



Open Source

in the Corporate World

J2EE Development with Free and Open Source Tools

Aaron Mulder



Why do you care?

Keep up with open source and free tools that can make you a more productive J2EE developer



Agenda

- Review free and open-source J2EE development tools
- We'll go into more depth for some tools than others, but try to show by example (with screen shots and a bit of source code)
- Don't worry, these slides will be online, with the product URLs



The Old Standbys

- **Databases**
 - PostgreSQL, MySQL, SAP-DB, Firebird, Hypersonic, McKoi
- **App Servers**
 - J2EE: JBoss, JOnAS, Geronimo (soon)
 - Web: Tomcat, Jetty
- **IDEs, Bug Trackers**
 - Eclipse, NetBeans, jEdit
 - Bugzilla, Scarab, JIRA*
- **Builds & Continuous Integration**
 - Ant, Maven, Anthill, CruiseControl



Server Products

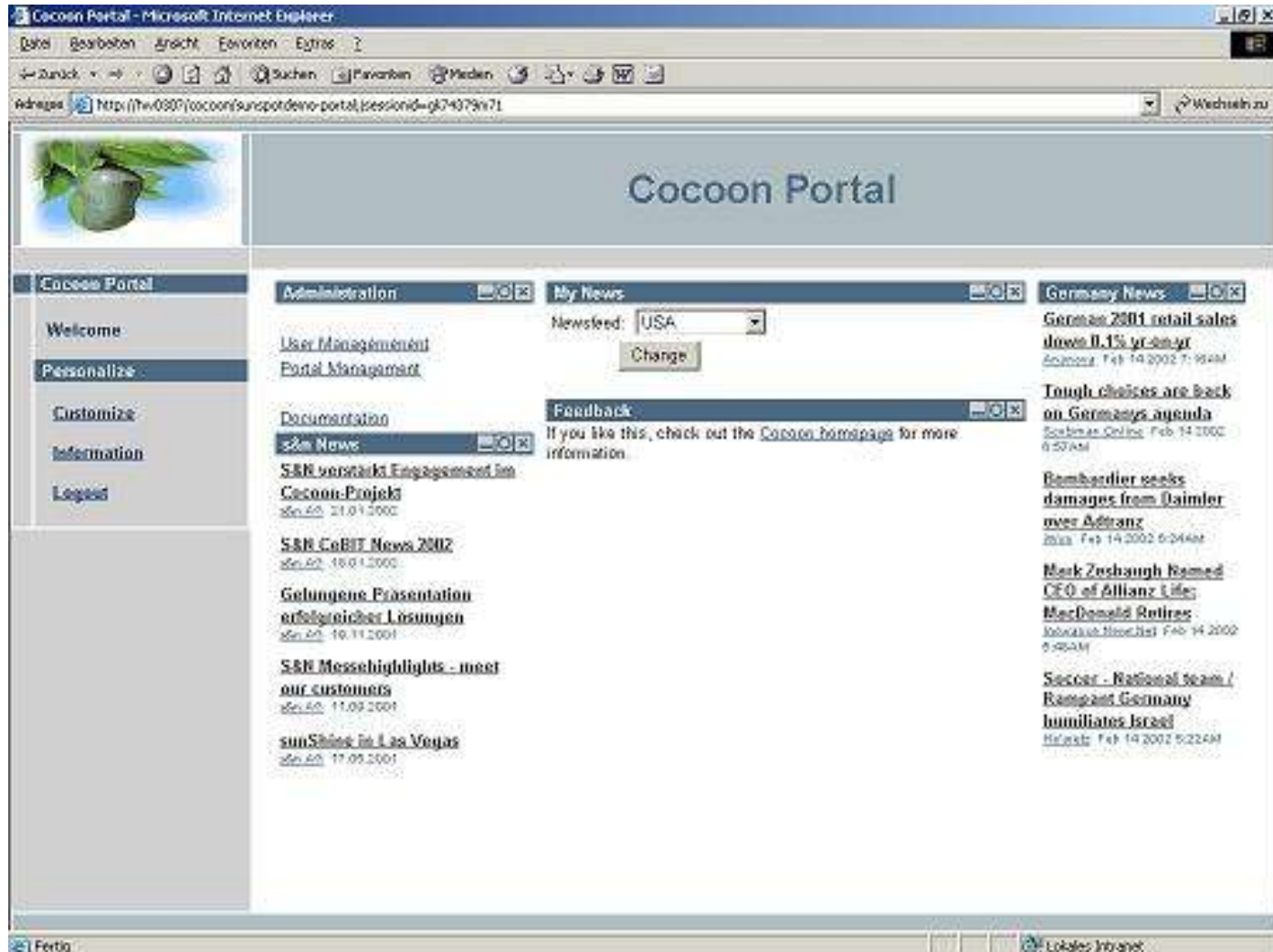
Part I



Portals

- Cocoon Portal
 - Jetspeed
 - Liferay
 - eXo
-
- Cocoon Portal has great XML/XSLT support, upcoming CMS add-on, “alpha” JSR-168
 - Jetspeed v1 works well today, but JSR-168 support is in the upcoming v2
 - Liferay is a portal offering JSR-168 support today
 - eXo is a server platform offering JSR-168 and WSRP support among other services

Cocoon Portal Screenshot



Jetspeed Screenshot

The screenshot shows the Apache Jetspeed web portal in a Mozilla Firefox browser window. The browser title is "Default Jetspeed Page - Mozilla Firefox" and the address bar shows "http://www.bluesunrise.com/jetspeed/index.jsp". The page features the Jetspeed logo and the Apache Portals logo. A navigation menu includes "Home", "Docs", and "API". The main content area is titled "Jetspeed Content Example" and contains several sections: "It works" (congratulations message), "Jetspeed 2" (new technology based on Java Portlet Standard), "Jetspeed Plugin" (Maven Plugin for creating projects), and "XML at Jetspeed" (article about the project). A "Welcome" section at the bottom provides default login credentials: turbine/turbine and admin/jetspeed. A "Jetspeed Documentation" sidebar on the right lists links for "Jetspeed 1.5 Final Released", "Jetspeed 1.5 Documentation", "Jetspeed 1.5 Tutorial", and "Jetspeed 2.0".

Default Jetspeed Page - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://www.bluesunrise.com/jetspeed/index.jsp

Firefox Help Firefox Support Plug-in FAQ

jetspeed APACHE PORTALS **JETSPEED**

Username: Password: Login

Create New Account | Login Help

Welcome to Jetspeed

Home Home Page RSS Dynamic

Docs

API

Jetspeed Content Example

It works

Jetspeed POWERED If you see this item, you've successfully installed and configured your Jetspeed portal. Congratulations

Jetspeed 2

Jetspeed Check out the new technology, Jetspeed 2, based on the Java Portlet Standard

POWERED BY jetspeed **Jetspeed Plugin**

Check out the Jetspeed Maven Plugin. Use the plugin to create your own projects based on Jetspeed.

XML at Jetspeed

XML.com has published an article about the Jetspeed project. Positive press is a good thing :)

Jetspeed Documentation

An Open Source Enterprise Information Portal.

- ♦ **Jetspeed 1.5 Final Released**
Jetspeed v1.5 Final is available.
- ♦ **Jetspeed 1.5 Documentation**
Jetspeed is an Open Source implementation of an Enterprise Information Portal. Jetspeed attempts to consume information from multiple resources on the Internet and helps the user manage large amounts of data. This information can come from multiple content sources: local files, local applications or remote HTTP sources.
- ♦ **Jetspeed 1.5 Tutorial**
Most comprehensive Jetspeed tutorial to date covering release 1.5.
- ♦ **Jetspeed 2.0**
New generation of Jetspeed supporting Java Portlet Standard
- ♦ **Jetspeed 1.5 Plugin**
The Jetspeed 1.5 Plugin: use this to develop your applications

Welcome

2 default accounts are available in this Jetspeed installation:

Login: turbine
Password: turbine

Login: admin
Password: jetspeed

Make sure to try them out.

Done



Liferay Screenshot

Home - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://demo.liferay.net/c/portal/layout?p_id=1

Welcome, Bob Smith! Home - My Account - Sign Out

Home
Change Colors Personalize Pages

Web Search
Yahoo! Go

Weather
90210 62.0 °F
Chicago 61.0 °F
Frankfurt/Main 72.0 °F
Rome, Italy 84.0 °F
Beijing 73.0 °F
City or Zip Code
Search

Mail
Inbox - Compose - Address Book - Folders - Search - POP Info
Inbox (0 New)
* @ From Subject Date Size
Delete Block Move To...

Document Library
Add Repository - View Repositories - Search

Repository	# of Documents	Last Post Date
Fatture	5	6/26/04 6:36 AM
test	0	
My Repository	0	
My documents	4	6/29/04 1:42 AM
tet	0	

Directory

First Name Middle Name Last Name
Email Address Instant Messenger Sex Age
Street 1 Street 2
City State Zip
Phone Fax Cell
AND Search List All

Random Bibli..
Better is a little with
righteousness than great
revenues with injustice.
— Proverbs 16:8

Done



Rules Engines

- Drools
 - OFBiz Rules
 - JESS*
 - InfoSapient
-
- Can be used to control web flow in addition to the standard back-end calculations
 - Can update rules without changing code
 - Not as mature rule authoring and deployment tools as commercial options (e.g. JRules)
 - Each tool uses a different rules language
 - JSR-94 covers rules engines



Drools Rule Sample

```
<rule name="Free Fish Food Sample">
  <parameter identifier="cart">
    <java:class>org.drools.ShoppingCart</java:class>
  </parameter>
  <parameter identifier="item">
    <java:class>org.drools.CartItem</java:class>
  </parameter>
  <java:condition>
    cart.getItems( "Fish Food" ).size() == 0
  </java:condition>
  <java:condition>
    item.getType().equals( "Fish" )
  </java:condition>
  <java:consequence>
    cart.addItem(new CartItem("Fish Food Sample"));
    modifyObject( cart );
  </java:consequence>
</rule>
```



Business Systems

- OFBiz
- Compiere

-
- OFBiz (Open For Business) includes a number of Java/J2EE business functions and developer tools in one package. It's built on a number of other open-source libraries.
 - Compiere is a J2EE ERP/CRM package, covering the usual marketing/sales, finance, accounting, distribution, inventory, HR... plus sales force automation



OFBiz Features

Business Features

- eCommerce
- Person/Group
- Marketing
- Catalog
- Facility
- Order
- Accounting
- Work Effort

Technical Features

- Web Cache
- Entities
- XML Data
- Scheduler
- Workflow
- Rules
- Flat Files
- Server Statistics



Compiere Screenshot

Sales Order SuperUser@GardenWorld.HQ [dev{dev-dev-compiere}]

File Edit View Go Tools Help

Order Client GardenWorld Organization HQ

Order Line Document No 50004 Order Reference

Order Tax Description

Target Document Type Standard Order

Date Ordered 05/22/2003 Date Promised 05/22/2003

Business Partner Joe Block Bill To Hartford

Partner Contact Partner Address Hartford

Price List Standard Currency USD

Approved Credit Approved

Invoice Rule Immediate Delivery Rule Availability

Warehouse / Service Point Standard Priority Medium

Delivery Via Pickup

Sales Rep GardenAdmin Discount Printed

Project

Campaign

Freight Cost Rule Freight included

On Credit Payment Term 2%10 Net 30

Status

Total Lines 0.00 Grand Total 0.00

Document Status Document Type

Navigate or Update record 1/1



Content Management

- Lenya
 - Plone
 - Slide
 - Bricolage
-
- Plone is a content management system built on Zope, including inline structured text
 - Leyna is a CMS add-on for Cocoon, and includes browser-based form and WYSIWYG editors
 - Both include workflow, content versioning, text search, layout customization
 - Bricolage is a higher-end alternative



Plone Screenshot

The screenshot shows a Mozilla Firefox browser window with the address bar displaying `http://docs.opengroupware.org/docs/howtos/DebianInstallHowTo`. The page title is "Debian Install HowTo" and it is part of the "OpenGroupware.org Documentation Project". The page content includes a navigation sidebar, a main text area with a list of requirements for Debian reviewers, and a calendar for June 2004. The page is marked as "Created by chris" and "Last modified 2003-08-01".

Navigation: OGo Docs, All Docs, User Docs, HowTos

about: Created by chris, Wiki Page, Last modified 2003-08-01

Debian Install HowTo

The Debian Install howto has been prepared by Robert Hutton and is available [here](#).

Our release process requires at least three independent Debian reviewers to confirm that:

1. The instruction set is complete and accurate.
2. Syntax is correct without omissions.
3. Typo's have been correct where ever possible.

Once confirmation has been received,(pls use the comment section below) with Roberts permission we will move a copy of the document to document server. All copyright and licenses will be respected and authorship will be attributed.

Current contributors to this Howto are Robert Hutton, and Bjoern Stierand.

We would like to greatfully acknowledge and thank Robert and Bjoern for their work and contribution.

Corrected Version --[pwhysall]2, 2003/08/04 16:35 CET [reply](#)

The Debian Install howto has been prepared by Robert Hutton and is available here.

Our release process requires at least three independent Debian reviewers to confirm that:

1. The instruction set is complete and accurate.
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We would like to greatfully acknowledge and thank Robert and Bjoern for their work and contribution.

Confirmation of HOWTO accuracy --[pwhysall]2, 2003/08/04 16:36 CET [reply](#)

June 2004						
Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

Bricolage Screenshot

BRICOLAGE

WORKFLOW

MY WORKSPACE

DOCUMENT

Actions
[New Story](#)
[New Alias](#)
[Find Stories](#)
[Active Stories](#)

Desks
[Edit](#)
[Copy](#)
[Legal](#)
[Publish](#)

MEDIA

TEMPLATE

ADMIN

Edit Desk Help My Alerts Log Out

Workflow | "Document" | "Edit"

STORIES Sort By:

MEDIA **TEMPLATES**

1024 v.3	The Princess Bride	
Category:	/reviews/movie	Bill Clinton
Site:	Default Site	
Story Type:	Review	
Cover Date:	2003-06-02 10:23:00	
Priority:	Normal	Notes Trail View Log <input type="checkbox"/> Delete
1025 v.1	The Years of Rice and Salt	
Category:	/reviews/book	Check Out
Site:	Default Site	
Story Type:	Review	Move to <input type="text"/>
Cover Date:	2004-04-17 10:40:00	
Priority:	Normal	Notes Trail View Log <input type="checkbox"/> Delete
1026 v.0	Lost in Translation	
Category:	/reviews/movie	Check In
Site:	Default Site	
Story Type:	Review	Move to <input type="text"/>
Cover Date:	2004-04-17 10:41:00	
Priority:	Normal	Notes Trail Edit Log <input type="checkbox"/> Delete

Move Assets Select All Delete Checked

Document: Done



Development Tools

Part II



Collaboration

- Wiki (MoinMoin)
 - OpenGroupware.org
 - IM (Jabber)
 - WebMail (SquirrelMail)
-
- Great for distributed teams, and people working offsite behind restrictive firewalls
 - All tools can be operated securely (over SSL, etc.)
 - Can often use ssh / PuTTY to port forward from remote locations
 - Wikis are a very user-friendly interface for creating and editing searchable content

Wiki in View Mode

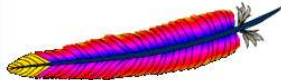


CvsInstructions - Apache Geronimo Wiki - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://wiki.apache.org/geronimo/CvsInstructions

Firefox Help Firefox Support Plug-in FAQ



CvsInstructions

UserPreferences

Apache Geronimo Wiki FrontPage RecentChanges TitleIndex WordIndex SiteNavigation HelpContents Apache ApacheWiki MoinMoin

1. CVS Instructions

The directions for checking out the geronimo module from CVS follow below. If you wish to view the CVS repository online, please go to [the CVS repository online](#).

1.1. Check out the source tree

```
# mkdir geronimo
# cd geronimo
# export CVSROOT=:pserver:anoncvs@cvcs.apache.org:/home/cvspublic
# cvs login password: anoncvs
# cvs co incubator-geronimo
```

1.2. Building a Diff

When you're trying to build a diff file, there are a few things you should bear in mind.

1. If you don't have CVS access, the diff isn't going to be able to incorporate added or removed files. In this case, you should build the diff, package up your new files and write a **very detailed** change log so that whichever committer gets your changes doesn't get lost and frustrated trying to incorporate your code. It also eases the process if you are available to work closely with the committer, if you carefully explain your changes and **be patient** while they are incorporated.
2. If you're on Windows and the person using your diff is on Unix or a Mac, there might be some line-end problems
3. When you transfer the file in email, the recipient might have to uuencode it, depending on your email settings and theirs

1.2.1. Command Line Instructions

When building a diff, you want to go to the directory which is either

- at the top of the module you're working on, or
- in the incubator-geronimo directory (for diffs which affect multiple modules).

Type `# cvs diff -N > filename.diff`. This should create a `filename.diff` file in that directory.

More on the `cvs diff` command can be found at http://www.cvshome.org/docs/manual/cvs-1.11.7/cvs_16.html#SEC129

[EditText](#) of this page [current page size 1769 bytes] (last edited 2003-11-21 05:59:07 by r73h117.res.gatech.edu)
[FindPage](#) by browsing, title search , text search or an index
Or try one of these actions: [AttachFile](#), [LikePages](#), [LocalSiteMap](#), [SpellCheck](#)

Apache Geronimo Wiki



Wiki in Edit Mode

Firefox Help Firefox Support Plug-in FAQ

Edit "CvsInstructions"

UserPreferences

Apache Geronimo Wiki FrontPage RecentChanges TitleIndex WordIndex SiteNavigation HelpContents Apache ApacheWiki MoinMoin

The lock of 9.unused.TWTC174.gigablast.com timed out 20595 minute(s) ago, and you were granted the lock for this page. Other users will be **warned** until 2004-06-29 16:36:27 that you are editing this page. Use the Preview button to extend the locking period.

Reduce editor size | HelpOnFormatting | InterWiki [current page size 1769 bytes]

```
= CVS Instructions =
The directions for checking out the geronimo module from CVS follow below. If you wish to view the CVS repository online, please go to [http://cvs.apache.org/viewcvs.cgi/incubator-geronimo/ the CVS repository online].

== Check out the source tree ==
{{{
# mkdir geronimo
# cd geronimo
# export CVSROOT=:pserver:anoncvs@cvs.apache.org:/home/cvspublic
# cvs login password: anoncvs
  (no password--hit enter)
# cvs co incubator-geronimo
}}}
```

== Building a Diff ==
When you're trying to build a diff file, there are a few things you should bear in mind.

1. If you don't have CVS access, the diff isn't going to be able to incorporate added or removed files. In this case, you should build the diff, package up your new files and write a ''very detailed'' change log so that whichever committer gets your changes doesn't get lost and frustrated trying to incorporate your code. It also eases the process if you are available to work closely with the committer, if you carefully explain your changes and ''be patient'' while they are incorporated.

Optional comment about this change

Make this page belong to category <No addition>

Save Changes Preview Check Spelling Cancel

Send mail notification
 Remove trailing whitespace from each line

Emphasis: *italics*; **bold**; ***bold italics***; ***mixed bold and italics***; ---- horizontal rule.
Headings: = Title 1 =; == Title 2 ==; === Title 3 ===; ==== Title 4 ====; ===== Title 5 =====.
Lists: space and one of * bullets; 1., a., A., i., I. numbered items; 1.#n start numbering at n; space alone indents.
Links: JoinCapitalizedWords; ["brackets and double quotes"]; url; [url]; [url label].
Tables: || cell text ||| cell text spanning two columns ||; no trailing white space allowed after tables or titles.

Your edit lock on CvsInstructions will expire in 10 minutes.

Wiki Revision History




Info for "FrontPage" - Apache Geronimo Wiki - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://wiki.apache.org/geronimo/FrontPage?action=info&history=1

Firefox Help Firefox Support Plug-in FAQ



Info for "FrontPage"

UserPreferences

Apache Geronimo Wiki FrontPage RecentChanges TitleIndex WordIndex SiteNavigation HelpContents Apache ApacheWiki MoinMoin

Revision History

[Return to general page information](#)

#	Date	Size	Editor	Comment	Action
1	2004-06-25 21:03:29	6578	69.111.157.225	Added logging doc link	
2	2004-06-21 00:58:40	6499	customer.panix.com		view diff
3	2004-06-15 11:59:42	6313	mail.knapp.co.at	Logo contest -> Logo Contest	view diff
4	2004-06-14 12:24:36	6313	EricLeGoff	adding a link to CVSGrab website	view diff
5	2004-06-10 16:22:39	6280	cng208.neoplus.adsl.tpnet.pl		view diff
6	2004-06-10 16:22:15	6299	cng208.neoplus.adsl.tpnet.pl		view diff
7	2004-06-03 18:59:44	6280	ool-43560634.dyn.optonline.net		view diff
8	2004-06-03 18:59:00	6288	ool-43560634.dyn.optonline.net		view diff
9	2004-05-31 18:45:15	6392	ool-43560634.dyn.optonline.net		view diff
10	2004-05-10 19:18:40	6392	63.240.163.227		view diff
11	2004-05-04 19:41:36	6393	EricLeGoff		view diff
12	2004-04-29 16:13:47	6329	194.90.151.18		view diff
13	2004-04-29 16:13:01	6356	station.sdccd.cc.ca.us		view diff
14	2004-04-29 16:12:14	6329	ool-43560634.dyn.optonline.net		view diff
15	2004-04-29 16:09:20	6328	dynamic-addr-94-5.resnet.rochester.edu		view diff
16	2004-04-29 16:08:09	6333	host-prestigemag-105-10.cust.ntelos.net		view diff
17	2004-04-29 16:05:56	6328	dynamic-addr-94-5.resnet.rochester.edu		view diff
18	2004-04-29 16:05:33	39	host-prestigemag-105-10.cust.ntelos.net		view diff
19	2004-04-29 16:04:43	6328	JeremyBoynes		view diff
20	2004-04-29 16:03:20	29	proxy3b.external.lmco.com		view diff
21	2004-04-29 16:02:15	6330	dynamic-addr-94-5.resnet.rochester.edu		view diff
22	2004-04-29 16:01:13	6356	194.90.151.18		view diff
23	2004-04-29 16:00:56	29	proxy3b.external.lmco.com		view diff
24	2004-04-29 16:00:32	6356	194.90.151.18		view diff
25	2004-04-29 16:00:13	70	proxy3b.external.lmco.com		view diff

Apache Geronimo Wiki



Evolution/OpenGroupware

Calendar - Ximian Evolution 1.2.2

File Edit View Actions Tools Search Help

New Send / Receive Go To Day Work Week Week Month

Calendar Mon 10 Mar - Sun 16 Mar 2003

Category is Any Category Find Now Clear

Local Folders

- Other Contacts
- SKYRIX
 - Personal Folders
 - Calendar**
 - Contacts
 - Enterprises
 - Groups
 - Developer
 - Calendar
 - Tasks
 - Magdeburg
 - Calendar
 - Tasks
 - OnlyHelgeTeam
 - dev
 - Tasks
 - Trash
 - Public Folders
 - Accounts
 - Calendar
 - Contacts
 - Enterprises
 - VFolders

Monday 10 March	Thursday 13 March
1900 2000 Statusmeeting mit S...	CeBIT meeting
Tuesday 11 March	Friday 14 March
	CeBIT meeting 001
Wednesday 12 March	Saturday 15 March
900 CeBIT 930 1200 Dev Meeting	CeBIT
	Sunday 16 March
	CeBIT 2015 2145 Krimi

March 2003

M	T	W	T	F	S	S
24	25	26	27	28	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	1	2	3	4	5	6

Summary

Click to add a task

- test 1
- md task 7.4
- md task 2
- md task
- ein neuer Zi...
- TestJob



SquirrelMail

SquirrelMail 1.5.0 [CVS] - Mozilla

File Edit View Go Bookmarks Tools Window Help

Current Folder: **INBOX** [Sign Out](#)

[Compose](#) [Addresses](#) [Folders](#) [Options](#) [Search](#) [Help](#) [Calendar](#) [Fetch](#) [SquirrelMail](#)

Previous | [Next](#) | 1 2 3 4 5 6 7 ... 180 181 182 183 | [Show All](#) | [Toggle All](#) Viewing Messages: 1 to 15 (2744 total)

Move Selected To: Transform Selected Messages:

<input type="checkbox"/> From	Date	<input type="checkbox"/> Subject
<input type="checkbox"/> Marc Groot Koerkamp	15:58	Re: [SM-ADMIN] List notifications?
<input type="checkbox"/> Simon Dick	15:45	Re: [SM-ADMIN] List notifications?
<input type="checkbox"/> Thijs Kinkhorst	15:46	Re: [SM-ADMIN] List notifications?
<input type="checkbox"/> Jonathan Angliss	15:32	Re: [SM-ADMIN] List notifications?
<input type="checkbox"/> Roland Staring	14:38	Re: Networked webcam
<input type="checkbox"/> Mail Delivery System	14:19	Undelivered Mail Returned to Sender
<input type="checkbox"/> Thijs Kinkhorst	14:19	Servicekosten
<input type="checkbox"/> Roland Staring	14:05	Re: Networked webcam
<input type="checkbox"/> Roland Staring	13:41	Re: Networked webcam
<input type="checkbox"/> Thijs Kinkhorst	12:19	Bewegwijzering morgen
<input type="checkbox"/> Nina Vieggers	11:53	RE: Bewegwijzering
<input type="checkbox"/> Eric Haubrich	11:06	RE: Multicast & IBB-Pop
<input type="checkbox"/> Michiel	10:29	Re: multicast
<input type="checkbox"/> Jaap Hibbeln	9:08	Re: [Schnet-1] Re: Re: Vergadering Internetcommissies
<input type="checkbox"/> Kees van Ginkel	9:02	Tel.Bas Wieggers

Previous | [Next](#) | 1 2 3 4 5 6 7 ... 180 181 182 183 | [Show All](#) | [Toggle All](#) Viewing Messages: 1 to 15 (2744 total)

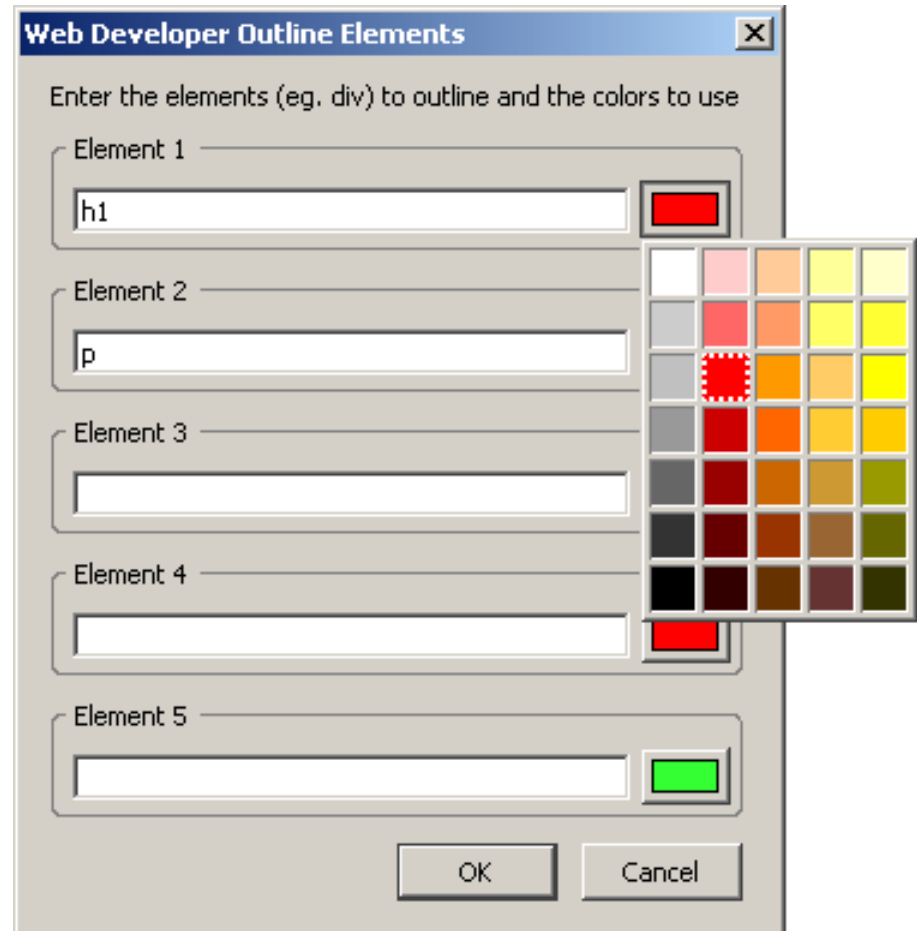
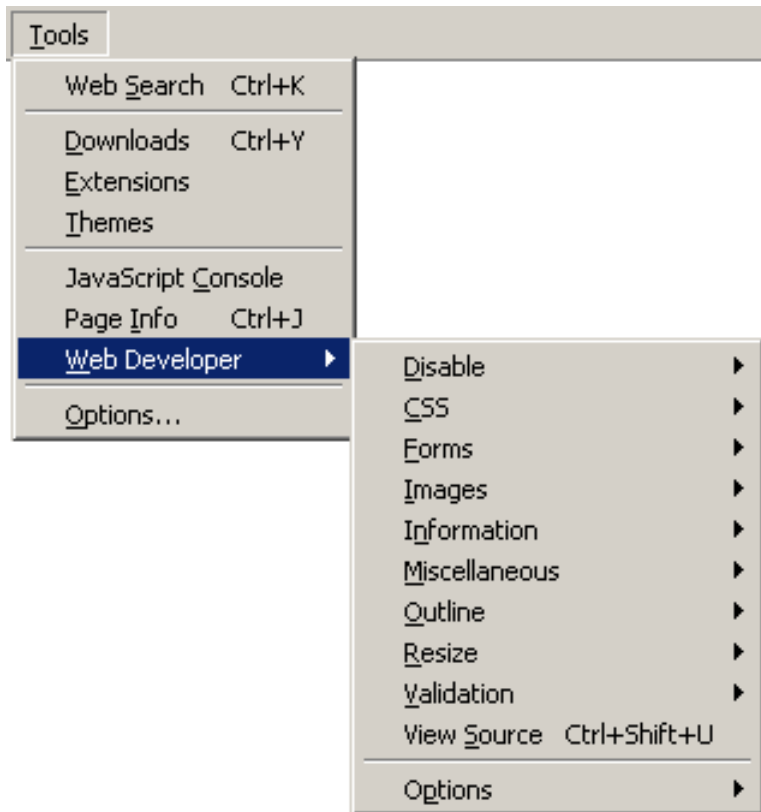
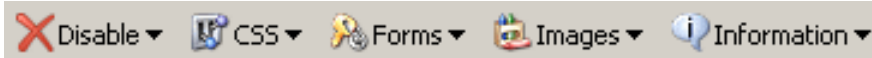


Web Troubleshooting

- Web Developer Extension for Mozilla
-
- Toolbar that lets you (among other things!)
 - disable cookies, animations, Java, JavaScript, style sheets, referrer...
 - View/edit CSS or styles on a particular element
 - View/edit form details & widgets
 - View images details, hide images, missing alt
 - Display tab index, ID, topographic info, cookies
 - Outline blocks, tables, frames
 - Validate CSS/HTML/links



WebDev Screenshots





Documentation

- DocBook
 - Structured Text
-
- Can write elaborate content using simple markup, and then use a tool to format it into output formats including RTF, PDF, HTML, JavaHelp, etc.
 - Document “source” is plain text and can be version controlled
 - Documentation builds can be integrated with source code control or application builds



DocBook Source

A screenshot of the TextPad editor window. The title bar reads "TextPad - [C:\dev\lisp\lqa\testplan.sgml *]". The menu bar includes "File", "Edit", "Search", "View", "Tools", "Macros", "Configure", "Window", and "Help". The toolbar contains various icons for file operations, editing, and navigation. The main text area displays the following XML code:

```
<chapter id="testplan">
  <title>Test Plan</title>

  <sect1 id="testing-types">
    <title>Types of Testing</title>

    <para>
      Testing of the &project; project will be conducted using both manual and
      automated test scripts focused on the following 7 areas.
    </para>

    <sect2 id="testplan-functional">
      <title>Functional Testing</title>
      <para>
        Extensive manual and automated testing to ensure that the product meets
        all of the functional requirements defined by the detailed use cases.
        Functional testing will produce most errors in the testing process.
        Failure types include:
        <orderedlist>
          <listitem>
            <para>Business rule not followed (e.g. duplicate name
              should be rejected</para>
          </listitem>
          <listitem>
            <para>Unexpected error -- a stacktrace of any kind is shown
              to the user</para>
          </listitem>
          <listitem>
            <para>Functionality not complete. A use case specifies more
              functionoality than the application appears to provide.
            </para>
          </listitem>
        </orderedlist>
      </para>
    </sect2>

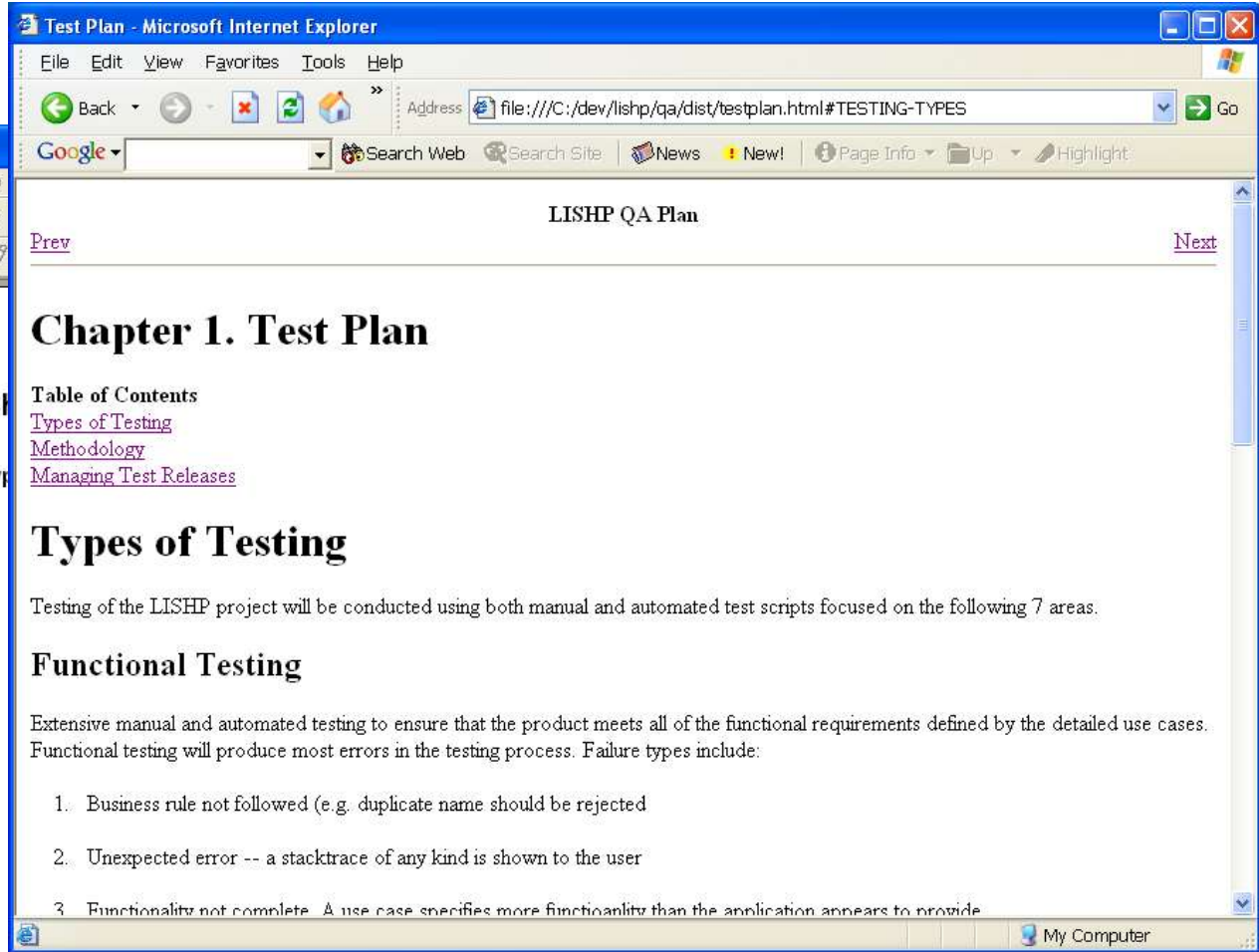
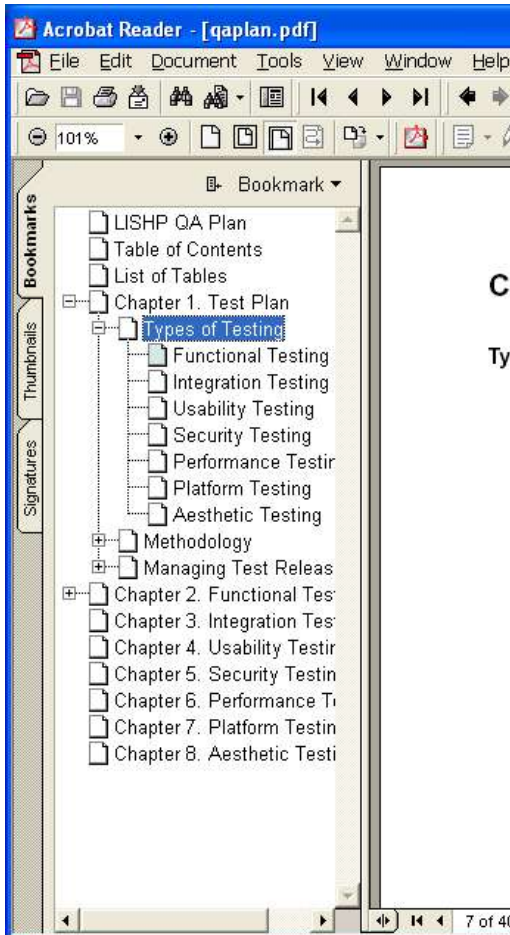
    <sect2 id="testplan-integration">
      <title>Integration Testing</title>
      <para>
```

The left sidebar shows a file list with "testplan.sgml *" selected. Below it is an "ANSI Characters" table with a scrollable list of characters and their corresponding symbols. The status bar at the bottom shows the page number "31" and the total page count "35".



DocBook Output

HTML



PDF



Database Browsers

- DBVisualizer
 - TORA
 - TOAD
 - SQuirreL
-
- Don't leave home without one!
 - Works with any JDBC-compliant database
 - Can browse the database, update on the fly, handle SQL commands and/or scripts, provide GUIs for filtering, insert/update, etc.
 - Oracle-specific tools have features such as query analysis

DBVisualizer Screenshot

The screenshot shows the DBVisualizer Personal 3.3 interface. The main window displays a MySQL database connection to 'localhost'. The 'Database Objects' tree on the left shows the 'customer' table selected. The main pane shows the 'TABLE: customer' with 126 rows. A filter is applied: 'iname = 'Niedringhaus' and address = '190 Windsor Street''. A context menu is open over the table data, listing various actions such as 'Select All Cells', 'Copy Selected Cells', 'Export Selection...', 'Fit Column Widths', 'Default Column Widths', 'Count Number of Bytes...', 'Browse Row in Form...', 'Show Result Meta Data', 'Set Filter for Selection', 'select * where ...', 'insert into ...', 'insert COPY into ...', 'update where ...', 'delete where ...', and 'Drop Table...'. The status bar at the bottom indicates 'Max Rows: 10000', 'Max Chars: 10', and '0.007 sec/0.008 sec | 126 / 9 | 1-20'.

id	fname	lname	address	city	state	zip
1	110	Michael	Agliori	135 North	Ohio	43216
2	196	Ling Ling	Andrews	999 R		T5N 15
3	550	Tony	Antolini	1539 S		60500
4	190	Randy	Arlington	529 N		48214
5	192	Rosanna	Beldov	153 N		51102
6	185	Serop	Belmont	2158 W		6115
7	187	Sebous	Bensoul	328 V		61614
8	189	Herbert	Berejiklia	36 Mu		02142
9	188	Yartan	Berenberg	259 1		60062
10	133	Moe	Bilhome	18 W.		91505
11	441	Elizabeth	Bordon	21 Gri		01801
12	209	Laura	Boyle	234 Pi		94022
13	167	Nicklas	Cara	5762 S		44107
14	158	Jack	Cass	26 We		02173
15	200	Helen	Chau	1542 Y		20878
16	198	Sheng	Chen	9214 Y		94583
17	197	Maio	Chermak	203 Sy		30346
18	194	Jen-Chang	Chin	3269 C		02203
19	114	Shane	Chopp	95 Sur		55104
20	220	Lewis N	Clark	987 Ex		85293

TORA Screenshot

The screenshot displays the TORA 1.1.4 application window. The main window is titled "system@GAIN [8.1.7.0.1] SQL Worksheet <1>". It contains a SQL query and its results.

```
SELECT /*+ ORDERED */
  a.TskCod TskCod,
  a.prsid - Person ID
  a.tskid - Årende ID
  c.chacod - Kanal kod
  c.vfiref - Verifikation Referens
  tskcod - Task kod
  tstepactnum - Task Procedure Step
  tstepactprid - Task Procedure Step
  tstepact - Task Procedure Step
```

The results are displayed in a table with columns: #, OWNER, DATA_TYPE, DATA_TYPE_MOD, DATA_TYPE_OWNER, and DATA_LEN.

#	OWNER	DATA_TYPE	DATA_TYPE_MOD	DATA_TYPE_OWNER	DATA_LEN
1	SYS	NUMBER	{null}	{null}	22
2	SYS	NUMBER	{null}	{null}	22
3	SYS	RAW	{null}	{null}	126
4	SYS	NUMBER	{null}	{null}	22
5	SYS	ALL_ALL_TABLES OWNER	VARCHAR2	{null}	30
6	SYS	ALL_ALL_TABLES TABLE_NAME	VARCHAR2	{null}	30
7	SYS	ALL_ALL_TABLES TABLESPACE_NAME	VARCHAR2	{null}	30
8	SYS	ALL_ALL_TABLES CLUSTER_NAME	VARCHAR2	{null}	30
9	SYS	ALL_ALL_TABLES IOT_NAME	VARCHAR2	{null}	30

The interface also shows a DB Browser on the left, a Schema Browser at the bottom, and a table of results for the "ESS" schema.

TYP	YER	VLDEDT	AOCTYP	SEGID
1	BAS	1998	2001-01-14 00:00:00	O
2	BAS	1998	2001-01-21 00:00:00	O
3	BAS	1998	2001-01-28 00:00:00	O
4	BAS	1998	2001-02-04 00:00:00	O
5	BAS	1998	2001-02-11 00:00:00	O



TOAD Screenshot

The screenshot displays the TOAD interface for the SCOTT schema. The main window shows the structure of the EMP table with the following columns:

Column Name	ID	Pk	Null?	Data Type	Default
EMPNO	1	1	N	NUMBER (4)	
ENAME	2		Y	VARCHAR2 (10)	
JOB	3		Y	VARCHAR2 (9)	
MGR	4		Y	NUMBER (4)	
HIREDATE	5		Y	DATE	
SAL	6		Y	NUMBER (7,2)	
COMM	7		Y	NUMBER (7,2)	
DEPTNO	8		Y	NUMBER (2)	

A context menu is open over the EMPNO column, listing various actions such as 'Add to Project Manager', 'Alter Table', 'Drop column', and 'Rename Table'. The interface also shows a Schema Browser on the left with tables like BONUS, DEPT, EMP, and SALGRADE. The bottom status bar indicates the user is SCOTT@KMS92.WORLD.

Squirrel SQL Screenshot

The screenshot displays the Squirrel SQL Client interface. The main window is titled "MySQL Test as nobody" and shows a tree view of database objects on the left. The "test" catalog is selected, showing a "user" table. The "Info" tab is active, displaying the following table:

Property	Value
Table Name	user
Qualified Name	mysql.user
Catalogue	mysql
Schema	
Type	TABLE
Remarks	

A "Global Preferences" dialog box is open, showing the "L & F" (Look and Feel) tab. The "Look and Feel" is set to "Metouia". The "Skin Theme Pack" is "whistlertemepack.zip". The "L & F jars" path is "D:\apps\squirrel-sql\plugins\laf\laf". The "Skin Theme Packs" path is "D:\apps\squirrel-sql\plugins\laf\laf". A note at the bottom of the dialog states: "Note: Controls may not be drawn correctly after changes in this panel until the application is restarted."

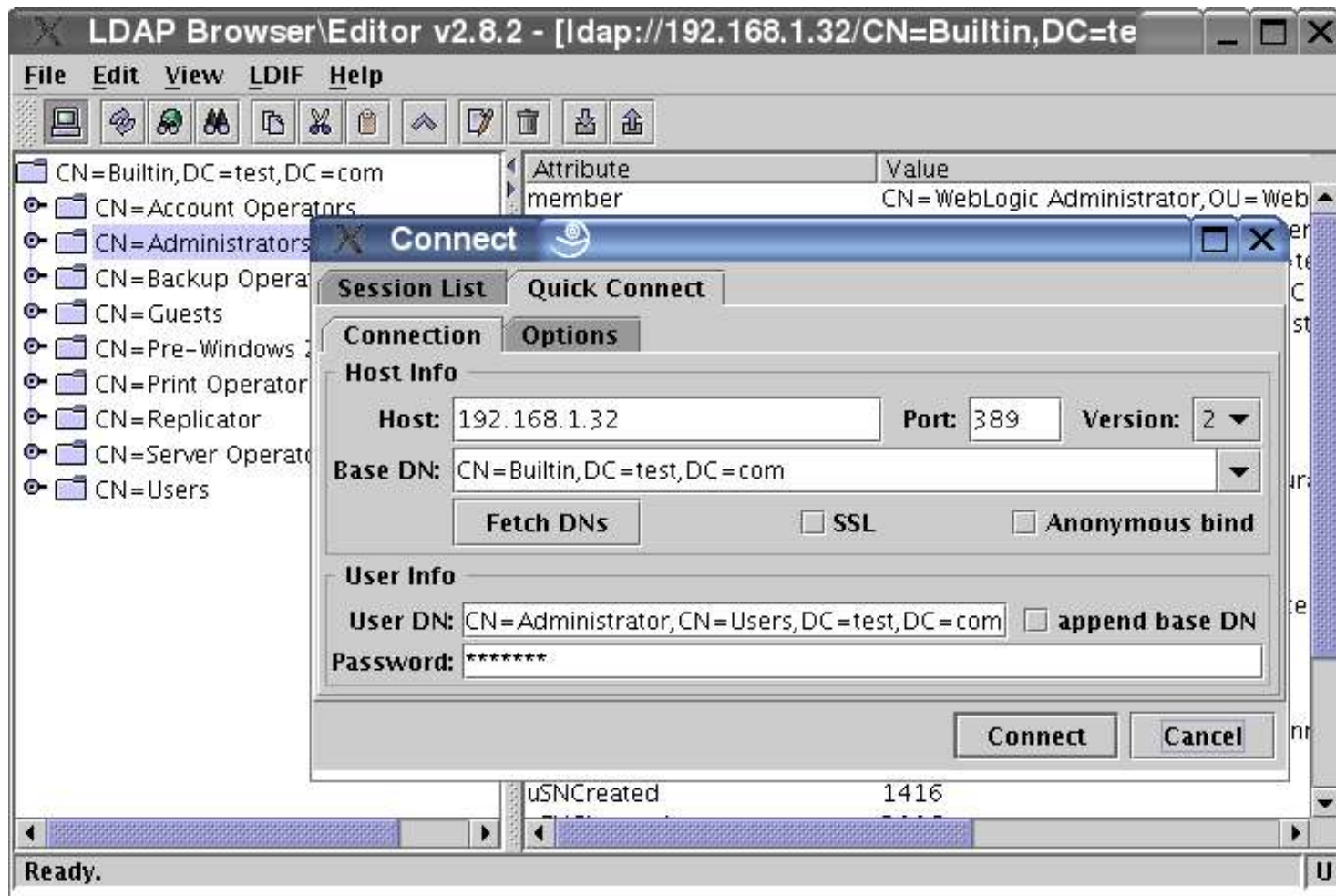
At the bottom of the Squirrel SQL Client window, the status bar shows "7.9MB/8.7MB" and "17:02:34".



LDAP Browse

- LDAP Browser
 - Luma
 - JXplorer
-
- Graphical view of an LDAP server
 - View attributes for an entry, query all the entries in a context, see what's visible depending on who connects, etc.
 - Great for troubleshooting connectivity problems when using an LDAP server (or Active Directory) for J2EE authentication

LDAP Browser/Editor





Luma Screenshot

The screenshot shows the Luma application window with the following components:

- Plugin:** Browser
- Entries:**
 - Luma
 - o=luma
 - cn=extremebi...
 - ou=Group
 - ou=People
 - mail=marco...
 - uid=daniel
 - uid=e
 - uid=foo
 - uid=wido
 - ou=accounts
 - ou=addressbo...
 - ou=automount
- Attributes and Values:**

Attributes	Values
dn	uid=wido,ou=People,o=luma
objectClass	posixAccount
objectClass	top
objectClass	shadowAccount
objectClass	organizationalPerson
objectClass	inetOrgPerson
cn	Wido Depping
loginShell	/bin/bash
userPassword	{CRYPT}xBQDV3pS8RL0
uidNumber	2581
manager	o=luma
shadowMax	99999
gidNumber	506



Testing

- JWebUnit
 - JMeter
 - TestMaker
 - MAXQ
-
- Covers load testing & web functional testing
 - Can build scripts using a web proxy (additional customization usually required)
 - Not as good test authoring, graphing, integration with OS/DB monitors, or process integration
 - Excellent first step for quality/performance feedback during development cycle

JMeter Screenshots



Apache JMeter

File Edit Run Options Help

Test Plan
 Jakarta Users
 HTTP Request Defaults
 Home Page
 Project Guidelines

HTTP Request
 Name: Project Guidelines
 Web Server
 Server Name or IP:
 Number:
 Request
 : Method: GET POST
/guidelines.html Follow Redirects Use KeepAlive
 Send Parameters With the Request:

Name:	Value	Encode?

 File With the Request:
 name:

Graph Results
 Name: Graph Visualizer
 Write All Data to a File
 Filename: Log Errors Only
 Graphs to Display Data Average Median Deviation Throughput

No of Samples 572 Latest Sample 438
 Deviation 278 Throughput 137.96985/minute

URL	Count	Average	Min	Max
List	100	71	0	660
Detail	300	66	0	550
Create	100	64	0	270
Delete	100	63	0	220
Update	100	74	0	390
Save	100	92	0	550
TOTAL	800	70	0	660



TestMaker Screenshot

The screenshot displays the TestMaker 4.0.4 application window. The interface is divided into several sections:

- File Tree (Left):** Shows a directory structure under 'tm4', including folders like 'agents', 'CVS', 'build', 'com', and 'CVS'. The 'agents' folder is expanded, listing various agent files such as 'checker_agent.a', 'DatasetHandler.a', 'GeoCash_agent.a', etc.
- Code Editor (Top Right):** Displays the source code for 'DatasetHandler.a'. The code includes comments for agent name, creation date, and author, followed by print statements for agent running, description, and results visualization.
- Recent Agents (Bottom Left):** Shows a list of recently used agents, with 'DatasetHandler.a' highlighted. It includes control icons for starting, stopping, and pausing agents.
- Most Recent Results (Bottom Right):** A line graph showing performance metrics over time. The Y-axis represents time in seconds (0 to 330), and the X-axis represents test iterations (1 to 29). Two data series are plotted: 'TotalTime' (blue line) and 'SetupTime' (cyan line). The TotalTime series shows significant fluctuations, peaking around 330 seconds at iteration 25. The SetupTime series remains relatively low, fluctuating between 10 and 90 seconds.

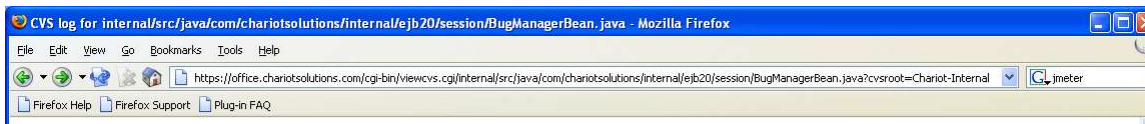
At the bottom of the graph area, there are tabs for 'Text Output' and 'Meters and Charts', with 'Meters and Charts' currently selected.



Source Control

- CVS
 - Subversion
 - ViewCVS
-
- Subversion is now used in production; it fixes some egregious problems with CVS (non-standard port, moving files, version controlling directories...)
 - ViewCVS is a great web interface for CVS and Subversion
 - Various scripts can be used i.e. to e-mail diffs, build documentation, or invoke bug tracking

ViewCVS Screenshots



CVS log for internal/src/java/com/chariotsolutions

Up to [Chariot-Internal] / internal / src / java / com / chariotsolutions

Request diff between arbitrary revisions / Display revisions graphically

Default branch: MAIN
Bookmark a link to: [HEAD](#) / [download](#)

Revision 1.9 / (view) - annotate - [select for diffs], Sat Jan 10 09:04:53
Branch: MAIN
CVS Tags: JELLYCO 2 0 3, JELLYCO 2 0 2, JELLYCO 2 0 1, JELLYCO 2 0 0, HEAD
Changes since 1.8: +12 -63 lines
Diff to [previous 1.8](#)

Add commons-fileupload (required by Struts).
Switch to EJB 2.0 CHR for many-to-many relationships
- remove EJBs for mapping tables
- update EJB Generator to skip mapping table, generate XDoclet CHR tags
- get rid of SQL for person/roles
Add calendar (Event) table & EJB
Regenerate everything with XDoclet 2.0 final
- Add some packages to EJB method arguments and return

Revision 1.8 / (view) - annotate - [select for diffs], Mon Dec 15 19:26:1
Branch: MAIN
CVS Tags: JELLYCO 2 0 0 BETA 1, JELLYCO 2 0 0 ALPHA
Changes since 1.7: +79 -56 lines
Diff to [previous 1.7](#)

Working in JBoss 3.x
- Updated to Struts 1.1
- Added order by to finders
- Added context in page title
- Don't enforce max field length -1
- Fleshed out DB script
- Added helpers and wrappers for full names, sorting, ...

Revision 1.7 / (view) - annotate - [select for diffs], Fri Dec 12 20:39:10
Branch: MAIN

Diff for internal/src/java/com/chariotsolutions/internal/ejb20/session/BugManagerBean.java between version 1.3 and 1.4

version 1.3, 2003/12/11 20:55:25	version 1.4, 2003/12/11 21:38:22
Line 60 import java.util.*; import java.util.zip.GZIPOutputStream; import java.util.zip.GZIPInputStream; import java.rmi.RemoteException; import java.text.SimpleDateFormat; import java.text.ParseException; import java.net.*;	Line 60 import java.util.*; import java.util.zip.GZIPOutputStream; import java.util.zip.GZIPInputStream; import java.text.SimpleDateFormat; import java.text.ParseException; import java.net.*;
Line 497 throw new EJBException("Unable to save history for BugID"+data.getJd(), e); } catch (FinderException e) { throw new EJBException("Unable to save bug with ID '"+data.getJd()+"", e); } catch (RemoteException e) { throw new EJBException("Unable to save bug"+e); } catch (UnknownHostException e) { log.error("Unable to send e-mail, no local host name found", e); } catch (NamingException e) {	Line 496 throw new EJBException("Unable to save history for BugID"+data.getJd(), e); } catch (FinderException e) { throw new EJBException("Unable to save bug with ID '"+data.getJd()+"", e); } catch (UnknownHostException e) { log.error("Unable to send e-mail, no local host name found", e); } catch (NamingException e) {
Line 506 } }	Line 503 } }
private void preUpdateBug(com.chariotsolutions.internal.ejb20.entity.Bug old, com.chariotsolutions.internal.ejb20.entity.BugData data) throws CreateException, FinderException, RemoteException, UnknownHostException, NamingException, DataEntryException { BugStatusHome bsh = BugStatusUtil.getHome(); BugStatus oldStatus = bsh.findByPrimaryKey(old.getStatusId()); BugStatus newStatus = bsh.findByPrimaryKey(data.getStatusId());	private void preUpdateBug(com.chariotsolutions.internal.ejb20.entity.Bug old, com.chariotsolutions.internal.ejb20.entity.BugData data) throws CreateException, FinderException, UnknownHostException, NamingException, DataEntryException { BugStatusHome bsh = BugStatusUtil.getHome(); BugStatus oldStatus = bsh.findByPrimaryKey(old.getStatusId()); BugStatus newStatus = bsh.findByPrimaryKey(data.getStatusId());
Line 718 */ public byte[] getAttachmentData(com.chariotsolutions.internal.ejb20.entity.AttachmentData data) { try { byte[] content = AttachmentContentUtil.getHome().findByAttachment(data.getJd(), getData()); if(data.getFileName().toLowerCase().endsWith(".bmp")) { try { ByteArrayOutputStream out = new ByteArrayOutputStream();	Line 715 */ public byte[] getAttachmentData(com.chariotsolutions.internal.ejb20.entity.AttachmentData data) { try { byte[] content = AttachmentContentUtil.getHome().findByAttachment(data.getJd(), getDbData()); if(data.getFileName().toLowerCase().endsWith(".bmp")) { try { ByteArrayOutputStream out = new ByteArrayOutputStream();



Profiling

- Eclipse Profiler
 - JMemProf
 - Cougar Profiler
 - JTreeProfiler
-
- Most tools use standard JVMPI interface to access JVM profiling information
 - New tools can use bytecode instrumentation (altering specific classes as needed) for better performance than standard JVMPI monitoring
 - These tools offer similar statistics and analysis to what commercial tools offer



Eclipse Profiler

The screenshot displays the Eclipse Profiler interface with the following components:

- Debugger:** Shows the execution of `test7 (2) [Profiler]` at `C:\j2sdk1.4.0\jre\bin\javaw.exe`.
- Source Editor:** Displays the code for `TOracleArchiver.java`, including package declarations and imports for `java.sql`, `java.util`, and `oracle.jdbc`.
- Heap:** A graph showing memory usage over time, with a significant spike and subsequent drop.
- Console:** Shows output from the application, including timestamps and performance metrics like `MSD 2002 954 lines/second`.
- Threads:** A table listing active threads and their execution times.
- Thread call tree:** A hierarchical view of the call stack, showing the execution path and time spent in various methods.

Thread	Direct time	%
main	945387,00	99,51
Thread-1	4669,00	0,49
Finalizer	0,00	0,00

Thread	Direct time	%
de.dreger.logazer.parser.test.test7.main	100,00%	945387 ms - 1 inv. - 0 ms - 0,00%
de.dreger.logazer.parser.TReportGenerator	67,74%	640399 ms - 883991 inv. - 16332 ms - 1,73%
de.dreger.logazer.parser.report.TReportGenerator	59,70%	564421 ms - 4419952 inv. - 6895 ms - 0,73%
de.dreger.logazer.parser.expression.TExpression	58,97%	557462 ms - 4419952 inv. - 101160 ms - 10,70%
de.dreger.logazer.parser.expression.TExpression	37,85%	357800 ms - 26904752 inv. - 38382 ms - 4,06%

Cougaar Profiler Results

Node_AgentA Memory Profiler - Mozilla (Build ID: 2002052918)

http://localhost:8800/\$~/profiler

Node_AgentA Memory Profiler

Date: Sat Jan 03 19:40:46 GMT 2004 (1073158846039)

Memory in Megabytes:

Used	Free	Total	Max	Force GC
6.70	57.56	63.63	832.00	

Type	Sample %	Instances			Memory		
		Live	GC'd	Total	Bytes Each	*Live	+Capacity Bytes
java.nio.HeapCharBuffer	1.00	1700	350700	352400	44	74800	374240C
java.lang.StringBuffer	1.00	2200	2892600	2894800	20	44000	75840C
java.io.ObjectInputStream\$BlockDataInputStream	1.00	100	49500	49600	52	5200	52280C
java.lang.String	1.00	5600	2798600	2804200	24	134400	47480C
java.io.ByteArrayInputStream	1.00	200	2300	2500	24	4800	35760C
java.text.DateFormatSymbols	1.00	100	0	100	40	4000	23880C
java.io.ObjectStreamClass	1.00	1700	1338200	1339900	104	176800	18480C
java.util.HashMap	1.00	1700	551000	552700	40	68000	17960C

Document: Done (5.685 secs)

JMemProf Results

JMemProf - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://oss.metaparadigm.com/jmemprof/examples/class-methodmem.html

Firefox Help Firefox Support Plug-in FAQ

Class Summary | Method Summary | Statistics | Filter

Method Memory for java.util.HashMap\$Entry

first | prev | next | last | >1 < 2 3 4 5 6 7 8 9 10

Class	Total		Direct		Depth 1		Depth 2		Depth 3		Depth 4	
	Num	Size	Num	Size	Num	Size	Num	Size	Num	Size	Num	Size
java.util.HashMap\$Entry	5692	111.2K										
Method	Num	Size	Num	Size	Num	Size	Num	Size	Num	Size	Num	Size
java.util.HashMap.addEntry	4897	95.6K	4897	95.6K								
java.util.HashMap.put	4831	94.4K			4831	94.4K						
org.jboss.mx.loading.UnifiedLoaderRepository3.cacheLoadedClass	1486	29K					743	14.5K	743	14.5K		
java.util.jar.Manifest.read	1184	23.1K					238	4.7K	945	18.5K		
java.util.jar.Manifest.<init>	1184	23.1K							239	4.7K	945	18.5K
java.util.jar.Attributes.read	1086	21.2K					945	18.5K			141	2.8K
java.util.HashSet.add	980	19.1K					980	19.1K				
org.jboss.mx.loading.LoadMgr.nextTask	933	18.2K							464	9.1K	469	9.2K
java.util.HashMap.createEntry	795	15.5K	795	15.5K								
java.util.HashMap.putForCreate	795	15.5K			795	15.5K						
java.util.HashMap.putAllForCreate	795	15.5K					795	15.5K				
java.util.HashMap.<init>	781	15.3K							781	15.3K		
java.util.PropertyResourceBundle.<init>	778	15.2K									778	15.2K
org.jboss.mx.loading.UnifiedLoaderRepository3.loadClassFromClassLoader	553	10.8K							278	5.4K	275	5.4K
org.jboss.mx.loading.UnifiedClassLoader3.loadClass	466	9.1K							2	40	464	9.1K
org.jboss.mx.loading.ClassLoaderUtils.addPackage	453	8.8K					328	6.4K	125	2.4K		
org.jboss.mx.loading.ClassLoaderUtils.updatePackageMap	453	8.8K							328	6.4K	125	2.4K
sun.reflect.DelegatingMethodAccessorImpl.invoke	424	8.3K									424	8.3K
org.apache.catalina.core.StandardContext.addMimeTypeMapping	389	7.6K					389	7.6K				
sun.reflect.GeneratedMethodAccessor20.invoke	384	7.5K							384	7.5K		
org.jboss.mx.loading.ClassLoaderUtils.updatePackageMap	308	6K									308	6K
org.jboss.mx.loading.LoadMgr.beginLoadTask	277	5.4K									277	5.4K
java.util.jar.JarFile.getManifest	239	4.7K									239	4.7K
java.util.jar.Attributes.put	141	2.8K					141	2.8K				
java.util.jar.Attributes.putValue	141	2.8K							141	2.8K		
org.jboss.mx.loading.UnifiedLoaderRepository3.getResource	101	2K									101	2K

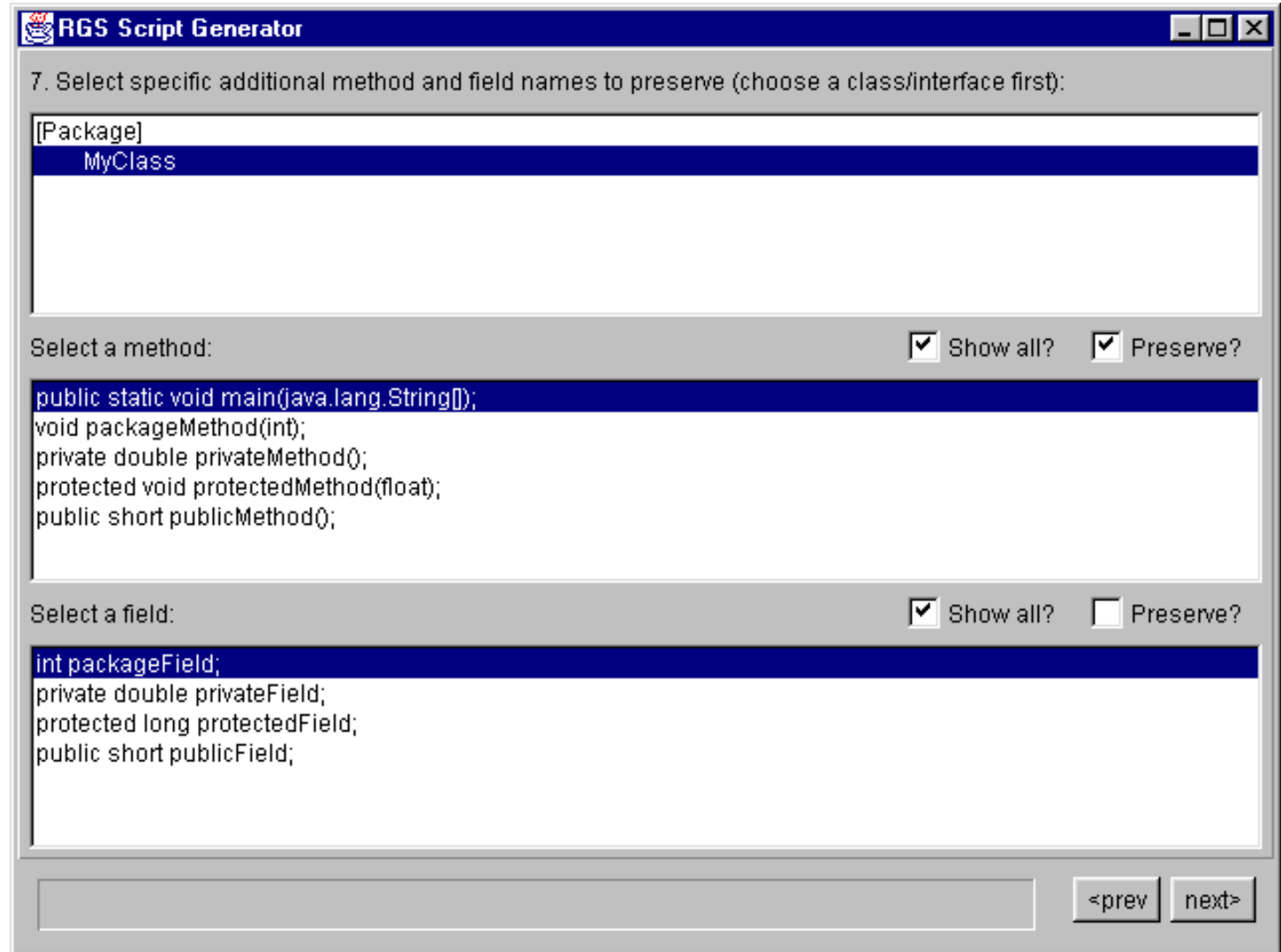
Done



Obfuscation

- ProGuard
 - RetroGuard
 - JODE
 - JavaGuard
-
- Can be incorporated into a standard build process (typically via Ant with a config script)
 - These tools change names and strip extra information to obfuscate classes
 - Also ends up compressing the JAR size
 - ProGuard can “de-obfuscate” stack traces and handles `Class.forName(“name”)`; JODE includes a decompiler

Sample Config GUI



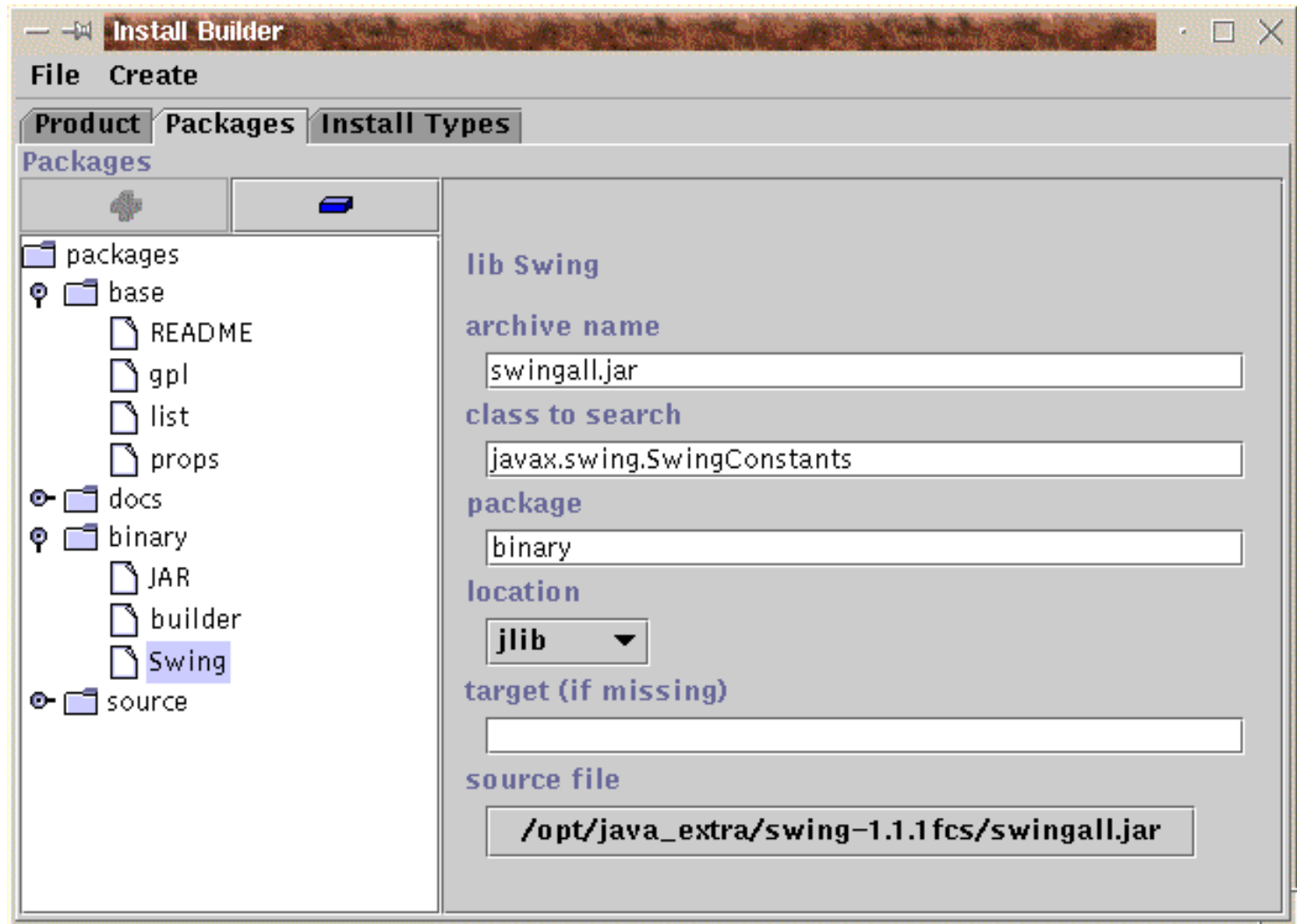


Installers

- IzPack
 - Packlet
 - VAInstall
 - Lift Off Java Installer
-
- Wraps the install/uninstall process, including locating a JVM & possibly missing libraries
 - Installer built based on a script, integrated with Ant, variable substitution, ...
 - Builds executable JAR or executable
 - Some tools can set executable flags, change CRLF format, handle differential upgrades



Lift Off Java Installer





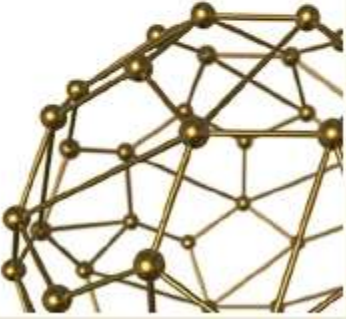
IzPack Screenshot

IzPack - Installation of linkSearch - The search engine

linkSearch
Search, find and use
Information on websites,
Intranets and local networks

*Compatible with Microsoft Office, Adobe PDF
and Macromedia Flash formats*

www.datalink.se



(Made with IzPack - <http://www.izforge.com/>)

Required Configuration

Page 1 of 6

The installation configuration is meant to help you get started.
linkSearch is highly customizable. Please refer to the README for
details. Required parameters must be set.

DNS name of your server:

Web server/admin ip:

Folder UNC or path:

OR

Internet/intranet start URL:

Start linkSearch after installation

Yes

No

Previous Next Quit



Code Helpers

- JRefactory
 - Hammurapi
 - Numerous product-specific plugins
-
- JRefactory offers numerous handy formatting, refactoring, & quality checking features (cut & paste detection, standards compliance, metrics)
 - Includes plugins for jEdit, NetBeans, JBuilder, and plain Ant scripts, with more IDEs on the way
 - Also includes a standalone GUI if your IDE is not supported
 - Hammurapi includes dozens of code inspectors and Ant integration

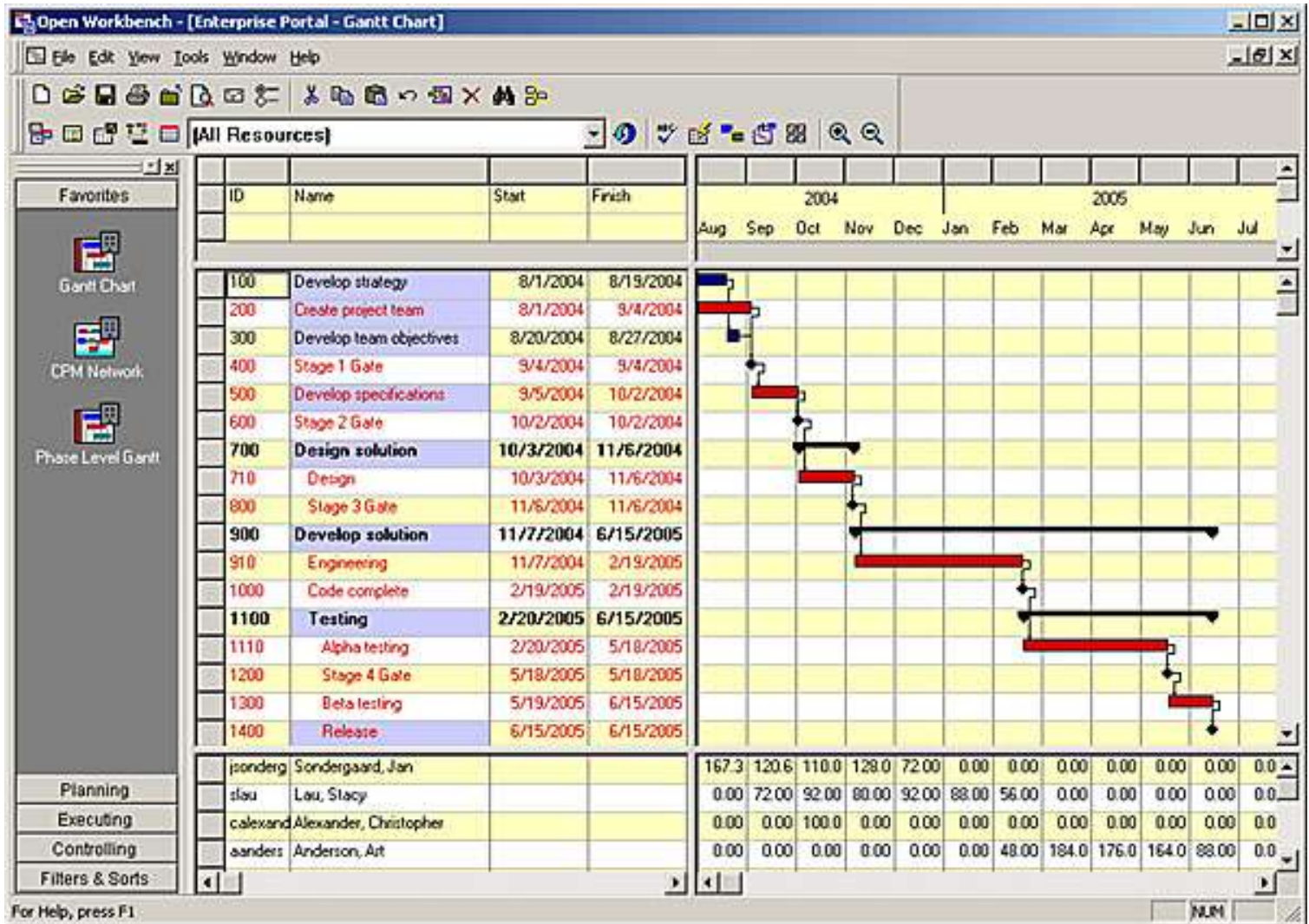


Project Management

- OpenWorkbench
-
- The open source version of MS Project
 - Scheduling, dependencies, scope changes, pretty pictures, it's all in there



OpenWorkbench





Libraries & APIs

Part III



XML Binding

- Castor XML
 - JiBX
 - JAXB RI
 - XMLBeans
-
- Maps XML data directly to Java objects; no manual parsing necessary
 - Provides manipulation & validation of XML data in the object realm
 - Different tools can generate Java code starting from XML, or create an XML format from Java code
 - Can customize output formatting



XML Binding Overview

```
<customer>
  <name>
    <first-name>Aaron</first-name>
    <last-name>Mulder</last-name>
  </name>
  <street>165 Indiana Ave</street>
  <city>Fort Washington</city>
  ...
</customer>
```

- Complex type definitions are mapped to classes
- Child elements & attributes are mapped to fields
- May be able to adjust depth

Customer

street
city

Name

firstName
lastName



Persistence

- Castor JDO
 - JORM
 - Hibernate
 - Apache OJB
-
- Handles mapping RDBMS data to Java objects and vice versa
 - Java objects can be POJOs
 - Can include transaction and caching support



Hibernate/Spring Code

```
public class Product implements Serializable {
    private String name;
    private Collection productRates;
    // getters & setters
}

public class HibernateProductManager extends
    HibernateDaoSupport {
    public ProductRate[] getProductRates(
        Integer productId) {
        Product p = (Product)
            getHibernateTemplate().get(
                Product.class, productId);
        if(p == null) {...}
        return (ProductRate[])
            p.getProductRates().toArray(
                new ProductRate[0]);
    }
}
```



Web Frameworks

- Struts
 - WebWork
 - Spring
 - Tapestry
-
- Struts and WebWork handle page flow, validation, MVC structure, HTML form to Java object mapping, JSP taglibs, etc.
 - Spring provides many of the same features, using an approach based on Inversion of Control (IoC), in addition to many utility APIs around JDBC, persistence, transactions, AOP, object/service management, and more.



Hibernate & Spring, again

```
public class Product implements Serializable {
    private String name;
    private Collection productRates;
    // getters & setters
}

public class HibernateProductManager implements
    ProductManager extends HibernateDaoSupport {
    public ProductRate[] getProductRates(
        Integer productId) {
        Product p = (Product)
            getHibernateTemplate().get(
                Product.class, productId);
        if(p == null) {...}
        return (ProductRate[])
            p.getProductRates().toArray(
                new ProductRate[0]);
    }
}
```



Spring Web (Java code)

```
public interface ProductManager {
    public ProductRate[] getProductRates (
        Integer product);
}
public class ViewProductRates extends
    SimpleFormController {
    private ProductManager productManager;
    // getter & setter

    public ModelAndView onSubmit(Object command)
        throws ServletException {
        ProductRatesForm form = (...) command;
        Integer productId = form.getProductId();
        ProductRate[] rates =
            mgr.getProductRates(productId);
        return new ModelAndView("viewRates",
            "rates", rates);
    }
}
```



Spring Web (JSP code)

```
<%@ taglib prefix="c"
        uri="http://java.sun.com/jstl/core" %>

<h1 align="center">Product Rates</h1>
<ul>
  <c:forEach items="{rates}" var="rate">
    <li>
      <c:out value="{rate.premium}" /> for
      <c:out value="{rate.coverage}" /> coverage
    </li>
  </c:forEach>
</ul>
```



Spring Config File

```
<bean id="SessionFactory" ← Hibernate Construct
    class="...hibernate.LocalSessionFactoryBean">

<bean id="TransactionManager" ← Transactions
    class="...hibernate.HibernateTransactionManager">

<bean id="ProductManager" ← "Session Bean"
    class="demo.HibernateProductManager">
    <property name="sessionFactory">
        <ref bean="SessionFactory"/>
    </property>
</bean>

<bean id="ViewProductRates" ← Web Controller
    class="demo.ViewProductRates">
    <property name="productManager">
        <ref bean="ProductManager"/>
    </property>
</bean>
```




Object-Level Security

- Acegi for Spring
 - Seraph
 - jSai
 - Security Filter
-
- Provides server-independent authentication and authorization with caching
 - Works in or out of a servlet container, but may not automatically pass credentials from web layer to EJB layer (depends on server plugin)
 - Some of these can redirect to SSL based on security requirements, hash password, provide login/logout event hooks



Search/Indexing

- Lucene
 - Nutch
 - JSpider
 - Heritrix
-
- JSpider & Heritrix crawl web site(s)
 - Check for errors, validate links, create site map
 - Detect traps, useless data (calendar for 2020...)
 - Lucene can index a set of content and do a mini-update for each bit as new content comes in, typically used to provide search features
 - Nutch is an open-source search engine



Text Processing

- iText
 - POI
 - FOP
-
- iText can programmatically create documents and then output them to formats including PDF
 - FOP can process XML formatted objects and output formats including PDF
 - POI can import and export files in Microsoft formats (Word, Excel, OLE compound docs)
 - These are all low-level compared to report writers



iText Code Sample

```
Document document = new Document();
PdfWriter writerA = PdfWriter.getInstance(document,
    new FileOutputStream("Chap0108a.pdf"));
writerA.setViewerPreferences(
    PdfWriter.PageLayoutTwoColumnLeft);
Watermark watermark = new Watermark(
    Image.getInstance("watermark.jpg"), 200, 420);
document.add(watermark);
HeaderFooter header = new HeaderFooter(
    new Phrase("This is a header"), false);
document.setHeader(header);
document.open();
document.setPageSize(PageSize.LETTER);
document.add(new Paragraph("Hello World"));
document.close();
```

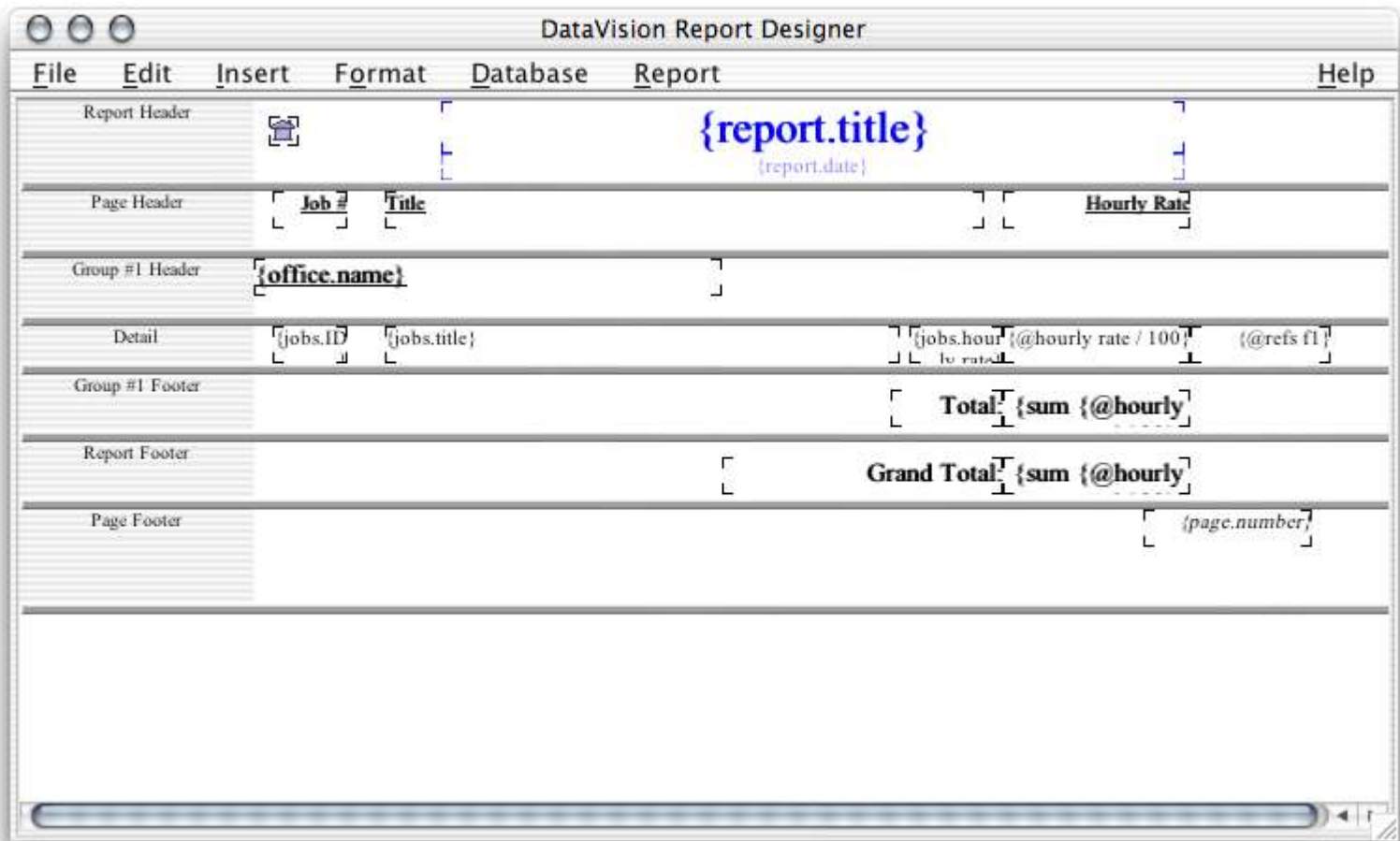


Reporting

- JasperReports
 - JFreeReport
 - DataVision
 - JFreeChart
-
- High-level tools to design and output reports
 - DataVision includes GUI editor, JFreeReport doesn't
 - Jasper is powerful and featureful, but GUI editors are not always up to date
 - Developers may end up maintaining report configuration files, printer configurations



DataVision Designer

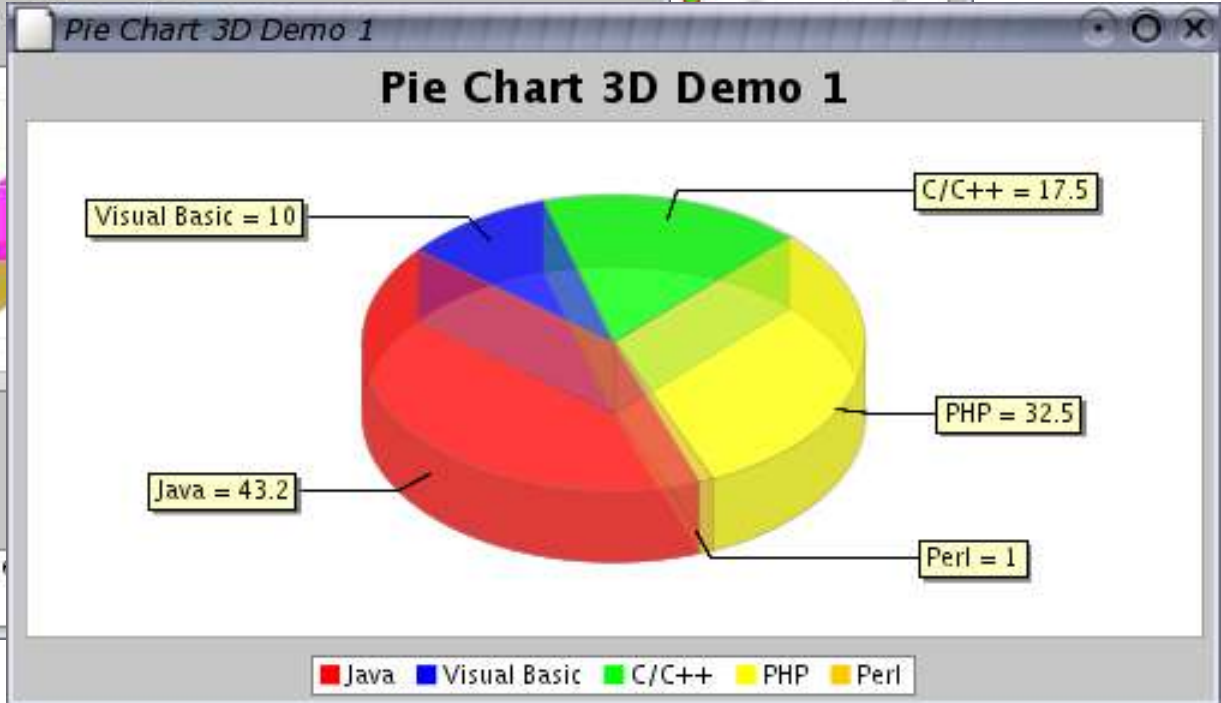
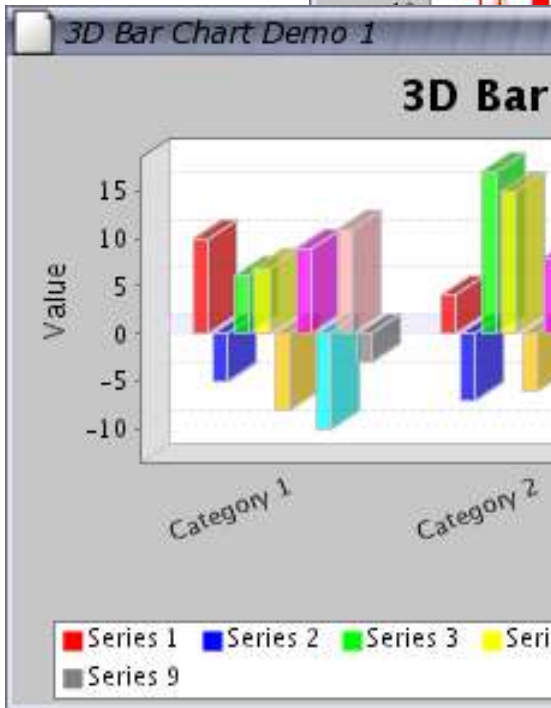
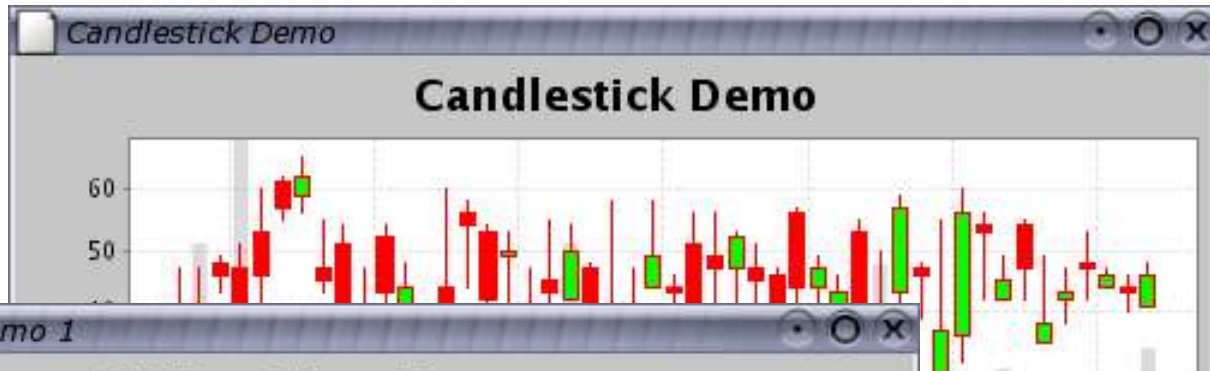




JasperReport Definition

```
<jasperReport name="test" pageWidth="612"
  pageHeight="792" columnWidth="540"
  columnSpacing="15" leftMargin="36"
  rightMargin="36" topMargin="36"
  bottomMargin="36">
  <parameter name="month"
    class="java.lang.String" />
  <parameter name="debit_account"
    class="java.lang.String" />
  <parameter name="credit_account"
    class="java.lang.String" />
  <title>
    <band height="100">
      <textField>
        <reportElement x="200" y="6"
          width="100" height="14"/>
        <textElement>
          <font fontName="arial"
            size="10" isBold="false"/>
```

JFreeChart Samples





Scheduling

- Quartz
 - J2EE Timer
 - JCronTab
 - (AutoSys/Cron)
-
- The J2EE timer service is quite limited; it can schedule N seconds in the future
 - JCronTab is a Java implementation of the UNIX cron service; it's reasonably lightweight
 - Quartz is very feature-rich, but requires more setup and maintenance (typically database tables, etc.). Quartz integration starting to appear as a feature in other products.



Others to Investigate

- OScache
- Laszlo and IDE for Eclipse
- Direct Web Remoting
- Sulu
- XUI
- MyFaces
- Beehive
- Jcrawler
- JobServer
- TestNG



URLs

PostgreSQL
postgresql.org

MySQL
mysql.org

SAP-DB
sapdb.org

Firebird
firebird.sourceforge.net

Hypersonic
hsqldb.sourceforge.net

McKoi
mckoi.com

JBoss
jboss.org

JOnAS
jonas.objectweb.org

Geronimo
geronimo.apache.org

Tomcat
jakarta.apache.org/tomcat

Jetty
jetty.mortbay.org

Eclipse
eclipse.org

NetBeans
netbeans.org

jEdit
jedit.org

Bugzilla
bugzilla.org

Scarab
scarab.tigris.org

JIRA
atlassian.com/software/jira

Ant
ant.apache.org

Maven
maven.apache.org

Anthill
urbancode.com/projects/anthill

CruiseControl
cruisecontrol.sourceforge.net

Cocoon Portal
cocoon.apache.org

Jetspeed/Pluto
portals.apache.org

Liferay
liferay.com

eXo
exo.sourceforge.net

Drools
drools.org

OFBiz
ofbiz.org



URLs

JESS

herzberg.ca.sandia.gov/jess

InfoSapient

info-sapient.sourceforge.net

Compiere

compiere.org

Lenya

cocoon.apache.org/lenya

Plone

plone.org

Slide

jakarta.apache.org/slide/

Bricolage

bricolage.cc

MoinMoin

moin.sf.net

OpenGroupware

opengroupware.org

Jabber

jabber.org

SquirrelMail

squirrelmail.org

Web Developer Extension

chrispederick.com

DocBook

docbook.org

StructuredText

zope.org

DBVisualizer

minq.se/products/dbvis

TORA

globecom.net/tora

TOAD

toadsoft.com

SquirrelL

squirrel-sql.sourceforge.net

LDAP Browser/Editor

iit.edu/~gawojar/ldap

Luma

luma.sourceforge.net

JXplorer

pegacat.com/jxplorer

JWebUnit

jwebunit.sourceforge.net

MAXQ

maxq.tigris.org

JMeter

jakarta.apache.org/jmeter

TestMaker

pushtotest.com/Downloads/features.html

CVS

cvshome.org



URLs

JMemProf
oss.metaparadigm.com/jmemprof

ViewCVS
viewcvs.sourceforge.net

Subversion
subversion.tigris.org

Eclipse Profiler
[eclipsecolorer.sourceforge.net/
index_profiler.html](http://eclipsecolorer.sourceforge.net/index_profiler.html)

JMemProf
oss.metaparadigm.com/jmemprof

Cougaar Profiler
profiler.cougaar.org

JTreeProfiler
jcoverage.sourceforge.net

ProGuard
proguard.sourceforge.net

RetroGuard
[retrologic.com/
retroguard-main.html](http://retrologic.com/retroguard-main.html)

JODE
jode.sourceforge.net

JavaGuard
[sourceforge.net/projects/
javaguard](http://sourceforge.net/projects/javaguard)

IzPack
izforge.com/izpack

Packlet
packlet.sourceforge.net

VAInstall
vainstall.sourceforge.net

Lift Off Java Installer
liftoff.sourceforge.net

JRefactory
jrefactory.sourceforge.net

Hammurapi
hammurapi.org

OpenWorkbench
openworkbench.org

Castor
castor.org

JAXB RI
jaxb.dev.java.net

JiBX
jibx.org

XMLBeans
xml.apache.org/xmlbeans

JORM
jorm.objectweb.org

Hibernate
hibernate.org

Apache OJB
db.apache.org/ojb



URLs

Struts

jakarta.apache.org/struts

WebWork

opensymphony.com/webwork

Spring

springframework.org

Tapestry

jakarta.apache.org/tapestry

Acegi

acegisecurity.sourceforge.net

Seraph

opensource.atlassian.com/seraph

jSai

oss.ipov.org/jsai

Security Filter

securityfilter.sourceforge.net

Lucene

jakarta.apache.org/lucene

Nutch

nutch.org

JSpider

j-spider.sourceforge.net

Heritrix

crawler.archive.org

iText

lowagie.com/iText

FOP

xml.apache.org/fop

POI

jakarta.apache.org/poi

JasperReports

jasperreports.sourceforge.net

DataVision

datavision.sourceforge.net

JFreeReport / JFreeChart

jfree.org

Quartz

opensymphony.com/quartz

JCronTab

jcrontab.sourceforge.net

OScache

opensymphony.com/oscache

Laszlo

openlaszlo.org

Direct Web Remoting

dwr.dev.java.net

Sulu

sulu.sourceforge.net

XUI

xui.sourceforge.net

MyFaces

myfaces.apache.org

Beehive

incubator.apache.org/beehive



URLs

JCrawler

jcrawler.sourceforge.net

JobServer

[grandlogic.com/content/html_docs/
products-jobserver.shtml](http://grandlogic.com/content/html_docs/products-jobserver.shtml)

TestNG

www.beust.com/testng



Questions?