

INTRODUCTION TO APACHE TOMCAT 6



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- ✔ fhanik@apache.org
- ✔ Tomcat Committer / ASF member
- ✔ Co-designed the Comet implementation
- ✔ Implemented NIO connector in 6
- ✔ Responsible for session replication and clustering
- ✔ Been involved with ASF since 2001
- ✔ Covalent Geek



- ❖ Covalent is the Leading Provider of Support for Apache Software Foundation Open Source Projects, Namely Tomcat, Geronimo, Axis, & Apache, the World's Leading Web Server*
- ❖ Covalent is One of the Few Sources of Full Commercial Support for Apache, Axis, Geronimo & Tomcat on a Global Basis
- ❖ Covalent Currently Supports More Than 50% of Fortune 500 and 20% of Global 2000 Companies



- Top Level Project – tomcat.apache.org
- 24 committers on file
- Active/core group is much smaller <10
- Find us on dev@tomcat.apache.org
- Work on what interests you and work without guidance



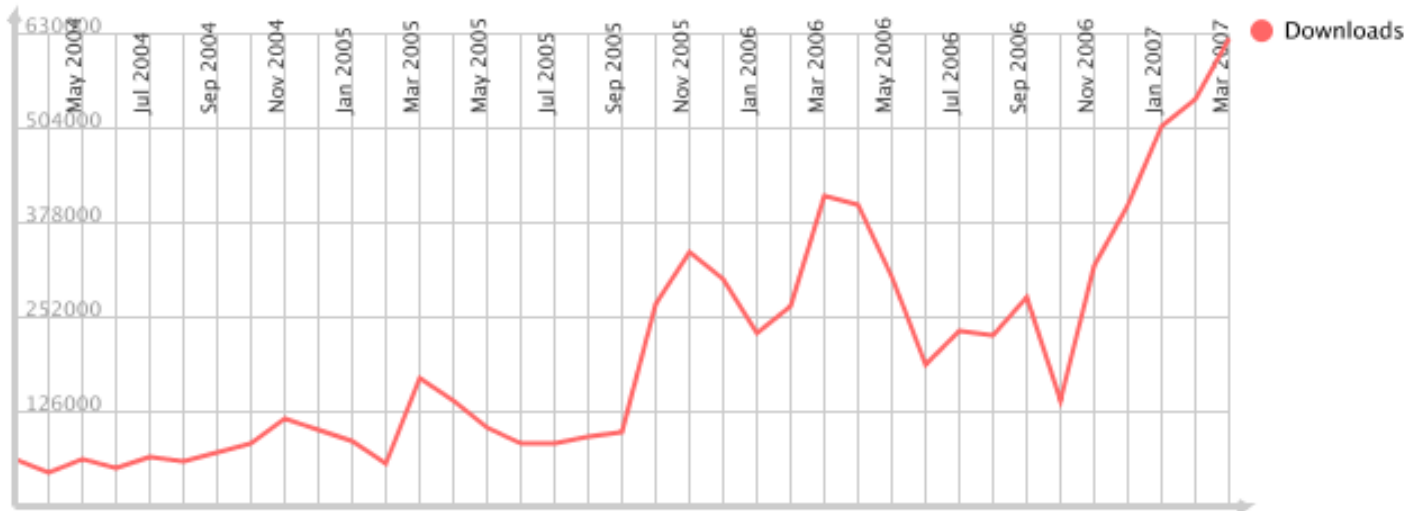
- History
- Tomcat Versions
- Development/Release Lifecycle
- New Features
- How to upgrade
- Q & A



- Started out as a reference implementation by Sun Microsystems
- Donated to ASF – Tomcat 3 (roughly 1999)
- Tomcat 4 – New Specs & First Rewrite – Codename Catalina
- Tomcat 5.0 New Specs
- Tomcat 5.5 – 2nd Rewrite – Performance
- Tomcat 6.0 – New Specs, New Cool Features



- ▶ Actively developed
 - ▶ In average 1 release/month
 - ▶ 10+ active committers
 - ▶ 600.000 downloads/month (not counting mirrors)



Generated on: 2007 Mar 15



Servlet/ JSP Spec		Tomcat version	JDK Version
2.5	2.1	6.0.x	JDK 1.5+
2.4	2.0	5.0.x, 5.5.x	JDK 1.4+
2.3	1.2	4.1.x	JDK 1.3+
2.2	1.1	3.3.x	JDK 1.2+ (?)



- ❖ Development mainly driven by
 - ❖ JSR Specifications
 - ❖ Servlet
 - ❖ JSP
 - ❖ Expression Language
 - ❖ ...
 - ❖ Competitor Features
 - ❖ Committer Ideas
 - ❖ User Ideas



- ✔ Committers work on areas of personal interest
- ✔ No corporate driving force
- ✔ Most Committers are sponsored by their employer to work on Tomcat
 - ✔ Employer respects the time as “ASF hat”
- ✔ Commit-Then-Review
 - ✔ Check in what you’ve done, if it’s wrong someone will complain



- Larger changes are discussed on mailing list until consensus has been reached
- Most commits are reviewed, few are ever slipped in without review
- Rarely are timelines for features discussed



- ✔ Average 1 release per month
 - ✔ Across all versions
- ✔ Release managed by “release manager”
 - ✔ Volunteer within the committer community
- ✔ Release scheduled when
 - ✔ “enough” has been done
 - ✔ Important security issues are discovered and fixed



- ❖ What dictates “stable” release
 - ❖ All TCK tests pass
 - ❖ Around 500 test cases
 - ❖ Candidate binaries have been tested by community in various environments and feedback has been received
 - ❖ 3x +1 votes during a stability vote



- ❖ New Servlet Spec
 - ❖ <http://java.sun.com/products/servlet/>
 - ❖ Maintenance release
 - ❖ Mostly clarifications
 - ❖ Requires minimum JDK 1.5
 - ❖ Must support annotations
 - ❖ web.xml is no longer required
 - ❖ And other minor changes



- ▼ Annotations support
 - ▼ Alternatives to some XML entries in web.xml
 - ▼ **@Resource:**
 - ▼ Class or variable “resource injection” request
 - ▼ **@Resources:**
 - ▼ Similar as **@Resource** but holds the array or **@Resource** annotations
 - ▼ **@RunAs:**
 - ▼ Used to replace `<run-as>` entries in web.xml
 - ▼ **@DeclareRoles:**
 - ▼ Alternative to `<security-role>` in web.xml
- ▼ Come from JSR 250 (Common Annotations for the Java Platform)



- ▼ Away with web.xml
 - ▼ File is no longer required to be a webapp
 - ▼ All you need is war file or directory in the webapps dir



- ❖ New JSP Spec
 - ❖ <http://java.sun.com/products/jsp/>
 - ❖ New unified expression language
 - ❖ And it has its own spec
 - ❖ JspApplicationContext
 - ❖ New TLD handling (deferred expressions)
 - ❖ Annotations
 - ❖ Resource Injection



- Shared (Injectable) Thread Pool Support
- server.xml

```
<Executor name="tpool1"  
    maxThreads="200"  
    minSpareThreads="5"  
    namePrefix="catalina-exec" />  
<Connector ... executor="tpool1" ...
```

- API Based on `j.u.concurrent.Executor`



▼ New Java NIO Connector

```
<Connector ...
```

```
    protocol=
```

```
    "org.apache.coyote.http11.Http11NioProtocol"
```

▼ SEND_FILE support

▼ Supports Comet



▼ Allow multiple url-pattern in servlet-mapping

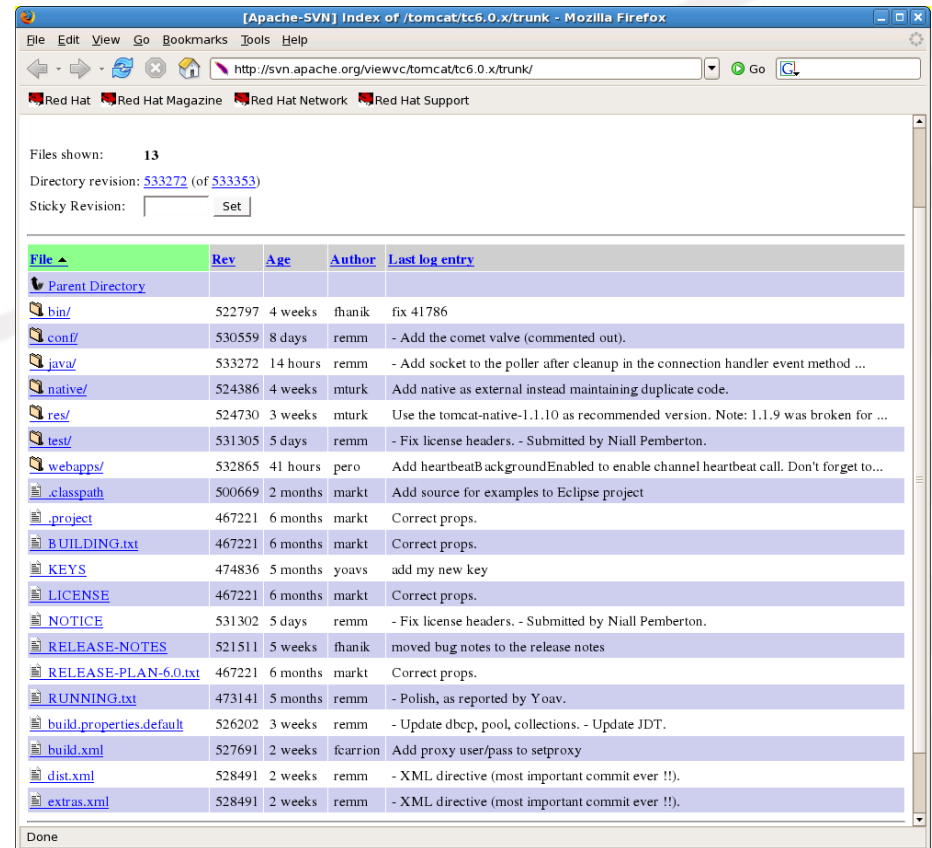
```
<servlet-mapping>  
  <servlet-name>OneFancyServlet</servlet-name>  
  <url-pattern>/foo/*</url-pattern>  
  <url-pattern>/bar/*</url-pattern>  
</servlet-mapping>
```



- ▼ Smaller logging framework
 - ▼ Tomcat JULI
 - ▼ Based on `java.util.logging`
 - ▼ Can be replaced with commons-logging adapter (built through `ant -f extras.xml`)
- ▼ Maven repo
 - ▼ Currently using ASF staging repo
 - ▼ Once some quirks are fixed, all useful Tomcat jars will be deployed to ASF main maven repo



- New subversion layout
- Simple to “build yourself”
- Reduced distro size
- Removal of obsolete items



Files shown: 13
 Directory revision: [533272](#) (of [533353](#))
 Sticky Revision:

File	Rev	Age	Author	Last log entry
Parent Directory				
bin/	522797	4 weeks	fhanik	fix 41786
conf/	530559	8 days	remm	- Add the comet valve (commented out).
java/	533272	14 hours	remm	- Add socket to the poller after cleanup in the connection handler event method ...
native/	524386	4 weeks	mturk	Add native as external instead maintaining duplicate code.
res/	524730	3 weeks	mturk	Use the tomcat-native-1.1.10 as recommended version. Note: 1.1.9 was broken for ...
test/	531305	5 days	remm	- Fix license headers. - Submitted by Niall Pemberton.
webapps/	532865	41 hours	pero	Add heartbeatB backgroundEnabled to enable channel heartbeat call. Don't forget to...
.classpath	500669	2 months	markt	Add source for examples to Eclipse project
.project	467221	6 months	markt	Correct props.
BUILDING.txt	467221	6 months	markt	Correct props.
KEYS	474836	5 months	yoavs	add my new key
LICENSE	467221	6 months	markt	Correct props.
NOTICE	531302	5 days	remm	- Fix license headers. - Submitted by Niall Pemberton.
RELEASE-NOTES	521511	5 weeks	fhanik	moved bug notes to the release notes
RELEASE-PLAN-6.0.txt	467221	6 months	markt	Correct props.
RUNNING.txt	473141	5 months	remm	- Polish, as reported by Yoav.
build.properties.default	526202	3 weeks	remm	- Update dbcp, pool, collections. - Update JDT.
build.xml	527691	2 weeks	fcarrion	Add proxy user/pass to setproxy
dist.xml	528491	2 weeks	remm	- XML directive (most important commit ever !!).
extras.xml	528491	2 weeks	remm	- XML directive (most important commit ever !!).



▼ How to build yourself

1. JDK 1.5, ant and svn installed
2. `svn co`
`http://svn.apache.org/repos/asf/tomcat/tc6.0.x/trunk`
`trunk trunk`
3. `cd trunk`
4. `ant download`
5. `ant`

▼ Binaries in trunk/output/build

▼ Downloads into /usr/share/java

- ▼ Change in `build.properties.default`



- ✔ New distribution layout
- ✔ common/*, server/*, shared/* are gone
 - ✔ Replaced by lib
 - ✔ ClassLoader directories can still be configured through `conf/catalina.properties`
- ✔ Windows Service Wrapper available in 32 and 64 bit formats
- ✔ Distributions are smaller

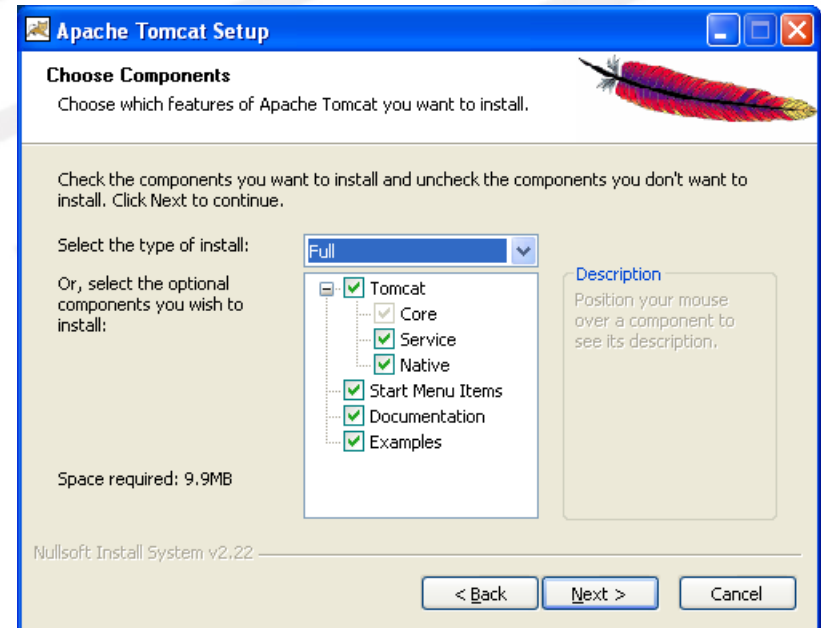
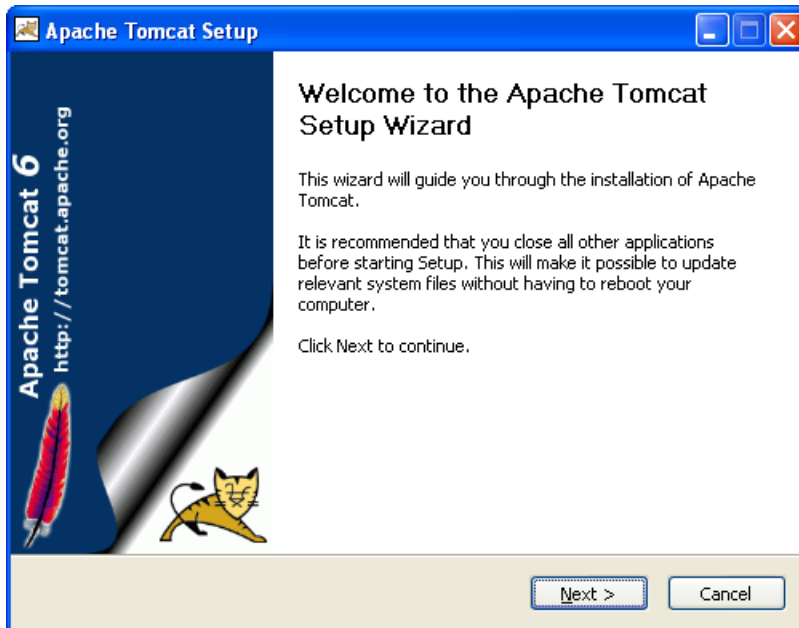


- ▼ Web Services support (JSR 109)
 - ▼ Tomcat provides factories for JSR 109 which may be used to resolve web services references.
Place the generated `catalina-ws.jar` as well as `jaxrpc.jar` and `wsdl4j.jar` (or another implementation of JSR 109) in the Tomcat `/lib/` folder.



Windows Installer

- Installs and setup the Tomcat as a Windows service
- Optionally download native `tcnative-1.dll` component located at heanet.ie





- ❖ Comet – aka Zero Latency HTTP
 - ❖ Ability to do “server push” instead of the traditional “client poll”
 - ❖ Keeps “connection open”
 - ❖ Ability to be handled asynchronously
 - ❖ Single thread – thousands of connections
 - ❖ Servlet that implements CometProcessor interface



- ❖ Different Connectors
- ❖ HTTP Connector – protocol=
 - ❖ `o.a.coyote.http11.Http11Protocol`
 - ❖ `o.a.coyote.http11.Http11AprProtocol`
 - ❖ `o.a.coyote.http11.Http11NioProtocol`
 - ❖ HTTP/1.1 aliased to `Http11` and `Http11Apr`
 - ❖ Depending on `PATH` or `LD_LIBRARY_PATH` settings
- ❖ AJP Connector
 - ❖ `org.apache.jk.server.JkCoyoteHandler`
 - ❖ `org.apache.coyote.ajp.AjpAprProtocol`
 - ❖ AJP/1.3 aliased to the two above
 - ❖ Depending on `PATH` or `LD_LIBRARY_PATH` settings



- log4j support
- ant -f extras.xml
- cp output/extras/tomcat-juli.jar to <TC_HOME>/bin (replace)
- cp output/extras/tomcat-juli-adapters.jar to <TC_HOME>/lib
- For log4j
 - cp log4j.jar to <TC_HOME>/lib
 - cp log4j.properties to <TC_HOME>/lib



- Additional Windows Service Support
- Java Service Wrapper
 - Independent from ASF
 - Additional features that are not available with Tomcat's wrapper (like thread dumps)
 - <http://wrapper.tanukisoftware.org/>
- Sample install/download
 - <http://people.apache.org/~fhanik/wrapper.html>



- ✔ Fully supported by Covalent
- ✔ Covered under existing Tomcat support plans
- ✔ Currently support ASF version
- ✔ Next major ERS will include Tomcat 6
- ✔ 6.0.13 or higher is right around the corner



- ✔ Tomcat 6 is not a rewrite
- ✔ Stability and Performance improvements from 5.5
- ✔ 6.0 is slowly becoming maintenance branch
- ✔ Only new features around Comet are going into 6.0.x
- ✔ 6.x has not yet been mapped out



- ✔ Easy from 5.0 and 5.5
 - ✔ Almost seamless
 - ✔ Just mind any extra additions you might have added into commons/lib, shared/lib etc
- ✔ Harder from 3.3 and 4.1
 - ✔ Major spec changes
 - ✔ Major layout changes
- ✔ Recommendation
 - ✔ Start with fresh 6.0 server.xml, don't reuse your old one
 - ✔ Same for other Tomcat config files



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 - ✔ www.covalent.com
 - ✔ 800/444-1935 or 925/974-8800
- ✔ Question and Answer time!!



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