State of the Cat New !

New and upcoming features in Apache Tomcat ™
Tomcat 10.1 and beyond

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Welcome to the Tomcat track

12:10 AM: HTTP/2, HTTP/3, the state of the art in our servers

2:20 PM: Panama: A case study with OpenSSL and Tomcat

3:10 PM: Automating your Tomcat with Ansible

4:10 PM: Proxying to Tomcat with Httpd

5:00 PM: Migrating from AJP to HTTP: It's about time

Contents

State of the Cat

Current releases

8.5.82: Java EE 7 / Java 7

9.0.67: Java EE 8 / Java 8

10.0.26: Jakarta EE 9 / Java 8

10.1.0: Jakarta EE 10 / Java 11

Native 1.2.35 / 2.0.1

Monthly release schedule

	O	N	D	J	F	M	A	M	J	J	A	S
10.1	M6	M7	M8	M10	M11	M12	M14	M15	M16	M17		0
10.0	12	13	14	16	17	18	20	21	22	23		26
9.0	54	55	56	58	59	60	62	63	64	65		67
8.5	72	73		75	76	77	78	79	81		82	
Native 2.0										1		
Native 1.2						32		33	34	35		

Major branches lookahead

8.5: full support

9.0: full support

10.0: EOL to be announced very soon

10.1: now stable (release on 09/26)

11: development starting soon

Notable security issues

CVE-2021-43980: Information disclosure caused by concurrency problems when recycling processor.

CVE-2021-42340: Memory leak with upgraded connections, for example WebSocket connections.

CVE-2022-25762: Tomcat 8.5 only. WebSocket concurrent activity with a socket close could lead to subsequent request mix up.

Need to update to at least 8.5.78, 9.0.62, 10.0.20 (April 2022 releases)

Project status

New committer: Han Li

Resources

Tomcat git, PRs welcome: https://github.com/apache/tomcat

Translations at POEditor: https://poeditor.com/projects/view?id=221603

Past presentations: https://tomcat.apache.org/presentations.html

Jakarta EE Support

Tomcat 10.0

Start of plan: https://cwiki.apache.org/confluence/display/TOMCAT/Jakarta+EE+Release+Numbering

Jakarta Servlet 5.0, Jakarta Server Pages 3.0. Jakarta Expression Language 4.0, Jakarta WebSocket 2.0, Jakarta Authentication 2.0 and Jakarta Annotations 2.0 support from Jakarta EE 9, no Java EE 8 support

Stable releases

Jakarta EE TCK tested

EOL announcement coming very soon, superseded by Tomcat 10.1

Tomcat 10.1

We're here !

Beta releases since M16, Stable 10.1.0 release now available

Jakarta Servlet 6.0, Jakarta Server Pages 3.1, Jakarta Expression Language 5.0, Jakarta WebSocket 2.1, Jakarta Authentication 3.0 and Jakarta Annotations 2.0 support from Jakarta EE 10

API and behavior changes over Jakarta EE 9

Servlet features

Deprecated items removal (Servlet single thread model removed)

Cookies modernized to RFC 6265, some deprecation (comments, version, etc), new setAttribute(name, value)

Process for decoding and normalizing URIs has been clarified

New methods and classes have been added to provide access to unique identifiers for the current request and/or associated connection

JSP and EL features

Servlet single thread model removed, JSP isThreadSafe now synchronized

errorOnELNotFound propagates EL unresolvable identifiers as errors

jsp:plugin is now a noop due to browser support removal

EL API now uses generics where appropriate

Deprecated MethodExpression.isParmetersProvided() method has been removed

WebSocket features

New ServerContainer.upgradeHttpToWebSocket() and allow runtime deployment of endpoints

Allow WebSocket POJO to be used on upgrade

Client-side API for configuring TLS connection for wss client connections

New ServerEndpointConfig.Configurator.getContainerDefaultConfigurator()

Tomcat 11

Starting soon !

Jakarta EE 11 support

Tomcat 9.11 will be the Java EE 8 equivalent

Tomcat 9.0 support continues

Tomcat 8.5 EOL

Tomcat 12

Jakarta EE 12 support

Tomcat 9.12 will be the Java EE 8 equivalent

Tomcat 9.0 support continues

Tomcat 9.11 EOL

Tomcat 13

Jakarta EE 13 support

Tomcat 9.13 will be the Java EE 8 equivalent

Tomcat 9.0 EOL

Tomcat 9.12 EOL

Tomcat 10.1 EOL

Tomcat N

Jakarta EE N support

Tomcat 9.N will be the Java EE 8 equivalent

Tomcat 9.(N-1) EOL

Tomcat (N-3) EOL

Jakarta EE Migration Tool 1.0

Helps migration from javax.* packages to jakarta.*

Static build time tool

Produces ready to use deployments or JARs

Supports different EE profiles and special cases using CLI options

Now also integrated into Tomcat deployment

Migration Tool demo

- **Uses the full example webapp from Tomcat 9**
- **WebSockets, Servlets, JSPs, EL, bundles JSTL**
- **Step by step migration process to run it on Tomcat 10**
- **Different ways to deploy**
- **Special cases and workarounds**

OpenSSL support

Reminder: APR connectors removal

HTTP and AJP APR connectors

Removed starting with Tomcat 10.1

Tomcat 10.0 advertised the upcoming removal

APR connectors remain supported in Tomcat 8.5 and 9.0

OpenSSL available with NIO and NIO2

Native 2.0

Remove APIs used by APR connectors

High level TLS APIs (similar to java.io JSSE) are removed

Much smaller than Native 1.2

Panama

Equivalent to Native 2.0, but much more cloud friendly

Java 17 support (JEP 412 incubator API)

Preview API in Java 19, then 20, regular API in Java 21

OpenSSL 1.1 and 3.0 support

No support for OpenSSL alternatives

OpenSSL using Java 17

OpenSSL works on Java 17 with "scary" JVM parameters

https://github.com/apache/tomcat/tree/main/modules/openssl-java17

Handshake benchmark: Slightly slower than Tomcat Native, faster than JSSE

OpenSSL using Java 20

OpenSSL works on Java 20 with only "--enable-preview" JVM parameter (and a warning in logs)

https://github.com/apache/tomcat/tree/main/modules/openssl-foreign

To be integrated into Tomcat main tree with Java 21

TLS refinements

Remove support for NPN in favor of ALPN

Enable use of FIPS for OpenSSL 3

OpenSSL TLS 1.3 cipher configuration

Warning for invalid CLIENT-CERT configurations (such as TLS 1.3 and JSSE)

Better support for PKCS#1 formatted private keys

Dedicated loggers for TLS handshake failures

Others

Java 11 required for Tomcat 10.1

Finally migrate code from Java 8

Remove use of finalize(), in favor of Cleaner

Remove some NIO workarounds

JSP source version and target version is now Java 11

Linux dual accept issue

Acceptor would accept a single connection twice

Now detected and caught

Fixed in kernel 5.10+

Project Loom

Conflicts with Jakarta EE design

Some low level Tomcat components updated for testing

More significant updates in Tomcat 11

Misc

Custom caching strategies for web application resources

Support for additional user attributes to TomcatPrincipal and GenericPrincipal

New maxHttpRequestHeaderSize and maxHttpResponseHeaderSize attributes allow setting maximum HTTP header sizes independently

Support for reproducible builds, using same Ant version and same JDK (vendor, version and platform)

Looking ahead