

Instrument Tomcat

To instrument applications on Apache Tomcat, add the Java Agent JAR location to the JVM options, as described here.

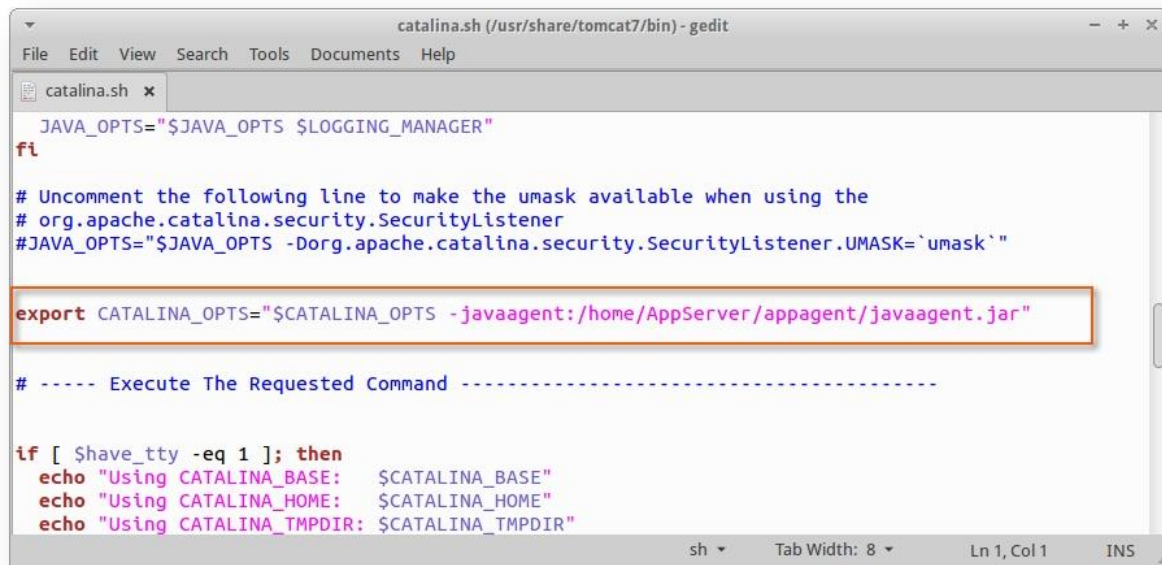
Configure Tomcat in a Linux Environment

1. Open the catalina.sh file located at <apache_version_tomcat_install_dir>/bin.
2. Add the -javaagent argument to the Catalina environment variables. You can put this command anywhere in the file before the command execution portion of the script.

```
export CATALINA_OPTS="$CATALINA_OPTS -  
javaagent:<agent_home>/javaagent.jar"
```

3. Replace <agent_home> with the full path to the Java Agent JAR file.

1. For example:



The screenshot shows a gedit editor window titled 'catalina.sh (/usr/share/tomcat7/bin) - gedit'. The editor displays the contents of the catalina.sh script. A line is highlighted with a red box: `export CATALINA_OPTS="$CATALINA_OPTS -javaagent:/home/AppServer/appagent/javaagent.jar"`. The script includes comments about umask and a section for executing the requested command. The status bar at the bottom indicates 'sh', 'Tab Width: 8', 'Ln 1, Col 1', and 'INS'.

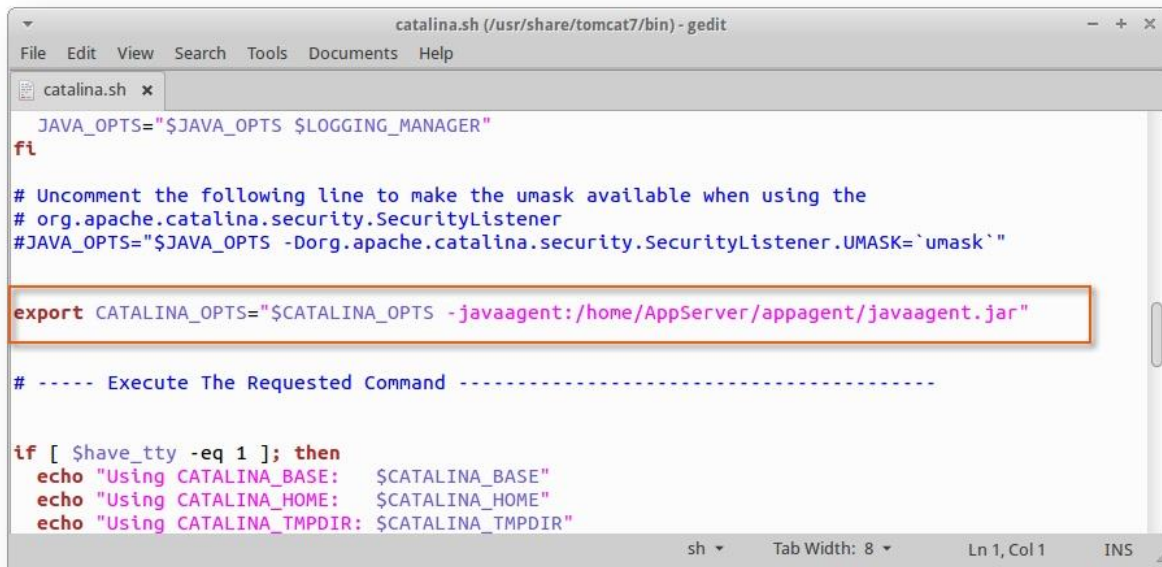
2. Restart the application server. The application server must be restarted for the changes to take effect.
3. Restart the application server. The application server must be restarted for the changes to take effect

Configure Tomcat in a Windows Environment

1. Open the **catalina.bat** file, located at <apache_version_tomcat_install_dir>\bin.
2. Add the following command to set the environment for Catalina anywhere in the file before the command execution portion of the script.

```
set CATALINA_OPTS=%CATALINA_OPTS% -javaagent:"Drive:<agent_home>\javaagent.jar"
```

3. Replace <agent_home> with the fully qualified path to the Java Agent JAR file. For example:



```
catalina.sh (/usr/share/tomcat7/bin) - gedit
File Edit View Search Tools Documents Help
catalina.sh x
JAVA_OPTS="$JAVA_OPTS $LOGGING_MANAGER"
fi
# Uncomment the following line to make the umask available when using the
# org.apache.catalina.security.SecurityListener
#JAVA_OPTS="$JAVA_OPTS -Dorg.apache.catalina.security.SecurityListener.UMASK=umask"
export CATALINA_OPTS="$CATALINA_OPTS -javaagent:/home/AppServer/appagent/javaagent.jar"
# ----- Execute The Requested Command -----
if [ $have_tty -eq 1 ]; then
echo "Using CATALINA_BASE:  $CATALINA_BASE"
echo "Using CATALINA_HOME:  $CATALINA_HOME"
echo "Using CATALINA_TMPDIR: $CATALINA_TMPDIR"
```

Restart the application server. The application server must be restarted for the changes to take effect.

Configure Tomcat as a Windows Service

When running Tomcat as a Windows service, add the javaagent argument to your Tomcat startup properties. These instructions apply to Apache Tomcat 6.x or later versions.

To install the Java agent in Tomcat running as a Windows service

1. Ensure that you are using administrator privileges.
2. Click **Programs > Apache Tomcat > Configure Tomcat**.
3. Click the **Java** tab and in the **Java Options** add:

```
-javaagent:"<agent_home>\javaagent.jar"
```

4. Restart the Tomcat service to have the changes take effect.

JVM Support

The AppDynamics Java Agent supports applications running with a JRE or a full JDK. These are the known JVM environments in which the Java Agent has been used to instrument applications.

Vendor	Implementation	Version	Operating System	Object Instance Tracking	Automatic Leak Detection ¹	Custom Memory Structures		
						Content Inspection	Access Tracking	Requires JVM Restart?
Oracle	Java HotSpot	7 Update 45+	Solaris Sparc 64 Windows Linux	-	-	-	-	-
BEA	JRockit	1.5	-	-	Yes	Yes	Yes	Yes
BEA	JRockit	1.6, 1.7	-	-	Yes	Yes	-	-
Oracle	JRockit JVM	28.1+	Linux Intel 64 Windows	-	-	-	-	-
IBM	JVM	1.5.x, 1.6.x, 1.7.x	-	-	Yes ²	Yes ^{2,3}	-	-
SUN	JVM	1.5, 1.6, 1.7	-	Yes	Yes	Yes	Yes	-
Open Source	OpenJDK	1.6	Linux, windows, everywhere	-	Yes	-	-	-
HP	OpenVMS	-	-	-	-	-	-	-

Notes:

¹ All JVMs must be restarted after enabling the Automatic Leak Detection feature.

² For IBM JVMs, automatic leak detection and custom memory structure features are available only if you are using the AppDynamics Java Agent for Sun JVM. These features rely on retransformation, which is disabled for the Java Agent for IBM running on an IBM JVM.

³ For IBM JVMs, a restart is required after configuring the custom memory structure.

Application Servers

These are the known application server environments in which the App Agent for Java has been used to instrument applications. Some require additional configuration. Application servers are usually found by the App Agent for Java as an entry point.

Vendor	Application Server / OSGi Runtime	Version	SOA Protocol	RMI Supported	JMX	Entry Points
Apache	Felix	-	-	-	-	Yes
Apache	Sling	-	-	-	-	Yes
Apache	Tomcat	5.x, 6.x, 7.x	-	-	Yes	
Apache	Resin	1.x - 4.x	-	-	-	-
Adobe	Cold Fusion	8.x, 9.x	-	No	-	Yes
	Equinox	-	-	-	-	Yes
Eclipse	Jetty	6.x, 7.x	-	-	-	-
IBM	InfoSphere	8.x	-	-	-	Yes
IBM	WebSphere	6.1	JAX-WS	-	-	Yes
IBM	WebSphere	7.x	JAX-WS	Yes, detect and correlate	Yes for WebSphere PMI	Yes
Open Source	Liferay Portal	-	-	-	-	-
	GlassFish Enterprise Server	2.x	-	-	Yes	Yes
Oracle	GlassFish Server and GlassFish Server Open Source Edition	3.1+	-	-	Yes for AMX	Yes
Oracle and BEA	WebLogic Server	9.x+	JAX-WS	Yes, detect and correlate for 10.x	Yes	Yes

Vendor	Application Server / OSGi Runtime	Version	SOA Protocol	RMI Supported	JMX	Entry Points
	Application Server (OC4J)	-	-	Yes, detect and correlate for 10.x	-	Yes
-	Grails, with Tomcat 7.x, Glassfish v3, Weblogic 12.1.1 (12c)	-	-	-	-	
-	JBoss Server	7+	-	-	-	Yes
-	JBoss Server	4.x, 5.x	-	Yes, detect and correlate	-	Yes
	JBoss AS	6.x, 7.x (standalone)				
	JBoss EAP	6.11, 6.2.0				

Application Server Configuration

For application server environments that require additional configuration, this section provides some information and links to topics that help you configure the environment. Environments in the Application Server Support table that require additional configuration, link to the configuration table below.

Application Server	Topics for Required and Optional Configuration
Apache Felix	To configure Apache Felix for Glassfish To configure Felix for Jira or Confluence See also Unable to get metrics from the Java App Server Agent on GlassFish
Apache Sling	OSGi Infrastructure Configuration#To configure Apache Sling
Apache Tomcat	Apache Tomcat Startup Settings Tomcat as a Windows Service Configuration

Application Server	Topics for Required and Optional Configuration
Apache Resin	Resin Startup Settings
Apache Cold Fusion	Configuration is required for transaction discovery, see Servlet Entry Points
Equinox	To configure Eclipse Equinox
Eclipse Jetty	Jetty Startup Settings
IBM InfoSphere	IBM WebSphere and InfoSphere Startup Settings
IBM WebSphere	IBM WebSphere and InfoSphere Startup Settings
Sun GlassFish Enterprise Server	GlassFish JDBC connection pools can be manually configured using MBean attributes and custom JMX metrics GlassFish Startup Settings Modify GlassFish JVM Options
Oracle GlassFish Server	including GlassFish Server Open Source Edition GlassFish Startup Settings Modify GlassFish JVM Options
Oracle and BEA WebLogic Server	Oracle WebLogic Startup Settings
JBoss Server	JBoss and Wildfly Startup Settings

Message Oriented Middleware Support

These are the known message oriented middleware environments in which the App Agent for Java has been used to instrument applications. Some require additional configuration. Click the link on the messaging server name in the following support matrix for information about additional configuration required or related configuration topics. Message oriented middleware servers are usually found by the App Agent for Java as an entry point.

Vendor	Messaging Server	Version	Protocol	Correlation/Entry Points	Exit Points	JMX
Apache	ActiveMQ	5.x+	JMS 1.x	Yes	Yes	Yes
Apache	ActiveMQ	5.x+	STOMP	No	-	Yes
Apache	ActiveMQ	5.8.x+	AMQP 1.0	No	-	Yes
Apache	ActiveMQ	5.x+	SOAP	Yes	-	Yes
Apache	Axis	1.x, 2.x	JAX-WS	Yes	Yes	-
Apache	Apache CXF	2.1	JAX-WS	Yes	Yes	-
Apache	Synapse	2.1	HTTP	Yes	Yes	-
Fiorano	Fiorano MQ		-	-	-	-
IBM	IBM MQ	6.x, 7.x	-	-	-	-
IBM	IBM Web Application Server (WAS)	6.1+, 7.x	Embedded JMS	-	Yes	-
IBM	IBM WebSphere MQ	-	JMS	Yes	Yes	-
	JBoss MQ	4.x	-	-	-	Yes
JBoss	JBoss Messaging	5.x	-	-	-	Yes
JBoss	HornetQ	-	-	-	-	Yes
	Open MQ	-	-	-	-	-
Mulesoft	Mule ESB	3.4	HTTP	Yes	Yes	-
Oracle	Oracle AQ	-	JMS	-	Yes	-
Oracle / BEA	WebLogic	9.x+	JMS 1.1	Yes	Yes	Yes
Progress	SonicMQ	-	-	-	-	-
Pivotal	RabbitMQ	-	HTTP	-	Yes	-
Rabbit	RabbitMQ Spring Client	-	-	Yes	Yes	-
Spring	Spring Integration	2.2.0	JMS	Yes	Yes	Yes

Message Oriented Middleware Configuration

For message oriented middleware environments that require additional configuration, this section provides some information and links to topics that help you configure the environment. Environments in the Message Oriented Middleware Support table that require additional configuration, link to the configuration table below.

Messaging Server	Topics for Required and Optional Configuration
Apache ActiveMQ	JMS Message Queue Exit Points
Apache Axis	Default exclude rules exist for Apache Axis, Axis2, and Axis Admin Servlets. See also, Web Service Entry Points
Apache Synapse	To enable correlation, set node property enable-soap-header-correlation =true.
IBM MQ	No additional configuration is required. See also, Default Backends Discovered by the App Agent for Java
IBM Web Application Server	No additional configuration is required. See also, JMS Message Queue Exit Points
IBM WebSphere MQ	IBM Websphere MQ Message Queue Exit Points
Mule ESB	Mule ESB Startup Settings Mule ESB Support See also HTTP Exit Points for Java
BEA WebLogic	Oracle WebLogic Startup Settings
Pivotal RabbitMQ	No additional configuration is required. See also, Default Backends Discovered by the App Agent for Java and RabbitMQ Message Queue Exit Points
RabbitMQ Spring Client	No addition configuration is required, See also, Message Queue Exit Points for Java
Spring Integration	Spring Integration Support See also, JMS Message Queue Exit Points

JDBC Drivers and Database Servers Support

These are the known JDBC driver and database server environments in which the App Agent for Java has been used to instrument applications. AppDynamics can follow transactions using these drivers to the designated database.

JDBC Vendor	Driver Version	Driver Type	Database Server	Database Version
Apache	10.9.1.0	Embedded or client	Derby	-
Apache	-	-	Cassandra	-
Progress	DataDirect	data connectivity for ODBC and JDBC driver access, data integration, and SaaS and cloud computing solutions	-	-
IBM	JDBC 3.0 version 3.57.82 or JDBC 4.0 version 4.7.85	DB2 Universal JDBC driver	DB2	9.x
IBM	JDBC 3.0 version 3.66.46 or JDBC 4.0 version 4.16.53	DB2 Universal JDBC driver	DB2	10.1
IBM	-	Type IV	Informix	-
Microsoft	4	Type II	MS SQL Server	2012*
Oracle MySQL, MySQL Community	5.x	Type II, Type IV	MySQL	5.x
Open Source	Connector/J 5.1.27	Type IV	MySQL	5.x
Open Source	-	Type IV	Postgres	8.x, 9.x
Oracle	9.x	Type II, Type IV	Oracle Database	8i+
Sybase	jConnect	Type IV	Sybase	-

Notes:

- Type II is a C or OCI driver
- Type IV is a thin database client and is a pure Java driver

Business Transaction Error Detection

AppDynamics App Agent for Java supports the following logging frameworks for business transaction error detection:

- Log4j

- `java.util.logging`

If you are using a different logger, see [Configuring Error Detection Using Custom Loggers](#).

NoSQL/Data Grids/Cache Servers Support

These are the known NoSQL, data grids and cache server environments in which the App Agent for Java has been used to instrument applications. Some require additional configuration. Click the link on the database, data grid or cache name in the following support matrix for information about additional configuration required or related configuration topics.

Vendor	Database/Data Grid/Cache	Version	Correlation/Entry Points	JMX
Apache	Cassandra (DataStax, REST) and Cassandra CQL3	1.x	Correlation	Yes
Apache	Apache Lucene - Apache Solr	1.4.1	Entry Points	Yes
JBoss	JBoss Cache TreeCache	-	-	-
Terracotta	EhCache	-	-	-
Open Source	Memcached	-	-	-
Open Source	MongoDB	-	-	-
Oracle	Coherence	3.7.1	Custom-Exit	Yes
JBoss	Infinispan	5.3.0+	Correlation	-

NoSQL/Data Grids/Cache Servers Configuration

For NoSQL, data grids, and cache server environments that require additional configuration, this section provides some information and links to topics that help you configure the environment. Environments in the NoSQL/Data Grids/Cache Servers Support table that require additional configuration, link to the configuration table below.

Database/Data Grid/Cache	Topics for Required or Optional Configuration
Apache Cassandra (DataStax, REST) and Cassandra CQL3	Cassandra Exit Points for Java Apache Cassandra Startup Settings Default Backends Discovered by the App Agent for Java
Apache Lucene - Apache Solr	Solr Startup Settings

Database/Data Grid/Cache	Topics for Required or Optional Configuration
JBoss	JBoss Startup Settings
Terracotta EhCache	EhCache Exit Points
Open Source Memcached	Memcached Exit Points
Open Source MongoDB	Configurations for Custom Exit Points for Java
Oracle Coherence	Coherence Startup Settings

Java Frameworks Support

These are the known Java framework environments in which the App Agent for Java has been used to instrument applications. Some require additional configuration. Click the link on the java framework name in the following support matrix for information about additional configuration required or related configuration topics.

Vendor	Framework	Version	SOA protocol (WebServices)	Auto Naming	Entry Points	Exit Points	Detection
Adobe	BlazeDS	-	HTTP and JMS adaptor	-	Yes		-
Adobe	ColdFusion	8.x, 9.x	-	-	Yes	-	Configuration required for transaction discovery
Apache	Cassandra with Thrift framework	-	-	-	Yes	Yes	Apache Thrift Entry and Exit points are detected
Apache	Struts	1.x, 2.x	-	-	Yes		Struts Actions are detected as entry points, struts invocation handler is

Vendor	Framework	Version	SOA protocol (WebServices)	Auto Naming	Entry Points	Exit Points	Detection
							instrumented
Apache	Tapestry	5	-	-	Yes	-	Not by default
	Wicket	-	-	No	Yes	-	Not by default
Apple	WebObjects	5.4.3	HTTP	Yes	Yes	-	Yes
	CometD	2.6	HTTP	Yes	Yes	-	-
Eclipse	RCP (Rich Client Platform)	-	-	-	-	-	-
Google	Google Web Toolkit (GWT)	2.5.1	HTTP	Yes	Yes	-	-
JBoss	JBossWS Native Stack	4.x, 5.x	Native Stack	-	-	-	-
Open Source	Direct Web Remoting (DWR)	-	-	-	-	-	-
Open Source	Enterprise Java Beans (EJB)	2.x, 3.x	-	-	Yes	-	-
Open Source	Grails	-	-	-	Yes	-	Not by default
Open Source	Hibernate JMS Listeners	1.x	-	-	-	-	-
Open Source	Java Abstract Windowing Toolkit (AWT)	-	-	-	-	-	-
Open Source	Java Server Faces (JSF)	1.x	-	Yes	Yes	-	Not by default

Vendor	Framework	Version	SOA protocol (WebServices)	Auto Naming	Entry Points	Exit Points	Detection
Open Source	Java Server Pages	2.x	-	Yes	-	-	Yes
Open Source	Java Servlet API	2.x	-	-	-	-	-
Open Source	Jersey	1.x, 2.x	REST, JAX-RS	Yes	Yes	No	Not by default
Open Source - Google	AngularJS	-	-	-	Yes	-	-
Oracle	Coherence with Spring Beans	2.x, 3.x	-	-	-	-	-
Oracle	Swing (GUI)	-	-	-	-	-	-
Oracle	WebCenter	10.0.2, 10.3.0	-	-	-	-	-
Open Source	JRuby HTTP	-	-	-	Yes	-	Not by default
Spring	Spring MVC	-	-	-	Yes	-	Not by default

Java Frameworks Configuration

For the Java framework environments that require additional configuration, this section provides some information and links to topics that help you configure the environment. Environments in the Java Frameworks Support table that require additional configuration, link to the configuration table below.

Java Framework	Topics for Required or Optional Configuration
Adobe BlazeDS	Message Queue Exit Points for Java
Adobe ColdFusion	Configuration is required for transaction discovery Java Web Application Entry Points

Java Framework	Topics for Required or Optional Configuration
	Servlet Entry Points
Apache Cassandra with Thrift framework	No additional configuration is required. See also, Default Backends Discovered by the App Agent for Java
Apache Struts	Struts Entry Points
Apache Tapestry	Java Web Application Entry Points Servlet Entry Points
Wicket	Java Web Application Entry Points Servlet Entry Points
Apple WebObjects	Business transaction naming can be configured via getter-chains, see Getter Chains in Java Configurations Identify Transactions Based on POJO Method Invoked by a Servlet
CometD	See also, HTTP Exit Points for Java
Open Source Enterprise Java Beans (EJB)	EJB Entry Points
Open Source Hibernate JMS Listeners	No additional configuration is required. See also, Advanced Options in Call Graphs
Open Source Java Server Faces (JSF)	Java Web Application Entry Points and Servlet Entry Points
Open Source Java Server Pages	Servlet Entry Points
Open Source Jersey	JAX-RS Support and node properties: rest-num-segments rest-transaction

Java Framework	Topics for Required or Optional Configuration
	rest-uri-segment-scheme
Open Source JRuby HTTP	Java Web Application Entry Points Servlet Entry Points
Spring MVC	Java Web Application Entry Points Servlet Entry Points

RPC/Web Services API Support

These are the known Java framework environments in which the App Agent for Java has been used to instrument applications. Some require additional configuration. Click the link on the RPC, web services or API framework name in the following support matrix for information about additional configuration required or related configuration topics.

Vendor	RPC/Web Services API Framework	Version	SOA Protocol - WebServices	Auto Naming	Correlation/Entry Points	Exit Points	Configurable BT Naming Properties	Detection
Apache	Apache CXF	2.1	JAX-WS	Yes	Yes	Yes	Yes	Yes
Apache	Apache Commons	-	HTTP Client	Yes	Yes	Yes	-	Yes
Apache	Apache Thrift	-	-	Yes	Yes	Yes	Yes	Yes
IBM	WebSphere	6.x	JAX-RPC	-	-	-	-	-
IBM	WebSphere	7.x	JAX-RPC	-	-	-	-	-
IBM	WebSphere	7.x	IIOP	-	-	-	-	-
JBoss	JBoss	4.x, 5.x	RMI	Yes	Yes	Yes	Yes	Yes

Vendor	RPC/Web Services API Framework	Version	SOA Protocol - WebServices	Auto Naming	Correlation/Entry Points	Exit Points	Configurable BT Naming Properties	Detection
Open Source	java.net. Http	-	HTTP	Yes	-	Yes	Yes	Yes
Oracle	GlassFish Metro	-	JAX-WS	-	-	-	-	-
Oracle	GlassFish Metro with Grails	-	JAX-WS	-	Yes	-	-	Not by Default
Oracle	Oracle Application Server	ORMI	-	no	-	-	-	-
Oracle	WebLogic	10.x	T3, IIOP	Yes	Correlation: Yes, Entry: No	Yes	-	Yes
Oracle	WebLogic	9.x, 10.x	JAX-RPC	-	-	-	-	-
Sun	Sun RMI	-	IIOP	-	Not by Default	-	-	-
-	Web Services	-	SOAP over HTTP	-	Yes	Yes	-	-

RPC/Web Services API Framework Configuration

For the RPC and web service API environment that require additional configuration, this section provides some information and links to topics that help you configure the environment. Environments in the RPC/Web Services API Framework Support table that require additional configuration, link to the configuration table below.

RPC/Web Services API	Topics for Required or Optional Configuration
Apache Commons	HTTP Exit Points for Java
Apache Thrift	Binary Remoting Entry Points for Apache Thrift

RPC/Web Services API	Topics for Required or Optional Configuration
	Default Backends Discovered by the App Agent for Java
IBM WebSphere	IBM WebSphere and InfoSphere Startup Settings , App Agent for Java on z-OS or Mainframe Environments Configuration See also, Unable to browse MBeans on WebSphere Application Server , Default configuration excludes WebSphere classes
JBoss	JBoss and Wildfly Startup Settings
Open Source java.net.Http	HTTP Exit Points for Java
Oracle WebLogic	Oracle WebLogic Startup Settings Default configuration excludes WebLogic classes
Web Services	Create Match Rules for Web Services Web Service Entry Points Web Services Exit Points for Java

Refer:

<https://docs.appdynamics.com/display/PRO14S/Apache+Tomcat+Startup+Settings#ApacheTomcatStartupSettings-SampleTomcat7.xcatalina.batfile>