

# Java 9 Modularity: First Look

---

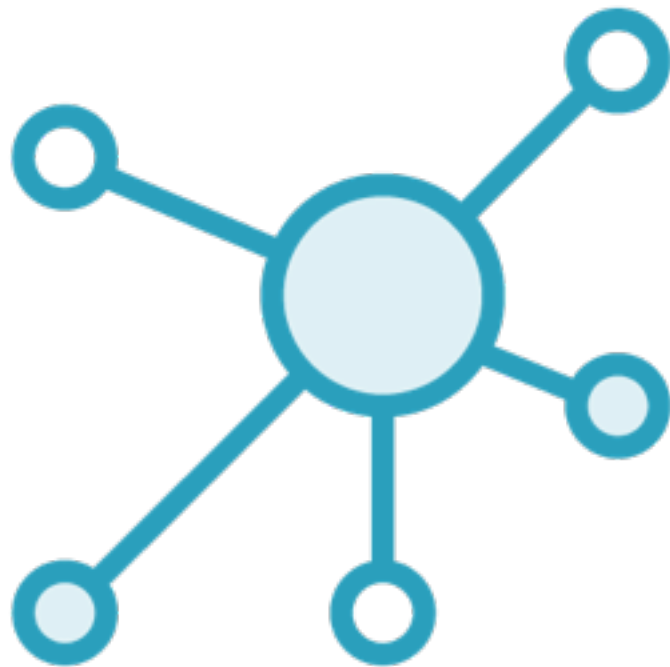
INTRODUCING JAVA 9 MODULARITY



**Sander Mak**

@sander\_mak [www.branchandbound.net](http://www.branchandbound.net)

# Java 9 **Is Coming**



## **Module System**

One of the biggest changes to  
Java ever



## **Additional Features**

HTTP/2 Client, updates to Stream  
APIs, Collection Factories

# Who Is This Course For?

**You ..**

**.. know Java well**

**.. are curious about  
Java 9**

**.. want to learn about  
modularity**



**Introducing Java 9 and Modularity**

**Creating Modules**

**Working With Modules**

**Services in a Modular World**

**The All-new Linking Phase**

**Getting Your Code Ready for Java 9**

# Java 9 Early Access Release



<https://jdk9.java.net/jigsaw/>

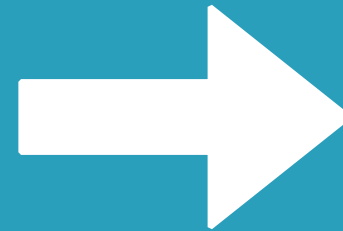


Release date: March 2017

**What** is modularity and  
**why** is it so important?

# Classpath Troubles

```
sbmak 31627 0.0 0.0 4523840 8376 s005 S+ Mon04PM 1:23.12 /Library/Java/JavaVir
tualMachines/jdk1.8.0_60.jdk/Contents/Home/bin/java -server -Xms32m -Xmx512m -cp /usr/local/Cellar/orientdb/2.1.5/libexec/lib/activation-1.1.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/annotati
ons-1.3.2.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/antlr-2.7.7.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/asm-3.2.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/asm-analysis-3.2.jar:/
usr/local/Cellar/orientdb/2.1.5/libexec/lib/asm-commons-3.2.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/asm-tree-3.2.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/asm-util-3.2.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/blueprints-core-2.6.0.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/commons-beanutils-1.7.0.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/commons-beanutils-core-1.8.0.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/commons-collections-3.2.1.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/commons-configuration-1.6.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/commons-csv-1.2.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/commons-digester-1.8.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/commons-lang-2.4.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/commons-logging-1.1.1.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/concurrentlinkedhashmap-lru-1.4.1.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/gremlin-groovy-2.6.0.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/gremlin-java-2.6.0.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/groovy-1.8.9.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/hazelcast-all-3.3.5.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/hibernate-jpa-2.0-api-1.0.0.Final.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/hppc-0.6.0.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/jackson-annotations-2.2.3.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/jackson-core-2.2.3.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/jackson-databind-2.2.3.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/jansi-1.5.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/javassist-3.16.1-GA.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/jettison-1.3.3.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/jline-0.9.94.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/jna-4.0.0.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/jna-platform-4.0.0.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/lucene-analysis-common-4.7.0.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/lucene-core-4.7.0.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/lucene-facet-4.7.0.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/lucene-memory-4.7.0.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/lucene-misc-4.7.0.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/lucene-queries-4.7.0.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/lucene-queryparser-4.7.0.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/lucene-sandbox-4.7.0.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/lucene-spatial-4.7.0.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/mail-1.4.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/minimal-json-0.9.1.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/orientdb-client-2.1.5.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/orientdb-core-2.1.5.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/orientdb-distributed-2.1.5.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/orientdb-enterprise-2.1.5.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/orientdb-etl-2.1.5.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/orientdb-graphdb-2.1.5.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/orientdb-lucene-2.1.5.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/orientdb-object-2.1.5.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/orientdb-server-2.1.5.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/orientdb-tools-2.1.5.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/pipes-2.6.0.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/snappy-java-1.1.0.1.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/spatial4j-0.4.1.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/stax-api-1.0.1.jar:/usr/local/Cellar/orientdb/2.1.5/libexec/lib/tinkerpop-gremlin-groovy-console-Console
sbmak 35871 0.0 0.0 2441988 696 s008 S+ 10:20PM 0:00.00 grep activation
SanderMBP:~ sbmak$
```



**Hard to understand**  
**Decreased maintainability**  
**No flexibility**

Your application:

"Monolith"

"Big Ball of Mud"



Modularity is the  
*ultimate agile tool.*

# What Is a Module?

A module has a **name**, it **groups** related code and is **self-contained**

# JAR Files Are Not the Answer

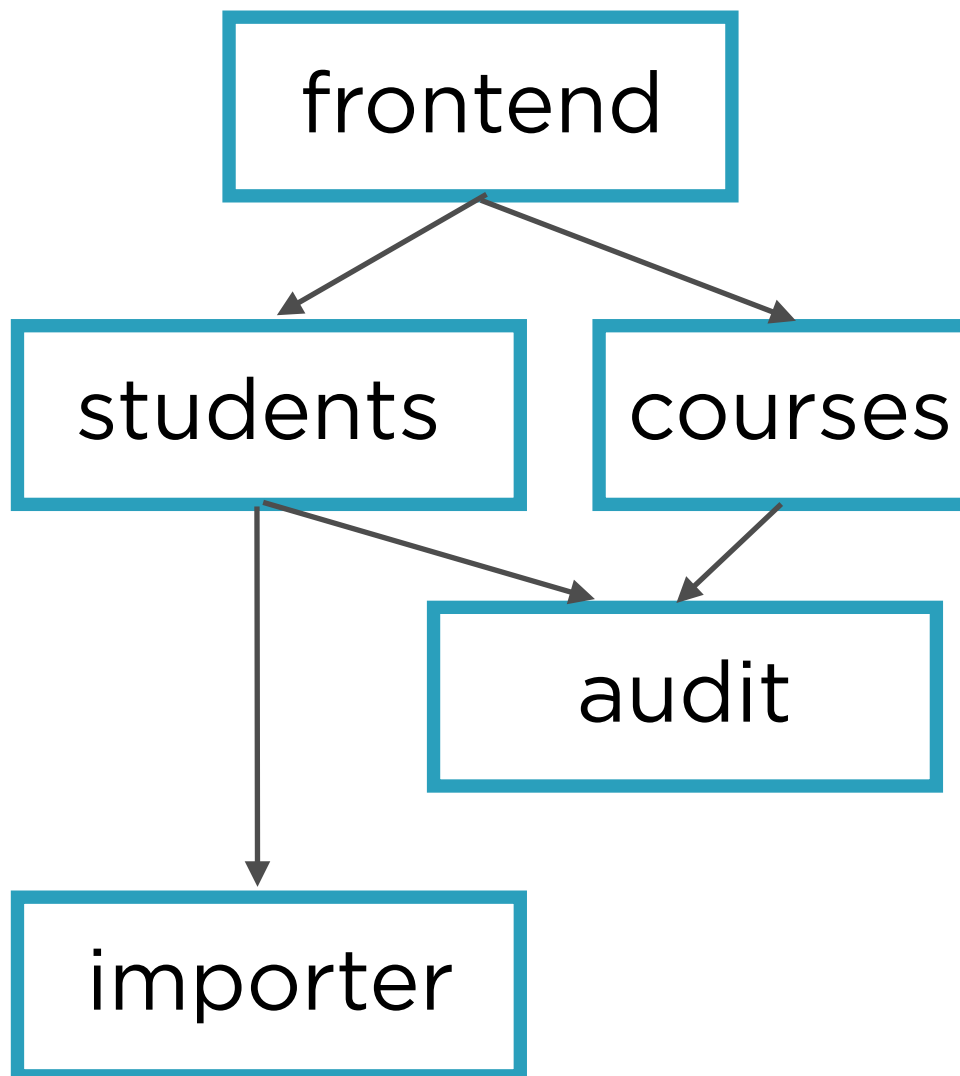


**Has a name**

**Grouping, but no encapsulation**

**Not self-contained**

Your application:



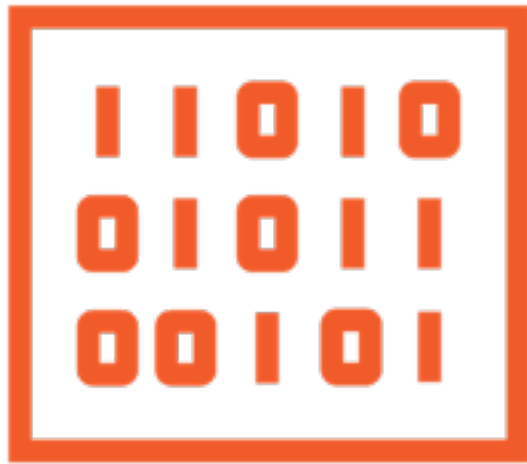
**Divide and Conquer**

**Clear interfacing**

**Hide implementation details**

**Reliable configuration**

# Three Tenets of Modularity



## **Strong Encapsulation**

Hide your internals, be strict about what is public API



## **Well-defined Interfaces**

When modules interact, use stable and well-defined interfaces



## **Explicit Dependencies**

A module lists what it needs from other modules.