

**Product / Technology Life Cycle Matrix (JAVA/JEE)**

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This is a sliding window in Calendar years. The date range of the Calendar Year is Jan 1 through Dec 31, and corresponds to industry conventions

Key=Meaning

W=Watch, R=Research, P=Pilot, C=Invest w/Caution, V=Vetoed  
 I=Invest, M=Current/Maintain  
 D=Divest, O=Obsolete

Tool/Technology	Platform	Arch	Kuali	Museum	Usage/Type/Comments	2007	2008	2009	2010	2011	2012
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**Application Platform**

Java 4	cross	X				D					
Java 5	cross	X				C					
Java 6	cross	X				R					

**Languages, Scripting Languages**

Java	cross	X				I					
Groovy	cross	X			Groovy is an agile and dynamic language for the Java Virtual Machine that builds upon the strengths of Java but has additional power features inspired by languages like Python, Ruby and Smalltalk, makes modern programming features available to Java developers with almost-zero learning curve, supports Domain Specific Languages and other compact syntax so your code becomes easy to read and maintain.	R					
JavaFX	cross	X		X	JavaFX Script is a highly productive scripting language that enables content developers to create rich media and content for deployment on Java environments. JavaFX Script is a declarative, statically typed programming language. It has first-class functions, declarative syntax, list-comprehensions, and incremental dependency-based evaluation.	W					
Scala	cross	X		X	Scala is a general purpose programming language designed to express common programming patterns in a concise, elegant, and type-safe way. It smoothly integrates features of object-oriented and functional languages. It is also fully interoperable with Java.	R					
Ruby	cross	X			A dynamic, open source programming language with a focus on simplicity and productivity. It has an elegant syntax that is natural to read and easy to write.	R					

**AOP Frameworks**

Aspectj	cross	X			AspectJ is a seamless aspect-oriented extension to the Java programming language, Java platform compatible and easy to learn and use. AspectJ enables the clean modularization of crosscutting concerns such as: error checking and handling, synchronization, context-sensitive behavior, performance optimizations, monitoring and logging, debugging support, multi-object protocols.	W					
AspectWerkz	cross	X			AspectWerkz is a dynamic, lightweight and high-performant AOP framework for Java	W					
JBossAOP	cross	X			JBoss-AOP allows you to apply interceptor technology and patterns to plain Java classes and Dynamic Proxies.	W					
CaesarJ	cross	X			CaesarJ is a new Java based programming language, which facilitates better modularity and development of reusable components. The components are collaborations of classes, but they can modularize crosscutting features or non-functional concerns.						

**Templating Engines**

<a href="#">Java Emitter Templates</a>	cross				With JET you can use a JSP-like syntax (actually a subset of the JSP syntax) that makes it easy to write templates that express the code you want to generate. JET is a generic template engine that can be used to generate SQL, XML, Java source code and other output from templates.	W					
<a href="#">Formatted Data Set</a>					The FormattedDataSet Java class is the easiest way to generate dynamic text (HTML, XML, WML, CSV, and more). The dynamic text is generated by using tabular data as input (SQL, ResultSets, 2 dimensional arrays and more).						
<a href="#">Velocity</a>	cross				Velocity permits you to use a simple yet powerful template language to reference objects defined in Java code. It is written in 100% pure Java and can be easily embedded into your own applications.	I					

**IDE**

<a href="#">Eclipse</a>	cross	X			An open development platform comprised of extensible frameworks, tools and runtimes for building, deploying and managing software across the lifecycle.	I					
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**UML**

<a href="#">MagicDraw</a>	cross	X	X		UML modeling solution supporting UML 2.0 metamodel and intuitive controls.	I					
<a href="#">Visual Paradigm</a>	cross		X		Visual Paradigm for UML (VP-UML) is a powerful, cross-platform and yet the most easy-to-use visual UML modeling and CASE tool.	W					

**Model Driven Development**

<a href="#">AndroMDA - (MDA/MDSD)</a>	cross	X			One of the most powerful Open Source MDA Generators	I					
<a href="#">Sculptor (DSL/DDD)</a>	cross	X			Sculptor Overview Sculptor is a simple and powerful code generation platform, which provides a quick start to Model Driven Software Development	W					
<a href="#">Eclipse Modelling Framework</a>	cross	X			A modeling framework and code generation facility for building tools and other applications based on a structured data model.	R					

**Build & Migration, Project LifeCycle**

<a href="#">Ant (Used by Maven)</a>	cross	X	X		Apache Ant is a Java-based build tool. In theory, it is kind of like Make, but without Make's wrinkles.	C					
<a href="#">Maven 1</a>	cross				Maven is a software project management and comprehension tool. Based on the concept of a project object model (POM), Maven can manage a project's build, reporting and documentation from a central piece of information.	C					
<a href="#">Maven 2</a>	cross	X	X		Maven is a software project management and comprehension tool. Based on the concept of a project object model (POM), Maven can manage a project's build, reporting and documentation from a central piece of information.	R					
<a href="#">Artefactory</a>					Artefactory is a Maven 2 enterprise repository with advanced features. It is based on JCR (using JackRabbit as the implementation) for artifacts storage and metadata management, with a web UI based on Wicket, and is using Jetty container for fast out-of-the-box startup.						
<a href="#">Virtual Ant</a>	cross	X			Work in a completely virtualized environment similar to Windows Explorer and run your tasks on a Virtual File System to see what they do, in real time, without affecting your real file system. The actual Ant build script is generated in the background.	W					
<a href="#">Eclipse Web Tools Platform</a>	cross	X			The Eclipse Web Tools Platform (WTP) project extends the Eclipse platform with tools for developing Web and Java EE applications.	R					
<a href="#">Java Web Start</a>	cross	X			Using Java Web Start technology, standalone Java software applications can be deployed with a single click over the network.	I					

**Testing/Monitoring**

Canoo WebTest	cross	X			Canoo WebTest is a free open source tool for automated testing of web applications. It calls web pages and verifies results, giving comprehensive reports on success and failure.	I					
Eclipse Test and Performance Tools	cross	X			TPTP provides powerful frameworks and services for an open platform upon which developers build unique test and performance tools—both open source and commercial—that easily integrate with Eclipse and other tools and address the entire test and performance lifecycle, from developer testing through production monitoring.	R					
Fit	cross	X			Framework for Integrated Test. Fit allows customers and testers to use tools like Microsoft Office to give examples of how a program should behave--without being programmers themselves. Fit automatically checks those examples against the actual program, thus building a simple and powerful bridge between the business and software engineering worlds.	R					
FitNesse	cross	X			FitNesse enables customers, testers, and programmers to learn what their software should do, and to automatically compare that to what it actually does do. It compares customers' expectations to actual results.	R					
Glassbox		X			Glassbox is a troubleshooting agent for Java applications that automatically diagnoses common problems.	W					
Jester	cross	X			Jester finds code that is not covered by tests. Jester makes some change to your code, runs your tests, and if the tests pass Jester displays a message saying what it changed. Jester includes a script for generating web pages that show the changes made that did not cause the tests to fail.	W					
Junit	cross	X			JUnit is a regression testing framework used by the developer who implements unit tests in Java.	I					
Selenium	cross	X			Selenium is a test tool for web applications. Selenium tests run directly in a browser, just as real users do. And they run in Internet Explorer, Mozilla and Firefox on Windows, Linux, and Macintosh.	R					
Java Application Monitor					The Java Application Monitor (JAMon) is a free, simple, high performance, thread safe, Java API that allows developers to easily monitor production applications.						
TestNG	cross	X			TestNG is a testing framework inspired from JUnit and NUnit but introducing some new functionalities that make it more powerful and easier to use.	I					

**Business Process Management and Work Flow**

Agila (Apache and Gluecode)	cross		X		Consisting of a lightweight BPM engine and auxiliary services.	W					
BPM 2.0 (Intalio)	cross		X		Intalio BPMS 4.0 is architected around three main ideas: support the latest industry standards for BPM, offer a zero code development approach and provide a one-click deployment life cycle.	W					
BPMScript	cross		X		BpmScript aims to make writing Business Processes simple by handling all of these requirements for you, leaving the only hard part writing the Business Processes themselves (and BpmScript aims to make that as easy as possible too).	W					
jBPM	cross	X	X		JBoss jBPM is a powerful workflow and BPM engine that enables the creation of business processes that coordinate between people, applications and services.	R					
Kuali Enterprise Workflow (KEW)	cross		X		KEW is a general-purpose electronic routing infrastructure or "workflow engine". Client applications use KEW to automate and regulate the routing and approval processes for the transactions/documents they create.	W					
Pi-Calculus for SOA	cross		X		Tools that leverage Pi Calculus to build more robust Service Oriented Architectures (SOA).	W					

**Inversion of Control (IOC)**

Google Guice	cross	X			Guice wholly embraces annotations and generics, thereby enabling you to wire together and test objects with less effort than ever before.	R					
Spring	cross	X	X		Full-stack Java/JEE application framework.	I					

**Rules Engine**

<a href="#">JBoss Rules</a>	cross		X		JBoss Rules is the supported and branded release of the Drools project. Drools provides for Declarative Programming and is flexible enough to match the semantics of your problem domain with Domain Specific Languages.	R					
<a href="#">JESS</a>			X		Jess is small, light, and one of the fastest rule engines available. Its powerful scripting language gives you access to all of Java's APIs.	W					
<a href="#">OpenRules</a>	cross		X		Cuite of open source components for Rules-based Application Development. OpenRules supports rules-based interaction processes with a quick and intuitive GUI generation.	W					

**Service Layer**

<a href="#">EJB 2</a>	cross				Enterprise JavaBeans (EJB) technology is the server-side component architecture for Java Platform, Enterprise Edition (Java EE). EJB technology enables rapid and simplified development of distributed, transactional, secure and portable applications based on Java technology.	D					
<a href="#">EJB 3</a>	cross				Enterprise JavaBeans (EJB) technology is the server-side component architecture for Java Platform, Enterprise Edition (Java EE). EJB technology enables rapid and simplified development of distributed, transactional, secure and portable applications based on Java technology.	R					
<a href="#">Spring</a>	cross				Full-stack Java/JEE application framework.	I					

**Persistence Layer**

<a href="#">Castor JDO</a>	cross		X		Castor is an Open Source data binding framework providing Java-to-XML binding, Java-to-SQL persistence, and more.	W					
<a href="#">Hibernate</a>	cross	X	X		An object/relational persistence and query service. Hibernate lets you develop persistent classes following object-oriented idiom - including association, inheritance, polymorphism, composition, and collections.	I					
<a href="#">Ibatis</a>	cross	X	X		iBATIS is a persistence framework which enables mapping SQL queries to POJOs (Plain Old Java Objects).	R					
<a href="#">Jaxor</a>	cross		X		Jaxor is a code-generating OR mapping tool which takes information defined in XML relating to the relational entities to be mapped and generates classes, interfaces and finder objects which can be used from any Java application.	W					
<a href="#">ObjectRelationalBridge (OBJ)</a>	cross		X		Apache ObjectRelationalBridge (OBJ) is an Object/Relational mapping tool that allows transparent persistence for Java Objects against relational databases.	V					
<a href="#">Spring EJBC</a>	cross				Full-stack Java/JEE application framework.	W					
<a href="#">Torque</a>	cross		X		Torque is an object-relational mapper for java. Torque does not use reflection to access user-provided classes, but it generates the necessary classes (including the Data Objects) from an XML schema describing the database layout	V					
<a href="#">EJB 2</a>	cross		X		Enterprise JavaBeans (EJB) technology is the server-side component architecture for Java Platform, Enterprise Edition (Java EE). EJB technology enables rapid and simplified development of distributed, transactional, secure and portable applications based on Java technology.	D					
<a href="#">EJB 3</a>	cross		X		Enterprise JavaBeans (EJB) technology is the server-side component architecture for Java Platform, Enterprise Edition (Java EE). EJB technology enables rapid and simplified development of distributed, transactional, secure and portable applications based on Java technology.	R					

**Web Application Framework**

<a href="#">Beehive</a>	cross				The initial Beehive project has three pieces. NetUI: An annotation-driven web application programming framework that is built atop Struts. Controls: A lightweight, metadata-driven component framework for building that reduces the complexity of being a client of enterprise resources. Web Service Metadata (WSM): An implementation of JSR 181.	W					
<a href="#">Google Web Toolkit</a>	cross				An open source Java software development framework that makes writing AJAX applications easy for developers who don't speak browser quirks as a second language.	R					
<a href="#">Grails</a>	cross				It's an open-source web application framework that leverages the Groovy language and complements Java Web development. Grails aims to bring the "coding by convention" paradigm to Groovy.	R					
<a href="#">Jboss Seam</a>	cross				Application framework for building next generation Web 2.0 applications by unifying and integrating technologies such as Asynchronous JavaScript and XML (AJAX), Java Server Faces (JSF), Enterprise Java Beans (EJB3), Java Portlets and Business Process Management (BPM).	R					
<a href="#">Spring w/JSF</a>	cross		X		Full-stack Java/JEE application framework.	I					
<a href="#">Struts</a>	cross		X		Open-source framework for creating Java web applications that utilize a MVC architecture.	D					
<a href="#">Tapestry</a>	cross				Tapestry complements and builds upon the standard Java Servlet API, and so it works in any servlet container or application server.	W					
<a href="#">Struts 2 (Web Work)</a>	cross				Built specifically with developer productivity and code simplicity in mind, providing robust support for building reusable UI templates, such as form controls, UI themes, internationalization, dynamic form parameter mapping to JavaBeans, robust client and server side validation, and much more.	W					

**Web UI**

<a href="#">MyFaces/Tomahawk/RichFaces</a>	cross	X			<a href="http://www.exadel.com/web/portal/products/VisualComponentPlatform">http://www.exadel.com/web/portal/products/VisualComponentPlatform</a> Java Server Faces	I					
<a href="#">OpenLaszlo</a>	cross	X			an open source platform for creating zero-install web applications with the user interface capabilities of desktop client software. OpenLaszlo programs are written in XML and JavaScript and transparently compiled to Flash and, with OpenLaszlo 4, DHTML.	R					
<a href="#">Sitemesh</a>	cross	X			SiteMesh uses a Servlet Filter that intercepts the HTML being returned to the web browser, extracting the relevant content and merging it into a template known as the decorator.	I					
<a href="#">Flex</a>	cross	X			Adobe® Flex™ 2 is a cross-platform development framework for creating rich Internet applications (RIAs).	W					

**AJAX Tools**

<a href="#">Icefaces</a>	cross				CEfaces is an integrated Ajax application framework that enables Java EE application developers to easily create and deploy thin-client rich Internet applications (RIA) in pure Java.	W					
<a href="#">Jmaki</a>	cross				Maki is a lightweight client/server framework for creating JavaScript centric Web 2.0 applications using CSS layouts, widgets widget model, client services such as publish/subscribe events to tie widgets together, JavaScript action handlers, and a generic proxy to interact with external RESTful web services.	R					
<a href="#">Ajax4jsf</a>	cross				Ajax4jsf extends JavaServer Faces to add AJAX capability to JSF applications without requiring the writing of any JavaScript.	R					
<a href="#">Google Web Toolkit</a>	cross				An open source Java software development framework that makes writing AJAX applications easy for developers who don't speak browser quirks as a second language.	R					

**Middleware**

<a href="#">Geromino</a>	cross		X		The goal of the Geronimo project is to produce a server runtime framework that pulls together the best Open Source alternatives to create runtimes that meet the needs of developers and system administrators.	W					
<a href="#">Glassfish</a>	cross		X		The main deliverables are an Application Server, the Java EE 5 Reference Implementation, and the Java Persistence API Reference Implementation, TopLink Essentials. The community also delivers Maven Repository, tools and much more.	W					
<a href="#">JBoss 3</a>	cross				A J2EE certified platform for developing and deploying enterprise Java applications, Web applications, and Portals.	OD					
<a href="#">JBoss 4.0.3</a>	cross		X		A J2EE certified platform for developing and deploying enterprise Java applications, Web applications, and Portals.	OD					
<a href="#">JBoss 4.2.0</a>	cross	X			A J2EE certified platform for developing and deploying enterprise Java applications, Web applications, and Portals.	I					
<a href="#">Tomcat 5.5</a>	cross		X		Apache Tomcat is the servlet container that is used in the official Reference Implementation for the Java Servlet and JavaServer Pages technologies.	M					

**Authorization and Authentication**

<a href="#">ACEGI</a>	cross		X		Acegi Security is a powerful, flexible security solution for enterprise software, with a particular emphasis on applications that use Spring.	PI					
<a href="#">CAS</a>	cross		X		CAS provides enterprise single sign on service.	M					
<a href="#">JAAS</a>	cross		X		A set of APIs that enable services to authenticate and enforce access controls upon users. It implements a Java technology version of the standard Pluggable Authentication Module (PAM) framework, and supports user-based authorization.	M					
<a href="#">AWS</a>	cross				The Authentication Web Server (AWS) component allows people and applications to prove their identities to each other in a secure manner over the network by providing centralized web proxy authentication.	D					
<a href="#">Shibboleth</a>	cross				Shibboleth is standards-based, open source middleware software which provides Web Single SignOn (SSO) across or within organizational boundaries.	R					

**Service Registry**

<a href="#">Infravio</a>	cross		X		Registry Repository based Service Oriented Architecture (SOA) Governance Platform.	W					
<a href="#">jUDDI (Apache)</a>	cross		X		jUDDI (pronounced "Judy") is an open source Java implementation of the Universal Description, Discovery, and Integration (UDDI) specification for Web Services.	W					
<a href="#">UDDI Server in Java</a>	cross		X		Consists of an open source java implementation of the UDDI version 2.0 server.	W					

**Portals**

<a href="#">eXo</a>			X		eXo Platform is a set of products that allows to tie together the web and the desktop, the enterprise and consumer digital lives in a coherent platform on which people can build efficient applications such as Contact Managements, Calendars, Business intelligence, CRM, Document Management Systems and many others.	W					
<a href="#">JBoss Portal</a>			X		JBoss Portal provides an open source platform for hosting and serving a portal's Web interface, publishing and managing its content, and customizing its experience.	W					
<a href="#">Jetspeed 2</a>			X		Jetspeed-2 is the next-generation enterprise portal at Apache.	W					
<a href="#">Liferay</a>			X		Open source portal platform that comes bundled with 60+ portlets.	W					
<a href="#">uPortal 2.5</a>			X		uPortal is an open-standard effort using Java, XML, JSP and J2EE.	W					
<a href="#">uPortal 3.0</a>			X		uPortal is an open-standard effort using Java, XML, JSP and J2EE.	W					

**Data Binding Tools**

<a href="#">Castor</a>	cross	X	X		Castor is an Open Source data binding framework providing Java-to-XML binding, Java-to-SQL persistence, and more.	I					
<a href="#">Jaxb (Sun)</a>	cross		X		Java Architecture for XML Binding (JAXB) allows Java developers to create and edit XML using familiar Java objects.	W					
<a href="#">jibx</a>	cross		X		JiBX is a framework for binding XML data to Java objects. It lets you work with data from XML documents using your own class structures.	W					

**Web Services protocols**

<a href="#">REST/XML</a>	cross	X				R					
<a href="#">REST/JSON</a>		X				R					
<a href="#">SOAP</a>	cross	X				I					

**Web Services Framework**

<a href="#">Apache Axis1</a>	cross	X			Apache Axis is an implementation of the SOAP ("Simple Object Access Protocol") submission to W3C.	C					
<a href="#">Apache Axis2</a>	cross	X	X		The new architecture on which Axis2 is based on is more flexible, efficient and configurable in comparison to Axis1.x architecture	R					
<a href="#">Enunciate</a>	cross	X			Enunciate is a Web service deployment framework. Enunciate leverages existing Web service technologies to provide a mechanism to build, package, deploy, and to clearly, accurately deliver your Web service API on the Java platform.	R					
<a href="#">Jboss-WS</a>	cross		X		JBossWS is a JAX-WS compliant web service stack developed to be part of JBoss' Java EE5 offering.	W					
<a href="#">Spring Web Services</a>	cross		X		Spring Web Services aims to facilitate contract-first SOAP service development, allowing for the creation of flexible web services using one of the many ways to manipulate XML payloads.	W					
<a href="#">Sun JAX-WS 2.0</a>	cross		X		The Java API for XML Web Services (JAX-WS) is a Java programming language API for creating web services.	W					
<a href="#">Web Services Invocation Framework</a>	cross	X			The Web Services Invocation Framework (WSIF) is a simple Java API for invoking Web services, no matter how or where the services are provided.	R					
<a href="#">Xfire / Apache CXF</a>	cross	X			Apache CXF is an open source services framework. CXF helps you build and develop services using frontend programming APIs, like JAX-WS.	R					

**Enterprise Service Bus**

<a href="#">Celtix/Atrix by IONA / Apache CXF</a>	cross		X		Apache CXF is an open source services framework. CXF helps you build and develop services using frontend programming APIs, like JAX-WS.	W					
<a href="#">JBoss ESB by JBoss(Red Hat)</a>	cross		X		Aims to provide the standard OSS infrastructure for SOA, use SOA principles internally as well as externally, and be standard compliant.	W					
<a href="#">Kuali Rice</a>	cross		X		The Kuali Rice effort will provide an enterprise class middleware suite of integrated products that will allow both Kuali and non-Kuali applications to be built in an agile fashion.	W					
<a href="#">Mule by Codehaus</a>	cross	X	X		Mule is the leading open source ESB (Enterprise Service Bus) and integration platform. It is a scalable, highly distributable object broker that can seamlessly handle interactions with services and applications using disparate transport and messaging technologies.	R					
<a href="#">Open ESB by Sun</a>	cross		X		Project Open ESB implements an Enterprise Service Bus (ESB) runtime using Java Business Integration as the foundation. This allows easy integration of web services to create loosely coupled enterprise class composite applications.	W					
<a href="#">ServiceMix by Apache</a>	cross	X	X		Apache ServiceMix is an Open Source ESB (Enterprise Service Bus) that combines the functionality of a Service Oriented Architecture (SOA) and an Event Driven Architecture (EDA).	W					

**Relational Database**

DB2	MF					M					
Ingres R3			X			W					
MySQL	cross		X			W					
Oracle	cross	X				I					
PostgreSQL	cross	X	X			R					
SQLServer	Windows					V					
Sybase	cross	X				D					

**Embedded Database (developer's desktop)**

Derby	cross	X			An open source relational database. Derby has a small footprint, is based on the Java, JDBC, and SQL standards, and provides an embedded JDBC driver	R					
Hypersonic	cross	X			HSQLDB is the leading SQL relational database engine written in Java. Best known for its small size, ability to execute completely in memory, its flexibility and speed.	I					

**Non Relational Database**

Caché		X			Object database enabling rapid Web application development, extraordinary transaction processing speed, massive scalability, and real-time queries against transactional data	W					
SleepyCat / Berkeley DB		X			Oracle Berkeley DB is a family of open source, embeddable databases that allows developers to incorporate within their applications a fast, scalable, transactional database engine with industrial grade reliability and availability.	W					

**Reporting/ Business Intelligence**

Eclipse BIRT	cross	X			An open source Eclipse-based reporting system that integrates with your Java/J2EE application to produce compelling reports. Provides core reporting features such as report layout, data access and scripting.	R					
Jasper Reports	cross	X			Consists of a world-class embeddable Java reporting library for developers, a comprehensive XML-based report definition format, and a powerful graphical report design tool for report developers.	I					

**Information Retrieval**

Compass	cross	X			Compass is an open source Java Search Engine Framework, enabling the power of Search Engine semantics to the application stack decoratively. Compass integrates seamlessly to popular development frameworks like Hibernate and Spring.	R					
Hibernate Search	cross	X			Hibernate Search brings the power of full text search engines to the persistence domain model and Hibernate experience, through transparent configuration (Hibernate Annotations) and a common API.	R					
Hibernate Shards	cross	X			Hibernate Shards is a framework that is designed to encapsulate and minimize the complexity of talking to multiple relational databases by adding support for horizontal partitioning to Hibernate Core.	W					
Lucene	cross	X			Apache Lucene is a high-performance, full-featured text search engine library written entirely in Java. It is a technology suitable for nearly any application that requires full-text search, especially cross-platform.	I					
Solr	cross	X			Solr is an open source enterprise search server based on the Lucene Java search library, with XML/HTTP and JSON APIs, hit highlighting, faceted search, caching, replication, and a web administration interface.	W					

**Domain Specific Language**

<a href="#">Antlr / Antlr Studio / AntlrWorks</a>	cross	X			ANother Tool for Language Recognition, is a language tool that provides a framework for constructing recognizers, interpreters, compilers, and translators from grammatical descriptions containing actions in a variety of target languages	R					
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**Visualization/Presentation**

<a href="#">JfreeChart</a>	cross	X			JFreeChart is a free 100% Java chart library that makes it easy for developers to display professional quality charts in their applications.	W					
<a href="#">Java Media APIs</a>	cross	X		X	Support for advanced media capabilities on the Java platform is provided via a suite of optional packages for graphics, image I/O, image processing, and time-based media (video, audio, etc.).	I					
<a href="#">Batik SVG Toolkit</a>	cross	X			Batik is a Java-based toolkit for applications or applets that want to use images in the Scalable Vector Graphics (SVG) format for various purposes, such as display, generation or manipulation.	W					
<a href="#">Itext PDF library</a>	cross	X			iText is an ideal library for developers looking to enhance web- and other applications with dynamic PDF document generation and/or manipulation. iText is not an end-user tool.	R					
<a href="#">Apache POI - Java API to MS format</a>	cross	X			The POI project consists of APIs for manipulating various file formats based upon Microsoft's OLE 2 Compound Document format using pure Java. In short, you can read and write MS Excel files using Java.	W					
<a href="#">GLF – Graphic Layers Framework</a>	cross	X			A high-level programming model to further simplify intricate graphical compositions.	I					

**Utility**

<a href="#">Quartz – Job Scheduler</a>	cross	X			Quartz is an open source, job scheduler for integration with stand-alone java applications and full-scale J2EE applications. Advanced features include clustering and participation in container managed transactions.	I					
<a href="#">Jsch – Java Secure Channel</a>	cross	X			A pure Java implementation of SSH2.	I					
<a href="#">Jakarta Commons Codec</a>	cross	X			Commons Codec provides implementations of common encoders and decoders such as Base64, Hex, Phonetic and URLs.	I					
<a href="#">Jakarta Commons HttpClient</a>	cross	X			The Jakarta Commons HttpClient component seeks to provide an efficient, up-to-date, and feature-rich package implementing the client side of the most recent HTTP standards and recommendations.	I					
<a href="#">Jakarta Commons Logging</a>	cross	X			The Logging package is an ultra-thin bridge between different logging implementations. A library that uses the commons-logging API can be used with any logging implementation at runtime.	I					
<a href="#">BouncyCastle</a>					The Bouncy Castle Crypto APIs for Java provide A lightweight cryptography API, a provider for the Java Cryptography Extension and the Java Cryptography Architecture, a clean room implementation of the JCE 1.2.1, a library for reading and writing encoded ASN,1 objects, a light weight client-side TLS API.						
<a href="#">Time and Money API</a>					This is a project to develop code for manipulating basic concepts in the recurring domains of time and money.						
<a href="#">Enterprise Control-M</a>	cross	X			A graphical tool that provides a focal point of control by consolidating the management of batch processing on all applications and platforms across the enterprise.	I					

**Cache**

<a href="#">Ehcache</a>	cross	X			Ehcache is a widely used java distributed cache for general purpose caching, JEE and light-weight containers.	I					
<a href="#">Oscache</a>	cross	X			OSCache is a caching solution that includes a JSP tag library and set of classes to perform fine grained dynamic caching of JSP content, servlet responses or arbitrary objects.	I					
<a href="#">JBoss Cache</a>	cross	X			JBoss Cache is a product designed to cache frequently accessed Java objects in order to dramatically improve the performance of e-business applications.	R					
<a href="#">JBoss Groups</a>	cross	X				R					

**Geospatial**

<a href="#">NASA World Wind</a>	cross	X		X	World Wind lets you zoom from satellite altitude into any place on Earth. Leveraging Landsat satellite imagery and Shuttle Radar Topography Mission data, World Wind lets you experience Earth terrain in visually rich 3D, just as if you were really there.	R					
<a href="#">Geotools</a>	cross	X		X	Geo Tools is an open source (LGPL) Java code library which provides standards compliant methods for the manipulation of geospatial data, for example to implement Geographic Information Systems (GIS) .	R					

**Semantic Web**

<a href="#">Jena</a>	cross	X		X	Jena is a Java framework for building Semantic Web applications. It provides a programmatic environment for RDF, RDFS and OWL, SPARQL and includes a rule-based inference engine.	P					
<a href="#">Jastor</a>	cross			X	astor is a open source Java code generator that emits Java Beans from Web Ontologies (OWL) enabling convenient, type safe access and eventing of RDF stored in a Jena Semantic Web Framework model.	P					
<a href="#">Life Science Identifiers</a>	cross			X	Life Science Identifiers (LSIDs) are persistent, location-independent, resource identifiers for uniquely naming biologically significant resources including species names, concepts, occurrences, genes or proteins, or data objects that encode information about them.	P					