

akullpp/awesome-java A curated list of awesome frameworks, libraries and software for the Java programming language. by @akullpp - Repository

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Ancients

In existence since the beginning of time, and which people will continue using long after the hype has waned.

- [Apache Ant](#) - Build process management with XML.
- [Apache Hadoop](#) - Storage and large-scale processing of data sets on clusters of commodity hardware.
- [Apache OpenNLP](#) - Toolkit for common tasks like tokenization.
- [Apache Velocity](#) - A template engine for HTML pages, emails or source code generation.
- [FreeMarker](#) - General templating engine with no heavyweight or opinionated dependencies.
- [GlassFish](#) - Application server and reference implementation for Java EE, sponsored by Oracle.
- [GWT](#) - Toolbox that includes a Java-to-JavaScript compiler for client-side code, XML parser, API for RPC, JUnit integration, internationalization support and widgets for the GUI.
- [Hamcrest](#) - Matchers that, when combined, create flexible expressions of intent.
- [HornetQ](#) - Clear, concise, modular and made for embedding.
- [Hudson](#) - Continuous integration server still in active development.
- [Java Modeling Language \(JML\)](#) - Behavioral interface specification language useful for specifying the behavior of code modules. It combines Eiffel's Design by Contract approach with the model-based specification approach of the Larch family of interface specification languages, with some elements of the refinement calculus. Used by several other verification tools.
- [JavaCC](#) - Parser generator with syntactic lookahead.
- [JavaServer Faces](#) - Oracle's open-source implementation of the JSF standard, Mojarra.
- [JavaServer Pages](#) - Common templating for websites with custom tag libraries.
- [JUnit](#) - Common testing framework.
- [Launch4j](#) - Wraps JARs in lightweight and native Windows executables.
- [Quartz](#) - Open-source job scheduler library with Apache 2.0 license.
- [TestNG](#) - Testing framework inspired by JUnit and NUnit, with different functionalities.
- [Trove](#) - High-performance primitive collections.

Bean Mapping

Frameworks that ease bean mapping.

- [Dozer](#) - Mapper that copies data from one object to another using annotations and API or XML configuration.

- [JMapper](#) - Uses byte code manipulation for lightning-fast mapping. Supports annotations and API or XML configuration.
- [MapStruct](#) - Code generator that simplifies mappings between different bean types, based on a convention-over-configuration approach.
- [ModelMapper](#) - Intelligent object mapping library that automatically maps objects to each other.
- [Orika](#) - JavaBean-mapping framework that recursively copies (among other capabilities) data from one object to another.
- [Selma](#) - Annotation processor-based bean mapper.

Build

Tools that handle the build cycle and dependencies of an application.

- [Apache Maven](#) - Declarative build and dependency management that favors convention over configuration. It might be preferable to Apache Ant, which uses a rather procedural approach and can be difficult to maintain.
- [Bazel](#) - Tool from Google that builds code quickly and reliably.
- [Gradle](#) - Incremental builds programmed via Groovy instead of declaring XML. Works well with Maven's dependency management.

Bytecode Manipulation

Libraries to manipulate bytecode programmatically.

- [ASM](#) - All-purpose, low-level bytecode manipulation and analysis.
- [Byte Buddy](#) - Further simplifies bytecode generation with a fluent API.
- [Bytebuddy](#) - Manipulate bytecode at runtime via DSL (rules); mainly for testing/troubleshooting.
- [cglib](#) - Bytecode generation library.
- [Javassist](#) - Tries to simplify bytecode editing.

Caching

Libraries that provide caching facilities.

- [Caffeine](#) - High-performance, near-optimal caching library.
- [Ehcache](#) - Distributed general-purpose cache.
- [Infinispan](#) - Highly concurrent key/value datastore used for caching.

Cluster Management

Frameworks that can dynamically manage applications inside of a cluster.

- [Apache Aurora](#) - Mesos framework for long-running services and cron jobs.
- [Apache Mesos](#) - Abstracts CPU, memory, storage, and other compute resources away from machines.

- [Singularity](#) - Mesos framework that makes deployment and operations easy. It supports web services, background workers, scheduled jobs, and one-off tasks.

Code Analysis

Tools that provide metrics and quality measurements.

- [Checkstyle](#) - Static analysis of coding conventions and standards.
- [Error Prone](#) - Catches common programming mistakes as compile-time errors.
- [FindBugs](#) - Static analysis of bytecode to find potential bugs.
- [Infer](#) - Modern static analysis tool for verifying the correctness of code.
- [jQAssistant](#) - Static code analysis with Neo4J-based query language.
- [PMD](#) - Source code analysis for finding bad coding practices.
- [Sourcetrail](#) ^{! [c]} - Visual source code navigator.
- [Spoon](#) - Library for analyzing and transforming Java source code.

Code Coverage

Frameworks and tools that enable code coverage metrics collection for test suites.

- [Clover](#) ^{! [c]} - Relies on source-code instrumentation instead of bytecode instrumentation.
- [Cobertura](#) - Relies on offline (or static) bytecode instrumentation and class loading to collect code coverage metrics.
- [JaCoCo](#) - Framework that enables collection of code coverage metrics, using both offline and runtime bytecode instrumentation.

Code Generators

Tools that generate patterns for repetitive code in order to reduce verbosity and error-proneness.

- [ADT4J](#) - JSR-269 code generator for algebraic data types.
- [Auto](#) - Generates factory, service, and value classes.
- [FreeBuilder](#) - Automatically generates the Builder pattern.
- [Immutables](#) - Annotation processors to generate simple, safe and consistent value objects.
- [JHipster](#) - Yeoman source code generator for Spring Boot and AngularJS.
- [Joda-Beans](#) - Small framework that adds queryable properties to Java, enhancing JavaBeans.
- [Lombok](#) - Code generator that aims to reduce verbosity.
- [JavaPoet](#) - API to generate source files.

Command-line Argument Parsers

Libraries that make it easy to parse command line options, arguments, etc.

- [Airline](#) - Annotation-based framework for parsing Git-like command-line arguments.

- [args4j](#) - Small library to parse command-line arguments.
- [JCommander](#) - Command-line argument-parsing framework with custom types and validation via implementing interfaces.
- [JOpt Simple](#) - Simple parser that uses the POSIX getopt() and GNU getopt_long() syntaxes. Uses a fluent API instead of annotations.
- [picocli](#) - ANSI colors and styles in usage help. Can be included as source to avoid dependency. Annotation-based, POSIX/GNU/any syntax, subcommands, strong typing for both options and positional args.

Compiler-compiler

Frameworks that help to create parsers, interpreters or compilers.

- [ANTLR](#) - Complex full-featured framework for top-down parsing.
- [JFlex](#) - A lexical analyzer generator.

Configuration

Libraries that provide external configuration.

- [config](#) - Configuration library for JVM languages.
- [ini4j](#) - Provides an API for handling Windows' INI files.
- [KAConf](#) - Annotation-based configuration system for Java and Kotlin.
- [owner](#) - Reduces boilerplate of properties.

Constraint Satisfaction Problem Solver

Libraries that help with implementing optimization and satisfiability problems.

- [Choco](#) - Off-the-shelf constraint satisfaction problem solver that uses constraint programming techniques.
- [JaCoP](#) - Includes an interface for the FlatZinc language, enabling it to execute MiniZinc models.
- [OptaPlanner](#) - Business planning and resource scheduling optimization solver.

CSV

Frameworks and libraries that simplify reading/writing CSV data.

- [Apache Commons CSV](#) - Provides a simple interface for reading and writing CSV files of various types.
- [jackson-dataformat-csv](#) - Jackson extension for reading and writing CSV.
- [opencsv](#) - Simple CSV parser.
- [Super CSV](#) - Powerful CSV parser with support for Dozer, Joda-Time and Java 8.
- [uniVocity-parsers](#) - One of the fastest and most feature-complete parsers. Also comes with parsers for TSV and fixed-width records.

Database

Everything that simplifies interactions with the database.

- [Apache Phoenix](#) - High-performance relational database layer over HBase for low-latency applications.
- [Chronicle Map](#) - Efficient, in-memory (opt. persisted to disk), off-heap key-value store.
- [eXist](#) - A NoSQL document database and application platform.
- [FlexyPool](#) - Brings metrics and failover strategies to the most common connection pooling solutions.
- [Flyway](#) - Simple database migration tool.
- [H2](#) - Small SQL database notable for its in-memory functionality.
- [HikariCP](#) - High-performance JDBC connection pool.
- [JDBI](#) - Convenient abstraction of JDBC.
- [Jedis](#) - Small client for interaction with Redis, with methods for commands.
- [Jest](#) - Client for the Elasticsearch REST API.
- [jetcd](#) - Client library for etcd.
- [Jinq](#) - Typesafe database queries via symbolic execution of Java 8 Lambdas (on top of JPA or jOOQ).
- [jOOQ](#) - Generates typesafe code based on SQL schema.
- [Liquibase](#) - Database-independent library for tracking, managing and applying database schema changes.
- [MapDB](#) - Embedded database engine that provides concurrent collections backed on disk or in off-heap memory.
- [MariaDB4j](#) - Launcher for MariaDB that requires no installation or external dependencies.
- [OrientDB](#) - Embeddable distributed database written on top of Hazelcast.
- [Presto](#) - Distributed SQL query engine for big data.
- [Querydsl](#) - Typesafe unified queries.
- [Realm](#) - Mobile database to run directly inside phones, tablets or wearables.
- [Redisson](#) - Allows for distributed and scalable data structures on top of a Redis server.
- [requery](#) - A modern, lightweight but powerful object mapping and SQL generator. Easily map to or create databases, or perform queries and updates from any Java-using platform.
- [Speedment](#) - Database access library that utilizes Java 8's Stream API for querying.
- [sql2o](#) - Thin JDBC wrapper that simplifies database access and provides simple mapping of ResultSets to POJOs.
- [Vibur DBCP](#) - JDBC connection pool library with advanced performance monitoring capabilities.
- [Xodus](#) - Highly concurrent transactional schema-less and ACID-compliant embedded database.

Data Structures

Efficient and specific data structures.

- [Apache Avro](#) - Data interchange format with dynamic typing, untagged data, and absence of manually assigned IDs.
- [Apache Orc](#) - Fast and efficient columnar storage format for Hadoop-based workloads.
- [Apache Parquet](#) - Columnar storage format based on assembly algorithms from Google's paper on Dremel.
- [Apache Thrift](#) - Data interchange format that originated at Facebook.
- [Big Queue](#) - A big, fast and persistent queue based on memory-mapped files.
- [Persistent Collection](#) - Persistent and immutable analogue of the Java Collections Framework.
- [SBE](#) - Simple Binary Encoding, one of the fastest message formats around.
- [Tape](#) - A lightning-fast, transactional, file-based FIFO.
- [Wire](#) - Clean, lightweight protocol buffers.

Date and Time

Libraries related to handling date and time.

- [Almanac Converter](#) - Simple conversion between different calendar systems.
- [iCal4j](#) - Parse and build iCalendar [RFC 5545](#) data models.
- [Joda-Time](#) - De facto standard date/time-library before Java 8.
- [ThreeTenBP](#) - Port of JSR 310 (java.time package) by the author of Joda-Time.
- [Time4J](#) - Advanced date and time library.

Dependency Injection

Libraries that help to realize the [Inversion of Control](#) paradigm.

- [Apache DeltaSpike](#) - CDI extension framework.
- [Dagger2](#) - Compile-time injection framework without reflection.
- [Feather](#) - Ultra-lightweight, JSR-330-compliant dependency injection library.
- [Governator](#) - Extensions and utilities that enhance Google Guice.
- [Guice](#) - Lightweight and opinionated framework that completes Dagger.
- [HK2](#) - Lightweight and dynamic dependency injection framework.

Development

Augmentation of the development process at a fundamental level.

- [AspectJ](#) - Seamless aspect-oriented programming extension.
- [DCEVM](#) - JVM modification that allows unlimited redefinition of loaded classes at runtime.
- [Faux Pas](#) - Library that simplifies error handling by circumventing the issue that none of the functional interfaces in the Java Runtime is allowed by default to throw checked exceptions.
- [HotswapAgent](#) - Unlimited runtime class and resource redefinition.
- [JavaParser](#) - Parse, modify and generate Java code.

- [JavaSymbolSolver](#) - A symbol solver for Java.
- [JRebel !\[\]](#) - Instantly reloads code and configuration changes without redeploys.
- [NoException](#) - Allows checked exceptions in functional interfaces and converts exceptions to Optional return.
- [Spring Loaded](#) - Class reloading agent.

Distributed Applications

Libraries and frameworks for writing distributed and fault-tolerant applications.

- [Apache Geode](#) - In-memory data management system that provides reliable asynchronous event notifications and guaranteed message delivery.
- [Apache Storm](#) - Realtime computation system.
- [Apache ZooKeeper](#) - Coordination service with distributed configuration, synchronization, and naming registry for large distributed systems.
- [Atomix](#) - Fault-tolerant distributed coordination framework.
- [Axon Framework](#) - Framework for creating CQRS applications.
- [Copycat](#) - Fault-tolerant state machine replication framework.
- [Dropwizard Circuit Breaker](#) - Circuit breaker design pattern for Dropwizard.
- [Failsafe](#) - Simple failure handling with retries and circuit breakers.
- [Hazelcast !\[\]](#) - Highly scalable in-memory datagrid with a free open-source version.
- [Hystrix](#) - Provides latency and fault tolerance.
- [JGroups](#) - Toolkit for reliable messaging and cluster creation.
- [Orbit](#) - Virtual actors; adds another level of abstraction to traditional actors.
- [Quasar](#) - Lightweight threads and actors for the JVM.
- [resilience4j](#) - Functional fault tolerance library.
- [Zuul](#) - A gateway service that provides dynamic routing, monitoring, resiliency, security, and more.

Distributed Databases

Databases in a distributed system that appear to applications as a single data source.

- [Apache Cassandra](#) - Column-oriented and provides high availability with no single point of failure.
- [Apache HBase](#) - Hadoop database for big data.
- [Druid](#) - Real-time and historical OLAP data store that excels at aggregation and approximation queries.
- [Infinispan](#) - Highly concurrent key-value data store used for caching.
- [OpenTSDB](#) - Scalable and distributed time series database written on top of Apache HBase.
- [OrientDB](#) - Embeddable distributed database written on top of Hazelcast.

Distribution

Tools that handle the distribution of applications in native formats.

- [Bintray !\[c\]](#) - Version control for binaries that handle publishing. Compatible with Maven or Gradle, with a free plan for open-source software as well as several business plans.
- [Boxfuse](#) - Deployment of JVM applications to AWS using the principles of immutable infrastructure.
- [Capsule](#) - Simple and powerful packaging and deployment. A fat JAR on steroids, or a "Docker for Java" that supports JVM-optimized containers.
- [Central Repository](#) - Largest binary component repository available as a free service to the open-source community. Default used by Apache Maven, and available in all other build tools.
- [IzPack](#) - Setup authoring tool for cross-platform deployments.
- [JitPack](#) - Easy-to-use package repository for GitHub. Builds Maven/Gradle projects on demand and publishes ready-to-use packages.
- [Nexus !\[c\]](#) - Binary management with proxy and caching capabilities.
- [packr](#) - Packs JARs, assets and the JVM for native distribution on Windows, Linux and Mac OS X.
- [really-executable-jars-maven-plugin](#) - Maven plugin for making self-executing JARs.

Document Processing

Libraries that assist with processing office document formats.

- [Apache POI](#) - Supports OOXML (XLSX, DOCX, PPTX) as well as OLE2 (XLS, DOC or PPT).
- [documents4j](#) - API for document format conversion using third-party converters such as MS Word.
- [docx4j](#) - Create and manipulate Microsoft Open XML files.

Formal Verification

Formal-methods tools: proof assistants, model checking, symbolic execution etc.

- [CATG](#) - Concolic unit testing engine. Automatically generates unit tests using formal methods.
- [Checker Framework](#) - Pluggable type systems. Includes nullness types, physical units, immutability types and more.
- [Daikon](#) - Detects likely program invariants and generates JML specs based on those invariants.
- [Java Path Finder \(JPF\)](#) - JVM formal verification tool containing a model checker and more. Created by NASA.
- [JMLOK 2.0](#) - Detects inconsistencies between code and JML specification through feedback-directed random tests generation, and suggests a likely cause for each nonconformance detected.
- [KeY](#) - Formal software development tool that aims to integrate design, implementation, formal specification, and formal verification of object-oriented software as seamlessly as possible. Uses JML for specification and symbolic execution for verification.
- [OpenJML](#) - Translates JML specifications into SMT-LIB format and passes the proof

problems implied by the program to backend solvers.

Functional Programming

Libraries that facilitate functional programming.

- [cyclops-react](#) - Monad and stream utilities, comprehensions, pattern matching, functional extensions for all JDK collections, future streams, trampolines and much more.
- [derive4j](#) - Java 8 annotation processor and framework for deriving algebraic data types constructors, pattern-matching and morphisms.
- [Fugue](#) - Functional extensions to Guava.
- [Functional Java](#) - Implements numerous basic and advanced programming abstractions that assist composition-oriented development.
- [jOOλ](#) - Extension to Java 8 that aims to fix gaps in lambda by providing numerous missing types and a rich set of sequential Stream API additions.
- [protonpack](#) - Collection of stream utilities.
- [StreamEx](#) - Enhances Java 8 Streams.
- [Vavr](#) - Functional component library that provides persistent data types and functional control structures.

Game Development

Frameworks that support the development of games.

- [jMonkeyEngine](#) - Game engine for modern 3D development.
- [libGDX](#) - All-round cross-platform, high-level framework.
- [LWJGL](#) - Robust framework that abstracts libraries like OpenGL/CL/AL.

Geospatial

Libraries for working with geospatial data and algorithms.

- [Apache SIS](#) - Library for developing geospatial applications.
- [Geo](#) - GeoHash utilities in Java.
- [Geotoolkit.org](#) - Library for developing geospatial applications. Built on top of the Apache SIS project.
- [GeoTools](#) - Library that provides tools for geospatial data.
- [GraphHopper](#) - Road-routing engine. Used as a Java library or standalone web service.
- [H2GIS](#) - A spatial extension of the H2 database.
- [Jgeohash](#) - Library for using the GeoHash algorithm.
- [Mapsforge](#) - Map rendering based on OpenStreetMap data.
- [Spatial4j](#) - General-purpose spatial/geospatial library.

GUI

Libraries to create modern graphical user interfaces.

- [JavaFX](#) - The successor of Swing.
- [Scene Builder](#) - Visual layout tool for JavaFX applications.
- [SWT](#) - The Standard Widget Toolkit, a graphical widget toolkit.

High Performance

Everything about high-performance computation, from collections to specific libraries.

- [Agrona](#) - Data structures and utility methods that are common in high-performance applications.
- [Disruptor](#) - Inter-thread messaging library.
- [Eclipse Collections](#) - Collections framework inspired by Smalltalk.
- [fastutil](#) - Fast and compact type-specific collections.
- [HPPC](#) - Primitive collections.
- [JCTools](#) - Concurrency tools currently missing from the JDK.
- [Koloboke](#) - Hash sets and hash maps.

HTTP Clients

Libraries that assist with creating HTTP requests and/or binding responses.

- [Async Http Client](#) - Asynchronous HTTP and WebSocket client library.
- [Feign](#) - HTTP client binder inspired by Retrofit, JAXRS-2.0, and WebSocket.
- [OkHttp](#) - HTTP+SPDY client.
- [restQL-core](#) - Microservice query language that fetches information from multiple services.
- [Retrofit](#) - Typesafe REST client.
- [Ribbon](#) - Client-side IPC library that is battle-tested in cloud.
- [Riptide](#) - Client-side response routing for Spring's RestTemplate.

Hypermedia Types

Libraries that handle serialization to hypermedia types.

- [JSON-LD](#) - JSON-LD implementation.
- [Siren4j](#) - Library for the Siren specification.

IDE

Integrated development environments that try to simplify several aspects of development.

- [Eclipse](#) - Established open-source project with support for lots of plugins and languages.
- [IntelliJ IDEA !\[c\]](#) - Supports many JVM languages and provides good options for Android development. The commercial edition targets the enterprise sector.
- [NetBeans](#) - Provides integration for several Java SE and EE features, from database access to HTML5.

Imagery

Libraries that assist with the creation, evaluation or manipulation of graphical images.

- [Imgscalr](#) - Simple, efficient and hardware-accelerated image-scaling library implemented in pure Java 2D.
- [Tess4J](#) - A JNA wrapper for Tesseract OCR API.
- [Thumbnailator](#) - High-quality thumbnail generation library.
- [TwelveMonkeys](#) - Collection of plugins that extend the number of supported image file formats.
- [ZXing](#) - Multi-format 1D/2D barcode image processing library.

JSON

Libraries for serializing and deserializing JSON to and from Java objects.

- [Genson](#) - Powerful and easy-to-use Java-to-JSON conversion library.
- [Gson](#) - Serializes objects to JSON and vice versa. Good performance with on-the-fly usage.
- [HikariJSON](#) - High-performance JSON parser, 2x faster than Jackson.
- [Jackson-datatype-money](#) - Open-source Jackson module to support JSON serialization and deserialization of JavaMoney data types.
- [Jackson](#) - Similar to GSON, but offers performance gains if you need to instantiate the library more often.
- [JSON-io](#) - Convert Java to JSON. Convert JSON to Java. Pretty print JSON. Java JSON serializer.
- [jsoniter](#) - Fast and flexible library with iterator and lazy parsing API.
- [LoganSquare](#) - JSON parsing and serializing library based on Jackson's streaming API. Outperforms GSON & Jackson's library.
- [Moshi](#) - Modern JSON library, less opinionated and uses built-in types like List and Map.

JSON Processing

Libraries for processing data in JSON format.

- [fastjson](#) - Very fast processor with no additional dependencies and full data binding.
- [Jolt](#) - JSON to JSON transformation tool.
- [JsonPath](#) - Extract data from JSON using XPATH-like syntax.
- [JsonSurfer](#) - Streaming JsonPath processor dedicated to processing big and complicated JSON data.

JVM and JDK

Current implementations of the JVM/JDK.

- [Avian](#) - JVM with both JIT and AOT modes. Includes an iOS port.
- [JDK 9](#) - Early-access releases of JDK 9.

- [OpenJDK](#) - Open-source implementation for Linux.
- [ParparVM](#) - VM with non-blocking, concurrent GC for iOS.
- [Zulu OpenJDK 9](#) - Early-access OpenJDK 9 builds for Windows, Linux, and Mac OS X.
- [Zulu OpenJDK](#) - OpenJDK builds for Windows, Linux, and Mac OS X through Java 8.

Logging

Libraries that log the behavior of an application.

- [Apache Log4j 2](#) - Complete rewrite with a powerful plugin and configuration architecture.
- [Graylog](#) - Open-source aggregator suited for extended role and permission management.
- [Kibana](#) - Analyzes and visualizes log files. Some features require payment.
- [Logback](#) - Robust logging library with interesting configuration options via Groovy.
- [Logbook](#) - Extensible, open-source library for HTTP request and response logging.
- [Logstash](#) - Tool for managing log files.
- [SLF4J](#) - Abstraction layer/simple logging facade.
- [tinylog](#) - Lightweight logging framework with static logger class.
- [Tracer](#) - Call tracing and log correlation in distributed systems.

Machine Learning

Tools that provide specific statistical algorithms for learning from data.

- [Apache Flink](#) - Fast, reliable, large-scale data processing engine.
- [Apache Mahout](#) - Scalable algorithms focused on collaborative filtering, clustering and classification.
- [Apache Spark](#) - Data analytics cluster-computing framework.
- [DatumBox](#) - Provides several algorithms and pre-trained models for natural language processing.
- [DeepDive](#) - Creates structured information from unstructured data and integrates it into an existing database.
- [Deeplearning4j](#) - Distributed and multi-threaded deep learning library.
- [H2O](#) - Analytics engine for statistics over big data.
- [JSAT](#) - Algorithms for pre-processing, classification, regression, and clustering with support for multi-threaded execution.
- [Oryx 2](#) - Framework for building real-time, large-scale machine learning applications. Includes end-to-end applications for collaborative filtering, classification, regression, and clustering.
- [Smile](#) - The Statistical Machine Intelligence and Learning Engine provides a set of machine learning algorithms and a visualization library.
- [Weka](#) - Collection of algorithms for data mining tasks ranging from pre-processing to visualization.

Messaging

Tools that help send messages between clients to ensure protocol independency.

- [Aeron](#) - Efficient, reliable, unicast and multicast message transport.
- [Apache ActiveMQ](#) - Message broker that implements JMS and converts synchronous to asynchronous communication.
- [Apache Camel](#) - Glues together different transport APIs via Enterprise Integration Patterns.
- [Apache Kafka](#) - High-throughput distributed messaging system.
- [Hermes](#) - Fast and reliable message broker built on top of Kafka.
- [JeroMQ](#) - Implementation of ZeroMQ.
- [Nakadi](#) - Provides a RESTful API on top of Kafka.
- [RocketMQ](#) - A fast, reliable, and scalable distributed messaging platform.
- [Smack](#) - Cross-platform XMPP client library.

Miscellaneous

Everything else.

- [Codename One](#) - Cross-platform solution for writing native mobile (iOS, Android, etc.) apps.
- [CQEngine](#) - Ultra-fast, SQL-like queries on Java collections.
- [Design Patterns](#) - Implementation and explanation of the most common design patterns.
- [Failsafe](#) - Simple failure handling with retries and circuit breakers.
- [FF4J](#) - Feature Flags for Java.
- [J2ObjC](#) - Java-to-Objective-C translator for porting Android libraries to iOS.
- [javaslang-circuitbreaker](#) - Functional fault tolerance library.
- [JavaX](#) - Reinventing and extending Java with a focus on simplicity.
- [JBake](#) - Static website generator.
- [JBot](#) - Framework for building chatbots.
- [Jimfs](#) - In-memory file system.
- [Joda-Money](#) - Basic currency and money classes and algorithms not provided by the JDK.
- [JPad](#) - Snippet runner.
- [Lanterna](#) - Easy console text-GUI library, similar to curses.
- [LightAdmin](#) - Pluggable CRUD UI library for rapid application development.
- [Membrane Service Proxy](#) - An open-source, reverse-proxy framework written in Java.
- [Modern Java - A Guide to Java 8](#) - Popular Java 8 guide.
- [Modernizer](#) - Detect uses of legacy Java APIs.
- [OpenRefine](#) - Tool for working with messy data: cleaning, transforming, extending it with web services and linking it to databases.
- [Polyglot for Maven](#) - Extensions for Maven 3.3.1+ that allows writing the POM model in dialects other than XML.
- [TypeTools](#) - Tools for resolving generic types.

- [Togglez](#) - Implementation of the Feature Toggles pattern.

Microservice

Tools for managing microservices: i.e., creation, coordination or discovery.

- [Apollo](#) - Libraries for writing composable microservices.
- [consul-api](#) - Client for the [Consul](#) API: a distributed, highly available and datacenter-aware registry/discovery service.
- [Eureka](#) - REST-based service registry for resilient load balancing and failover.
- [Lagom](#) - Framework for creating microservice-based systems.

Monitoring

Tools that monitor applications in production.

- [AppDynamics](#) ^{![]{c}} - Performance monitor.
- [Automon](#) - Combines the power of AOP with monitoring and/or logging tools.
- [Glowroot](#) - Open-source Java APM.
- [Instrumental](#) ^{![]{c}} - Real-time Java application performance monitoring. A commercial service with free development accounts.
- [JavaMelody](#) - Performance monitoring and profiling.
- [jmxtrans](#) - Connect to multiple JVMs and query them for their attributes via JMX. Its query language is based on JSON, which allows non-Java programmers to access the JVM attributes. Supports different output writes, including Graphite, Ganglia, and StatsD.
- [Jolokia](#) - JMX over REST.
- [Kamon](#) - Tool for monitoring applications running on the JVM.
- [Metrics](#) - Expose metrics via JMX or HTTP and send them to a database.
- [New Relic](#) ^{![]{c}} - Performance monitor.
- [nudge4j](#) - Remote developer console from the browser for Java 8 via bytecode injection.
- [OverOps](#) ^{![]{c}} - In-production error monitoring and debugging.
- [Pinpoint](#) - Open-source APM tool.
- [Prometheus](#) - Provides a multi-dimensional data model, DSL, autonomous server nodes and much more.
- [SPM](#) ^{![]{c}} - Performance monitor with distributing transaction tracing for JVM apps.
- [Stagemonitor](#) - Open-source performance monitoring and transaction tracing for JVM apps.
- [Sysmon](#) - Lightweight platform monitoring tool for Java VMs.

Native

For working with platform-specific native libraries.

- [JavaCPP](#) - Provides efficient and easy access to native C++.

- [JNA](#) - Work with native libraries without writing JNI. Also provides interfaces to common system libraries.
- [JNR](#) - Work with native libraries without writing JNI. Also provides interfaces to common system libraries. Same goals as JNA, but faster, and serves as the basis for the upcoming [Project Panama](#).

Natural Language Processing

Libraries that specialize in processing text.

- [CogCompNLP](#) - Provides common annotators for plain text input.
- [CoreNLP](#) - Provides a set of fundamental tools for tasks like tagging, named entity recognition, and sentiment analysis.
- [DKPro](#) - Collection of reusable NLP tools for linguistic pre-processing, machine learning, lexical resources, etc.
- [LingPipe](#) - Toolkit for tasks ranging from POS tagging to sentiment analysis.

Networking

Libraries for building network servers.

- [Comsat](#) - Integrates standard Java web-related APIs with Quasar fibers and actors.
- [Finagle](#) - Extensible RPC system for constructing high-concurrency servers. It implements uniform client and server APIs for several protocols, and is protocol-agnostic to simplify implementation of new protocols.
- [Grizzly](#) - NIO framework. Used as a network layer in Glassfish.
- [gRPC](#) - RPC framework based on protobuf and HTTP/2.
- [MINA](#) - Abstract, event-driven async I/O API for network operations over TCP/IP and UDP/IP via Java NIO.
- [Netty](#) - Framework for building high-performance network applications.
- [Nifty](#) - Implementation of Thrift clients and servers on Netty.
- [Undertow](#) - Web server providing both blocking and non-blocking APIs based on NIO. Used as a network layer in WildFly.
- [urnlib](#) - Represent, parse and encode URNs, as in RFC 2141.

ORM

APIs that handle the persistence of objects.

- [Apache Cayenne](#) - Provides a clean, static API for data access. Also includes a GUI Modeler for working with database mappings, and DB reverse engineering and generation.
- [Ebean](#) - Provides simple and fast data access.
- [EclipseLink](#) - Supports a number of persistence standards: JPA, JAXB, JCA and SDO.
- [Hibernate](#) - Robust and widely used, with an active community.
- [MyBatis](#) - Couples objects with stored procedures or SQL statements.

- [SimpleFlatMapper](#) - Simple database and CSV mapper.

PaaS

Java platform as a service.

PDF

Tools to help with PDF file creation.

- [Apache FOP](#) - Creates PDFs from XSL-FO.
- [Apache PDFBox](#) - Toolbox for creating and manipulating PDFs.
- [Dynamic Jasper](#) - Abstraction layer to JasperReports.
- [DynamicReports](#) - Simplifies JasperReports.
- [flyingsaucer](#) - XML/XHTML and CSS 2.1 renderer.
- [iText !\[c\]](#) - Creates PDF files programmatically.
- [JasperReports](#) - Complex reporting engine.

Performance analysis

Tools for performance analysis, profiling and benchmarking.

- [fastThread !\[c\]](#) - Analyze and visualize thread dumps with a free cloud-based upload interface.
- [GCeasy !\[c\]](#) - Tool to analyze and visualize GC logs. It provides a free cloud-based upload interface.
- [honest-profiler](#) - A low-overhead, bias-free sampling profiler.
- [jHiccup](#) - Logs and records platform JVM stalls.
- [JITWatch](#) - Analyze the JIT compiler optimisations made by the HotSpot JVM.
- [JMH](#) - a Java harness for building, running, and analysing nano/micro/milli/macro benchmarks written in Java and other languages targeting the JVM.
- [JProfiler !\[c\]](#) - Database profiling for JDBC, JPA and NoSQL, with JEE support.
- [LatencyUtils](#) - Utilities for latency measurement and reporting.
- [XRebel !\[c\]](#) - Real-time profiling for web applications, with an in-browser widget.
- [YourKit Java Profiler !\[c\]](#) - Profiler for any application running on the JVM.

Platform

Frameworks that are suites of multiple libraries encompassing several categories.

- [CUBA Platform](#) - High-level framework for developing enterprise applications with a rich web interface, based on Spring, EclipseLink and Vaadin.
- [Light-Java](#) - A fast, lightweight and productive microservices framework with built-in security.
- [Orienteer](#) - Open-source business application platform for rapid configuration/development of CRM, ERP, LMS and other applications.
- [Spring](#) - Provides many packages for dependency injection, aspect-oriented

programming, security, etc.

Reactive libraries

Libraries for developing reactive applications.

- [Akka](#) - Toolkit and runtime for building concurrent, distributed, fault-tolerant and event-driven applications.
- [Reactive Streams](#) - Provides a standard for asynchronous stream processing with non-blocking backpressure.
- [Reactor](#) - Library for building reactive fast-data applications.
- [RxJava](#) - Library for composing asynchronous and event-based programs using observable sequences from the JVM.
- [vert.x](#) - Polyglot event-driven application framework.

REST Frameworks

Frameworks specifically for creating RESTful services.

- [Dropwizard](#) - Opinionated framework for setting up modern web applications with Jetty, Jackson, Jersey and Metrics.
- [Jersey](#) - JAX-RS reference implementation.
- [Microserver](#) — A convenient, extensible microservices plugin system for Spring & Spring Boot. With more than 30 plugins and growing, it supports both micro-monolith and pure microservices styles.
- [Rapidoid](#) - A simple, secure and extremely fast framework consisting of an embedded HTTP server, GUI components and dependency injection.
- [rest.li](#) - Framework for building robust, scalable RESTful architectures using typesafe bindings and asynchronous, non-blocking IO with an end-to-end developer workflow that promotes clean practices, uniform interface design and consistent data modeling.
- [RESTEasy](#) - Fully certified and portable implementation of the JAX-RS specification.
- [RestExpress](#) - Thin wrapper on the JBoss Netty HTTP stack that provides scaling and performance.
- [Restlet Framework](#) - Pioneering framework with powerful routing and filtering capabilities, and a unified client and server API.
- [Spark](#) - Sinatra inspired framework.

Science

Libraries for scientific computing, analysis and visualization.

- [DataMelt](#) - Environment for scientific computation, data analysis and data visualization.
- [Erdos](#) - Modular, light and easy graph framework for theoretic algorithms.
- [GraphStream](#) - Library for modeling and analyzing dynamic graphs.
- [JGraphT](#) - Graph library that provides mathematical graph-theory objects and algorithms.

- [JGraphX](#) - Library for visualizing (mainly Swing) and interacting with node-edge graphs.
- [Mines Java Toolkit](#) - Library for geophysical scientific computation, visualization and digital signal analysis.
- [Tablesaw](#) - Includes a data-frame, an embedded column store, and hundreds of methods to transform, summarize, or filter data.

Search

Engines that index documents for search and analysis.

- [Apache Lucene](#) - High-performance, full-featured, cross-platform, text search engine library.
- [Apache Solr](#) - Enterprise search engine optimized for high-volume traffic.
- [Elasticsearch](#) - Distributed, multitenant-capable, full-text search engine with a RESTful web interface and schema-free JSON documents.

Security

Libraries that handle security, authentication, authorization or session management.

- [Apache Shiro](#) - Performs authentication, authorization, cryptography and session management.
- [Bouncy Castle](#) - All-purpose cryptographic library and JCA provider offering a wide range of functions, from basic helpers to PGP/SMIME operations.
- [Cryptomator](#) - Multiplatform, transparent, client-side encryption of files in the cloud.
- [Hdiv](#) - Runtime application that repels application security risks included in the OWASP Top 10, including SQL injection, cross-site scripting, cross-site request forgery, data tampering, and brute force attacks.
- [jjwt](#) - JSON web token for Java and Android.
- [Keycloak](#) - Integrated SSO and IDM for browser apps and RESTful web services.
- [Keyczar](#) - Easy-to-use, safe encryption framework with key versioning.
- [Nbvcxz](#) - Advanced password strength estimation.
- [OACC](#) - Provides permission-based authorization services.
- [pac4j](#) - Security engine.
- [PicketLink](#) - Umbrella project for security and identity management.

Serialization

Libraries that handle serialization with high efficiency.

- [FlatBuffers](#) - Memory-efficient serialization library that can access serialized data without unpacking and parsing it.
- [FST](#) - JDK-compatible, high-performance object graph serialization.
- [Kryo](#) - Fast and efficient object graph serialization framework.
- [MessagePack](#) - Efficient binary serialization format.

Server

Servers specifically used to deploy applications.

- [Apache Tomcat](#) - Robust, all-round server for Servlet and JSP.
- [Apache TomEE](#) - Tomcat plus Java EE.
- [Jetty](#) - Provides a Web server and javax.servlet container, plus support for HTTP/2, WebSocket, OSGi, JMX, JNDI, JAAS and many other integrations.
- [nanohttpd](#) - Tiny, easily embeddable HTTP server.
- [WebSphere Liberty](#) - Lightweight, modular server developed by IBM.
- [WildFly](#) - Formerly known as JBoss and developed by Red Hat with extensive Java EE support.

Template Engine

Tools that substitute expressions in a template.

- [Handlebars.java](#) - Logicless and semantic Mustache templates.
- [Jtwig](#) - Modular, configurable and fully tested template engine.
- [Thymeleaf](#) - Aims to be a substitute for JSP and works for XML files.

Testing

Tools that test from model to the view.

- [Apache JMeter](#) - Functional testing and performance measurements.
- [ArchUnit](#) - Test library for specifying and asserting architecture rules.
- [Arquillian](#) - Integration and functional testing platform for Java EE containers.
- [AssertJ](#) - Fluent assertions that improve readability.
- [Awaitility](#) - DSL for synchronizing asynchronous operations.
- [Burst](#) - A unit testing library for varying test data.
- [Citrus](#) - Integration testing framework that focuses on both client- and server-side messaging.
- [ConcurrentUnit](#) - Toolkit for testing multi-threaded and asynchronous applications.
- [Cucumber](#) - Behavioural Driven Development (BDD) testing framework.
- [Cukes-REST](#) - A collection of Gherkin steps for REST-service testing using Cucumber.
- [Fixture Factory](#) - Generates fake objects from a template.
- [Galen](#) - Layout and functional testing framework for websites.
- [Gatling](#) - Load testing tool designed for ease of use, maintainability and high performance.
- [GreenMail](#) - In-memory email server for integration testing. Supports SMTP, POP3 and IMAP including SSL.
- [J8Spec](#) - Library that allows tests written in Java to follow the BDD style introduced by RSpec and Jasmine.
- [JBehave](#) - Framework for BDD.
- [JFairy](#) - Fake data generator.

- [JGiven](#) - Developer-friendly BDD testing framework compatible with JUnit and TestNG.
- [JMockit](#) - Integration testing, API mocking and faking, and code coverage.
- [JSONAssert](#) - Simplifies testing JSON strings.
- [junit-dataprovider](#) - A TestNG-like data provider/runner for JUnit.
- [JUnitParams](#) - Creates readable and maintainable parametrised tests.
- [Lambda Behave](#) - Descriptive behavioural specification framework.
- [Mockito](#) - Mocking framework that lets you write tests with a clean and simple API.
- [MockServer](#) - Allows mocking of systems integrated with HTTPS.
- [Moco](#) - Concise web services for stubs and mocks; Duke's Choice Award winner (2013).
- [Mutability Detector](#) - Reports whether instances of a given class are immutable.
- [PIT](#) - Fast mutation-testing framework for evaluating fault-detection abilities of existing JUnit or TestNG test suites.
- [pojo-tester](#) - Automatically performs tests on basic POJO methods.
- [PowerMock](#) - Mocks static methods, constructors, final classes and methods, private methods, and removal of static initializers.
- [raml-tester](#) - Tests if a request/response matches a given RAML definition.
- [Randomized Testing](#) - JUnit test runner and plugins for running JUnit tests with pseudo-randomness.
- [REST Assured](#) - Java DSL for easy testing of REST/HTTP services.
- [Selenide](#) - Concise API around Selenium to write stable and readable UI tests.
- [Selenium](#) - Portable software testing framework for web applications.
- [Spock](#) - Developer testing and specification framework for Java and Groovy applications.
- [TestContainers](#) - Provides throwaway instances of common databases, Selenium web browsers, or anything else that can run in a Docker container.
- [WireMock](#) - Stubs and mocks web services.

Utility

Libraries which provide general utility functions.

- [Apache Commons](#) - Provides configuration, validation, collections, file uploading, XML processing and other general-purpose functions.
- [CRA\\$H](#) - Provides a shell into a JVM that's running CRA\$H. Used by Spring Boot and others.
- [Dex](#) - Java/JavaFX tool capable of powerful ETL and data visualization.
- [Embulk](#) - Bulk data loader that helps data transfer between various databases, storages, file formats, and cloud services.
- [Gephi](#) - Cross-platform for visualizing and manipulating large graph networks.
- [Guava](#) - Collections, caching, primitives support, concurrency libraries, common annotations, string processing, I/O, and more.
- [JADE](#) - Framework and environment for building and debugging multi-agent systems.
- [JavaVerbalExpressions](#) - Library that helps with constructing difficult regular expressions.
- [JUnit](#) - A lightweight, pure Java library implementing the Git version control system.

- [minio-java](#) - Provides simple APIs to access any Amazon S3-compatible object storage server.
- [Protégé](#) - Provides an ontology editor and a framework to build knowledge-based systems.
- [Underscore-java](#) - Port of Underscore.js functions.

Version Managers

Utilities that help create the development shell environment and switch between different Java versions.

- [jabba](#) - Java Version Manager inspired by nvm. Supports Mac OS X, Linux and Windows.
- [jenv](#) - Java Version Manager inspired by rbenv. Can configure globally or per project. Tested on Debian and Mac OS X.
- [SDKMan](#) - Java Version Manager inspired by RVM and rbenv. Supports UNIX-based platforms and Windows.

Web Crawling

Libraries that analyze the content of websites.

- [Apache Nutch](#) - Highly extensible, highly scalable web crawler for production environments.
- [Crawler4j](#) - Simple and lightweight web crawler.
- [JSoup](#) - Scrapes, parses, manipulates and cleans HTML.

Web Frameworks

Frameworks that handle the communication between the layers of a web application.

- [Apache Tapestry](#) - Component-oriented framework for creating dynamic, robust, highly scalable web applications.
- [Apache Wicket](#) - Component-based web application framework similar to Tapestry, with a stateful GUI.
- [Blade](#) - Lightweight, modular framework that aims to be elegant and simple.
- [Bootique](#) - Minimally opinionated framework for runnable apps.
- [Grails](#) - Groovy framework that provides a highly productive environment by favoring convention over configuration, no XML and support for mixins.
- [Looby](#) - Scalable, fast and modular micro-framework that offers multiple programming models.
- [Ninja](#) - Full-stack web framework.
- [Pippo](#) - Small, highly modularized, Sinatra-like framework.
- [Play](#) - Built on Akka, it provides predictable and minimal resource consumption (CPU, memory, threads) for highly-scalable applications in Java and Scala.
- [PrimeFaces](#) - JSF framework with both free and commercial/support versions and frontend components.

- Ratpack - Set of libraries that facilitate fast, efficient, evolvable and well-tested HTTP applications.
- Spring Boot - Microframework that simplifies the development of new Spring applications.
- Vaadin - Event-driven framework build on top of GWT. Uses server-side architecture with Ajax on the client side.