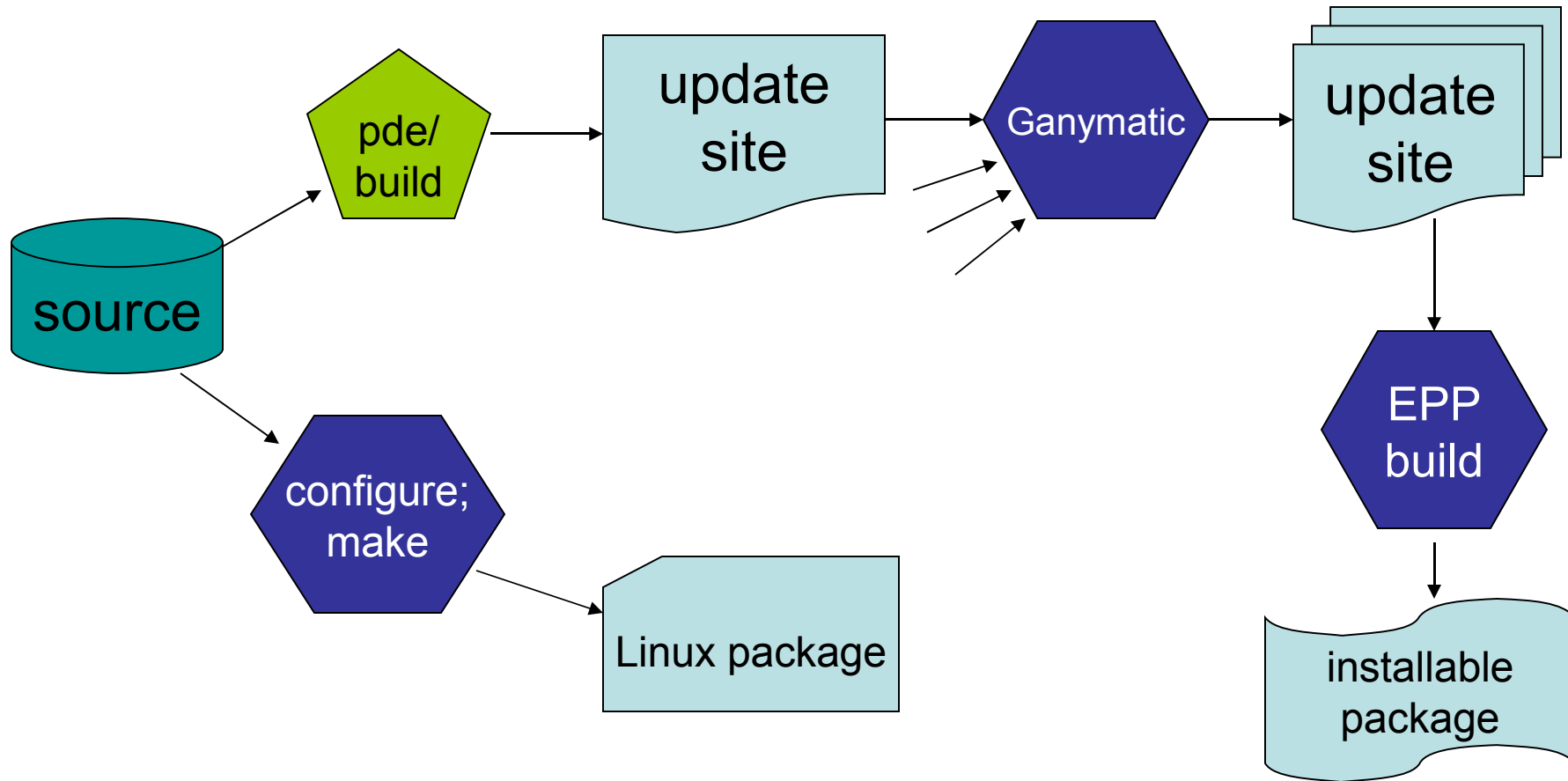


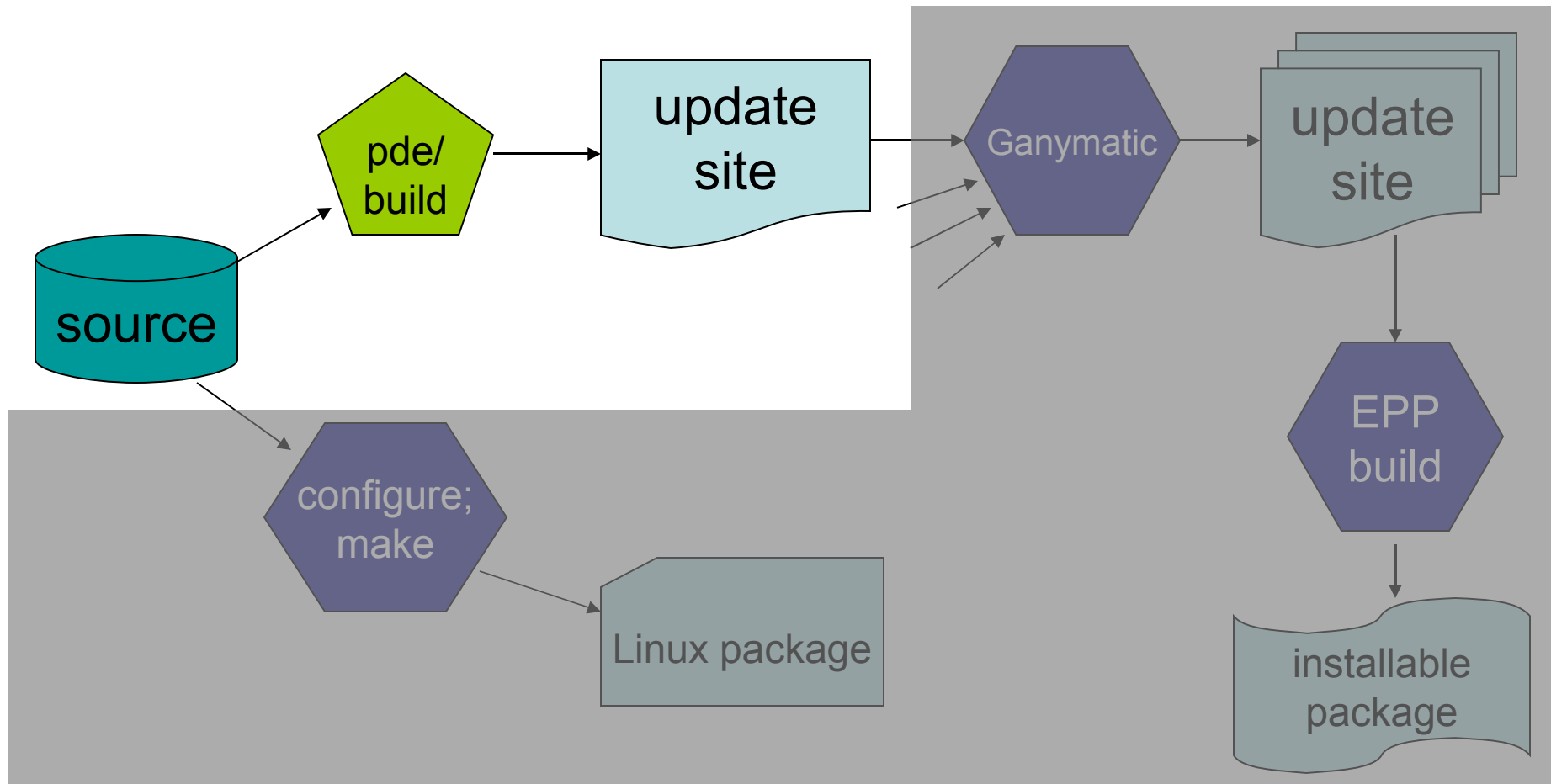
From Europa to Ganymede: Eclipse Packaging and Ganymatic

Bjorn Freeman-Benson (Eclipse Foundation)
Markus Knauer (Innoopract)
Andrew Overholt (Red Hat Canada, Ltd.)

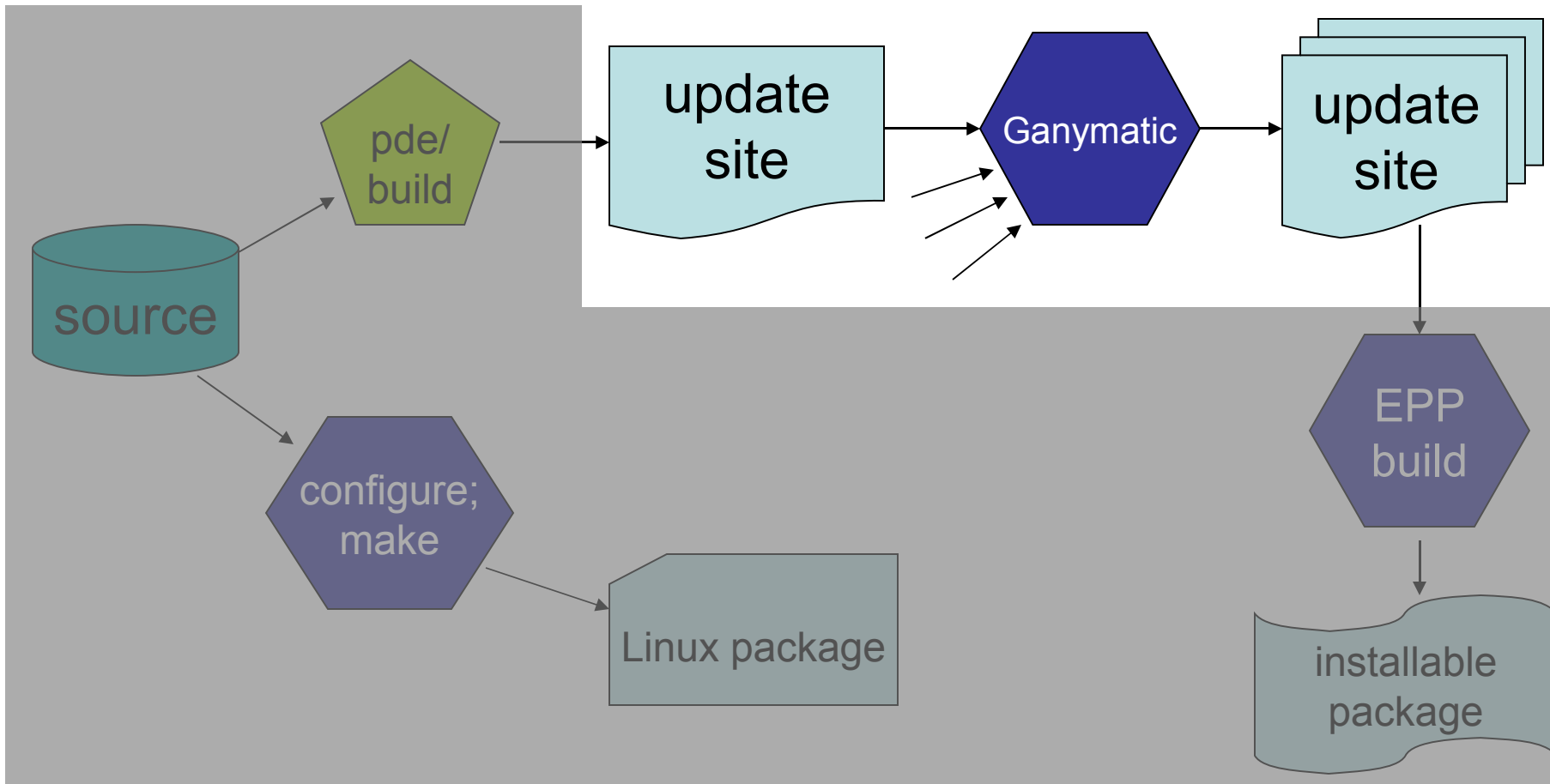
Eclipse Builds and Packages



The Role of Projects



The Role of Ganymatic



Ganymede, the Ideal

- Simultaneous release of ~30 projects
- A single date (June 27th)
- A single SCM tag for adopters
- A single installer / single update site for users

Ganymede, the Reality

- Ganymede should be “project coordination only”
- Limitations of update manager cause us to need a single update site with all projects
 - ◆ Copies of the projects rather than just pointers to the project’s own update site
- Limitations of update manager cause us to need an update site that is as small as possible
- Thus we need a way to assemble one update site from multiple update sites...
- ...without (much) extra work by each project

Ganymatic, the Build Tool (1)

Server : build.eclipse.org



Dashboard **Builds** Administration

Summary

6 project build(s)

0 project(s) inactive

0 project build(s) failed

6 project build(s) succeeded

0 project(s) building

100% of projects passing

Tools

- [Add a project](#)
- [RSS Feed](#)
- [for CCTray](#)
- [for CC-Config](#)
- [JMX Console](#)



	cleanup-artifacts-B at 19 Mar 2008 07:05 GMT +00:00		
	ganymatic-R3.0-I at 19 Mar 2008 00:03 GMT +00:00		
	orbit-I at 11 Mar 2008 17:30 GMT +00:00		
	orbit-M at 28 Jan 2008 15:52 GMT +00:00		
	orbit-R at 28 Jan 2008 15:23 GMT +00:00		
	orbit-S at 9 Feb 2008 16:38 GMT +00:00		

Ganymatic, the Build Tool (2)



Latest Build	
Mar 19, 2008 00:05:05 GMT	Fail

Latest Good Build	
Mar 14, 2008 22:25:33 GMT	Success

Cruise Control	
Staging update site	
Ganymede wiki page	
	all builds
	successful builds
	failed builds

Packages				
Build ID (UTC)	CPP	Java	JEE	RCP
20080319-0540	Success <small>win32 other</small>	Fail	Fail	Fail
20080318-0540	Success <small>win32 other</small>	Fail	Fail	Fail
20080304-0640	Success <small>win32 other</small>	Success <small>win32 other</small>	Success <small>win32 other</small>	Success <small>win32 other</small>
20080221-1100	Success	Success	Success	Success

Recent	
Mar 19, 2008 00:05:05 GMT	Fail
Mar 18, 2008 02:02:50 GMT	Fail
Mar 14, 2008 22:25:33 GMT	Success
Mar 14, 2008 21:57:48 GMT	unable to determine status
Mar 14, 2008 21:56:43 GMT	unable to determine status
Mar 14, 2008 21:16:17 GMT	Success
Mar 14, 2008 20:12:13 GMT	Success
Mar 14, 2008 18:52:01 GMT	unable to determine status
Mar 14, 2008 18:46:27 GMT	Fail
Mar 14, 2008 18:26:25 GMT	Fail
Mar 14, 2008 16:04:55 GMT	Success
Mar 14, 2008 15:37:28 GMT	Success
Mar 14, 2008 15:23:27 GMT	Fail
Mar 14, 2008 07:03:54 GMT	Success
Mar 13, 2008 00:13:29 GMT	Fail (mylyn)

Ganymatic, Logs

Build started Mar 19, 2008 00:04:07 GMT; completed Mar 19, 2008 00:05:05 GMT

Ganymede Build Log

Errors:

- (other) **61 105**

```
resolve.cquery:
[java] ERROR: Digest could not be parsed:Unable to retrieve remote reference
"http://download.eclipse.org/technology/dltk/updates/1.0/digest.zip". [Server returned HTTP response code: "404
Not Found" for URL: http://download.eclipse.org/technology/dltk/updates/1.0/digest.zip.]
[java] ERROR [0020] : No suitable provider for component
org.eclipse.dltk.ruby:site.feature/[1.0.0.v20080204-1458-7__--E8McIJUKea2IBUDc,1.0.0.v20080204-1458-7__--E8McIJUKea2II
was found in searchPath org.eclipse.dltk-sc
[java] ERROR [0020] : Rejecting provider site.feature(${downloads}/technology/dltk/updates-dev/1.0/site.xml): No
component match was found
[java] ERROR [0020] : No suitable provider for component
org.eclipse.dltk.tcl:site.feature/[1.0.0.v20080204-1458-7A--E9IgKLfLheijKz-Mz,1.0.0.v20080204-1458-7A--E9IgKLfLheij]
was found in searchPath org.eclipse.dltk-sc
[java] ERROR [0020] : Rejecting provider site.feature(${downloads}/technology/dltk/updates-dev/1.0/site.xml): No
component match was found
[java] ERROR [0020] : No suitable provider for component
org.eclipse.dltk.core:site.feature/[1.0.0.v20080204-1458-7A--E9IgKLgKleemUMae,1.0.0.v20080204-1458-7A--E9IgKLgKleem]
was found in searchPath org.eclipse.dltk-sc
[java] ERROR [0020] : Rejecting provider site.feature(${downloads}/technology/dltk/updates-dev/1.0/site.xml): No
component match was found
[java] ERROR: Digest could not be parsed:Unable to retrieve remote reference
"http://download.eclipse.org/modeling/gmf/update-site/milestone/digest.zip". [Server returned HTTP response code:
"404 Not Found" for URL: http://download.eclipse.org/modeling/gmf/update-site/milestone/digest.zip.]
[java] INFO: TAG-ID 0020 = project:
file:/opt/public/ganymede/workingdir/org.eclipse.ganymede.sitecontributions/dltk.sc, path: org.eclipse.ganymede ->
org.eclipse.dltk-sc
```

Ganymatic, Success

Build started Mar 14, 2008 22:23:40 GMT; completed Mar 14, 2008 22:25:33 GMT

Ganymede Build Log

`get.properties:`

`verify.properties.buckminster.home:`

`verify.properties.contribs.dir:`

`verify.properties.site.dir:`

`verify.properties.downloads:`

Ganymatic, the Issues

- Project update sites contain extra versions
 - ◆ = cannot just copy everything from all update sites
- Project features are not complete
 - ◆ They depend on other features
 - ◆ (This is a good thing)
 - ◆ = just copying features is not enough, needs transitive closure



Ganymatic, powered by Buckminster

- Buckminster is a dependency resolver (and many other things)
- Ganymatic uses Buckminster to materialize an update site
 - ◆ (On my dev machine, I use Buckminster to materialize a workspace)
- Finds the minimal necessary set of features and plug-ins, then creates the collected update site.

Buckminster Highlights

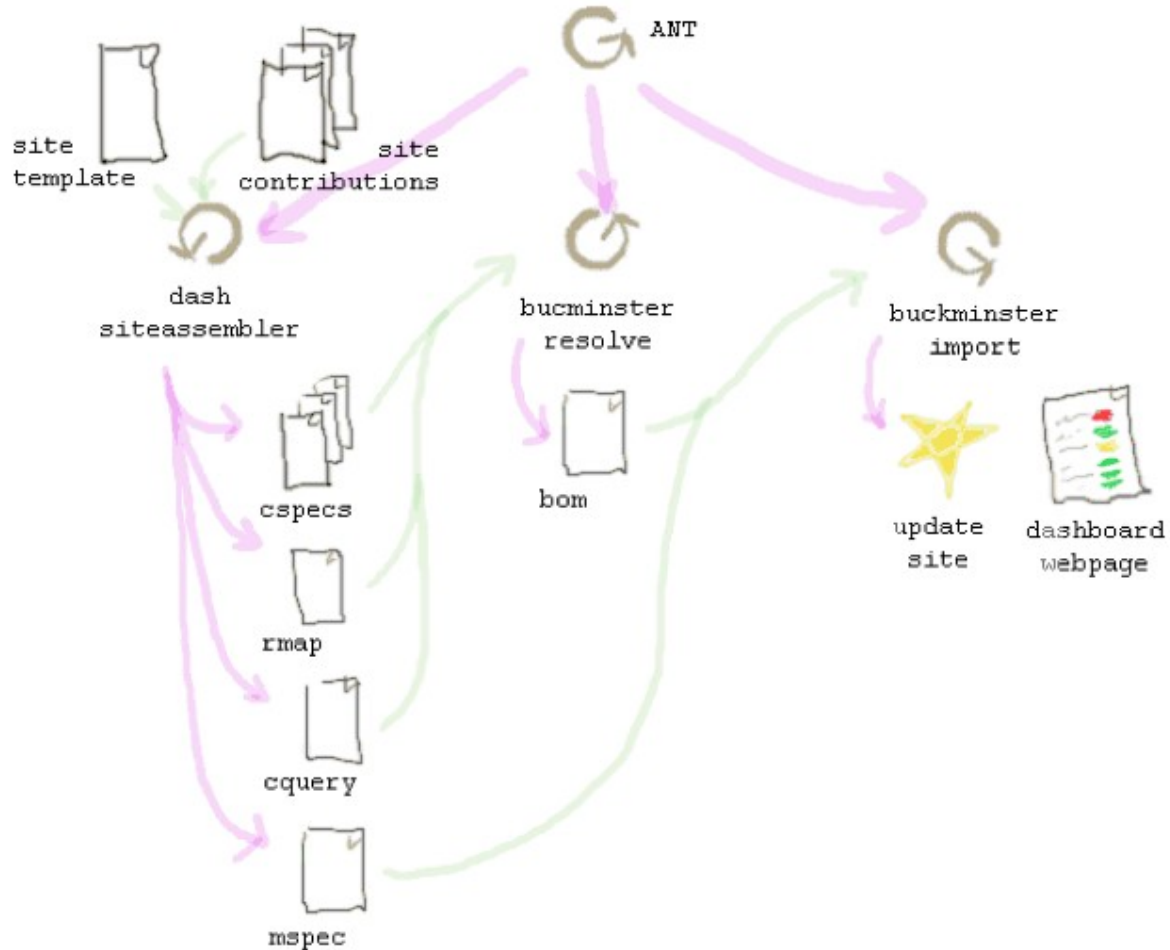
- Resolution & materialization framework
 - ◆ Manages and resolves dependencies
 - ◆ Materializes components in context of choice
 - ◆ Can build workspaces defined as “virtual distros”
 - ◆ Supports CVS, SVN, PDE, update sites, other repositories
- Model agnostic meta-framework
 - ◆ Spans repos, component & build types
 - ◆ Supports complex assembly patterns
- Catalyst for distro creation
 - ◆ Simplified consumption of cross-project dependencies

Ganymatic, site contributions

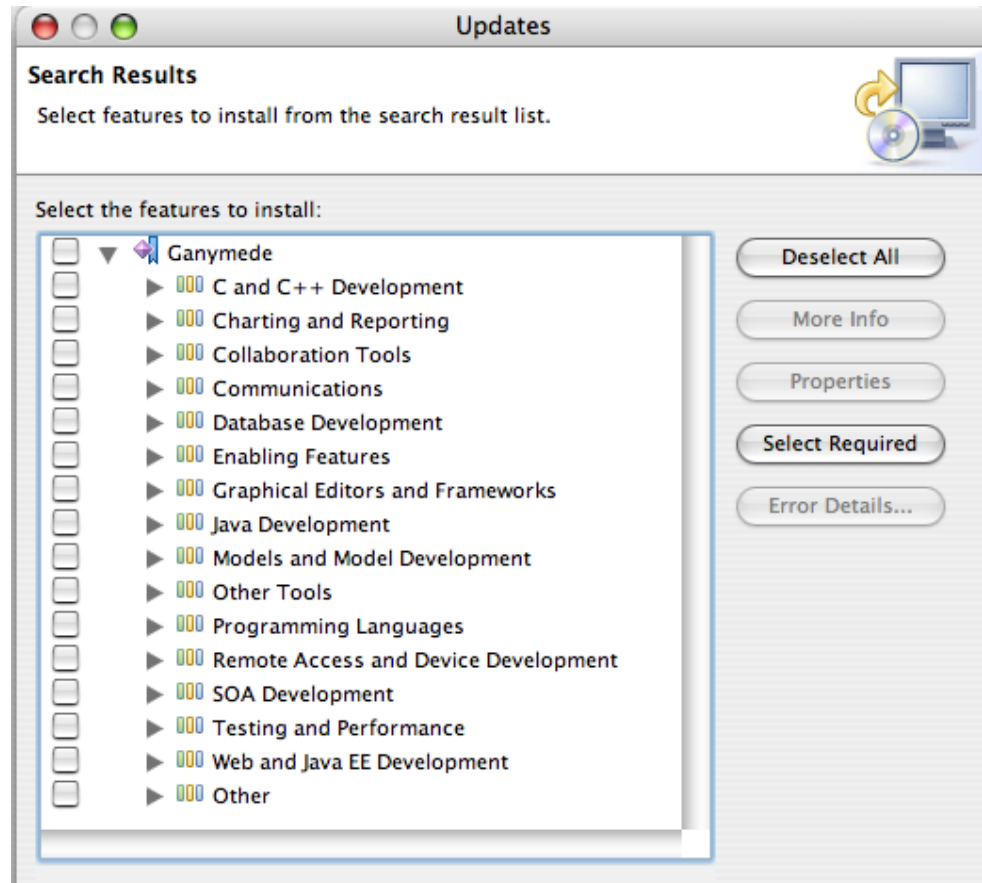
```
<?xml version="1.0" encoding="UTF-8" ?>
<sc:siteContribution
  xmlns=... xmlns:sc=...
  updateSite="{downloads}/tools/gef/updates/site-interim-ganymede.xml">
<sc:member name="Anthony Hunter" email="anthonyh@ca.ibm.com" />
<sc:cspec name="org.eclipse.gef-sc">
  <dependencies>
    <dependency name="org.eclipse.draw2d.sdk"

    versionDesignator="[3.4.0.v20080115-677-8082A5655G39998x422_2448]" />
    <dependency name="org.eclipse.draw2d" versionDesignator=... />
    <dependency name="org.eclipse.gef.sdk" versionDesignator=... />
    ...
  </dependencies>
  <groups>
    <public name="Enabling Features">
      <attribute component="org.eclipse.draw2d.sdk" />
      <attribute component="org.eclipse.draw2d" />
    </public>
    <public name="Graphical Editors and Frameworks">
      <attribute component="org.eclipse.gef.sdk" />
    </public>
    ...
  </groups>
</sc:cspec>
</sc:member>
</sc:siteContribution>
```

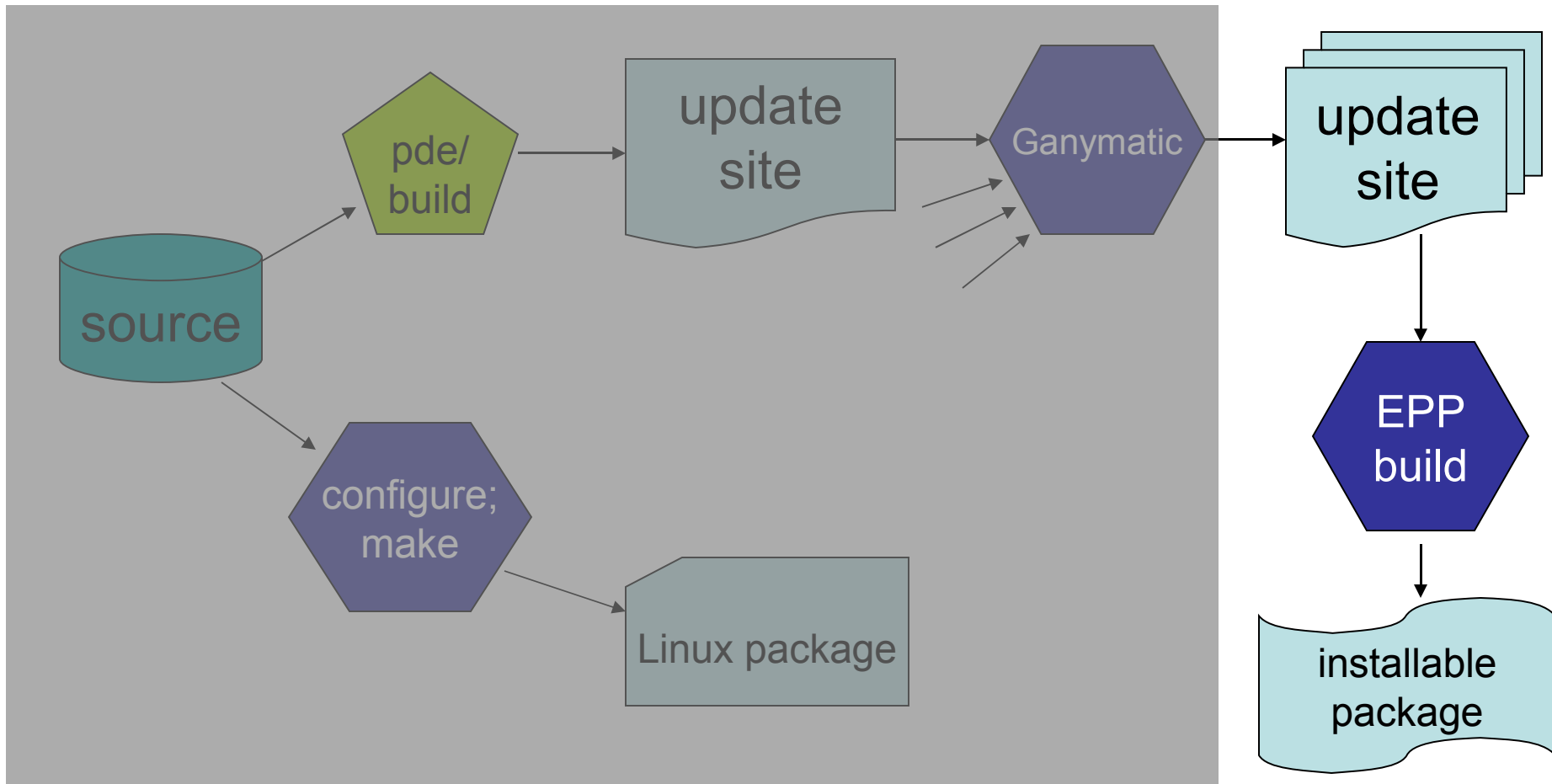
Ganymatic, a Sketch



Ganymatic, the Result

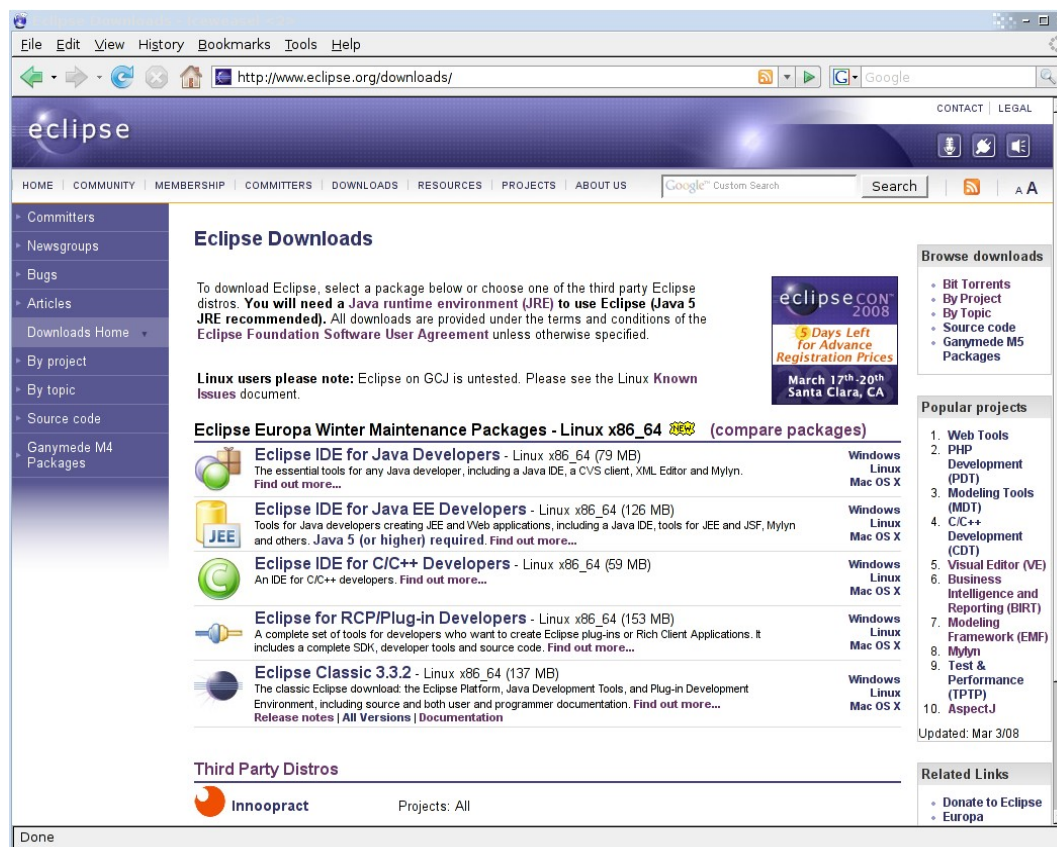


The Role of EPP



Some Facts about EPP

EPP creates the packages for eclipse.org/downloads



The screenshot shows the Eclipse Downloads page in a web browser. The page title is "Eclipse Downloads". It features a navigation menu on the left with options like "Committers", "Newsgroups", "Bugs", "Articles", "Downloads Home", "By project", "By topic", "Source code", and "Ganymede M4 Packages". The main content area includes a "Browse downloads" section with links for "Bit Torrents", "By Project", "By Topic", "Source code", and "Ganymede M5 Packages". Below this is a "Popular projects" list with 10 items: "Web Tools", "PHP Development (PDT)", "Modeling Tools (MDT)", "C/C++ Development (CDT)", "Visual Editor (VE)", "Business Intelligence and Reporting (BIRT)", "Modeling Framework (EMF)", "Mylyn", "Test & Performance (TPTP)", and "AspectJ". The page is updated as of Mar 3/08. At the bottom, there are "Related Links" for "Donate to Eclipse" and "Europa".

Eclipse Downloads

To download Eclipse, select a package below or choose one of the third party Eclipse distros. **You will need a Java runtime environment (JRE) to use Eclipse (Java 5 JRE recommended).** All downloads are provided under the terms and conditions of the Eclipse Foundation Software User Agreement unless otherwise specified.

Linux users please note: Eclipse on GCJ is untested. Please see the Linux Known Issues document.

Eclipse Europa Winter Maintenance Packages - Linux x86_64 (compare packages)

Package Name	OS	Size
Eclipse IDE for Java Developers	Windows, Linux, Mac OS X	79 MB
Eclipse IDE for Java EE Developers	Windows, Linux, Mac OS X	126 MB
Eclipse IDE for C/C++ Developers	Windows, Linux, Mac OS X	59 MB
Eclipse for RCP/Plug-in Developers	Windows, Linux, Mac OS X	153 MB
Eclipse Classic 3.3.2	Windows, Linux, Mac OS X	137 MB

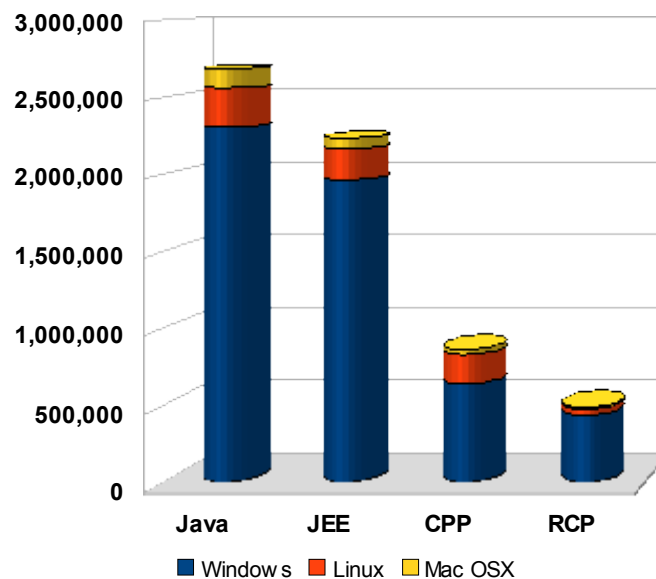
Third Party Distros

- Innoopract

Some Facts about EPP

One, two, three... next EPP package

- ◆ Every three seconds, an EPP package is downloaded
- ◆ 6,3M downloads in the first 9 months



Goals of the Eclipse Packaging Project

- Create entry level downloads
 - ◆ This helps users to start with Eclipse
- Provide feedback about the content
 - ◆ Find out about usage profiles
 - ◆ Measure popularity
 - ◆ EPP Usage Data Collector
- Help projects to integrate with each other
 - ◆ Which project provides a suitable extension to package X?
 - ◆ How can project Y structure its features to make it consumable?
 - ◆ Detect dependency problems

How Eclipse build systems are different

You build from scratch / source

- ◆ Example: You have written code for your RCP application
- ◆ PDE build!
- ◆ Plugin export, feature build, site.xml build, product build
- ◆ Linux Distro build

You are consuming pre-build plugins and features

- ◆ Example: You want to create a product for your users
 - EPP: Build a product from Eclipse Update Sites
 - Ganymatic: Build an Update Site from Update Sites

Technology of the EPP Build

- Use Eclipse Update Manager to pull features from update sites
- Use PDE packager to create packages
- Everything driven by a single configuration file

4 features listed.

4 sites listed.

Looking up features...All features accounted for.

Installing features...

Created installation site at /opt/public/technology/epp/epp_build/34/workspace_cpp/extension_site.

Installing features for platform win32,win32,x86...

Installing feature org.eclipse.cvs...Done.

Installing feature org.eclipse.platform...Done.

Installing feature org.eclipse.cdt...Done.

Installing feature org.eclipse.epp.usagedata.feature...Done.

Done.

Done.

Building configured application...

Configuration files taken from /opt/public/technology/epp/epp_build/34/ws/packagerConfiguration.

The application will be built in /opt/public/technology/epp/epp_build/34/workspace_cpp.

Packing installation site....Done.

Building...Done.

Moving Files...Done.

Done.

The EPP Configuration File

One simple XML file that drives the build process

- ◆ Name, perspective, product ID
 - ◆ A set of update sites
 - ◆ A set of required features
 - ◆ The base platform archive
 - ◆ A platform specific eclipse.ini file
-
- ◆ Future: Metadata with a package description that can be used on a webpage etc.

The EPP Configuration File Example

```
<?xml version="1.0" encoding="UTF-8"?>
<configuration>
  <rcp version="3.4M4" />
  <product
    name="eclipse-java-ganymede-M4"
    eclipseProductId="org.eclipse.platform.ide"
    initialPerspectiveId="org.eclipse.jdt.ui.JavaPerspective" />
  <updateSites>
    <updateSite url="file:///home/data/httpd/download.eclipse.org/releases/ganymede/staging/" />
    <updateSite url="file:///home/data/httpd/download.eclipse.org/technology/epp/updates/0.5milestones/" />
  </updateSites>
  <requiredFeatures>
    <feature id="org.eclipse.platform" version="latest" />
    <feature id="org.eclipse.cvs" version="latest" />
    <feature id="org.eclipse.jdt" version="latest" />
  </requiredFeatures>
  <rootFileFolder folder="/home/data/httpd/download.eclipse.org/eclipse/downloads/drops/S-3.4M4-200712131700" />
  <extensionSite relativeFolder="extension_site"></extensionSite>
  <targetPlatforms>
    <platform os="linux" ws="gtk" arch="x86_64">
      <archiveFormat format="tar" />
      <eclipseIniFileContent path="/eclipse/">- showsplash
org.eclipse.platform
-vmargs
-Dosgi.requiredJavaVersion=1.5
-Xms40m
-Xmx256m</eclipseIniFileContent>
    </platform>
  </targetPlatforms>
</configuration>
```


Problems

- Dependencies
 - ◆ Not only dependencies between features, but also on a bundle level
- Order of features in the configuration file and the build process (again: dependencies)
 - ◆ Sometimes a wrong order of features in the
- Missing editor for configuration file
 - ◆ There *could* be an editor that helps creating a valid configuration

Next Step of EPP: Being a Package Maintainer

- EPP provides the build technology and the infrastructure
- EPP provides a central Drupal web page with the help of the Foundation
- Package Maintainer provides configuration file in its own repository location
- Package Maintainer is responsible for
 - ◆ Package content
 - ◆ Testing
 - ◆ +1 / -1 before release

Ganymede

Download Nightly Build

- ◆ Nightly build on Foundation server
- ◆ Early feedback about the quality of the Ganymede Staging Update Site

Download Milestone

- ◆ Milestone builds
- ◆ Getting feedback from the larger community

Download Release

- ◆ New and improved Ganymede packages
- ◆ First new packages (Modeling, Reporting) available
- ◆ Central place for 'all-in-one' packages (e.g. Webtools all-in-one)
- ◆ Improved download pages

Getting Feedback: The Usage Data Collector

- Help committers and organizations better understand how developers are using Eclipse
- Open, transparent, Opt-In
- Data to be collected
 - Loaded bundles
 - Commands accessed via keyboard shortcuts
 - Actions invoked via menus or toolbars
 - Perspective changes
 - View usage
 - Editor usage
- Identifying keys for workstation and workspace
- Upload to Eclipse Foundation Server

Usage Data Collector Results

- UDC included in all Ganymede M4 EPP packages
- 14 days period from 2008-02-29 to 2008-03-14
 - ◆ <http://www.eclipse.org/epp/usagedata/results.php>
- 2,359,688 usage data events were been generated by 453 users (an average of 5,209 events per user)

Usage Data Collector Results: Views and Editors

Views

org.eclipse.jdt.ui.PackageExplorer	26207
org.eclipse.ui.console.ConsoleView	12766
org.eclipse.ui.navigator.ProjectExplorer	7022
org.eclipse.search.ui.views.SearchView	4941
org.eclipse.debug.ui.DebugView	4882
org.eclipse.ui.views.ProblemView	3700
org.eclipse.ui.views.ContentOutline	3026

Editors

org.eclipse.jdt.ui.CompilationUnitEditor	17129
org.eclipse.wst.xml.ui.internal.tabletree.XMLMultiPageEditorPart	2595
org.eclipse.jdt.ui.ClassFileEditor	2175
org.eclipse.ui.DefaultTextEditor	1387
org.eclipse.cdt.ui.editor.CEditor	1279
org.eclipse.compare.CompareEditor	1176
org.eclipse.jst.jsp.core.jspsource.source	1164

Usage Data Collector Results: Perspectives and Commands

Perspectives

org.eclipse.jdt.ui.JavaPerspective	4092
org.eclipse.debug.ui.DebugPerspective	2240
org.eclipse.team.ui.TeamSynchronizingPerspective	1100
org.eclipse.jst.j2ee.J2EEPerspective	1090
org.eclipse.pde.ui.PDEPerspective	299
org.eclipse.team.cvs.ui.cvsPerspective	192
org.eclipse.ui.resourcePerspective	182
org.eclipse.cdt.ui.CPerspective	182

Commands

org.eclipse.ui.file.save	87307
org.eclipse.ui.edit.text.goto.wordNext	71286
org.eclipse.ui.edit.delete	66741
org.eclipse.ui.edit.paste	57605
org.eclipse.ui.edit.text.goto.wordPrevious	51207

EPP and p2

- EPP will include the necessary p2 bits in its packages
 - ◆ This allows users to use Eclipse Update Manager and p2 technology
- p2 will allow to consume EPP configuration files
 - ◆ p2 installer reads EPP configuration files and creates an EPP package on the fly
 - ◆ Features...
- EPP build will be switched from using PDE packager to p2

Further Information

- EPP Project Webpage

- ◆ <http://www.eclipse.org/epp>

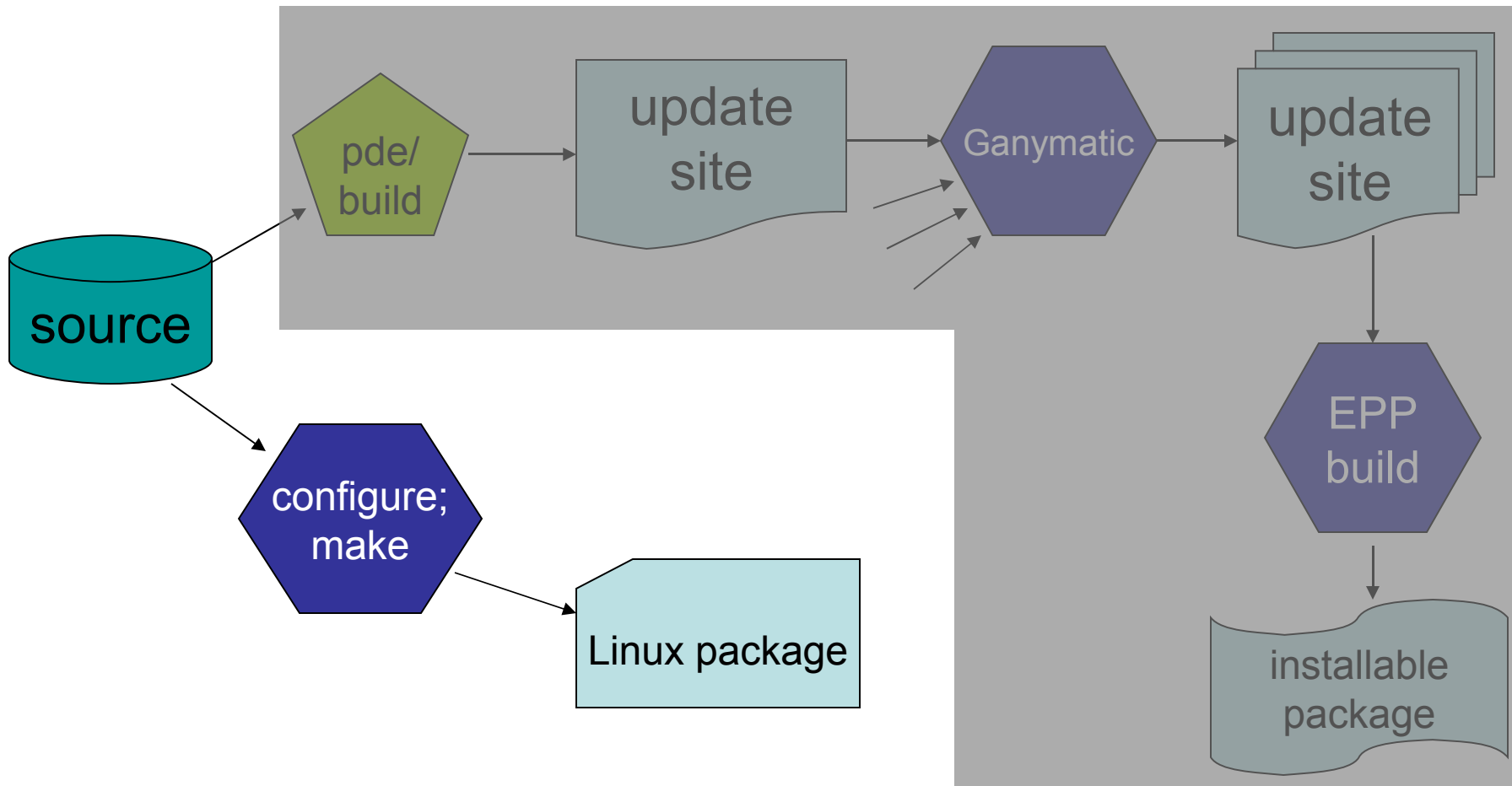
- Newsgroup

- ◆ <http://dev.eclipse.org/newslists/news.eclipse.technology.packaging/maillist.html>

- Mailing List

- ◆ <https://dev.eclipse.org/mailman/listinfo/epp-dev>

The Role of Linux Packages



Another way: Linux distributions

Differences from EPP
Avoid potential barriers
Make it easier

Why do this?

millions of potential users

How to reach them

How to reach them

Become part of distributions


```
yum install eclipse-jdt
```

```
apt-get install eclipse-sdk
```

Difference #1 between EPP and Linux distributions:

granularity

How to reach them

Become **part** of distributions

Package	Arch	Version	Repository	Size
Installing:				
eclipse-pde	i386	1:3.3.1.1-13.fc8	installed	71 M
Installing for dependencies:				
eclipse-cvs-client	i386	1:3.3.1.1-13.fc8	installed	7.2 M
eclipse-jdt	i386	1:3.3.1.1-13.fc8	installed	49 M
eclipse-pde-runtime	i386	1:3.3.1.1-13.fc8	installed	461 k
eclipse-platform	i386	1:3.3.1.1-13.fc8	installed	54 M
eclipse-rcp	i386	1:3.3.1.1-13.fc8	installed	24 M
libswt3-gtk2	i386	1:3.3.1.1-13.fc8	installed	7.4 M

Transaction Summary

```
=====
Install          0 Package(s)
Update          0 Package(s)
Remove         16 Package(s)
```

How to reach them

Become part of distributions

Need **packages**

You: “But I target multiple versions in my work!”

You₂: “I always use the latest N-build”

Me: “You're not the **target audience**”

Then why are you here?

millions of potential users

You: “I want my project to be a part of this”

Me: “Awesome! It's easy”

How do packages get made?

magic

No, seriously ...

Buildable source

Buildable source is
reproducible

Buildable source

- + patches (ideally none)
- + build system (distro-provided)
- + file shuffling (common places)



packages!

FIXME

Issues with shared installations
(ex. <https://bugs.eclipse.org/215034>)

Making sure test suites work against
installed packages

Do this

should be buildable offline

simple (e.g. `./configure; make`)

Don't do this

```
cvs -d:ext:myusername@dev.eclipse.org
```

```
scp myusername@dev.eclipse.org
```

SCM tagging as part of build

Do this

Make 2-phase builds:

1. fetch, tag, post buildable source drop
2. build from source drop

From Europa to Ganymede: Eclipse Packaging and Ganymatic

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