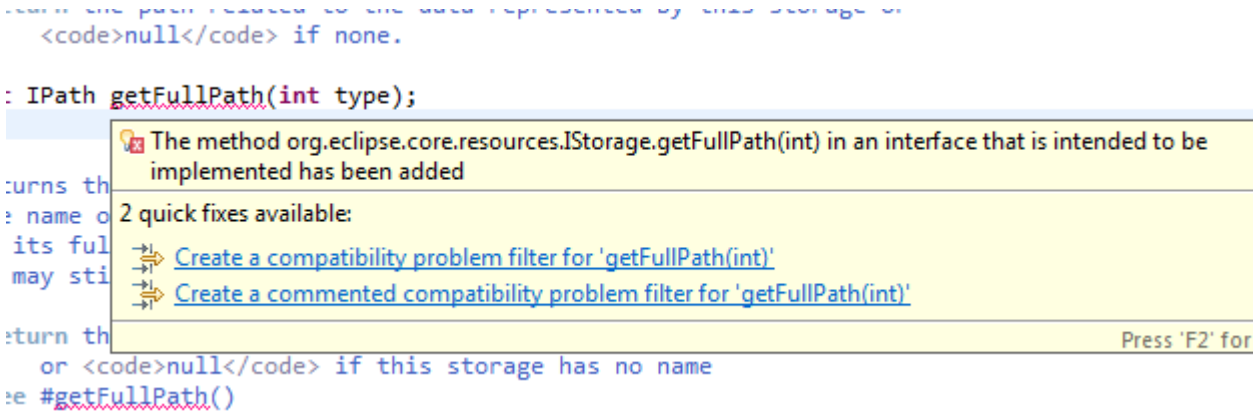
```
 * @noimplement This interface is not intended to be implemented by clients.
 * @noextend This interface is not intended to be extended by clients.
 */
public interface IResource extends IAdaptable, ISchedulingRule {
```

- @noinstantiate (Classes)
- @nooverride (Methods)
- @noreference (Methods, constructors, fields)

Adjusting Problem Severities



Filtering Known Problems



Filtering Known Problems

/org.eclipse.core.resources/.settings/.api_filters

```
<resource path="src/org/eclipse/core/resources/IStorage.java" type="org.eclipse.core.resources.IStorage">
      <filter comment="Planned breakage" id="403804204">
          <message_arguments>
              <message_argument value="org.eclipse.core.resources.IStorage"/>
              <message_argument value="getName(int)"/>
          </message_arguments>
      </filter>
      <filter id="1211105284">
          <message_arguments>
              <message_argument value="getName(int)"/>
          </message_arguments>
      </filter>
  </resource>
```

API use scan

- Who is using my API?
- Who refers to internals?

List of bundles using org.eclipse.ant.core

Terminology

1. API References - are references that are only made to public API of a bundle
2. Internal References - are references that are only made to internal non-API of a bundle
3. Internal-Permissible References - are references that are only made to internal non-API of a bundle, but are allowed via the `x-friends` directive
4. Other References - are references that have been detected but could not be resolved

Bundle	API References	Internal References	Internal-Permissible References	Other References
org.eclipse.ant.ui	323	0	62	0
org.eclipse.pde.build	8	0	0	0
org.eclipse.pde.core	48	0	0	0

How does it work?

- API Tools relies on bytecode manipulation
  - generates .class files stubs retaining API information
  - operates on binaries (guarding binary compatibility)

Summary

- Use OSGi to ensure your assumptions are met
- Bundle evolution is complex
  - breaking/not breaking
  - source vs. binary
- Other considerations
  - reexporting packages
  - non API bundles
  - external libraries
  - versioning features
- Solution
  - use PDE API Tools
  - visit http://wiki.eclipse.org/Version_Numbering