The Stairway to Maven

The JAKARTA Project Build And Comprehension Tool

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The Problem

How do you build and maintain complex software projects written in Java?!

- The Chinese Approach ...
  - You can always find a student or two for the build
- Make or better not to Make – that‘s the question ...
  - Ever tried to run a UNIX makefile on Windows?!
- All ANTs are equal and some are even more equal ...
  - Tired of copy/pasting ANT scripts?!
  - Need something like ANT with more bells ans whistles?!

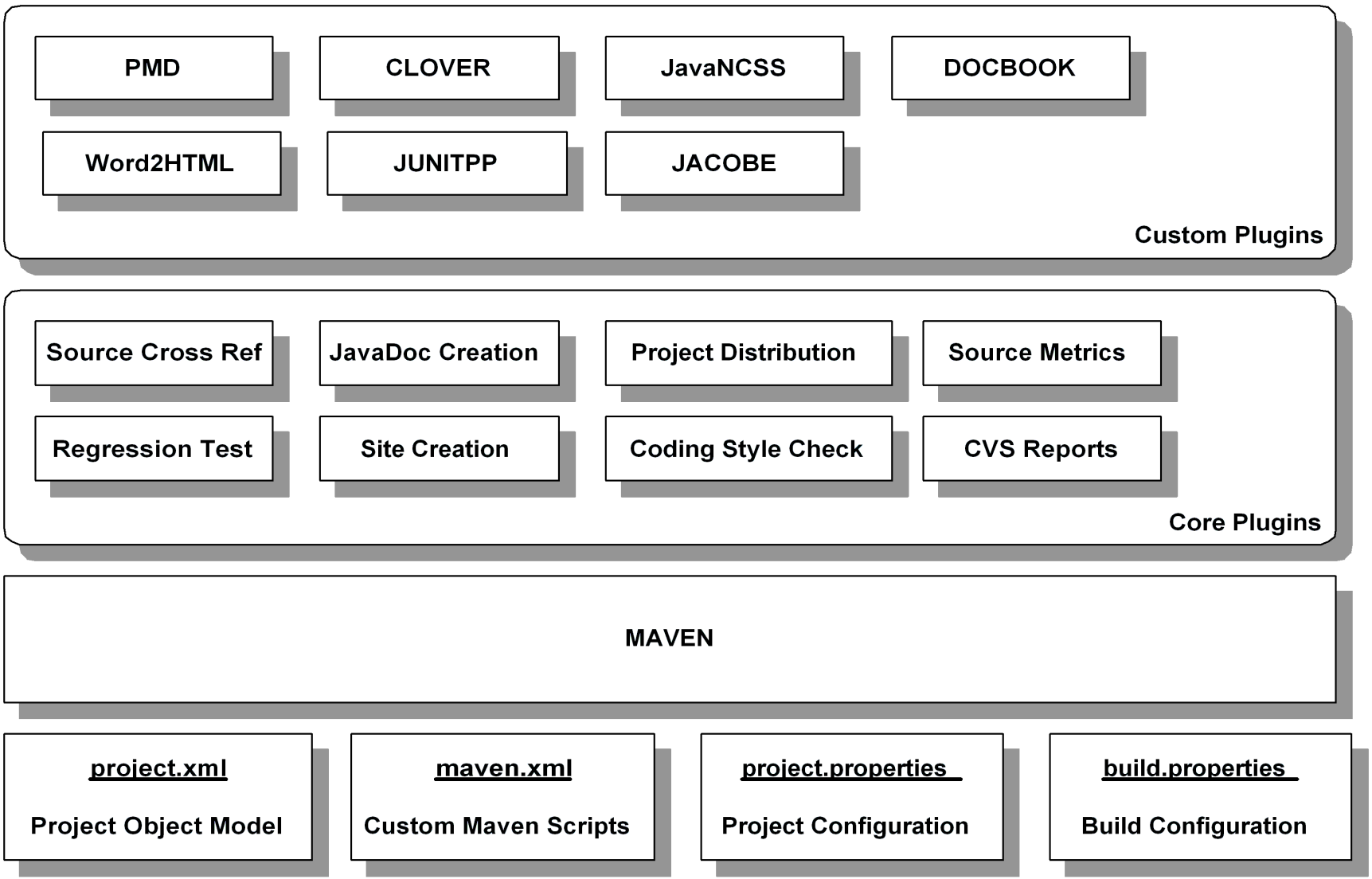
The intent of Maven is to make intra-project development highly manageable in the hopes of providing more time for cross-project development. You might call it cross-project pollination or the sharing of project development knowledge, this is what Maven attempts to encourage.

Jason van Zyl

Maven For Rookies

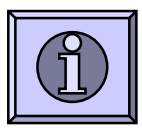
- Maven was initially developed for buiding Turbine
- Maven matured into an open source software engineering platform
- The core functionality is automated project building, distribution and website creation
- A project is described with a XML Project Object Model (POM)
- The POM defines how to build a project and the external dependencies
- The Maven functionality is implemented in terms of plugins
- The plugins are written in Jelly
- JARs are downloaded from a remote repository and stored into a local repository

What is in the Maven Box?!



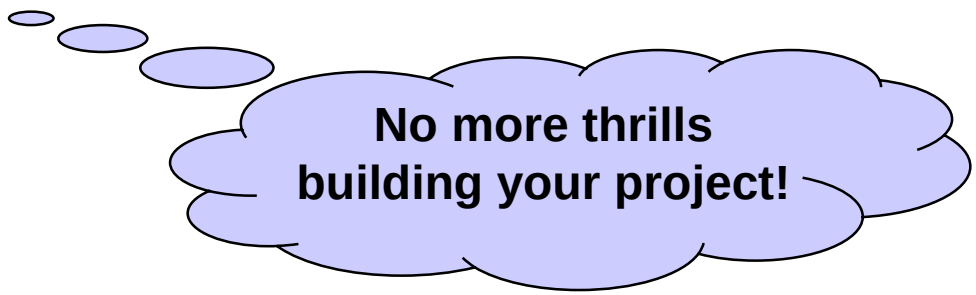
Project Object Model (POM)

- Verbose project description
- Company information
- List of developer and their roles
- Mailing list support
- CVS server access
- Source code and unit test code path
- JAR dependencies
  - Versioning
  - How to download



Build Plugins

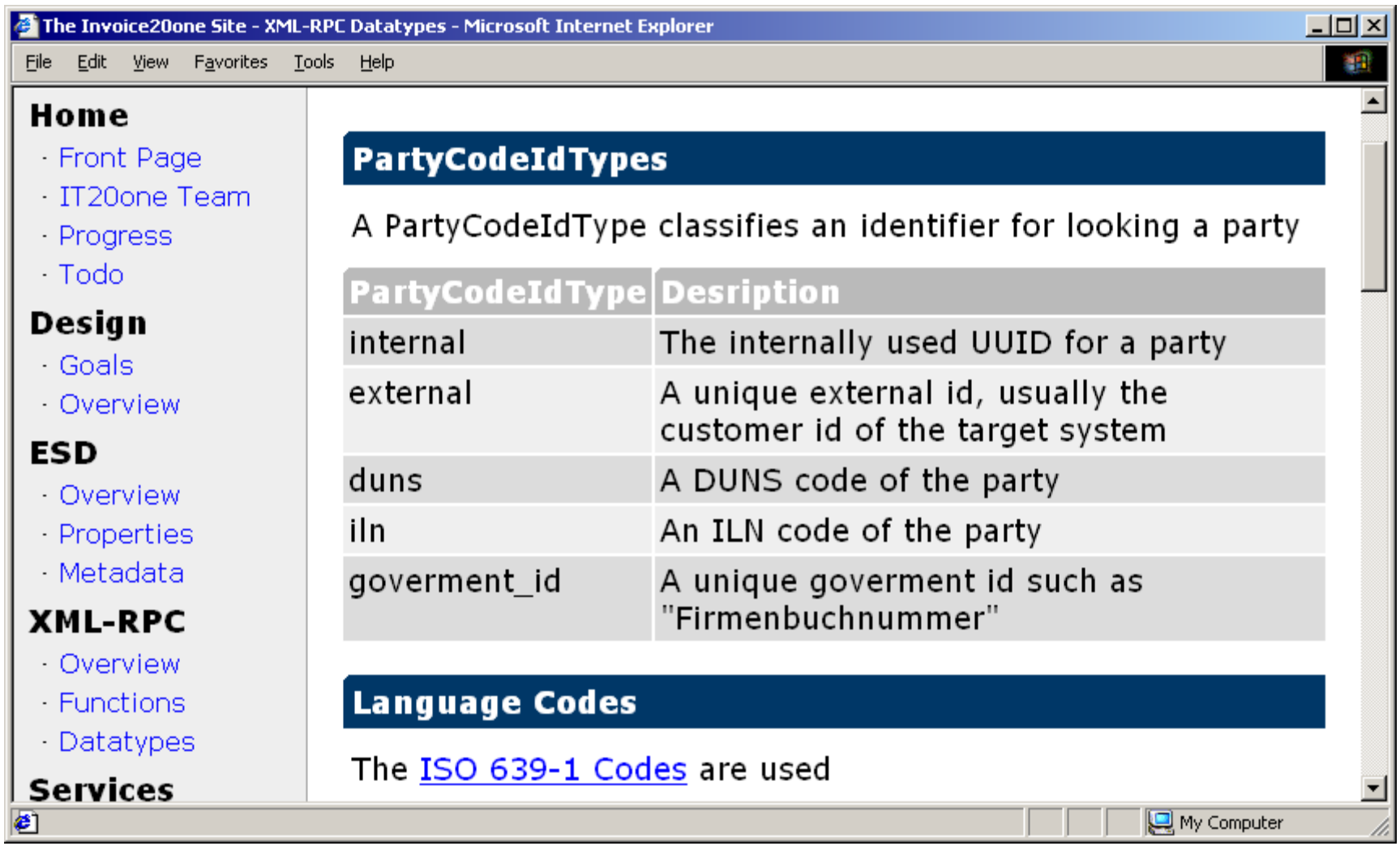
- The distribution plugin allows building a binary or a source distribution from the command line
- An **ANT** build file can be generated and distributed to allow **ANT** users to build the distribution
- Other plugins allows
  - Creating a WAR file
  - Creating a JAR file
  - Deploying the distribution automatically



Site Plugin

- Site creation based on Project Object Model
- Site generation uses XDOC
  - Maven generated XDOC
  - Manually written documentation
- DVSL transforms XDOC into HTML
- Site layout is defined through *xdoc/navigation.xml*
- Site appearance is customizable through properties defined in *project.properties*

Site Plugin


The Invoice20one Site - XML-RPC Datatypes - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Home
· Front Page
· IT20one Team
· Progress
· Todo
Design
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· Overview
ESD
· Overview
· Properties
· Metadata
XML-RPC
· Overview
· Functions
· Datatypes
Services
PartyCodeIdTypes
A PartyCodeIdType classifies an identifier for looking a party
PartyCodeIdType
Desription
internal
The internally used UUID for a party
external
A unique external id, usually the customer id of the target system
duns
A DUNS code of the party
iln
An ILN code of the party
goverment_id
A unique goverment id such as "Firmenbuchnummer"
Language Codes
The ISO 639-1 Codes are used
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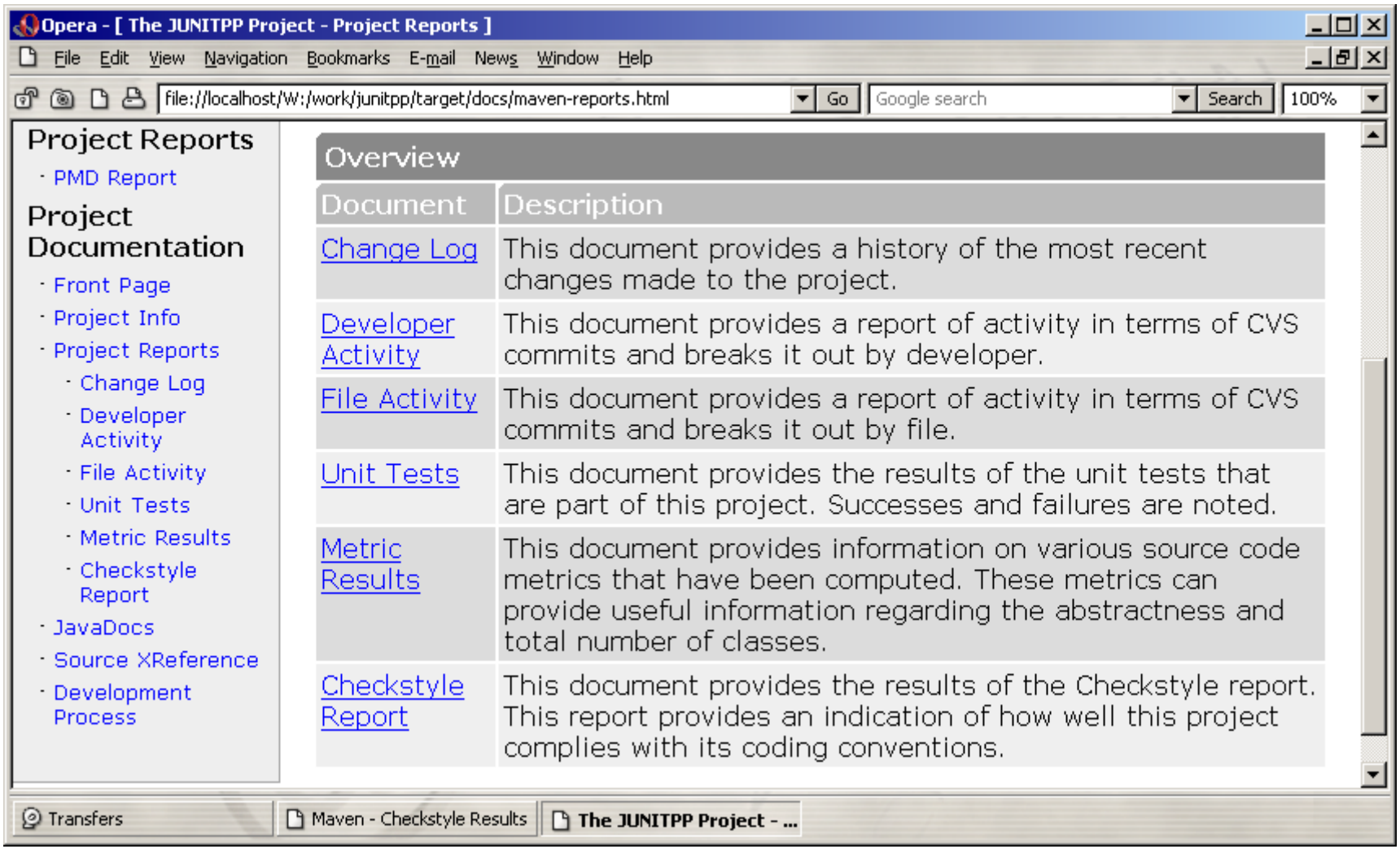
Site Plugin


Opera - [The JUNITPP Project - Project Reports]
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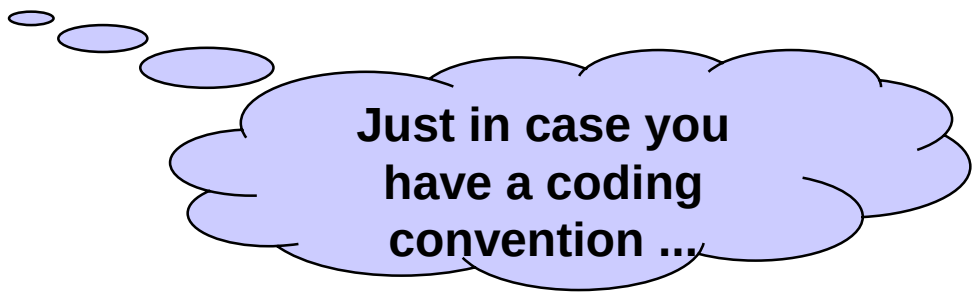
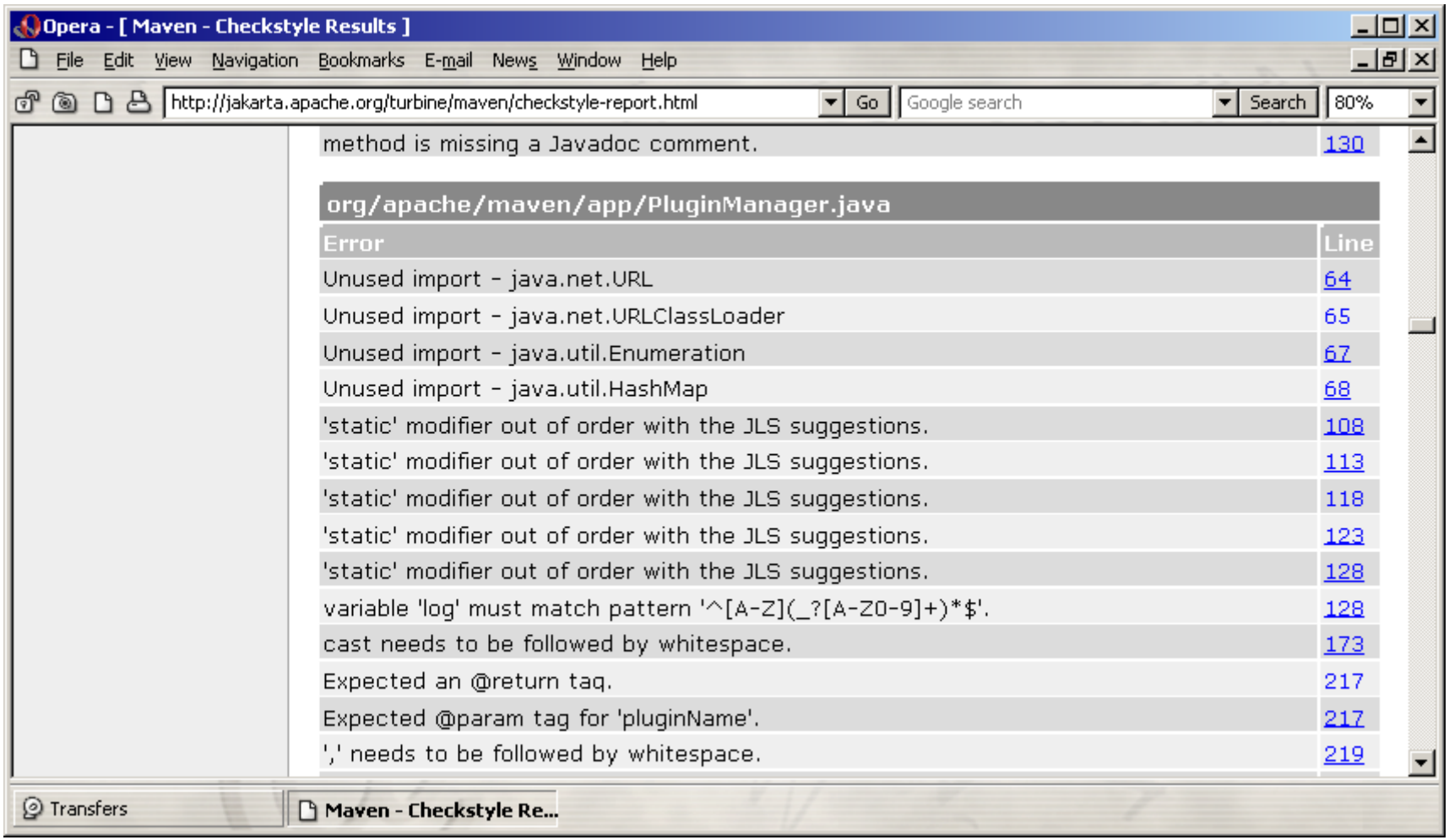
PMD Report
Project Documentation
Front Page
Project Info
Project Reports
Change Log
Developer Activity
File Activity
Unit Tests
Metric Results
Checkstyle Report
JavaDocs
Source XReference
Development Process
Overview
Document
Description
Change Log
This document provides a history of the most recent changes made to the project.
Developer Activity
This document provides a report of activity in terms of CVS commits and breaks it out by developer.
File Activity
This document provides a report of activity in terms of CVS commits and breaks it out by file.
Unit Tests
This document provides the results of the unit tests that are part of this project. Successes and failures are noted.
Metric Results
This document provides information on various source code metrics that have been computed. These metrics can provide useful information regarding the abstractness and total number of classes.
Checkstyle Report
This document provides the results of the Checkstyle report. This report provides an indication of how well this project complies with its coding conventions.
Transfers
Maven - Checkstyle Results
The JUNITPP Project - ...

CheckStyle Plugin

- Various coding styles can be defined
  - Sun coding convention
  - Turbine coding convention
  - Roll your own coding convention (if you really have to)
- Rules are customizable through *project.properties*
  - Maximum line length of 100 instead of 80 characters
  - Patterns for constants and variables
  - Setting a differnt tab width

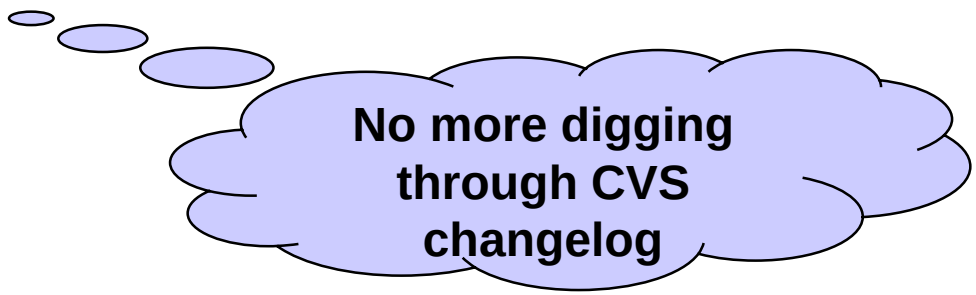


CheckStyle Plugin

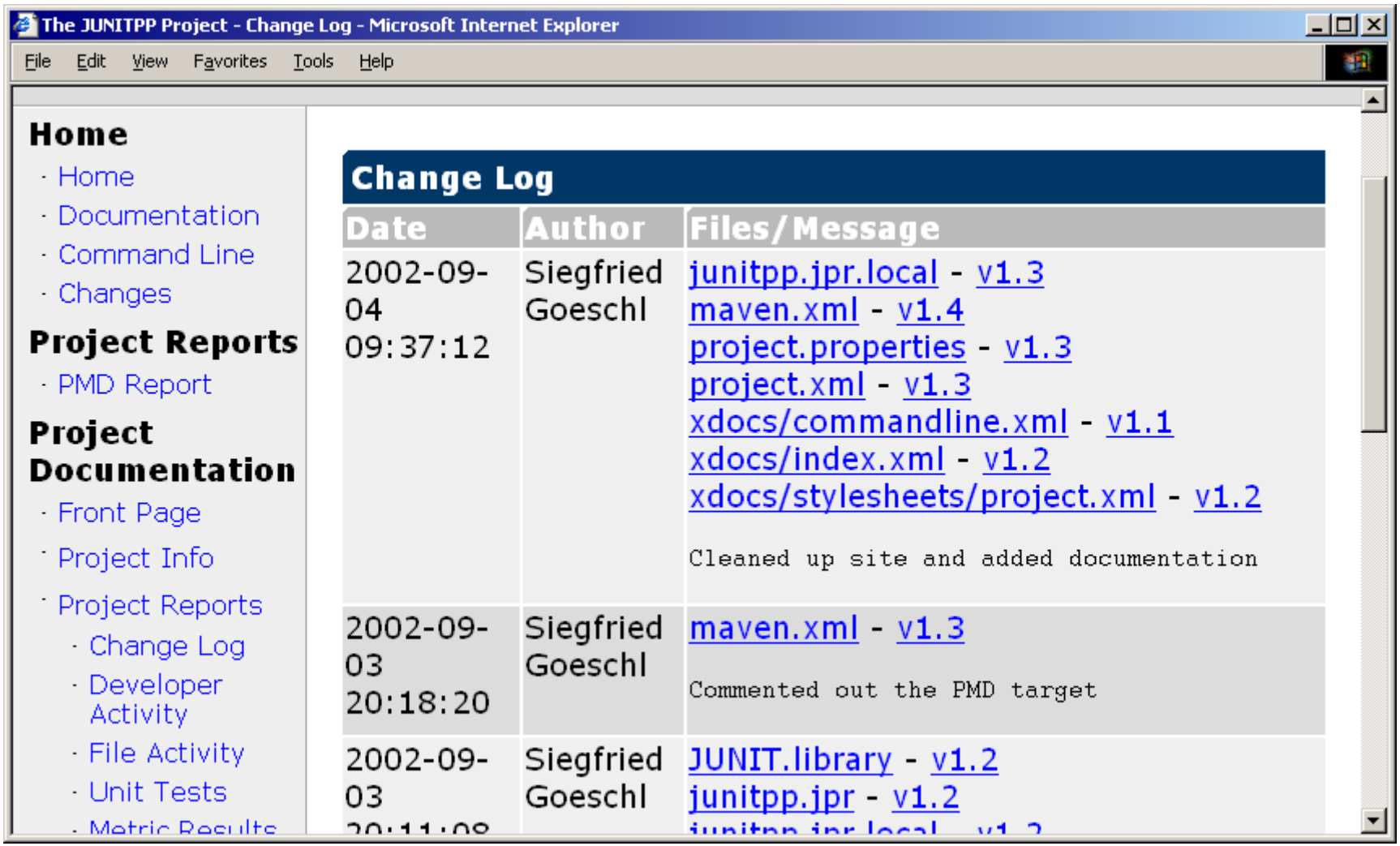


Activity Plugin

- Plugin accesses CVS directly to extract development activity information
- Extracts information about
  - Changes and commits
  - Number of commits per developer
  - Number of changes for a file
- Ongoing work to support VSS and ClearCase

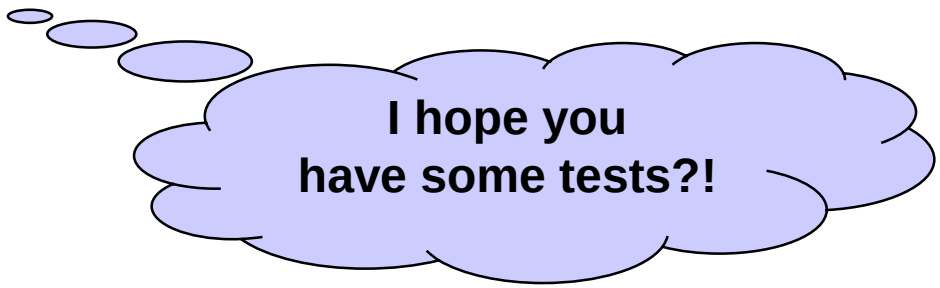


Activity Plugin

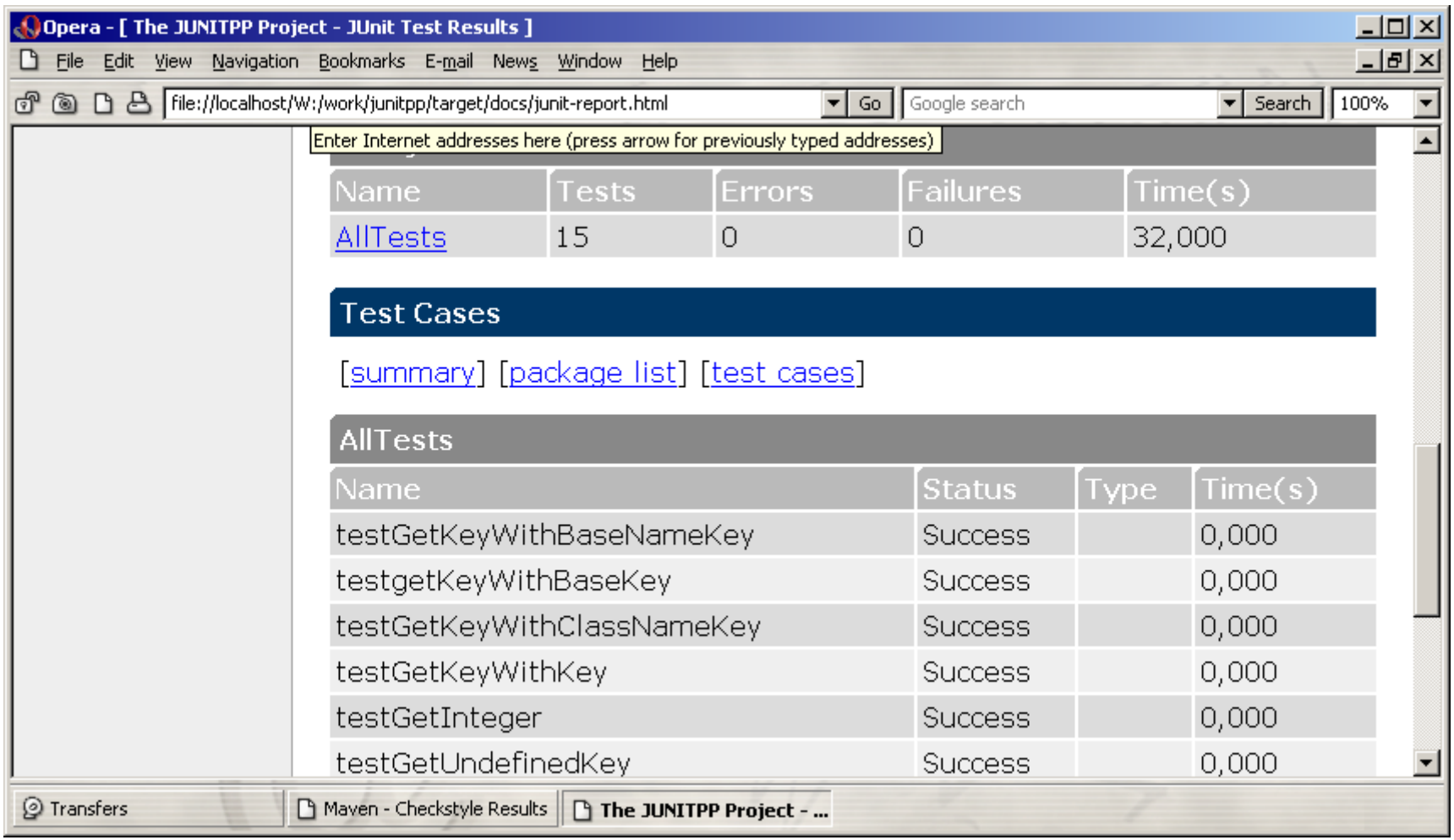


Test Plugin

- Runs **JUNIT** test case
- The plugin creates a **XDOC** report
- The **XDOC** report is then transformed to HTML
- The **JUNIT** test report is then integrated within the generated project site



Test Plugin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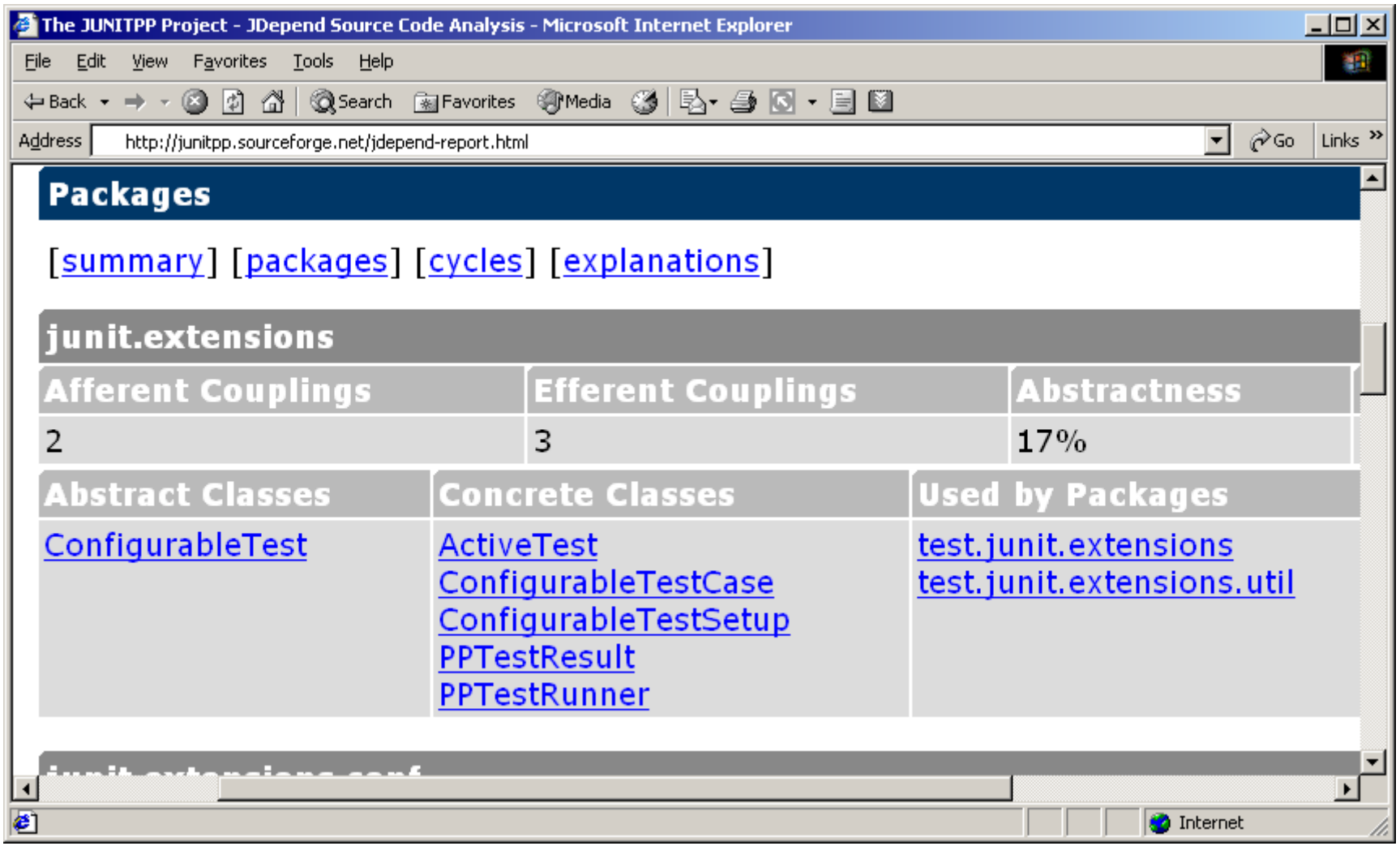
AllTests 15 0 0 32,000
Test Cases
[summary] [package list] [test cases]
AllTests
Name Status Type Time(s)
testGetKeyWithBaseNameKey Success 0,000
testgetKeyWithBaseKey Success 0,000
testGetKeyWithClassNameKey Success 0,000
testGetKeyWithKey Success 0,000
testGetInteger Success 0,000
testGetUndefinedKey Success 0,000
Transfers
Maven - Checkstyle Results
The JUNITPP Project - ...

JDepend Plugin

- Is using **JDepend** from ClarkWare
- Reports package dependencies
- Finds cyclic dependencies
- Generates a HTML report to be included into project website

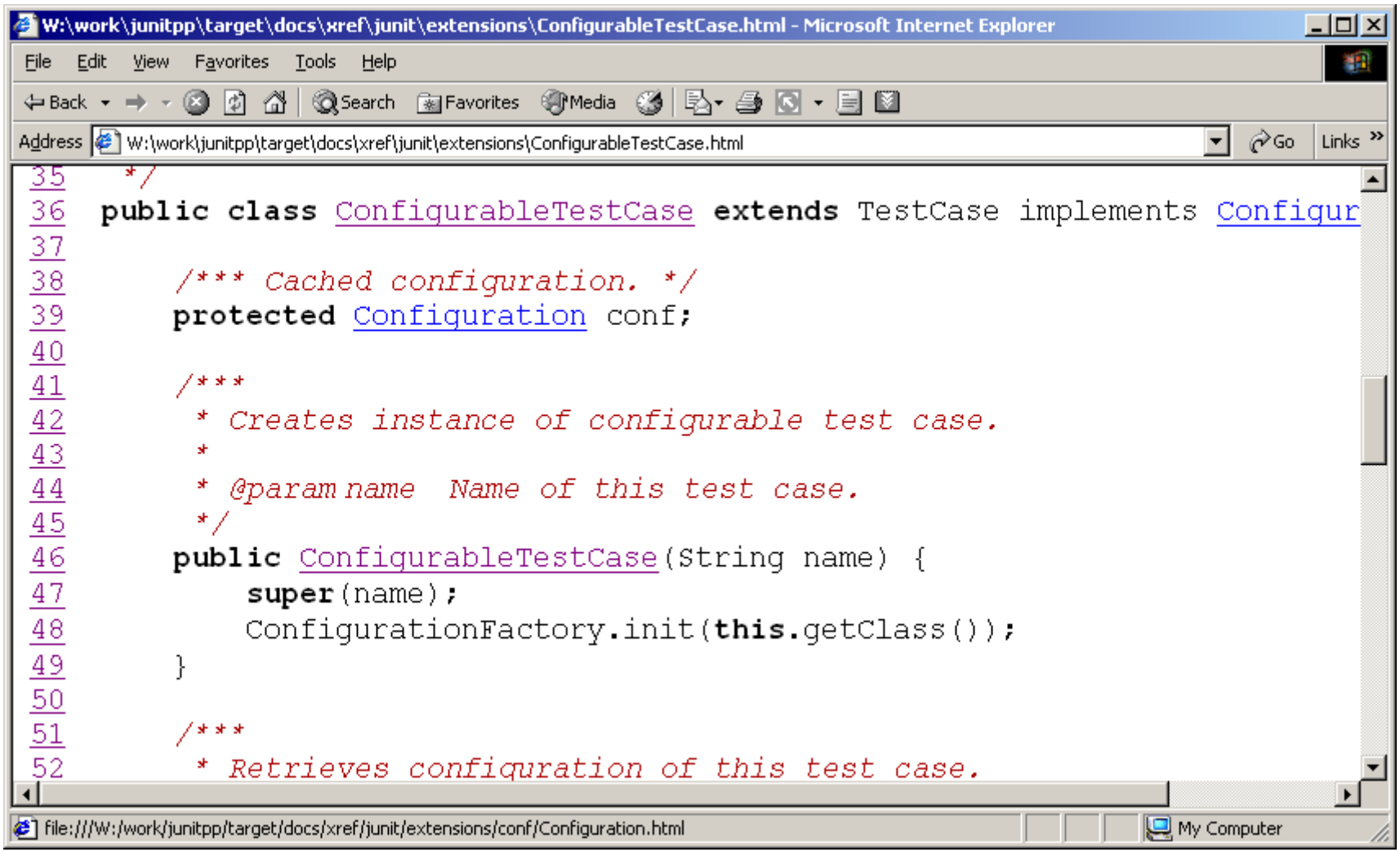
JDepend Plugin



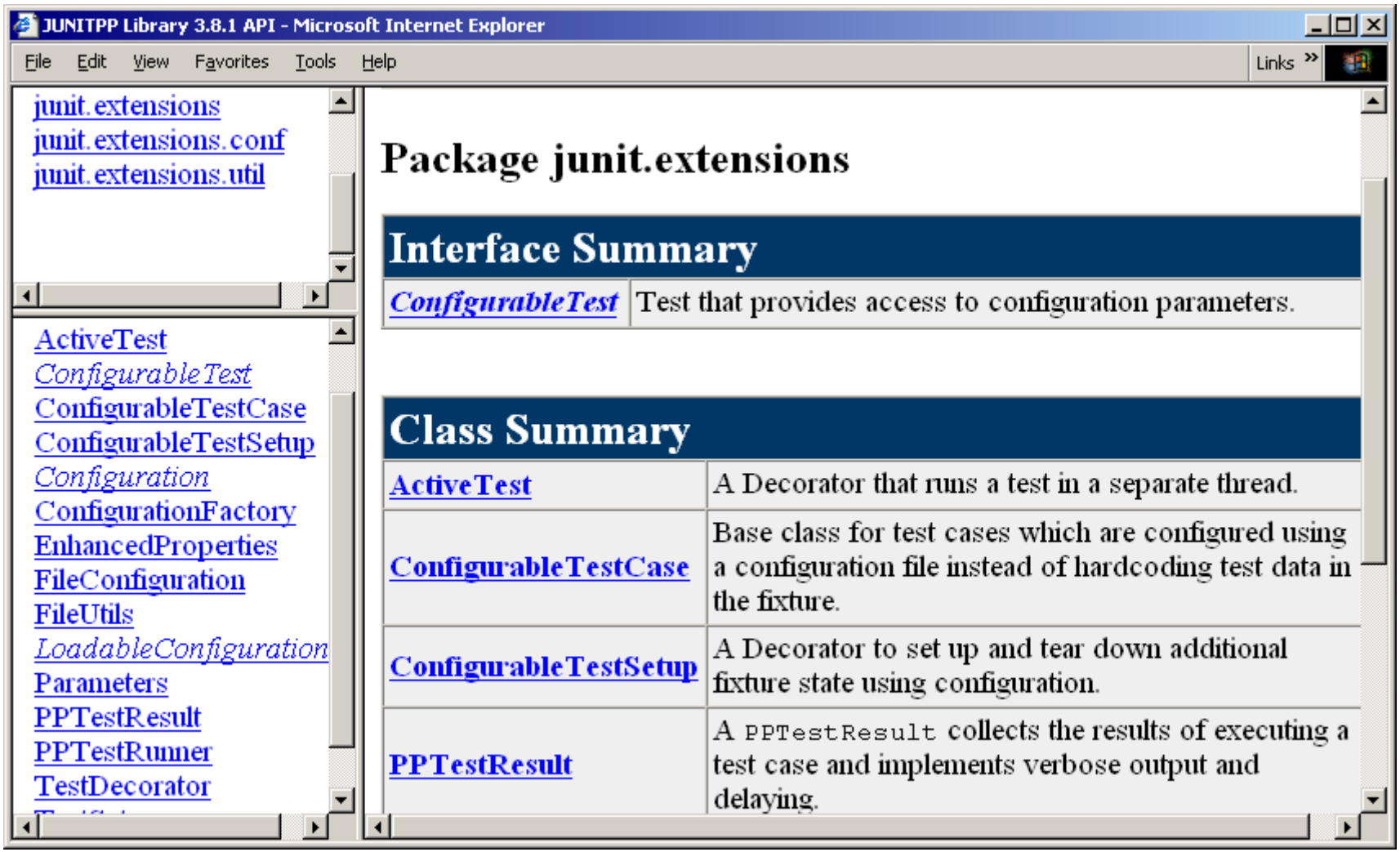
Java Cross Reference Plugin

- Transforms source files into HTML files
- Provides syntax coloring and hypertext linking
- Allows linking between reports and actual source code as done with
  - CheckStyle plugin
  - PMD plugin

Java Cross Reference Plugin



JavaDoc Plugin



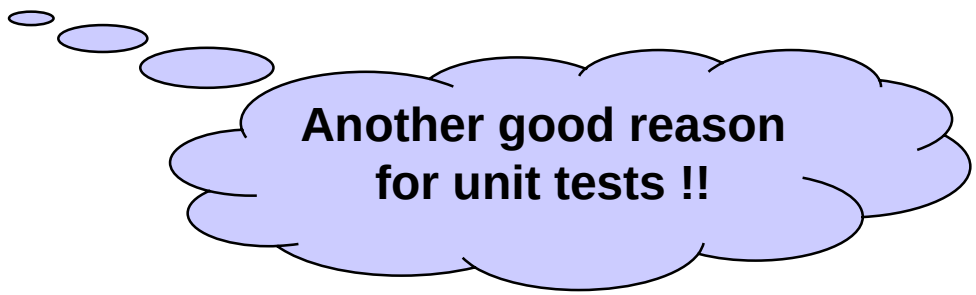
No More Slides ...

Custom Plugins

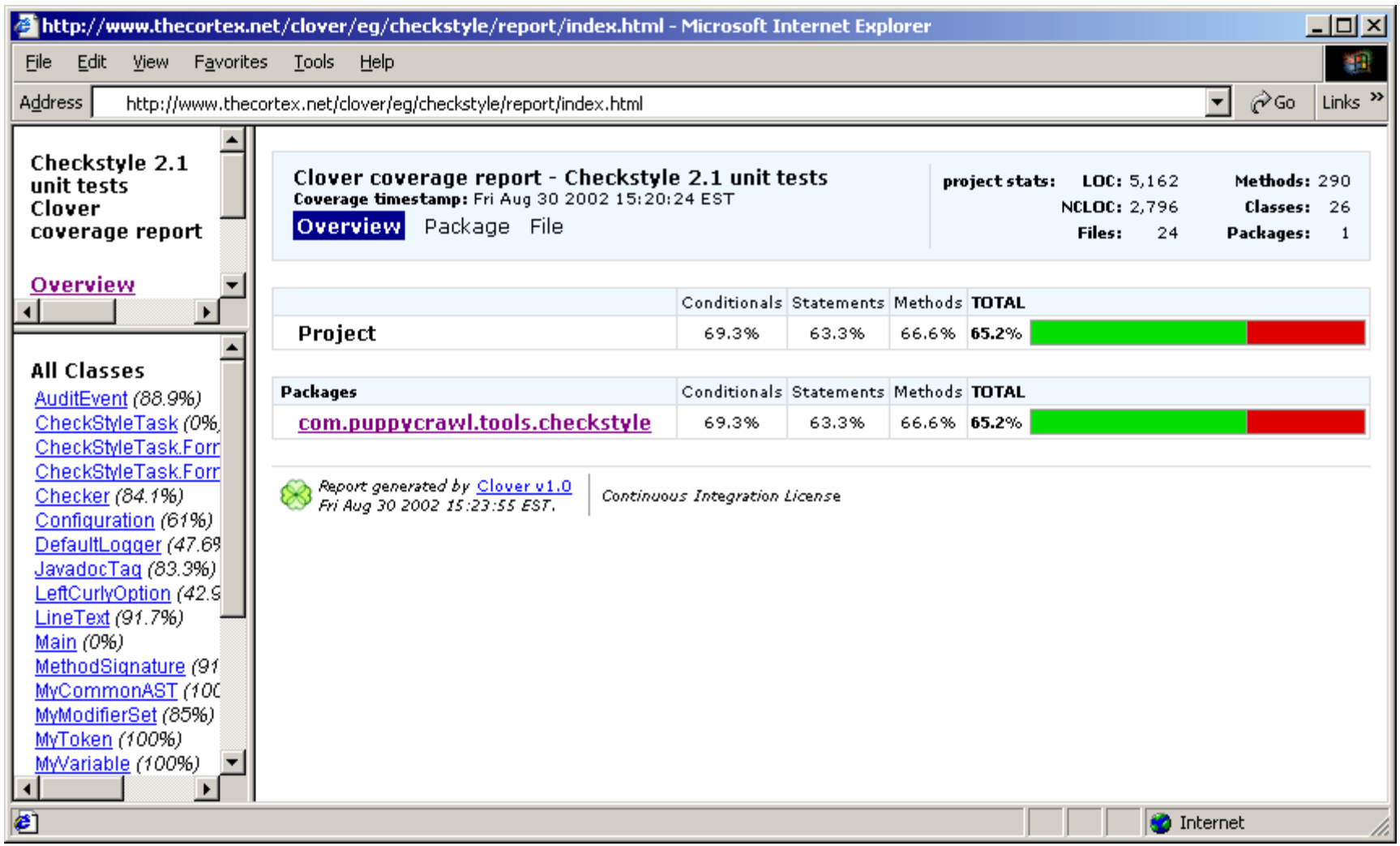
- Everything in **Maven** is a plugin
- Feel free to roll and contribute your own plugins
- Deployment of plugins as JAR files being dropped into the maven plugin directory
- There are many plugins available
  - **CLOVER** Code Coverage Analyzer
  - **PMD** Static Source Code Analyzer
  - **JavaNCSS** Java Source Code Metric Analyzer
  - **Word2HTML**
  - **...**

Clover Test Coverage Plugin

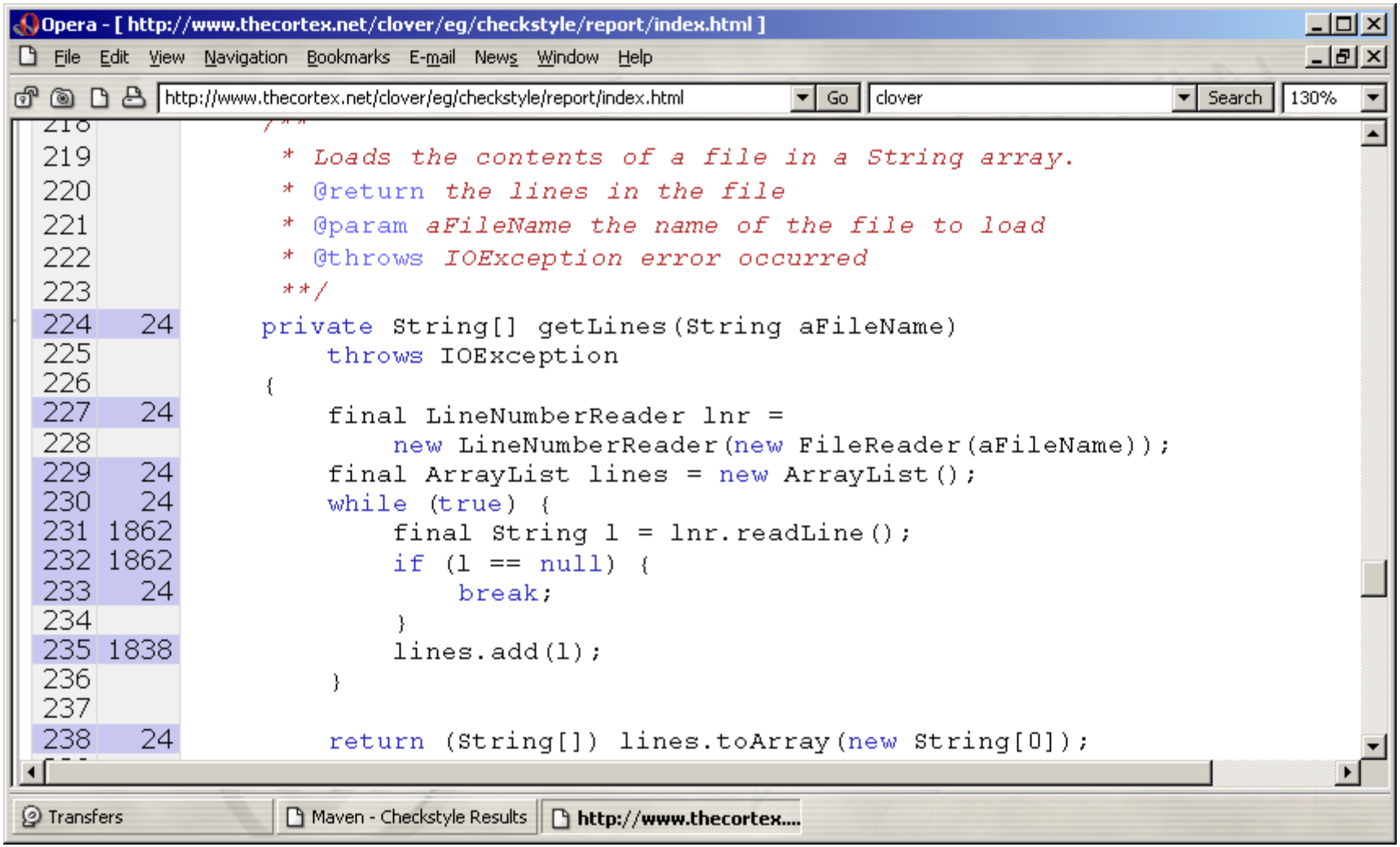
- Commercial software from ***The Cortex***
- Instruments the **JUNIT** test case code
- Generates a HTML test coverage report
  - Conditional Coverage
  - Statement Coverage
  - Method Coverage
- Integrated into generated project site through Maven



Clover Test Coverage Plugin



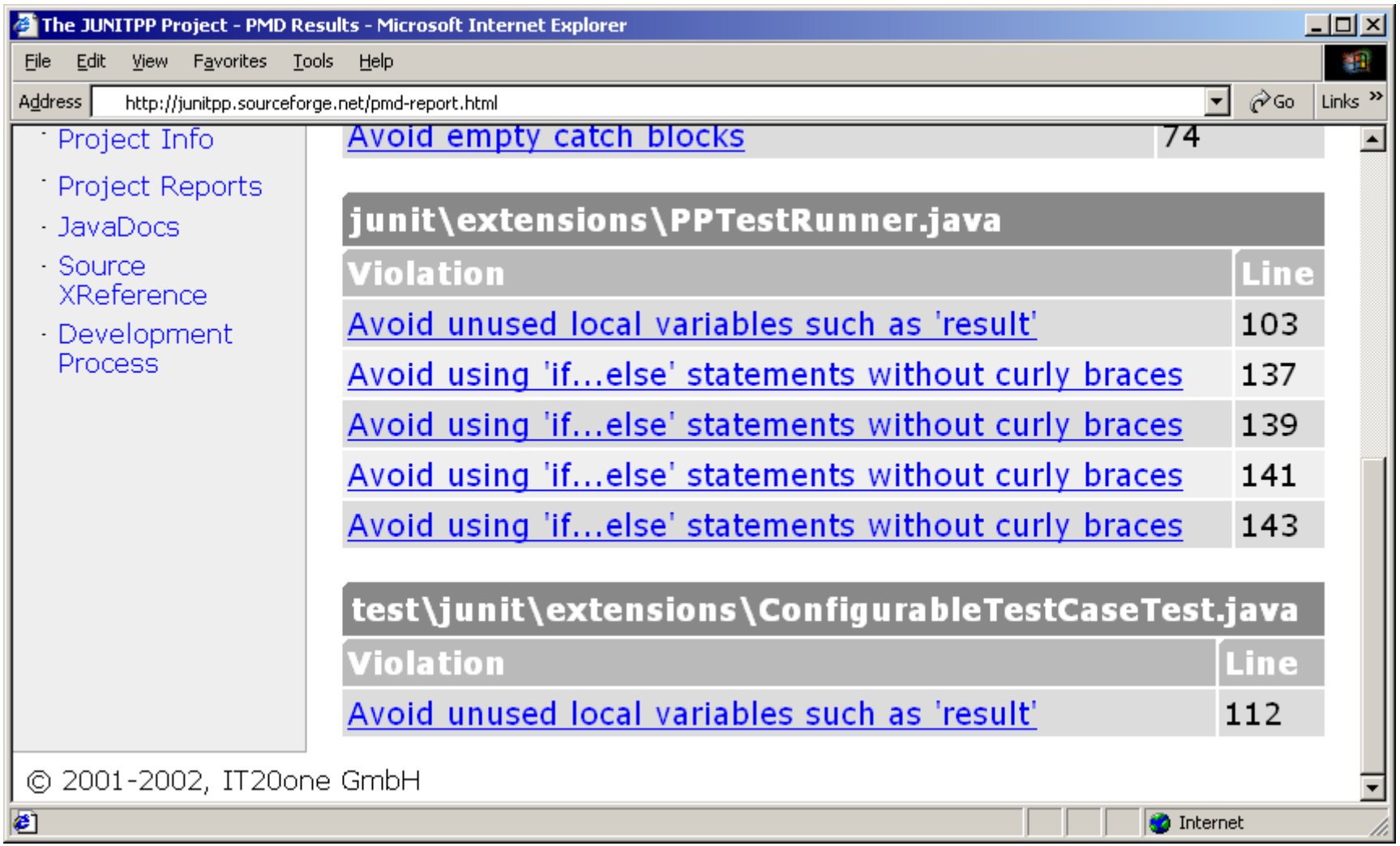
Clover Test Coverage Plugin



PMD Plugin

- **PMD** is a static source code analyzer
- **PMD** is rule driven
  - Basic rules
  - Import rules
  - Unused code rules
  - Naming rules
  - Design rules
- The plugin creates an HTML report with linking to the Source Cross Reference

PMD Plugin


The JUNITPP Project - PMD Results - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://junitpp.sourceforge.net/pmd-report.html
Go Links
Project Info
Project Reports
JavaDocs
Source XReference
Development Process
Avoid empty catch blocks 74
junit\extensions\PPTestRunner.java
Violation Line
Avoid unused local variables such as 'result' 103
Avoid using 'if...else' statements without curly braces 137
Avoid using 'if...else' statements without curly braces 139
Avoid using 'if...else' statements without curly braces 141
Avoid using 'if...else' statements without curly braces 143
test\junit\extensions\ConfigurableTestCaseTest.java
Violation Line
Avoid unused local variables such as 'result' 112
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Internet

JavaNCSS Plugin

- **JavaNCSS** is a source code metric analyzer
- Determines simple metrics
  - Number of packages
  - Number of classes
  - Number of functions
  - Number of non-commented lines of code
  - Number of JavaDoc lines
- Generates an XML report which is transformed to HTML using a XSL stylesheet

JavaNCSS Plugin

JavaNCSS Analysis - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Packages

Nr.	Classes	Functions	NCSS	Javadocs	Package
1	1	2	7	3	javax.mail.internet
2	3	29	307	32	org.webdocwf.util.smime.activation
3	30	75	591	105	org.webdocwf.util.smime.cms
4	4	22	173	26	org.webdocwf.util.smime.crypto
5	17	50	658	67	org.webdocwf.util.smime.der
6	3	15	318	18	org.webdocwf.util.smime.exception
7	1	2	66	3	org.webdocwf.util.smime.mail
8	3	59	857	62	org.webdocwf.util.smime.smime
9	13	17	931	18	org.webdocwf.util.smime.test
10	7	41	622	48	org.webdocwf.util.smime.util
	82	312	4530	382	Total

Packages	Classes	Functions	NCSS	Javadocs	per
10,00	82,00	312,00	4.530,00	382,00	| Project
	8,20	31,20	453,00	38,20	| Package
		3,80	55,24	4,66	| Class
			14,52	14,52	| Function

The Future

- Support of other version control systems for generating the activity report
  - Microsoft‘s Visual Source Safe
  - Rational‘s ClearCase
  - Perforce
- POM Inheritance Mechanism to simplify **mavenizing** multiple projects
- **Quilt** intergration as Open Source alternative to **Clover**
- There is a Source Forge Maven Plugin-in project

Conclusion

- **Maven** is an Open Source project build and comprehension tool developed by the **JAKARTA** community
- **Maven** is an integration platform for software engineering tools using a plug-in mechanism
- **Maven** provides a remote and local JAR repository to simplify upgrading of JARs
- **Maven** could be the answer to a lot of your software engineering problems
- And last but not least

Maven rocks ...

Any questions !?

Related Links

Maven	http://jakarta.apache.org/turbine/maven/
JavaNCSS	http://www.kclee.com/clemens/java/javancss/
PMD	http://pmd.sourceforge.net/
Turbine	http://jakarta.apache.org/turbine/index.html
Clover	http://www.thecortex.net/clover/
JDepend	http://www.clarkware.com/software/JDepend.html
Jelly	http://jakarta.apache.org/commons/sandbox/jelly/
Maven Plug-ins	http://maven-plugins.sourceforge.net/
ANT	http://jakarta.apache.org/ant/index.html
QUILT	http://quilt.sourceforge.net/
DVSL	http://jakarta.apache.org/velocity/dvsl/index.html

Plugin Development

- The plugins are implemented in Jelly
  - Jelly is a XML scripting language similar to ANT
  - Allows conditionals and loops
  - Compatible to ANT scrips
- A plugin exports goals which are invoked
  - Directly by a script
  - As pregoal or postgoal within Maven
- A plugin can
  - Start external application
  - Fork a JVM to execute Java code
  - Execute a Java code in-process